UNIVERSIDADE FEDERAL DO PARANÁ

FERNANDA BRUNKOW

Análise do comportamento e evolução cultural: relações entre as propostas conceituais de B. F. Skinner e S. S. Glenn

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Curitiba, 15 de agosto de 2014.

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Fernanda Brunkow

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(Carl Sagan, *Variedades da Experiência Científica*)

RESUMO

Brunkow, F. (2014). *Análise do comportamento e evolução cultural: relações entre as propostas conceituais de B. F. Skinner e S. S. Glenn.* Dissertação de Mestrado. Curitiba: Programa de Pós-Graduação em Psicologia, Universidade Federal do Paraná.

Skinner inclui a cultura como parte do objeto de estudo da Análise do Comportamento e afirma que esta sofre a ação de um terceiro nível de seleção, nomeado evolução cultural. Esta compreensão sobre a evolução cultural é revolucionada em 1986, ocasião em que Glenn introduz sua proposta conceitual envolvendo o conceito de metacontingência. O conceito de metacontingência é identificado por Glenn e por uma parcela da literatura analítico-comportamental como referente a este terceiro nível de seleção; todavia, não ficam imediatamente claras as relações entre esta nova proposta teórica e os conceitos skinnerianos precedentes. O objetivo deste trabalho é indicar tais relações no tratamento dado à evolução cultural. O método desenvolvido parte do pressuposto de que a pesquisa conceitual é comportamento verbal, e que o "referente" de uma resposta deve ser encontrado entre as variáveis que a determinam. Assim, investigamos nos relatos de eventos apresentados pelos próprios autores quais propriedades físicas parecem controlar a emissão dos conceitos relacionados à evolução cultural. Em Skinner, foram selecionados os conceitos de comportamento social, prática cultural, sobrevivência da cultura e evolução cultural, e nos textos de Glenn os conceitos de contingência entrelaçada, produto agregado, sistema receptor e metacontingência. Inicialmente, foram esclarecidas as variáveis que controlam a emissão dos conceitos em cada autor individualmente e, posteriormente, estes dados foram comparados. As relações entre o tratamento dado a evolução cultural foram estabelecidas em três elementos: unidade de seleção, consequência cultural e processo de evolução cultural. Como resultado, identificamos que o conceito de evolução cultural em Skinner é emitido predominantemente em referência a operantes transmitidos, que compõem práticas culturais, selecionadas devido ao favorecimento da sobrevivência física dos membros da cultura. Em Glenn, por sua vez, o termo metacontingência é aplicado a um fenômeno diferente, qual seja: a seleção de determinadas formas de interação devido a consequências comuns, que podem ser automáticas ou socialmente mediadas. Foram encontradas diferenças no tratamento dos autores tanto em relação aos conceitos empregados quanto em consideração aos relatos de eventos que controlavam tais respostas verbais nos três elementos avaliados. Concluiu-se que as propostas conceituais de Skinner e Glenn a respeito da evolução cultural são distintas, mas não incompatíveis. Não obstante, ressaltamos a necessidade de diferenciá-las conceitualmente, considerando que não demonstram estar sob controle dos mesmos fenômenos.

Palavras-chave: análise do comportamento; evolução cultural; metacontingência.

ABSTRACT

Brunkow, F. (2014). *Behavior analysis and cultural evolution: relations between the conceptual proposals of B. F. Skinner and S. S. Glenn*. Master thesis. Curitiba: Programa de Pós-Graduação em Psicologia, Universidade Federal do Paraná.

Skinner includes culture as part of the subject matter of behavior analysis, and asserts that culture undergoes a third kind of selection called cultural evolution. This comprehension about cultural evolution is revolutionized in 1986, when Glenn introduces her conceptual proposal involving the concept of metacontingency. The concept of metacontingency is identified by Glenn and part of the behavior analysis literature as referring to this third kind of cultural selection; nevertheless, the relations between this new proposal and previous Skinnerian concepts aren't immediately obvious. The aim of this study is to indicate those relations in the treatment given by both authors to cultural evolution. The method here developed relies on the assumption that conceptual research is verbal behavior, and that the "reference" of a verbal response must be found among the variables that determine it. Given this, we investigated which physical properties seem to control the emission of concepts related to cultural evolution in the reports of both authors. From Skinner's reports we selected the concepts of social behavior, cultural practice, cultural survival and cultural evolution, while interlocked contingencies, aggregate product, receiving system and metacontingency were selected from Glenn's. Initially, variables which control the emission of the concepts were clarified and, after that, this data were compared. The relations between the treatment given by the authors to cultural evolution were established based on three elements: unity of selection, cultural consequence and cultural evolution process. As a result, we identified that, for Skinner, the concept of cultural evolution is mainly emitted in reference to transmitted operants, which compose cultural practices that are selected because they favor the physical survival of the members of the culture. For Glenn, on the other hand, the term metacontingency is applied to a different phenomenon - that is, the selection of specific forms of interaction due to common consequences, which can be either automatic or socially mediated. Differences were found in the treatment given by the authors regarding both the concepts employed and the reports of events that controlled the verbal responses in the three elements we analysed. It was concluded that the conceptual proposals of Skinner and Glenn about cultural evolution are distinct, although not incompatible. Nonetheless, we emphasize the necessity of differentiate them conceptually, considering that they do not appear to be under control of the same phenomena.

Keywords: behavior analysis; cultural evolution; metacontingency.

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Introdução

B. F. Skinner (1904-1990), principal teórico da Análise do Comportamento e fundador do Behaviorismo Radical, incluiu os fenômenos culturais como parte do objeto de estudo da Análise do Comportamento desde muito cedo (e.g., 1948, 1953, 1959). Já em 1948, com a publicação de seu livro "Walden II", romance sobre uma comunidade utópica baseada em princípios filosóficos e tecnológicos fundamentados pela Análise do Comportamento, Skinner concebe a ciência não só como um meio de produzir uma vida mais feliz e produtiva para o indivíduo, mas que, de uma forma mais abrangente e desafiadora, incluiria a preocupação em promover a sobrevivência das culturas.

Alguns anos mais tarde, em "Ciência e Comportamento Humano" (1953) Skinner dedica-se extensivamente à investigação de fenômenos sociais. Entre os assuntos tratados neste livro destacam-se: o comportamento de pessoas em grupo, as agências controladoras do comportamento e o planejamento de uma cultura. A Análise do Comportamento passa a demonstrar uma capacidade teórica promissora para a análise e intervenção em contextos mais amplos. Assim, fenômenos sociais e culturais são considerados não somente parte do que se busca explicar para a previsão e controle do comportamento individual, mas estudar e intervir na cultura constitui por si parte do escopo de uma ciência do comportamento. Nas palavras de Skinner:

> The deliberate manipulation of the culture is therefore itself a characteristic of many cultures - a fact to be accounted for in a scientific analysis of human behavior. Proposing a change in a cultural practice, making such a change, and

> accepting such a change are all parts of our subject matter. (Skinner, 1953/2014, p. 427)

Embasando as propostas de intervenção da Análise do Comportamento está o modelo de seleção por consequências (Skinner, 1981/1987b), que prevê a ação de variáveis selecionadoras em três níveis de análise distintos, porém complementares. O primeiro destes níveis, a filogênese, refere-se às contingências de sobrevivência responsáveis pela seleção natural das espécies; o segundo nível, a ontogênese, diz respeito às contingências de reforçamento responsáveis pelo repertório adquirido por seus membros, incluindo contingências especiais mantidas por um ambiente social evoluído, que compõem o terceiro nível de seleção.

A evolução das culturas torna-se um nível especial de análise devido à produção de outro tipo de consequência. De acordo com Skinner, "it is the effect on the group, not the reinforcing consequences for the individual members, that is responsible for the evolution of the culture." (Skinner, 1981/1987b, p. 54). As práticas de uma cultura não se mantêm apenas por serem reforçadoras para os membros de grupo, mas porque "contribute to the survival of the group and are perpetuated because they do so" (Skinner, 1984/1987d, p. 74).

Apesar de Skinner recorrer à contingência de reforçamento como a tecnologia oferecida pela Análise do Comportamento para a intervenção em escala social e conferir à Antropologia (Skinner, 1981/1987b, p. 54) a tarefa de investigar o nível cultural com mais afinco, muitos analistas do comportamento buscaram integrar estas duas áreas de conhecimento. Entre os autores que se dedicaram a este propósito, a autora que provavelmente mais se destacou foi Sigrid S. Glenn. Em mais de 20 anos de publicações, Glenn apresentou conceitos que promoveram uma nova perspectiva sobre

o estudo das culturas na Análise do Comportamento, na qual "as unidades mínimas que descrevem práticas culturais tornam-se mais complexas" (Andery, 2011, p. 209).

O conceito de metacontingência de Glenn é introduzido em 1986 com o artigo *Metacontingencies in Walden Two*, no qual a autora analisa a seleção de práticas culturais em sociedades. Ao longo de suas publicações, Glenn refina o conceito de metacontingência e a descreve como constituída por contingências comportamentais entrelaçadas, seu produto agregado e o sistema receptor (Glenn & Malott, 2004, p. 100; Vichi, Andery & Glenn, 2009). Apesar de utilizar conceitos inéditos, Glenn reiteradamente (Glenn, 1986, p. 2, 1988, p. 169; Glenn & Malagodi, 1991b, p. 5) relata estar tratando dos mesmos fenômenos indicados por Skinner no terceiro nível de seleção – isto é, a evolução cultural: "I later realized I was translating into daily events, or perhaps clarifying for myself, Skinner's distinction between the selection of operant behavior in individuals and the selection of cultural practices in societies" (Glenn, 1986, p. 2). Esta identificação entre o conceito de metacontingência e o fenômeno entendido como evolução cultural em Skinner também é observada constantemente no restante da literatura analítico-comportamental envolvendo a metacontingência (e.g., Caldas, 2013; Todorov, 2006; Vasconcelos, 2013; Vieira, Woelz & Glenn, 2012).

Desde seu surgimento, o conceito de metacontingência de Glenn tem impulsionado muitas discussões teóricas (e.g., Andery & Sério, 1997/2005; Carrara, 2006; Hounmanfar & Rodrigues, 2006), tentativas de interpretação de fenômenos sociais (e.g., Andery, Michelleto & Sério, 2005; Martone & Banaco, 2005; Todorov, Moreira & Prudêncio, 2004) e, nos últimos sete anos, pesquisas experimentais (e.g., Borba, Silva, Cabral, Leite & Tourinho, 2014; Leite, 2009; Morford & Cihon, 2013; Vichi, Andery & Glenn, 2009) e quase-experimentais (Sampaio, 2008) envolvendo a noção de evolução cultural na Análise do Comportamento. À luz dos conceitos de

Glenn, analistas do comportamento retomaram o olhar para questões sociais, buscando ampliar a capacidade de análise e intervenção sobre um contexto mais amplo.

A despeito do crescente volume de trabalhos voltados à evolução cultural sob esta nova perspectiva, não fica imediatamente claro quais são as contribuições oferecidas pela proposta da autora em relação aos conceitos skinnerianos precedentes. Embora o conceito de metacontingência proposto por Glenn seja inspirado no terceiro nível de seleção de Skinner e busque promover avanços e refinamentos no estudo da cultura pela Análise do Comportamento, é possível perguntar de que forma isso efetivamente ocorre. Se não estão claras para os analistas do comportamento diferenças e similaridades entre estas propostas teóricas, publicações envolvendo estes autores podem estar desconsiderando incoerências relevantes entre elas, utilizando conceitos diferentes ao tratar de fenômenos semelhantes ou, ainda, deixando de esclarecer em que sentido as ferramentas conceituais de Glenn produzem mudanças no estudo da evolução cultural.

Considerando a relevância da noção de evolução cultural na Análise do Comportamento, a utilização do conceito de metacontingência por analistas do comportamento e a falta de clareza acerca das mudanças envolvidas na compreensão do terceiro nível de seleção a partir da proposta de Glenn, a presente pesquisa busca responder a seguinte questão: quais as relações entre os tratamentos de Skinner e Glenn para a evolução cultural? Como resultado, espera-se tornar as relações entre o estudo da evolução cultural em Skinner e Glenn mais claras para os analistas do comportamento, enriquecendo discussões conceituais e análises experimentais no âmbito cultural.

Método

1. Considerações Preliminares

A produção do conhecimento na Análise do Comportamento é representada por Tourinho (1999) através de um triângulo epistêmico. Tourinho sugere que os vértices do triângulo corresponderiam às três áreas de pesquisa na análise do comportamento, a saber: conceitual[1] (behaviorismo radical), empírica (análise experimental do comportamento) e aplicada (análise aplicada do comportamento). Através do triângulo epistêmico, o autor indica que trabalhos conceituais, pesquisas empíricas e trabalhos de intervenção constituem áreas cujas produções guardam sempre relações entre elas.

Com relação às áreas de pesquisa apontadas por Tourinho (1999), a presente pesquisa encontra-se próxima ao vértice da pesquisa conceitual, ou behaviorismo radical, ao investigar propostas teóricas voltadas à evolução cultural. Como Tourinho (1999) enfatiza, porém, um trabalho validado na Análise do Comportamento, mesmo que se localize mais próximo de determinado vértice, sempre dialoga, em algum grau, com as demais áreas de pesquisa. A pesquisa conceitual, então, não se encontra desvinculada das demais áreas de produção do conhecimento, mas é estabelecida por Skinner como condição para a instalação de programas de pesquisa e para o desenvolvimento da pesquisa empírica, regulando-a permanentemente e sendo também regulada por seus resultados. Portanto, não há trabalho conceitual na análise do comportamento que não se articule, em alguma medida, com programas de investigação empírica e com demandas relativas à solução de problemas humanos (Tourinho, 1999).

[1] Existem diversas expressões na literatura da Análise do Comportamento para o que chamaremos aqui de "pesquisa conceitual" como, por exemplo, "pesquisa teórica", "pesquisa reflexiva" ou "pesquisa filosófica". Por convenção, neste trabalho será utilizada sempre a expressão "pesquisa conceitual".

Ao encontro desta argumentação, Andery (2010) descreve a Análise do Comportamento como um "conjunto de práticas de uma comunidade" (os analistas do comportamento) e seus produtos. Estas práticas envolvem as maneiras de fazer pesquisa e os seus resultados, ou seja, envolvem a pesquisa científica que serve de base e fundamento para a produção de corpo de conhecimento teórico e de explicações (comportamento verbal) sobre o comportamento e, então, para o desenvolvimento de técnicas, procedimentos e tecnologias de intervenção que são aplicadas para a solução de problemas envolvendo comportamentos (Andery, 2010, p. 319).

Em conformidade com Tourinho, portanto, para Andery (2010) estas três áreas de pesquisa são práticas de analistas do comportamento distintas, mas necessariamente permeadas uma pelas outras. Dentro destas possibilidades de pesquisa, a pesquisa conceitual é distinguida como o comportamento verbal dos cientistas sobre as próprias pesquisas que, por sua vez, também são comportamentos (Andery, 2010).

Segundo Andery (2010), a pesquisa conceitual se diferencia em relação a outros tipos de pesquisa na Análise do Comportamento em sua base de dados. Entre os métodos de pesquisa desta ciência, tem-se a "pesquisa de base empírica" em contraste com a "pesquisa de base documental". A primeira inclui pesquisas observacionais e a segunda envolve pesquisas cujos dados são produtos de comportamento verbal acumulado. Apesar desta diferenciação, a autora defende que na Análise do Comportamento a pesquisa conceitual também depende da coleta de dados, e neste sentido também tem "base empírica". Se em uma investigação conceitual os dados são produtos de comportamento verbal acumulado, é, então, o comportamento verbal dos autores que se coloca como objeto deste estudo. Analisá-los, não obstante, inclui a análise das complexas contingências de reforçamento que os controlam (Skinner, 1984/1988, p. 523).

Em 1945, Skinner expõe sua teoria sobre a interpretação de termos psicológicos, na qual os significados destes termos são investigados através das contingências que lhes dão origem. Nas palavras do autor,

> Significados, conteúdos e referentes devem ser encontrados entre os determinantes, não entre as propriedades, da resposta. A questão, "O que é comprimento?" parece ser satisfatoriamente respondida listando as circunstâncias sob as quais a resposta "comprimento" é emitida (ou, melhor, dando alguma descrição geral destas circunstâncias). (Skinner, 1945/1988, p. 548)

Assim, Skinner (1945/1988, p. 548) aponta para duas variáveis que devem ser investigadas ao estudar o comportamento verbal: primeiramente, qual a condição específica de estimulação sob os quais os termos psicológicos são empregados (o que corresponde a "encontrar referentes") e segundo, porque cada resposta é controlada por sua condição correspondente.

Um exemplo simples do processo descrito por Skinner, é a emissão da resposta "vermelho". Segundo Skinner (1957, p. 117), ao emiti-la o falante não se refere a um "conceito de vermelho" ou a "vermelhidão" de algo. A comunidade verbal "não reforça uma resposta quando um 'conceito' está presente; o que está presente é um estímulo particular" (Skinner, 1957, p. 117). Em uma ciência empírica, como a Análise do Comportamento, a propriedade correlacionada com o reforço deve ser especificada em termos físicos, afirma Skinner (1957, p. 117). Consequentemente, sugerir uma análise de conceitos relacionados à evolução cultural requer determinar quais propriedades físicas parecem controlar a emissão da resposta verbal "prática cultural" ou "metacontingência". Conforme argumentaremos adiante, uma possibilidade para tal

investigação consiste na análise do próprio relato dos autores sobre essas condições de estimulação.

De acordo com Skinner (1957, pp.418-421), na história da ciência, pode-se traçar o desenvolvimento de práticas verbais especialmente voltadas ao bom êxito da ação. Para tanto, a comunidade científica encoraja o controle de estímulo preciso do objeto ou propriedade de um objeto identificado ou caracterizado, de tal forma que a ação prática será mais eficaz. É necessário não somente assegurar a precisão do comportamento verbal, mas estabelecer práticas que esclareçam a relação entre uma resposta verbal dada a um estímulo verbal e as circunstâncias não verbais responsáveis por ela. Skinner (1957, p. 421) explica que o falante é quem está em condições de esclarecer as relações entre seu comportamento verbal e as contingências que o controlam, uma vez que o ouvinte geralmente não entra em contato com estas. Quando um falante diz a palavra "light" (que pode ser emitida em resposta a um objeto de pouco peso ou à radiação visível), exemplifica Skinner (1957, pp. 420-421), é possível que o ouvinte aja em relação à condição ambiental errada. Assim, o falante original estaria na posição de fornecer, por exemplo, autoclíticos apropriados que possam indicar ao leitor sob quais condições de estimulação o falante está emitindo aquela resposta, dizendo: "Eu disse 'light' no sentido de 'não pesado'" (Skinner, 1957, p.421). Uma vez que o falante pode fornecer ao leitor dados mais precisos sobre as condições de estimulação que controlam seu comportamento, torna-se viável uma análise indireta da condição de estimulação que produz uma resposta através do relato do próprio falante - no caso desta pesquisa, através dos textos dos autores.

Nos trabalhos de Skinner e Glenn é possível notar algumas descrições de eventos que controlaram ou controlariam a resposta de emissão dos conceitos relacionados à evolução cultural no próprio texto dos autores. Ao fornecer informações

sobre quais condições de estimulação, ainda que hipotéticas, controlam a emissão que o autor faz de um conceito, o comportamento do autor serve como modelo para o leitor; é possível inferir a função de indicar sob que condições o leitor também deveria fazê-lo.

Os relatos das condições de estimulação que controlam o comportamento verbal dos autores encontram-se presentes em descrições de eventos, reais ou hipotéticos, que produziriam condições de estimulação apropriada para a emissão de um conceito ser reforçada. Ainda através dos textos dos autores, é possível identificar tais condições nas indicações de colaboração de suas propostas conceituais para ações práticas mais efetivas no contexto cultural. É o caso dos exemplos, reais e hipotéticos, de intervenções culturais fundamentadas conceitualmente por estas propostas que produziram ou supostamente produziriam resultados satisfatórios.

É importante destacar que múltiplas variáveis controlam a emissão de qualquer resposta (Skinner, 1957, p. 229) e que a presente análise limita-se a um tipo específico destas variáveis, que são os eventos reais e hipotéticos expostos nos textos dos autores. Portanto, as interpretações dadas ao material e as conclusões deste trabalho baseiam-se na descisão metodológica que elege esta e não outras possíveis fontes de controle do comportamento verbal dos autores.

2. Método em Pesquisa Conceitual na Análise do Comportamento

Embora a pesquisa conceitual na Análise do Comportamento não conte com o rigor metodológico presente, por exemplo, na pesquisa experimental a tentativa de Tourinho (2010) de criar um método específico para estudos denominados "conceituais", "filosóficos" ou "reflexivos" traz avanços metodológicos significativos ao padronizar etapas para busca, seleção e tratamento destes dados. Dada a relevância

da proposta metodológica do autor para trabalhos conceituais, a presente pesquisa buscará cumprir sistematicamente cada etapa sugerida por Tourinho (2010).

Em sua proposta, Tourinho (2010) apresenta a seguinte sequência de decisões metodológicas a serem tomadas em pesquisas conceituais: definição do problema de pesquisa; especificação das informações relevantes; seleção do material; levantamento de informações; e tratamento das informações. Cada etapa encontra-se individualmente delineada abaixo.

2.1 Definição do problema de pesquisa.

O presente trabalho busca responder a seguinte questão: quais as relações entre os tratamentos de Skinner e Glenn para a evolução cultural?

2.2 Especificação das informações relevantes.

O tema evolução cultural é bastante amplo, tornando indispensável circunscrever conceitos específicos para que a análise pretendida possa ser realizada. Como o intuito da pesquisa é relacionar as propostas conceituais de Skinner e Glenn para descrição do processo de evolução cultural, foram identificados os principais conceitos utilizados pelos autores ao tratar do terceiro nível de seleção.

Embora não haja consenso sobre quais os conceitos necessários ou relevantes para a descrição da evolução cultural nos textos de Skinner ou Glenn, as descrições da evolução cultural nos textos dos autores incluem, de forma geral, alguns conceitos específicos utilizados para estudar o fenômeno. Quatro destes conceitos presentes na obra de cada autor foram selecionados por serem avaliados como suficientes para o propósito da pesquisa.

Nos textos de Skinner sobre evolução cultural, foram identificados os conceitos de (1) comportamento social, (2) prática cultural, (3) sobrevivência da cultura[2] e (4) evolução cultural. Em Glenn[3], por sua vez, os conceitos identificados foram: (1) contingências comportamentais entrelaçadas, (2) produto agregado, (3) sistema receptor e (4) metacontingência. Os textos selecionados deveriam abordar especificamente tais conceitos.

2.3 Seleção do material.

As informações relevantes foram buscadas em fontes classificadas em duas categorias: (a) publicações de Skinner, (b) publicações de Glenn. Cada categoria será detalhada a seguir.

a. Publicações de Skinner

A fonte (a) foi escolhida porque o objetivo geral deste trabalho é identificar relações entre os conceitos propostos pelo autor e por Glenn para o estudo da evolução cultural na Análise do Comportamento. Consideramos que a melhor forma de fazê-lo é recorrendo à fonte primária, ou seja, diretamente aos trabalhos do autor no idioma original.

A obra de Skinner é extensa, e discute a evolução cultural em vários momentos. Para tornar a presente pesquisa viável, foi necessário estabelecer alguns critérios de seleção. Foram incluídos apenas textos publicados em livros. Além disso, optou-se por recorrer apenas às obras publicadas a partir do livro *Science and Human Behavior*. Este livro, publicado em 1953, foi escolhido como ponto de partida para a

[2] O termo sobrevivência da cultura não é apresentado de forma consistente na obra de Skinner, podendo referir-se à solução dos problemas da cultura (1974, p. 205) ou à sobrevivência física do grupo (1984/1987e, p. 74), por exemplo. Este assunto será discutido com mais profundidade ao longo deste trabalho.

[3] Considerando os refinamentos conceituais realizados pela autora desde 1986, para a seleção de conceitos foi utilizado como referência o último texto com a co-autoria de Glenn sobre metacontingências (Vichi, Andery & Glenn, 2009).

seleção de textos por se tratar da obra a partir da qual Skinner passa a utilizar conceitos analítico-comportamentais para descrever e analisar uma série de fenômenos sociais.

Nos livros publicados a partir desta data, as seguintes palavras-chave que indicam a provável presença da temática de interesse foram empregadas: *cultural*, *culture*, *cultures*, *cultural practice(s)*, *future*, *evolution*, *society* e *social*. Todos os livros ou capítulos de livro que apresentassem uma ou mais palavras-chave no título, índice ou resumo do texto foram pré-selecionados. No caso das obras de Skinner que tiveram um ou mais capítulos selecionados, foram buscados outros capítulos que pudessem ter relação com o tema através da leitura de alguns de seus parágrafos. Em seguida, todos os textos pré-selecionados foram lidos, tendo sido selecionados apenas aqueles relevantes para a presente pesquisa – ou seja, os que discutissem os conceitos de prática cultural, sobrevivência da cultura e evolução cultural.

A listagem bibliográfica completa dos textos de Skinner selecionados encontra-se abaixo.

Tabela 1: Bibliografia de B. F. Skinner selecionada.

Nº	**Referência**
1.	Skinner, B. F. (2005a). Can science help? In B. F. Skinner, *Science and human behavior* (pp.3-10). The B. F. Skinner Foundation. (Trabalho original publicado em 1953)
2.	Skinner, B. F. (2005b). Social Behavior. In B. F. Skinner, *Science and human behavior* (pp.297-312). The B. F. Skinner Foundation. (Trabalho original publicado em 1953)
3.	Skinner, B. F. (2005c). Personal Control. In B. F. Skinner, *Science and human behavior* (pp.313-322). The B. F. Skinner Foundation. (Trabalho original publicado em 1953)
4.	Skinner, B. F. (2005d). Group Control. In B. F. Skinner, *Science and human behavior* (pp.323-329). The B. F. Skinner Foundation. (Trabalho original publicado em 1953)
5.	Skinner, B. F. (2005e). Government and law. In B. F. Skinner, *Science and human behavior* (pp.333-349). The B. F. Skinner Foundation. (Trabalho original publicado em 1953)

6.	Skinner, B. F. (2005f). Religion. In B. F. Skinner, *Science and human behavior* (pp.350-358). The B. F. Skinner Foundation. (Trabalho original publicado em 1953)
7.	Skinner, B. F. (2005g). Psychotherapy. In B. F. Skinner, *Science and human behavior* (pp.359-383). The B. F. Skinner Foundation. (Trabalho original publicado em 1953)
8.	Skinner, B. F. (2005h). Economic Control. In B. F. Skinner, *Science and human behavior* (pp.384-401). The B. F. Skinner Foundation. (Trabalho original publicado em 1953)
9.	Skinner, B. F. (2005i). Education. In B. F. Skinner, *Science and human behavior* (pp.402-412). The B. F. Skinner Foundation. (Trabalho original publicado em 1953)
10.	Skinner, B. F. (2005j). Culture and control. In B. F. Skinner, *Science and human behavior* (pp.415-426). The B. F. Skinner Foundation. (Trabalho original publicado em 1953)
11.	Skinner, B. F. (2005k). Designing a culture. In B. F. Skinner, *Science and human behavior* (pp.426-437). The B. F. Skinner Foundation. (Trabalho original publicado em 1953)
12.	Skinner, B. F. (2005l). The problem of control. In B. F. Skinner, *Science and human behavior* (pp.437-451). The B. F. Skinner Foundation. (Trabalho original publicado em 1953)
13.	Skinner, B. F. (1972a). Freedom and control of men. In B. F. Skinner (Ed.), *Cumulative Record: A selection of papers* (pp.3-19). New York: Appleton-Century-Crofts. (Trabalho original publicado em 1956)
14.	Skinner, B. F. (1972b). The control of human behavior. In B. F. Skinner (Ed.), *Cumulative Record: A selection of papers* (pp.19-25). New York: Appleton-Century-Crofts. (Trabalho original publicado em 1955)
15.	Skinner, B. F. (1972c). Some issues concerning human behavior. In B. F. Skinner (Ed.), *Cumulative Record: A selection of papers* (pp.25-39). New York: Appleton-Century-Crofts. (Trabalho original publicado em 1959)
16.	Skinner, B. F. (1972d). The design of cultures. In B. F. Skinner (Ed.), *Cumulative Record: A selection of papers* (pp.39-51). New York: Appleton-Century-Crofts. (Trabalho original publicado em 1961)
17.	Skinner, B. F. (1972e). Man. In B. F. Skinner (Ed.), *Cumulative Record: A selection of papers* (pp.51-58). New York: Appleton-Century-Crofts.
18.	Skinner, B. F. (1972f). The design of experimental communities. In B. F. Skinner (Ed.), *Cumulative Record: A selection of papers* (pp.58-69). New York: Appleton-Century-Crofts.
19.	Skinner, B. F. (1972g). Why are the behavioral sciences not more effective? In B. F. Skinner (Ed.), *Cumulative Record: A selection of papers* (pp.421-429). New York: Appleton-Century-Crofts.
20.	Skinner, B. F. (1972h). Two "synthetic social relations". In B. F. Skinner (Ed.), *Cumulative Record: A selection of papers* (pp.533-537). New York: Appleton-

	Century-Crofts.
21.	Skinner, B. F. (1969a) The role of the environment. In B. F. Skinner, *Contingencies of reinforcement: A theoretical analysis* (pp.3-28). New York: Appleton-Century-Crofts.
22.	Skinner, B. F. (1969b) Utopia as an experimental culture. In B. F. Skinner, *Contingencies of reinforcement: A theoretical analysis* (pp.29-49). New York: Appleton-Century-Crofts.
23.	Skinner, B. F. (1971a). A technology of behaviour. In B. F. Skinner, *Beyond freedom and dignity* (pp.9-31). New York: Pelican Books.
24.	Skinner, B. F. (1971b). The evolution of a culture. In B. F. Skinner, *Beyond freedom and dignity* (pp.126-143). New York: Pelican Books.
25.	Skinner, B. F. (1971c). The design of a culture. In B. F. Skinner, *Beyond freedom and dignity* (pp.143-180). New York: Pelican Books.
26.	Skinner, B. F. (1971d). What is man? In B. F. Skinner, *Beyond freedom and dignity* (pp.180-211). New York: Pelican Books.
27.	Skinner, B. F. (1978a). Human behavior and Democracy. In B. F. Skinner (Ed.), *Reflections on behaviorism and society* (pp. 3-16). Englewood Cliffs, NJ: Prentice-Hall. (Trabalho original publicado em 1973)
28.	Skinner, B. F. (1978b). Are we free to have a future? In B. F. Skinner (Ed.), *Reflections on behaviorism and society* (pp. 16-32). Englewood Cliffs, NJ: Prentice-Hall. (Trabalho original publicado em 1973)
29.	Skinner, B. F. (1978c). The ethics of helping people. In B. F. Skinner (Ed.), *Reflections on behaviorism and society* (pp. 33-48). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1973)
30.	Skinner, B. F. (1978d). Humanism and behaviorism. In B. F. Skinner (Ed.), *Reflections on behaviorism and society* (pp. 48-56). Englewood Cliffs, NJ: Prentice-Hall. (Trabalho original publicado em 1973)
31.	Skinner, B. F. (1978e). Walden two revisited. In B. F. Skinner (Ed.), *Reflections on behaviorism and society* (pp.56-67). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1973)
32.	Skinner, B. F. (1978f). Can we profit from our discovery of behavioral science? In B. F. Skinner (Ed.), *Reflections on behaviorism and society* (pp. 83-97). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1973)
33.	Skinner, B. F. (1978g). Walden (One) and Walden Two. In B. F. Skinner (Ed.), *Reflections on behaviorism and society* (pp. 188-195). Englewood Cliffs, NJ: Prentice-Hall. (Trabalho original publicado em 1973)
34.	Skinner, B. F. (1978h). Freedom and dignity revisited. In B. F. Skinner (Ed.), *Reflections on behaviorism and society* (pp. 195-199). Englewood Cliff: Prentice-Hall. (Trabalho original publicado em 1973)
35.	Skinner, B. F. (1974a) The self and the others. In B. F. Skinner, *About behaviorism* (pp. 166-188). New York: Alfred A. Knopf.
36.	Skinner, B. F. (1974b) The question of control. In B. F. Skinner, *About behaviorism* (pp. 189-207). New York: Alfred A. Knopf.

37.	Skinner, B. F. (1987a). Why we are not acting to save the world? In B. F. Skinner, *Upon further reflection* (pp. 1-15). Englewood Cliffs: Prentice-Hall.
38.	Skinner, B. F. (1987b). What is wrong with daily life in the western world? In B. F. Skinner, *Upon further reflection* (pp.15-33). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado e 1986)
39.	Skinner, B. F. (1987c). News from nowhere, 1984. In B. F. Skinner, *Upon further reflection* (pp.33-51). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1984)
40.	Skinner, B. F. (1987d). Selection by consequences. In B. F. Skinner, *Upon further reflection* (pp.51-64). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1981)
41.	Skinner, B. F. (1987e). The evolution of behavior. In B. F. Skinner, *Upon further reflection* (pp.65-74). Englewood Cliffs: Prentice-Hall. (Trabalho original publicadoem 1984)
42.	Skinner, B. F. (1987f). The evolution of verbal behavior. In B. F. Skinner, *Upon further reflection* (pp.75-93). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1986)
43.	Skinner, B. F. (1987g). The contrived reinforcer. In B. F. Skinner, *Upon further reflection* (pp.173-185). Englewood Cliffs: Prentice-Hall.
44.	Skinner, B. F. (1989a). Genes and behavior. In B. F. Skinner, *Recent issues in the analysis of behavior* (pp. 49-56). Columbus: Merrill. (Trabalho original publicado em 1988)
45.	Skinner, B. F. (1989b). New preface to beyond freedom and dignity. In B. F. Skinner, *Recent issues in the analysis of behavior* (pp. 113-120). Columbus: Merrill.

b. Publicações de Glenn

As publicações de Glenn são relevantes por motivos semelhantes à seleção da fonte (a). Da mesma forma que na seleção anterior, optou-se consultar a fonte primária.

Para a consulta aos trabalhos de Glenn, primeiramente foi utilizado *website* pessoal e profissional da mesma (sirgridglenn.org). No ícone "Vita" encontra-se disponibilizado o currículo da mesma, que contém uma lista detalhada de livros e artigos publicados pela autora ou com sua colaboração. Contudo, este se encontrava desatualizado, tornando necessário buscar uma fonte complementar de informações

recentes. Ainda no *website* da autora, no ícone "Publications"[4] há uma lista, - menos completa que a disponível no currículo, entretanto, mais atual, - com as publicações da autora por ano desde 1986. A publicação de 1986 é o artigo seminal do conceito de metacontingência, a partir do qual novos conceitos foram incorporados à explicação dos fenômenos culturais na Análise do Comportamento. Portanto, esta pesquisa se restringiu apenas aos trabalhos da autora publicados desde esta data.

Os textos foram pré-selecionados pela presença de determinadas palavras-chave no título e/ou resumo. Foram utilizadas as palavras-chave já mencionadas na fonte (a) e adicionadas outras especificamente relacionadas com a proposta de Glenn, quais sejam: *metacontingency*, *metacontingencies* e *interlocking contingencies*. Todos os textos pré-selecionados foram lidos integralmente e foram selecionados somente aqueles que abordassem conceitos e pesquisas empíricas envolvendo o estudo da cultura na Análise do Comportamento, resultando na seguinte lista bibliográfica:

Tabela 2: Bibliografia de S. S. Glenn selecionada

Nº	**Referência**
1.	Glenn, S. S. (1986). Metacontingencies in Walden Two. *Behavior Analysis and Social Action, 6*, 2-8.
2.	Glenn, S. S. (1988). Contingencies and metacontingencies: Toward a synthesis of behavior analysis and cultural materialism. *The Behavior Analyst, 11*, 161-179.
3.	Glenn, S. S. (1989). Verbal behavior and cultural practices. *Behavior Analysis and Social Action, 7*, 10-14.
4.	Glenn, S. S. (1991) Contingencies and metacontingencies: Relations among behavioral, cultural, and biological evolution. In P. A. Lamal (Ed.), Behavioral Analysis of Societies and Cultural Practices (pp. 39-73). Washington: Hemisphere Press.
5.	Glenn, S. S., &Malagodi, E. F. (1991). Process and Content in Behavioral and Cultural Phenomena. *Behavioral and Social Issues, 1*, 1-14.

[4] O texto *Windows onthe 21st Century* constava no ícone "Publications" do *website* da autora com a data de publicação de 2003 e no ícone "Vita" 1993. Após a busca do artigo, foi confirmada a publicação em 1993, conforme indica a lista bibliográfica apresentada na tabela 2.

6.	Glenn, S. S. (2003). Windows on the 21st Century. *The Behavior Analyst, 16*, 133-151.
7.	Glenn, S. S. (2001). On The design of cultures: 1961-2001. *Behavior and Social Issues, 11,* 14-15.
8.	Glenn, S. S. (2003). Behavioral contingencies and the origins of culture. In K. A. Lattal, & P. N. Chase (Eds.). Behavior Theory & Philosophy. Plenum Press.
9.	Glenn, S. S. (2004). Individual Behavior, Culture, and Social Change. *The Behavior Analyst, 27*, 133-151.
10.	Glenn, S. S., & Malott, M. E. (2004). Complexity and Selection: Implications for Organizational Change. *Behavior and Social Issues, 13*, 89-106.
11.	Malott, M. E., & Glenn, S. S. (2006). Targets of Intervention in Cultural and Behavioral Change. *Behavior and Social Issues, 15*, 31-56.
12.	Vichi, C., Andery, M. A., Glenn, S. S. (2009). A Metacontingency Experiment: The Effects of Contingent Consequences on Patterns of Interlocking Contingencies of Reinforcement. *Behavior and Social Issues, 18,* 1-17.

2.4 Levantamento de informações.

Concluída a leitura dos textos selecionados, foram elaboradas categorias de registro, que são as classes de informações necessárias para responder o problema de pesquisa.

Primeiramente, para que fosse possível realizar a análise das relações entre conceitos propostos e condições de estimulação relatadas pelos autores, foi necessário indicar tais dados. A partir das considerações preliminares apresentada, cada conceito selecionado foi classificado em duas subcategorias: (a) conceito proposto e (b) relato dos estímulos controladores dos conceitos enquanto respostas verbais. A subcategoria (a) indicava o conceito selecionado enquanto a (b) apresentava o relato de condições, hipotéticas ou experimentais, nas quais a resposta verbal (o conceito proposto) é ou deveria ser reforçada, bem como indicações de exemplos, reais e hipotéticos, de intervenções culturais fundamentadas por tais conceitos.

Após a formulação das categorias de registro, os trechos selecionados foram arquivados em tabelas e associados à categoria correspondente. Um mesmo trecho de

texto pôde ser arquivado em mais de uma categoria. Os trechos selecionados foram categorizados conforme o seguinte exemplo:

Tabela 3: Modelo de categoria de registro.

CATEGORIAS DE REGISTRO SKINNER			
L	**T**	**C**	**REFERENCIA**
2	**1**	**3S4S**	... Resembles the decision of the citizens of Samuel Butler's Erewhon, where the instruments and products of science were put into museums - as vestiges of a stage in the evolution of human culture which did not survive. (p.5)
3	**2**	**1S**	Social behavior may be defined as the behavior of two or more people with respect to one another or in concert with respect to a common environment. (p.297)

Na tabela 3, a coluna L indica o número da linha, a T o número do texto de acordo com a tabela apresentada no tópico 2.3. e a C o conceito selecionado (a). Em relação à coluna C, a letra "S" indica que o texto possui autoria de Skinner e "G" de Glenn. A numeração, por sua vez, corresponde aos conceitos selecionados para o estudo previamente indicados no tópico 2.2. Finalmente, a coluna REFERENCIA apresenta o relato de condições na qual o conceito está sendo utilizado.

Os conceitos selecionados em Skinner e Glenn (a) muitas vezes não se encontravam mencionados diretamente no trecho de relato de estímulos controladores dos conceitos enquanto respostas verbais (b) categorizados. Deste modo, foi necessário ampliar os critérios para não restringir os dados da pesquisa. Assim, foram incluídos parágrafos que indicassem a presença de conceitos relacionados pelo autor como equivalentes ou parte de um dos conceitos selecionados. Por exemplo, além do conceito de comportamento social, parágrafos mencionando conceitos como estímulo social, lei social e episódio social também foram contemplados em 1S.

2.5 Tratamento das informações.

Segundo Tourinho (2006), embora o processo de coleta de dados já seja regulado por hipóteses formuladas desde a construção do problema de pesquisa, há um momento posterior em que se trata menos de coletar informações e mais de tornar tais informações inteligíveis. Na presente pesquisa, a formulação das categorias de análise requereu o estabelecimento de relações entre relatos de estímulos controladores, ou relatos de eventos (b), e os conceitos selecionados enquanto respostas verbais (a).

Considerando que nem todos os trechos mencionavam o conceito diretamente e que o relato de eventos controladores nem sempre era descrito claramente, as relações estabelecidas com base no material foram realizadas com diferentes graus de precisão, a serem expostos e discutidos ao longo do texto. Os relatos de estímulos controladores dos conceitos propostos pelos autores foram agrupados didaticamente em algumas classes de análise principais e gerais, compostas por classes secundárias e específicas que compõem os itens dos dois primeiros capítulos deste trabalho. Neste primeiro momento, a análise buscou identificar sob controle de quais relatos de eventos (b) os conceitos selecionados foram utilizados pelos autores em suas publicações.

Foi possível identificar a aplicação de um mesmo conceito (a) a diferentes classes de relatos de eventos e a classes de relatos de eventos incompatíveis. Em relação ao segundo caso, aplicação a classes de relatos de eventos incompatíveis foi considerada como refinamento ou inconsistência conceitual. Consideramos que houve refinamento conceitual quando as classes de relatos de eventos incompatíveis eram decorrentes de uma alteração conceitual sinalizada e aplicada consistentemente nos textos publicados a partir da data em que tal alteração foi indicada. Nestas situações, as classes de relatos incompatíveis eram analisadas, porém, só a mais recente era considerada representativa da posição do autor. Já quando a alteração não era sinalizada explicitamente ou quando classes de relatos de eventos incompatíveis que controlavam a emissão de um conceito

continuaram a ser apresentadas simultaneamente, a aplicação do conceito foi considerada inconsistente. Nestes casos, os empregos incompatíveis dos conceitos foram analisados criticamente.

No terceiro capítulo, os conceitos propostos pelos autores foram relacionados, considerando-se três elementos: unidade de seleção cultural, consequência cultural e processo de evolução cultural. A análise buscou identificar: (1) se o mesmo conceito ou conceitos que supostamente deveriam tratar do mesmo fenômeno eram utilizados em referência aos mesmos relatos de eventos (por ex., o conceito de prática cultural utilizado por Skinner e Glenn) e (2) se relatos de eventos agrupados nas mesmas classes eram tratados pelos mesmos conceitos (por ex., o comportamento cooperativo presente em *Cooperating Pigeons* e *A Metacontingency Experiment*).

1. Evolução Cultural em B. F. Skinner

1.1 O Conceito de Comportamento Social

Em suas obras, Skinner identifica diversos fenômenos como possíveis eventos controladores para a emissão do conceito de comportamento social. Na tentativa de agrupá-los em uma única definição capaz de abranger todas as peculiaridades dos fenômenos descritos pelo autor, nota-se que a primeira definição de comportamento social apresentada por Skinner na literatura selecionada já revela antecipadamente alguma informação sobre conjuntos de eventos compreendidos por este conceito. Nas palavras de Skinner (linha: 2): "social behavior may be defined as the behavior of two or more people with respect to one another or in concert with respect to a common environment".

Embora uma definição geral possa ser um passo inicial na identificação do fenômeno em questão, faz-se necessário identificar variáveis específicas que possam controlar a emissão do conceito de forma mais precisa para que o leitor fique sob controle dos estímulos adequados. Para os objetivos presentes, este processo envolveu analisar exemplos de situações descritas como sociais e, posteriormente, identificar estímulos peculiares presentes em cada uma delas. Como produto desta análise, formulou-se determinadas classes específicas agrupadas nos tópicos subseqüentes.

1.1.1 Comportamento social como comportamento de X como variável para o comportamento de outro(s) organismo(s).

Os episódios mais simples de comportamento social descritos por Skinner provavelmente são aqueles que envolvem variáveis de um organismo que chamaremos de "X" sobre o comportamento de um ou mais indivíduos. Nestes casos, o comportamento do indivíduo "X" afeta um ou mais indivíduos, mas o oposto não ocorre – ou seja, os outros indivíduos não são variáveis controladoras relevantes para o comportamento de "X". Exemplos deste tipo de comportamento social são infrequentes na obra skinneriana e podem ser encontrados em alguns relatos de eventos descrevendo imitação (linhas: 29, 177, 308, 362, 428, 429, 434, 451, 452, 455, 467, 468, 469). Alguns tipos de imitação, de acordo com Skinner (linha: 177), elucidam a emergência do comportamento social a partir de antecedentes não-sociais.

> For example, if organism A sees organism B running in obvious alarm, A will probably avoid aversive consequences by running in the same direction. Or, if A sees B picking and eating ripe berries, A will probably be reinforced for approaching the same berry patch. Thousands of instances of this sort compose a general contingency providing for the reinforcement of doing-as-others-do. (linha: 177)

No exemplo acima, o organismo "B" está sob controle de outros elementos do ambiente que não "A", enquanto "A" está sendo controlado por "B" apresentando o comportamento imitativo. Pode-se dizer que neste episódio o comportamento de "A" é social, pois "B" está sendo uma variável que controla seu comportamento. Entretanto, o comportamento do organismo imitado "B" em relação ao "A" não é social.

Embora Skinner não especifique com clareza as variáveis em operação, é possível que os eventos apresentados como modelação filogenética (linhas: 432, 451,

469, 471) também integrem este tipo de episódio social. A modelação filogenética ocorre quando o imitador comporta-se de tal forma que possa ser mais facilmente imitada. Todavia, o padrão é herdado filogeneticamente e não requer que o modelador esteja sob controle do comportamento do imitador, como pode ser observado no seguinte exemplo:

> Once imitation has evolved, contingencies prevail for the evolution of modeling. If, for example, young birds learn to fly sooner when they imitate their parents, they are more likely to survive if the parents fly in conspicuous, easily imitated ways. (linha: 451)

Assim como certas formas de imitação, portanto, é possível interpretar que o comportamento do pássaro que emite comportamentos descritos como modelação filogenética também não esteja sob controle do comportamento dos filhotes, embora os filhotes estejam sob controle do padrão de vôo dos pais. A modelação filogenética, com um grau de precisão inferior em relação à imitação, pode ser compreendida nesta classe de comportamentos sociais.

1.1.2 Comportamento social como comportamento de X como variável para o comportamento de Y e vice-versa.

Relatos de eventos nos quais dois ou mais organismos são variáveis para o comportamento um do outro são predominantes no material selecionado sobre comportamento social. Como estes eventos envolvem mais de um indivíduo, a identificação de estímulos que controlam a emissão do conceito torna-se mais complexa, uma vez que requer observar interação das variáveis que controlam o comportamento de dois ou mais organismos.

De acordo com Skinner (linha: 14), inicialmente a análise de tais eventos pode ser feita considerando um organismo por vez. Primeiramente, é preciso considerar entre

as variáveis que afetam o comportamento de um organismo “X” algumas geradas por um segundo organismo “Y”. Então, o comportamento de “Y” pode ser analisado assumindo “X” como fonte de variáveis. Somando as análises dos dois indivíduos a interação de X e Y é reconstruída. A análise estará completa se contemplar todas as variáveis necessárias para descrever o comportamento dos dois organismos.

Entre as numerosas descrições de eventos compreendendo este tipo de comportamento social (linhas: 8, 14, 15, 16, 20, 21, 22, 23, 31, 32, 33, 35, 36, 38, 39, 40, 41, 42, 43 50, 56, 58, 86, 91, 94, 122, 178, 179, 180, 181, 345, 384, 386, 434, 435, 453, 470, 471), há um exemplo especialmente didático no qual Skinner evidencia as variáveis envolvidas na interação verbal entre dois indivíduos nomeados A e B.

> Consider a simple episode in which A asks B for a cigarette and gets one. To account for the occurrence and maintenance of this behavior we have to show that A provides adequate stimuli and reinforcement for B and vice versa. … The first interchange between the two is in the direction of B to A: B is a discriminative stimulus in the presence of which A emits the verbal response. The second interchange is in the direction A to B: the response generates auditory stimuli acting upon B. If B is already disposed to give a cigarette to A - for example, if B is "anxious to please A" or "in love with A", the auditory pattern is a discriminative stimulus for the response of giving a cigarette. B does not offer cigarettes indiscriminately; he waits for a response from A as an occasion upon which a cigarette will be accepted. A's acceptance depends upon a condition of deprivation in which the receipt of a cigarette is reinforcing. This is also the condition in which A emits the response "Give me a cigarette", and the contingency which comes to control B's behavior is thus established. The third interchange is A's receipt of the cigarette from B. This is the

> reinforcement of A's original response and completes our account of it. If B is reinforced simply by evidence of the effect of the cigarette upon A, we may consider B's account closed also. (linha: 20)

Na descrição do episódio verbal apresentada, Skinner coloca o leitor sob controle do comportamento dos organismos A e B. O comportamento verbal de A de pedir um cigarro está parcialmente sob controle da presença do organismo B como antecedente, assim como a resposta de B é em parte produzida pela pergunta de A. Observa-se que embora a análise do comportamento individual seja condição para a abordagem do fenômeno exemplificado é somente ao atrelar as análises dos dois organismos que se torna possível abranger todas as variáveis envolvidas na interação.

É importante observar que há uma variedade de conceitos utilizados por Skinner ao tratar deste tipo de fenômeno. Em certas ocasiões, ao referir-se a este tipo de interação apresentada, Skinner emprega os termos episódio social (linhas: 14, 15, 16, 17, 18, 21, 22, 23, 26, 180), sistema social (linhas: 24, 48, 82, 85, 119, 181), "*interlocking system*" (linhas: 22, 24, 25, 27) e "*interlocked behavior*" (linhas: 24, 48). Todos estes termos são considerados como equivalentes na presente análise, visto que adquirem função semelhante nos textos do autor, sendo utilizados sob controle do mesmo tipo de relatos de eventos (b).

Configurações especiais de interação entre dois organismos, contudo, emergem quando "X" responde de determinada forma em função do efeito no comportamento de "Y" (linha: 179). Dito de outro modo, "X" se comporta de uma forma que altera o comportamento de "Y" devido às consequências do comportamento de "Y" para "X". Coloquialmente, diríamos que "X "está deliberadamente controlando "Y" (linha: 31).

Exemplos mais simples deste tipo de controle são encontrados nos eventos designados como modelação operante (linhas: 362, 434, 453, 469, 470). Segundo

Skinner (linha: 453), a modelação operante se caracteriza pelo fato de que o comportamento do imitador produz consequências reforçadoras para o modelador, que se comporta de formas sejam mais facilmente imitadas (linha: 434). Este caso diferencia-se da modelação filogenética apresentada no tópico anterior, considerando que na modelação operante o comportamento do indivíduo imitado também é controlado pelo comportamento do imitador. Consideremos o exemplo (linha: 434) de uma situação na qual para abrir determinada porta é necessário deslizá-la para o lado e não puxá-la ou empurrá-la. O modelador poderia fazer gestos do movimento que abre a porta sob controle do efeito de facilitar a imitação por parte de outro indivíduo que o observa.

Tipos mais complexos de comportamento social envolvendo controle "deliberado" entre dois indivíduos são expostos em relatos de eventos chamados por Skinner de controle pessoal (linhas: 32, 33, 35, 36, 38, 39, 40, 41, 42, 43, 58, 179, 180). Partindo do comportamento imitativo analisado previamente, temos o seguinte exemplo:

> A special kind of social behavior emerges when A responds in a definite way because of the effect in the behavior of B. We must consider the importance of B to A as well as of A to B. For example, when A sees B looking into a store window, he is likely to be reinforced if he looks too, as in the example of the berry patch. But if this looking is important to B, or to a third person who controls B, a change may take place in B's behavior. B may look into the window in order to induce A to do the same. The carnival shill plays on the behavior of prospective customers in this way. B's behavior is no longer controlled by what is seen in the window but (directly or indirectly) by the effect of that behavior on A. (The original contingencies for A breaks down:

> the window may not now be "worth looking into.") Action taken by B because of its effect on the behavior of A may be called "personal control". (linha: 179)

Neste exemplo de controle pessoal, tem-se um indivíduo B que se comporta de tal forma que forneça variáveis para manipular um comportamento específico por parte do outro indivíduo. B não está sob controle da vitrine, como nos episódios de imitação, mas sob controle de uma resposta de A.

O termo controle pessoal pode sugerir uma única direção para o controle exercido. Contudo, salvo as exceções envolvendo exemplos de imitação e modelação filogenética, o controle entre os organismos mostra-se mútuo nos relatos de eventos presentes nos textos selecionados (linha: 180). Skinner aponta que, mesmo em situações nas quais o controle aparentemente incide sobre um único indivíduo, o comportamento do indivíduo controlado também afeta o controlador. Como exemplo, o autor destaca que mesmo na interação entre mestre e escravo "the slave control the master as completely as the master the slave, in the sense that the techniques of punishment employed by the master have been selected by the slave's behavior in submitting to them" (linha: 180).

Todas as formas de comportamento social envolvendo o comportamento de dois organismos descritas até aqui (um produzindo variáveis que agem sobre o comportamento de outro) tornam-se possivelmente ainda mais efetivas com o desenvolvimento do comportamento verbal (linhas: 362, 384, 453, 470, 471). Skinner argumenta que a espécie humana adquire extraordinárias vantagens com a evolução do comportamento verbal, desenvolvendo repertórios mais amplos sob controle de um maior número de variáveis (linha: 470). Através da linguagem, o indivíduo pode seguir e emitir instruções verbais sobre comportamentos e as consequências que o seguem (linha: 384).

O comportamento verbal é um repertório especial e extremamente rico, e abordá-lo profundamente fugiria ao escopo desta pesquisa. É válido ressaltar, no entanto, que as consequências do comportamento verbal são operantes, e distinguidas apenas pelo fato de que são mediadas por outras pessoas (linha: 408). Ou seja, as variáveis do comportamento verbal são sociais, e não incluem processos essencialmente diferentes dos aqui considerados.

1.1.3 Comportamento de X e Y em relação a um ambiente comum.

Até aqui, foram explorados relatos de eventos descritos como comportamento social envolvendo dois ou mais organismos comportando-se um em relação ao outro. Outra possibilidade é que o comportamento de dois ou mais indivíduos esteja relacionado em um episódio social não primariamente por uma interação entre eles, mas por variáveis externas compartilhadas (linhas: 3, 26). Eventos descritos como competição (linhas: 26, 205) e cooperação (linhas: 17, 18, 19, 27, 28, 30, 175, 205, 206, 207, 208, 435, 436, 437), são exemplos deste tipo de comportamento social. Para abordá-los, serão apresentados dois experimentos extraídos do artigo *Two "Synthetic Social Relations"* no qual as variáveis em operação podem ser identificadas com maior precisão.

O primeiro experimento descrito, intitulado *The "Ping-Pong" Playing Pigeons* (linha: 205), demonstra um exemplo de competição. Resumidamente, os pombos eram treinados individualmente para uma atividade semelhante ao jogo de pingue-pongue. Inicialmente, eles foram ensinados isoladamente a bicar a bola fazendo com que ela rolasse para o outro lado de uma mesa, caindo em uma calha. Como consequência, um mecanismo operava um dispensador de comida que reforçava o pombo com alimento. No desempenho final, os dois pombos eram dispostos um em cada lado da mesa, e cada um bicava a bola fazendo com que ela rolasse até o outro lado. Com a presença do outro

sujeito, era necessário que a bola não fosse bicada pelo pombo do outro lado da mesa para que caísse na calha. Desta forma, um pombo era reforçado em detrimento do segundo, caracterizando competição. Se um pombo repetidamente era bem sucedido no jogo, o outro sofria extinção.

O segundo experimento apresentado no artigo chama-se *Cooperating Pigeons* (linhas: 206, 207, 208) e descreve um procedimento no qual os pombos deveriam agir em conjunto para produzir reforço. Primeiramente, os pombos foram colocados em dois compartimentos e separados por um vidro contendo três botões dispostos verticalmente em cada um. Para obter reforço, os dois pombos deveriam bicar simultaneamente um determinado par de botões. Quando o reforço era liberado, contudo, o par em operação que deveria ser pressionado para a liberação do reforço era modificado de forma aleatória.

Os pombos deveriam cooperar em duas atividades: (1) descobrir o par efetivo e (2) bicar os botões ao mesmo tempo. Os sujeitos começaram a testar os pares de botões de forma não sistemática. Em geral, houve uma divisão de trabalho em relação às duas tarefas. Um pombo (chamado de líder) explorava o ambiente – ou seja, bicava os botões em alguma ordem – e outro pombo (explorador) bicava o botão correspondente ao pressionado pelo primeiro.

O comportamento cooperativo pode ocorrer através de variadas formas de interação entre organismos, desde que envolvam a ação conjunta para a produção de consequências. Não obstante, um aspecto comum a vários exemplos de cooperação dos textos selecionados é a presença de um organismo que aparece como líder e outro como seguidor. Nos trechos deste tipo, o líder fica predominantemente sob controle das variáveis ambientais enquanto o seguidor está sob controle das variáveis emitidas pelo líder (linha: 18). O líder, no entanto, não é independente de seus seguidores,

considerando que seu comportamento requer o suporte do comportamento correspondente por parte de outros organismos (linha: 19).

1.1.4 Comportamento social *versus* não-social.

Para esclarecer os estímulos sob controle dos quais o conceito de comportamento social é utilizado, faz-se necessário não somente apontar os relatos de eventos nos quais o conceito está presente, mas também identificar que características específicas do comportamento social o diferenciam do dito não-social. Em alguns momentos da obra de Skinner (linhas: 4, 7, 11, 26, 208, 408, 462), o autor se dedica a este propósito: (1) indicando sob controle de quais variáveis seria adequado ou inadequado nomear uma situação como social e (2) traçando comparações entre os processos envolvidos no comportamento social e não-social. A seguir, estas considerações serão analisadas individualmente.

Considerando o comportamento social como qualquer comportamento de um ou mais organismos que atue como variável que afeta o comportamento de outro(s) organismo(s), é possível questionar como identificar com precisão se a variável observada em um evento é ou não social. Como veremos adiante, as tentativas de Skinner de responder a esta questão não deixam claro sob controle de que estímulos tal distinção é feita.

No primeiro trecho em que tenta elucidar esta questão, Skinner diferencia o comportamento social do não-social destacando que no primeiro caso a referência a outro organismo é condição para a descrição do episódio e acrescenta que comportamento social se diferencia pelo fato de ser mediado por outros indivíduos (linha: 408). Como exemplo, ele analisa uma situação na qual a mãe alimenta seu filho.

We cannot describe the reinforcement without referring to another organism. But social reinforcement is usually a matter of personal mediation. When a

> mother feeds her child, the food, as a primary reinforcer, is not social, but the mother behavior presenting it is. (linha: 7)

Neste trecho, é destacado o papel de mediação realizado pela mãe entre o filho e o alimento. Na situação descrita, Skinner diferencia a comida como estímulo não-social e o comportamento da mãe de apresentá-la como social.

Apesar de trazer tal diferenciação, outros exemplos descritos por Skinner não esclarecem apropriadamente sob controle de que estímulos ela é feita. Tomemos como exemplo a distinção feita por Skinner entre comportamento social e não-social envolvendo uma situação de competição.

> Social behavior as here defined is not necessarily involved. Catching a rabbit before it runs away is not very different from catching it before someone else does. In the latter case, a social interchange may occur as a by-product if one individual attacks the other. (linha: 26)

De acordo com o relato apresentado, as situações de perseguir um coelho bem como a de pegá-lo antes que outro o apanhe não seriam, necessariamente, sociais. O autor afirma, no entanto, que o comportamento social poderia ocorrer na segunda situação no caso de um ataque entre dois indivíduos. Skinner não evidencia no trecho selecionado o que no episódio descrito controlou a distinção entre comportamento social ou não-social. Todavia, uma possível interpretação é que nas primeiras descrições apresentadas os indivíduos estariam respondendo a um ambiente modificado por outro indivíduo e não ao indivíduo propriamente – pela fuga do coelho ou pela ação anterior de outro predador, por exemplo.

Não obstante, os textos do autor não esclarecem sob controle de que eventos seria possível concluir que o indivíduo está respondendo à mudança no ambiente ou a

outro indivíduo. Um exemplo que apresenta um evento muito semelhante ao citado acima ilustra esta dificuldade:

> [Social episode] Consider, for example, the interaction between predator and prey called "stalking". We may limit ourselves to that behavior of the predator which reduces the distance between itself and its pray and that behavior of the prey which increases the distance. A reduction in the distance is positively reinforcing to the predator and negatively reinforcing to the prey; an increase is negatively reinforcing to the predator and positively reinforcing to the prey. If the predator is stimulated by the prey, but not vice versa, then the predator simply reduces the distance between itself and the prey as rapidly as possible. If the prey is stimulated by the predator, however, it will respond by increasing the distance. This need not to be an open flight, but simply any movement sufficient to keep the distance above a critical value. In the behavior called stalking the predator reduces the distance as rapidly as possible without stimulating the prey to increase it. When the distance has become short enough, the predator may break into open pursuit, and the prey into open flight. (linha: 15)

No evento descrito não fica claro se Skinner avalia que predador e presa estão respondendo um ao comportamento do outro ou ao ambiente modificado pelo outro indivíduo - como sugere a interpretação hipotética do exemplo anterior. Enquanto em um segmento do texto Skinner parece indicar que predador e presa estão respondendo à distância produzida pelo outro organismo (“a reduction in the distance is positively reinforcing to the predator and negatively reinforcing to the prey” - linha: 15) em outro ele se atém a variáveis sociais (“if the predator is stimulated by the prey, but not vice versa” - linha:15). Além disso, ao mesmo tempo em que o relato de evento é exposto

por Skinner como exemplo de episódio social, a situação de perseguição se aproxima do exemplo anterior analisado como não-social, "catching a rabbit before it runs away" (linha: 26). Conclui-se que os relatos de eventos utilizados por Skinner para abordar a distinção entre comportamento social e não-social não especificam apropriadamente sob controle de quais estímulos ela é feita, e que são inconsistentes - ou seja, relatos de eventos semelhantes são descritos pelo autor ora como comportamento social, ora como não-social (linhas: 15, 26).

Embora Skinner estabeleça a referência a outro organismo como critério, não fica evidente sob controle de quais eventos ele deve ser aplicado. Ao analisar um fenômeno é possível descrever um número maior ou menor de variáveis e estendê-las mais ou menos temporalmente. Sendo assim, seria possível limitar as variáveis descritas em situações previamente chamadas de sociais e considerá-las como não-sociais. Tomemos os experimentos com pombos apresentados como exemplo. Em *The "Ping-Pong" Playing Pigeons* o pombo estaria respondendo não ao comportamento do adversário, mas ao movimento da bola. Já em *Cooperating Pigeons*, por sua vez, ao botão colorido e não à bicada do outro pombo.

Se não está explícito nos textos de Skinner sob controle de quais variáveis específicas é possível diferenciar o comportamento social do não-social (1), ao comparar os processos envolvidos (2) o autor é mais claro. Em relação às similaridades entre comportamento social e não-social, Skinner argumenta que os processos envolvidos na seleção do comportamento são os mesmos.

Segundo o autor (linhas: 4, 11, 26), a função dos estímulos chamados de sociais não se diferencia dos presentes em situações não-sociais: "It is always an individual who behaves, and he behaves with the same body and according the same processes in a non-social situation" (linha: 4). O estímulo social, como qualquer outro

estímulo, se tornaria importante devido às contingências das quais faz parte (linha: 11). Esta afirmação é exemplificada por Skinner ao abordar uma característica freqüentemente considerada peculiar ao comportamento social:

> Some social stimuli are also frequently set apart because a very slight physical event appears to have an extremely powerful effect. But this is true of many non-social stimuli as well; to one who has been injured in a fire a faint smell of smoke may be a stimulus of tremendous power. Social stimuli are important because the social reinforcers with which they are correlated are important. (linha: 11).

Ainda que o comportamento social não apresente processos novos na análise operante, aparentemente ele adquire função especial quando consideramos a evolução cultural. Como veremos mais tarde, o comportamento social é indispensável para a transmissão de práticas culturais entre membros de uma cultura e essencial para a emergência do terceiro nível de seleção (linha: 467).

Até o momento, foram expostos diversos exemplos de relatos de eventos envolvendo o conceito de comportamento social e análises de possíveis estímulos que controlaram a emissão do conceito nos textos de Skinner. O conceito de comportamento social, de forma geral, é utilizado em referência ao comportamento de indivíduos em diversas formas de interação. Quando considerados conjuntos de organismos, ou grupos, no entanto, Skinner passa a adotar termos como cultura e prática cultural.

1.2 Cultura e Prática Cultural

1.2.1 Cultura e prática cultural como conjuntos de contingências de reforçamento social.

O conjunto de contingências dispostas por um grupo é referido na obra de Skinner principalmente pelo conceito de cultura (e.g. linhas: 25, 56, 121, 123, 209,

352). Com freqüência, contudo, Skinner utiliza também os termos grupo (e.g. linhas: 10, 13, 21, 24, 28, 107), ambiente social (e.g. linhas: 56, 111, 113, 120, 121, 124) e sistema social[5] (e.g. linhas: 24, 48, 82, 85, 119, 181). Através da análise realizada, não foram encontradas diferenças significativas em relação aos estímulos que controlaram a emissão destes termos. Para facilitar a compreensão do texto, optou-se por convencionar o termo cultura para tratar destes relatos de eventos. Nos casos de citação direta em que o autor utiliza outra terminologia, o conceito cultura será indicado entre colchetes.

A cultura é composta por contingências de reforçamento social, as quais geram e sustentam o comportamento dos indivíduos a elas expostos (linhas: 209, 429, 454). Neste contexto, tais contingências são chamadas de práticas culturais.

> The social environment [cultura] I have been referring to is usually called a culture, though a culture is often defined in other ways – as a set of customs or manners, as system of values and ideas, as a network of communication, and so on. As a set of contingencies of reinforcement maintained by a group, possibly formulated in rules or laws, it has a clear-cut physical status, a continuing existence beyond the lives of members of the group [culture], a changing pattern as practices are added, discarded, or modified, and, above all, power. A culture so defined controls the behavior of members of the group that practices it. (linha: 352)

As contingências de reforçamento social dispostas por uma cultura, suas práticas culturais, são operantes transmitidos intra ou entre gerações de indivíduos (linha: 268). Tais operantes são inicialmente selecionados por suas consequências em nível

[5] O termo sistema social é empregado tanto em situações descrevendo a interação entre organismos X e Y (e.g. linha: 24), como discutido anteriormente, como em referência a conjuntos de práticas culturais (e.g. linha: 119).

individual: “The process presumably begins at the level of the individual. A better way of making a tool, growing food, or teaching a child is reinforced by its consequence – the tool, the food, or a useful helper, respectively” (linha: 410). O comportamento mantido no repertório de um organismo, todavia, pode ser transmitido através de qualquer forma de comportamento social. Ao ser transmitido, Skinner passa a chamá-lo de prática cultural (linha: 455).

Em decorrência da transmissão, observamos conjuntos específicos de contingências de reforçamento social afetando o comportamento dos indivíduos em uma cultura. A transmissão dos operantes adquiridos ao longo da vida de um indivíduo permite que as práticas sejam perpetuadas mesmo quando seus praticantes são substituídos. Neste sentido, as práticas culturais são unidades mais duradouras do que os operantes de indivíduos singulares, como ilustra o exemplo a seguir:

> For example, some practices are perpetuated as the members of a group are severally replaced. If A has already developed specific controlling behavior with respect to B, depending partly upon incidental characteristics of B's behavior, he may impose the same control on a new individual, C, who might not himself have generated just the same practices in A. (linha: 178)

No relato de evento utilizado como exemplo, Skinner considera a prática de controle do comportamento de A em relação a B. Após ter este operante supostamente reforçado devido aos seus efeitos sobre o comportamento de B, A passa a utilizar a mesma técnica para controlar o comportamento de C. Embora o comportamento de C em si provavelmente não produzisse este padrão de comportamento em A, C está sendo afetado por uma prática cultural de origem anterior à sua participação na cultura.

Apesar de ressaltar que o comportamento social é responsável pela transmissão operante, é pertinente destacar que nem todo comportamento social pode ser

identificado desta forma. Skinner parece utilizar o termo transmissão especificamente sob controle de episódios sociais nos quais há aquisição de um novo comportamento (e.g. linhas: 238, 245, 267, 298, 308). Embora não aponte claramente tal distinção em seus textos, considerando os relatos de eventos aos quais o conceito de transmissão é aplicado é pouco provável que as situações de comportamento social de pedir um cigarro exposta em 1.1.2 ou o comportamento cooperativo dos pombos em 1.1.3 fossem consideradas por Skinner como transmissão cultural.

Skinner faz menção ao conceito de cultura sob controle de eventos que vão desde conjuntos mais restritos de práticas culturais (e.g. linhas: 124, 481) até a totalidade das práticas culturais produzidas pela espécie humana (e.g. linhas: 299, 479, 485). Esta fluidez em relação à delimitação da cultura repercute no conceito de prática cultural. Se práticas culturais são conjuntos de contingências de reforçamento social da cultura, decorre que as variáveis que compõem as práticas culturais só podem ser identificadas dependendo do que é considerado como cultura.

Um exemplo que demonstra esta flexibilidade em relação aos conjuntos de contingências chamados de práticas culturais e cultura é o tratamento dado por Skinner às técnicas utilizadas na América para controlar o comportamento sexual (linhas: 124, 125, 126, 127). No relato de evento, o autor descreve uma série de formas de controle do comportamento sexual por parte de agências governamentais, educacionais e religiosas, além do grupo ético: "Access to the world at large was forbidden or permitted only in the company of a chaperon who might use physical restraint if necessary. Stimuli leading to sexual behavior were, so far as possible, eliminated from the immediate environment" (linha: 124). Estas técnicas, no entanto, foram substituídas por outras formas de controle devido a certas consequências indesejáveis provocadas pela repressão dos impulsos sexuais:

> The modern version of sexual control is very different … Instead of removing from the environment all stimuli which could possibly lead to sexual behavior, a knowledge of the anatomy and function of sex is supplied. Friendly relations with the opposite sex are more freely permitted, and severe punishment of sexual behavior is avoided in favor of instruction in the consequences of such behavior. (linha: 126)

Esta alteração de técnicas de controle do comportamento sexual é chamada por Skinner de mudança de prática cultural: "These consequences, doubtless in company with many other factors, led to a substantial change in the practice" (linha: 124). Skinner argumenta, ainda, que esta mudança provavelmente não seria adotada por todos os grupos. O governo e a religião, por exemplo, são agências que possivelmente manteriam técnicas antigas, enquanto outros grupos do qual o indivíduo é membro poderiam controlá-lo a partir das novas técnicas. O indivíduo seria então "affected by conflicting techniques which show a transition from one cultural practice to the other" (linha: 127).

Aqui, sob controle do relato de eventos (b) envolvendo a mudança e conflito de técnicas de controle do comportamento sexual, Skinner utiliza o conceito de prática cultural (a). No início do mesmo exemplo, porém, sob controle do mesmo relato de eventos Skinner emprega o conceito de cultura (b): "A given social environment [cultura] may change extensively in the lifetime of a single individual, who is then subjected to conflicting cultures" (linha: 124).

O trecho analisado fornece um exemplo didático da aplicação do conceito de cultura e de prática cultural a conjuntos de contingências de reforçamento dispostas por grupos de indivíduos. Como foi possível ilustrar, tais conceitos não são estáticos e não são utilizados em referência a um fenômeno em especial. Os termos cultura e prática

cultural aparecem em Skinner como princípios gerais que podem ser empregados a qualquer conjunto variável de contingências de reforçamento.

A ação dos indivíduos em grupo na cultura pode aludir à possibilidade de tratar grupos como se fossem indivíduos. Skinner (linhas: 2, 28, 30, 54, 97, 174, 198), entretanto, enfatiza que é sempre o indivíduo que se comporta, e se comporta de acordo com os mesmos processos de uma situação não-social. Para Skinner "the individual behavior explains the group phenomenon" (linha: 2). O problema apresentado ao considerar fenômenos grupais é explicar porque as pessoas se comportam em conjunto.

> We may answer questions of this sort by examining the variables generated by the group which encourage the behavior of joining and conforming. We cannot do this simply by saying that two individuals will behave together cooperatively if it is "in their common interest to do so". We must point to specific variables affecting the behavior of each of them. (linha: 28)

O que Skinner parece estar dizendo com esta afirmação é que não é possível explicar fenômenos sociais através de análises grupais, mas que cada indivíduo é afetado por variáveis individuais, e interagirá com o ambiente de forma singular. Partindo desta interpretação, possivelmente uma análise que identificasse variáveis comuns (alimento, por exemplo) afirmando que os pombos do experimento *Cooperating Pigeons* comportavam-se cooperativamente devido a elas seria imprecisa. Assim como realizado na análise feita por Skinner, para compreender o comportamento cooperativo seria essencial apontar variáveis específicas que controlaram o comportamento de cada sujeito (linha: 28).

Apesar de ressaltar a necessidade da elucidação de variáveis individuais, Skinner não exclui a possibilidade de tratar a cultura como unidade, e faz generalizações de processos operantes. Foram identificados dois tipos principais de fenômenos

analisados por Skinner nos quais a cultura é considerada como unidade. O primeiro envolve o estudo dos efeitos da cultura sobre o comportamento de organismos individuais e, em contrapartida, a relevância do comportamento de tais organismos para a manutenção e o desenvolvimento da cultura (linha: 138, 198). Já o segundo compreende a própria cultura como objeto de estudo, indicando quaisquer variáveis internas e externas ao sistema social que o afetem. Estes dois tipos de fenômenos serão abordados com mais profundidade a seguir.

1.2.2 Cultura e prática cultural como variável que afeta o comportamento dos membros da cultura e vice-versa.

Em diversos segmentos de texto selecionados, Skinner aborda a cultura como fonte de variáveis para o comportamento do indivíduo (linhas: 24, 25, 30, 44, 45, 46, 48, 49, 51, 52, 53, 54, 55, 58, 59, 66, 86, 90, 91, 92, 98, 99, 101, 102, 118, 119, 122, 123, 130, 136, 167, 196, 198, 211, 218, 352, 352, 394, 454, 456, 457, 458, 472) e, no sentido oposto, o indivíduo como fonte de variáveis que afetam a cultura (linhas: 25, 45, 60, 61, 87, 88, 89, 98, 198, 218, 233, 276, 298, 350, 457, 458). Segundo Skinner, é possível considerar tais efeitos da cultura sobre seus membros e vice-versa a partir do momento em que os membros da cultura são afetados por ela e a afetam da mesma forma.

> The group [cultura] acts as a unit insofar as its members are affected by the individual in the same way. It need not be highly organized, but some sort of organization usually develops. Controlling practices acquire a certain uniformity from the cohesive forces which lead individuals to take part in group action and from their mode of transmission from one generation to another. (linha: 45)

Skinner (linha: 30) argumenta que, embora seja sempre o indivíduo que se comporta, o grupo produz um efeito mais poderoso. O fato de os indivíduos unirem-se em grupos aumenta intensamente a capacidade de produzirem consequências reforçadoras: “The man who pulls on a rope is reinforced by the movement of the rope regardless of the fact that other mans may be pulling at the same time” (linha: 30). Os produtos gerados pelo grupo superam enormemente as somas das consequências que poderiam ser atingidas caso eles se comportassem isoladamente.

Exemplos nos quais as práticas de um grupo afetam o comportamento de seus membros são abundantes nos textos de Skinner. Tais relatos de eventos incluem qualquer grupo que disponha variáveis que afetam o indivíduo. Uma das formas mais comuns de controle do comportamento do indivíduo pelo grupo se dá através do que Skinner chama de controle ético:

> The principal technique employed in the control of the individual by any group of people who have lived together for a sufficient length of time is as follows. The behavior of the individual is classified as either "good" or "bad" or, to the same effect, "right" or "wrong" and is reinforced or punished accordingly. ... The behavior of an individual is usually called good or right insofar as it reinforces other members of the group and bad or wrong insofar as it is aversive. (linha: 46)

Nota-se nos exemplos relatando o comportamento de indivíduos em grupo que generalizações de análises individuais para o nível grupal, ainda que imprecisas, mostram-se necessárias quando se trata de um grande número de indivíduos agindo em conjunto. Afirmar que o grupo controla o indivíduo ou vice-versa, contudo, não significa que isto seja suficiente para compreender as variáveis envolvidas no episódio social. Mesmo que Skinner faça generalizações como “o grupo classifica o

comportamento do indivíduo como ‘bom’ ou ‘mau’ e o pune ou reforça de acordo”, ele afirma que para explicar apropriadamente este episódio seria necessário atentar para variáveis individuais específicas (linhas: 48, 54). Portanto, ao analisar este episódio poderíamos identificar, por exemplo, que “good behavior on the part of A may be positively reinforced by B because it generates an emotional disposition on the part of B to ‘do good’ to A” (linha: 48).

Em sua maior parte, as práticas de controle do comportamento aplicadas pelo grupo funcionam ao custo de uma temporária desvantagem para o indivíduo e vantagem de outros membros do grupo. Resumidamente, o grupo restringe o comportamento egoísta e encoraja o altruísmo. Contudo, o indivíduo também ganha com as vantagens obtidas pelo grupo, já que faz parte dele (linhas: 51, 52, 53, 54).

A efetividade das práticas de controle da cultura sobre seus membros decorre do seu poder para reforçar ou punir. O poder da cultura é derivado do número absoluto de membros e da importância de outras pessoas na vida de cada membro. Usualmente a cultura não é bem organizada, e suas práticas não são consistentemente sustentadas. Dentro da cultura, porém, determinadas agências de controle manipulam conjuntos particulares de variáveis. As agências de controle como educação, governo e economia são geralmente mais bem organizadas do que a cultura como um todo, e com freqüência operam com maior sucesso (linha: 55).

> The power to wield economic control naturally rests with those who possess the necessary money and goods. The economic agency may consist of a single individual, or it may be as highly organized as a large industry, foundation, or even government. It is not size or structure which defines the agency as such, but the use to which the economic control is put. The individual uses his wealth for personal reasons, which may include the support of charities, scientific

> activities, artistic enterprises, and so on. …. If there is any special economic agency as such, it is composed of those who possess wealth and use it in such a way as to preserve or increase this source of power. Just as the ethical group is held together by the uniformity of the aversive effect of the behavior of the individual, so those who possess wealth may act together to protect and to control the behavior of those who threaten it. To that extent we may speak of the broad economic agency called "capital". The study of such an agency requires an examination of the practices which represent concerted economic control and of the return effects which support these practices. (linhas: 98, 99)

No caso da economia, temos um conjunto de práticas relacionadas ao poder para controlar os membros da cultura através do acúmulo de dinheiro. Assim como no caso dos grupos menos organizados, o estudo das práticas culturais de agências demanda investigarmos quais são as variáveis dispostas pela cultura para controlar os indivíduos e como, em contrapartida, o comportamento dos indivíduos colabora para a manutenção das práticas culturais.

O controle da cultura sobre o indivíduo da forma como analisado aqui é mais poderoso, mas, a princípio, não se diferencia do controle pessoal já discutido ou do controle do indivíduo sobre o grupo. Segundo Skinner, o controle pessoal do homem forte ou inteligente, por exemplo, é uma espécie de governo pessoal, cujo poder deriva de sua habilidade ou força (linha: 58) Na agência governamental organizada, por sua vez, são utilizados equipamentos específicos e a tarefa de punir é incumbida a grupos especiais como a polícia e os militares (linha: 59): “The techniques employed by an individual will be similar to those of a political machine or party” (linha: 60).

Ainda que seu comportamento seja menos poderoso do que as variáveis produzidas pelo grupo, o indivíduo também pode controlar o grupo. O indivíduo pode,

por exemplo, ao ser estimulado aversivamente, contra-atacar o agente controlador. Ele pode responder às criticas feitas pelo grupo criticando o grupo ao invés de submeter-se a elas: “the liberal accuses the group of beign reactionary, the libertine accuses it of beign prudish” (linha: 88). Outra possibilidade é o indivíduo simplesmente recusar-se a agir em conformidade com as práticas: “a child unsuccessful in avoiding or revolting against parental control simply becomes stubborn” (linha: 89). Quando isto ocorre o grupo pode intensificar suas práticas, por exemplo, atirando contra o revolucionário ou preparando o indivíduo para controlar suas próprias tendências a escapar do controle, se revoltar ou atacar (linha: 90).

1.2.3 A cultura como objeto de análise.

Além das análises de Skinner envolvendo o comportamento de indivíduos ou conjuntos de indivíduos em interação, outra possibilidade de análise focaliza a própria cultura como objeto de estudo. O leitor passa a ficar sob controle de aspectos que perpassam outro nível de análise e que superam, mas não independem de, outras variáveis discutidas até aqui.

Para esclarecer esta passagem para a análise da cultura, examinaremos um exemplo no qual a diferença em relação aos estímulos que Skinner coloca o leitor sob controle são evidenciadas:

> We may not be satisfied with an explanation of the behavior of two parties in a social interaction. The slaves in a quarry cutting stone for a pyramid work to escape punishment or death, and the rising pyramid is sufficiently reinforcing to the reigning Pharaoh to induce him to devote part of his wealth to maintaining the forces which punish or kill. An employer pays sufficient wages to induce men to work for him, and the products of their labor reimburse him with, let us say, a great deal to spare. These are on-going social systems, but in

> thus analyzing them we may not have taken everything into account. The system may be altered by outsiders in whom sympathy with, or fear of, the lot of the slave or exploited worker may be generated. More important, perhaps, is the possibility that the system may not be in equilibrium. It may breed changes which lead to its destruction. Control through punishment may lead to increasing viciousness, with an eventual loss of the support of those needed to maintain it; and the increasing poverty of the worker and the resulting increase in the economic power of the employer may also lead to counter-controlling action. (linha: 181)

No primeiro segmento de texto, Skinner apresenta situações nas quais variáveis que atuam sobre o comportamento dos indivíduos em interação estão sendo analisadas. O autor o faz apontando comportamentos e consequências que mantém o comportamento social. O foco é o comportamento de interação entre indivíduos, como no caso do controle econômico por parte do empregador, ou no efeito de práticas culturais sobre o comportamento dos indivíduos e vice-versa, como no caso do Faraó e seus escravos.

Na segunda parte do parágrafo, contudo, o próprio sistema social ou cultura como um todo passa a ser o elemento analisado. Neste momento, Skinner chama a atenção do leitor para as variáveis que afetam o sistema. Isto é feito indicando: (1) variáveis externas ao sistema que possam afetá-lo, como no caso dos *outsiders* e/ou (2) variáveis internas, como a ação de contracontrole por parte do trabalhador.

Outro exemplo interessante no qual Skinner analisa práticas culturais (linhas: 82, 83, 84, 85) envolve a análise do governo e dos governados. Neste caso, a conjunção das contingências dispostas pelo governo e pelos governados é considerada como cultura:

> Government and governed compose a social system [cultura] in the sense of Chapter XIX. The questions which have just been raised concern the reciprocal interchange between participants. The government manipulates variables which alter the behavior of the governed and is defined in terms of its power to do so. The change in the behavior of the governed supplies a return reinforcement to the government which explains its continuing function. (linha: 82)

Segundo Skinner, neste caso a cultura é inerentemente instável, uma vez que o poder da agência aumenta a cada interação. Quando o poder aumenta, as práticas de controle da agência tornam-se cada vez mais efetivas e cada vez mais voltadas aos interesses da agência - como, por exemplo, quando um governo "uses force to acquire wealth" (linha: 83). Este processo não decorre indefinidamente, contudo. O desequilíbrio pode atingir um limite devido a variáveis internas, quando se esgotam os recursos dos governados ou quando os indivíduos se engajam em ações de contracontrole como as discutidas anteriormente, por exemplo. Outros limites podem ser oriundos de variáveis externas à cultura, como a competição com grupos que pretendam tomar o poder da agência em questão (linha: 84). Para garantir a manutenção da cultura, algumas práticas culturais podem ser codificadas em leis que impõem restrições à agência governamental (linha: 85). Ao tratar do efeito das variáveis responsáveis pela manutenção ou deterioração da cultura, Skinner utiliza predominantemente o conceito de sobrevivência da cultura.

1.3 Sobrevivência da Cultura

Quando descreve o comportamento individual pelo paradigma do condicionamento operante ou faz generalizações em nível grupal, Skinner coloca o leitor sob controle de consequências reforçadoras ou aversivas que atuam de forma seletiva sobre o comportamento. Ao abordar a cultura, contudo, ele se refere também a

outro processo: a sobrevivência da cultura: "A culture, however, is the set of practices characteristic of a group of people, and it is selected by a different kind of consequence, its contribution to the survival of the group" (linha: 476).

Há uma série de termos empregados por Skinner para tratar deste processo que é responsável pela evolução das culturas, a saber: sobrevivência da cultura (e.g. linha: 476), sobrevivência do grupo (e.g. linha: 423), sobrevivência (e.g. linha: 457), sobrevivência do grupo praticante (e.g. linha: 362), força do grupo (e.g. linha: 365), solução de problemas do grupo (e.g. linha: 313) e contingências de sobrevivência (e.g. linha: 425). De forma geral, não foram identificadas diferenças de padrões em relação aos relatos de eventos que controlaram a emissão destes termos. Para facilitar a compreensão do texto, recorreu-se ao mesmo procedimento utilizado ao discutir a cultura – isto é, optou-se por convencionar o conceito de sobrevivência da cultura para tratar do fenômeno, incluindo o conceito entre colchetes nas citações diretas que mencionem outra terminologia.

1.3.1 Sobrevivência da cultura como sobrevivência de conjuntos de contingências de reforçamento social que favorecem a sobrevivência física dos membros da cultura.

Para esclarecer ao leitor o que sobrevive na evolução cultural, Skinner recorre a analogias com a seleção natural. Assim como uma característica anatômica de uma espécie é transmitida entre gerações, práticas culturais são transmitidas por comportamento social entre indivíduos.

> A culture corresponds to a species. We describe it by listing many of its practices, as we describe a species by listing many of its anatomical features. Two or more cultures may share a practice, as two or more species may share an anatomical feature. The practices of a culture, like the characteristics of a

> species, are carried by its members, who transmit them to other members. (linha: 235)

As contingências dispostas pela cultura, contudo, operam e são transmitidas por indivíduos. Skinner (linhas: 156, 235, 237, 291) defende que o indivíduo é o portador das práticas culturais. Neste sentido, a existência da cultura depende também da sobrevivência física de seus membros.

> A culture has no existence apart from the behavior of the individuals who maintain its practices. It is always an individual who behaves, who acts upon the environment and is changed by the consequences of his action, and who maintains the social contingencies which are a culture. The individual is the carrier of both his species and his culture. Cultural practices, like genetic traits, are transmitted from individual to individual. A new practice, like a new genetic trait, appears first in an individual and tends to be transmitted if it contributes to his survival as an individual (linha: 291)

Apesar de depender da sobrevivência de seus membros a sobrevivência da cultura vai além dos organismos que a compõem. Skinner argumenta que a existência da cultura é mais duradoura que a vida do indivíduo: “What survives are the species and the culture. They lie ‘beyond the individual’ in the sense that they are responsible for him and outlive him. Nevertheless, a species has no existence apart from its members or a culture apart from the people who practice it” (linha: 228).

Pode-se concluir que embora a transmissão na seleção natural e na evolução cultural ocorra apenas porque torna possível a sobrevivência física dos membros da espécie ou cultura, o que sobrevive e se mantém entre gerações não são os indivíduos, mas, respectivamente, características da espécie e conjuntos de contingências de reforçamento social: “A culture, like a species, is selected by its adaptation to an

environment; to the extent that it helps its members to get what they need and avoid what is dangerous, it helps them to survive and transmit the culture" (linha: 237).

É possível afirmar que o processo de seleção cultural possui similaridade à filogênese e que difere da ontogênese. Na seleção das espécies e das culturas determinadas características são transmitidas e selecionadas quando contribuem para a sobrevivência física dos indivíduos que possuem estas características. A ontogênese difere destes processos, uma vez que não se observa relação direta[6] entre a seleção do comportamento operante e sobrevivência física dos organismos. Às diferenças em relação ao comportamento operante acrescenta-se o fato de que os produtos das práticas culturais que afetam as chances de sobrevivência da cultura não têm efeito atual sobre o comportamento, como ocorre no caso consequências operantes. Este último ponto será retomado ao longo deste capítulo.

Em decorrência da variação em relação aos conjuntos de contingências de reforçamento social nomeadas como cultura em Skinner, como discutido em 1.2.1, é possível interpretar que práticas culturais ou culturas sobrevivem. Isto porque quando se considera uma definição mais ampla de cultura, conjuntos específicos chamados de culturas são nomeados como práticas culturais. Seria possível concluir com base nesta observação que, afinal, o que sobrevive são conjuntos de contingências de reforçamento social que podem ser mais ou menos amplos.

Ainda que seja possível identificar a sobrevivência da cultura com um número mais ou menos específico de membros e contingências de reforçamento social, é pertinente atentar para o fato de que uma prática cultural isoladamente teria poucas

[6] É importante a ressalva de que a ontogênese é produto da seleção natural, e que a susceptibilidade ao condicionamento operante presumivelmente foi selecionada por promover a sobrevivência dos indivíduos. Com "não se observa relação direta" quer-se destacar que o comportamento não é selecionado por promover a sobrevivência do organismo - ou seja, outros tipos de conseqüências não relacionadas à sobrevivência dos indivíduos podem reforçar o comportamento e selecioná-lo.

chances de afetar de modo significativo a sobrevivência ou colapso da cultura. Deste modo, assim como as características fenotípicas de um organismo respondem em conjunto por suas possibilidades de sobrevivência, os efeitos sobre as chances de sobrevivência da cultura são decorrentes da totalidade de práticas de uma cultura. Não obstante, cada prática cultural tem sua contribuição para as possibilidades de sobrevivência do grupo (Dittrich, 2004, p. 196).

Ao concluir que o que sobrevive são conjuntos de contingências de reforçamento social, adiantamos uma provável interpretação de que a cultura seria selecionada quando suas práticas promovem a sobrevivência dos seus conjuntos de contingências de reforçamento social. Por exemplo, uma religião cujas práticas favorecessem a sobrevivência da referida religião estariam aumentando as chances de sobrevivência da cultura. Ora, isto seria equivalente a sustentar que características de uma espécie que produzem a sobrevivência daquelas características sobrevivem. Conjuntos de contingências de reforçamento social, tais como características da espécie, modificam-se e são selecionados devido à sua contribuição para a sobrevivência física dos seus portadores. Se a sobrevivência da cultura estivesse ligada à manutenção de conjuntos específicos de contingências de reforçamento, a variação e seleção seriam improváveis, pois o processo conduziria a um resultado estático. Conseqüentemente, no processo de evolução cultural os efeitos das contingências de reforçamento social devem sempre ser avaliados em relação à sobrevivência dos indivíduos que fazem parte da cultura – seja ela caracterizada por um conjunto amplo ou específico de membros e práticas culturais.

Antes de identificar eventos aos quais o conceito de sobrevivência da cultura é aplicado, é necessário estabelecer uma diferenciação importante entre consequências seletivas de terceiro nível e consequências de segundo nível.

1.3.2 Distinção entre a sobrevivência da cultura e efeitos de consequências operantes sobre a cultura.

Uma das formas pelas quais Skinner analisa práticas culturais envolve, como apresentado, uma generalização de princípios operantes que atuam sempre sobre o comportamento individual. Práticas culturais são afetadas não somente pela sobrevivência da cultura, mas por consequências em nível operante. Para elucidar esta diferença, temos o seguinte relato de evento:

> The distinction is harder to see when survival more closely resembles reinforcement. Governments, for example, operate by maintaining contingencies of (usually) negative reinforcement. Citizens obey the law to escape from or avoid fines and imprisonment. Laws are maintained primarily because the consequences reinforce the behavior of those who compose the government and maintain them. If those who have the power to maintain the laws abuse their power, however, they may generate escape (defection) or attack (revolution). If some sort of equilibrium is reached, both parties enjoy some measure of security or order. Security and order are often called the justifications of government. They contribute to the survival of the group [sobrevivência da cultura] and hence of the practice, but they are not reinforcing consequences, either for governors or governed. (linha: 457)

No exemplo descrito acima, Skinner apresenta primeiramente algumas consequências operantes responsáveis por determinadas práticas culturais: leis como contingências de reforçamento negativo para os cidadãos, por exemplo. Em seguida, ele cita produtos das práticas culturais que aparecem descritos como segurança e ordem. Estes seriam selecionados não por serem consequências reforçadoras, mas por seu efeito

favorável à sobrevivência da cultura. O autor observa que estes produtos geralmente são chamados de justificativas do governo e os diferencia das consequências operantes:

> But that "justification" of the practice is not contingent on behavior in such a way as to function as a reinforcer. Practices emerging from either positive or negative reinforcement could be said to serve as variations. Some of them are then selected by the survival of the practicing group [sobrevivência da cultura]. Other consequences contribuiting to the survival of a culture as less like the consequences responsible for the pratices. (linha: 458)

Práticas culturais surgem e são consequenciadas inicialmente em nível operante e só posteriormente tornam-se alvo da seleção cultural: "A practice arises as a mutation, it affects the chances that the group will solve its problems [sobrevivência da cultura], and if the group survives, the practice survives with it." (linha: 354)

Em algumas ocasiões, Skinner utiliza as expressões "benefícios imediatos" ou "consequências imediatas" (linhas: 106, 107, 136, 141, 145, 151) das práticas culturais para tratar das consequências operantes e "consequências de longo-prazo" ou "consequências remotas" (linhas: 107, 150, 180, 183, 244, 249, 259, 277, 308, 313, 484) em referência aos efeitos das práticas culturais sobre as chances de sobrevivência da cultura. O relato de prática cultural abaixo apresenta exemplos destes dois tipos de consequências:

> In explaining public education, certain immediate benefits to the group as a whole may be pointed out. The lower grades of the public schools take over the educational function of the family, supervise the children during part of the day, generate behavior which is useful to the family and the community and which permits the family to escape censure. … Aside from any immediate return we have to note the possible long-term effect of education. Like family

> pride or education by members of the group, the explicit educational institution may be explained by a different sort of consequence to the group to be considered in Section VI [Seção do livro que compreende o conceito de sobrevivência da cultura]. (linhas: 106, 107)

Skinner constantemente enfatiza, todavia, que somente as consequências operantes têm efeitos diretos sobre as práticas culturais (linhas: 170, 190, 244, 250, 276, 314, 351, 363, 369, 476, 477, 480).

> The fact is that cultural practices have evolved in which contingencies of immediate reinforcement generate behavior having remote consequences and this has presumably happened in part because the consequences have strengthened the culture, permitting it to solve its problems and hence survive. That the remote consequences, no matter how important for the culture, are nevertheless not having any current effect is all too evident when efforts are made to take into account a future which is not the by-product of currently reinforced behavior. (linha: 314)

A seleção cultural conforme entendida por Skinner, tal qual a filogênese, não ocorre em uma velocidade acessível à observação direta. Neste sentido, o condicionamento operante revela vantagens práticas decorrentes da imediaticidade do processo de seleção (linha: 412):

> Each of the three levels of variation and selection has its own discipline – the first, biology; the second, operant conditioning; and the third, anthropology. Only the second, operant conditioning, occurs at a speed at which it can be observed from moment to moment. Biologists and anthropologists study the processes through which variations arise and are selected, but they merely reconstruct the evolution of a species or culture. Operant conditioning is

> selection in progress. It resembles a hundred million years of natural selection or a thousand years of the evolution of a culture compressed into a very short period of time. (linha: 411)

Práticas culturais, portanto, têm sempre consequências responsáveis por sua existência em nível operante. Ao promover a sobrevivência da cultura, entretanto, determinadas práticas culturais mantidas por contingências de reforçamento imediatas tornaram possível observarmos a presença de práticas com "consequências remotas" favoráveis à sobrevivência. Estas consequências remotas, como destacado por Skinner, não têm função atual na manutenção das práticas culturais. O processo sobrevivência da cultura na seleção de práticas culturais é decorrente de uma história anterior. Práticas culturais mantidas por reforçamento que no passado permitiram a sobrevivência dos membros da cultura em questão sobrevivem com eles e, assim, continuam a ser transmitidas.

1.3.3 Sobrevivência da cultura enquanto processo que atua sobre conjuntos específicos de práticas culturais.

Como exposto no tópico 1.2.1, a cultura é identificada nos textos de Skinner com diferentes níveis de abrangência, contendo desde conjuntos específicos de contingências de reforçamento social até o conjunto que compreende todas as variáveis sociais dispostas pela espécie humana. Primeiramente, trataremos exclusivamente da sobrevivência da cultura em relação à primeira definição e, no próximo tópico, em relação à segunda. Nestes dois momentos da pesquisa, os trechos que não tornam claro sob controle de quais fenômenos o termo cultura foi empregado não serão incluídos na análise.

O conceito de sobrevivência aparece nos textos de Skinner ao tratar de conjuntos específicos de práticas culturais (linhas: 137, 220, 246, 247, 249, 351, 364,

480, 481) com uma freqüência significativamente inferior quando comparado aos trechos em que trata do conjunto total de variáveis sociais dispostas pela espécie humana (linhas: 156, 170, 200, 241, 250, 251, 263, 266, 299, 306, 319, 328, 329, 333, 335, 339, 372, 373, 374, 402, 483, 484) – nove e 22 ocorrências, respectivamente. Ao considerarmos conjuntos específicos de contingências de reforçamento social como cultura, torna-se possível reconhecer a sobrevivência de conjuntos específicos de práticas culturais como sobrevivência da cultura. Neste sentido, a sobrevivência de agências enquanto organizações pode ser compreendida como sobrevivência de tais culturas.

> Thus, a government is challenged when its citizens refuse to pay taxes, serve in the armed forces, participate in elections, and so on, and it may meet the challenge either by strengthening its contingencies or by bringing deferred gains to bear on the behaviour at issue. But how can it answer the question: 'Why should I care whether my government, or my form of government, survives long after my death?' Similarly, a religious organization is challenged when its communicants do not go to church, contribute to its support, take political action in its interests, and so on, and it may meet the challenge by strengthening its contingencies or pointing to deferred gains. But what is its answer to the question: 'Why should I work for the long-term survival of my religion?' An economic system is challenged when people do not work productively, and it may respond by sharpening its contingencies or pointing to deferred advantages. But what it its answer to the question: 'Why should I be concerned about the survival of a particular kind of economic system?' (linha: 249)

Segundo Skinner, as instituições controlam o comportamento de seus membros através da manipulação de contingências de reforçamento. A disposição de tais contingências, todavia, é controlada por uma "consequência mais remota", como discutido em 1.3.2. Esta "consequência de longo prazo" é a sobrevivência da cultura.

> The important thing is that institutions last longer than individuals and arrange contingencies which take a reasonably remote future into account. The behavioral processes are illustrated by a person who works for a promised return, who plays a game in order to win, or who buys a lottery ticket. With their help, religious institutions make the prospect of an afterlife reinforcing, and governments induce people to die patriotic deaths. (linha: 351)

É oportuno enfatizar novamente que esta consideração em relação ao futuro no planejamento de uma cultura é resultado de um processo de evolução prévio. Ou seja, culturas que produziram indivíduos cujas práticas promoveram sua sobrevivência, consequentemente, sobreviveram e transmitiram esta prática às gerações posteriores. É apenas neste sentido que é possível admitir que "consequências remotas" controlam o comportamento.

> Much of what a person does to promote the survival of a culture is not 'intentional' - that is, it is not done because it increases survival value. A culture survives if those who carry it survive ... The simple fact is that a culture which for any reason induces its members to work for its survival, or for the survival of some of its practices, is more likely to survive. (linhas: 246, 247)

A interpretação acerca da sobrevivência da cultura exposta em três das nove ocorrências aqui constatadas revela uma análise semelhante à exposta em 1.3.1. O trecho da linha 249 identifica a sobrevivência da cultura com a sobrevivência de conjuntos de contingências de reforçamento que constituem determinadas agências, já o

trecho das linhas 246 e 247 argumenta que a cultura que induz os membros a trabalhar para a sobrevivência de algumas de suas práticas tem mais chances de sobreviver. Esta posição é rara nos textos do autor, e se opõe a noção apresentada na maior parte de seus textos, que tratam a sobrevivência da cultura como sobrevivência de conjuntos de contingências de reforçamento social que promovem a sobrevivência dos membros.

Conforme argumentado em 1.3.1, a hipótese de que a cultura sobrevive quando suas práticas promovem a sobrevivência das próprias práticas é redundante e, aparentemente, incorreta. Afinal, como resultado, a cultura seria formada por um conjunto de contingências de reforçamento social praticamente imutável. As práticas culturais, no entanto, variam e são selecionadas conforme sua adaptação ao ambiente produz a sobrevivência física dos membros da cultura. Modificações nos conjuntos ou contingências de reforçamento social, de forma contrária à sugerida pela interpretação aqui contestada, podem ser imprescindíveis para a sobrevivência da cultura como exposta na maioria expressiva dos textos de Skinner consultados.

1.3.4 Sobrevivência da cultura enquanto processo que atua sobre todas as práticas culturais dispostas pela espécie humana.

O conceito de sobrevivência da cultura aparece predominantemente nos textos de Skinner em relatos de eventos que o identificam com a sobrevivência de toda a cultura produzida pela espécie humana (linhas: 156, 170, 200, 241, 250, 251, 263, 266, 299, 306, 319, 328, 329, 333, 335, 339, 372, 373, 374, 402, 483, 484). Os trechos contendo o conceito desta forma são principalmente de dois tipos. O primeiro tipo compreende descrições de propostas de intervenções em escala cultural: “Design for what? There is only one answer: the survival of the culture and of mankind” (linha: 339). O segundo tipo apresenta predições sobre o futuro da cultura: “Signs of damage became powerful reinforcers, and now a massive aggression threatens the world. And

that's a threat for which evolution could not prepare us. The very human nature that once barely led to our survival will soon end our survival once and for all" (linha: 402).

Uma prática cultural favorável do ponto de vista da sobrevivência da cultura pode ser extremamente aversiva em nível operante: "There are circumstances under which a group is more likely to survive if it is not happy, or under which it will survive only if a large numbers of its members submit to slavery" (linha: 141). Por outro lado, práticas culturais que podem ser fatais quando considerados seus efeitos sobre a sobrevivência da cultura são mantidas devido às consequências operantes (linhas: 141, 144, 151, 182, 190, 219, 221, 281, 284, 307, 321, 363, 402, 455, 457, 480): "We change our cultural practices because it is in our nature as men to be reinforced in certain ways. This is not an infallible guide. It could, indeed, lead to fatal mistakes" (linha: 190).

Um exemplo desta constatação é o alto consumo de bens pelos membros da cultura: "People produce and consume vast quantities of goods just because goods are "good" - that is, reinforcing" (linha: 477). Esta é uma consequência operante e imediata do comportamento que entra em conflito com a sobrevivência da cultura. Como evidencia Skinner, continuando o mesmo trecho: "but the fact that the materials of which they are composed, in both agriculture and industry, will eventually be exhausted and that the by-products of their use will irreversibly foul the environment are consequences too remote to have any current effect" (linha: 477).

Na seleção de práticas culturais pela evolução cultural, os trechos selecionados mostram o incontestável posicionamento de Skinner de que as consequências no terceiro nível são muito remotas para atuar diretamente sobre o comportamento dos membros da cultura (linhas: 189, 190, 196, 245, 261, 276, 281, 307, 311, 312, 363, 476, 477):

> A major step is the emergence of practices which induce members to work for the survival of their culture. Such practices cannot be traced to personal goods, even when used for the good of others, since the survival of a culture beyond the lifetime of the individual cannot serve as a source of conditioned reinforcers (linha: 261).

Conseqüentemente, para alcançar objetivos favoráveis à sobrevivência da cultura, o autor propõe, invariavelmente, a manipulação de práticas culturais via técnicas operantes (linhas: 145, 170, 184, 193, 196, 233, 245, 276, 311, 314, 318, 340, 478, 479): "Just as as an ultimate genetic effect cannot be reached if immediate effects are not beneficial, so we must look only to the immediate consequences of behavior for modifications in a cultural pattern" (linha: 190). Esta alteração das práticas culturais via consequências imediatas do comportamento, entretanto, aqui é projetada sob controle da promoção da sobrevivência da cultura: "Nevertheless, cultural inventions have created current conditions which have at least a probabilistic connection with future consequences" (linha: 190).

Skinner (linhas: 477, 478, 479) aproxima seu posicionamento sobre como corrigir a ineficácia da sobrevivência da cultura no controle do comportamento às demais consequências remotas no comportamento operante. O autor argumenta que os danos à saúde são muito remotos para punir o comportamento de fumar e propõe a criação de contingências substitutas atuais como punir os fumantes com críticas ou aumentar os impostos sobre os cigarros. Segundo Skinner, este tipo de intervenção poderia ser feita em escala cultural. "Our treatment of cigarette smoking is a miniature model of what might be done. … On a very much larger scale I thought we could find current surrogates for the remote consequences which now threaten the world" (linhas: 478, 479). Exemplos de como isso seria aplicado à cultura apresentados por Skinner

são: “Give people reasons for having only a few children or none at all and remove the reasons why they often have so many. Promote ways of life which are less consuming and less polluting.”(linha: 479)

A sobrevivência da cultura como aqui considerada pode entrar em conflito com a sobrevivência da cultura como abordada em 1.3.3. Ou seja, práticas culturais que favorecem a sobrevivência da cultura como um conjunto específico de práticas podem ser prejudiciais quando observados seus efeitos em relação à cultura como o conjunto total de práticas da espécie humana. O trecho abaixo exemplifica este conflito:

> If the futures of governments, religions, and capitalistic systems were congruent with the future of the species, our problem would be solved. When a certain behavior was found to endanger the species, the institutions would declare it illegal, sinful, or too costly, respectively, and would change the contingencies they impose. Unfortunately, the futures are different. Nuclear weapons are made to guarantee the survival of governments and religions, not the species. … Those institutions are the embodiments of cultural practices that have come into existence through selection, but the contingencies of selection are in conflict with the future of the human species. (linhas: 365, 366)

No exemplo selecionado, é possível conceber governo e religião como culturas (tópico 1.3.3) e suas práticas podem aumentar ou diminuir as chances da sobrevivência destas. Ao ampliar a definição de cultura para todas as variáveis dispostas pela espécie humana, contudo, as práticas do governo e religião podem ser analisadas a partir de outro referencial. Deste modo, uma prática que favorece a sobrevivência de uma religião, por exemplo, pode ser extremamente destrutiva quando a cultura é compreendida em sua totalidade.

Resumidamente, é possível concluir que a sobrevivência da cultura em Skinner refere-se à sobrevivência de conjuntos de contingências de reforçamento mais ou menos inclusivos, caracterizados como cultura ou práticas culturais, que favorecem a sobrevivência física dos indivíduos a eles expostos. Este tipo de seleção de práticas culturais ou cultura(s) é responsável pelo processo chamado por Skinner de evolução cultural.

1.4 Evolução Cultural

Todos os conceitos discutidos ao longo deste capítulo referem-se a eventos que são partes de um fenômeno mais amplo, chamado por Skinner de evolução cultural - ou terceiro nível de seleção. Embora os dois termos sejam mencionados com freqüência, Skinner não apresenta relatos de eventos que especifiquem com clareza as variáveis sob controle das quais o conceito é utilizado. É possível identificar somente um relato de evento cujas variáveis envolvidas estão suficientemente explicitadas. Tal relato trata da evolução da prática de lavar batatas em um grupo de macacos, e encontra-se integralmente transcrito abaixo:

> As social environments, cultures evolve through a third kind of variation and selection. Consider another example of social behavior that recently attracted attention. A monkey accidentally dips a sweet potato into the sea water, and the resulting salted, grit-free potato is specially reinforcing. Dipping is therefore repeated and becomes a standard part of the monkey`s repertoire. Other monkeys then imitate the behavior and come under the control of the same contingencies. Eventually, all the monkeys on a given island wash their sweet potatoes. Washing would usually be called a cultural practice, particularly if on another island a similar accidental reinforcement had never occurred and the monkeys never washed their sweet potatoes. The survival of a culture is more

> than a product of contingencies of reinforcement, however. It occurs when practices contribute to the survival of the practicing group and survive with the group. If, for example, washing sweet potatoes prevented the spread of a fatal disease, the resulting contribution to the survival of the group would not be a reinforcing consequence. (linha: 455)

Como ilustrado no caso do grupo de macacos, o processo de evolução cultural tem início a partir de um comportamento operante mantido no repertório de um organismo individual. No exemplo apresentado, a imitação cumpre o papel da transmissão. Ao observar o primeiro macaco que lava as batatas o imitador está sob controle do comportamento do imitado e o operante é transmitido entre organismos.

Ao ser transmitido entre os membros do grupo, o operante passa a ser nomeado por Skinner como prática cultural: "Eventually, all the monkeys on a given island wash their sweet potatoes. Washing would usually be called a cultural practice" (linha: 140). De acordo com Skinner, no ponto da transmissão já não há similaridades entre a seleção natural e a evolução cultural, dado que a última seria lamarckiana:

> Cultural evolution is Lamarckian in the sense that acquired practices are transmitted. To use a well-worn example, the giraffe does not stretch its neck to reach food which is otherwise out of reach and then pass on a longer neck to its offspring; instead, those giraffes in whom mutation has produced longer necks transmit the mutation. But a culture which develops a practice permitting it to use otherwise inaccessible sources of food can transmit that practice not only to new members but to contemporaries or to surviving members of an earlier generation. (linha: 238)

O relato sobre o grupo de macacos apresentado oferece um exemplo simples da definição de Skinner previamente discutida sobre cultura e práticas culturais. Ora,

uma vez que os indivíduos estão afetando e sendo afetados pelo comportamento de outros indivíduos, estão dispondo contingências de reforçamento social. Logo, o conjunto de contingências dispostas pelo grupo de macacos pode ser tido como uma cultura e o comportamento de lavar batatas como uma prática cultural.

Durante a aquisição e transmissão de operantes entre membros de uma cultura, temos a seleção de práticas culturais por via operante. Ou seja, as práticas culturais são transmitidas e mantidas no repertório comportamental dos macacos devido aos seus efeitos reforçadores. Como visto em 1.3.2, é possível generalizar estas consequências individuais e afirmar que a prática cultural de lavar batatas é mantida por consequências reforçadoras para os membros do grupo. Esta consequência, todavia, ainda não é a consequência cultural: "The survival of a culture is more than a product of contingencies of reinforcement, however" (linha: 455).

O exemplo apresentado por Skinner sugere que práticas culturais podem ser transmitidas entre gerações e mantidas na cultura sem que haja evolução cultural. A condição para o emprego do termo prática cultural foi a ocorrência da transmissão do comportamento de lavar batatas entre os macacos da ilha. Entretanto, até então não há um novo processo de seleção, considerando que as consequências que mantêm o comportamento individual e prática cultural são operantes.

Skinner argumenta que práticas culturais que se originam a partir de consequências operantes são as variações sobre as quais a evolução cultural opera (linhas: 367, 393, 438, 458): "Practices emerging from either positive or negative reinforcement could be said to serve as variations. Some of them are then selected by the survival of the practicing group" (linha: 458). Estas variações são selecionadas no terceiro nível quando contribuem "to the success of the practicing group in solving its

problems. It is the effect on the group, not the reinforcing consequences for the individual members, that is responsible for the evolution of the culture" (linha: 410).

Este "efeito sobre o grupo" apontado por Skinner como responsável pela evolução cultural é o efeito das práticas culturais sobre as chances de sobrevivência da cultura. Ao final do segmento de texto selecionado como exemplo, Skinner conclui que a seleção cultural ocorreria caso a prática de lavar batatas prevenisse uma doença fatal. Nesta situação hipotética, seria possível dizer que houve evolução cultural: a prática de lavar batatas foi selecionada por promover a sobrevivência da cultura. "A culture evolves when new practices, introduced for perhaps irrelevant reasons, are selected by their contributions to the survival of the practicing group" (linha: 362).

Conclui-se que os elementos necessários para identificação de um fenômeno como evolução cultural em Skinner, são: (1) operantes transmitidos entre indivíduos intra ou entre gerações por comportamento social (prática cultural); (2) efeitos produzidos pelas práticas culturais que afetam as chances sobrevivência física dos membros da cultura; e, finalmente, (3) seleção de determinados conjuntos de contingências de reforçamento social.

2. Evolução Cultural em S. S. Glenn

2.1 Unidade de seleção cultural

2.1.1 Contingências entrelaçadas.

Embora o termo contingências entrelaçadas – *interlocked* ou *interlocking contingencies of reinforcement* – só seja incorporado à metacontingência em 1988, em seu texto de 1986 Glenn já coloca o leitor sob controle dos fenômenos que seriam mais tarde referidos pelo conceito. Metacontingências seriam compostas por classes de operantes mediados socialmente com consequências comuns:

> The metacontingency is the unit of analysis describing the functional relations between a class of operants, each operant having its own immediate, unique consequence, and a long term consequence commom to all the operants in the metacontongency. Metacontingencies must be mediated by socially arranged contingencies of reinforcement. (linha: 5)

O termo contingências entrelaçadas é introduzido em 1988 para tratar de tais classes de operantes mediados socialmente afetados por uma consequência cultural: "Cultural outcomes, however, do not select the behavior of individuals; they select the interlocking behavioral contingencies comprising the cultural practice" (linha: 49).

Retomando o trabalho de Skinner, Glenn observa que para descrever o comportamento social é necessário descrever os operantes de dois ou mais organismos (linha: 320). Estes operantes interligados dão origem a uma unidade cultural. Segundo a autora, o termo enfatiza o fato de que a ação de um indivíduo, ou seus efeitos, funciona como parte do ambiente de outro indivíduo (linha: 321): "They have been termed 'interlocking contingencies' (Glenn, 1988) to call attention to the dual roles that each person's behavior plays in social processes - the role of action and the role of behavioral environment for the action of others" (linha: 103).

De acordo com Glenn, assim como operantes são as unidades de seleção na ontogênese, as contingências entrelaçadas são as unidades sobre as quais a seleção cultural atua. Enquanto as contingências de reforçamento descrevem relações entre ações de organismos e suas consequências individuais, a metacontingência descreve relações entre tais contingências comportamentais entrelaçadas e o ambiente na qual ocorrem.

> A science of behavior focuses on relations between the activities of individual organisms and environmental events, while a science of culture focuses on relations between recurring cultural practices (i.e., interrelated behavior among individuals) and the environments in which those practices occur. The units of analysis differ. (linha: 22)

Esta diferença sobre o foco de análise (individual e cultural) refere-se tanto às unidades consideradas como objeto de seleção quanto às consequências que agem retroativamente sobre elas. Nesta etapa da pesquisa, focaremos principalmente na distinção entre unidades.

Um relato de evento que evidencia distinções entre os estímulos que deveriam controlar o conceito de comportamento operante e a metacontingência é um exemplo que trata da fabricação de peças plásticas moldadas (linhas: 252, 253, 254). Os operantes de um trabalhador poderiam envolver a configuração dos moldes para peças plásticas incluindo tarefas como colocar o molde em uma empilhadeira, levá-lo até a prensa e colocá-lo na prensa. Variações nos operantes que permitem que a produção de peças seja efetuada de forma correta são selecionadas e tornam-se cada vez mais freqüentes no repertório do indivíduo. A relação entre as atividades do trabalhador e suas consequências individuais seleciona o operante de moldar as peças. Este tipo seleção recebe o nome de contingência de reforçamento.

Algumas vezes, no entanto, o comportamento de um indivíduo A ou o produto do seu comportamento é a ocasião para o comportamento de um indivíduo B, e o comportamento do indivíduo B ou seu produto, pode ser a ocasião para o comportamento de um indivíduo C. As contingências de A, B e C seriam, então, entrelaçadas. Por exemplo, o trabalhador A pega o molde e o carrega até a prensa. B configura os mostradores da prensa de acordo com as especificações de engenharia. O trabalhador C, por sua vez, molda as peças. O comportamento de A, B e C, neste sentido, faria parte de um conjunto de contingências entrelaçadas mais inclusivo que, como unidade, resultaria em um produto agregado: peças plásticas moldadas. Este produto difere da consequência individual, pois não é contingente aos operantes de cada indivíduo. Cada trabalhador emite comportamentos específicos com consequências individuais. O produto agregado é contingente a todo o entrelaçamento formado por operantes de A, B e C que inclui, mas não é restrito a, comportamentos de cada trabalhador.

Glenn explicita no exemplo acima que esta unidade cultural pode ser reduzida a contingências de reforçamento. No entanto, observa que analisar fenômenos culturais sob uma perspectiva comportamental não explica totalmente a evolução e manutenção da contingência entrelaçada: "it is clear that cultural practices may be 'reduced to' the contingencies of reinforcement operating on each individual taking part of the cultural practice. However, such reduction does not fully explain the evolution and maintenance of the practice as such" (linha: 22).

Em uma análise comportamental a unidade é o operante e o produto do comportamento é resultado da ação de um organismo individual. Sob um foco de análise cultural, contudo, o comportamento interligado de mais de um indivíduo é entendido como unidade e o produto agregado é formado pela ação conjunta destes

indivíduos. As contingências entrelaçadas são identificadas como variações no nível cultural que dão origem a produtos agregados (linha: 210):

> The concept of metacontingencies addresses evolution by selection when the lineages that evolve are not the recurring acts of individuals, but rather are recurring interlocking behavioral contingencies (IBCs) that function as an integrated unit and result in an outcome that affects the probability of future recurrences of the IBCs. (linha: 233)

2.1.2 Práticas culturais.

Nos primeiros textos de Glenn (1986, 1988 e 1989) o conceito de contingência entrelaçada não é considerado diferente do de prática cultural. Enquanto em alguns momentos Glenn identifica contingências entrelaçadas com as práticas culturais (linhas: 20, 80) em outros a autora sustenta que práticas culturais são conjuntos de contingências entrelaçadas (linhas: 38, 39, 40, 45, 49, 57, 82). Em textos posteriores, porém, o conceito de prática cultural é diferenciado e aplicado a três tipos de fenômenos que podem incluir ou não contingências entrelaçadas.

Em 1991a, Glenn expõe critérios para a identificação de um fenômeno enquanto prática cultural:

> Thus the necessary elements of a cultural practice are: (1) behavioral content acquired during the lifetime of each participant; (2) behavioral environments of one or more participants that include (but are not limited to) the behavior of co specifics; (3) the repeated acquisition of the behavior within and between generations (linha: 115).

Para exemplificar o que é uma prática cultural, Glenn (1991a, 2003) utiliza o relato da observação feita sobre um grupo de macacos – também citado por Skinner e discutido no capítulo anterior deste trabalho. A prática cultural de lavar batatas no grupo

de macacos, como vimos em 1.4, incluía a aquisição de um operante e posterior transmissão entre indivíduos. Para Glenn, o fenômeno caracteriza o conceito de prática cultural. Todavia, não há contingências entrelaçadas como entendidas na metacontingência: não há recorrência do entrelaçamento e a consequência cultural que atua seletivamente sobre ele. Ainda que o comportamento de um macaco seja parte do ambiente de outro indivíduo durante a transmissão, após a aquisição do operante o comportamento passa a ser individual e mantido por consequências singulares (linhas: 115, 199).

> Each monkey's behavior was reinforced by its own consequences (more potato taste, less dirt taste). Although the acquisition of each monkey's operant involved another's behavior as part of its behavioral environment, once the behavior was in their repertoires, the practice was carried out by each monkey individually, and each produced consequences for itself. (linha: 115)

Práticas culturais, como definidas aqui, envolvem a repetição de operantes análogos entre indivíduos de uma única geração ou entre gerações de indivíduos (linha: 114). Tal transmissão operante de práticas culturais envolvendo comportamentos individuais é chamada por Glenn de linhagem culturo-comportamental. Glenn considera que neste tipo de transmissão ainda não há processos no nível cultural (linhas: 198, 199, 200).

Este processo, entretanto, pode originar entidades mais inclusivas no nível cultural quando o operante transmitido passa a integrar repetidamente contingências entrelaçadas. Como veremos posteriormente, as contingências entrelaçadas formam uma unidade coesa e tornam-se objeto de seleção cultural para Glenn, compondo linhagens culturais (linhas: 200, 205, 207): “When the behavior replicated in culturo-behavioral lineages participates in repetitions of interlocking behavioral contingencies, cultural-

level selection becomes possible. Cultural-level selection is selection of interlocking behavioral contingencies, not just the behavior of individuals" (linha: 207).

Apesar de definir prática cultural de acordo com os três critérios mencionados há pouco, elencados em dois textos que abordam a transmissão de operantes (linhas: 115, 187), Glenn posteriormente aplica o conceito a tipos de fenômenos diferentes. A autora argumenta que o conceito de prática cultural pode referir-se à similaridade de operantes e à produção de um produto agregado comum: "When operant lineages of enough people are similar enough in form or product, they may be called a cultural practice" (linha: 298).

Segundo Glenn, então, o conceito de prática cultural pode ser aplicado também a dois tipos de fenômenos envolvendo sempre mais de um indivíduo: (1) operantes similares em relação à forma e (2) operantes que resultam em um mesmo produto (linhas: 220, 302). No exemplo dos macacos citado há pouco temos uma prática cultural com semelhança em relação à forma. Os operantes dos macacos exibem uma mesma topografia, mas o produto (batata com menos areia) é individual. O segundo tipo de fenômeno considerado por Glenn como prática cultural deve-se à formação de um produto agregado comum resultante da ação independente dos indivíduos. Aqui, não é necessário que os operantes sejam topograficamente semelhantes. Por exemplo, cada indivíduo utiliza um meio de locomoção, por exemplo, transporte público ou carro para ir ao trabalho. Estes dois operantes diferentes contribuem para aumentar a poluição do ar, que é um único produto agregado (linhas: 224, 225).

Observa-se que a similaridade de operantes em sua topografia, bem como a geração de um produto agregado não requerem, a princípio, os três critérios estabelecidos anteriormente pela autora – aquisição, transmissão e repetição de operantes intra ou entre gerações. Por exemplo, os operantes de diversos indivíduos

podem apresentar semelhança em relação à forma sem necessariamente envolver transmissão cultural (e.g., linha: 221). Tendo em vista que Glenn indica três elementos envolvendo a transmissão de operantes como necessários para nomearmos fenômenos como práticas culturais e mais tarde aplica o conceito a fenômenos que não cumprem tais requisitos, mas sem que isto seja abordado de forma explícita em seus textos, esta alteração foi avaliada como uma inconsistência conceitual. Conclui-se que o conceito de prática cultural é aplicado por Glenn a três fenômenos diferentes, mas que não são excludentes entre si: (1) operantes transmitidos intra ou entre gerações (conforme os três critérios indicados por Glenn), (2) operantes similares de indivíduos e (3) operantes que formam um produto agregado comum.

Entre as práticas culturais que geram um produto agregado é possível identificar três tipos diferentes de práticas culturais, a saber: as macrocontingências, as contingências entrelaçadas sem recorrência e as metacontingências. Enquanto no primeiro tipo o produto agregado é resultado cumulativo de comportamentos individuais, nos outros dois ele é produzido por contingências entrelaçadas. A figura abaixo representa as relações entre os relatos de eventos que controlam a emissão do conceito de prática cultural.

PRÁTICA CULTURAL

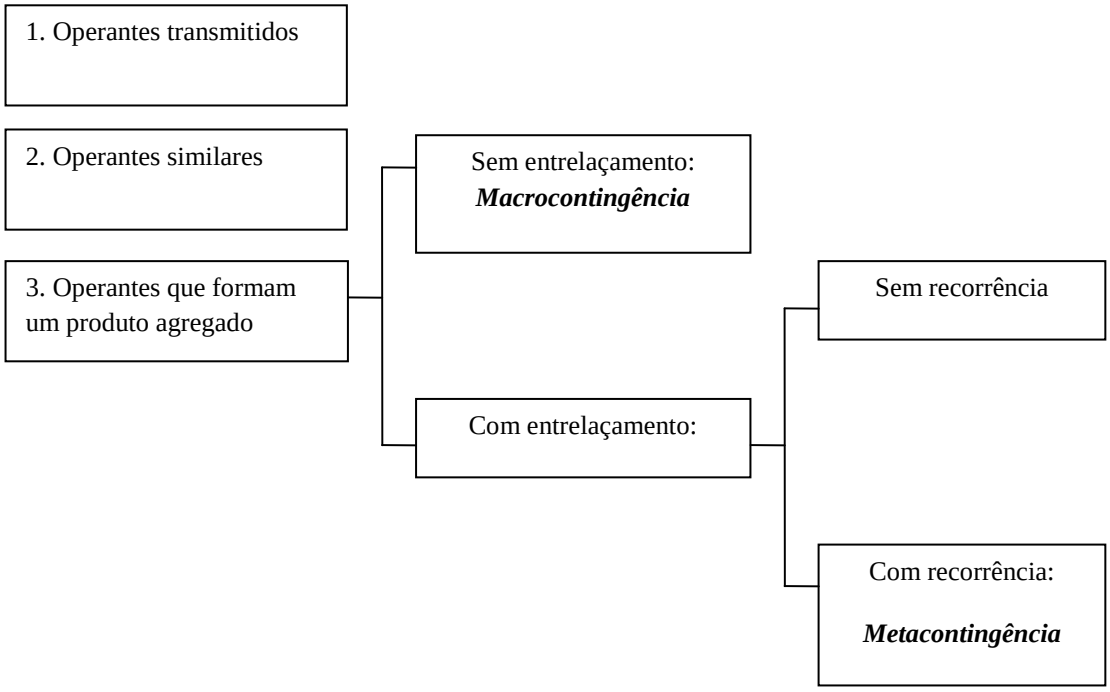

Figura 1: Representação esquemática dos relatos de eventos que controlam a emissão do conceito de prática cultural em S. S. Glenn.

Como a imagem destaca, o conceito de prática cultural compreende uma amplitude maior de fenômenos que incluem, mas não são restritos, àqueles descritos pelos conceitos de macro e metacontingência. Na figura, estão indicados os relatos de eventos aos quais o conceito de prática cultural é aplicado, que sempre envolvem um ou mais dos três elementos indicados na figura, que são: (1) operantes transmitidos, (2) operantes similares, e (3) produto agregado.

Entre as classes de relatos de eventos que controlam a emissão do conceito de prática cultural estão representadas no retângulo de número três as que envolvem o produto agregado como característica isolada ou combinada com outros elementos (por ex., transmissão de operantes com produção de produto agregado). Como veremos, este produto agregado pode ser produzido por três tipos de fontes: macrocontingências, comportamento entrelaçado sem recorrência e metacontingências.

2.2 Produto agregado

O conceito aqui chamado de produto agregado aparece sob diversas terminologias ao longo das publicações de Glenn: consequência cultural (e.g. linha: 157), produto cultural (e.g. linha: 77), consequência cultural de longo prazo (e.g. linha: 5) e produto cultural de longo prazo (e.g. linha: 1). O conceito de produto agregado foi convencionado por ser o termo utilizado nos textos mais recentes consultados, e será indicado entre colchetes nas citações diretas que empreguem outra terminologia. De uma forma geral, o termo faz referência a qualquer tipo de efeito produzido pelo comportamento de mais de um organismo.

Glenn (linha: 288, 289) constrói uma analogia com os produtos operantes que ajuda a evidenciar os fenômenos que controlam a emissão do termo produto agregado. A autora aponta que o comportamento operante quase sempre envolve produtos, e este produto define o operante específico que uma intervenção é designada a mudar. Por exemplo, um estudante pode estar insatisfeito com suas notas e estratégias específicas podem ser desenvolvidas para alterar este produto. De modo semelhante, quando consideramos o comportamento de um grupo de indivíduos determinados produtos, que neste contexto são chamados de produtos agregados, são originados. Eles se diferenciam do produto operante, uma vez que é necessário alterar o comportamento de mais de um indivíduo para modificá-lo. Assim como uma consequência produzida pela resposta de um indivíduo pode não controlá-la, um produto agregado pode ou não afetar os indivíduos que o produzem para ser nomeado enquanto tal. Como exemplo, Glenn (linha: 289) apresenta a poluição de hidrovias, indicando que tal produto agregado é resultado da ação de muitos indivíduos. Este produto, no entanto, não tem, necessariamente, efeito sobre o comportamento dos indivíduos responsáveis por ele.

Os produtos agregados podem ser resultantes de três tipos de fontes. De acordo com Glenn (2006), o produto agregado pode ser formado pela soma da ação de indivíduos agindo independentemente na macrocontingência, pela contingência entrelaçada sem recorrência e pela contingência entrelaçada na metacontingência (linhas: 290, 291, 292). Cada uma destas origens do produto agregado será analisada individualmente a seguir.

2.2.1 Produto agregado na macrocontingência.

Entre os fenômenos aos quais o conceito de produto agregado é aplicado, provavelmente o mais simples são os que não envolvem entrelaçamento. O conceito de macrocontingências é cunhado em 2004a para tratar da relação entre operantes independentes de diversos participantes da prática cultural (nomeados de *macrobehavior*) e o efeito cumulativo produzido por eles (linhas: 210, 225, 226, 227, 228, 229, 240, 241, 245, 298, 310, 311): "I will define a macrocontingency as the relation between a cultural practice and the aggregate sum of consequences of the macrobehavior constituting the practice" (linha: 227).

Na macrocontingência, Glenn esclarece que este efeito cumulativo que caracteriza o produto agregado pode ser resultado não somente de operantes, mas de contingências entrelaçadas diferentes e independentes:

> Although the operants of individuals are functionally independent of one another, the behavior of each person may contribute to a cumulative effect that is relevant to the well-being of many people. Similarly, the outcomes of metacontingencies may also contribute to a cumulative effect. The relation between independently evolving operant lineages, or between independently evolving cultural lineages, and their cumulative effect is identified as a macrocontingency (linha: 210)

A autora argumenta que tais operantes, e presumivelmente tais contingências entrelaçadas independentes, podem envolver diversos indivíduos e diversas topografias (linhas: 226). O critério para considerarmos um determinado fenômeno como macrocontingência, portanto, parece ser a presença de diversas unidades independentes que produzem efeitos cumulativos específicos.

Um exemplo utilizado por Glenn (linhas: 224, 225) é o comportamento de dirigir para chegar até o trabalho. Embora dirigir seja uma das possibilidades, há outros comportamentos que produzem o mesmo resultado, como utilizar o transporte público ou a bicicleta. O fato de a maior parte das pessoas optar pelo carro sugere contingências operantes mais favoráveis à emissão deste comportamento para a maioria dos indivíduos. Ainda que o deslocamento de carro envolva um custo monetário maior, geralmente este é mais conveniente e custa menos tempo em relação às outras possibilidades. Estas consequências, no entanto, variam, e são únicas para cada pessoa. Por exemplo, um indivíduo que utilizava o carro pode ser transferido para uma unidade da empresa mais próxima de sua casa e passar a optar por outro meio de transporte.

Além desta consequência individual, contudo, a opção de locomoção produz um efeito cumulativo apresentado como poluição do ar. Assim, a soma dos efeitos do comportamento de vários indivíduos agindo isoladamente resultou em um determinado produto agregado. Este efeito sobre a poluição do ar é um tipo de consequência diferente da originada pelo operante individual. Em suma, além de muito atrasada e cumulativa para ter função comportamental, ela é gerada pelo comportamento de muitas pessoas, de tal forma que a mudança de comportamento de um único indivíduo não é suficiente para alterar o produto agregado de forma significativa (linha: 225). Glenn destaca que esta é “a diferença crítica” entre as consequências individuais e o produto

agregado na macrocontingência: “No matter how much one behaves for the common good, the behavior of others can undo it all” (linha: 225).

Uma característica comum a diversos produtos agregados identificados pela autora é a relevância social que apresentam (e.g., linhas: 290, 299); não obstante, isto nem sempre ocorre (e.g., linhas: 221, 229). Uma vez que o produto agregado na macrocontingência é gerado por comportamento operante sem entrelaçamento e que não há distinção essencial entre o produto agregado e o produto do comportamento individual, conclui-se que a única diferença entre o produto agregado na macrocontingência e o produto do comportamento individual é o número de indivíduos engajados em sua produção.

Mesmo que as macrocontingências gerem produtos agregados, eles são efeitos da soma de contingências operantes individuais e não do comportamento interligado de indivíduos. Deste modo, Glenn afirma que a unidade sobre a qual a intervenção é proposta é operante, ainda que o produto possa ser considerado cultural no sentido de envolver o comportamento de mais de um indivíduo (linha: 300).

2.2.2 Produto agregado com contingência entrelaçada sem recorrência.

Outra fonte de produtos agregados é o comportamento interligado de indivíduos no qual cada indivíduo contribui para um produto que ocorre uma única vez (linha: 291). Glenn argumenta que neste caso não há seleção operante ou cultural, visto que o produto ocorre uma única vez e não retroage sobre os operantes ou contingências entrelaçadas (linhas: 316, 317).

Um exemplo citado por Glenn (linha: 316) é a criação do programa de certificação do analista do comportamento na Flórida. As condições da criação da certificação foram originais e envolveram vários indivíduos emitindo novos comportamentos. O produto agregado foi a certificação do analista do comportamento

no Estado da Flórida, o primeiro nos Estados Unidos. Glenn explica que, neste caso, não há seleção envolvida: "The repertoires of operant lineages of most the individuals involved probably didn't change much. Nor were the systematic re-occurrences of the interlocking operant contingencies related to a recurring aggregate product" (linha: 316).

2.2.3 Produto agregado na metacontingência.

A partir de sua publicação de 1991a Glenn estabelece uma distinção entre as metacontingências e as demais práticas culturais e acrescenta aspectos exclusivos metacontingências:

> Most cultural practices, however, have an additional element: they involve two or more individuals whose interactions produce consequences for each of them individually and whose joint behavior, in addition, produces an aggregate outcome that may or may not have a behavioral effect (linha: 115).

Um exemplo de metacontingência é apresentado por Glenn (linha: 201) ao descrever o comportamento de caça de dois indivíduos, Sam e Deke. Cada um deles possui diversos operantes em seus repertórios relacionados à caça de animais. As primeiras instâncias deste repertório provavelmente se formaram ao observarem indivíduos mais experientes. Glenn menciona que o que o repertório apresentado pelos dois é produto de atos que foram bem sucedidos para a caça por diversas gerações. Há transmissão operante - no entanto, o comportamento de nenhum deles tem efeito sistemático sobre o comportamento do outro. Até aqui, segundo as definições de Glenn, estamos tratando de uma linhagem culturo-comportamental. Sam e Deke repetem, possivelmente com alguma variação, as ações dos membros da comunidade à qual pertencem (linha: 201).

Todavia, seria possível que os dois passassem a caçar cooperativamente, por exemplo, se Sam abordasse o animal pela direita enquanto Deke fosse pela esquerda. O produto do comportamento conjunto poderia superar o resultado da ação individual, tornando mais provável que os dois passassem a caçar em conjunto (linha: 203). Neste caso, estaríamos tratando de uma contingência entrelaçada, pois Sam e Deke estariam respondendo um ao comportamento do outro. Tal unidade coesa composta pela inter-relação repetida entre estes indivíduos dá origem a uma linhagem cultural.

Quando considera o comportamento dos indivíduos atuando cooperativamente em contingências entrelaçadas, Glenn afirma estar tratando de dois processos. Segundo Glenn, a comida obtida seleciona tanto os operantes emitidos por Sam e Deke individualmente quanto a contingência entrelaçada da qual os dois participam. Enquanto os operantes de cada indivíduo são restritos à existência destes, a contingência entrelaçada pode ser mais duradoura. Se, por exemplo, Tom substituísse Sam na contingência entrelaçada aprendendo a emitir comportamentos semelhantes, a linhagem cultural continuaria sendo replicada. Neste sentido, o alimento como produto do comportamento de caça selecionaria não apenas repertórios individuais, mas uma unidade composta pela ação dos dois indivíduos em interação: a contingência entrelaçada.

A prática cultural com contingências entrelaçadas, ou simplesmente as contingências entrelaçadas, não é somente um operante, ou seja, uma classe de operantes emitida por um indivíduo particular, mas um conjunto de operantes de diferentes indivíduos relacionados funcionalmente (linha: 81): “In the interlocking contingencies of reinforcement comprising a cultural practice, each individual participating in the practice provides critical components of the behaviorally potent environment for the other participants” (linha: 84). É importante destacar que, para

Glenn, a unidade cultural não requer apenas que os indivíduos interajam no momento da transmissão de um operante. A contingência entrelaçada na metacontingência requer um responder sistemático ao comportamento do outro. Portanto, a prática cultural sem contingência entrelaçada não é identificada por Glenn como unidade cultural.

Para ilustrar de que se trata este responder sistemático, um exemplo envolvendo o preparo de refeições por Marta e Todd será apresentado. Marta e Todd regularmente cozinham juntos. Marta prepara as entradas, molhos e legumes com a ajuda de Todd; e Todd prepara os antepastos e sobremesas com a ajuda de Marta. O momento das atividades de cada um é baseado no que eles observam o outro fazendo durante a preparação. O resultado do comportamento conjunto de Marta e Todd é a produção de uma refeição com determinados pratos e duração de preparo. Glenn pontua que este resultado não poderia ser obtido com Marta e Todd trabalhando em cozinhas separadas. Deste modo, a refeição não é um produto que seleciona apenas seus comportamentos individuais, mas uma unidade composta por seus comportamentos entrelaçados (linha: 233).

A despeito de elucidarem as condições que controlam a emissão do conceito de contingências entrelaçadas, os exemplos fornecidos por Glenn não tornam claro o critério a partir do qual um comportamento pode ou não ser caracterizado como entrelaçado. Supondo que Marta e Todd preparassem os pratos em cozinhas separadas, mas combinando entre si o que deveria ser preparado, o comportamento ainda seria considerado entrelaçado? O comportamento do indivíduo que apenas trabalhe no mercado vendendo verduras para Marta toda vez que ela cozinhasse poderia ser considerado parte da contingência entrelaçada? Estendendo ainda mais as variáveis envolvidas no preparo da refeição, o indivíduo que planta e colhe as verduras utilizadas para o preparo dos pratos de Marta faz parte da contingência entrelaçada?

Voltando à discussão feita em Skinner, é possível descrever um número mais ou menos abrangente de variáveis relacionadas à emissão de determinado comportamento para caracterizá-lo como social. De forma ampla, pelo menos em sociedades atuais, praticamente todos os nossos comportamentos envolvem comportamentos ou produtos do comportamento de outros indivíduos e, portanto, requerem contingências entrelaçadas em alguma medida. Embora a presença ou não de entrelaçamento seja considerada um critério fundamental para a unidade cultural em Glenn, observa-se que ainda não são claros quais são estes limites, temporais e de número de variáveis analisadas, para que seja possível identificar com precisão a presença desta unidade. Se conceitualmente não há respostas precisas a estas questões, são possivelmente apenas trabalhos experimentais e aplicados que poderão indicar limites para estas fronteiras arbitrárias.

Nesta seção, abordamos determinados produtos do comportamento que se diferenciam dos produtos operantes no sentido de que envolvem o comportamento de mais de um indivíduo em sua geração. Tais produtos são nada mais do que resultados do comportamento de vários indivíduos, sendo classificados sob as diversas formas mencionadas há pouco. É válido enfatizar novamente que estes produtos, a princípio, não possuem necessariamente uma característica especial que os tornem diferentes dos produtos do comportamento individual. Retomando o exemplo das peças plásticas[7], sua fabricação pode envolver tanto vários comportamentos emitidos por um único indivíduo quanto contingências entrelaçadas entre o comportamento dos indivíduos A, B e C, como demonstrado na própria descrição do evento. O que distingue o produto agregado em relação ao produto do comportamento individual é o fato de envolver um número maior de sujeitos. Como veremos em 2.4, entretanto, diferentemente das

[7] Consultar página 80.

macrocontingências, nas metacontingências este produto adquire função especial ao permitir a emergência de um novo processo de seleção.

2.3 Sistema Receptor

Nos trabalhos de Glenn anteriores a 2004b, os produtos do comportamento de um grupo de indivíduos e suas consequências seletivas não são diferenciados conceitualmente. Em 2004a a autora sugere que as contingências entrelaçadas podem ser alteradas de duas formas. A primeira seria modificar o ambiente externo à contingência entrelaçada e esperar por variações no entrelaçamento que gerem produtos satisfatórios às necessidades das novas contingências de seleção. A segunda possibilidade seria alterar os componentes das contingências entrelaçadas para que elas se adequem melhor ao ambiente selecionador - ou seja, planejar as variações nas contingências entrelaçadas. (linha: 242). Este "ambiente externo" ou "ambiente selecionador" só é distinguido do produto agregado de forma evidente em 2004b, no entanto.

Em suas publicações de 2004b e 2006 Glenn inclui o conceito de sistema receptor para tratar de entidades culturais específicas: organizações, como empresas e escolas (linhas: 268, 301).

> In organizations, metacontingencies have three components: interlocking behavioral contingencies, their aggregate product, and their receiving system. The receiving system is the recipient of the aggregate product and thus functions as the selecting environment of the interlocking behavioral contingencies (linha: 267).

O novo componente aqui descrito aparece referido por dois conceitos, que são utilizados como sinônimos, a saber: ambiente externo (linhas: 242, 243, 254, 260, 261, 267, 269, 270, 273, 274, 275, 276, 279, 280, 296, 314, 318) e sistema receptor (linhas:

268, 270, 281, 301, 302, 303). Neste trabalho, eles também serão empregados de forma equivalente.

Para elucidar as classes de eventos que controlam a emissão do conceito de sistema receptor, dois exemplos descritos pela autora serão brevemente apresentados. No primeiro exemplo selecionado, Glenn considera um restaurante como organização: "Consider a restaurant as an organization. The aggregate product of the restaurant's interlocking behavioral contingencies is food served, and the receiving system is the consumers" (linha: 270). Este produto agregado envolve o comportamento de vários indivíduos em interação, por exemplo: o garçom anotando os pedidos, o chefe de cozinha passando as instruções, o cozinheiro preparando a refeição e entregando-a ao garçom. As contingências entrelaçadas são selecionadas quando seu produto satisfaz as exigências do ambiente selecionador. Neste caso, Glenn identifica tal sistema receptor com as pessoas que freqüentam o restaurante e comem seus pratos: "If the meals are well adapted to demand, consumers are likely to continue patronizing the restaurant" (linha: 270).

O segundo exemplo selecionado evidencia esta relação funcional entre contingências entrelaçadas, seu produto agregado e o sistema receptor. De acordo com Glenn, um produto agregado pode deixar de suprir as demandas do ambiente externo quando as contingências entrelaçadas que o produzem são modificadas ou quando o sistema receptor se altera. Na produção de um jornal, por exemplo, há contingências entrelaçadas de vários indivíduos em sua publicação diária. Quando os indivíduos que compõem as contingências entrelaçadas ou o comportamento dos indivíduos que já faziam parte do entrelaçamento mudam é possível que o produto agregado se altere e não seja mais capaz de satisfazer às exigências externas. Uma forma pela qual isto poderia ocorrer é citada por Glenn: "in the newspaper example, the readership may stop

subscribing if the content of the newspaper changes as a result of new personnel's failure to integrate its activities in the interlocking contingencies constituting the company" (linha: 296). Outra possibilidade é que o próprio sistema receptor se modifique, produzindo uma demanda diferente. Assim, as contingências entrelaçadas precisariam ser alteradas para que fossem capazes de gerar os novos produtos requeridos pelo ambiente externo (linha: 296).

Com a introdução do conceito de sistema receptor, duas inconsistências conceituais começam a ser observadas nos textos de Glenn. Primeiramente, em alguns momentos a autora mantém seu posicionamento inicial e afirma que o que é selecionado são as contingências entrelaçadas (e.g. linhas: 268, 280, 304): "metacontingencies are the units of analysis in organizational ecosystems, and their interlocking behavioral contingencies constitute the cultural entities that evolve via selection" (linha: 280). Em outros trechos, contudo, Glenn parece sugerir que a seleção cultural atua sobre as contingências entrelaçadas *e* seus produtos agregados (e.g. linhas: 271, 296, 323): "The aggregate products generated by the interlocking contingencies vary over time, and the environments in which they exist differentially select those variations" (linha: 271).

A segunda inconsistência encontrada é que em determinados relatos de eventos Glenn parece empregar o conceito de sistema receptor ao tratar apenas de alguns tipos de metacontingência; entretanto, em diversas situações ela utiliza este componente como um terceiro elemento que integra a própria definição do que é uma metacontingência (linha: 303, 304, 323): "Metacontingencies have three components: interlocking behavioral contingencies, their aggregate product, and their receiving system" (linha: 268).

Identificamos a seguir uma passagem na qual Glenn parece afirmar que o sistema receptor não é um componente indispensável para todas as metacontingências.

Segundo Glenn, as contingências entrelaçadas, assim como as respostas operantes, podem ou não resultar em produtos automáticos que as selecionam. Quando não resultam em tais produtos, as contingências entrelaçadas podem ser mantidas por mediação social, requerendo um sistema receptor. Para exemplificar a diferença entre estes dois tipos de metacontingência, Glenn compara o relato de evento de Todd e Marta ao produzir refeições e ao restaurante recentemente apresentado:

> Like the responses in operant contingencies, the IBCs in metacontingencies can result in both automatic outcomes and socially mediated outcomes that depend on the features of the automatic outcome. For example, Todd's and Marta's IBCs at first had automatic outcomes - meals - that differentially perpetuated some variations of the IBCs. Eventually, the IBCs constituting their restaurant were maintained by the ordering behavior of customers. As in the case of social reinforcers for individual behavior, the socially mediated relation between the IBCs of the restaurant and the sustaining income generated from customer purchases provides a foundation for more complex relations. (linha: 236)

Este relato de evento demonstra que em alguns casos o próprio produto agregado pode selecionar a contingência entrelaçada, e que em outros pode ser necessária a mediação social da consequência cultural. Tal mediação recebe a denominação sistema receptor. Aparentemente, portanto, quando as contingências entrelaçadas são mais complexas, torna-se: (1) menos provável que o produto agregado as afete diretamente e (2) mais provável que elas dependam de sistemas receptores (Tourinho & Vichi, 2012, p. 173). Por exemplo, a produção do jornal em si não seleciona as contingências entrelaçadas no relato de evento recém-analisado. É necessário que o jornal satisfaça as exigências do público que o compra ou assina, e

com isso permita o pagamento dos salários dos indivíduos que o produzem e da infra-estrutura necessária para tanto.

Outra conclusão possível a partir do relato dos eventos expostos é a de que se a produção de produtos automáticos *versus* socialmente mediados na metacontingência é análoga ao operante como sugerido por Glenn (linha: 293), considerar que a seleção cultural atua sobre as contingências entrelaçadas e seus produtos seria equivalente a sustentar que o operante e seus produtos são selecionados no segundo nível de seleção. Partindo desta análise, no relato de evento de Glenn no qual uma criança ganha pontos ou aprovação social (consequência) quando lava a louça seria possível considerar como unidades o comportamento de lavar a louça e o produto (louça limpa, por exemplo). Isto é, a interpretação de que a contingência entrelaçada e o produto agregado são selecionados parece incompatível com posicionamentos feitos pela autora em outros momentos.

Considerando as inconsistências conceituais destacadas e a necessidade de viabilizar comparações posteriores com os conceitos de Skinner, optamos por adotar como base para tais comparações o posicionamento da autora exposto há pouco na passagem da linha 236, por ser o único momento em que Glenn discute seu posicionamento sobre quais fenômenos requerem o uso do conceito de sistema receptor. Nesta passagem, Glenn aponta a contingência entrelaçada como variação e argumenta que em algumas situações o produto agregado pode selecioná-la de forma automática, e em outras pode ser necessário a descrição de um terceiro elemento, nomeado sistema receptor.

2.4. Metacontingência

Nos textos de Glenn é possível observar pelo menos duas classes de descrições de eventos que aparecem como a ação da consequência cultural sobre as contingências

entrelaçadas. A primeira classe aborda a seleção de contingências entrelaçadas devido aos efeitos sobre as chances de sobrevivência física dos indivíduos participantes da metacontingência, e está presente principalmente nos primeiros textos da autora, ressurgindo eventualmente até a publicação de 2004a. A segunda, por sua vez, é análoga ao comportamento operante, e surge conjuntamente com o conceito de contingências entrelaçadas, em 1988. Esta segunda classe de relatos de eventos que controlam a emissão do conceito de metacontingência é observada frequentemente em textos mais recentes, sendo a única mencionada nos três últimos textos consultados.

Estas duas classes de relatos de eventos aos quais o conceito de metacontingência é aplicado serão analisadas individualmente. Serão excluídos textos cujas descrições de eventos não sejam suficientemente claras para a presente análise. Neste momento, daremos ênfase ao processo de seleção, uma vez que as unidades envolvidas já foram introduzidas anteriormente.

2.4.1 Metacontingência como seleção de contingências entrelaçadas favoráveis à sobrevivência física dos indivíduos participantes.

A primeira classe de relatos de eventos (linhas: 58, 59, 64, 67, 68, 70, 71, 85, 89, 93, 95, 96, 158, 164, 209, 217, 221) que controlam a emissão do conceito de metacontingência refere-se à seleção de determinadas contingências entrelaçadas em função de seus efeitos sobre a sobrevivência física dos indivíduos participantes. Este é, portanto, um sentido, ou uma classe de relatos de eventos, que pode controlar a afirmação de que esta unidade cultural é selecionada: “When interlocking contingencies, in which an extended group of individuals participate, fail to maintain outcomes that keep the individuals alive and behaving with respect to one another, the culture ceases to exist” (linha: 85).

O exemplo sobre a produção de cestos em uma vila descrito por Glenn (linhas: 66, 67, 68, 70, 71) ilustra este tipo de emprego do conceito de metacontingência. De forma resumida, a autora considera o conjunto de contingências entrelaçadas de tecer cestos para o transporte de água em uma vila. Os cestos produzidos na vila gotejam um pouco. Esta prática cultural, no entanto, varia. É possível que um indivíduo dê um nó ligeiramente diferente, e seja necessário ajustá-los periodicamente para que o cesto não vaze excessivamente. É provável que o indivíduo que carrega a água reclame e instrua o tecelão a fazer sua atividade de forma diferente. Caso os nós não melhorem, é possível que o indivíduo que carrega a água conceda uma parte menor da água para o tecelão.

Outra possibilidade é que a variação na forma de fazer nós resulte em um cesto que não vaze. Neste caso, outros indivíduos podem observar o nó deste tecelão e imitá-lo. Tecer o novo tipo de nó torna-se, então, prática cultural naquela vila: "Interlocking behavioral contingencies that produce watertight baskets become the standard practice" (linha: 67). Este novo tipo de cesto permite estocar água, o que antes era inviável naquela comunidade. Glenn supõe que em algum momento (durante uma seca, por exemplo), estocar água permitiu àquela vila sobreviver, enquanto as vilas que não produziram cestos que permitiam isto desapareceram. Desse modo, a sobrevivência física dos indivíduos participantes da contingência entrelaçada permitiu a replicação posterior dessa prática cultural, enquanto a forma antiga, que gotejava, deixou de existir:

> At some point (during droughts, for example), water storage allowed permaclones[8] that had developed water storage practices to survive while those permaclones that had not produced baskets in which water could be stored

[8] Permaclone é um termo utilizado por Harris (1964) na classificação de entidades culturais e, de acordo com Glenn (1988, p. 163), refere-se a indivíduos comportando-se em repetidos episódios comportamentais nos quais os membros do grupo podem ser substituídos de tempos em tempos.

> disappeared; the basket-making and water-carrying practices of the former permaclone survived while replication of the latter's practices ceased. Only some interlocking behavioral contingencies (cultural practices) were selected by outcomes. (linha: 68)

Nesta possibilidade de análise, considera-se que a consequência cultural (linha: 72) seleciona contingências entrelaçadas que permitem a sobrevivência física dos indivíduos participantes da metacontingência. As práticas são replicadas e mantidas na cultura em decorrência desta sobrevivência física - e também, consequentemente, sobrevivem.

Apesar de indicar relatos de eventos nos quais esta análise é possível, Glenn adverte que em sociedades complexas como as atuais é difícil conceber uma situação na qual uma prática cultural gere produtos que ocasionem a morte de todos os indivíduos envolvidos na prática: "Because sociocultural systems with which we are familiar are so large and complex, it is difficult to imagine circumstances in which a cultural practice has an outcome that results in the death of all the individuals contributing to the outcome" (linha: 158). Outra possibilidade de análise apontada por Glenn, que será tratada no próximo tópico, é a de que as contingências entrelaçadas sejam selecionadas de forma análoga à que ocorre no comportamento operante.

2.4.2 Metacontingência como seleção de contingências entrelaçadas de modo análogo à seleção operante.

A maior parte dos trechos de Glenn selecionados nas categorias de registro (51 ocorrências de um total de 68 trata da seleção de contingências entrelaçadas de forma análoga ao comportamento operante. (linhas: 45, 46, 51, 53, 69, 81, 111, 115, 116, 122, 123, 128, 155, 156, 157, 166, 171, 172, 204, 206, 233, 234, 235, 237, 243, 244, 252, 253, 254, 263, 264, 270, 271, 275, 282, 293, 296, 301, 302, 303, 313, 314, 315, 322,

323, 326, 327, 328, 330, 332, 333): “Paralleling the contingencies of reinforcement that account for the origin and maintenance of operant behavior, metacontingencies account for the origin and maintenance of IBCs and their effects” (linha: 323).

A consequência cultural relaciona-se funcionalmente com as contingências entrelaçadas, afetando a probabilidade de novas ocorrências. Para exemplificar este tipo de processo seletivo, recorreremos à última publicação em co-autoria de Glenn selecionada. O experimento de Vichi, Andery & Glenn (2009) demonstra empiricamente eventos responsáveis pela emissão dos conceitos envolvidos na metacontingência, e será exposto aqui de forma resumida.

No experimento, dois grupos, compostos por quatro participantes cada, deveriam apostar *token*s (cada *token* valia um centavo) em uma matriz de oito colunas por oito linhas com um sinal positivo ou negativo em cada célula. Os participantes escolhiam uma fileira e apostavam e, em seguida, o experimentador escolhia uma coluna. Se a célula formada pela escolha do grupo e do experimentador tivesse um sinal positivo os jogadores recebiam o dobro do número de *tokens* apostados por eles e, se o sinal fosse negativo, perdiam metade dos *tokens* apostados. Após cada tentativa, os participantes deveriam (a) depositar alguns *tokens* do grupo em um vaso e (b) decidir como compartilhar entre os participantes os *tokens* restantes. Nenhum participante poderia ser deixado sem *tokens* após esta distribuição.

Os participantes eram informados que a escolha da quantidade d*e toke*ns a ser depositada no vaso em alguns momentos seria decida pelo experimentador. Esta intervenção ajudava o experimentador a induzir distribuições iguais ou desiguais d*e toke*ns entre os participantes . Na condição experimental A o experimentador escolhia uma coluna que levava ao sinal positivo quando a distribuição de *tokens* na tentativa anterior era feita igualmente entre os jogadores, e um sinal negativo quando a

distribuição era desigual. Já na condição B, ocorria o oposto: a distribuição desigual era seguida por uma escolha do experimentador que produzia um sinal positivo e a distribuição igual por um sinal negativo. A figura abaixo ilustra os estímulos que controlam a emissão de cada conceito proposto por Glenn para o estudo da metacontingência, e como eles se relacionam no experimento.

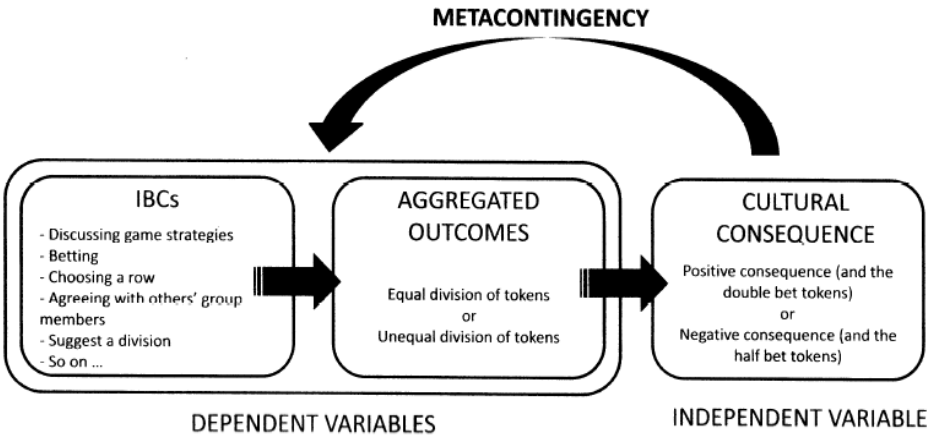

Figura 2: Diagrama esquemático do experimento de Vichi, Andey & Glenn. Fonte: Vichi, C., Andery, M. A., Glenn, S. S. (2009). A Metacontingency Experiment: The Effects of Contingent Consequences on Patterns of Interlocking Contingencies of Reinforcement. Behavior and Social Issues, 18, 1-17

No primeiro grupo as condições foram A-B-A-B e no segundo B-A-B. O experimento demonstrou que a contingência entrelaçada responsável pelo produto (distribuição igual ou desigual de *tokens*) é alterada em função da ação da consequência cultural (*tokens* duplicados ou divididos pela metade): "The interrelated behavior of individuals in groups changes as a function of consequences upon the products of those behaviors" (p. 53). As contingências entrelaçadas são modificadas, portanto, quando a consequência cultural muda: "Furthermore, it shows that changes in the behaviors of

individuals and the group interactions are reversible; that is, individual and ‘group’ patterns change when ‘external contingencies’ change” (p. 53).

Nota-se que diferentemente da primeira classe de relatos de eventos discutida, que descreve a seleção do ambiente externo como efeito das contingências entrelaçadas sobre as chances de sobrevivência física dos participantes da metacontingência, a segunda classe se aproxima mais da seleção operante. Não há obrigatoriamente relação direta entre a consequência cultural e a sobrevivência física dos indivíduos, e sim sobre a probabilidade de recorrência da contingência entrelaçada.

Em diversos momentos, Glenn (linhas: 122, 128, 238, 244) estabelece esta comparação entre os processos de seleção do comportamento individual e seleção cultural:

> The relation between IBCs and their outcomes has functional parallels to the complex relations of behavioral contingencies. The IBCs produce outcomes, variations in instantiations of IBCs cause differential outcomes, and the future frequency of the IBCs as well as their characteristics are a function of the differential relation between instantiations and outcomes. (linha: 238)

Consequências operantes e culturais, portanto, atuam da mesma forma, no sentido de que afetam a probabilidade da recorrência de suas unidades - comportamento operante e contingências entrelaçadas, respectivamente: “The outcomes produced by a cycle of IBCs can affect future cycles of IBCs, just as the consequences of a behavioral occurrence can affect future occurrences of that behavior” (linha: 244).

Glenn argumenta que uma diferença crítica entre comportamento operante e contingências entrelaçadas na metacontingência seja o fato de que as segundas resultem em produtos agregados que não podem ser gerados por indivíduos comportando-se isoladamente: “From the present perspective, behavior is transformed into cultural level

entities when the interlocking behavior of individuals produces aggregate outcomes that could not be achieved by any individual acting alone" (linha: 116). No entanto, em alguns relatos de eventos descritos pela autora (e.g. linhas: 66, 234, 253) os produtos poderiam ser gerados por organismos individuais. Por exemplo, Marta poderia aprender a emitir os comportamentos de Todd e produzir a refeição sozinha (linha: 234).

A própria autora menciona, na descrição discutida em 2.2.3 (envolvendo a produção de peças plásticas moldadas), exemplos de um trabalhador isoladamente produzindo-as e, posteriormente, a ação conjunta dos indivíduos A, B e C. Embora o comportamento entrelaçado possa gerar produtos cuja produção por organismos individuais seria inviável, muitas vezes estes produtos são estruturalmente iguais aos produzidos pelo comportamento operante. Deste modo, o tipo de produto em si não parece ser um elemento crítico para a distinção em relação aos operantes. O que parece caracterizar outro nível de análise não é a natureza do produto, mas o fato de ser resultante do comportamento de indivíduos em interação.

Assim, a metacontingência torna-se um fenômeno especial por envolver o que Glenn descreve como cooperação (linha: 111). Segundo a autora, o comportamento cooperativo - ou seja, comportamento interdependente mantido pelo produto da interação - na metacontingência é que possibilita outro nível de seleção. Retomando o exemplo da metacontingência envolvendo o comportamento de caça de Sam e Deke, temos a seguintes considerações de Glenn:

> In short, individuals cooperate when interdependent behavior produces more reinforcement than independent behavior. Cooperative behavior can be viewed, then, as a form of maximization. Thus, Sam and Deke's behavior in participating in the interlocking contingencies was maintained by the reinforcers produced. The interlocking contingencies were a fortuitous side

> effect of the operant processes accounting for the behavior of each of them. The point critical to the present theoretical perspective, however, is that food that results from the interrelated behavior of Sam and Deke functions in selection processes at two levels. It functions to support the cooperative operants of the participating individuals, as did the reinforcers in the experimental studies cited above. And it also selects the interlocking contingencies themselves in which both Deke's and Sam's behavior participates. The operant processes that result in maximizing also result in the emergence of a cultural-level interactor that functions as a cohesive whole with respect to its selection environment. These two levels of selections can be distinguished in terms of the entities functioning as cohesive wholes in the two selection processes (linhas: 203, 204).

Deste modo, pode ser importante descrever não somente os processos responsáveis pela seleção dos operantes de Sam e Deke, mas também pela seleção da interação entre eles, que permite outro nível de análise em sua explicação. Este outro nível de análise exige que o analista do comportamento esteja sob controle do comportamento entrelaçado de indivíduos como unidade e de uma consequência comum aos participantes, e não apenas do comportamento de um único organismo e suas consequências individuais.

2. 4.3 Relações entre meta e macrocontingência.

É importante aprofundarmos o conceito de macrocontingência e sua relação com o de metacontingência, considerando que é possível compreendermos a seleção cultural a partir das duas perspectivas tratadas em 4.1 e 4.2. Primeiramente, traçaremos relações entre meta e macrocontingência considerando a classe de relatos de eventos analisada em 4.1 e, posteriormente, em 4.2.

2. 4.3.1 Macro e metacontingências: duas fontes de produtos agregados que afetam as chances de sobrevivência física dos indivíduos.

Como discutido, uma possibilidade de aplicação do conceito de metacontingência é a relatos de eventos em que há seleção de produtos agregados em função de seus efeitos sobre a sobrevivência física dos indivíduos participantes. Considerando esta classe de fenômenos, seria possível incluir as macrocontingências nesta definição. Na metacontingência as contingências entrelaçadas, e na macrocontingência os operantes, seriam selecionados devido aos efeitos de seus produtos sobre as chances de sobrevivência dos indivíduos participantes. O processo seria o mesmo, envolvendo apenas unidades diferentes.

Em diversos textos, Glenn afirma explicitamente que a macrocontingência pode gerar produtos agregados que poderiam ter um impacto relevante sobre a sobrevivência da cultura, ou fornece relatos de eventos que evidenciam esta conclusão (linhas: 225, 228, 229, 230, 240, 241, 298, 310, 311): “The relation between any particular cultural practice and its cumulative effect may be critically important to the welfare of the people of the culture, and even to the survival of that culture” (linha: 230).

A poluição do ar, por exemplo, é um produto agregado que pode ser produzido por muitos indivíduos isoladamente dirigindo até o trabalho. O comportamento é mantido por contingências individuais, mas produz consequências socialmente relevantes (linha: 240). Seria possível deduzir que a prática cultural, ou macrocontingência, poderia ser selecionada ou não devido aos seus efeitos sobre as chances de sobrevivência da cultura.

A despeito de mencionar produtos agregados produzidos por macrocontingências que poderiam afetar as chances de sobrevivência da cultura, para

Glenn tais produtos não são selecionados devido a estes efeitos. Na macrocontingência a prática cultural sofreria apenas a ação de consequências operantes. Não haveria, então, seleção cultural envolvida (linha: 300).

Embora o que descrevemos aqui seja uma análise concebível a partir de alguns textos da autora ela não se faz presente nos textos de Glenn. Ou seja, trata-se de uma especulação a partir da possibilidade de interpretação dos da autora exposta em 4.1. Ao estabelecer a diferenciação entre macro e metacontingência, Glenn está sob controle da segunda possibilidade de classe de relatos de eventos, que controlam a emissão do conceito de metacontingência abordada em 4.2.

2.4.3.2 Macro e metacontingências: diferentes processos seletivos.

A segunda classe de relatos de eventos aos quais o conceito de metacontingência é aplicado, como destacado, envolve o efeito da consequência cultural sobre a probabilidade da recorrência da contingência entrelaçada. Ao estabelecer a distinção entre meta e macrocontingência Glenn parece estar sob controle desta forma de seleção.

A principal distinção estabelecida por Glenn entre a macro e a metacontingência é o fato de que na primeira não há entrelaçamento. Um exemplo em que Glenn esclarece as diferenças entre as unidades e processos na macro e metacontingência trata do estilo de corte de cabelo (linhas: 219, 220, 221, 222). Muitos cabeleireiros podem cortar o cabelo seguindo um mesmo estilo, e este comportamento similar pode caracterizá-lo como prática cultural. A autora argumenta, no entanto, que esta similaridade não implica que a prática seja uma unidade cultural. Ou seja, o comportamento de um cabeleireiro não precisa relacionar-se funcionalmente ao comportamento de outro cabeleireiro. Cada cabeleireiro, individualmente, poderia ter simplesmente aprendido ao longo do tempo a cortar o cabelo de determinadas formas

que agradavam seus clientes. Não obstante, os produtos resultantes (os cortes de cabelo) são esteticamente parecidos:

> Neither the hairstyles nor the behavior of the hairdressers are functionally related to one another, even though the behavior of each hairdresser interrelates with the behavior of each of his or her patrons. In this case, the similar behavior of many individual constitutes a cultural practice, but there is no evidence of cultural transmission and, therefore, no cultural-behavioral lineage exists (linha: 221).

Contudo, a autora observa que poderia haver um "ponto de transmissão cultural" que conectasse o comportamento de dois ou mais cabeleireiros. Por exemplo, o cabeleireiro A poderia demonstrar a outros cabeleireiros sua forma de estilo de corte e os outros poderiam passar a cortar o cabelo da mesma forma. Outra possibilidade é que o cabeleireiro A demonstrasse seu estilo de corte em uma revista vista por outros cabeleireiros. Nestes casos, haveria transmissão. Glenn argumenta que o comportamento similar de indivíduos isolados, como abordado anteriormente quando os cabeleireiros comportavam-se isoladamente, é suficiente para considerá-lo como prática cultural. Todavia, isto não é suficiente para assumir transmissão cultural ou uma origem comum, como ocorre nos exemplos de interação entre os cabeleireiros aqui expostos – por meio de demonstração do corte ou publicação em revista.

No contexto apresentado (linha: 220), Glenn aborda distinções entre meta e macrocontingência, e a transmissão decorrente do comportamento social seria uma delas. Ainda que aqui a autora identifique a transmissão como parte do que é próprio da metacontingência, é difícil imaginar algum comportamento que não seja produto da transmissão cultural ou que não a promova – ao menos em culturas complexas. A primeira situação, em que não haveria transmissão, é rara, uma vez que estímulos

sociais fazem parte constante de nosso ambiente. Mesmo na situação hipotética na qual o cabeleireiro houvesse aprendido sozinho o corte de cabelo, o fato de os indivíduos frequentarem o salão para cortar o cabelo e os próprios instrumentos por ele utilizados pressupõem uma transmissão cultural anterior.

Da mesma forma que é difícil conceber um comportamento que não seja produto de transmissão cultural, é pouco provável que o comportamento de um indivíduo não afete a linhagem cultural da qual faz parte. Um exemplo que explicita esta dificuldade de imaginar um comportamento que não envolva transmissão cultural é oferecido por Glenn ao tratar de como o comportamento de um PhD em análise experimental do comportamento poderia não fazer parte das contingências entrelaçadas que compõem a Association for Behavior Analysis (ABA):

> Further, the behavior of participants must enter into interlocking contingencies with the behavior of others if it is to contribute to the evolution of behavior analysis as a cultural entity. For example, imagine that Jodi Student obtained a PhD in the experimental analysis of behavior and promptly relocated to a space station circling the moon, where she continued doing experimental research with her experimental subjects. If Jodi does not report to discuss her results and methods with other behavior analysts, they cannot enter into the cultural entity known as behavior analysis (linha: 171).

A transmissão de práticas culturais, portanto, não parece ser exclusividade da metacontingência. Apesar de Glenn utilizá-la como característica específica da metacontingência nos exemplos da ABA e do estilo do corte de cabelo, como discutido em 2.1.2, a autora aponta que transmissão de práticas culturais também ocorre em práticas sem contingências entrelaçadas (e.g. linhas: 201, 115). Como exemplo, temos o relato de evento do comportamento de caça individual de Sam e Deke (linha: 201).

Antes da cooperação, embora Glenn pontue que o comportamento de caça foi aprendido ao observar membros mais experientes e transmitido entre gerações, não há entrelaçamento ou metacontingência. Portanto, mesmo que seja possível dizer que há entrelaçamento no momento da transmissão o comportamento é mantido por contingências individuais.

Assim como relatos de eventos podem envolver transmissão sem ser classificados como metacontingência, relatos de metacontingência podem não envolver transmissão. O experimento de metacontingência apresentado em 2.4.2 é considerado uma metacontingência ainda que não envolva transmissão operante, mas indivíduos respondendo a um ambiente comum.

Outro aspecto que parece distinguir a metacontingência é o fato de que as contingências entrelaçadas são mais duradouras do que os operantes emitidos pelos indivíduos que a compõem: “These interlocking behavioral contingencies (...) outlive the repertoires of any of their participating organisms so long as they function adequately in the cultural selection contingencies”. (linha: 207). Por transcender a vida de indivíduos a contingência entrelaçada originaria uma unidade passível de seleção cultural: “Cultural content originates when behavioral repertoires of two or more individuals form an enduring unit that has the possibility of lasting beyond the lifetime of those individuals. Evolutionary processes occurring at the cultural level of analysis account for cultural practices that extend across generations” (linha: 139).

No entanto, assim como as contingências entrelaçadas, práticas culturais que não envolvem entrelaçamento também são replicadas entre gerações e, neste sentido, transcendem a vida dos indivíduos que a praticam. Ainda, de modo oposto, nem todas as metacontingências envolvem replicação entre gerações e duração para além da vida

dos indivíduos que a compõem. O experimento com metacontingências mencionado em 4.2 ilustra também este ponto.

Portanto, a transmissão e a produção de uma unidade mais duradoura do que a vida de organismos individuais não são exclusividade da metacontingência. O que há de diferente e que confere especificidade à metacontingência é a presença do entrelaçamento, com um produto agregado e uma consequência que retroage sobre a probabilidade futura da repetição do entrelaçamento - dito de outro modo, a seleção do comportamento cooperativo de indivíduos. As características observadas especificamente nos fenômenos descritos sob o conceito de metacontingência, por conseguinte, são: (1) operantes entrelaçados de indivíduos, (2) que geram um produto agregado, e (3) que são selecionados (operantes entrelaçados) por uma consequência cultural - que pode ou não ser o próprio produto agregado.

3. Relações entre Evolução Cultural em B. F. Skinner e S. S. Glenn

Nos capítulos anteriores, apresentamos os principais conceitos relacionados à noção de evolução cultural em Skinner e Glenn, e analisamos algumas interpretações possíveis a partir dos textos selecionados. No trabalho realizado até aqui, esta tarefa envolveu indicar em que relatos de eventos os conceitos foram empregados pelos autores, investigando sua utilização nas publicações de cada autor isoladamente. Esclarecidos os relatos de eventos que controlam a emissão dos conceitos envolvidos na evolução cultural nos textos de cada autor, torna-se possível estabelecer relações entre suas concepções sobre evolução cultural. Os conceitos propostos por Skinner e Glenn foram agrupados didaticamente em três elementos: unidade de seleção, consequência e processo evolutivo. Cada um destes elementos será discutido individualmente nos tópicos subseqüentes.

3.1 Unidades de Seleção

Ao tratar da evolução cultural, Skinner identifica como unidade cuja variação é selecionada a prática cultural. Glenn, por sua vez, inicia suas publicações indicando como unidade a prática cultural, considerando-a equivalente ao conceito de contingência entrelaçada ou como um conjunto de contingências entrelaçadas. Posteriormente, a autora diferencia prática cultural e contingência entrelaçada e considera a última como unidade de evolução cultural.

A discussão das unidades de seleção passará por quatro etapas. Primeiramente, discutiremos a utilização de um mesmo termo em referência a relatos de eventos que podem ser distintos em Skinner e Glenn: o conceito de prática cultural. Em segundo lugar, identificaremos relatos de eventos com características semelhantes descritos sob níveis de análise distintos: cooperação operante em Skinner e metacontingência em

Glenn. Em seguida, estabeleceremos relações entre as unidades de seleção cultural propostas por cada autor. Por fim, indicaremos similaridades e distinções entre os conceitos de prática cultural em Skinner e as linhagens culturo-comportamentais e culturais em Glenn.

3.1.1 Prática cultural em Skinner e Glenn.

Para Skinner a unidade da seleção cultural é a prática cultural. Nos textos do autor, este conceito refere-se a operantes transmitidos que passam a integrar as contingências de reforçamento social dispostas por um grupo de indivíduos (linhas: 268, 410). As práticas culturais são descritas por Skinner como as variações (linha: 458) ou mutações (linha: 354) sobre as quais a seleção cultural atua.

Embora em seus textos iniciais Glenn identifique a prática cultural com as contingências entrelaçadas e, portanto, com a unidade da seleção cultural, posteriormente elas são diferenciadas. Nos textos de Glenn foram identificados três tipos de relatos de eventos nos quais o conceito de prática cultural é empregado, a saber: os que envolvem operantes transmitidos, operantes similares ou operantes que formam um produto agregado.

Ainda que operantes similares e que formam um produto agregado com freqüência envolvam transmissão cultural, isto nem sempre ocorre. É possível identificar operantes similares sem que haja transmissão cultural daquele operante particular devido a similaridades do ambiente não-social. Da mesma forma, é possível que operantes que formam um produto agregado não sejam produto da transmissão cultural. Um exemplo hipotético de prática cultural sem transmissão apresentado por Glenn (linhas: 219, 220, 221, 222), discutido no capítulo anterior, é o de vários cabeleireiros que emitem operantes similares, cortam o cabelo da mesma forma e, como

produto, diversos indivíduos que são clientes destes cabeleireiros tem estilos de corte de cabelo parecidos: “In this case, the similar behavior of many individual constitutes a cultural practice, but there is no evidence of cultural transmission” (linha: 221).

É possível chegar a duas conclusões até aqui. A primeira, e mais óbvia, é de que as unidades de seleção cultural em Skinner e Glenn recebem terminologias distintas a partir da publicação de 2001a - respectivamente: prática cultural e contingência entrelaçada. A segunda conclusão é de que a aplicação do conceito de prática cultural nas publicações de Glenn estende-se a fenômenos que não necessariamente incluem transmissão operante e, logo, podem diferenciar-se do que é considerado como prática cultural por Skinner. Considerando-se que termo não é necessariamente utilizado pelos autores para abordar os mesmos fenômenos, torna-se indispensável indicar em trabalhos que utilizam o conceito de prática cultural se ele está sendo empregado em conformidade com o tratamento dado por Skinner ou Glenn.

3.1.2 Contingência entrelaçada em Glenn e comportamento cooperativo em Skinner.

No tópico anterior discutimos a aplicação de um mesmo conceito, o de prática cultural, a relatos de eventos distintos. Neste momento, analisaremos conceitos diferentes sendo aplicados a experimentos semelhantes envolvendo comportamento cooperativo. No experimento de Skinner intitulado *Cooperating Pigeons* (linhas: 206, 207, 208) e no experimento de Vichy, Andery & Glenn (2009) observamos organismos comportando-se cooperativamente. Todavia, estes fenômenos semelhantes são analisados a partir de conceitos diferentes, quais sejam: o comportamento operante em Skinner e a metacontingência em Glenn.

Em Skinner, os pombos deveriam cooperar em duas atividades: (1) descobrir o par efetivo de botões e (2) bicá-los ao mesmo tempo. Já no experimento de Vichy, Andery & Glenn (2009), a cooperação envolvia (1) escolher em conjunto uma linha e apostar, (2) depositar alguns *tokens* do grupo em um vaso e (3) decidir como compartilhar entre os participantes os *tokens* restantes. A consequência comum aos participantes no experimento de Skinner era a disponibilidade do alimento e em Vichy, Andery & Glenn a quantidade de *tokens* que poderiam ser trocados por dinheiro ao final das sessões.

Ainda que os experimentos em questão sejam semelhantes no sentido de que há comportamento cooperativo entre indivíduos, Skinner e Glenn utilizam conceitos diferentes para abordá-lo. Skinner limita-se ao conceito de comportamento operante enquanto Glenn adiciona o conceito de metacontingência à descrição do fenômeno.

Observa-se que ainda que o evento pudesse ser satisfatoriamente analisado a partir do comportamento operante, o conceito de metacontingência coloca o leitor sob controle de outro nível de análise. Em *Cooperating Pigeons*, a variável dependente de Skinner é o comportamento de cada pombo individualmente. Por exemplo, ele observa que um dos pombos desenvolveu o padrão de explorar os botões enquanto o outro bicava o botão correspondente (linha: 208). O experimento de metacontingência apresentado, por sua vez, tem como variável dependente o comportamento cooperativo do grupo. Glenn não se atém ao repertório individual de algum membro em particular, mas à interação do grupo como um todo. Por exemplo, o experimento demonstra que a distribuição dos *tokens* (contingência entrelaçada) foi alterada quando a condição experimental mudava (A ou B) (linha: 330).

Assim, ainda que o experimento de Glenn também envolva processos operantes subjacentes, o conceito de metacontingência descreve o mesmo fenômeno a partir de outro nível de análise. Enquanto Skinner descreve a cooperação identificando o comportamento de cada pombo e as consequências contingentes ao operante de organismos individuais, Glenn o faz observando a interação entre indivíduos, ou contingência entrelaçada, e consequências contingentes ao entrelaçamento.

3.1.3 Prática cultural *versus* contingência entrelaçada.

Os termos prática cultural e contingência entrelaçada são conceitos entendidos como unidades de seleção no nível cultural. Tais unidades são utilizadas em referência ao que foi possível identificar como classes de relatos de eventos distintas. Como vimos, o conceito de contingência entrelaçada é mencionado por Glenn em textos que apresentam interação entre indivíduos. Outros termos semelhantes como "*interlocking system*" (linhas: 22, 24, 25, 27) e "*interlocked behavior*" (linhas: 24, 48) aparecem já na obra de Skinner ao tratar de comportamento social que envolve o comportamento de um organismo X como variável para o comportamento de um organismo Y e vice-versa (1.1.2). Nestes casos, a análise completa da interação requer investigar as variáveis necessárias para descrever o comportamento pelo menos dois organismos.

O comportamento de interação formado por dois ou mais indivíduos pode ou não fazer parte de uma metacontingência. A princípio, não necessariamente existe uma consequência funcional contingente à contingência entrelaçada. É possível que a interação entre os indivíduos envolva apenas um indivíduo se comportando em relação ao outro e consequências individuais, como explorado em 1.1.2. A contingência entrelaçada, no entanto, pode produzir uma consequência comum, como ocorre nos relatos de eventos descritos por Skinner como comportamento cooperativo. Nestes casos, o fenômeno recebe o nome de metacontingência.

Enquanto a unidade de seleção da evolução cultural para Glenn se aproxima de um novo nível de análise sobre o comportamento cooperativo tratado por Skinner a partir da noção operante, ela se distancia da unidade proposta por Skinner ao tratar da evolução cultural, isto é, a prática cultural. A prática cultural em Skinner aplica-se a relatos de eventos que não envolvem necessariamente os elementos necessários na metacontingência: (1) a interação repetida entre indivíduos e (2) uma consequência comum que seleciona esta interação. Para Skinner, a prática cultural pode envolver a transmissão de um operante mantido por consequências individuais. Por exemplo, no caso do grupo de macacos, a prática de lavar batatas só apresenta entrelaçamento no momento da transmissão, e não há consequência comum. De modo contrário, a contingência entrelaçada também não requer transmissão operante. O experimento de Vichi, Andery & Glenn (2009) demonstra indivíduos em interação e consequências comuns. Há grupos de indivíduos agindo em conjunto em relação ao mesmo ambiente, mas não há evidência de transmissão operante.

Embora o experimento de metacontingência analisado seja especialmente didático para a diferenciação estabelecida por não envolver transmissão, em sociedades complexas quase todo comportamento é produto de transmissão operante ou envolve contingências entrelaçadas e metacontingências em alguma medida. Não obstante, características específicas estão presentes quando Skinner ou Glenn empregam seus conceitos de prática cultural ou contingência entrelaçada. As unidades de seleção cultural em Skinner e Glenn, portanto, são diferentes tanto em sua nomenclatura quanto em relação aos relatos de eventos que controlam a emissão dos conceitos.

3.1.4 Prática cultural em Skinner e as linhagens culturo-comportamentais e culturais em Glenn.

Conforme discutido, segundo Skinner, a transmissão operante dá origem a práticas culturais que são consideradas unidades sobre as quais a seleção cultural atua. A princípio, contudo, a transmissão de práticas culturais não requer que se trate deste outro tipo de processo seletivo (linha: 410). Como demonstrado nos relatos de eventos discutidos em 1.3.2, práticas culturais podem ser transmitidas e mantidas em uma cultura em função de consequências operantes. Por exemplo, um indivíduo pode produzir uma nova ferramenta que permite caçar com maior facilidade e transmitir este operante, que é mantido no seu próprio repertório e no de outros membros da cultura devido às consequências reforçadoras proporcionadas por este operante.

A prática cultural, não obstante, é uma unidade diferenciada do comportamento de membros da cultura considerados individualmente. A transmissão operante torna possível a perpetuação de práticas da cultura mesmo quando seus praticantes são substituídos, constituindo uma unidade mais duradoura do que o repertório de organismos individuais (linha: 178).

Skinner explica que uma criança que nasce em uma cultura sofre a ação de um ambiente que é, em grande medida, social (linha: 176). Este ambiente social dispõe de variáveis, práticas culturais, que são fruto de uma história anterior que possibilitou feitos provavelmente impossíveis durante o período de vida de um único indivíduo. Skinner observa, por exemplo, que muitas das aquisições da humanidade foram resultados de acidentes extraordinários. Todavia, processos como a imitação, a modelação e o comportamento verbal permitiram que outros indivíduos ficassem sob controle das mesmas contingências fortuitas (linhas: 429).

Esta unidade chamada de prática cultural e assinalada por Skinner como variação que é objeto da seleção no terceiro nível é denominada por Glenn linhagem culturo-comportamental. Retomemos um exemplo previamente discutido em Glenn que envolvia os indivíduos Sam e Deke engajados na prática cultural de caça. No relato de evento, supõe-se que a cultura da qual Sam e Deke participam desenvolveu determinadas técnicas para capturar animais. As primeiras instâncias dos operantes relacionados à caça emergentes nos repertórios destes indivíduos foram produtos da observação de outros membros da cultura. Tais operantes transmitidos na cultura recebem o nome de linhagens culturo-comportamentais, e referem-se à repetição, possivelmente com alguma variação, de comportamentos que foram bem sucedidos na captura de animais por gerações anteriores (linha: 201).

Segundo Glenn, as linhagens culturo-comportamentais diferenciam-se das linhagens operantes – ou seja, de operantes emitidos por um único individuo. Enquanto linhagens operantes são restritas à existência dos indivíduos que emitem a resposta, o operante transmitido pode continuar a ser replicado mesmo quando um membro da cultura morre:

> The distinction between operant lineages and culturo-behavioral lineages rests on the fact that operant lineages are parts of the repertoires of individual organisms and they cease to exist when their host organism dies; A culturo-behavioral lineage exists so long as the operant lineages of any participant repertoires continue being replicated in the repertoires of other participants. (linha:199)

O termo linhagens culturo-comportamentais de Glenn parece equivalente ao conceito de práticas culturais em Skinner, sendo utilizado sob controle de relatos de eventos semelhantes. É possível agrupar tais relatos de eventos sob uma mesma

classificação, composta por operantes adquiridos por um indivíduo e transmitidos a outros membros da espécie por qualquer meio de comportamento social. Ainda que os conceitos de linhagem culturo-comportamental de Glenn e prática cultural de Skinner sejam aplicados ao que foi possível identificar como o mesmo tipo fenômeno, para Glenn esta linhagem ainda não constitui uma unidade de seleção no terceiro nível.

Glenn afirma que este tipo de linhagem mais simples poderia originar entidades mais inclusivas, chamadas de linhagens culturais. Continuando o relato da situação hipotética anterior, Glenn supõe que Sam e Deke passam a caçar cooperativamente. Neste caso, Sam e Deke estariam, a cada caça, um sob controle das respostas emitidas pelo outro. Notoriamente, as interações repetidas são necessárias, mas não suficientes para o que Glenn denomina como linhagem cultural. Seria possível que operantes fossem transmitidos e mantidos em parte por variáveis sociais sem que haja uma consequência conjunta que mantivesse o entrelaçamento. Logo, nas linhagens culturais faz-se imprescindível uma consequência comum à contingência entrelaçada, que recebe o nome de consequência cultural. Glenn destaca que nesta situação a consequência conjunta manteria não apenas os operantes individuais de Sam e Deke, mas uma unidade coesa formada pelos seus comportamentos entrelaçados (linha: 202):

> Repetitions of operant acts under control of the behavior of conspecific are required for the emergence of culturo-behavioral lineages. When the behavior replicated in culturo-behavioral lineages participates in repetitions of interlocking behavioral contingencies, cultural-level selection becomes possible. Cultural-level selections is selection of interlocking behavioral contingencies, not just the behavior of individuals. (linha: 207)

O principal aspecto que diferencia as linhagens culturais das culturo-comportamentais, de acordo com Glenn, é o fato de que somente a primeira apresenta

processos em dois níveis. A consequência produzida pelo comportamento entrelaçado de Sam e Deke seleciona não apenas seus operantes, mas a própria inter-relação entre eles - isto é: “as long as the cultural interactors result in consequences that maintain the interlocking contingencies as a cohesive whole, the cultural lineage continues to be susceptible to evolution by differential selection”. (linha: 204)

Identificamos dois processos no exemplo apresentado. Quando apresenta o conceito de linhagens culturo-comportamentais Glenn descreve um relato de evento envolvendo a transmissão de operantes, qual seja: a imitação do comportamento de membros mais experientes e posterior emissão de comportamentos relacionados à captura da presa que produzem uma consequência responsável por sua manutenção no repertório de cada indivíduo. Já ao abordar o conceito de linhagens culturais, Glenn trata do comportamento cooperativo de Sam e Deke na caça e das consequências comuns que mantêm o entrelaçamento. Em ambos os casos, como veremos adiante, as descrições de Glenn se afastam do que é considerado por Skinner como evolução cultural, pois os processos indicam consequências que afetam a probabilidade de recorrência de um operante ou um entrelaçamento.

Embora no caso das linhagens culturo-comportamentais Glenn esteja tratando de uma unidade idêntica à skinneriana, ou seja, operantes transmitidos, ela descreve consequências operantes, e não consequências relacionadas aos efeitos sobre as chances de sobrevivência da cultura. Pode-se dizer que Glenn está tratando da ação operante sobre práticas culturais, entendidas aqui, em conformidade com Skinner, como operantes transmitidos. No segundo caso, por sua vez, Glenn aparentemente descreve o comportamento cooperativo sob um novo nível de análise, no qual a própria interação passa a ser a variável dependente, como discutido em 3.1.2.

A análise realizada permitiu constatar que os conceitos utilizados ao tratar da unidade de seleção no terceiro nível e as classes de relatos de eventos às quais eles são empregados são frequentemente relacionados de formas distintas por Skinner e Glenn. É possível identificar conceitos idênticos aplicados a classes de relatos de eventos diferentes e, de modo oposto, classes de relatos de eventos semelhantes sendo tratadas por conceitos diversos em Skinner e Glenn. A Tabela 4 retrata estas relações. Enquanto a parte superior da tabela relaciona conceitos comuns em Skinner e Glenn e as classes de relatos de eventos aos quais eles são aplicados, a inferior relaciona classes de relatos de eventos comuns e os conceitos utilizados para tratá-las.

Tabela 4: Unidades de seleção cultural: Relações entre o tratamento de Skinner e Glenn a conceitos comuns e relatos de eventos (RE) agrupados na mesma classe.

	SKINNER	GLENN
Conceitos comuns:	***Classes de RE***	
Prática cultural	Operantes transmitidos	Operantes transmitidos Operantes que formam um produto agregado Operantes similares
Contingência entrelaçada	Comportamento de X como variável para Y e vice-versa	Comportamento de X como variável para Y e vice-versa
Classes de RE comuns:	***Conceitos***	
Operantes transmitidos	Prática cultural	Prática cultural Linhagem culturo-comportamental
Comportamento cooperativo	Contingência de reforço	Metacontingência

3.2 Consequência Cultural

Um aspecto comum entre os textos de Skinner e Glenn é o fato de que em ambos a prática cultural pode gerar efeitos que são resultado da ação de mais de um indivíduo. Para facilitar a leitura do texto, nomeamos estes efeitos de consequência cultural.

Quando os relatos de eventos descritos por Skinner indicam consequências no terceiro nível de seleção, elas referem-se a efeitos relacionados à sobrevivência física dos membros da cultura. Práticas culturais são mantidas não somente por consequências operantes, mas porque permitiram a sobrevivência daquela cultura no passado e tendem a perpetuar-se ou desaparecer em função destes efeitos. Já nos textos de Glenn, o produto agregado é qualquer tipo de efeito produzido pela ação de mais de um indivíduo, seja em conjunto (metacontingência) ou isoladamente (macrocontingência). Os exemplos apresentados pela autora incluem basicamente três tipos de relatos de eventos envolvendo produto agregado: (1) relatos de eventos nos quais o produto agregado parece relacionar-se com a sobrevivência da cultura, (2) relatos de eventos nos quais o produto agregado ou sistema receptor seleciona um entrelaçamento de forma análoga ao operante e (3) relatos de eventos nos quais o produto agregado não tem função.

Como em alguns casos o conceito de produto agregado pode ser aplicado a relatos de eventos que apresentam efeitos sobre a sobrevivência da cultura, a consequência cultural em Skinner e Glenn pode coincidir. Por exemplo, Glenn (linhas: 66, 67, 68, 70, 71) apresenta um relato de evento em que um indivíduo aprendia a tecer cestos que não gotejavam e transmitia este operante para outros membros da cultura. Esta prática cultural tornou possível o estoque de água que, durante uma seca, permitiu a sobrevivência física dos membros da cultura em questão.

No entanto, há dois outros tipos de produto agregado que divergem dos tipos de fenômenos identificados como consequência cultural em Skinner. Um deles trata do produto agregado de forma análoga ao produto do comportamento operante. No exemplo de Marta e Todd cozinhando em conjunto (linha: 233), Glenn identifica como produto agregado a refeição produzida por eles. Tal consequência cultural diverge da skinneriana, considerando que os efeitos sobre a sobrevivência são irrelevantes.

Finalmente, há os casos em que o produto agregado não tem função, ou seja, ele é simplesmente a identificação de algum resultado do comportamento de mais de um indivíduo. Como ilustração deste tipo de relato de evento, temos o exemplo da certificação do analista do comportamento na Flórida (2.2.2) e o estilo de corte de cabelo (linhas: 219, 220, 221, 222). O produto agregado, neste caso, não seleciona a contingência entrelaçada e nem afeta as chances de sobrevivência da cultura.

Os relatos de eventos que abordam efeitos do comportamento de mais de um indivíduo, aqui chamados de consequência cultural, são distintos em Skinner e Glenn. Embora em alguns exemplos Glenn aponte como consequência cultural um fenômeno que parece ser semelhante ao tratado por Skinner pelo conceito de sobrevivência da cultura, isto ocorre em relativamente poucos textos e não aparece em publicações recentes. Aparentemente, ao longo de suas publicações Glenn se distancia da proposta skinneriana em termos do que é considerado como consequência cultural. A seguir, aprofundaremos esta questão ao estender a investigação ao processo de evolução cultural.

3.3 Relações Entre o Processo de Evolução Cultural em Skinner e Glenn

Em 2.4 identificamos dois tipos de relatos de eventos que parecem controlar a emissão do conceito de metacontingência em Glenn. A primeira classe de relatos de

eventos aproxima-se da noção de evolução cultural em Skinner, apontando efeitos sobre as chances de sobrevivência física dos indivíduos participantes da metacontingência. Este tipo de relato de evento encontra-se principalmente nos primeiros textos da autora, e o último trecho incluído nesta categoria é da publicação de 2004a. Já a segunda classe é análoga ao comportamento operante, e é observada em textos mais recentes, sendo a única mencionada nos três últimos textos consultados. Cada uma destas interpretações será relacionada com o tratamento dado a evolução cultural em Skinner.

3.3.1 Sobrevivência da cultura em Skinner e metacontingência em 2.4.1.

Em Skinner, o conceito de evolução cultural é empregado em relatos de eventos que tratam da sobrevivência da cultura. Como mencionado em 1.3.1, ao utilizar o conceito de sobrevivência da cultura Skinner refere-se à seleção de práticas culturais em função de seus efeitos sobre a sobrevivência física dos membros da cultura. Alguns relatos de eventos apresentados por Glenn, principalmente em seus primeiros textos, aproximam-se do posicionamento de Skinner sobre a evolução cultural. Glenn expõe diversos exemplos (linhas: 58, 59, 64, 67, 68, 70, 71, 85, 89, 93, 95, 96, 158, 164, 209, 217, 221) que tornam possível uma análise que identifica a consequência cultural com efeitos relacionados à sobrevivência da cultura. Esta comparação está ilustrada abaixo por um trecho extraído de Skinner, seguido por um trecho de Glenn:

> The fact is that cultural practices have evolved in which contingencies of immediate reinforcement generate behavior having remote consequences and this has presumably happened in part because the consequences have strengthened the culture, permitting it to solve its problems and hence *survives* [grifo acrescentado]. That the remote consequences, no matter how important for the culture, are nevertheless not having any current effect is all too evident

> when efforts are made to take into account a future which is not the by-product of currently reinforced behavior (linha: 314).
>
> Individuals participating in a practice maintained the behavior of other participants because their own behavior in doing so was reinforced. When the practice emerged in the culture, the behavioral components remained intact so long as the individuals' behavior was reinforced (or, perhaps, doing otherwise was punished). This practice was not directed toward a cultural "end". However, the practice had an outcome that affected *survival of the group* [grifo acrescentado] at a later time. The ability of the group to increase water production during a drought (due to their superior water storing, which resulted from improved basket making) would result in that permaclone's survival (and further replication of that practice). (linha: 73)

Além disso, sobretudo em seu primeiro artigo sobre metacontingências, Glenn estabelece características relacionadas à evolução cultural idênticas às skinnerianas, afirmando que a consequência operante é imediata, enquanto na seleção cultural teríamos uma consequência de longo prazo. A seguir um trecho de Skinner e outro de Glenn, respectivamente, que evidenciam esta aproximação:

> Aside from any immediate return we have to note the possible *long-term effect* [grifo acrescentado] of education. Like family pride or education by members of the group, the explicit educational institution may be explained by a different sort of consequence to the group to be considered in Section VI. (linha: 107)
>
> The metacontingency is the unit of analysis describing the functional relations between a class of operants, each operant having its own immediate, unique

> consequence, and a *long term consequence* [grifo acrescentado] commom to all the operants in the metacontongency. (linha: 5)

Como salientado no primeiro capítulo, Skinner enfatiza constantemente a necessidade de planejar contingências imediatas que reforcem o comportamento dos indivíduos envolvidos em práticas culturais, uma vez que a consequência cultural ocorre em longo prazo, e não tem efeito atual sobre o comportamento. Ou seja, diferentemente da consequência operante, a consequência cultural não aumenta a probabilidade de que práticas culturais ocorram. De forma análoga à filogênese, as práticas que permitiram a sobrevivência dos membros da cultura simplesmente sobrevivem ou não. Em seu artigo de 1986, Glenn apresenta uma posição aparentemente semelhante. A autora argumenta que a consequência cultural é de longo prazo, e muito remota para manter o comportamento dos indivíduos engajados na prática, sendo necessário dispor do que ela chama de contingências de mediação:

> Take, for example, the various behaviors involved in producing the long term consequence of reduced air pollution. Engineers must engage in the various operants involved in designing catalytic converters; assembly line workers must learn to build them and integrate them into working parts of the car; costumers must buy those cars and pump unleaded gasoline; refinery personnel must develop and use the process of taking the lead out of gasoline. The likelihood of all these operants occurring without socially mediated contingencies appears to be small. The mediating contingencies are designed and implemented because of the relation of such mediation to long term outcomes such as reduced pollution. (linha: 6)

O exemplo acima demonstra um relato de evento em Glenn que descreve a poluição do ar como consequência cultural. Considerando que a poluição do ar é um produto do comportamento que pode afetar as chances de sobrevivência dos membros da cultura, ele pode ser incluído nas mesmas classes de relatos de eventos relacionadas à noção de seleção cultural em Skinner.

Embora alguns relatos de eventos apresentados por Glenn descrevam consequências culturais semelhantes às skineriannas, nem todos os relatos de eventos que apresentam aspectos relacionados à sobrevivência da cultura são identificados pela autora como seleção cultural. Além disso, enquanto para Glenn a evolução cultural atua apenas sobre as contingências entrelaçadas, para Skinner ela atua sobre práticas culturais compreendidas como operantes transmitidos. Como vimos, no entanto, nem sempre estes operantes transmitidos são constituídos por comportamento entrelaçado de forma recorrente. É possível que haja entrelaçamento apenas durante a transmissão, e que as consequências que mantêm o operante sejam individuais.

Em decorrência desta distinção entre unidades de seleção, práticas culturais na macrocontingência não são compreendidas como unidades de evolução cultural, mesmo quando afetam as chances de sobrevivência da cultura. Glenn (linhas: 224, 225) apresenta um relato de evento em que analisa as consequências individuais produzidas pelo comportamento de dirigir ou optar por outro meio de locomoção para ir ao trabalho. Neste caso, a consequência cultural observada pela autora é a poluição do ar. Este tipo de produto agregado afeta as chances de sobrevivência dos membros da cultura e poderia ser identificado como consequência cultural nos textos de Skinner. Contudo, para Glenn não há seleção cultural envolvida.

3.3.2 Sobrevivência da cultura e metacontingência em 2.4.2.

A expressiva maioria dos textos de Glenn (51 ocorrências de um total de 68) trata a evolução cultural de forma completamente distinta de Skinner. Além da distinção entre unidades de seleção já pontuada, a consequência cultural e o processo pela qual ela atua sobre as unidades envolvem fenômenos diferentes. Enquanto a evolução cultural em Skinner refere-se à seleção de práticas culturais que promovem a sobrevivência física dos membros da cultura, em Glenn o termo trata da seleção de contingências entrelaçadas e produtos agregados que satisfazem às demandas do ambiente.

Conforme apontado há pouco, o primeiro texto de Glenn sobre metacontingências, de 1986, é semelhante à abordagem de Skinner sobre evolução cultural, e indica a consequência operante como uma consequência de curto prazo, e a consequênia cultural como uma consequência de longo prazo, que não tem efeito direto sobre o comportamento dos indivíduos. Todavia, esta concepção é modificada ao longo das publicações da autora. Posteriormente, Glenn passa a fornecer definições de metacontingência e relatos de eventos que tratam a consequência cultural na metacontingência como uma consequência análoga às operantes:

> Metacontingencies, like behavioral contingencies, involve two kinds of causality. …. First, the recurrences of IBCs produce outcomes (analogous to consequences produced by recurrences of operant responses). Second, *the outcomes affect the future frequency and other measures of the future recurrences of those IBCs* [grifo acrescentado]. The contingencies of selection in metacontingencies are between cultural-level units (IBCs) and their selecting environments. (linha: 245)

Diferentemente da consequência cultural em Skinner, as consequências culturais descritas por Glenn podem ocorrer logo após o comportamento, e não se relacionam, necessariamente, com a sobrevivência da cultura. Outra distinção importante é o fato de que a consequência cultural apresenta uma relação funcional com as contingências entrelaçadas e, portanto, exerce controle sobre o comportamento dos participantes. Como destacado no primeiro capítulo, contudo, para Skinner, diferentemente das consequências operantes, as consequências culturais não têm efeito direto sobre o comportamento, no sentido de aumentar sua freqüência ou alterar sua topografia. A consequência cultural em Skinner simplesmente seleciona ou não as práticas culturais: quando os membros da cultura sobrevivem, a prática cultural, conseqüentemente, sobrevive com eles:

> A culture, however, is the set of practices characteristic of a group of people, and it is selected by a different kind of consequence, its contribution to the survival of the group. That is an important point. Although the controlled use of fire may contribute to the survival of the culture of which it is a part, *that consequence is too remote to reinforce* [grifo acrescentado] the behavior of any member of the group. (linha: 477)

Para Glenn, as consequências culturais diferenciam-se das operantes apenas no sentido de que são produzidas por mais de um indivíduo. Como exemplo, (linhas: 251, 252, 253) temos as peças plásticas moldadas, consideradas consequência operante quando produzidas por um indivíduo e produto agregado quando produzidas por mais de um indivíduo. Em Skinner, todavia, estamos considerando outro efeito. Este não se dá sobre a probabilidade de ocorrência das práticas culturais ou contingências entrelaçadas, mas sobre a sua manutenção na cultura quando promove a sobrevivência

física de seus membros. Portanto, é possível considerar a evolução cultural em Skinner análoga à filogênese e em Glenn à ontogênese.

Para esclarecer esta distinção compararemos brevemente um relato de evento envolvendo seleção cultural em Skinner e outro em Glenn. Em Skinner, selecionamos o exemplo de da prática cultural de lavar batatas em macacos, por ser o único relato de evento no qual as variáveis estão suficientemente especificadas para a presente análise. Em Glenn, por sua vez, elegemos o experimento com metacontingências de Vichi, Andry e Glenn (2009) por ser baseado em dados empíricos.

Em 1.4, foi apresentado integralmente o relato de evento identificado como evolução cultural por Skinner. No exemplo do grupo de macacos, Skinner (linha: 455) descreve o que sistematizamos em três eventos: (1) a aquisição de um operante por um indivíduo: "A monkey accidentally dips a sweet potato into the sea water, and the resulting salted, grit-free potato is specially reinforcing. Dipping is therefore repeated and becomes a standard part of the monkey`s repertoire."; (2) a transmissão do operante entre os membros da cultura e a nomeação deste operante transmitido como prática: "Other monkeys then imitate the behavior and come under the control of the same contingencies. Eventually, all the monkeys on a given island wash their sweet potatoes. Washing would usually be called a cultural practice."; (3) os efeitos desta prática cultural sobre as chances de sobrevivência da cultura: "If, for example, washing sweet potatoes prevented the spread of a fatal disease, the resulting contribution to the survival of the group would not be a reinforcing consequence".

Em Glenn, o termo evolução cultural refere-se a um fenômeno diferente. No experimento de metacontingências descrito em 2.4.2, identificamos: (1) comportamento de interação entre indivíduos - isto é, a contingência entrelaçada, (escolher a fileira,

determinar a quantidade de *tokens* a ser depositada no vaso, distribuir os *tokens* restantes entre si); (2) um produto da interação entre os indivíduos - isto é, o produto agregado, (distribuição igual ou desigual); e (3) os efeitos da consequência cultural comum aos participantes da metacontingência (sinal positivo ou negativo) sobre a recorrência de novos entrelaçamentos: "The interrelated behavior of individuals in groups changes as a function of consequences upon the products of those behaviors"(p. 53).

No exemplo de Skinner não há interação entre indivíduos, exceto no momento da transmissão. O operante de lavar batatas é mantido por consequências individuais, e não por consequências comuns aos macacos do grupo. A consequência cultural é o efeito sobre a sobrevivência dos membros do grupo que seleciona ou não as práticas culturais, e não qualquer outro efeito que retroage funcionalmente sobre elas. De modo oposto, no experimento de metacontingência a interação entre indivíduos não envolve transmissão de operantes, mas indivíduos se comportando entre si e em relação a um ambiente comum. Além disso, na metacontingência a consequência cultural exerce controle sobre a contingência entrelaçada e altera sua probabilidade de ocorrência.

3.3.3 Sobrevivência da cultura como sobrevivência dos seus conjuntos de contingências de reforçamento social e a metacontingência.

Ao tratar da evolução cultural em Skinner, discutimos que uma possibilidade de análise pautada por algumas ocorrências do conceito de sobrevivência da cultura, ou de termos utilizados por ele como sinônimos, é a de que a cultura sobrevive quando promove a sobrevivência dos próprios conjuntos de contingências de reforçamento social que a constituem. Esta possibilidade de interpretação foi identificada em trechos de um capítulo específico de *Beyond freedom and dignity* (1971) intitulado *The evolution of a culture*. Neste capítulo, Skinner fornece descrições que sugerem que uma

cultura sobrevive quando garante a sobrevivência de seu conjunto de contingências de reforçamento ou de determinadas práticas culturais. Como exemplos, temos os seguintes trechos: “Why should I be concerned about the survival of a particular kind of economic system?” (linha: 249) e “The simple fact is that a culture which for any reason induces its members to work for its survival, or for the survival of some of its practices, is more likely to survive” (linha: 247).

Em relação à Skinner, concluímos que este posicionamento é raro em seus textos, e que é e incoerente com a noção apresentada na maior parte das ocorrências identificadas, que trata a sobrevivência da cultura como sobrevivência de conjuntos de contingências de reforçamento social que promovem a sobrevivência física dos membros da cultura. Ainda, argumentamos que a hipótese de que a cultura sobrevive quando suas práticas promovem a sobrevivência das próprias práticas é redundante e, aparentemente, incorreta, pois o processo conduziria a um conjunto de práticas estático. De forma oposta, contudo, as práticas culturais variam e são selecionadas conforme sua adaptação ao ambiente permite que seus membros continuem vivos e as transmitindo, o que pode ou não requerer a manutenção temporária de práticas específicas.

De uma forma semelhante ao emprego do termo “sobrevivência da cultura” à sobrevivência dos próprios conjuntos de contingências de reforcamento social que compõem a cultura, Glenn apresenta trechos (e.g.: 139, 238, 244, 282) que utilizam o termo “sobrevivência” para abordar a manutenção de determinadas contingências entrelaçadas. Glenn afirma que as práticas culturais, na metacontingência, sobrevivem quando o produto agregado gerado pelos participantes preenche os requisitos do ambiente selecionador (linha: 139). O seguinte relato de evento envolvendo um restaurante ilustra esta proposição: “The restaurant will survive only if its food and its

physical features (ambience) meet the requirements of the selecting environment (people who eat there)" (linha: 270).

Mas, em que sentido Glenn constata que um produto agregado pode ou não estar adaptado ao ambiente? Como já debatido, as consequências culturais na metacontingência afetam as contingências entrelaçadas de forma análoga ao operante. Se uma consequência cultural seleciona um entrelaçamento quando o mantém ou aumenta sua probabilidade de ocorrência, é possível concluir que as considerações de Glenn sobre quando uma contingência entrelaçada (ou um conjunto delas) sobrevive são semelhantes ao que seria possível observar em relação ao operante. Ou seja, neste caso, o termo sobrevivência é aplicado ao fenômeno da repetição de determinados padrões de resposta, que são fortalecidos por uma consequência que ocorre logo após o comportamento.

Se no contexto da evolução cultural a conclusão de que a cultura sobrevive quando promove a sobrevivência de suas próprias práticas é incoerente (pois seria equivalente a sustentar que características de uma espécie que produzem a sobrevivência daquelas características sobrevivem), quando a expressão é avaliada em relação à metacontingência é necessário atentar para um fenômeno diferente. A contingência entrelaçada pode sobreviver, presumivelmente, da mesma forma pela qual um operante sobrevive no repertório comportamental de um organismo - isto é, quando as consequências produzidas tornam provável sua repetição.

Conclusão

O presente estudo sugere que embora as propostas conceituais de Skinner e Glenn sejam supostas por Glenn e por parte da literatura analítico-comportamental como referentes ao mesmo fenômeno, isto é, a evolução cultural, uma análise aprofundada destes dois autores parece refutar esta possibilidade interpretativa. Destacamos distinções em relação aos conceitos utilizados e relatos de eventos que parecem controlar sua emissão nos três elementos avaliados, quais sejam: unidade de seleção, consequência cultural e processo evolutivo.

Na obra de Skinner consultada, o termo evolução cultural é aplicado a relatos de eventos envolvendo operantes transmitidos, que compõem práticas culturais, selecionados devido ao favorecimento das chances de sobrevivência física dos membros da cultura. Trata-se de um processo análogo à filogênese e que não tem efeito atual sobre as práticas de uma cultura. Skinner afirma simplesmente que as práticas que permitiram que os indivíduos de uma cultura sobrevivessem sobrevivem com eles, enquanto as práticas que não promoveram tal sobrevivência, conseqüentemente, são extintas.

Embora especialmente alguns relatos de eventos nas primeiras publicações de Glenn possam indicar um processo similar ao tratado por Skinner, posteriormente sua concepção de evolução cultural é refinada em diversos aspectos. Em seus textos recentes, Glenn aplica o termo metacontingência predominantemente a relatos de eventos que envolvem comportamento cooperativo e consequências comuns aos participantes que podem ser automáticas (produto agregado) ou mediadas socialmente (sistema receptor). Como foi possível diferenciar, este não é o mesmo tratamento dado por Skinner ao comportamento cooperativo, visto que Glenn está assumindo como

variável dependente o próprio comportamento inter-relacionado dos indivíduos, e não o comportamento de sujeitos específicos.

Em relação ao tratamento de grupos de indivíduos como unidades, Skinner sempre se atém ao repertório de organismos individuais, ainda que esteja analisando fenômenos grupais: “a scientific analysis which satisfies these conditions confines itself to individual organisms rather than statistical constructs or *interacting groups of organisms* [grifo acrescentado], even in the study of social behavior” (linha: 174). Apesar de propor suas análises sempre em nível individual, entretanto, Skinner não nega a possibilidade de que outro nível de análise de fenômenos sociais possa ser útil: “another level of description may also be valid and may well be more convenient” (Skinner, 1953/2014, p. 297). Inclusive, relatos de eventos apresentados pelo autor generalizam os efeitos de contingências semelhantes em operação, o que parece um indício de que outro nível de análise possivelmente seja necessário ao tratar de situações envolvendo um número grande de indivíduos.

O nível de análise proposto por Glenn pode ser extremamente relevante em uma análise de determinados tipos de fenômenos sociais, pois permite uma descrição diferenciada do operante no qual a seleção da própria interação entre indivíduos é colocada como variável de interesse. Esta contingência entrelaçada mantida por consequências comuns pode ser simples ou envolver sistemas complexos de atividades coordenadas com numerosos participantes emitindo diversas respostas. Desta forma, pode ser conveniente descrever a evolução destes sistemas de comportamentos coordenados a partir de um nível de análise próprio.

A despeito da importância dada à noção de evolução cultural na obra de Skinner, o efeito relacionado à sobrevivência da cultura, neste trabalho chamado de consequência cultural, não tem influência direta sobre o comportamento dos membros

da cultura. Assim, embora invariavelmente as culturas sejam selecionadas por este processo, Skinner observa que mudanças no âmbito cultural são possíveis unicamente através da manipulação de contingências de reforçamento. Neste sentido, a noção de evolução cultural traz contribuições para a Análise do Comportamento ao indicar a finalidade última de um planejamento cultural: a sobrevivência física dos membros da cultura. No entanto, o autor não fornece ferramentas adicionais ao conceito de contingência de reforçamento para atingi-lo. Trata-se de um constructo que tem implicações para o domínio ético, e somente de forma indireta o tecnológico.

Ainda que a conclusão sobre a utilidade de um novo nível de análise seja da competência de pesquisas aplicadas, o conceito de metacontingência é uma ferramenta em potencial para intervenções em escala cultural. Assim, quando o comportamento de indivíduos em interação gera um produto, tem-se indicado a possibilidade de modificar o comportamento dos participantes através da manipulação de consequências compartilhadas ao invés de consequências individuais. Neste sentido, ao menos em relação aos trabalhos de Skinner, pode-se afirmar que o conceito de metacontingência é uma perspectiva conceitual e tecnológica inovadora no tratamento de fenômenos sociais. Não obstante, diferentemente da evolução cultural em Skinner, o processo seletivo na metacontingência aproxima-se do nível operante – conclusão fortalecida por pesquisas experimentais com metacontingência que demonstram processos análogos aos operantes como, por exemplo, o reforçamento negativo (Saconatto & Andery, 2013) e esquemas de reforçamento intermitente (Amorim, 2010).

A partir da análise realizada é possível concluir que os tratamentos dados à evolução cultural nos trabalhos de Skinner e Glenn são diferentes, mas não incompatíveis. Ou seja, os conceitos propostos pelos autores abordam fenômenos distintos e suas análises sobre a evolução cultural podem ser complementares no estudo

da cultura, embora não sejam coincidentes. Assim como os efeitos operantes sobre as práticas culturais, as metacontingências se inserem como um nível de análise responsável pela seleção de práticas culturais que não substitui, mas pode ser somada, ao conceito de evolução cultural de Skinner no estudo da cultura pela Análise do Comportamento. Por fim, concluímos que existe a necessidade de distinção entre estas duas propostas conceituais, que não demonstram estar sob controle de um mesmo "terceiro nível de seleção".

Referências Bibliográficas

Amorim, V. C. (2010). Análogos experimentais de metacontingências: efeitos da intermitência da consequência cultural. (Dissertação de Mestrado, Pontifícia Universidade Católica de São Paulo). Recuperado de http://accultura.files.wordpress.com/2011/05/virginia-cordeiro-amorim.pdf

Andery, M. A. P. A. (2010). Métodos de pesquisa em análise do comportamento. *Psicologia USP, 21,* 313-342.

Andery, M. A. P. A. (2011). Comportamento e cultura na perspectiva da análise do comportamento. *Revista Perspectivas, 2,* 203-217.

Andery, M. A. P. A. & Sério, T. M. A. P. (2005). O conceito de metacontingências: afinal, a velha contingência de reforçamento é insuficiente? Em Todorov, J.C.; Martone, R.C.; Moreira, M.B (Orgs.), *Metacontingências: comportamento, cultura e sociedade* (pp. 149-159). Santo André: Esetec. (Trabalho original publicado em 1997)

Andery, M. A. P. A., Micheletto, N., & Sério, T. M. A. P. (2004). Publicações de B. F. Skinner: de 1930 a 2004. *Revista Brasileira de Terapia Comportamental e Cognitiva, 6,* 94-134

Andery, M. A. P. A., Micheletto, N. & Sério, T. M. de A. P. (2005). A análise de fenômenos sociais: esboçando uma proposta para identificação de contingências entrelaçadas e metacontingências. *Revista Brasileira de Análise do Comportamento, 1,* 149-165.

Borba, A., Silva, B. R., Cabral, P. A. A., Leite, F. L. & Tourinho, E. Z. (2014). Effects of exposure to macrocontingencies in isolation and social situations in the production of ethical self-control. *Behavior and Social Issues*, 23, 5-19. doi:10.5210/bsi.v23i0.4237

Caldas, R. A. (2013). *Unidades de seleção em três níveis de análise: diferenças entre unidades comportamentais e culturais*. (Tese de doutorado, Pontifícia Universidade Católica de São Paulo) Recuperado de http://accultura.files.wordpress.com/2014/02/rodrigo-araujo-caldas.pdf

Carrara, K. (2006). *Análise do Comportamento e questões sociais: qual a contribuição das metacontingências?* Anais do II Encontro de Análise do Comportamento de Curitiba. Curitiba: Universidade Federal do Paraná.

Dittrich, A. (2004). *Behaviorismo radical, ética e política: aspectos teóricos do compromisso social*. (Tese de doutorado, Universidade Federal de São Carlos) Recuperado de http://www.dfmc.ufscar.br/uploads/publication s/4ef37629b64 95.pdf

Leite, Felipe L. (2009). *Efeitos de instruções e história experimental sobre a transmissão de práticas de escolha em microculturas de laboratório*. (Dissertação de Mestrado, Universidade Federal do Pará). Recuperado de http://www3.ufpa.br/ppgtpc/dmdocuments/MESTRADO/DissertFelipeLeite2009. pdf

Glenn, S. S. (1986). Metacontingencies in Walden Two. *Behavior Analysis and Social Action*, 6, 2-8.

Glenn, S. S. (1988). Contingencies and metacontingencies: Toward a synthesis of behavior analysis and cultural materialism. *The Behavior Analyst*, 11, 161-179.

Glenn, S. S. (1989). Verbal behavior and cultural practices. *Behavior Analysis and Social Action, 7*, 10-14.

Glenn, S. S. (1991a) Contingencies and metacontingencies: Relations among behavioral, cultural, and biological evolution. Em P. A. Lamal (Org.), *Behavioral*

Analysis of Societies and Cultural Practices (pp. 39-73). Washington: Hemisphere Press.

Glenn, S. S. & Malagodi, E. F. (1991b). Process and content in behavioral and cultural phenomena. *Behavioral and Social Issues, 1*, 1-14.

Glenn, S. S. (2001). On The design of cultures: 1961-2001. *Behavior and Social Issues, 11*, 14-15.

Glenn, S. S. (2003a). Behavioral contingencies and the origins of culture. Em K. A. Lattal, & P. N. Chase (Orgs.). Behavior Theory & Philosophy. Plenum Press.

Glenn, S. S. (2003b). Windows on the 21st Century. *The Behavior Analyst, 16*, 133-151.

Glenn, S. S. (2004). Individual Behavior, Culture, and Social Change. *The Behavior Analyst, 27*, 133-151.

Glenn, S. S., & Malott, M. E. (2004). Complexity and Selection: Implications for Organizational Change. *Behavior and Social Issues, 13*, 89-106.

Harris, M. (1964). *The nature of cultural things*. New York: Random House.

Houmanfar, R. & Rodrigues, J. (2006). The metacontingency and the behavioral contingency: Points of contact and departure. *Behavior and Social Issues, 15*, 13-30.

Malott, M. E., & Glenn, S. S. (2006). Targets of Intervention in Cultural and Behavioral Change. *Behavior and Social Issues, 15*, 31-56.

Martone, R. C. & Banaco, R. A. (2005). Comportamento social: A imprensa como agência e ferramenta de controle social. Em J. C. Todorov, R. C. Martone, & M. B. Moreira (Orgs.), *Metacontingências: Comportamento, cultura e sociedade* (pp. 61-80). Santo André: ESETec.

Morford, Z. H. & Cihon T. (2013). Developing an experimental analysis of metacontingencies: considerations regarding cooperation in a four-person

prisoner's dilemma game. *Behavior and Social Issues*, 22, 5-20.doi: 10.5210/bsi.v.22i0.4207

Saconatto, A. T. & Andery, M. A. P. A. (2013). Seleção por metacontingências: um análogo experimental de reforçamento negativo. Interação em Psicologia, 17 (1), 1-10.

Sampaio, A. A. S. (2008). *A quase-experimentação no estudo da cultura: análise da obra Colapso de Jared Diamond*. (Dissertação de Mestrado, Pontifícia Universidade Católica de São Paulo). Recuperado de http://accultura.files.wordpress.com/2008/04/sampaio-2008-a-quase-experimentacao-no-estudo-da-cultura.pdf

Skinner, B. F. (1948). *Walden Two*. New York: Macmillan.

Skinner, B. F. (1957). *Verbal behavior*. New York: Appleton-Century-Crofts.

Skinner, B. F. (1969a). The role of the environment. Em B. F. Skinner, *Contingencies of reinforcement: A theoretical analysis* (pp. 3-28). New York: Appleton-Century-Crofts.

Skinner, B. F. (1969b). Utopia as an experimental culture. Em B. F. Skinner, *Contingencies of reinforcement: A theoretical analysis* (pp.29-49). New York: Appleton-Century-Crofts.

Skinner, B. F. (1971). *Beyond freedom and dignity*. New York: Pelican Books.

Skinner, B. F. (1972a). Freedom and control of men. Em B. F. Skinner (Org.), *Cumulative Record: A selection of papers* (pp. 3-19). New York: Appleton-Century-Crofts. (Trabalho original publicado em 1956)

Skinner, B. F. (1972b). Freedom and control of men. Em B. F. Skinner (Org.), *Cumulative Record: A selection of papers* (pp. 51-58). New York: Appleton-Century-Crofts.

Skinner, B. F. (1972c). Some issues concerning human behavior. Em B. F. Skinner (Org.), *Cumulative Record: A selection of papers* (pp.25-39). New York: Appleton-Century-Crofts. (Trabalho original publicado em 1959)

Skinner, B. F. (1972d). The control of human behavior. Em B. F. Skinner (Org.), *Cumulative Record: A selection of papers* (pp.19-25). New York: Appleton-Century-Crofts. (Trabalho original publicado em 1955)

Skinner, B. F. (1972e). The design of cultures. Em B. F. Skinner (Org.), *Cumulative Record: A selection of papers* (pp.39-51). New York: Appleton-Century-Crofts. (Trabalho original publicado em 1961)

Skinner, B. F. (1972f). The design of experimental communities. Em B. F. Skinner (Org.), *Cumulative Record: A selection of papers* (pp.58-69). New York: Appleton-Century-Crofts.

Skinner, B. F. (1972g). Two "synthetic social relations". Em B. F. Skinner (Org.), *Cumulative Record: A selection of papers* (pp.533-537). New York: Appleton-Century-Crofts. (Trabalho original publicado em 1962)

Skinner, B. F. (1972h). Why are the behavioral sciences not more effective? Em B. F. Skinner (Org.), *Cumulative Record: A selection of papers* (pp.421-429). New York: Appleton-Century-Crofts.

Skinner, B. F. (1974). *About behaviorism*. New York: Alfred A. Knopf.

Skinner, B. F. (1978a). Are we free to have a future? Em B. F. Skinner (Org.), *Reflections on behaviorism and society* (pp. 16-32). Englewood Cliffs, NJ: Prentice-Hall. (Trabalho original publicado em 1973)

Skinner, B. F. (1978b). Can we profit from our discovery of behavioral science? Em B. F. Skinner (Org.), *Reflections on behaviorism and society* (pp. 83-97). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1973)

Skinner, B. F. (1978c). Freedom and dignity revisited. Em B. F. Skinner (Org.), *Reflections on behaviorism and society* (pp. 195-199). Englewood Cliffs, NJ: Prentice-Hall. (Trabalho original publicado em 1973)

Skinner, B. F. (1978d). Humanism and behaviorism. Em B. F. Skinner (Org.), *Reflections on behaviorism and society* (pp. 48-56). Englewood Cliffs, NJ: Prentice-Hall. (Trabalho original publicado em 1973)

Skinner, B. F. (1978e). Human behavior and Democracy. Em B. F. Skinner (Org.), *Reflections on behaviorism and society* (pp. 3-16). Englewood Cliffs, NJ: Prentice-Hall. (Trabalho original publicado em 1973)

Skinner, B. F. (1978f). The ethics of helping people. Em B. F. Skinner (Org.), *Reflections on behaviorism and society* (pp.33-48). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1973)

Skinner, B. F. (1978g). Walden two revisited. Em B. F. Skinner (Org.), *Reflections on behaviorism and society* (pp.56-67). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1973)

Skinner, B. F. (1987a). News from nowhere, 1984. Em B. F. Skinner (Org.), *Upon further reflection* (pp.33-51). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1984)

Skinner, B. F. (1987b). Selection by consequences. Em B. F. Skinner (Org.), *Upon further reflection* (pp.51-64). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1981)

Skinner, B. F. (1987c). The contrived reinforcer. Em B. F. Skinner (Org.), *Upon further reflection* (pp.173-185). Englewood Cliffs: Prentice-Hall.

Skinner, B. F. (1987d). The evolution of behavior. Em B. F. Skinner (Org.), *Upon further reflection* (pp.65-74). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1984)

Skinner, B. F. (1987e). The evolution of verbal behavior. Em B. F. Skinner (Org.), *Upon further reflection* (pp.75-93). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1986)

Skinner, B. F. (1987f). What is wrong with the daily life in the western world? Em B. F. Skinner (Org.), *Upon further reflection* (pp. 15-33). Englewood Cliffs: Prentice-Hall. (Trabalho original publicado em 1986)

Skinner, B. F. (1987g). Why we are not acting to save the world? Em B. F. Skinner (Org.), *Upon further reflection* (pp. 1-15). Englewood Cliffs: Prentice-Hall.

Skinner, B. F. (1988). The operational analysis of psychological terms. In A. C. Catania & S. Harnad (Orgs.), *Canonical papers of B. F. Skinner* (pp.547-553).New York: Cambridge University Press. (Trabalho original publicado em 1945)

Skinner, B. F. (1989a). Genes and behavior. Em B. F. Skinner (Org.), *Recent issues in the analysis of behavior* (pp. 49-56). Columbus: Merrill. (Trabalho original publicado em 1988)

Skinner, B. F. (1989b). New preface to beyond freedom and dignity. Em B. F. Skinner (Org.), *Recent issues in the analysis of behavior* (pp. 113-120). Columbus: Merrill.

Skinner, B. F. (2014). *Science and human behavior*. The B. F. Skinner Foundation. Recuperado de http://www.bfskinner.org/newtestsite/wp-content/uploads /2014/02/ScienceHumanBehavior.pdf (Trabalho original publicado em 1953)

Todorov, J. C. (2006). The metacontingency as a conceptual tool. *Behavior and Social Issues*, 15, 92-94. doi: 10.5210/bsi.vl5il.347

Todorov, J. C. Moreira, M., Prudêncio, M. R. A., & Pereira, G. C. C. (2004). Um estudo de contingências e metacontingências no Estatuto da Criança e do Adolescente. Em J. C. Todorov, R. C. Martone, & M. B. Moreira (Orgs.), *Metacontingências: Comportamento, cultura e sociedade* (pp. 45-54). Santo André: ESETec.

Tourinho, E. Z. (1999). Estudos conceituais na análise do comportamento. *Temas em Psicologia, 7*, 213-222.

Tourinho, E. Z. (2006). *Subjetividade e Relações Comportamentais*. Tese (Professor Titular) não-publicada. Universidade Federal do Pará, Belém. Recuperado de http://www.ufpa.br/ppgtpc/dmdocuments/disciplinas/2008SubjetividadeeComportamento.pdf

Tourinho, E. Z. (2010). Métodos de pesquisa conceitual em análise do comportamento. Trabalho apresentado no *XIX Encontro Brasileiro de Psicoterapia e Medicina Comportamental*, Campos do Jordão.

Vasconcelos, L. A. (2013). Exploring macrocontingencies and metacontingencies: experimental and non-experimental contributions. *Suma Psicológica*, 20(1), 31-43.

Vieira, A. B. S. N., Woelz, T. A. R. & Glenn, S. S. (2012). Effect of resource scarcity on dyadic fitness in a simulation of two-hunter nomoclones. *Revista Latinoamericana de Psicologia*, 44(1), 159-167.

Vichi, C., Andery, M. A.P.A. & Glenn, S. S. (2009). A metacontingency experiment: the effects of contingent consequences on patterns of interlocking contingencies of reinforcement. *Behavior and Social Issues, 18,* 41-57. doi:10.5210%2Fbsi.v18i1.2292

Anexo I

CATEGORIAS DE REGISTRO SKINNER			
L	**T**	**C**	**REFERENCIA**
2	**1**	**3S4S**	... Resembles the decision of the citizens of Samuel Butler's Erewhon, where the instruments and products of science were put into museums - as vestiges of a stage in the evolution of human culture which did not survive. (p.5)
3	**2**	**1S**	Social behavior may be defined as the behavior of two or more people with respect to one another or in concert with respect to a common environment. (p.297)
4	**2**	**1S**	Many generalizations at the level of the group need not to refer to behavior at all. There is an old law in economics, called Gresham's Law, which states that bad money drives good money out of circulation. If we can agree as to what money is, whether it is good or bad, and when it is in circulation, we can express this general principle without making specific reference to the use of money by individuals. Similar generalizations are found in sociology, cultural anthropology, linguistics, and history. But a "social law" must be generated by the behavior of individuals. It is always an individual who behaves, and he behaves with the same body and according to the same processes as in a non-social situation. If an individual possessing two pieces of money, one good and one bad, tends to spend the bad and save the good - a tendency which may be explained in terms of reinforcing contingencies - and if this is true of a large number of people, the phenomenon described by the Gresham's Law arises. The individual behavior explains the group phenomenon. Many economists feel the need for some such explanation of all economic law, although there are others who would accept the higher level of description as valid in its own right. (p. 298)
5	**2**	**1S**	We are concerned here simply with the extent to which an analysis of the behavior of the individual which has received substantial validation under the favorable conditions of a natural science may contribute to the understanding of social phenomena. To apply our analysis to the phenomena of the group is an excellent way to test its adequacy, and if we are able to account for the behavior of people in groups without using any new term or presupposing any new process or principle, we shall have revealed a promising simplicity in the data. (p. 298)
6	**2**	**1S**	Social behavior arises because one organism is important to another as part of its environment. (p.298)
7	**2**	**1S**	Social reinforcement. Many reinforcements require the presence of other people. In some of these, as in certain forms of sexual and pugilistic behavior, the other person participates merely as an object. We cannot describe the reinforcement without referring to another organism. But social reinforcement is usually a matter of personal mediation. When a mother feeds her child, the food, as a primary reinforcer, is not social, but the mother behavior presenting it is. The difference is slight - as one may see by comparing breast-feeding with bottle-feeding. (p. 298-299)
8	**2**	**1S**	The contingency established by a social reinforcing system may slowly change. ... The child who has gained attention with three requests on the average may later find it necessary to make five, then seven, and so on. The change corresponds to an increasing tolerance for aversive stimulation in the reinforcing person. Contingencies of positive reinforcement may also drift in the same direction. When a reinforcing person becomes harder and harder to please, the reinforcement is made contingent upon more extensive or highly differentiated behavior. (p. 300)

9	**2**	**1S**	We have already noted another peculiarity of social reinforcement: the reinforcing system is seldom independent of the behavior reinforced. This is exemplified by the indulgent but ambitious parent who withholds reinforcement when his child is behaving energically, either to demonstrate the child's ability or to make the most efficient use of available reinforces, but who reinforces an early response when the child begins to show extinction. This is a sort of combined ratio-and-interval reinforcement. Educational reinforcements are in general of this sort. They are basically governed by ratio schedules, but they are not unaffected by the level of the behavior reinforced. As in piecework pay, more and more may be demanded for each reinforcement as a performance improves, but remedial steps may be needed. Schedules of reinforcement which adjust to the rate of the behavior reinforced do not often occur in inorganic nature. (p.301)
10	**2**	**1S**	A social stimulus, like any other stimulus, becomes important in controlling behavior because of the contingencies into it enters. The facial expression which we group together and call "smiles" are important because they are the occasions upon which certain kinds of social behavior receive certain kinds of reinforcement. (p. 301-302)
11	**2**	**1S**	Some social stimuli are also frequently set apart because a very slight physical event appears to have an extremely powerful effect. But this is true of many non-social stimuli as well; to one who has been injured in a fire a faint smell of smoke may be a stimulus of tremendous power. Social stimuli are important because the social reinforces with which they are correlated are important. (p. 302)
12	**2**	**1S**	Social stimuli are important to those to whom social reinforcement is important. The salesman, the courtier, the entertainer, the seducer, the child striving for the favor of his parents, the "climber" advancing from one social level to another, the politically ambitious - all are likely to be affected by subtle properties of human behavior, associated with favor or disapproval, which are overlooked by many people. It is significant that the novelist, as a specialist in the description of human behavior, often shows an early history in which social reinforcement has been especially important. (p. 303)
13	**2**	**1S**	The social stimulus which is least likely to vary from culture to culture is that which controls the imitative behavior described in Chapter VII. The ultimate consequences of imitative behavior may be peculiar to the culture, but the correspondence between the behavior of the imitator and that of the imitate is relative independent of it. Imitative behavior is not entirely free of style of convention, but the special features of the imitative repertoire characteristic of a group are slight. When a sizable repertoire has once been developed, imitation may be so skilful, so easy, so "instinctive", that we are likely to attribute it to some such special mode of interpersonal contact as empathy. It is easy to point to a history of reinforcement, however, which generates behavior of this sort. (p.304)
14	**2**	**1S**	We may analyse a social episode by considering one organism at a time. Among the variables to be considered are those generated by a second organism. We then consider the behavior of the second organism, assuming the first as a source of variables. By putting the analyses together we reconstruct the episode. The account is complete if it embraces all the variables needed to account for the behavior of the individuals. (p. 304)
15	**2**	**1S**	[social episode] Consider, for example, the interaction between predator and prey called "stalking". We may limit ourselves to that behavior of the predator which reduces the distance between itself and its pray and that behavior of the prey which increases the distance. A reduction in the distance is positively reinforcing to the predator and negatively reinforcing to the prey; an increase is negatively reinforcing to the predator and positively reinforcing to the prey. If the predator is stimulated by the prey, but not vice versa, then the predator simply reduces the distance between itself and the prey as rapidly as possible. If the prey is stimulated by the predator, however, it will respond by increasing the distance. This need not to be an open flight, but simply any movement sufficient to keep the distance above a critical value. In the behavior called stalking the predator reduces the distance as rapidly as possible without stimulating the prey to increase it. When the distance has become short enough, the predator may break into open pursuit, and the prey into open flight. (p.304-305)

16	**2**	**1S**	[social episode] A similar formulation may be applied where "distance" is not so simple as in movement in space. In conversation, for example, one speaker may approach a topic from which another moves away uneasily. The first may be said to stalk the second if he approaches the topic in a such way as to avoid stimulating the second to escape. We eliminate the figure of speech in "approaching a topic" by analysing the reinforcing and aversive properties of verbal stimuli. (p. 305)
17	**2**	**1S**	Another example of a social episode is leading and following. This generally arises when two or more people are reinforced by a single external system which requires their combinated action - for example, when two men pull on a rope which cannot be moved by either one alone. The behavior of one is similar to that of the other, and the interaction may be slight. If the timing is important, however, one man will pace the other. The first sets a rhythmic pattern relatively independent of the second; the second times his behavior by that of the first. The first may facilitate this by amplifying the stimuli which affect the second - as by saying, "All together now, one, two, three, pull!" (p. 305)
18	**2**	**1S**	[social episode] The nature of leading and following is clearer when the two kinds of behavior differ considerably and the contingency of reinforcement is complex. A division of labour is usually then required. The leader is primarily under the control of external variables, while the follower is under the control of the leader. A simple example is ballroom-dancing. The reinforcing consequences - both positive and negative - depend upon a double contingency: (1) the dancers must execute certain sequences of steps in certain directions with respect to the available space and (2) the behavior of one must be timed to correspond with the other. This double contingency is usually divided between the dancers. The leader sets the pattern and responds to the available space; the follower is controlled by the movements of the leader and responds appropriately to satisfy the second contingency. (p. 305)
19	**2**	**1S**	It is easy to set up cooperative situations with two or more experimental organisms and to observe the emergence of leading and following. In a demonstration experiment two pigeons are placed in adjacent cages separated by a glass plate. Side by side near the glass are two vertical columns of three buttons each, one column being available to each pigeon. The apparatus is set to reinforce both pigeons with food but only when they peck corresponding buttons simultaneously. Only one pair of buttons is effective at any one time. The situation calls for a rather complicated cooperation. The pigeons must explore the three pairs to discover which is effective, and they must stroke both buttons in each pair at the same time. These contingencies must be divided. One bird - the leader - explores the buttons, sticking them in some characteristic order or more or less random. The other bird - the follower - strikes the button opposite whichever button is being struck by the leader. The behavior of the follower is controlled almost exclusively by the behavior of the leader, whose behavior in turn is controlled by the apparatus which randomizes the reinforcements among the three pairs of buttons. Two followers or two leaders placed together can solve the problem only accidentally. The function of leader may shift from one bird to another over a period of time, and a temporary condition may arise in which both are followers. The behavior then resembles that of two people who, meeting under circumstances where the convention of passing on the right is not strongly observed, oscillate from side to side before passing. ... The leader is not wholly independent of the follower, however, for his behavior requires the support of corresponding behavior on the part of others, and to the extent that cooperation is necessary, the leader is, in fact, led by his followers. (p. 306)

20	**2**	**1S**	Verbal episode. ... An alternative formulation would require too much space here, but a single example may suggest how this sort of social behavior may be brought within range so natural science. Consider a simple episode in which A asks B for a cigarette and gets one. To account for the occurrence and maintenance of this behavior we have to show that A provides adequate stimuli and reinforcement for B and vice versa. A's response "Give me a cigarette", would be quite ineffective in a purely mechanical environment. It has been conditioned by a verbal community which occasionally reinforces it in a particular way. A has long since formed a discrimination by virtue of which the response is not emitted in the absence of a member of that community . He has also probably formed more sublet discriminations in which he is more likely to respond in the presence of an "easy touch". B has either reinforced this response in the part or resembles someone who has. The first interchange between the two is in the direction of B to A: B is a discriminative stimulus in the presence so which A emits the verbal response. The second interchange is in the direction A to B: the response generates auditory stimuli acting upon B. If he is already disposed to give a cigarette to A - for example, if B is "anxious to please A" or "in love with A", the auditory pattern is a discriminative stimulus for the response of giving a cigarette. B does not offer cigarettes indiscriminately; he waits for a response from A as an occasion upon which a cigarette will be accepted. A's acceptance depends upon a condition of deprivation in which the receipt of a cigarette is reinforcing. This is also the condition in which A emits the response "Give me a cigarette", and the contingency which comes to control B's behavior is thus established. The third interchange is A's receipt of the cigarette from B. This is the reinforcement of A's original response and completes our account of it. If B is reinforced simply by evidence of the fact of the cigarette upon A, we may consider B's account closed also. But such behavior is more likely to remain a stable part of the culture if these evidences are made conspicuous. If A not only accepts the cigarette but also says, "Thank you", a fourth interchange takes place: the auditory stimulus is a conditioned reinforcer to B, and A produces it just because it is. B may in turn increase the likelihood of future "Thank you's" on the part of A by saying, "Not at all". (p. 307-308)
21	**2**	**1S2S**	Another example [social episode] is a practice common on sailing ships in the eighteenth century. Sailors would amuse themselves by tying several boys or younger men in a ring to a mast by their left hands, their right hands remaining free. Each boy was given a stick or whip and told to strike the boy in front of him whenever he felt himself being struck by the boy behind. The game was begun by striking one boy lightly. This boy then struck the boy ahead of him, who in turn struck the boy next ahead, and so on. Even though it was clearly in the interest of the group that all blows be gentle, the inevitable result was a furious lashing. (p. 309)
22	**2**	**1S**	[social episode] The unstable elements in this interlocking system are easy to identify. We cannot assume that each boy gave precisely the kind of blow he received because this is not an easy comparison to make. It is probable that he underestimated the strength of the blows he gave. The slightest tendency to give a little harder than he received would produce the ultimate effect. Moreover, repeated blows probably generate an emotional disposition in which one naturally strikes harder. (p. 309)
23	**2**	**1S**	[social episode] A comparable instability is seen when two individuals engage in a casual conversation which leads to a vituperative quarrel. The aggressive effect of a remark is likely to be underestimated by the man who makes it, and repeated effects generate further aggression. (p. 309)

24	**2**	**1S2S**	Although the interchange between two or more individuals whose behavior is interlocked in a social system must be explained in its entirety, certain variables may remain obscure. ... Sometimes a reciprocal interchange explains the behavior in terms of reinforcement. Each individual has something to offer by way of reinforcing the other, and once established, the interchange sustains itself. We may detect mutual reinforcement in the case of a mother and a child. Instead of tendencies to behave in certain ways, they may illustrate tendencies to be reinforced by certain social stimuli. Aside from this, the group may manipulate special variables to generate tendencies to behave in ways which result in the reinforcement of others. The group may reinforce the individual for telling the truth, helping others, returning favors, and reinforcing others in turn for doing the same. The Golden Rule is a generalized statement of the behavior thus supported by the group. Many important interlocking systems of social behavior could not be maintained without such conventional practices. This is an important point in explaining the success of cultural practices characteristic of the group. (p. 309-3010)
25	**2**	**1S**	To the extent that prior reinforcement by the group determines the suitability of the behavior of the individual for the individual for an interlocking system, the system itself is not wholly self-sustaining. The instability is demonstrated when an individual who is not adequately controlled by the culture gains a temporary personal advantage by exploiting the system. ... The boy in the fable cries, "Wolf!" because certain patterns of social behavior have been established by the community and he finds the resulting behavior of his neighbors amusing. The aggressive door-to-door salesman imposes upon the good manners of the housewife to hold her attention in the same way. In each case the system eventually breaks down: the neighbors longer respond to the cry of "Wolf!" and the housewife slams the door. (p. 310)
26	**2**	**1S**	The behavior of two individuals may be related in a social episode, not primarily through an interchange between them, but through common external variables. The classic example is competition. Two individuals come into competition when the behavior of one can be reinforced only at the cost of the reinforcement of the other. Social behavior as here defined is not necessarily involved. Catching a rabbit before it runs away is not very different from catching it before someone else does. In the latter case, a social interchange may occur as a by-product if one individual attacks the other. (p. 310-311)
27	**2**	**1S**	Cooperation, in which the reinforcement of two or more individuals depends upon the behavior of both or all of them, is obviously not the opposite of competition for its appears to require an interlocking system. (p. 311)
28	**2**	**1S**	The Group as a Behaving Unit. It is common to speak of families, clans, nations, races and other groups as if they were individuals. Such concepts as "the group mind", "the instinct of the herd", and "national character" have been invented to support this practice. Is always the individual who behaves, however. The problem presented by the larger group is to explain why many people behave together. Why does a boy join in a gang? Why does a man join a club or fall in with q lynching mob? We may answer questions of this sort by examining the variables generated by the group which encourage the behavior of joining and conforming. We cannot do this simply by saying that two individuals will behave together cooperatively if it is "in their common interest to do so". We must point to specific variables affecting the behavior of each of them. From a practical point of view, as in setting up cooperative behavior in the pigeon demonstration just described, an analysis of the relevant variables is also essential. The particular contingencies controlling the behavior of the co-operators must be carefully maintained. (p. 311)
29	**2**	**1S**	Some progress toward explaining the participation in a group is made by the analysis of imitation. In general, behaving as others behave is likely to be reinforcing. Stopping to look in a store window which has already attracted a crowd is more likely to be reinforced than stopping to look in store windows which have not attracted crowds. Using words which have already been used by others, rather than strange terms, is more likely to be reinforced positively or to be free of aversive consequences. Situations of this sort multiplied a thousand fold generate and sustain an enormous tendency to behave as others are behaving. (p. 311-312)

30	**2**	**1S**	To this principle we must add another of perhaps greater importance. If it is always the individual who behaves, it is nevertheless the group which has more powerful effect. By joining a group the individual increases his power to achieve reinforcement. The man who pulls on a rope is reinforced by the movement of the rope regardless of the fact that others may be pulling at the same time. The man attired in full uniform, parading smartly down the street, is reinforced by the acclaim of the crowd even though it would not be forthcoming if he were marching alone. The coward in the lynching mob is reinforced when his victim writhes in terror as he shouts at him - regardless of the fact that a hundred others are, and must be, shouting at him also. The reinforcing consequences generated by the group easily exceed the sums of the consequences which could be achieved by the members separately. The total reinforcing effect is enormously increased. (p. 312)
31	**3**	**1S**	In the important case now to be considered the effect is one of reinforcement. A behaves in a way which alters B's behavior because of the consequences which B's behavior has for A. We say, colloquially, that A is deliberately controlling B. This does not mean that A is necessarily able to identify the cause or effect of his action. When a baby cries for his mother's attention, he generates an aversive stimulus which he withdraws when the mother pays attention. As a result, the behavior of the mother in paying attention is reinforced. Neither the baby nor the mother may understand the processes involved, but we may still say that the baby has learned how to control his mother in this respect. (p. 313)
32	**3**	**1S**	The controller's relation to the controllee may then be characterized as that of governor to governed, priest to communicant, therapist to patient, employer to employee, teacher to pupil, and so on. But almost everyone controls some relevant variables, apart from such a role, which he may employ to his own advantage. This we may speak of as personal control. ... The strong man uses the variables which derive from his strength. The wealthy man resorts to money. The pretty girl uses primary or conditioned sexual reinforcement. The weakling becomes a sycophant. The shrew controls through aversive stimulation. (p. 314)
33	**3**	**1S2S**	When compared with the practices of organized agencies, personal control is nevertheless weak. A man of great wealth, a gangster with a gun, or an extremely beautiful woman is the occasional exception to the rule that the individual is rarely, simply as an individual, able to alter the variables affecting other people in very important ways. (p. 314)
34	**3**	**1S2S**	The limitations of personal control have led to standard practice in which available variables are first manipulated in order to establish and maintain contact between controller and controllee. If this move is successful, further possibilities of control may then be developed. (p. 314)
35	**3**	**1S**	The preliminary stage of maintaining contact with the controllee is best seen in the career of the entertainer or, somewhat less obviously, the writer, artist, or musician. People of this sort exploit their relatively poor sources of control almost exclusively to increase the probability that the controllee will come back for more. The principal technique is reinforcement. We might say, in fact, that it is the business of the entertainer, writer, artist, or musician to create reinforcing events. (p. 315)
36	**3**	**1S2S**	Physical force is the most immediately effective technique available to those who have the necessary power. In its most immediately personal form it is exemplified by the wrestler who suppresses the behavior of his opponent through sheer physical restraint. The most extreme form of restraint is death: the individual is kept from behaving by being killed. Less extreme forms include the use of handcuffs, strait jackets, jails, concentration camps, and so on. These all suggest violent control, often for extremely selfish purposes, but even highly civilized societies use physical restraint in the control of children, criminals, and the dangerously insane. (p. 315)
38	**3**	**1S**	If the individual possesses money or goods, he may use them for purposes of reinforcement in the form of wages, bribes, or gratuities. If he is in a position to do someone a favor, he can reinforce accordingly. He may also be able to offer his own physical labor, either to an employer in return for wages or to a friend in return for a particular action. Sexual stimulation is a common form of reinforcement and is widely used in personal control. (p. 317)

39	**3**	**1S**	Negative reinforcement is employed in personal control in the aversive cry of the child and the nuisance value of the behavior of an adult. Control is achieved by making the withdrawal of these aversive stimuli contingent upon the response to be strengthened. Forgiveness and acquittal are similarly reinforcing. The bully who pommels another boy until he cries "Uncle!", the police who employ the third degree to obtain a confession, and the nation which makes war until the enemy surrenders, exemplify the same use of aversive stimulation. (p. 317)
40	**3**	**1S**	[Personal control] Punishment as the removal of positive reinforcers, conditioned or unconditioned, is exemplified by cutting a dependent off "without a cent", refusing to supply food or shelter previously given, imposing economic sanctions, and refusing customary sexual contact. Another important example is withholding customary social stimulation, as in snubbing an acquaintance or "putting a schoolboy on silence". Lesser degrees of such punishments are social neglect and inattention. (p. 318)
41	**3**	**1S**	[Personal control] Physical injury is exemplified by spanking a child, striking an adult, and attacking a nation. Conditioned aversive stimuli, many of them verbal, are exemplified by disapproval and criticism, by damning and cursing, by ridicule, and by the carrying of bad news. (p. 318)
42	**3**	**1S**	[Personal control] It is possible to use techniques based upon reinforcement and punishment without being able to control the events in question. A considerable effect may be achieved simply by clarifying the relation between behavior and its consequences. The instructor in sports, crafts, or artistic activities may directly reinforce the behavior he is trying to establish, but he may also simply point up the contingency between a given form of behavior and the result - "Notice the effect you get when you hold the brush this way", "Strike the key this way and see if it isn't easier", "If you swing the club this way, you won't slice the ball", and so on. (p. 319)
43	**3**	**1S**	[Personal control] If we are controlling a child's behavior through reinforcement with candy, it is well to make sure that little candy is received at other times. Deprivation may also be used to control behavior which has been strengthened by generalized rein-forcers. To evoke behavior which has been reinforced with money, one procedure is to deprive the individual in such a way as to strengthen behavior which can be executed only with money. For example, a man is made susceptible to bribery by encouraging him to follow a mode of living in which money is an important requirement. Satiation is a common technique of control which is particularly effective in eliminating unwanted behavior. A child stops teasing for candy when he is given all he will eat. One may satiate an aggressor by submitting to him - by "turning the other cheek". (p. 319)
44	**4**	**1S**	The individual is subjected to a more powerful control when two or more persons manipulate variables having a common effect upon his behavior. This will happen if two or more persons are moved to control him in the same way. (p. 323)
45	**4**	**1S2S**	Since an individual may affect all other members of a group in this way, their countercontrol may be undertaken in concert. All the other members become what we may designate as the controlling group. The group acts as a unit insofar as its members are affected by the individual in the same way. It need not to be highly organized, but some sort of organization usually develops. Controlling practices acquire a certain uniformity from the cohesive forces which lead individuals to take part in group action (Chapter XIX) and from their mode of transmission from one generation to another. (p. 323-324)
46	**4**	**1S**	The principal technique employed in the control of the individual by any group of people who have lived together for a sufficient length of time is as follows. The behavior of the individual is classified as either "good" or "bad" or, to the same effect, "right" or "wrong" and is reinforced or punished accordingly. ... The behavior of an individual is usually called good or right insofar as it reinforces other members of the group and bad or wrong insofar as it is aversive. (p. 324)
47	**4**	**1S2S**	The actual controlling practices are usually obvious. Good behavior is reinforced, and bad behavior punished. The conditioned aversive stimulation generated by bad behavior as the result of punishment is associated with an emotional pattern commonly called "shame". The individual responses to this when he "feels ashamed of himself". ... Another part of the reaction of shame is a conspicuous change in normal dispositions - the social offender acts in a shamefaced manner. (p. 325)

48	**4**	**1S**	In explaining any given instance of group control we have to show how the behavior of the controller is interlocked with that of the controllee in a social system. We must also show that both are adequately accounted for by the specified variables. In a given instance, good behavior on the part of A may be positively reinforced by B because it generates an emotional disposition on the part of B to "do good" to A. (p. 325)
49	**4**	**1S**	Another possibility is that the group appropriately reinforces good behavior just because the probability of similar behavior in the future is thus increased. The gratuity may be given to guarantee similar service in the future; it then has nothing to do with gratitude as an emotional disposition to favor others. The community also teaches each member to thank or praise the individual who has behaved well and to do so even when the members himself is not directly affected. An act of heroism is acclaimed by many people who have not, in this instance, been positively reinforced. (p. 326)
50	**4**	**1S**	The emotional dispositions which lead the members of a group to punish bad behavior are, unfortunately, more obvious. ... If A's aggression is momentarily reduced through B's counter aggression (we have seen, of course, that the long-term effect is different), B will be reinforced. B's behavior in punishing A may thus be due simply to operant reinforcement. (p. 326)
51	**4**	**1S2S**	The control exercised by the group works to at least the temporary disadvantage of the individual. The man who has been positively reinforced for giving his possessions and services to others may find himself thoroughly despoiled. The group has generated behavior which, although it achieves the positive reinforcement accorded good behavior, also creates strongly aversive conditions for the individual. (p. 327)
52	**4**	**2S**	Among the forms of good behavior strengthened by the community are practices of self-control in which behavior which might result in extensive reinforcement is weakened. (p. 327)
53	**4**	**1S2S**	In short, the effect of group control is in conflict with the strong primarily reinforced behavior of the individual. Selfish behavior is restrained, and altruism is encouraged. But the individual gains from these practices because he is part of the controlling group with respect to every other individual. He may be subject of control, but he engages in similar practices in controlling the behavior of others. Such a system may reach a "steady state" in which the individual's advantages and disadvantages strike some sort of balance. (p. 327)
54	**4**	**1S2S**	Within the framework of a natural science certain kinds of behavior are observed when people live together in groups - kinds of behavior which are directed toward the control of the individual and which operate for the advantage of other members of the group. We define "good" and "bad," "right" or "wrong," with respect to a particular set o practices. We account for the practices by nothing the effects which they have upon the individual and in turn upon the members of the group, according to the basic processes of behavior. (p. 328)
55	**5**	**1S2S**	The group exercises an ethical control over each of its members mainly through its power to reinforce or punish. The power is derived from sheer number and from the importance of other people in the life of each member. Usually the group is not well organized, nor are its practices consistently sustained. Within the group, however, certain controlling agencies manipulate particular sets of variables. These agencies are usually better organized than is the group as a whole, and they often operate with greater success. (p. 333)
56	**5**	**1S2S**	A functional analysis of behavior provides us with a basic conception with which we may approach each of these fields in turn. We may be interested primarily in testing such an analysis by discovering whether it yields a plausible account of the behavior of the individual in each case, but if we can achieve such an account, then a considerable advantage may be claimed over traditional formulations. Not only will our analysis in each case have the support of the scientific study of the individual under optimal conditions of observation, it will be common to all fields. It will then be possible to consider the effect upon the individual of the total culture, in which all our controlling agencies and all the other features of the social environment work together simultaneously and with single effect. (p. 334)

57	**5**	**2S**	In discussing controlling agencies, we are concerned specifically with certain kinds of power over variables which affect human behavior and with the controlling practices which can be employed because of this power. (p. 334 - 335)
58	**5**	**1S**	The strong or clever man is a sort of personal government whose power derives from his strength or skill. He may acquire henchmen who exercise the actual control over the group but who are in turn controlled by him trough personal strength or skill. (p. 335)
59	**5**	**1S2S**	The underworld gang often shows a governmental structure of this sort. In the organized government of a modern state the specific task of punishment is assigned to special groups - the police and military. Their power is usually sheer physical force, amplified by special equipment, but the power of the ultimate governmental agency may be of a different nature. For example, the police and military may be recruited after appropriate education, they may be controlled trough economic measures, or they may act under religious pressure. (p. 335 - 336)
60	**5**	**1S**	The individual must induce the group to assign governmental power to him, and once in office he must maintain his connection with this source. The techniques employed by an individual will be similar to those of a political machine or party. (p. 336)
61	**5**	**1S2S**	Once an agency with a particular membership is in power, however, it may ensure its own support through the use of the power to punish rather than trough appeal to the congruence of its function with that of the ethical group. Not everyone pay taxes simply because of group pressure. We are not concerned here, however, with the various kinds of ultimate power in government or with the internal control which maintains the structure of the agency or makes it function smoothly. The effect upon the governed is the point at issue. (p. 336)
62	**5**	**2S3S**	Where the group classifies behavior as "right' or "wrong", for purposes of ethical reinforcement, the governing agency adopts a distinction between "legal" and "illegal". The terms are denned roughly in relation to the source of power of the agency. Under an absolute ruler behavior is illegal if it has aversive consequences for the agency. (p. 336 - 337)
63	**5**	**2S**	A government uses its power to "keep the peace" - to restrain behavior which threatens the property and persons of other member of the group. A government which possesses only the power to punish can strengthen legal behavior only by making the removal of a threat of punishment contingent upon it. This is sometimes done, but the commoner technique is simply to punish illegal forms of behavior. (p. 337)
64	**5**	**2S**	Some governmental punishments consist of removing positive reinforcers - for example, dispossessing a man of property, fining him, taxing him punitively, or depriving him of contact with society through incarceration or banishment. Other common punishments consist of presenting negative reinforces - for example, inflicting physical injury as in flogging, threatening injury or death, imposing a sentence at hard labor, exposing the individual to public ridicule in the stocks, and aversively stimulating the individual in minor ways as by requiring him to report in person o a police station where the principal punishment is simply the time and labor consumed in reporting. In practice, these punishments are made contingent upon particular kinds of behavior in order to reduce the probability that the behavior will occur again. (p. 337)
65	**5**	**2S**	A direct weakening as the opposite effect of reinforcement is, as we have seen, unlikely. Instead, conditioned aversive stimuli are produced, one effect of which resembles the "sense of shame" of group control. When this results from governmental punishment, the commoner term is "guilt". ... As the net effect of governmental control, then, illegal behavior comes to generate aversive stimuli which makes the individual "feel guilty" and which provide for the automatic positive reinforcement of behaving legally. (p. 337)
66	**5**	**1S**	Any behavior commanded by the government - in actual fact by "persons in authority' who are able to exert governmental control - is eventually carried out within the range of the verbal history of the individual. (p. 338)

67	**5**	**2S**	A law is thus a statement of a contingency of reinforcement maintained by a governmental agency. The contingency may have prevailed as controlling practice prior o its codification as a law, or it may represent a new practice which goes into effect with the passage of the law. Laws are thus both descriptions of past practices and assurances of similar practices in the future. A law is a rule of conduct in the sense that it specifies the consequences of certain actions which in turn "rule" behavior. (p. 339)
68	**5**	**2S**	The effect of a law upon the controllee. To show how individual actually comes to abide by a code, we should have to analyze how he learns not to lie, not to steal, not to assault others, and so on. The governmental agency may codify its controlling practices and maintain the contingencies thus set forth, but it seldom attempts to make the code effective in any other way. The individual is directly affected by only a small fraction of prevailing contingencies. In asserting that "ignorance of the law is no excuse", the governmental agency leaves the actual conditioning of the individual to others. Parents and friends establish minor contingencies which keep behavior within legal bounds, and the governmental function may also be actively supported by the ethical group and by religious and educational institutions with their appropriate techniques. (p. 339)
69	**6**	**2S3S**	We have no reason to be disturbed by the fact that the basic practice through which an efficient government "keeps the peace" is exemplified under far less admirable circumstances in the use which the bully or gangster makes of his power to punish. It is not the technique of control but the ultimate effect upon the group which leads us to approve or disapprove of any practice. (p. 350)
70	**6**	**2S**	A prototype of religious control arises when rare or accidental contingencies are used in controlling the behavior of others. For example, we may "blame" someone for an unfortunate event which was not actually the result of his behavior, although the temporal relation was such that a contingency can be asserted. "If you hadn't dawdled so, we should have started earlier, and the accident never would have happened." We blame him in order to alter his future behavior—to make him less likely to dawdle, and we achieve this by converting an unrelated event into an effective punishing consequence through certain verbal processes. We use the event as a punishment, even though we did not actually arrange the contingency. It is only a short step to claiming the ability to arrange such contingencies. This is the underlying principle of witchcraft. Unless the controllee behaves according to command, the controller will bring bad luck to him. The threat to do so may be as powerful as the infliction of comparable physical punishment. (p. 351)
71	**6**	**2S**	Perhaps it is a far cry from these selfish practices to those of the organized religious agency, but the same techniques appear to be exemplified. The control which defines a religious agency in the narrowest possible sense derives from a claimed connection with the supernatural, through which the agency arranges or alters certain contingencies involving good or bad luck in the immediate future or eternal blessedness or damnation in the life to come. Such a controlling agency is composed of those who are able to establish their claim to the power to intervene supernaturally. The agency may consist of a single individual, such as the tribal medicine man, who resorts to demonstrations of magic to prove his power to bring good luck or bad, or of a well-organized church with documented proof that the power to intervene in the arrangement of reinforcing contingencies has been vested in it by supernatural authority. We are concerned here, not with the actual structure of the agency nor with the internal techniques of control which make it an effective instrument, but with the practices through which it controls the members of the group. (p. 352)
72	**6**	**2S**	The principal technique is an extension of group and governmental control. Behavior is classified, not simply as "good" and "bad" or "legal" and "illegal," but as "moral" and "immoral" or "virtuous" and "sinful." It is then reinforced or punished accordingly. Traditional descriptions of Heaven and Hell epitomize positive and negative reinforcement. (p. 352 - 353)

73	**6**	**2S**	To a poverty-stricken people primarily concerned with the source of the next meal, it is a perpetual fish fry. To the unhappy it is relief from pain and sorrow or a reunion with departed friends and loved ones. Hell, on the other hand, is an assemblage of aversive stimuli, which has often been imaginatively portrayed. In Dante's Inferno, for example, we find most of the negative reinforcers characteristic of social and nonsocial environments. Only the electric shock of the psychological laboratory is missing. The power achieved by the religious agency depends upon how effectively certain verbal reinforcements are conditioned—in particular the promise of Heaven and the threat of Hell. Religious education contributes to this power by pairing these terms with various conditioned and unconditioned reinforcers which are essentially those available to the ethical group and to governmental agencies. (p. 353)
74	**6**	**2S**	The agency punishes sinful behavior in such a way that it automatically generates an aversive condition which the individual describes as a "sense of sin." The agency then provides escape from this aversive condition through expiation or absolution and is thus able to supply a powerful reinforcement for pious behavior. The use of physical restraint by a religious agency is exemplified by actual incarceration, as in the treatment of women in Moslem countries. Relevant environmental conditions are manipulated when the stimuli which elicit or set the occasion for sinful behavior are weakened or removed and when the stimuli which elicit or serve as the occasion for virtuous behavior are pointed up. Suggested regimens of simple fare, unseductive clothing, limited personal contact, and the other features of the cloister or the "sheltered life" follow this pattern. Religious agencies are likely to favor censorship of movies, plays, and books, the enforcement of laws governing modesty of dress, the prohibition of the sale of alcoholic beverages, and so on, because these measures reduce occasions for sinful behavior. (p. 353- 354)
75	**6**	**2S**	The behavior which comes under religious control depends upon the type of agency. For the medicine man, who uses his magic for his own aggrandizement, "pious" behavior is simply any behavior which reinforces him. On the other hand, the well-developed religious agency which derives much of its power from the group may control largely in accordance with group practice. It works in concert with ethical control in suppressing selfish, primarily reinforced behavior and in strengthening behavior which works to the advantage of others. The control is usually much more stringent, however, than that exercised by the group. Variables are manipulated in ethical control because of some current threat to the welfare of a member of the group, but the religious agency maintains its practices according to more enduring criteria of virtuous and sinful behavior. (p. 355 - 356)
76	**6**	**2S**	The religious agency usually establishes a repertoire of obedience for future use, and it may also set up extremely powerful self-control to guarantee a measure of controlled behavior in the absence of the religious agent. The latter is one of the consequences of an emphasis on punishment. Because the control is often exerted more powerfully than by the group, the religious conscience or superego often speaks in a louder voice than the ethical. (p. 356 - 357)
77	**6**	**2S**	The individual may confine himself to restricted diets, enter upon periods of fasting, engage in certain exercises or adopt certain postures, or take certain drugs—all because of the resulting change in his dispositions to act in virtuous or sinful ways. (p. 357)
78	**6**	**2S**	When a religious practice does not appeal to supernatural events, its traditional justification resembles that of ethical control; a religious practice is supported because it maximizes piety or virtue. These entities have a function in the field of religion similar to that of the greatest good of the greatest number in ethics, and freedom or justice in government. They are "principles" in terms of which we choose or suggest a given practice. (p. 358)
79	**6**	**2S**	If the individual's behavior in this respect resembles religious control, he may simply join the agency. He is reinforced for serving as a religious agent by the effect upon his own behavior. (p. 357)

80	**6**	**2S**	The controlling relations which hold the religious agency together as an effective unit do not account for the ultimate form of control, nor would they explain the agency which has only one member. To account for the existence and maintenance of the agency as a whole we turn to external variables. If the agency serves the group by extending ethical control, the agency may be explained by the support which the group gives it. The religious agent may be paid by the group, he may be disposed to control because the group approves this as "right," or he may be coerced into working for the agency because any other course of action would be punished as "wrong." (p. 357)
81	**5**	**2S**	Modern governments, however, have it in their power to use other techniques and do so extensively. If wealth is accumulated - trough taxation, for example - economic control is then available (Chapter XXV). This is used as a form of positive reinforcement in subsidies and bonuses. The citizen is thus induced to act legally rather than deterred from acting illegally. Although it is theoretically possible to control agricultural production thought punishment by making the cultivation of certain crops illegal, a government with economic power achieves the same effect trough positive reinforcement with subsidies. The educational control of legal behavior is another alternative technique. Where it is theoretically possible to induce a soldier to fight entirely trough coercion - by arranging matters so that he must fight or be still more severely punished than in battle - a modern government is likely to generate and inclination to fight trough educational devices. Variables in the fields of respondent conditioning, motivation, and emotion are arranged to increase a disposition to fight. These practices lead eventually to far more effective behavior than coercion. (p. 345)
82	**5**	**2S4S**	Government and governed compose a social system in the sense of Chapter XIX. The questions which have just been raised concern the reciprocal interchange between participants. The government manipulates variables which alter the behavior of the governed and is defined in terms of its power to do so. The change in the behavior of the governed supplies a return reinforcement to the government which explains its continuing function. A given system may be as simples as a strong man taking property from the weaker members of a group or as a complex as a modern government embarking upon an educational program which will be generate the skilled manpower it needs. (p. 346)
83	**5**	**2S4S**	Such system is inherently unstable, again in the sense of Chapter XIX, since the power of the agency increases with each interchange. In fact, the growth of power accelerates as control becomes more and more effective. Other things being equal, governments grow stronger in the act of governing. When the strong man coerces others to engage in control in his interest, his total power is increased. When *a* government uses force to acquire wealth, it can then also exercise economic control. (p. 346 - 347)
84	**5**	**2S3S4S**	The process cannot go on indefinitely, however. One limit, which arises within the system itself, is the simple exhaustion of the resources of the governed. This is exemplified in the ultimate failure of the tyrannical exploitation of a people. Excessive control also generates behavior on the part of the controllee in the form of escape, revolt, or passive resistance, as we shall see in Chapter XXIV. Other limits may be imposed from outside the system trough competition with other would-be governing agencies. (p. 347)
85	**5**	**2S3S**	The codification of controlling practices often has the effect of stabilizing the system. In the stating a contingency between behavior and punishment, for example, a law imposes a restriction upon the governing agency. The social system of government and governed cannot deteriorate appreciably unless the law is changed. A more explicit countercontrol is represented by a constitution, in which a government which derives its power from consent of the governed is constrained to use that power within specified areas. A constitution may specify the composition of the governing agency, the channels trough which it received its power, and the procedures according to which laws are to be made, interpreted, and enforced. With these specifications the system is prevented from deteriorating trough an asymmetrical interchange. (p. 347)

86	**7**	**1S2S**	The control exercised by the group and by religious governmental agencies, as well as by parents, employers, associates, and so on, restricts the selfish, primarily reinforced behavior of the individual. It is exercised for just that reason. Certain by-products, however, are not to the advantage of the controller and are often harmful both to the individual and to the group. These are especially likely to be encountered when the control is excessive or inconsistent (p.359).
87	**7**	**1S**	Escape. The individual may simply run away from the controller. The hermit escapes from the control of the ethical group by physically withdrawing from it, as the boy run s away from home; but the controllee may be "withdrawn" being actually separated (p. 359).
88	**7**	**1S2S**	Revolt. The individual may counterattack the controlling agent. He may respond to criticism from the group by criticizing it in turn; the liberal accuses the group of being reactionary, the libertine accuses it of being prudish. (p. 359-360).
89	**7**	**1S**	Passive resistance. Another result, far less easily described, consists of simply not behaving in conformity with controlling practices. This often follows when the individual has been extinguished in efforts to escape or revolt. The behavior is epitomized by the mule which fails to respond to the aversive stimulation. The child, unsuccessful in avoiding or revolting against parental control, simply becomes stubborn. (p.360)
90	**7**	**1S2S**	The controlling agency usually deals with these by-products by intensifying its practices. The escapee is captured and confined more securely. The revolt is put down, and the revolutionist shot. ... The agency may also meet this problem by preparing the individual in advance to control his own tendencies to escape, revolt, or strike. It classifies these types of behavior as wrong, illegal, or sinful, and punishes accordingly. As a result any tendency on the part of the individual to escape, revolt or strike generates aversive self-stimulation, a reduction in which may reinforce behavior acceptable to the agency. But in the long run the problem cannot be solved in this way. Intensification of control may simply multiply the difficulties. Physical restraint or death may effectively eliminate behavior, but the individual is no longer useful to the group (p.360).
91	**8**	**1S**	As a simple example of economic control an individual is induced to perform labor through reinforcement with money or goods. The controller makes the payment of a wage contingent upon the performance of work. In actual practice, however, the process is seldom as simple as this. When we tip a man or pay him for performing a small service and thereby increase the probability of his performing a similar service in the future, we do not depart far from the laboratory study of operant reinforcement. Behavior has occurred and has been strengthened by its consequences. (p. 384-385)
92	**8**	**1S**	To the employer the economic value of labor is just that amount of money which he will give up in return for that labor. This depends upon the results of the labor. We pay a man for mowing the lawn if a mowed lawn is reinforcing. We pay him for making shoes if shoes are personally reinforcing or can be exchanged for money or goods which are reinforcing for other reasons. Sometimes behavior itself is directly reinforcing, as in entertainment; we have seen that the entertainer is in the business of making his behavior positively reinforcing so that it will have economic value. (p. 392)
93	**8**	**2S**	Thorndike found that people were in general willing to name a price for engaging in a wide variety of aversive tasks - such as letting a snake coil around one's arms and head, eating a dead earthworm, or spitting on a picture of George Washington. Money which is paid for behavior which, although not especially aversive in itself, may possibly lead to punishment, is usually called a bribe. (p. 392-393)
94	**8**	**1S**	The use of money in buying and selling permits us to evaluate goods as we evaluate labor - on a simple one-dimensional scale. An object is "worth" to an individual just that amount of money which he will give up in exchange for it, or in exchange for which he will give it up. Before an exchange or a sale can occur, certain critical values must be reached or exceeded. A will give the article to B if the aversive consequences of this act are roughly matched by the positively reinforcing consequences the money which B will give to A. B will give this amount of money to A if the aversive consequences which are thus involved are matched by the positively reinforcing consequences of receiving the article from A. (p. 394)

96	**8**	**2S**	Statements about goods, money, prices, wages, and so on, are often made without mentioning human behavior directly, and many important generalizations in economics appear to be relatively independent of the behavior of the individual. A reference to human behavior is at least implied, however, in the definition of all key terms. Physical objects are not goods apart from their reinforcing value. More obviously, money cannot be denied without reference to its effect upon human behavior. Although it may be possible to demonstrate valid relationships among the data generated by the economic transactions of large numbers of people, certain key processes in the behavior of the individual must be considered. The traditional procedure has been to *deduce* the behavior of the individual engaging in economic transactions from the data derived from the group. This procedure led to the Economic Man of nineteenth-century economic theory, who was endowed with just the behavior needed to account for the over-all facts of the larger group. This explanatory fiction no longer plays a prominent role in economic theorizing. (p. 398-399)
97	**8**	**2S**	Some attention to the individual transaction is often required when generalizations at the level of the group prove invalid. We have already noted many special conditions which affect economic value. In the data generated by millions of people the effects of these special conditions may strike an average or cancel each other out. But when a given condition holds for a large number of people, it cannot be disposed of in this way. Economists frequently explain the failure to predict a particular consequence from a broad generalization by appealing to special conditions of this sort. ... If the science of economics were to take all such extra-economic variables into account, it would become a complete science of human behavior. But economics is concerned with only a small number of the variables of which the behavior of the individual is a function. (p. 399)
98	**8**	**2S**	The power to wield economic control naturally rests with those who possess the necessary money and goods. The economic agency may consist of a single individual, or it may be as highly organized as a large industry, foundation, or even government. It is not size or structure which defines the agency as such, but the use to which the economic control is put. The individual uses his wealth for personal reasons, which may include the support of charities, scientific activities, artistic enterprises, and so on. The eleemosynary foundation if engaged in disposing of wealth in support of specified activities. Religious and governmental agencies frequently, as we have seen, use this supplementary technique for their special purposes. (p. 400)
99	**8**	**1S2S**	If there is any special economic agency as such, it is composed of those who possess wealth and use it in such a way as to preserve or increase this source of power. Just as the ethical group is held together by the uniformity of the aversive effect of the behavior of the individual, so those who possess wealth may act together to protect wealth and to control the behavior of those who threaten it. To that extent we may speak of the broad economic agency called "capital". The study of such an agency requires an examination of the practices which represent concerted economic control and of the return effects which support these practices. (p. 400)
100	**8**	**2S**	As in religious, governmental, or psychotherapeutic control, economic power may be used to further the special interests of those who possess it. Excessive control generates behavior on the part of the controllee which imposes a practical limit. The group as a whole usually condemns the excessive use of wealth as bad or wrong, and classifies the charitable use of wealth as good or right. Some counter-control is also exerted by religious and governmental agencies. ... Laws concerning prostitution, child labor, fraudulent practices, gambling, and so on all impose limits. ... All these measures alter the balance between those possessing labor or goods and those possessing money; hence they alter the frequency with which certain kinds of economic transactions take place. The effect is usually to reduce the extent to which the possessor of wealth is able to employ it in controlling others. (p. 400-401)
101	**9**	**1S2S**	Education is the establishing of behavior which will be of advantage to the individual and to others at some future time. The behavior will eventually be reinforced in many of the ways we have already considered; meanwhile reinforcements are arranged by the educational agency for the purposes of conditioning. The reinforcers it uses are artificial, as such expressions as "drill", "exercise", and "practice" suggest. (p. 402)
102	**9**	**1S2S**	Eventually, noneducational consequences determine whether the individual will continue to behave in the same fashion. Education would be pointless if other consequences were not eventually forthcoming, since the behavior of the controllee at the moment when he is being educated is of no particular importance to anyone. (p. 402-403)

103	**9**	**2S**	The immediate family functions as an educational agency in teaching the child to walk, to talk, to play, to eat in a given way, to dress himself, and so on. It uses the primary reinforcers available to the family: food, drink, and warmth, and such conditioned reinforcers as attention, approval, and affection. The family sometimes engages in education for obvious reasons -- for example, because the child is converted into a useful member. The "pride" which a parent takes in the term simply describes the fact that the achievement of a child is reinforcing. This fact appears to depend upon the culture. The individual continues to receive many forms of casual instruction from members of the group outside his family, where the variables available to the group are similar to those in ethical control (Chapter XXI). Certain forms of behavior are classified as good or right and others as bad or wrong and are reinforced accordingly. It is not always clear why this is done, however. An extension of ethical control to education may, like family pride, have special advantages for the group, in which case it can be explained only through an analysis of cultural practices (Section VI). (p. 403)
104	**9**	**2S**	The artisan teaches an apprentice because in so doing he acquires a useful helper, and industries teach those who work for them for a similar reason. The reinforcers are usually economic. (p. 403)
105	**9**	**2S**	Education is a profession, the members of which engage in education primarily because of economic reinforcement. As in many other professions, reinforcements supplied by the ethical group are also often important: teaching is not only a way of earning a living, it is a "good thing to do". In explaining the presence of educational institutions in a given community, then, we have to explain the behavior of those who pay for or approve those who teach. What is received by them in return? (p. 404)
106	**9**	**2S**	In explaining public education, certain immediate benefits to the group as a whole may be pointed out. The lower grades of the public schools take over the educational function of the family, supervise the children during part of the day, generate behavior which is useful to the family and the community and which permits the family to escape censure. Comparable results from the education of older children are not always clear, and this fact raises a practical as well as a theoretical difficulty. The explicit educational agency is not found in every culture, and the extent to which a given group supports it may vary widely from time to time. (p. 404)
107	**9**	**3S**	Aside from any immediate return we have to note the possible long-term effect of education. Like family pride or education by members of the group, the explicit educational institution may be explained by a different sort of consequence to the group to be considered in Section VI. (p. 404)
108	**9**	**2S**	The reinforcers used by established educational institutions are familiar: they consist of good grades, promotions, Phi Beta Kappa keys, diplomas, degrees, and medals, all of which are associated with the generalized reinforcer of approval. (p. 405)
109	**9**	**2S**	Those who are in ultimate control - for example, those who supply the institution with money- may insist that the curriculum be closely followed. The college supported by a religious agency engages in appropriate religious instruction and must not establish behavior opposed to the interests of the agency. Schools supported by a government may be asked to apply their educational techniques in supporting the government and to avoid any education which conflicts with governmental techniques of control or threatens the sources of governmental power. (p. 411)
110	**10**	**2S**	In addition to the ethical behavior discussed in Chapter XXI the individual acquires from the group an extensive repertoire of manners and customs. What a man eats and drinks and how he does so, what sorts of sexual behavior he engages in, how he builds a house or draws a picture or rows a boat, what subjects he talks about or remains silent about, what music he makes, what kinds of personal relationships he enters into and what kinds he avoids - all depend in part upon the practices of the group of which he is a member. (p. 415)

111	**10**	**2S**	Behavior comes to conform to the standards of a given community when certain responses are reinforced and others are allowed to go unreinforced or are punished. These consequences are often closely interwoven with those of the nonsocial environment. The way in which a man rows a boat, for example, depends in part upon certain mechanical contingencies; some movements are effective and others ineffective in propelling the boat. These contingencies depend upon the construction of the boat and oars - which are in turn the result of other practices observed by the boatmakeres in the group. They also depend upon the type of water, which may be peculiar to a group for geographical reasons, so that the manner in which a boat is rowed in an inland lake district is different from that along the seacoast even when a boat and oars are of the same type. (p. 416)
112	**10**	**2S**	The educational contingencies established by the group are still another source of difference. The individual is reinforced with approval when he adopts certain grips, postures, kinds of strokes, and so on, and punished with criticism when he adopts others. These variables are especially important in determining the "style" which eventually becomes characteristic of a group. (p. 416)
113	**10**	**2S**	The contingencies to be observed in the social environment easily explain the behavior of the conforming individual. The problem is to explain the contingencies. Some of these are arranged for reasons which have no connection with the effect of customs or manners upon the group. The community functions as a reinforcing environment in which certain kinds of behavior are reinforced and others punished, but it is maintained as such through other return benefits. (p. 416)
114	**10**	**2S**	Verbal behavior is a good example. In a given community certain vocal responses are characteristically reinforced with food, water, and other services and objects. These responses become part of the child's repertoire as naturally as nonverbal responses reinforced by the same consequences. It does not greatly matter whether a child gets a drink by bending over a pool or by saying, "I want a drink of water". To explain why the water is forthcoming in the latter case, however, requires a rather elaborate analysis of the verbal environment. Is not enough to note here that a verbal environment may maintain itself through its effects upon all participants, quite apart from its function in teaching the language to new members of the community. An adult in a new verbal environment may receive no explicit educational reinforcement but may nevertheless acquire an adequate vocabulary. Some nonverbal customs and manners can be explained in the same way. Moreover, when a custom is perpetuated by a governmental, religious, or educational agency, we may point to the usual return benefits. (p. 416)
115	**10**	**2S**	In many groups a mistake in grammar or pronunciation is followed by more aversive consequences than, say, minor instances of lying or stealing. The group also supports educational agencies which supply additional consequences working in the same direction. But why is such deviant behavior aversive? Why should the group call an ungrammatical response "wrong" if the response is not actually ambiguous? Why should it protest unconventional modes of dress or rebuke a member for unconventional table manners? One classical is to show that a given form of deviant behavior must have been aversive for good reason under an earlier condition of the group. Foodstuffs are in general selected by contingencies which follow from their physical and chemical properties. Foods which are unpalatable, inedible or poisonous come to be left alone. (p. 417)
116	**10**	**2S**	A child who starts to eat such a food receives powerful aversive stimulation from the group. "Good" and "bad" foods are eventually specified in ethical, religious, or governmental codes. When, now, through a change in climate or living conditions, or as the result of changing practices in the preparation and preservation of food, a "bad" food becomes safe, the classification may nevertheless survive. There is no longer any current return advantage to the group to explain why eating a particular food is classified as bad. The classification may be especially puzzling if the group has meanwhile invented an explanation for it. (p. 417)

117	**10**	**2S**	In his *Theory of the Leisure Class*, Thorstein Veblen demonstrated that customs or manners which seemed to have no commensurate consequences, and which were explained in terms of doubtful principles of beauty or taste, had an important effect upon other members of the group. ... According to this theory, a modern American university builds Gothic buildings not because the available materials resemble those which were originally responsible for this style of architecture, or because the style is beautiful itself, but because the university then commands a more extensive control by resembling medieval educational institutions. The practices of the group which perpetuate a "good" style of architecture are thus as easy to explain as those which perpetuate modes of construction which are "good" for mechanical reasons. (p. 417-418)
118	**10**	**1S2S**	Perhaps the simplest explanation of the differential reinforcement of conforming behavior is the process of induction. The forces which shape ethical behavior to group standards are powerful. The group steps in to suppress lying, stealing, physical assault, and so on, because of immediate consequences to its members. Its behavior in so doing is eventually a function of certain characteristic features of the "good" and "bad" behavior of the controlled individual. (p. 418)
119	**10**	**1S2S**	No matter how we ultimately explain the action of the group in extending the ethical classification of "right" and "wrong" to manners and customs, we are on solid ground in observing the contingencies by virtue of which the behavior of characteristic of a particular group is maintained. As each individual comes to conform to a standard pattern of conduct, he also comer to support that pattern by applying a similar classification to the behavior of others. Moreover, his own confirming behavior contributes to the standard with which the behavior of others is compared. Once a custom, manner, or style has arisen, therefore, the social system which observes it appears to be reasonably self-sustaining. (p. 418-419)
120	**10**	**1S**	A social environment is usually spoken of as the "culture" of a group. The term is often supposed to refer to a spirit or atmosphere or something with equally nonphysical dimensions. Our analysis of the social environment, however, provides an account of the essential features of culture within the framework if a natural science. It permits us not only to understand the effect of culture but, as we shall see later, to alter cultural design. (p.419)
121	**10**	**1S2S**	In the broadest possible sense the culture into which an individual is born is composed of all the variables affecting him which are arranged by other people. The social environment is in part the result of those practices of the group which generate ethical behavior and of the extension of these practices to manners and customs. It is in part the accomplishment of all the agencies considered in Section V and of various sub agencies with which the individual may be especially close contact. (p. 419)
122	**10**	**1S2S**	The individual's family, for example, may control him through an extension of religious or governmental techniques, by way of psychotherapy, through economic control, or as an educational institution. The special groups to which he belongs - from the play group of street gang to adult social organizations - have similar effects. Particular individuals may also exert special forms of control. A culture, in this broad sense, is thus enormously complex and extraordinarily powerful. (p. 419)
123	**10**	**1S2S**	It is not, however, unitary. In any large group there are no universally observed contingencies of control. Divergent customs and manners often come into conflict - for example, in the behavior of the child immigrants, where social reinforcements supplied by the family may not coincide with those supplied by acquaintances and friends. (p. 419)
124	**10**	**2S**	A given social environment may change extensively in the lifetime of a single individual, who is then subjected to conflicting cultures. In America, important changes have recently taken place in the techniques used to control sexual behavior. The unmarried female was formerly subjected to strict control by the ethical group and governmental, religious, and educations agencies. Access to the world at large was forbidden or permitted only in the company of a chaperon who might use physical restraint if necessary. Stimuli leading to sexual behavior were, so far as possible, eliminated from the immediate environment. The anatomy and physiology of reproductive organs, particularly of the male, remained obscure, and any behavior which might alter this condition was severely punished. (...) (p. 420)

125	**10**	**2S**	Such severe measures could be justified only by arguing that sexual behavior was wrong, that it was nevertheless very powerful, and that aggressive sexual behavior on the part of the male must be met with exceptional defenses on the part of the female. There were often objectionable by-products, however. Although the control was intended to apply mainly to premarital sexual behavior, the effect commonly extended into the marital state, and the individual was prevent from enjoying sexual relations in a normal fashion. The resulting repression of sexual impulses had many of the neurotic effects outlined in Chapter XXIV - from pervert sexual activity to the behavior of the common scold. These consequences, doubtless in company with many other factors, led to a substantial change in the practice. (p. 420)
126	**10**	**2S**	[Practice] The modern version of sexual control is very different. Although there is no one clearly formulated program, it is recognized that anxiety with respect to sexual behavior is unnecessary. Instead of removing from the environment all stimuli which could possibly lead to sexual behavior, a knowledge of the anatomy and function of sex is supplied. Friendly relations with the opposite sex are more freely permitted, and severe punishment of sexual behavior is avoided in favor of instruction in the consequences of such behavior. It is possible that these techniques are not so effective as earlier measures. Sexual behavior is probably not so deeply repressed, and it is also probably commoner at the overt level. The net result may or may not be to the advantage of the individual and the group. (p. 420-421)
127	**10**	**2S**	In any case, the adolescent of today is affected by conflicting techniques which show a transition from one cultural practice to the other. In general, religious and governmental controls still follow the earlier pattern. Within the family, members of different ages frequently differ in their controlling techniques. The family as a whole may differ substantially from other groups of which the individual is a member. We cannot say that a single set of practices with respect to the control of sexual behavior is characteristic of the culture of such person. (p. 421)
128	**10**	**2S**	Repertoire. The inanimate world builds an elaborate repertoire of practical responses. It may also set up behavior which is effective in extending such a repertoire: our subject will show a strong "curiosity about nature" if exploratory responses have frequently been reinforced, and special skills in research and invention if self-manipulative behavior of the sort discussed in Chapter XVI has been conditioned. But the comparable repertoire generated by the culture is usually much more extensive. Verbal problem-solving and social skills employed in personal control are important examples. All controlling agencies are concerned in part with the creation of behavior or this sort, although it is the special concern, of course, of education. The competence of the individual in dealing with things, as well as men, will depend largely upon the extent to which such agencies have characterized the social environment. (p. 422 -423)
129	**10**	**2S**	We may agree that if a group is characterized by a unique set of practices, it may also be characterized by unique modes of behavior, but the casual connection between the practice and the mode of behavior may be left to a functional analysis of relevant variables under the conditions characteristic of an experimental science. (p. 425)
130	**11**	**1S2S**	The social environment of any group of people is the product of complex series of events in which accident sometimes plays a proeminent role. Manners and customs often spring from circumstances which have little or no relation to the ultimate effect upon the group. The origins of more explicit controlling practices may be equally adventitious. Thus the pattern of control exercised by a strong leader, reflecting many of his personal idiosyncrasies, may result in a established governmental classification of behavior as legal or illegal and may even set the pattern for a highly organized agency. (p. 426)
131	**11**	**2S**	The techniques which a saint employs to control himself may become part of the established practices of a religious agency. Economic control is determined in part by the resources available to the group, which are ultimately a matter of geography. Other fortuitous factors are introduced when different cultures intermingle or when a culture survives important changes in nonsocial environment. A cultural practice is not the less effective in determining the behavior characteristic of a group because its origins are accidental. (p.426)

132	**11**	**1S2S**	In many cultural groups we observe practices which might be described as "making changes in the practice". The great religious books supply many examples of the deliberate construction of a social environment. The Ten Commandments were a codification of existing and proposed practices according to which, henceforth, behavior was to be reinforced or punished by the group or by the religious agency. The teachings of Christ were more clearly in the nature of a new design. In governmental control, the enactment of a law usually establishes new cultural practices, and a constitution is a similar undertaking on a broader scale. Experimental curricula in schools and colleges and books on child care which recommend substantial changes in family practices are attempts to manipulate important parts of a culture. (p. 427)
133	**11**	**2S**	The social environment is changed to some extent when a new technique of psychotherapy is derived from a theory or from an experimental study of human behavior. Social legislation creates an experimental environment in which behavior is more often reinforced with food, clothing, housing, and so on, and in which certain kinds of deprivation are less likely to occur. Planning the structure of a large industry or governmental agency is an experiment in cultural design. These are all examples of the manipulation of small parts of the social environment; what is called "Utopian" thinking embraces the design of a culture as a whole. (p. 427)
134	**11**	**2S**	The deliberate manipulation of the culture is therefore itself a characteristic of many cultures - a fact to be accounted for in a scientific analysis of human behavior. Proposing a change in a cultural practice, making such a change, and accepting such a change are all parts of our subject matter. Although this is one of the most complex of human activities, the basic pattern seems clear. Once a given feature of an environment has been shown to have an effect upon human behavior which is reinforcing, either in itself or as an escape from a more aversive condition, construct such an environment is easily explained as building a fire or closing a window when a rooms grows cold. (p. 427)
135	**11**	**2S**	When we speak of the "deliberate" design of a culture, we mean the introduction of a cultural practice "for the sake of its consequences". But as we saw discussing "voluntary behavior" in Chapter VII, it is never a future consequence which is effective. A change in practice is made because similar changes have had certain consequences in the past. When the individual describes his own behavior, he may speak of past consequences as the "goal" of his current action but this is not very helpful. We can best understand the cultural designer, not by guessing at his goals or asking him to guess at them for us, but by studying the earlier environmental events which have led him to advocate a cultural change. (p. 428)
136	**11**	**1S2S3S**	When a given change in cultural design is proposed primarily to induce people to make the change, we may account for it as in the exhortatory example above. The proposal may also be a prediction of consequences. Sometimes these are easily specified, as when it is said that the group "ought" to approve of honesty because its members will thus avoid being deceived or that it "ought"" to disapprove of theft because its members will then avoid the loss of property. Sometimes the implied consequences are less obvious, as when a study of behavior leads someone to propose that we "ought" to deal with criminals in a certain way or that we "ought" to avoid aversive control in education. It is at this point that the classical values of freedom, security, happiness, knowledge, and so on are usually appealed to. We have seen that these often refer indirectly to a certain immediate consequences of cultural practices. But the crucial issue concerning value hinges upon another meaning of the word "ought" in which a more remote consequence is implied. Is there a scientific parallel for this kind of value? *The survival of a culture*. (p. 429-430)

137	**11**	**1S2S3S**	We have seen that in certain respects operant reinforcement resembles the natural selection of evolutionary theory. Just as genetic characteristics which arise as mutations are selected or discarded by their consequences, so novel forms of behavior are selected or discarded through reinforcement. There is still a third kind of selection which applies to cultural practices. A group adopts a given practice - a custom, a manner, a controlling device - either by design or through some event which, so far as its effect upon the group is concerned, may be wholly accidental. As a characteristic of the social environment this practice modifies the behavior of members of the group. The resulting behavior may affect the success of the group in competition with other groups or with the social environment. Cultural practices which are advantageous will tend to be characteristic of the groups which survive and which therefore perpetuate those practices. Some cultural practices may therefore be said to have a survival value, while others are lethal in the genetic sense. (p. 430)
138	**11**	**2S3S**	A given culture is, in short, an experiment in behavior. It is a particular set of conditions under which a large number of people grow and live. These conditions generate the patterns or aspects of behavior - the cultural character - which we have already examined. The general interest level of members of the group, their motivations and emotional dispositions, their behavioral repertoires, and the extent to which they practice self-control and self knowledge are all relevant to the strength of the group as a whole. In addition the culture has an indirect effect upon others factors. The general health of the group will depend upon birth rate, hygiene, methods of child care, general living conditions, and hours and kinds of work, upon whether many man and women of talent go into medicine and nursing, and upon what proportion of the wealth goes into the construction of hospitals, public health services and so on. All these conditions in turn, depend upon the culture. (p. 430-431)
139	**11**	**2S**	Cultural practices are also largely responsible for the use which is made of the genetic material born into the group, since they determine whether the individual will be able to develop his talents fully, whether educational institutions will be open to him regardless of the class or other distinction, whether educational polices are progressive or reactionary, whether he will be subject to political or economic favoritism in the selection of a profession, and so on. The culture also determines the extent to which the members of the group are preoccupied with food or sex or with escape from minor aversive stimulation as hard search for "comfort" or from such major aversive stimulation as hard labor or combat, as well as the extent to which they are subject to exploitation by powerful agencies. In turn, therefore, it determines the extent to which they are able to engage in productive activities in science, art, crafts, sports, and so on. The experimental test of a given culture is provided by competition between groups under the conditions characteristic of a particular epoch. (p. 431)
140	**11**	**3S**	Survival value is a difficult criterion because it has perhaps even less obvious dimensions than happiness, freedom, knowledge, and health. It is not an unchanging criterion, for what may in this sense be a "good" culture in one period is not necessarily "good" in another. Since survival always presupposes competition, if only with the inanimate environment, it does not appear to define a "good" culture in the absence of competition. There appears to be no way in which we can test the survival value of a culture in vacuum to determine its absolute goodness. Conversely, the temporary survival of a culture is no proof of its goodness. All present cultures have obviously survived, many of them without very great change for hundreds of years, but this may not mean that they are better cultures than others which have perished or suffered drastic modification under more competitive circumstances. The principle of survival does not permit us to argue that the status quo must be good because it is here now. (p. 431-432)
141	**11**	**3S**	Another difficulty is that survival is often in direct conflict with traditional values. There are circumstances under which a group is more likely it survive if it is not happy, or under which it will survive only if a large numbers of its members submit to slavery. Under certain circumstances the survival of a culture may depend upon the unrestricted exercise of sexual behavior, while under other circumstances severely repressive control may strengthen advantageous behavior of other sorts. In other to accept survival as a criterion in judging a culture, it thus appears to be necessary to abandon such principles as happiness, freedom, and virtue. (p. 432)

142	**11**	**2S3S**	Our problem is not to determine the value or goals which operate in the behavior of the cultural designer; it is rather to examine the complex conditions under which design occurs. Some changes in culture may be made because of consequences which are roughly described as happiness, freedom, knowledge, and so on. Eventually, the survival of the group acquires a similar function. The fact that a given practice is related to survival becomes effective as a prior condition in cultural design. Survival arrives late among the so-called values because the effect of a culture upon human behavior, and in turn upon the perpetuation of the culture itself, can be demonstrated only when a science of human behavior has been well developed. The "practice of changing practice" is accelerated by science just because science provides an abundance of instances in which the consequences of practices are shown. (p. 433)
143	**11**	**2S3S4S**	The evolution of cultures appears to follow the pattern of the evolution of species. The many different forms of culture which arise correspond to the "mutations" of genetic theory. Some forms prove to be effective under prevailing circumstances and others not, and the perpetuation of the culture is determined accordingly. When we engage in the deliberate design of a culture, we are, so to speak, generating "mutations" which may speed up the evolutionary process. The effect could be random, but there is also the possibility that such mutations may be specially adapted to survival. (p. 434)
144	**11**	**3S**	But there is one difficulty and it is a very serious one. Survival will not have a useful effect upon the behavior of the cultural design unless he can actually calculate survival value. A number of current issues suggest that this is not always possible. We may change the pattern of family life and of educational institutions so that children will grow up to be happier people, but are we sure that happy people are most likely to survive in the world today? (p. 434)
145	**11**	**2S3S**	A rigorous science of behavior makes a different sort of remote consequence effective when it leads us to recognize survival is a criterion in evaluating a controlling practice. We have seen that happiness, justice, knowledge, and so on are not far removed from certain immediate consequences which reinforce the individual in selecting one culture or one practice against another. But just as the immediate advantage gained through punishment is eventually matched by later disadvantages, these immediate consequences of a cultural practice may be followed by others of a different sort. A scientific analysis may lead us to resist the more immediate blandishments of freedom, justice, knowledge, or happiness in considering the long-run consequence of survival. (p. 435-436)
146	**11**	**2S3S**	Perhaps the greatest contribution which a science of behavior may make to the evaluation of cultural practices is an insistence upon experimentation. We have no reason to suppose that any cultural practice is always right or wrong according to some principle or value regardless of the circumstances of that anyone can at a given time make an absolute evaluation of its survival value. So long as this is recognized, we are less likely to seize upon the hard and fast answer as an escape from indecision, and we are more likely to continue to modify cultural design in order to test the consequences. (p. 436)
147	**12**	**3S**	The great advantage of diversification is not closely related to the problem of control. Diversification permits a safer and more flexible experimentation in the design of culture. The totalitarian state is weak because if it makes a mistake, the whole culture may be destroyed. Under the diversification, new techniques of control may be testes locally without a serious threat to the whole structure. (p. 441)
148	**12**	**3S**	The ultimate strength of a controller depends upon the strength of those whom he controls. The wealth of a rich man depends upon the productivity of those whom he controls through wealth; slavery as a technique in the control of labor eventually proves nonproductive and too costly to survive. The strength of a government depends upon the inventiveness and productivity of its citizens; coercive controls which lead to inefficient or neurotic behavior defeat their own purpose. An agency which employs the stupefying practices of propaganda suffers from the ignorance and the restricted repertoires of those whom it controls. A culture which is content with the status quo - which claims to know what controlling practices are the best and therefore does not experiment - may achieve a temporary stability but only at the price of eventual extinction.

149	**12**	**4S**	By showing how governmental practices shape the behavior of those governed, science may lead us more rapidly to the design of a government, in the broadest possible sense, which will necessarily promote well-being of those who are governed. The maximal strength of the manpower born to a group usually requires conditions which are described roughly with such terms as freedom, security, happiness, and knowledge. In the exceptional case in which it does not, the criterion of survival also works in the interests of the governed as well as those of the government. It may not be purely wishful thinking to predict that this kind of strength will eventually take first place in the consideration of those who engage in the design of culture. Such an achievement would simply represent a special case of self-control in the sense of Chapter XV. It is easy for a ruler, or the designer of a culture, to use any available power to achieve certain immediate effects. It is much more difficult to use power to achieve certain ultimate consequences. But every scientific advance which points up such consequences makes some measure of self-control in the design of culture more probable. (p. 443 - 444)
150	**12**	**3S**	Government for the benefit of the governed is easily classified as an ethical or moral issue. This need not mean that governmental design is based upon any absolute principles of right and wrong but rather, as we have just seen, that is under the control of long-term consequences. (p. 444)
151	**12**	**3S4S**	Countermeasures become part of the ethical practices of our group, and religious agencies support these measures by branding the use of physical force immoral or sinful. All these measures which oppose the use of physical force are thus explained in terms of the immediate aversive consequences. In the design of government, we can, however, evaluate the use of physical force by considering the ultimate effect upon the group. Why should a particular government not slaughter the entire population of a captured city or country? It is part of our cultural heritage to call such behavior wrong and to react, perhaps in a violently emotional way, to the suggestion. The fact that the members of a group do react in this way could probably be shown to contribute ultimately to the strength of the group. But quite apart from such a reaction we may also condemn such a practice because it would eventually weaken the government. As we have seen, it would lead to much more violent resistance in other wars, to organized counterattack by countries afraid of meeting the same fate, and to very serious problems in the control of the government's own citizens. In the same way, although we may object slavery because aversive control of one individual is also aversive to others, because it is "wrong" or because it is "incompatible with our conception of the dignity of man", and alternative consideration in the design of culture might be that slavery reduces the effectiveness of those who are enslaved and has serious effects upon members of the group. Similarly, we defend a way of life which we believe to be superior to others by listing those characteristics which are immediately reinforcing to us and which we call ethically or morally good; but in evaluating a particular cultural experiment we may, instead, ask whether that way of life makes for the most effective development of those who follow it. (p. 444 -445)
152	**12**	**3S**	Ethical and moral principles have undoubtedly been valuable in the design of cultural practices. Presumably those principles which are with us today have been most valuable in this respect. However, the ultimate survival value of any given set is not thereby guaranteed. What science can tell us about the effect of a given practice upon behavior, and the effect of that behavior upon the survival of the group, may lead more directly to recognition of the ultimate strength of government in the broadest sense. Eventually the question must be asked with respect to mankind in general. Much has been written recently of the need to return to "moral law" in deliberations concerning human affairs. But the question, "*Whose* moral law?" frequently proves embarrassing. Faced with the problem of finding a moral law acceptable to all the people of the world, we become more acutely aware of the shortcomings of the principles proposed by any one group or agency. The possibility of promoting such principles, either through education or military conquest, is not promising. If a science of behavior can discover those conditions of life which ma for the ultimate strength of men, it may provide a set of "moral values" which, because they are independent of the history and culture of any one group, may be generally accepted. (p. 445)

153	**12**	**4S**	Although science may provide the basis for a more effective cultural design, the question of who is to engage in such design remains unanswered. "*Who should* control?" is a spurious question - at least until we have specified the consequences with respect to which it may be answered. If we look to the long-term effect upon the group the question becomes, "Who should control if the culture is to survive?" But this is equivalent to asking, "Who *will* control in the group which does survive?" The answer requires the kind of prediction which cannot be made with any certainty because of extremely complex circumstances to be taken into account. In the long run, however, the most effective control from the point of view of survival value cultural practices. Since a science of behavior is concerned with demonstrating the consequences of cultural practices, we have some reason for believing that such a science will be an essential mark of the culture or cultures which survive. The current culture which, on this score alone, is most likely to survive is, therefore, that in which the methods of science are most effectively applied to the problems of human behavior. (p. 445 - 446)
154	**12**	**4S**	A reasonable statement of our present position in the evolution of culture might take this form: We find ourselves members of a culture in which science has flourished and in which the methods of science have come to be applied to human behavior. If, as seems to be the case, the culture derives strength from this fact, it is reasonable prediction that a science of behavior will continue to flourish and that our culture will make a substantial contribution to the social environment of the future. (p. 446)
155	**12**	**3S**	It does not matter that the individual may take it upon himself to control the variables of which his own behavior is a function or, in a broader sense, to engage in the design of his own culture. He does this only because he is the product of a culture which generates self-control or cultural design as a mode of behavior. The environment determines the individual even when he alters the environment. (p. 448)
156	**12**	**2S3S**	This prior importance of the environment has slowly come to be recognized by those who are concerned with changing the lot of mankind. It is more effective to change the culture than the individual because any effect upon the individual as such will be lost at his death. Since cultures survive for much longer periods any effect upon them is more reinforcing. There is a similar distinction between clinical medicine, which is concerned with the health of the individual, and the science of medicine, which is concerned with improving medical practices which will eventually affect the health of billions of individuals. Presumably, the emphasis on culture will grow as the relevance of the social environment to the behavior of the individual becomes clearer. We may therefore find it necessary to change from a philosophy which emphasizes the individual to one which emphasizes the culture or the group. But cultures also change and perish, and we must not forget that they are created by individual action and survive only through the behavior of individuals. (p. 448)
157	**13**	**2S4S**	History records many foolish and unworkable schemes for human betterment, but almost all the great changes in our culture which we now regard as worthwhile can be traced to perfeccionistic philosophies. Governmental, religious, educational, economic, and social reforms follow a common pattern. Someone believes that a change in a cultural practice - for example, in the rules of evidence in a court of law, in the characterization of man's relation to God, in the way children are taught to read and write, in permitted rates of interest, or in minimal housing standards - will improve the condition of men: by promoting justice, permitting men to seek salvation more effectively, increasing the literacy of people, checking an inflationary trend, or improving public health and family relations, respectively. The underlying hypothesis is always the same: that a different physical or cultural environment will make a different and better man. (p. 4)
158	**13**	**2S3S4S**	The earliest cultural practices must have originated in sheer accidents. Those which strengthened the group survived with the group in a sort of natural selection. As soon as men began to propose and carry out changes in practice for the sake of possible consequences, the evolutionary process must have accelerated. The simple practice of making changes must have had survival value. A further acceleration is now to be expected. As laws of behavior are more precisely stated, the changes in environment required to bring about a given effect may be more clearly specified. Conditions which have been neglected because their effects were slight or unlooked for may be shown to be relevant. (p. 4)

159	**13**	**2S**	Designing a new cultural pattern is in many way like designing an experiment. In drawing up a new constitution, outlining a new educational problem, modifying a religious doctrine, or setting up a new fiscal policy, many statements must be quite tentative. We cannot be sure that the practices we specify will have the consequences we predict, or that the consequences will reward our efforts. This is in the nature of such proposals. They are not value judgments - they are guesses. To confuse and delay the improvement of cultural practices by quibbling about the word *improve* is itself not a useful practice. Let us agree, to start with, that health is better than illness, wisdom better than ignorance, love better than hate, and productive energy better then neurotic sloth. (p. 6)
160	**13**	**2S4S**	If we are not to rely solely upon accident for the innovations which give rise to cultural evolution, we must accept the fact that some kind of control of human behavior is inevitable. We cannot use good sense in human affairs unless someone engages in the design and construction of environmental conditions which affect the behavior of men. Environmental changes have always been the condition for the improvement of cultural patterns, and we can hardly use the more effective methods of science without making changes on a grander scale. We are all controlled by the world in which we live, and part of the world has been and will be constructed by men. The question is this: Are we to be controlled by accident, by tyrants, or by ourselves in effective cultural design? (p. 11)
161	**13**	**2S4S**	We distinguish between the things we have to do to avoid punishment and those we want to do for rewarding consequences. In a culture which did not resort to punishment we should never "have" to do anything except with respect to the punishing contingencies which arise directly in the physical environment. And we are moving toward such a culture, because the neurotic, not to say psychotic, by-products of control through punishment have long since led compassionate men to seek alternative techniques. (p. 14)
162	**13**	**2S**	Praise and blame are cultural practices which have been adjuncts of the prevailing system of control in Western democracy. All peoples do not engage in them for the same purposes or to the same extent, nor, of course, are the same behaviors always classified in the same way as subject to praise or blame. In admiring intellectual and moral heroism and unrewarding labor, and in rejecting a world in which these would be uncommon, we are simply demonstrating our own cultural conditioning. By promoting certain tendencies to admire and censure, the group of which we are a part has arranged for the social reinforcement and punishment needed to assure a high level of intellectual and moral industry. Under other and possibly better controlling systems, the behavior which we now admire would occur, but not under those conditions which make it admiral, and we should have no reason to admire it because the culture would have arranged for its maintenance in other ways. (p. 15)
163	**13**	**2S**	Although it is tempting to assume that it is human nature to believe in democratic principles, we must not overlook the "cultural engineering" which produced and continues to maintain democratic practices. If we neglect the conditions which produce democratic *behavior*, it is useless to try to maintain a democratic *form* of government. And we cannot expect to export a democratic form of government successfully if we do not also provide for the cultural practices which will sustain it. Our forebears did not discover the essential nature of man; they evolved a pattern of behavior which worked remarkably well under the circumstances. The "set of principles" expressed in that pattern in not the only true set or necessarily the best. (p. 17)
164	**14**	**2S**	A technique need not be immediately objectionable to the controllee to engender counter-control. The gambler, for instance, is possibly the last person to ask for legal or moral restrictions on gambling enterprises. The alcoholic does not usually advocate the control of alcoholic beverages. Few workers object to being paid, even for kinds of work or according to pay schedules which society proscribes. It is the rare man who objects to the tyranny of the beautiful woman. In all these cases, society appeals to long-term consequences to justify measures of counter-control. Unfortunately, such consequences do not supply any hard-and-fast rule. (p. 22)

165	**14**	**2S3S**	We must continue to experiment in cultural design, as nature has already experimented, testing the consequences as we go. We may deal with cultural practices as a whole, as in a "utopian" thinking, or piecemeal by changing one counter-controlling technique at a time. Eventually, the practices which make for the greatest (biological, and psychological strength of the group will presumably survive, as will the group which adopts them. (p. 22)
166	**14**	**3S**	Survival is not a criterion which we are free to accept or reject, but it is, nevertheless, the one according to which our current decisions will eventually be tested. It is less clear-cut than some absolute criterion of right and wrong, but it is more reassuring in its recognition of the changing needs of society. (p. 22)
167	**15**	**1S2S**	People living together in groups come to control one another with a technique which is not inappropriately called "ethical". When an individual behaves in a fashion acceptable to the group, he receives admiration, approval, affection, and many other reinforcements which increase the likelihood that he will continue to behave in that fashion. When his behavior is not acceptable, he is criticized, censured, blamed, or otherwise punished. In the first case the group calls him "good"; in the second, "bad". This practice is so thoroughly ingrained in our culture that we often fail to see that it is a technique of control. Yet we are almost always engaged in such control, even though the reinforcements and punishments are often subtle. (p. 27)
168	**15**	**2S**	The practice of admiration is an important part of a culture, because behavior which is otherwise inclined to be weak can be set up and maintained with its help. The individual is especially likely to be praised, admired, or loved when he acts for the group in the face of great danger, for example, or sacrifices himself or his possessions, or submits to prolonged hardship, or suffers martyrdom. These actions are not admirable in any absolute sense, but they require admiration if they are to be strong. (p. 27)
169	**15**	**2S4S**	As I have pointed out elsewhere [page 19], the new techniques emerging from a science of behavior must be subject to the explicit counter-control which has already been applied to earlier and cruder forms. Brute force and deception, for example, are now fairly generally suppressed by ethical practices and by explicit governmental and religious agencies. A similar counter-control of scientific knowledge in the interests of the group is a feasible and promising possibility. Although we cannot say how devious the course of its evolution may be, a cultural pattern of control and counter-control will presumably emerge which will be most widely supported because it is most widely reinforcing. (p. 33)
170	**15**	**2S3S**	People behave in ways which, as we say, conform to ethical, governmental, or religious patterns because they are reinforced for doing so. The resulting behavior may have far-reaching consequences for the survival of the pattern which it conforms. And whether we like it or not, survival is the ultimate criterion. This is where, it seems to me, science can help not in choosing a goal, but in enabling us to predict the survival value of cultural practices. Man has too long tried to get the kind of world he wants by glorifying some brand of immediate reinforcement. As science points up more and more of the remoter consequences, he may begin to work to strengthen behavior, not in a slavish devotion to a chosen value, but with respect to the ultimate survival of mankind. (p. 36)
171	**15**	**2S3S**	He assumes that "the conditioner can be said to be autonomous in the traditional liberal sense." But then he notes: "Of course the conditioner has been conditioned. But he has not been conditioned by the conscious manipulation of another person." But how does this affect the resulting behavior? Can we not soon forget the origins of the "artificial" diamond which is identical with the real thing? Whether it is an "accidental" cultural pattern, such as is said to have produced the founder of Walden Two, or the engineered environment which is about to produce his successors, we are dealing with sets of conditions generating human behavior which will ultimately be measured by their contribution to the strength of the group. We look to the future, not the past, for the test of "goodness" or acceptability. (p. 38)

172	**16**	**3S**	Such an account must make contact with biology, on the one hand, but save in an interpretation of social phenomena, on the other. If it is to yield a satisfactory analysis of the design and implementation of social practices, it must be free of a particular defect. Evolutionary theory, especially in its appeal to the notion of survival, suffered for a long time from circularity. It was not satisfying to argue that forms of life which had survived must therefore have had survival value and had survived because of it. A similar weakness is inherent in psychologies based on adjustment or adaptation. It is not satisfying to argue that a man adapts to a new environment because of his intelligence and emotional stability if these are then defined in terms of capacities to adapt. It is true that organisms usually develop in directions which maximize, phylogenetically, the survival of the species and, ontogenetically, the adjustment of the individual; but the mechanisms responsible for both kinds of change need to be explained without recourse to the selective effect of their consequences. (p. 40)
173	**16**	**2S3S**	In biology this is now being done. Genetics clarifies and supports evolutionary theory with new kinds of facts, and in doing so eliminates the circularity in the concept of survival. A comparable step in the study of human behavior is to analyze the mechanisms of human action apart from their contribution to personal and cultural adjustment. It is not enough to point out that a given form of behavior is advantageous to the individual or that a cultural practice strengthens the group. We must explain the origin and the perpetuation of both behavior and practice. (p. 40-41)
174	**16**	**1S**	A scientific analysis which satisfies these conditions confines itself to individual organisms rather than statistical constructs or interacting groups of organisms, even in the study of social behavior. Its basic datum is the probability of the occurrence of the observable events we call behavior (or of inferred having the same dimensions). (p. 41)
175	**16**	**1S2S3S**	Although the mechanisms which permit modification of behavior are inherited, learned behavior does not emerge from, and is not an extension of, the unlearned behavior of the individual. The organism does not simply refine or extend a genetic behavioral endowment to make it more effective or more inclusive. Instead, it develops collateral behavior, which must be distinguished from an inherited response system even when both serve similar functions. It is important to remember this when considering social behavior. In spite of certain intriguing analogies, it is not likely that the social institutions of man are founded on or that they emerged from the instinctive patterns of animal societies. They are the achievements of individuals, modifying their behavior as inherited mechanisms permit. The co-ordinated activities of the anthill or beehive operate on very different principles from those of a family, a large company, or a great city. The two kinds of social behavior must have developed through different processes, and they are maintained in force for different reason. To take a specific example, verbal behavior is not a refinement upon instinctive cries of alarm, distress, and so on, even though the reinforcing contingencies in the one case are analogous to the conditions of survival in the other. (p. 42-43)
176	**16**	**1S4S**	In general, the evolution of man has emphasized modifiability rather than the transmission of specific forms of behavior. Inherited verbal or other social responses are fragmentary and trivial. By far the greater part of behavior develops in the individual through processes of conditioning, given a normal biological endowment. Man becomes a social creature only because other men are important parts of his environment. The behavior of a child born into a flourishing society is shaped and maintained by variables, most of which are arranged by other people. These social variables compose the "culture" in which the child lives, and they shape his behavior in conformity with that culture, usually in such a way that he in turn tends to perpetuate it. The behavioral processes present no special problems. Nevertheless, a satisfactory account calls for some explanation of how a social environment can have arisen from nonsocial precursors. (p. 43)

177	**16**	**1S**	The emergence of a given form of social behavior from nonsocial antecedents is exemplified by imitation. Inherited imitative behavior is hard to demonstrate. The parrot may possibly owe its distinction only to an inherited capacity to be reinforced by the production of imitative sounds. In any case, an inherited repertoire of imitative behavior in man is insignificant, compared with the product of certain powerful contingencies of reinforcement which establish and maintain behaving-as-others-behave. For example, if organism A sees organism B running in obvious alarm, A will probably avoid aversive consequences by running in the same direction. Or, if A sees B picking and eating ripe berries, A will probably be reinforced for approaching the same berry patch. Thousands of instances of this sort compose a general contingency providing for the reinforcement of doing-as-others-do. In this sense, behavior exemplifying imitation is acquired, yet it is practically inevitable whenever two or more organisms live in contact with one another. The essential conditions are not in themselves social. (p. 43-44)
178	**16**	**1S2S**	Most social behavior, however, arises from social antecedents. Transmission is more important than social invention. Unlike the origin of cultural practices, their transmission need not to be a matter for speculation, since the process can be observed. Deliberate transmission (that is, transmission achieved because of practices which have been reinforced by their consequences) is not needed. For example, some practices are perpetuated as the members of a group are severally replaced. If A has already developed specific controlling behavior with respect to B, depending partly upon incidental characteristics of B's behavior, he may impose the same control on a new individual, C, who might not himself have generated just the same practices in A. A mother who has shaped the vocal responses of her first baby into a primitive verbal repertoire may bring already established contingencies to bear on a second child. A leader who has acquired aversive controlling practices in his interactions with a submissive follower may take by storm a second follower even though, without this preparation, the leader-follower relation might have been reversed in the second case. Overlapping group membership is, of course, only one factor contributing to manners, customs, folkways, and other abiding features of a social environment. (p. 44)
179	**16**	**1S**	A special kind of social behavior emerges when A responds in a definite way because of the effect in the behavior of B. We must consider the importance of B to A as well as of A to B. For example, when A sees B looking into a store window, he is likely to be reinforced if he looks too, as in the example of the berry patch. But if this looking is important to B, or to a third person who controls B, a change may take place in B's behavior. B may look into the window in order to induce A to do the same. The carnival shill plays on the behavior of prospective customers in this way. B's behavior is no longer controlled by what is seen in the window but (directly or indirectly) by the effect of that behavior on A. (The original contingencies for A breakdown: the window may not now be "worth looking into.") Action taken by B because of its effect on the behavior of A may be called "personal control". An important subdivision is verbal behavior, the properties of which derive from the fact that reinforcements are mediated by other organisms. Another subdivision is cultural design. (p. 44-45)
180	**16**	**1S2S3S**	In analyzing any social episode from this point of view a complete account must be given of the behaviors of both parties as they contribute to the origin and maintenance of the behavior of each other. For example, in analyzing a verbal episode, we must account for both speaker and listener. This is seldom done in the case of nonverbal personal control. In noticing how the master controls the slave or the employer the worker, we commonly overlook reciprocal effects and, by considering action in one direction only, are led to regard control as exploitation, or at least the gaining of a one-sided advantage; but the control is actually mutual. The slave control the master as completely as the master the slave, in the sense that the techniques of punishment employed by the master have been selected by the slave's behavior in submitting to them. This does not mean that the notion of exploitation is meaningless or that we may not appropriately ask, Cui bono?. In doing so, however, we go beyond the account of the social episode itself and consider certain long-term effects which are clearly related to the question of value judgments. A comparable consideration arises in the analysis of any behavior which alters a cultural practice. (p. 45)

181	**16**	**1S2S3S**	We may not be satisfied with an explanation of the behavior of two parties in a social interaction. The slaves in a quarry cutting stone for a pyramid work to escape punishment or death, and the rising pyramid is sufficiently reinforcing to the reigning Pharaoh to induce him to devote part of his wealth to maintaining the forces which punish or kill. An employer pays sufficient wages to induce men to work for him, and the products of their labor reimburse him with, let us say, a great deal to spare. These are on-going social systems, but in this analyzing them we may not have taken everything into account. The system may be altered by outsiders in whom sympathy with, or fear of, the lot of the sale or exploited worker may be generated. More important, perhaps, is the possibility that the system may not actually be in equilibrium. It may breed changes which lead to its destruction. Control through punishment may lead to increasing viciousness, with an eventual loss of the support of those needed to maintain it; and the increasing poverty of the worker and the resulting increase in the economic power of the employer may also lead to counter-controlling action. (p. 45)
182	**16**	**2S3S4S**	A culture which raises the question of collateral or deferred effects is most likely to discover and adopt practices which will survive or, as conditions change, will lead to modifications which in turn will survive. This is an important step in cultural design, but it is not easily taken. Long-term consequences are usually not obvious, and there is little inducement to pay any attention to them. We may admire a man who submits to aversive stimulation for the sake of later reinforcement or who eschews immediate reinforcement to avoid later punishment, but the contingencies which lead him to be 'reasonable" in this sense (our admiration is part of them) are by no means overpowering. It has taken civilizes societies a long time to invent the verbal devices - the precepts of moral and ethics - which successfully promote such an outcome. Ultimate advantages seem to be particularly easy to overlook in the control of behavior, where a quick though slight advantage may have undue weight. Thus, although we boast that the birch rod has been abandoned, most school children are still under aversive control - not because punishment is more effective in the long run, but because it yields immediate results. It is easier for the teacher to control the student by threatening punishment than by using positive reinforcement with its deferred, though more powerful, effects. (p. 45-46)
183	**16**	**3S**	A culture which has become sensitive to the long-term consequences of its measures is usually supported by a literature or philosophy which includes a set of statements expressing the relations between measures and consequences. To the cultural designer, these statements function as prescriptions for effective action; to the members of the group, they are important variables furthering effective self-management. (p. 46)
184	**16**	**2S3S**	Thus, a government may induce its citizens to submit to the hardship and tragedy of war by picturing a future in which the world is made safe for democracy or free of Communism, or to a program of austerity by pointing to economic changes which will eventually lead to an abundance of good things for all. In so doing, it strengthens certain behavior on the part of its citizens which is essential to its purposes, and the resulting gain in power reinforces the government's own concern for deferred effects and its efforts to formulate them. (p. 46)
185	**16**	**2S**	The scientific study of behavior underlines the collateral effects of controlling practices and reveals unstable features of a given interaction which may lead to long-deferred consequences. It may dictate effective remedial or preventive measures.(p. 46)
186	**16**	**1S2S**	A similarly reciprocal effect is involved in social action, especially in cultural design. Governmental, religious, economic, educational, and therapeutic institutions have been analyzed in many ways - for example, as systems which exalt such entities as sovereignty, virtue, utility, wisdom, and health. There is a considerable advantage in considering these institutions simply as behavioral technologies. Each one uses an identifiable set of techniques for the control of human behavior, distinguished by the variables manipulated. The discovery and invention of such techniques and their later abandonment or continued use - in short, their evolution - are, or should be, a part of the history of technology. The issues they raise, particularly with respect to the behavior of the discoverer or inventor, are characteristic of technology in general. (p. 47)
187	**16**	**2S3S**	Cultural practices have survived or fallen only in part because of their effect on the strength of the group, and those which have survived are usually burdened with unnecessary impedimenta. By association, the current designer is handicapped by the fact that men look behind any cultural invention for irrelevant, ingenuous, or threatening forces. (p. 48)

188	**16**	**3S**	We cannot predict the success or failure of a cultural invention with the same accuracy as we do that of a physical invention. It is for this reason that we are said to resort to value judgments in the second case. What we resort to is guessing. It is only in this sense that value judgments take up where science leaves off. When we can design small social interactions and, possibly, whole cultures with the confidence we bring to physical technology, the question of value will not be raised. (p. 49)
189	**16**	**2S3S**	We change our cultural practices because it is in our nature as men to be reinforced in certain ways. This is not an infallible guide. It could be, indeed, lead to fatal mistakes. For example, we have developed sanitation and medical science to escape from aversive events associated with illness and death, yet a new virus could conceivably arise to wipe out everyone except those to whom chronic illness and filth had granted immunity. On the present evidence, our decision in favor of sanitation and medicine seems to make for survival, but in the light of unforeseeable developments we may in time look back upon is as having had no survival value. (p. 49)
190	**16**	**2S3S**	Yet the nature of man tells us something. Just as an ultimate genetic effect cannot be reached if immediate effects are not beneficial, so we must look only to the immediate consequences of behavior for modifications in a cultural pattern. Nevertheless, cultural inventions have created current conditions which have at least a probabilistic connection with future consequences. It is easy to say that men work for pleasure and to avoid pain, as the hedonist would have it. These are, indeed, powerful principles; but in affecting the day-to-day behavior of men, they have led to the construction of cultural devices which extend the range of both pleasure and pain almost beyond recognition. It is the same man, biologically speaking, who acts selfishly or for the good of the group, and it is the same man who, as a disinterested scientist, will make human behavior vastly more effective through cultural invention. (p. 49)
191	**17**	**3S**	The hard fact is that the culture which most readily acknowledges the validity of a scientific analysis is most likely to be successful in that competition between cultures which, whether we like it or not, will decide all such issues with finality. (p. 57)
192	**18**	**3S**	Utopias have often occupied islands, but walls isolate almost as well as water. There is also a certain isolation from tradition. ... All this makes it easier to think about such a community as a viable or perishable entity - as an organism with a life of its own. Its success or failure, unlike the rise and fall of eras or nations, is likely to be quick and conspicuous. New ways of doing things are tested for their bearing on its success. Such a community, in short, is an experiment. (p. 59)
193	**18**	**3S**	In conceiving of a community as a pilot experiment, the designer may turn directly to two practical questions: What behavior on the part of the members of a community is most likely to contribute to its success? How may that behavior be generated and maintained? Some answers to the first question are quite obvious. It is important to a community that its members defend it against its enemies, produce the food, shelter, clothing, and other things it need, and maintain internal order. It is also obviously important that its members teach each other, and, particularly, new members, how to behave in necessary ways. Other kinds of behavior - for example, in the uses of leisure - often figure prominently among expressed goals, but their relevance to the success of prominently among expressed goals, but their relevance to the success of a community is not always clear. There behaviors are things members "want to do", and various reasons may be given for doing them, but the designer may proceed most effectively by confining himself to behaviors that are demonstrably related to success or survival. (p. 59 - 60)
194	**18**	**2S**	Terms like "authoritarian" and "laissez-faire" seldom refer to properties which a designer can build into a social environment, and terms like "peaceful" and "stable" do not sharply characterize behavior which can be shown to contribute to the success of such an environment. There is a more useful level of analysis. Every developed language contains terms which describe in great detail the social environment and the behavior it generates. (p. 60)
195	**18**	**3S**	A special branch of psychology has now reached the point at which promising technological applications are becoming feasible. The principles derived from an experimental analysis of behavior offer the designer considerable help in setting up an environment under which behavior which will contribute to the success of the community may be generated. (p. 60 - 61)

196	**18**	**1S2S3S**	A community may resort to positive reinforcement to generate any behavior important to its success. For example, it may arrange for reinforcement through group approval of accepted behavior as an alternative to coercive legal or ethical control. It will also be interested, of course, in the classical problem of maintaining productive labor. ... The designer of effective working conditions is a small community is in a favorable position to use a technology of reinforcement. The immediate temporal contingencies are crucial. (p. 62)
197	**18**	**2S3S**	These are all forms of behavior which flourish when behaviors having a more specific relevance to the success of a community are not needed. A community may be able to afford a certain number of them, but it stands to profit more from other uses of free time. Sports, games, and other forms of complex play; arts and crafts, music, and the dance; literature and the theater; and the contemplation, observation, and exploration of nature which constitute "science" in the broadest sense are important activities to the designer because they bear on the success of the community. Some of them make the community more attractive in the sense that they reinforce the simple behavior and discourage defection. For example, they reinforce the simple behavior of remaining in the community. Other activities develop extraordinary skills which make it possible for members to meet emergencies with maximum effectiveness. Those which advance science yield the physical and cultural technologies needed for the maintenance and improvement of the community as a way of life. (p. 64)
198	**18**	**1S2S4S**	In summary, then, a community is much more complex than a laboratory experiment in human behavior but much simpler than the large-scale enterprises analyzed in political science, economics, and other social disciplines. For this reason it is especially helpful in studying the effects of a social environment on human behavior and, in return, the relevance of that behavior to the maintenance and development of the environment. It is a favorable ground for social invention. (p. 64)
199	**18**	**3S**	In writing the *New Atlantis* Francis Bacon could imagine that scientists might be organized to solve the problems of the community. Only after he had made such an organization plausible was the Royal Society founded - and quite clearly on Bacon's model. More general principles are also encouraged. The success or failure of a community, for example, is easily seen to mean the success or failure of all its members, whether or not its social structure is egalitarian, but it is hard to reach a similar sense of community in thinking about a nation or the world as a whole. (p. 65)
200	**19**	**3S**	Like most religious, it also has its apocalyptic vision: our way of life, and possibly mankind itself, may not long survive if we continue on our present course. ... The vision is not divine revelation but as inference from facts, and although the speed with which we are moving toward destruction may be debated, few scientists question the direction. Salvation may come spontaneously from some kind of inbuilt corrective process, but it is more likely that we shall save ourselves only if we solve our problems in a quite deliberate fashion. To do so we need a much clearer understanding of why people behave as they do. We need, in short, a science and technology of behavior which will permit us to deal with the behavioral aspects of our problems as effectively as other technologies deal with their physical and biological aspects. (p. 421)
201	**19**	**3S**	I shall argue, in short, that the social sciences are not more effective precisely because they are not fully behavioral, and for that reason not really scientific, and for *that* reason not commensurate with the problems they are asked to solve. (p. 422)

202	**19**	**1S2S**	A group of about forty juvenile offenders - teenage armed robbers, rapists, and murderers - who were at the time "students" in the National Training School in Washington, D.C., once relocated at the Robert F. Kennedy Center in Morgantown, West Virgina, participated in an experiment directed by Harold Cohen of the institute for Behavioral Research in Silver Spring, Maryland. A new social environment was constructed in which no boy was required to do anything. He could sleep on a pad in a dormitory, eat nutritious if not very palatable food, and sit on a bench all day. But he could greatly improve his lot by earning points exchangeable for more delicious food at mealtimes, admission to games rooms, the rental of a private room or television set, or have a short vacation away from the school. He could earn points by doing simples chores, but much more easily by learning things. Correct responses to programmed instructional materials and correct answers in examinations after studying other kinds of material meant points. The results were dramatic. Boys who had been convinced by the school system that they were unteachable discovered that they were not. They learned reading and writing and arithmetic, and acquired other verbal and manual skills. They did so without compulsion, and the hostile behavior characteristic of such institutions quickly disappeared. (p. 425 - 426)
203	**19**	**3S4S**	What kinds of cultural contingencies induce people to engage in the control of other people? Under what contingencies do people act like tyrants? Under what contingencies do they act like "men and women of good will?" We must hope that a culture will emerge in which those who have power will use it for the general good. Such a culture would probably be most likely to survive, and that is an important point. Geneticists are beginning to speak of changing the course of human evolution, but we have long been able to change the evolution of cultures. As we begin to understand what a culture is, we may begin to move toward better designs. (p. 427)
204	**19**	**4S**	A historical parallel may be significant. In the fifth century B.C., China was advanced in physical technology as any other part of the world, and it retained its position until about 1400 A.D. Among its great contributions were the compass, gunpowder, and movable type. But for the next three hundred years, very little use was made of them. Military power remained ceremonial, astrological, and geomantic, long voyages were forbidden, and an ideographic system of notation gained little from movable type. A neo-Confucianism system of thought emphasized passive knowing. The West seized upon these Chinese inventions, however, and made fantastic progress. The compass enabled men to explore the globe, and gunpowder to conquer it. Movable type led to a flood of books which brought about a revival of learning. Meanwhile, China remained a medieval society. The difference was not in the availability of technological means but in the cultural contingencies governing their use. Something of the same sort could happen again. It is possible that our current aggrandizement of the individual will obscure the possibility of building a better way of life. The evolution of our democratic culture will then have taken a disastrous turn. (p. 428)
205	**20**	**1S**	In the finish performance, the demonstrator would start a ball near the middle of the table. It rolled to one edge and the pigeon on that side pecked it, driving it back across the table. At the other edge it was pecked by the other pigeon and thus returned. The pigeons usually watched the course of the ball as it acrossed the table, and maneuvered into position to meet the return. They developed considerable skill in sending the ball straight across. Moving pictures show rallies of as many as five or six shots before a point was made. There is no evidence, however, that either pigeon reached the stage of placing or changing the pace of its shots so that the opponent would miss. (...) The demonstration offers a convenient example of competition. One bird is reinforced at the expense of another. If one is repeatedly successful, the other suffers extinction ("discouragement"). It was possible to maintain a reasonable balance in successful play by lowering the weight of the relatively unsuccessful bird or raising that of the successful, the principal effect being to sustain attention rather than alter accuracy or power. (p. 533-535)
206	**20**	**1S**	Cooperating pigeons. Two pigeons in adjacent compartments were separated by a pane of glass. Three red buttons were arranged in a vertical row on each side of the glass as shown in Fig. 2. The buttons were approximately 10in., 7 1/2 in., and 5 in. from the floor, respectively. By pecking a button the pigeon closed a switch. In the final performance, both pigeons were reinforced with food (Fig. 2, below) when they pecked a corresponding pair of buttons so nearly simultaneously that the brief closures of the circuits (each lasting perhaps a tenth of second) overlapped. At any given time, however, only one pair of buttons was operative, and the effective pair was scheduled in a roughly random way. (p.535)

207	**20**	**1S**	It was necessary for the pigeons to cooperate in two tasks: (1) discovering the effective pair and (2) pecking both buttons at the same time. In general, no pattern of exploration could be observed. The pigeons tested all three pairs of buttons in what was evidently unsystematic way. In general, there was a division of labor with respect to the two tasks. One pigeon (the "leader") explored - that is, struck the three buttons in some order. A similar performance could have been generated in one pigeon alone in the apparatus by requiring simply that a given one of three buttons be struck. The other pigeon (the "follower") struck the button opposite that being struck by the leader. Similar behavior could have been generated in one pigeon alone in the apparatus if one button after another have been marked by a discriminative stimulus. (p. 535)
208	**20**	**1S**	The performance was established by conditioning each bird separately to peck the three buttons, reinforcement being roughly randomized. When sustained behavior occurred on all three buttons, two birds could be put in the adjacent spaces for the first time. The presence of another bird temporally disturbed the performance, but both birds eventually began to respond to the buttons. At this stage responses to corresponding buttons within, say, half a second of each other would trigger both food-dispensers. These contingencies sufficed to build cooperative behavior without further attention. The visual stimulation supplied by one pigeon pecking on a button became a discriminative stimulus controlling a response to the corresponding button on the part of the other. Prolonged exposure to these conditions made pigeons strongly imitative in other aspects. They would often drink from glasses of water in the compartments at the same time, for example. ... Possibly because the leader-follower relation had frequently been shifted, each bird was evidently largely controlled by the behavior of the other. (p. 537)
209	**21**	**3S**	Malinowski was among the first to contend that customs are followed because of their consequences, and we can now formulate this functional position in a more comprehensive way. A culture is not the behavior of the people living in it; it is the "it" which they live - the contingencies of social reinforcement which generate and sustain their behavior. The contingencies are maintained by other members of the group, whose behavior in maintaining them is the product of earlier contingencies in the verbal community. To record what the people in a culture *do* is an important step - but only a first step - in discovering why they do it. Rules which have been extracted from the contingencies, and used in maintaining them (see Chapter 6), are helpful to those who study a culture, but they usually represent only the more obvious contingencies. More subtle contingencies may go unsuspected for a long time. They are nevertheless the principal subject matter of anthropology and sociology. (p. 13)
210	**21**	**3S4S**	Other economic contingencies induce men to buy and sell, rent and hire, lend and borrow, prospect, invent, promote, and so on. The strength of a culture depends substantially upon the results, and it is no accident that we ask some basic questions about cultures in terms of their economic contingencies. Yet the distinguishing features of capitalism, socialism, communism, and other economic systems are more often traceable to geography, natural resources, forms of government, and political theories than to a technology based on a scientific analysis of economic behavior. The wealth of a culture depends upon the productive behavior of its members. It is a natural resource which is shamefully neglected because a true economic technology has yet to be devised. The basic principles are available in an experimental analysis of behavior. (p. 19 - 20)
211	**21**	**1S2S3S**	The techniques of education, psychotherapy, economies, and government are all found in miniature in daily life. The members of a group teach each other, make each other's environment easier to live in, induce each other to work and exchange goods, and maintain ethical and moral sanctions which have the effect of governmental measures. They do so, of course, by arranging various contingencies of reinforcement, which are the proper subject matter of anthropology and sociology. It is a difficult field, in part because the practices are less likely to be codified than in other disciplines, and in part because there no controlling figure - such as a teacher, therapist, employer, or governor whose behavior would make uncodified practices visible. (p. 20 - 21)

212	**21**	**2S3S**	Daily life is sometimes explicitly designed, however. The religious communities in the Judeo-Christian tradition were based on sets of rules (e.g., the Rules of Benedict and Augustine) specifying contingencies of social reinforcement. Schools and colleges are to some extent communities in this sense and have their own rules. Institutions for the care of psychotics and retardates, orphanages, summer camps, and penal institutions are other examples. The techniques of control, codified or uncodified, are often aversive; but efforts have recently been made to design communities of these sorts using positive contingencies. (p. 21)
213	**21**	**2S3S**	An experiment in the National Training School for Boys in Washington, D. C., the students of which are juvenile delinquents, is an example. The culture of that community was redesigned in the following way (38). Aversive control was minimized; no boy was required to do anything. A boy might, if he wished, "go on relief"; he could eat nutritious if uninteresting food, sleep on a pad in a dormitory, and spend each day sitting on a bench. He could greatly improve his way of life, however, by earning points exchangeable for more interesting food, a private room, a television set, admission to the game room, a trip away from the institution, and so on. Points could be earned by working in the kitchen or by performing janitorial services, *but most readily by studying and learning*. Right answers were worth points. (p. 21)
214	**21**	**3S**	One result, important to management, was improved morale. The boys performed useful services and behaved well with respect to each other without aversive control and hence without its unwanted by-products. A more important result was related to the avowed purpose of the institution. Most juvenile delinquent have been conspicuous failures in school. They have been persuaded that they are dull or stupid. Under the powerful educational contingencies arranged in the training school, the boys discovered that they could learn and in many cases learn rapidly. In doing so, they acquired behavior which would therefore increase the chances that they would behave in acceptable rather than illegal ways. (p. 21 - 22)
215	**21**	**3S**	Compared with education, psychotherapy, economics, and government, very little thought has been given to the explicit design of daily life. The exception is the so-called utopian literature. Utopian writers have been concerned with the social environment and with the possibility of redesigning it. Whether they have known it or not, they have been concerned with the contingencies of reinforcement under which men live. They have been limited by the theories of human conduct with which they have were familiar; but as our understanding improves, it should be possible to suggest better versions. Basic science always leads eventually to an improved technology, and a science of behavior is no exception. It should supply a technology of behavior appropriate to the ultimate utopian goal: an effective couture. (p. 22)
216	**22**	**4S**	A much more interesting possibility arises when we recognize the role of contingencies of reinforcement, for we can then apply something like the "behavioral engineering" of *Walden Two* to cultural design. A utopian community is a pilot experiment, like the pilot plant in industry or the pilot experiment in science, where principles are tested on a small scale to avoid the risks and inconvenience of size. (p. 37 - 38)
217	**22**	**4S**	Given these helpful simplifications and the demonstrated power of a behavioral technology, a successful utopia is not too hard to imagine. The necessary physical environment is being analyzed in the field of urban design. The micro-rayons in Russia, the Newtownes of Great Britain, and many urban experiments in the United States, while still largely concerned with physical aspects, have also been designed with some attention to the basic principle that a city or a building is meaningful only as an environment in which people live and must rest upon an understanding of the interaction between behavior and the environment. (p. 38)
218	**22**	**1S**	It is not too often successful. A common practice, for example, is to extract rules from the prevailing contingencies, natural or social, and to make positive and negative reinforcers contingent upon the behavior of following them (see Chapter 6). The rule-following contingencies are often unskillfully designed, and members of a culture seldom take net consequences into account. On the contrary, they resist control of this sort. They object to what they are asked to do and either drop out of the culture - as hermits, hobos, or hippies - or remain in it while challenging its principles. (p. 39)

219	**22**	**3S**	The designer must take something else into account which is still more difficult to bring to bear on the individual member. Will the culture *work*? It is a question which is clarified by the concept of a community as an experiment. A community is a thing, having a life of its own. It will survive or perish, and the designer must keep that fact in mind. The problem is that survival is often furthered by behavior which is not only not reinforced but may have punishing (even lethal) consequences. Phylogenic contingencies of survival [...] supply examples. When a member of a herd of grazing animals spots the approach of a predator and utters a warning cry, the group is more likely to escape and survive, but the member who emits the cry balls attention to himself and may perish. Ontogenic contingencies of reinforcement work in the same way: a culture induces a hero to die for his country or a martyr for his religion. (p. 40)
220	**22**	**3S4S**	The result is a different kind of dropout, who objects to taking the survival of a culture as a "value". The protest sometimes takes this form: "Why should I care whether my way of life survives or contributes to the way of life of the future?" An honest answer would seem to be, "There is no good reason, but if your culture has not convinced you that there is, so much the worse for your culture". The thoughtful person may inquire further. Why should the *culture* care whether it survives? Survival for what? How do we know that a culture is evolving in the right direction? Questions of this sort show a misunderstanding of the nature of evolution, biological and cultural. The processes of mutation and selection do not require, and may not provide, any advance plan of the state toward which they lead. (p. 40 - 41)
221	**22**	**3S**	A well-designed culture is a set of contingencies of reinforcement under which members behave in ways which change it in such a way that it will do these things even more effectively in the future. Personal sacrifice may be a dramatic example of the conflict of interests between the group and its members, but it is the product of a bad design. Under better contingencies behavior which strengthen the culture may be highly reinforcing. A jingoistic nationalism may be an easy way of underlining the good of a group, but the survival of a culture regarded simply as a set of practices, quite apart from those who practice them, can also be made the basis for a design. (It is significant that current discussions of survival are likely to speak of competition between ways of life rather than between nations or religions.) (p. 41)
222	**22**	**3S**	It has no bearing on the ultimate goodness of the design. It is nevertheless in its effects on human nature - on the genetic endowment of the species - that any environment, physical or social, is to be evaluated. The man who insists upon judging a culture in terms of whether or not he likes it is the true immoralist. Just as he refuses to follow rules designed to maximize his own net gain because they conflict with immediate gratification, so he rejects contingencies designed to strengthen the group because they conflict with his "rights as an individual". He sets himself up as a standard of human nature, implying or insisting that the culture which produced him is the only good or natural culture. (p. 41 - 42)
223	**22**	**4S**	He has reached a very special point in that story. He is the product of an evolutionary process in which essentially accidental changes in genetic endowment have been differentially selected by accidental features of the environment, but he has now reached the point at which he can examine that process and do something about it. He can change the course of his own evolution through selective breeding, and in the not too distant future he will quite possibly change it by changing his chromosomes. The "value judgment" which will then be demanded are beginning to attract attention. The point is that *we have long since reached a comparable stage in the evolution of cultures.* We produce cultural "mutations" when we invent new social practices, and we change the conditions under which they are selected when we change the environments in which men live. (p. 45 - 46)
224	**22**	**3S4S**	To refuse to do either of these things is to leave further changes in our culture to accident, and accident is the tyrant really to be feared. (p. 46)

225	**22**	**3S**	Whether we like it or not, survival is the value by which we shall be judged. The culture which takes its survival into account is most likely to survive. To recognize the fact is not, unfortunately, to resolve all our difficulties. It is hard to say what kinds of human behavior will prove most valuable in a future which cannot be clearly foreseen. Nor is it easy to identify the practices which will generate the kinds of behavior needed, but here at least we have made some progress. The design of behavior to specification is the very essence of a technology derived from an experimental analysis. The authors of the classical utopian literature proposed to achieve the good life they described in ways which are now seen to be inadequate, but the value of utopian thinking must not, therefore, be underestimated. In a curious way it has always taken cultural evolution into account. It has scrutinized the sources of social practices, examined their consequences, and proposed alternatives which should have more desirable consequences - and all in the experimental spirit characteristic of science. In the long run, of course, we must dispense with utopian simplifications, for the real test of a culture is the world at large. (p. 46 - 47)
226	**22**	**3S4S**	And the persistent question about that test is this: Is it to be *our* culture which survives and contributes most to the culture of the future? We can point to certain reassuring features. We enjoy the advantages which flow from the very practice of changing practice; until recently we have been perhaps unique in our disposition to try new ways of doing things. We give thought to consequences. Our practice of asking whether something works or whether something else would work better is often criticized as a crude pragmatism, but it may prove to have been an important cultural mutation. We readily change practices because we are not greatly restrained by revelation or immutable decrees, and for similar reasons we are free to pursue a science of behavior. Above all, we have recognized the need for the explicit design of a way of life. (p. 47)
227	**22**	**3S**	But not all signs are propitious. The contingencies of reinforcement which shape and maintain the behavior of the cultural designer are not yet very clear. Obvious economic contingencies bring yearly improvements in automobiles, for example, but there are no comparable forces at work to improve governmental and ethical practices, education, housing or psychotherapy. The survival of the culture has not yet been brought to bear in a very effective way on those who are engaged in government in the broadest sense. (p 47)
228	**22**	**3S**	A scientific analysis of human behavior and of genetic and cultural evolution cannot make individual freedom the goal of cultural design. The individual is not an origin or source. He does not initiate anything. Nor is it he who survives. (The doctrine of survival after death is a source of personal reinforcers appropriate only to an earlier design.) What survives are the species and the culture. They lie "beyond the individual" in the sense that they are responsible for him and outlive him. Nevertheless, a species has no existence apart from its members or a culture apart from the people who practice it. It is only trough effects on individuals that practices are selected or designed. If by "man" we mean a member of the human species with its unique genetic endowment, it's human nature, then man is still the measure of all things. But it is a measure we can use effectively only if we accept it for what it is, as this is revealed in a scientific analysis rather than in some earlier conception, no matter how convincing that conception may have seemed or how effective it may have proved to be in another culture. (p. 48 - 49)
229	**23**	**3S**	As Darlington has said, 'Every new source from which man has increased his power on the earth has been used to diminish the prospects of his successors. All his progress has been at the expense of damage to his environment which he cannot repair and could not foresee'. Whether or not he could have foreseen the damage, man must repair it or all is lost. And he can do so if he will recognize the nature of the difficulty. The application of the physical and biological sciences alone will not solve our problems because the solution lie in another field. (p. 9-10)
230	**23**	**2S3S**	Overcrowding can be corrected only by inducing people not to crowd, and the environment will continue to deteriorate until polluting practices are abandoned. In short, we need to make vast changes in human behavior, and we cannot make them with the help of nothing more than physics or biology, no matter how hard we try. (p. 10)

231	**24**	**2S4S**	A child is born a member of the human species, with a genetic endowment showing many idiosyncratic features, and he begins at once to acquire a repertoire of behavior under the contingencies of reinforcement to which he is exposed as an individual. Most of these contingencies are arranged by other people. They are, in fact, what is called a culture, although the term is usually defined in other ways. Two eminent anthropologists have said, for example, that 'the essential core of culture consists of traditional (i.e., the historically derived and selected) ideas and especially their attached values'. But those who observe cultures do not see ideas or values. They see how people live, how they raise their children, how they gather or cultivate food, what kinds of dwellings they live in, what they wear, what games they play, how they treat each other, how they govern themselves, and so on. These are the customs, the customary behaviors, of a people. To explain them, we must turn to the contingencies which generate them. (p.126)
233	**24**	**1S2S3S**	A person is not only exposed to the contingencies that constitute a culture, he helps to maintain them, and to the extent that the contingencies induce him to do so the culture is self-perpetuating. The effective reinforcers are a matter of observation and cannot be disputed. What a given group of people calls good is a fact: it is what members of the group find reinforcing as the result of their genetic endowment and the natural and social contingencies to which they have been exposed. (p. 126-127)
234	**24**	**1S3S4S**	A given set of values may explain why a culture functions, possibly without much change for a long time; but necessarily change. The physical environment changes, as people move about, as the climate changes, as natural resources are consumed or diverted to other uses or made unusable, and so on. Social contingencies also change as the size of a group or its contact with other groups changes, or as controlling agencies grow more or less powerful or compete among themselves, or as the control exerted leads to countercontrol in the form of escape or revolt. The contingencies characteristic of a culture may not be adequately transmitted, so that the tendency to be reinforced by a given set of values is not maintained. The margin of safety in dealing with emergencies may then be narrowed or broadened. In short, the culture may grow stronger or weaker, and he may foresee that it will survive or perish. The survival of a culture then emerges as a new value to be taken into account in addition to personal and social goods. (p. 127)
235	**24**	**2S3S4S**	The fact that a culture may survive or perish suggests a kind of evolution, and a parallel with the evolution of species has, of course, often been pointed out. It needs to be started carefully. A culture corresponds to a species. We describe it by listing many of its practices, as we describe a species by listing many of its anatomical features. Two or more cultures may share a practice, as two or more species may share an anatomical feature. The practices of a culture, like the characteristics of a species, are carried by its members, who transmit them to other members. In general, the greater the number of the individuals who carry a species or a culture, the greater its chance of survival. (p. 128)
236	**24**	**2S3S**	A culture, like a species, is selected by its adaptation to an environment; to the extent that it helps its members to get what they need and avoid what is dangerous, it helps them to survive and transmit the culture. The two kinds of evolution are closely interwoven. The same people transmit both a culture and a genetic endowment - though in very different ways and for different parts of their lives. The capacity to undergo the changes in behavior which make a culture possible was acquired in the evolution of the species, and, reciprocally, the culture determines many of the biological characteristics transmitted. Many current cultures, for example, enable individuals to survive and breed who would otherwise fail to do so. Not every practice in a culture, or every trait in a species, is adaptive, since non-adaptive practices and traits may be carried by adaptive ones, and cultures and species which are poorly adaptive may survive for a long time (p. 128)

237	**24**	**2S3S4S**	New practices correspond to genetic mutations. A new practice may weaken a culture - for example, by leading to an unnecessary consumption of resources or by impairing the health of its members - or strengthen it - for example, by helping members make a more effective use of resources or improve their health. Just as a mutation, a change in the structure of a gene, is unrelated to the contingencies of selection which affect the resulting trait, so the origin of a practice need not to be related to its survival value. The food allergy of a strong leader may give rise to a dietary law, a sexual idiosyncrasy to a marriage practice, the character of a terrain to a military strategy - and the practices may be valuable to the culture for quite unrelated reasons. Many cultural practices have, of course, been traced to accidents. Early Rome, situated on a fertile plain and raided by tribes from the natural fortresses of the surrounding hills, developed laws concerning property which outlasted the original problem. The Egyptians, reconstructing boundaries after the annual flooding of the Nile, developed trigonometry, which proved valuable for many other reasons. (p. 129)
238	**24**	**2S4S**	The parallel between biological and cultural evolution breaks down at the point of transmission. There is nothing like the chromosome-gene mechanism in the transmission of a cultural practice. Cultural evolution is Lamarckian in the sense that acquired practices are transmitted. To use a well-worn example, the giraffe does not stretch its neck to reach food which is otherwise out of reach and then pass on a longer neck to its offspring; instead, those giraffes in whom mutation has produced transmit the mutation. But a culture which develops a practice permitting it to use otherwise inaccessible sources of food can transmit that practice not only to new members but to contemporaries or to surviving members of an earlier generation. More important, a practice can be transmitted through 'diffusion' to other cultures - as if antelopes, observing the usefulness of the longer neck in giraffes, were to grow longer necks. Species are isolated from each other by the non-transmissibility of genetic traits, but there is no comparable isolation of cultures. A culture is a set of practices, but it is not a set which cannot be mixed with other sets. (p. 129-130)
239	**24**	**2S**	Several kinds of isolation may produce a well-defined culture by limiting the transmissibility of practices. Geographical isolation is suggested when we speak of a 'Samoan' culture, and racial characteristics which may interfere with the exchange of practices by a 'Polynesian' culture. A dominant controlling agency or system may hold a set of practices together. A democratic culture, for example, is a social environment marked by certain governmental practices, supported by compatible ethical, religious, economic and educational practices. A Christian, Moslem, or Buddhist culture suggests a dominant religious control, and a capitalist or socialist culture a dominant set of economic practices, each possibly associated with compatible practices of other kinds. A culture defined by a government, a religion, or an economic system does not require geographical or racial isolation. (p. 130)
240	**24**	**1S2S3S4S**	Although the parallel between biological and cultural evolution falters at the point of transmissibility, the notion of cultural evolution remains useful. New practices arise, and they tend to be transmitted if they contribute to the survival of those who practice them. We can in fact trace the evolution of a culture more clearly than the observed rather than inferred and can often be directly manipulated. Nevertheless, as we have seen, the role of the environment has only begun to be understood, and the social environment which is a culture is often hard to identify. It is constantly changing, it lacks substance, and it is easily confused with the people who maintain the environment and are affected by it. (p. 130-131)

241	**24**	**2S3S**	Since a culture tends to be identified with the people who practice it, the principle of evolution has been used to justify competition between cultures in the so-called 'doctrine of Social Darwinism'. Wars between governments, religions, economic systems, races, and classes have been defended on the grounds that the survival of the fittest is a law of nature - and a nature 'red in tooth and claw'. If man has emerged as a master species, why should we not look forward to a master subspecies or race? If culture has evolved in a similar process, why not a master culture? It is true that people do kill each other, and often because of practices which seem to define cultures. One government or form of government competes with another, and the principal means are indicated by their military budgets. Religious and economic systems resort to military measures. The Nazi solution to the Jewish problem was a competitive struggle to the death. And in competition of that sort the strong do seem to survive. But no man survives for long; or any governmental, religious, or economic agency for very long. What evolve are practices. (p. 131)
242	**24**	**2S3S**	In neither biological nor cultural evolution is competition with other forms the only important condition of selection. Both species and cultures 'compete' first of all with the physical environment. Most of the anatomy and physiology of a species is concerned with breathing, feeding, maintaining a suitable temperature, surviving danger, fighting infection, procreating, and so on. Only a small part is concerned with, and hence has survived because of, success in fighting other members of the same species or other species. Similarly, most of the practices which compose a culture are concerned with sustenance and safety rather than with competition with other cultures, and they have been selected by contingencies of survival in which successful competition has played a minor role.(p. 132)
243	**24**	**4S**	A culture is not the product of a creative 'group of mind' or the expression of a 'general will'. No society began with a social contract, no economic system with the idea of barter or wages, no family structure with an insight into the advantages of cohabitation. A culture evolves when new practices further the survival of those who practice them. (p. 132)
244	**24**	**2S3S**	When it has become clear that a culture may survive or perish, some of its members may begin to act to promote its survival. To the two values which, as we have seen, may affect those in a position to make use of a technology of behavior - the personal 'goods', which are reinforcing because of the human genetic endowment, and the 'goods of others', which are derived from personal reinforcers - we must now add a third, the good of the culture. But why is it effective? Why should people in the last third of the twentieth century care about what the people in the last third of the twenty-first century will look like, how they will be governed, how and why they will work productively, what they will know, or what their books, pictures, and music will be like? No current reinforcers can be derived from anything so remote. Why, then, should a person regard survival of his culture as a 'good'? (p. 132-133)
245	**24**	**2S3S**	It is no help, of course, to say that a person acts 'because he feels concern for the survival of his culture'. Feelings about any institution depend upon the reinforcers the institution uses. What a person feels about a government may range from the most zealous patriotism to the most abject fear, depending on the nature of the controlling practices. What a person feels about an economic system may range from enthusiastic support to bitter resentment, depending on the way the system uses positive and negative reinforcers. And what a person feels about the survival of his culture will depend on the measures used by the culture to induce its members to work for its survival. The measures explain the support; the feelings are by-products. Nor is it any help to say that someone suddenly gets the idea of working for the survival of a culture and transmits it to others. An 'idea' is at least as difficult to explain as the practices said to express it, and much less accessible. But how are we to explain the practices? (p. 133)
246	**24**	**2S3S**	Much of what a person does to promote the survival of a culture is not 'intentional' - that is, it is not done because it increases survival value. A culture survives it those who carry it survive, and this depends in part upon certain genetic susceptibilities to reinforcement, as the result of which behavior making for survival in a given environment is shaped and maintained. Practices which induce the individual to work for the good of others presumably further the survival of others and hence the survival of the culture the others carry. (p.133)

247	**24**	**2S3S**	None of this will explain what we might call a pure concern for the survival of a culture, but we do not really need an explanation. Just as we do not need to explain the origin of a genetic mutation in order to account for its effect in natural selection, so we do not need to explain the origin of a cultural practice in order to account for its contribution to the survival of a culture. The simple fact is that a culture which for any reason induces its members to work for its survival, or for the survival of some of its practices, is more likely to survive. Survival is the only value according to which a culture is eventually to be judged, and any practice that furthers survival has survival value by definition. (p. 134-135)
248	**24**	**3S**	If it is not very satisfactory to say that any culture which induces its members to work for its survival for any reason is therefore more likely to survive and perpetuate the practice, we must remember that there is very little to explain. Cultures seldom generate a pure concern for their survival - a concern completely free from the jingoistic trappings, the racial features, the geographical locations, or the institutionalized practices with which cultures tend to be identified. (p. 135)
249	**24**	**2S3S**	When the goods of others are challenged, especially the goods of organized others, it is not easy to answer by pointing to deferred advantages. Thus, a government is challenged when its citizens refuse to pay taxes, serve in the armed forces, participate in elections, and so on, and it may meet the challenge either by strengthening its contingencies or by bringing deferred gains to bear on the behavior at issue. But how can it answer the question: 'Why should I care whether my government, or my form of government, survives long after my death?' Similarly, a religious organization is challenged when its communicants do not go to church, contribute to its support, take political action in its interests, and so on, and it may meet the challenge by strengthening its contingencies or pointing to deferred gains. But what is its answer to the question: 'Why should I work for the long-term survival of my religion?' An economic system is challenged when people do not work productively, and it may respond by sharpening its contingencies or pointing to deferred advantages. But what it its answer to the question: 'Why should I be concerned about the survival of a particular kind of economic system?' The only honest answer to that kind of question seems to be this: 'There is no good reason why you should be concerned, but if your culture has not convinced you that there is, so much the worse for your culture.' (p. 135-136)
250	**24**	**3S4S**	It is even more difficult to explain any action designed to strengthen a single culture for all mankind. A Pax Romana or Americana, a world made safe for democracy, world communism, or a 'catholic' church commands the support of strong institutions, but a 'pure' world culture does not. It is not likely to evolve from successful competition between religious, governmental, or economic agencies. We can nevertheless point to many reasons why people should now be concerned for the good of all man-kind. The great problems of the world today are all global. Overpopulation, the depletion of resources, the pollution of the environment, and the possibility of a nuclear holocaust - these are the not-so-remote consequences of present courses of action. But pointing to consequences is not enough. We must arrange contingencies under which consequences have an effect. How can the cultures of the world bring these terrifying possibilities to bear on the behavior of their members? (p. 136)
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252	**24**	**2S3S4S**	The evolution of a culture raises certain questions about so-called 'values' which have not been fully answered. Is the evolution of a culture 'progress'? What is its goal? Is the goal a kind of consequence quite different from the consequences, real or spurious, which induce individuals to work for the survival of their culture? (p. 136-137)

253	**24**	**4S**	A structural analysis may seem to avoid these questions. If we confine ourselves simply to what people do, then a culture seems to evolve simply by passing through a sequence of stages. Though a culture may skip a stage, some kind of characteristic order may be demonstrated. The structuralist looks for an explanation of why one stage follows another in the pattern of the sequence. Technically speaking, he tries to account for a dependent variable without relating it to any independent variables. The fact that evolution occurs in time suggests, however, that time may be a useful independent variable. As Leslie White has put it: 'Evolution may be defined as a temporal sequence of forms: one form grows out of another; culture advances from one stage to another. In this process, time is as integral a factor as change of form.' (p. 137)
254	**24**	**4S**	A directed change in time is often spoken of as 'development'. Geologists trace the development of the earth through various eras, and paleontologists trace the development of species. Psychologists follow the development of, say, psychosexual adjustment. The development of a culture may be followed in its use of materials (from stone to bronze to iron), in its ways of getting food (from gathering to hunting and fishing to cultivation), in its use of economic power (from feudalism to commercialism to industrialism to socialism), and so on. (p. 137)
255	**24**	**4S**	Facts of this sort are useful, but change occurs not because of the passage of time, but because of what happens while time is passing. The Cretaceous period in geology did not appear at a given stage in the development of the earth because of a predetermined fixed sequence but because a preceding condition of the earth led to certain changes. The horse's hoof did not develop because time passed but because certain mutations were selected when they favored survival in the environment in which the horse was living. (p. 137-138)
256	**24**	**2S4S**	The same issues arise in the development of a culture. Food-gathering practices naturally precede agriculture, not because of an essential pattern but because people must stay alive somehow (as by gathering food) until agricultural practices can be acquired. The necessary order in the historical determinism of Karl Marx is in the contingencies. Class struggle is a crude way of representing the ways in which men control each other. The rise of the power of merchants and the decline of feudalism and the later appearance of an industrial age (possibly to be followed by socialism or a welfare state) depend largely upon changes in economic contingencies of reinforcement. (p. 138)
257	**24**	**4S**	A pure developmentalism, contenting itself with patterns of sequential change in structure, misses the chance to explain behavior in terms of genetic and environmental histories. It also misses the chance to change the order in which stages succeed one another or the speed with which they do so. In a standard order, but the order is determined by contingencies that may be changed. Similarly, a culture may develop through a sequence of stages as contingencies develop, but a different order of contingencies can be designed. We cannot change the age of the earth or of the child, but in the case of the child we need not wait for time to pass in order to change the things that happen in time. (p. 138-139)
258	**24**	**4S**	We say that an organism grows towards maturity or in order to reach maturity. Maturity becomes a goal, and progress becomes movement towards a goal. A goal is literally a terminus – the end of something such as foot race. It has no effect on the race except to bring it to an end. The word is used in this relatively empty sense when we say that the goal of life is death or that the goal of evolution is to fill the earth with life. Death is no doubt the end of life, and a full world may be the end of evolution, but these terminal conditions have no bearing on the process through which they are reached. We do not live in order to die, and evolution does not proceed in order to fill the earth with life. (p. 140)

259	**24**	**3S4S**	We explain the development of a species and of the behavior of a member of the species by pointing to the selective action of contingencies of survival and contingencies of reinforcement. Both the species and the behavior of the individual develop when they are shaped and maintained by their effects on the world around them. That is the only role of the future. … There is another important possibility: both kinds of evolution make organisms more sensitive to the consequences of their actions. Organisms most likely to be changed by certain kinds of consequences have presumably had an advantage, and a culture brings the individual under the control of remote consequences which could have played no part in the physical evolution of the species. A remote personal good becomes effective when a person is controlled for the good of others, and the culture which induces some of its members to work for its survival brings even more remote consequence to bear. (p. 140-141)
260	**24**	**2S**	The task of the cultural designer is to accelerate the development of practices which bring the remote consequences of behavior into play. We turn now to some of the problems he faces. (p. 141)
261	**24**	**1S2S3S4S**	The social environment is what is called a culture. It shapes and maintains the behavior of those who live in it. A given culture evolves as new practices arise, possibly for irrelevant reasons, and are selected by their contribution to the strength of the culture as it 'competes' with the physical environment and with other cultures. A major step is the emergence of practices which induce members to work for the survival of their culture. Such practices cannot be traced to personal goods, even when used for the good of others, since the survival of a culture beyond the lifetime of the individual cannot serve as a source of conditioned reinforcers. Other people may survive the person they induce to act for their good, and the culture whose survival is at issue often identified with them or their organizations, but the evolution of a culture introduces an additional kind of good or value. A culture which for any reason induces its members to work for its survival is more likely to survive. It is a matter of the good of the culture, not of the individual. Explicit design promotes that good by accelerating the evolutionary process, and since a science and a technology of the behavior make for better design, they are important 'mutations' in the evolution of a culture. If there is any purpose or direction in the evolution of a culture, it has to do with bringing people under the control of more and more of the consequences of their behavior. (p. 141-142)
262	**25**	**2S4S**	Many people are engaged in the design and redesign of cultural practices. They make changes in the things they use and the way they use them. They invent better mousetraps and computers and discover better ways of raising children, paying wages, collecting taxes, and helping people with problems. We need not spend much time on the word 'better'; it is simply the comparative of 'good', and goods are reinforcers. One camera is called better than another because of what happens when it is used. A manufacturer induces potential buyers to 'value' his camera by guaranteeing that it will perform in satisfactory ways, by quoting what users have said about its performance, and so on. It is, of course, much harder to call one culture better than another, in part because more consequences need to be taken into account. (p. 143)

263	**25**	**2S3S**	The same principles are being applied, however, in the preparation of instructional materials at all educational levels, in psychotherapy beyond simple management, in rehabilitation, in industrial management, in urban design, and in many other fields of human behavior. There are many varieties of 'behavior modification' and many different formulations, but they all agree on the essential point: behavior can be changed by changing the conditions of which it is a function. … Such a technology is ethically neutral. It can be used by villain or saint. There is nothing in a methodology which determines the values governing its use. We are concerned here, however, not merely with practices, but with the design of a whole culture, and the survival of a culture then emerges as a special kind of value. A person may design a better way of raising children primarily to escape from children who do not behave well. He may solve his problem, for example, by being a martinet. Or his new method may promote the good of the children or of parents in general. It may demand time and effort and the sacrifice of personal reinforcers, but he will propose and use it if he has been sufficiently induced to work for the good of others. If he is strongly reinforced when he sees other people enjoying themselves, for example, he will design an environment in which children are happy. If his culture has induced him to take an interest in its survival, however, he may study the contribution which people make to their culture as a result of their early history, and he may design a better method in order to increase that contribution. Those who adopt the method may suffer some loss in personal reinforcers. (p. 147-148)
264	**25**	**2S**	The same three kinds of values may be detected in the design of other cultural practices. The classroom teacher may devise new ways of teaching which make life easier for him, or which please his students (who in turn reinforce him), or which make it likely that his students will contribute as much as possible to their culture. The industrialist may design a wage system that maximizes his profits, or works for the good of his employees, or most effectively produces the goods a culture needs, with a minimal consumption of resources and minimal pollution. A party in power may act primarily to keep its power, or to reinforce those it governs (who in return keep it in power), or to promote the state, as by instituting a program of austerity which may cost the party both power and support. (p. 148-149)
265	**25**	**3S**	The same three levels may be detected in the design of a culture as a whole. If the designer is an individualist, he will design a world in which he will be under minimal control and will accept his own personal goods as the ultimate values. If he has been exposed to an appropriate social environment, he will design for the good of others, possibly with a loss of personal goods. If he is concerned primarily with survival value, he will design a culture with an eye to whether it will work. (p. 149)
266	**25**	**2S3S**	When a culture induces some of its members to work for its survival, what are they to do? They will need to foresee some of the difficulties the culture will encounter. These usually lie far in the future, and details are not always clear. Apocalyptic visions have had a long history, but only recently has much attention been paid to the prediction of the future. There is nothing to be done about completely unpredictable difficulties, but he may foresee some trouble by extrapolating current trends. It may be enough simply to observe a steady increase in the number of people on earth, in the size and location of nuclear stockpiles, or in the pollution of the environment and the depletion of natural resources; we may then change practices to induce people to have fewer children, spend less on nuclear weapons, stop polluting the environment, and consume resources at a lower rate, respectively. (p. 149)

267	**25**	**3S4S**	We do not need to predict the future to see some of the ways in which the strength of a culture depends upon the behavior of its members. A culture that maintains civil order and defends itself against attack frees its members from certain kinds of threats and presumably provides more time and energy for other things (particularly if order and security are not maintained by force). A culture needs various goods for its survival, and its strength must depend in part on the economic contingencies which maintain enterprising and productive labour, on the availability of the tools of production, and on the development and conservation of resources. A culture is presumably stronger if it induces its members to maintain a safe and healthful environment, to provide medical care, and to maintain a population density appropriate to its resources and space. A culture must be transmitted from generation to generation, and its strength will presumably depend on what and how much its new members learn, either through informal instructional members learn, either through informal instructional needs the support of its members, and it must provide for disaffection or defection. A culture must be reasonably stable, but it must also change, and it will presumably be strongest if it can avoid excessive respect for tradition and fear of novelty on the one hand and excessively rapid change measure of survival value if it encourages its members to examine its practices and to experiment with new ones. (p. 149-150)
268	**25**	**2S3S**	A culture is very much like the experimental space used in the analysis of behavior. Both are sets of contingencies of reinforcement. A child is born into a culture as an organism is placed in an experimental space. Designing a culture is like designing an experiment; contingencies are arranged and effects noted. In an experiment we are interested in what happens, in designing a culture with whether it will work. This is the difference between science and technology. (p. 150-151)
269	**25**	**2S3S4S**	A utopian community is usually composed of a relatively small number of people living together in one place and in stable contact with each other. They can practice an informal ethical control and minimize the role of organized agencies. They can learn from each other rather than from the specialists called teachers. They can be kept from behaving badly towards each other through censure rather than the specialized punishments of a legal system. They can produce and exchange gods without specifying values in terms of money. They can help those who have become ill, infirm, disturbed, or aged with a minimum of institutional care. Troublesome contacts with other cultures are avoided through geographical isolation (utopias tend to be located on islands or surrounded by high mountains), and the transition to a new culture is facilitated by some formalized break with the past, such as a ritual of rebirth (utopias are often set in the distant future so that the necessary evolution of the culture seems plausible). A utopia is a total social environment, and all its parts work together. The home does not conflict with the school or the street, religion does not conflict with government, and so on. Perhaps the most important feature of the utopian design, however, is that the survival of a community can be made important to its members. The small size, the isolation, the internal coherence – all these give a community an identity which makes its success or failure conspicuous. (p. 151-152)
270	**25**	**2S3S**	Walter Lippmann has said that 'the supreme question before mankind' is how men can save themselves from the catastrophe which threatens them, but to answer it we must do more than discover how men can 'make themselves willing and able to save themselves'. We must look to the contingencies that induce people to act to increase the chances that their cultures will survive. We have the physical, biological, and behavioral technologies needed 'to save ourselves'; the problem is how to get people to use them. It may be that 'utopia has only to be willed', but what does that mean? What are the principal specifications of a culture that will survive because it induces its members to work for its survival? (p. 155)
271	**25**	**2S3S**	The unplanned also goes wrong. The idiosyncrasies of a jealous ruler who regards any disturbance as an offence against him may have an accidental survival value if law and order are maintained, but the military strategies of a paranoid leader are of the same provenance and may have an entirely different effect. The industry which arises in the unrestrained pursuit of happiness may have an accidental survival value when war materiel is suddenly needed, but it may also exhaust natural resources and pollute the environment. (p.158-159)

272	**25**	**2S4S**	If a planned culture necessarily meant uniformity or regimentation, it might indeed work against further evolution. If men were very much alike, they would be less likely to hit upon or design new practices, and a culture which made people as much alike as possible might slip into a standard pattern from which there would be no escape. That would be bad design, but if we are looking for variety, we should not fall back upon accident. Many accidental cultures have been marked by uniformity and regimentation. The exigencies of administration in governmental, religious, and economic systems breed uniformity, because it simplifies the problem of control. Traditional educational establishments specify what the student is to learn at what age and administer tests to make sure that the specifications are met. The codes of governments and religions are usually quite explicit and allow little room for diversity or change. The only hope is planned diversification, in which the importance of variety is recognized. (p. 159)
273	**25**	**3S**	Planning does not prevent useful accidents. For many thousands of years people used fibers (such as cotton, wool, or silk) from sources which were accidental in the sense that they were the products of contingencies of survival not closely related to the contingencies which made them useful to men. (p.159-160)
274	**25**	**2S4S**	There is no virtue in the accidental nature of an accident. A culture evolves as new practices appear and undergo selection, and we cannot wait for them to turn up by chance. (p. 160)
275	**25**	**2S4S**	A complete break with the past is impossible. The designer of a new culture will always be culture-bound, since he will not be able to free himself entirely from the predispositions which have been engendered by the social environment in which he has lived. To some extent he will necessarily design a world he likes. Moreover, a new culture must appeal to those who are to move into it, and they are necessarily the products of an older culture. Within these practical limits, however, it should be possible to minimize the effect of accidental features of prevailing cultures and to turn to the sources of the things people call good. The ultimate sources are to be found in the evolution of the species and the evolution of the culture. (p. 161)
276	**25**	**1S2S3S**	The practical question, which we have already considered, is how remote consequences can be made effective. Without help a person acquires very little moral or ethical behavior under either natural or social contingencies. The group supplies supporting contingencies when it describes its practices in codes or rules which tell the individual how to behave and when it enforces those rules with supplementary contingencies. Maxims, proverbs, and other forms of folk wisdom give a person reasons for obeying rules. Governments and religions formulate the contingencies they maintain somewhat more explicitly, and education imparts rules which make it possible to satisfy both natural and social contingencies without being directly exposed to them. (p. 170)
277	**25**	**2S3S4S**	This is all part of the social environment called a culture, and the main effect, as we have seen, is to bring the individual under the control of the remoter consequences of his behavior. The effect has had survival value in the process of cultural evolution, since practices evolve because those who practice them are as a result better off. There is a kind of natural morality in both biological and cultural evolution. Biological evolution has made the human species more sensitive to its environment and more skilful in dealing with it. Cultural evolution was made possible by biological evolution, and it has brought the human organism under a much more sweeping control of the environment. (p. 170)
278	**25**	**4S**	Man has not evolved as an ethical or moral animal. He has evolved to the point at which he has constructed an ethical or moral culture. He differs from the other animals not in possessing a moral or ethical sense but in having been able to generate a moral or ethical social environment. (p. 171-172)
279	**25**	**3S4S**	The intentional design of a culture and the control of human behavior it implies are essential if the human species is to continue to develop. Neither biological nor cultural evolution is any guarantee that we are inevitably moving towards a better world. Darwin concluded the Origin of Species with a famous sentence: 'And as natural selection works solely by and for the good of each being, all corporeal and mental endowments will tend to progress towards perfection.' … But extinct species and extinct cultures testify to the possibility of miscarriage. (p. 172)

280	**25**	**2S3S4S**	Survival value changes as conditions change. For example, a strong susceptibility to reinforcement be certain kinds of foods, sexual contact, and aggressive damage was once extremely important. When a person spent a good part of each day in searching for food, it was important that he quickly learnt where to find it or how to catch it, but with the advent of agriculture and animal husbandry and ways of storing foods, the advantage was lost, and the capacity to be reinforced by food now leads to overeating and illness. When famine and pestilence frequently decimated the population, it was important that men should breed at every opportunity, but with improved sanitation, medicine, and agriculture, the susceptibility to sexual reinforcement now means overpopulation. At a time when a person had to defend himself against predators, including other people, it was important that any sign of damage to a predator should reinforce the behavior having that effect, but with the evolution of organized society the susceptibility to that kind of reinforcement has become less important and may now interfere with more useful social relations. It is one of the functions of a culture to correct for these innate dispositions through the design of techniques of control, and particularly of self-control, which moderate the effects of reinforcement. (p. 172-173)
281	**25**	**3S**	The good of a culture cannot function as the source of genuine reinforcers for the individual, and the reinforcers contrived by cultures to induce their members to work for their survival are often in conflict with personal reinforcers. The number of people explicitly engaged in improving the design of automobiles, for example, must greatly exceed the number of those concerned with improving life in city ghettos. It is not that the automobile is more important than a way of life, but rather than the economic contingencies which induce people to improve automobiles are very powerful. They arise from the personal reinforcers of those who manufacture automobiles. No reinforcers of comparable strength encourage the engineering of the pure survival of a culture. The technology of the automobile industry is also, of course, much further advanced than a technology of behavior. (p. 174)
282	**25**	**4S**	Large numbers of people are now at leisure for appreciable periods of time, but there has been no chance of effective selection of either genetic endowment or a relevant culture. (p. 175)
283	**25**	**2S3S**	People at leisure also become spectators, watching the serious behaviors of others as in the Roman circus or a modern football game, or in the theatre or movies, or they listen to or read accounts of the serious behavior of other people, as in gossip or literature. Little of this behavior contributes to personal survival or the survival of a culture. (p. 175)
284	**25**	**2S3S**	Leisure is one of the great challenges to those who are concerned with the survival of a culture because any attempt to control what a person does when he does not need to do anything is particularly likely to be attacked as unwarranted meddling. Life, liberty, and the pursuit of happiness are basic rights. But they are the rights of the individual and were listed as such at a time when the literatures of freedom and dignity were concerned with the aggrandizement of the individual. They have only a minor bearing on the survival of a culture. (p. 176)
285	**25**	**2S3S4S**	A preference for methods which make control inconspicuous or allow it to be disguised has condemned those who are in a position to exert constructive counter-control to the use of weak measures. This could be a lethal cultural mutation. Our culture has produced the science and technology it needs to save itself. It has the wealth needed for effective action. It has, to a considerable extent, a concern for its own future. But if it continues to take freedom or dignity, rather than its own survival, as its principal value, then it is possible that some other culture will make a greater contribution to the future. (p. 177-178)
286	**25**	**3S**	A culture is like experimental space used in the study of behavior. It is a set of contingencies of reinforcement, a concept which has only recently begun to be understood. The technology of behavior which emerges is ethically neutral, but when applied to the design of a culture, the survival of the culture functions as a value. Those who have been induced to work for their culture need to foresee some of the problems to be solved, but many current features of a culture have an obvious bearing on its survival value. The designs to be found in the utopian literature appeal to certain simplifying principles. They have the merit of emphasizing survival value: Will the utopia work? The world at large is, of course, much more complex, but the processes are the same and practices work for the same reasons. Above all, there is the same advantage in stating objectives in behavioral terms. (p. 178)

287	**26**	**2S4S**	Man himself may be controlled by his environment, but it is an environment which is almost wholly of his own making. The physical environment of most people is largely man-made. The surfaces a person walks on, the walls which shelter him, the clothing he wears, many of the food he eats, the tools he uses, the vehicles he moves about in, most of the things he listens to and looks at are human products. The social environment is obviously man-made - it generates the language a personal speaks, the customs he follows, and the behavior he exhibits with respect to the ethical, religious, governmental, economic, educational, and psychotherapeutic institutions which control him. The evolution of a culture is in fact a kind of gigantic exercise in self-control. As the individual controls himself by manipulating the world in which he lives, so the human species has constructed an environment in which its members behave in a highly effective way. Mistakes have been made, and we have no assurance that the environment man has constructed will continue to provide gains which outstrip the losses, but man as we know him, for better or for worse, is what man has made of man. (p. 201)
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289	**26**	**2S4S**	Man has 'controlled his own destiny', if that expression means anything at all. The man that man has made is the product of the culture man has devised. He has emerged from two quite different process of evolution: the biological evolution responsible for the human species and the cultural evolution carried out by that species, Both of these processes of evolution may now accelerate because they are both subject to intentional design. Men have already changed their genetic endowment by breeding selectively and by changing contingencies of survival, and they may now begin to introduce mutations directly related to survival. For a longtime men have introduced new practices which serve as cultural mutations, and they have changed the conditions under which practices are selected. They may now begin to do both with a clearer eye to the consequences.(p. 203)
290	**26**	**4S**	Man will presumably continue to change, but we cannot say in what direction. No one could have predicted the evolution of the human species at any point in its early history, and the direction of intentional genetic design will depend upon the evolution of a culture which is itself unpredictable for similar reasons. (203-204)
291	**26**	**2S3S**	The individual occupies a place in a culture not unlike his place in the species, and in early evolutionary theory that place has hotly debated. Was the species simply a type of individual, and if so, in what sense could it evolve? Darwin himself declared species 'to be purely subjective inventions of the taxonomist'. A species has no existence except as a collection of individuals, nor has a family, tribe, race, nation, or class. A culture has no existence apart from the behavior of the individuals who maintain its practices. It is always an individual who behaves, who acts upon the environment and is changed by the consequences of his action, and who maintains the social contingencies which are a culture. The individual is the carrier of both his species and his culture. Cultural practices, like genetic traits, are transmitted from individual to individual. A new practice, like a new genetic trait, appears first in an individual and tends to be transmitted if it contributes to his survival as an individual. (p. 203)

292	**26**	**2S4S**	Yet, the individual is at best a locus in which many lines of development come together in a unique set. His individuality is unquestioned. Every cell in his body is a unique genetic product, as unique as that classic mark of individuality, the fingerprint. An even within the most regimented culture every personal history is unique. ... But the individual nevertheless remains merely a stage in a process which began long before he came into existence and will long outlast him. He has no ultimate responsibility for a species trait or a cultural practice, even though it was he who underwent the mutation or introduced the practice which became part of the species or culture. Even if Lamarck had been right in supposing that the individual could change his genetic structure through personal effort, we should have to point to the environmental circumstances responsible for the effort, as we shall have to do when geneticists begin to change the human environment. And when an individual engages in the intentional design of a cultural practice, we must turn to the culture which induces hum to do so and supplies the art or science he uses. (p. 204-205)
293	**26**	**3S**	The individualist can find no solace in reflecting upon any contribution which will survive him. He has refused to act for the good of others and is therefore not reinforced by the fact that others whom he has helped will outlive hum. He has refused to be concerned for the survival of his culture and is not reinforced by the fact that the culture will long survive him. In the defense of his own freedom and dignity he has denied the contributions of the past and must therefore relinquish all claim upon the future. (p.205-206).
294	**26**	**2S4S**	In the scientific picture a person is a member of a species shaped by evolutionary contingencies of survival, displaying behavioral process which bring him under control of the environment in which he lives, and largely under control of a social environment which he and millions of others like him have constructed and maintained during the evolution of a culture. (p. 206)
295	**26**	**4S**	But does man not then become merely a victim or passive observer of what is happening to him? He is indeed controlled by his environment, but we must remember that it is an environment largely of his own making. The evolution of a culture is a gigantic exercise in self-control. (p. 210)
296	**27**	**3S**	It is perhaps a natural mistake to suppose that the abolition of aversive social control leads in the end to this kind of permissiveness but, like convenience and comfort, small personal freedoms are purchased at great social cost. Everyone suffers when people are ill-mannered, illiterate, and ignorant, when laws are frequently broken, when people continue to need help, when goods are unequally distributed, and when so-called victimless crimes prove to have victims. In short: the world has changed, and the processes through which we free ourselves from aversive stimulation, non-social and social, have begun to work against the survival of the culture and possibly the species. (p. 6 - 7)
297	**27**	**2S**	Here, then, are two basic issues faced by all modern government. Somewhere between freedom and despotism and between affluence and poverty there are points at which personal and social gains are balanced, but how can those points be reached? The most likely answer shows the traditional preoccupation with aversive control: we should enforce the laws, limit the extent to which people can acquire goods (as by taxing excesses), and make people work for what they get. But are there nonpunitive alternatives? Can we design an environment in which people will treat each other well, keep the size of the population within bounds, learn to work and work productively, preserve and enhance the reinforcing character of the world, explore and analyze that world, limit the use and do all this because the results are positively reinforcing? (p. 7)
298	**27**	**1S2S**	People are governed, in the broadest sense, by the world in which they live, particularly by their social environment. The operations of such an environment is most obvious in a small homogeneous group, where behavior injurious to others is punished and behavior favoring others is reinforced, either by relaxing a threat or by presenting goods. As a social environment evolves, supportive practices appear. The group classifies behavior as good, bad, right, and wrong and uses these terms as conditioned reinforcers in strengthening or suppressing behavior. It describes some of the more important contingencies in the form of rules, and by following rules its members conform more quickly and avoid direct exposure to punitive consequences. Individuals may act to maintain the very contingencies to which they conform and when they do so without supervision, they are said to show self-control or the possession of an ethical or moral sense. Such a social environment transmits itself as new members of a group acquire the behavior of maintaining the contingencies. (p. 8)

299	**27**	**3S**	It is probably impossible to keep these fields apart, and it is modern use the term culture cover them all. A culture is a complete social environment in which some contingencies are maintained by individuals and others by institutions. The earlier division was useful, however, because culture in the older sense meant the social contingencies not maintained by centralized agencies. Democracy has a special meaning when we apply the term to a culture in that sense. (p. 9)
300	**27**	**3S**	It is then more obvious that control rests with the people. A social environment exists only because of what people do for and to other people and it is never more than that even when power is usurped by or delegated to a special agency, but in a culture in the older sense the control is direct. (p. 9)
301	**27**	**2S3S**	Positive reinforcement has a strengthening effect not only upon the behavior of the individual, but also upon the culture, by creating a world from which people are not likely to defect and which they are likely to defend, promote, and improve. All those who act to make the physical world more beautiful - the ecologists concerned with natural beauty and the artists, musicians, architects, and other who create beautiful things - all increase the chances that living in the world will be positively reinforced. Those who use behavior modification, properly defined, could be said to be concerned with preserving and furthering the beauty of the social environment - or, to borrow a phrase from a vanishing culture, to create more beautiful people. (p. 11)
302	**27**	**3S**	The results are sometimes productive. We may turn to art, music, literature, science or the other great achievements of the humans species. More often, however, they are stultifying and wasteful - as when we turn to alcohol or other drugs, surrender to the variable-ratio schedules exploited by gambling systems, vicariously live the serious lives of others in gossip, literature, films, and spectator sports, or turn to violence as an escape from boredom. A contingent reinforcer for the unemployed, but not for the affluent. Noncontingent reinforcers keep the group from most fully developing the capacities of its members and threaten the strength of the culture and presumably its chances of survival. Still another principle concerns the extent to which a culture prepares its members to meet its contingencies. A social environment is extraordinary complex, and new members of a group do not come prepared with appropriate behavior. The individual was once inducted into a culture by natural instructional programs , in the presence of favorable models. There are no longer an important part of growing up, and more explicit control is now needed. Programmed sequences of contingencies, in the hands of skillful teachers and counselors can lead efficiently to the complex repertoires demanded by a social environment. (p. 13)
303	**27**	**2S**	These, then, are some of the principles to be observed in promoting the effective control of people by people. James Reston, writing in the New York Times, quoted the London Economist on the contribution America can make in its third century. It will depend, the Economist said, on how its three main institutions evolve. "These three main institutions are, in reverse order of important, its business corporations, its government, and its mechanisms for living together" - in other words, the economy, the polity, and the culture in the older sense. Perhaps we may leave business to the economists and government to the political scientists, but to whom shall we assign the "mechanisms for living together," which the Economist puts at the top of the list? I submit that they are simply the contingencies which define the social environment as a culture and therefore precisely the field of a technology of behavior. (p. 13 - 14)
304	**27**	**2S3S4S**	It is often said that in the end the question is who will control the controllers (Quis custodiet ispsos custodes?), but the issue is not Who but What. People act to improve cultural practices when their social environment induce them to do so. Cultures which have this effect and which support the relevant sciences are more likely to solve their problems and survive. It is an evolving culture, then, which is most likely to control the controller. (p 14 - 15)
305	**27**	**1S2S**	There will no doubt continue to be governmental and economic agencies, organizations, and institutions, for they have their proper functions, but they should not be given na exclusive franchise. A social environment functions most successfully for the individual, the group, and the species if, so far as possible, people directly control people. The design of a social environment in which they do so is one of our most pressing needs. It is quite clearly a special challenge to psychology as a science of behavior. (p. 15)

306	**28**	**3S**	It became clear that certain features of that world had bearing on some long-standing problems. What follows is offered as an example. Doomsday prophecies are now commonplace of daily life. We are continually reminded that, for all its past triumphs, mankind may be headed straight for disaster. Unless something is done, and soon, there will be too many people in the world, and they will ever more rapidly exhaust its resources and pollute its air, land, and water, until in one last violent struggle for what is left, some madman will release a stockpile of nuclear missiles. There are optimists, of course, who contend that the human species, like some other species, will prove to have some built-in mechanism which limits population (a mechanism more acceptable than the famine, plague and war which have served that purpose in the past), that new and nonpolluting sources of energy will be discovered, and that some kind of world government or possibly the deterrent effect of even more horrible weapons will put an end to war. But the trend is certainly ominous, and Cassandra, who always prophesies disaster, may again be right. If so, it will be for the last time. If she is right now, there will be no more prophecies of any kind. (p. 16 - 17)
307	**28**	**2S3S**	One of the most ominous things about the future is how little is being done about it. The great majority of the people on the earth do not know that there is a problem, and of those who know very few take any relevant action. A major difficulty is that the future always seems to conflict with the present. It may be obvious to commuters that their private cars are polluting the air they breathe, but a private car is nevertheless much more convenient than a public transportation. Energy may be in short supply, but it is pleasant to heat buildings in the winter and cool them in the summer so that roughly the same kind of clothing can be worn in both seasons. Inflation undermines the future which would otherwise be provided for by personal savings or social security, but higher wages for labor and higher prices for management are momentarily rewarding. Overpopulation may be a major threat, but people take pleasure in procreation and pride in children. Wars may be inevitable so long as wealth is unevenly distributed, but those who are lucky enough to have an undue share naturally defend it. Physical and biological technologies are probably powerful enough to solve these problems and guarantee a decent future, but they will do so only if they are put to use. The problem is human behavior How can people be induced to take the future into account? That is a question to which, I think, an analysis of behavior is relevant. (p. 17)
308	**28**	**1S3S**	Even when supplemented by the conditioning of reinforcers, operant conditioning will not, without help, generate much of the human behavior which "takes the future into account". No individual could, in a single lifetime acquire a very large repertoire in this way. A farmer plants in the spring "in order that he may harvest in the fall", but it is unlikely that anyone ever learned to do so for that reason alone. Another process comes into play. It involves other people, who accumulate and transmit useful behavior. A basic process, imitation, may be part of the human genetic endowment. Other people have been a stable feature of the human environment, and a tendency to behave as others are observed to behave should have had great survival value, others presumably behave as they do for good reason, and by imitating them an individual can expediently acquire behavior useful for the same reason. Many species show innate imitative behavior, although its existence in man is still debated. In any case, there are contingencies of reinforcement, rather like the of survival, which include people to behave as others are behaving. By imitating those whose behavior has already been shaped by prevailing contingencies, people acquire appropriate behavior without being directly exposed to the contingencies themselves. The customs and manners of a group seem to be maintained by such a process. With the help of imitation, individuals need not construct for themselves the long sequences which bring their behavior under the control of fairly remote consequences. They acquire much greater repertoires than would be possible in a nonsocial environment. (p. 22)

309	**28**	**2S**	There are other arrangements of reinforcers which seems to bring the future more actively into play. Governmental practices supply good examples. The reinforcers used to "keep the peace" are almost exclusively aversive or punitive; for example, citizens are fined, flogged, or imprisoned when they behave illegally. The reinforcers used to induce citizens to defend a government against its enemies are also largely aversive; defectors and deserters are imprisoned or shot. A system of conditioned positive reinforcers is also used, ranging from medals to memorials. The behavior strengthened has consequences which reinforce the government for maintaining these conditions, but citizens may gain indirectly (if less immediately) from the order and security which result. Their behavior is due primarily to contrived governmental contingencies, but it has consequences in the possibly distant future which would be reinforcing if they occurred sooner. The governmental practice bridges a temporal gap. (p. 22 - 23)
310	**28**	**2S**	Religious agencies also control their communicants with contrived reinforcers both positive and negative. The claimed power to determine extraordinary rewards and punishments after death is used first of all to strengthen the agency, but the communicant may acquire useful practices of self-control, as well as the advantages of living among well-behaved people. (p. 23)
311	**28**	**1S3S**	Education shows the same pattern. The craftsman teaches his apprentice because he acquires a useful helper, but the apprentice gains by becoming a craftsman in his own right. It would be difficult to spot all the reason why parents, peers, employers, religions and governments contrive educational contingencies, but a distinction may still be drawn between the advantages gained by those who teach or pay for teaching and the possibly long-deferred gains of the learner. Ethical and moral practices are less conspicuously organized, but the same pattern prevails. People control each other - governing, teaching, giving incentives - because of immediate gains but in ways which yield possibly long deferred advantages for all. (p. 23)
312	**28**	**2S**	The consequences which lie in the possibly distant future are often cited to justify practices in government, religion, economics, education, and ethics. Governments may act primarily to maintain their power, but they seek legitimacy by pointing to peace and security. religious agencies appeal to values such as peace of mind and compassion. Entrepreneurs justify themselves by pointing not to their profits but to the resources they develop and the good they make available. And when a proposal is made to change a practice, it is usually supported by pointing to the deferred advantages rather than the immediate gains of those who propose it. Nevertheless, it is quite unlikely that the deferred consequences have any effect as reinforcers. They are, on the contrary, simply incidental by-products. (p. 23)
314	**28**	**2S3S**	This is not to deny that they serve a different kind of function. The fact is that cultural practices have evolved in which contingencies of immediate reinforcement generate behavior having remote consequences and this has presumably happened in part because the consequences have strengthened the culture, permitting it to solve its problems and hence survives. That the remote consequences, no matter how important for the culture, are nevertheless not having any current effect is all too evident when efforts are made to take into account a future which is not the by-product of currently reinforced behavior. (p. 24)
315	**28**	**2S**	These measures are obviously taken for the sake of possibly long deferred consequences, but it has proved to be difficult to support them with immediate reinforcers. In fact, in democratic countries few if any institutional sanctions and suasions, designed for whatever purposes, are now working well. In our own culture, for example, people do not seems to be as law-abiding as they once were or as readily disposed to serve in the armed services. This does not mean that they have developed criminal tendencies or lost their patriotism; it means that laws are no longer as strictly enforced or military service as highly honored. We imposed light punishments or suspend sentences, and in many states the death penalty has been abolished. We no longer shoot deserters, or glorify our heroes. (Only the returning prisoner of war is met with a brass band playing "See, the conquering hero comes!") (p. 24)

316	**28**	**2S4S**	The money people receive should be made more sensitively contingent on what they do. Welfare payments should depend on useful work. But this is not necessarily a way to make the future more effective. Stronger measures are also likely to be proposed for the sake of immediate consequences - for others. Powerful controllers are also committed to quick effects, and the remoter gains which sometimes occur as a kind of by-product are by no means guaranteed. The pendulum has swung from despotism trough democracy to anarchy and back again many times, with little or no change in the future prospects of mankind. A stable equilibrium between control and countercontrol may occur from time to time, but equilibrium will not suffice. (p. 27)
317	**28**	**2S4S**	Scientists should also be best able to say what can be done. The physical and biological sciences are needed if we are to redesign our cities to avoid the effects of crowding, to develop new forms of transportation, and to discover new sources of energy and new methods of contraception. Unfortunately physical and biological technology alone cannot guarantee that its solutions will be put into effect. To solve the major problem we need an effective technology of behavior. We need, in short, a new field of specialization - the design of cultural practices. (p. 29)
318	**28**	**2S3S**	The specifications of that future were listed in Beyond Freedom and Dignity. Frazier has tried to construct a world in which "people live together without quarreling, maintain themselves by producing the food, shelter, and clothing they need, enjoy themselves and contribute to the enjoyment of others in art, music, literature, and games, consume only a reasonable part of the resources of the world and add as little as possible to its pollution, bear no more children than can be decently raised, continue to explore the world around them and discover better ways of dealing with it, and come to know themselves accurately and, therefore, manage themselves effectively. He has done this by constructing a social environment rich in immediate reinforcers, so selected that they strengthen the kinds of behavior which make a future possible. (p. 29 -30)
319	**28**	**2S3S**	Walden Two feel free. Frazier himself, as the designer of a culture, is also under the control of positive consequences, no matter how remote. He has responded to the appeal of Utopian rather than Cassandra predictions - an important point. Threatening predictions sometimes spur action (it is perhaps just another sign of the weakness of the future that we so often respond only to threats), but they also induce people to escape simply by turning to other things. It is possible that we shall act more consistently with respect to the future when we see the possibility of building a better world rather than merely fending off disaster. But something more is needed. Why should anyone design a better way of life? The answer has been waiting for us in the Utopian literature. An international community emphasizes the issue of survival. The overriding question is: Will it work? It is not so obvious that the same question must be asked of every culture. It is asked, at least implicitly, by all those who are trying to solve the problems which face our culture today, and it must eventually be asked about mankind as a whole. Overpopulation, pollution, the exhaustion of resources. nuclear war - these are threats to the survival of the human race. Will the world that mankind has made for itself work? (p. 30)
320	**28**	**2S3S**	The question is whether practices chosen for that reason have survival value. Are they to make a major contribution to the future, or will practices chosen for different reasons by different people - say, the Chinese - displace them? The question once suggested a kind of social Darwinism, but cultural practices are no longer confined to any one territory, nation, race, religion, or economic system. What is evolving is a social environment, in which the genetic endowment of the human species will be maximally effective. (p. 30 - 31)

321	**28**	**2S3S**	Remove the commas, and my title is more to the point. Are we sufficiently free of the present to have a future? Our extraordinary commitment to immediate gratification has served the species well. The powerful reinforcing effects of drugs like alcohol and heroin are no doubt accidents, but our susceptibilities to reinforcement by food, sexual contact, and signs of aggressive damage have had great survival value. Without them the species would probably not be here today, but under current conditions they are almost as nonfunctional as drugs, leading not to survival but to obesity and waste, to overpopulation, and to war, respectively. No matter how free we feel, we are never free of our genetic endowment or of the changes which occur in us during our lifetime. But if other aspects of human nature, aspects we sum up the word intelligence, come into play, we may design a world in which our susceptibilities to reinforcement will be less troublesome and in which we shall be more likely to behave in ways which promise a future. The task can scarcely be overestimated. Happiness is a dangerous value, and the pursuit of happiness has clearly been too successful. Like other affluent nations, we must, to coined a horrid word, "deaffluentize". People have done so in the past when pestilence and famine have deprived them of natural reinforcers, and when revolutions in government and religion have changed their social environments, but the power of immediate reinforcement continues to reassert itself and with ever more threatening consequences. This could happen once too often. It is possible that the human species will be "consumed by that which it was nourished by". We have it in our power to avoid such an ironic fate. The question is whether our culture will induce us to do so. (p. 32)
322	**29**	**2S3S**	We may also help others because in doing so we further the survival of the group to which we belong. A social environment (a "culture") may induce us to give help even though we gain nothing directly from the advantage of the group. Thus, we may be a Good Samaritan at some personal sacrifice, and the group supplies overriding reasons for doing so with practices which have been selected simply because they have contributed to its survival. The group plays such a role when it steps in to guarantee adequate care for the very young, the aged, the infirm, the retarded, and the psychotic. There are few, if any, behavioral processes which provide for such care in the absence of a depositing social environment, with the possible exception of such genetic considerations as the care of the very young. (p. 34)
323	**29**	**3S**	Aggressive behavior offsets or corrects compassionate help and may have survival value, for either species or group, if it leads to a more equitable distribution of goods, but the question is not who should have how much of what but, rather, how they are to get what they have. (p. 38)
324	**29**	**3S**	For reasons which in themselves illustrate a powerful behavioral principle, we have grossly overemphasized the importance of simple possession. Neither happiness nor the survival of the group depends on the satisfaction derived from having things. And the most generous help may fail as ignominiously as the most aggressive despoliation. Something else is needed to achieve conditions under which human beings will show the productivity, the creativity, and the strength inherent in their genetic endowment and which are essential to the survival of the group. (p. 47)
325	**30**	**2S4S**	Since the only selves we know are human selves, it is often said that man is distinguished from other species precisely because he is aware of himself and participates in the determination of his future. What distinguishes the human species, however, is the development of a culture, a social environment that contains the contingencies generating self-knowledge and self control. It is this environment that has been so long neglected by those who have been concerned with the inner determination of conduct. The neglect has meant that better practices for building self-knowledge and self-management have been missed. (p. 52)
326	**30**	**2S3S4S**	An environment analysis has a special advantage in promoting a kind of value concerned with the good of the culture. Cultures evolve under special contingencies of survival. A practice that makes a culture more likely to survive survives with the culture. Cultures become more successful in meeting contingencies of survival as they induce their members to behave in more and more subtle and complex ways. (Progress is not inevitable, of course, for there are extinct cultures as well as extinct species.) An important stage is reached when a culture induces some of its members to be concerned for its survival, because they may then design more effective practices. (p. 53)
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328	**30**	**2S3S4S**	Better forms of government are not to be found in better rules, better educational practices in better teachers, better economic systems in more enlightened management, or better therapy in more compassionate therapists. Neither are they to be found in better citizens, students, workers, or patients. The age old mistake is to look for salvation in the character of autonomous men and women rather than in the social environments that have appeared in the evolution of cultures and that can now be explicitly designed. By turning from man qua man to the external conditions of which man's behavior is a function, it has been possible to design better practices in the care of psychotics and retardates in child care, in education (in both contingency management in the classroom and the design of instructional material), in incentive systems in industry, and in penal institutions. In these and many other areas we can now more effectively work for the good of the individual, for the greatest good of the greatest number, and for the good of the culture or of mankind as a whole. These are certainly humanistic concerns, and no one who calls himself a humanist can afford to neglect them. Men and women have never faced a greater threat to the future of their species. There is much to be and done quickly and nothing less than the active prosecution of a science of behavior will suffice. (p. 54 - 55)
329	**31**	**3S**	But there was, I think, a better reason why more and more people began to read the book. The world was beginning to face problems of an entirely new order of magnitude - the exhaustion of resources, the pollution of the environment, overpopulation, and the possibility of a nuclear holocaust, to mention only four. Physical and biological technologies could, of course, help. We could find new sources of energy and make better use of those we had. The world could feed itself by growing more nutritious grains and eating grain rather than meat. More reliable methods of contraception could keep the population within bounds. Impregnable defenses could make a nuclear war impossible. But that would happen only if human behavior changed, and how it could be changed was still unanswered question. How were people to be induced to use new forms of energy, to eat grain rather than meat, and to limit the size of their families; and how were atomic stockpiles to be kept out of the hands of desperate leaders? (p. 58)
330	**31**	**2S3S**	Although sometimes questioned, the survival value of art, music, literature, games and other activities not tied to the serious business of life is clear enough. A culture must positivitely reinforce the behavior of those who support it and must avoid creating negative reinforcers from which its members will escape through defection. A world which has been made beautiful and exciting by artists, composers, writers, and performers is as important for survival as one which satisfies biological needs. (p. 63)
331	**31**	**2S3S**	City schools show how much harm bigness can do to education, and education is important because it is concerned with the transmission and hence the survival of a culture. We know how to solve many educational problems with programmed instruction and good contingency management, saving resources and the time and effort of teachers and students. Small communities are ideal settings for new kinds of instruction, free from interference by administrators, politicians, and organizations of teachers. (p. 62 - 63)
332	**31**	**2S**	What is needed is not a new political leader or a new kind of government but further knowledge to the design of cultural practices. (p. 66)
333	**31**	**2S3S**	The choice is clear: either we do nothing and allow a miserable and probably catastrophic future to overtake us, or we use our knowledge about human behavior to create a social environment in which we shall live productive and creative lives and do so without jeopardizing the chances that those who follow us will be able to do the same. Something like a Walden Two would not be a bad start. (p. 66)
334	**32**	**3S**	People are said to treat each other in ways which express compassion and love and which inspire gratitude, but the important thing is the contribution to the functioning of the social environment or culture. The behavior we call ethical makes as group function more effectively. The feelings or states of mind associated with it are collateral products. (p. 93)
335	**32**	**3S**	Enough is already known about those conditions to assure reasonable success in the interpretation, prediction, and control of human behavior. A refusal to take advantage of what is within reach could mean the difference between the survival and the destruction of our civilization or even the species. (p. 95)

336	**33**	**3S**	In Walden Two every effort is made to reduce the things needed for "the good life". I didn't realize it at the time, but there is a bonus. Walden Two is not only minimally consuming, it is minimally polluting. (p. 191)
338	**34**	**2S3S**	The struggle for freedom has moved slowly, and alas erratically, toward a culture in which controlling power is less and less likely to fall into the hands of individuals of groups who use it tyrannically. We have tried to construct such a culture by exerting countercontrol over those who misuse power. Countercontrol is certainly effective, but it leads at best to a kind of uneasy equilibrium. The next step can be taken only through the explicit design of a culture which goes beyond the immediate interests of controller and counter controller. (p. 197)
339	**34**	**3S**	Design for what? There is only one answer: the survival of the culture and of mankind. Survival is a difficult value (compared, say, with life, liberty, or the pursuit of happiness) because it is hard to predict the conditions a culture must meet, and we are only beginning to understand how to produce the behavior needed to meet them. Moreover, we are likely to reject survival as a value because it suggests competition with other cultures, as in a social Darwinism, in which aggressive behavior is aggrandized. But other contingencies of survival are important, and the value of cooperative, supportive behavior can be easily demonstrated. (p. 197)
340	**34**	**3S**	Must individual freedoms be "sacrificed" for the sake of the culture? Most of my critics contend that I am saying so, but the answer depends on how people are induced to work for the good of their culture. If they do so under a threat of punishment, than freedom (for such a threat) is sacrificed, but if they are induced to do so through positive reinforcement, their sense of freedom is enhanced. Young Chinese wear plain clothing, live in crowded quarters, eat simple diets, observe a rather puritanical sexual code and work long hours - all for the greater glory of China. Are they sacrificing freedom? They are if that are under aversive control, if they behave as they do because they will be denounced by their fellows when they behave otherwise. But if Mao succeeded in making signs of progress toward a greater China positively reinforcing, then it is possible that they feel freer, and happier, than most young Americans. (p. 197-198)
341	**35**	**2S3S**	The managed self is composed of what is significantly called selfish behavior - the product of the biological reinforces to which the species has been made sensitive through natural selection. The managing self, on the other hand, is set up mainly by the social environment, which has its selfish reasons for teaching a person to alter his behavior in such a way that it becomes less aversive and possibly more reinforcing to others. (p. 176-177)
342	**35**	**2S**	Unfortunately, the reinforces most often used are negative: governmental and religious control is based mainly on the threat of punishment ("power"), and noninstitucional practices are often of the same sort. (p. 181)
343	**35**	**2S**	We must look at why people help others, exerting control as they do so. The culture of the therapist should lead him to act in ways which are good for the person he is helping, and the problem of those who are concerned for therapy is to generate such a culture, not to find humane therapists. (p. 186)
344	**35**	**2S**	Governing. In the broadest sense the term should include all management, but it is usually confined to governmental and religious practices, particularly those which are punitive and which are said to build a sense of responsibility. Like duty (what is due or owed to others) and obligation (what one is obliged to pay), responsibility suggests aversive consequences, and we sometimes say that a person is responsible in the sense that he responds to aversive contingencies. We hold him responsible by maintaining such contingencies. (p. 186)
345	**35**	**1S**	People learn rather easily to control others. A baby, for example, develops certain methods of controlling his parents when he behaves in ways leading to certain kinds of action. Children acquire techniques of controlling their peers, and they become skillful in this long before they control themselves. (p. 188)
346	**36**	**2S**	Organized agencies or institutions, such as governments, religions, and economic systems, and to a lesser powerful extent educators and psychotherapists, exert a powerful and often troublesome control. It is exerted in ways which most effectively reinforce those who exert it, and unfortunately this usually means in ways which either are immediately aversive to those controlled or exploit them in the long run. (p. 190)

347	**36**	**1S2S**	People do begin to call behavior good or bad, right or wrong and to reinforce or punish accordingly, and rules are eventually stated which help the community maintain the practices. A person who learns these rules and behaves by explicitly following them still has not internalized them, even when he learns to control himself and thus to adjust even more effectively to the contingencies maintained by the group. Social behavior does not require that the contingencies which generate it should be formulated in rules or, if they have been formulated, that a person should know the rules. It is extraordinarily important, however, that social practices be formulated. (p.193)
348	**36**	**2S3S**	Man has been said to be superior to the other animals because he has evolved a moral or ethical sense. "By far the most important characteristic of human being is that we have and exercise moral judgment." But what has evolved is a social environment in which individuals behave in ways determined in part by their effects on others. Different people show different amounts and kinds of moral and ethical behavior, depending upon the extent of their exposure to such contingencies. Morals and ethics have been said to involve "attitudes toward law and government which have taken centuries in the building." but it is much more plausible to say that the behavior said to express such attitudes is generated by contingencies that have developed over the centuries. An attitude toward government as distinct from behavior can scarcely have survived for centuries; what have survived are governmental practices. (p. 195)
349	**36**	**2S**	To attribute moral and ethical behavior to environmental contingencies seems to leave no room for absolutes. It suggests a kind of relativism in which what is good is whatever is called good. One objection to this is that it refers to reinforcers but not to the maintained contingencies in which they appear. We also tend to object what another group calls good differs widely from what we call good, if our practices conflict. But an environmental account is not relativism in this sense. The "boo-hurrah theory" of ethical emotivists was an appeal to feelings sharply localized in ethical and moral standards. Ethical and moral contingencies of reinforcement have their own consequences, to which I shall return in a moment. (p. 196)
350	**36**	**1S2S**	People have suffered so long and so painfully the controls imposed upon them that it is easy to understand why they so bitterly oppose any form of control. A simple analysis of controlling practices, such as that in the preceding chapter, is likely to be attacked simply because it could be misused by controllers. But in the long run any effective countercontrol leading to the "liberation" of the individual can be achieved only by explicit design, and this must be based upon a scientific analysis of human behavior. We must surely begin with the fact that human behavior is always controlled. "Man is born free", said Rousseau, "and is everywhere in chains", but no one is less free than a newborn child, nor will he become free as he grows older. His only hope is that he will come under the control of a natural and social environment in which he will make the most of his genetic endowment and in doing so most successfully pursue happiness. His family and his peers are part of that environment, and he will benefit if they behave in ethical ways. Education is another part of that environment, and he will acquire the most effective repertoire if his teachers recognize their role for what it is rather than assume that it is to leave him free to develop himself. His government is part of that environment, and it will "govern least" if it minimizes its punitive measures. He will produce what he and others need most effectively and least aversively if incentive conditions are such that he works carefully and industriously and is reinforced by what he does. All this will be possible not because those with whom he associates possess morality and a sense of ethics or decency or compassion, but because they in turn are controlled by a particular kind of social environment. (p. 201)

351	**36**	**2S3S**	The most important contribution of a social environment – a contribution wholly abandoned in the return to a thoroughgoing individualism – has to do with the mediation of the future. The brutal prospect of overpopulation, pollution, and the exhaustion of resources has given the future a new and relatively immediate significance, but some concern for the future has, of course, long prevailed. It has been said that a hundred years ago "there were few men alive, whether Utilitarians or religious people, who then thought of the goodness of an act as being in the act itself or in the will that willed it; all was in the consequences, for their happiness tomorrow or the 'life hereafter'; both were matters of future reward." But goodness in the light of which an act may be judged is one thing; inducing people to be good or to act well "for the sake of a future consequence" is another. The important thing is that institutions last longer than individuals and arrange contingencies which take a reasonably remote future into account. The behavioral processes are illustrated by a person who works for a promised return, who plays a game in order to win, or who buys a lottery ticket. With their help, religious institutions make the prospect of an afterlife reinforcing, and governments induce people to die patriotic deaths. (p. 201-202)
352	**36**	**1S2S3S4S**	The social environment I have been referring to is usually called a culture, though a culture is often defined in other ways – as a set of customs or manners, as system of values and ideas, as a network of communication, and so on. As a set of contingencies of reinforcement maintained by a group, possibly formulated in rules or laws, it has a clear-cut physical status, a continuing existence beyond the lives of members of the group, a changing pattern as practices are added, discarded, or modified, and, above all, power. A culture so defined controls the behavior of members of the group that practices it. (p. 202-203)
353	**36**	**2S**	Why do people develop a language? Why do they practice some kind of marriage? Why do they maintain moral practices and formulate them in codes? Some answers to questions of this sort are to be found in the biological characteristics of the species, other in "universal features" of the environments in which people live. (p. 203)
354	**36**	**2S3S4S**	The important thing about a culture so defined is that it evolves. A practice arises as a mutation, it affects the chances that the group will solve its problems, and if the group survives, the practice survives with it. It has been selected by its contribution to the effectiveness of those who practice it. Here is another example of that subtle process called selection, and it has the same familiar features. Mutations may be random. A culture need not have been designed, and its evolution does not show a purpose. (p. 203)
355	**36**	**2S**	The practices which compose a culture are a mixed bag, and some parts may be inconsistent with others, or in open conflict. Our own culture is sometimes called sick, and "in a sick society, man will lack a sense of identity and feelings of competence; he will see the suspension of his own thought structures... to enter into a more fruitful relationship with those around him as betrayal; he will approach the world of human interaction with a sense of real despair; and only when he has been through that despair and learnt to know himself will he attain as much of what is self-fulfilling as the human condition allows." (p. 204)
356	**36**	**1S2S**	In translation: a sick society is a set of contingencies which generate disparate or conflicting behaviors suggesting more than one self, which does not generate the strong behavior with which a feeling of competence is associated, which fails to generate successful social behavior and hence leads a person to call the behavior of other betrayal, and which, supplying only infrequent reinforcement, generates the condition felt as despair. Another writer has said that our culture is "in convulsion owing to its state of values", but he may say that the values, here as elsewhere, refer to reinforcers, and that it is the contingencies of which they are a part which are opposing and conflicting. (p. 204)

357	**36**	**2S**	Better ways of teaching (introduced for whatever reason, possibly only because of immediate consequences for teacher or student) will make a more effective use of the human genetic endowment. Better incentive conditions (introduced for whatever reason, possibly only in the interests of management or labor) mean more and better goods and more enjoyable working conditions. Better ways of governing (introduced for whatever reason, possibly merely in the interests of governed or governor) mean less time wasted in personal defense and more time in other things. More interesting forms of art, music, and literature (created for whatever reasons, possibly simply for the immediate reinforcement of those creating or enjoying them) mean fewer defections to other ways of life. (p. 204-205)
358	**36**	**3S**	The point survives when the appeal to character is corrected by speaking of "a nation which maintains a social environment in which its citizens behave in ways called intelligent, energetic, brave, patriotic, and benevolent." Darwin was speaking of the survival value of a culture. (p. 205)
359		**3S4S**	There are remarkable similarities in natural selection, operant conditioning and the evolution of social environments. Not only do all three dispense with a prior creative design and a prior purpose, they invoke the notion of survival as a value. What is good for the species is what makes for its survival. What is good for the individual is what promotes his well-being. What is good for a culture is what permits it to solve its problems. There are, as we have seen, other kinds of values, but they eventually take second place to survival. (p. 205)
360	**36**	**2S3S4S**	The notion of evolution is misleading – and it misled both Herbert Spencer and Darwin – when it suggests that the good represented by survival will naturally work itself out. Things go wrong under all three contingencies of selection, and they may need to be put right by explicit design. Breeding practices have long represented a kind of intervention in the evolution of the species, and geneticists are now talking about changing genetic codes. The behavior of the individual is easily changed by designing new contingencies of reinforcement. New cultural practices are explicitly designed in such fields as education, psychotherapy, penology, and economic incentives. (p. 205-206)
361	**36**	**1S2S4S**	We must look instead at the conditions under which people govern, give help, teach, and arrange incentive systems in particular ways. In other words we must look to the culture as a social environment. Will a culture evolve in which no individual will be able to accumulate vast power and use it for his own aggrandizement in ways which are harmful to others? Will a culture evolve in which individuals are not so much concerned with their own actualization and fulfillment that they do not give serious attention to the future of the culture? These questions, and many others like them, are the questions to be asked rather than who will control and to what end. No one steps outside the causal stream. No one really intervenes. Mankind has slowly but erratically created environments in which people behave more effectively and no doubt enjoy the feelings which accompany successful behavior. It is a continuing process. (p. 206)
362	**37**	**1S2S3S4S**	Operant behavior, like natural selection, prepares the organism for a future, but it is only a future that is similar to the selecting past. Moreover, the repertoire of behaviors that can be acquired without help by a single organism in a single lifetime is not very large. That fault was in turn corrected by the evolution of processes through which organisms were affected by the selecting pasts of other members of the species. Imitation is an example. When members of a group imitate each other and model behavior to be imitated, they acquire much larger repertoires, which are effective under a greater variety of conditions. The human species went far beyond imitation and modeling with the evolution of verbal behavior, or language. People not only show each other what to do - they tell them. A language is the product of a third kind of selection by consequences, the evolution of cultures. A culture evolves when new practices, introduced for perhaps irrelevant reasons, are selected by their contributions to the survival of the practicing group. Cultural practices are also said to have purposes. For example, the purpose of education is said to be the production of informed members of a group, but again, we should speak only of selecting consequences. Educational practices evolve when they contribute informed members to the group. (p. 3)

363	**37**	**2S3S**	That very fact may be helpful, however. Can something of the sort not be done to solve our problem? Why not arrange immediate consequences that will have the effect that remote consequences would have if they were acting now? There is nothing very new in that suggestion. Ethics is mainly a matter of the conflict between immediate and remote consequences. How can we forego a reward in order to avoid a later punishment or take punishment for the sake of a later reward? Cultures have helped to solve the problem by supplying immediate consequences that have the same effect as the remote ones. They shame their members who fail to forego immediate rewards or refuse to take immediate punishment, and commend those who do it. If eating too much salt and sugar were more serious, it would be called shameful. (p. 6)
364	**37**	**2S3S4S**	It might also be called illegal or sinful, because in advanced cultures sanctions of that sort are taken over by governments and religions. Those institutions outlive people, and those who respond to their sanctions can therefore be said to be working for a future beyond their own. The sanctions are usually punitive: One pays taxes to a government or contributes to a religion because punishment of some sort will follow if one does not. But positive consequences also usually follow - security and order in the case of government, and peace of mind and answers to puzzling questions in the case of religion. These positive consequences are sometimes called the justifications of governments and religions. Money and goods are other immediate reinforcers used to induce people to work for a future beyond their own - the future of a business or industry. The justification is said to be the more abundant production and distribution of goods. Without these so-called justifications, governments, religions and capital would not have been able to maintain their control. (p. 6 - 7)
365	**37**	**2S3S**	If the futures of governments, religions, and capitalistic systems were congruent with the future of the species, our problem would be solved. When a certain behavior was found to endanger the species, the institutions would declare it illegal, sinful, or too costly, respectively, and would change the contingencies they impose. Unfortunately, the futures are different. Nuclear weapons are made to guarantee the survival of governments and religions, not the species. Governments and religions estimate their strength in the sheer number of their supporters and are therefore "prolife". (China may seem to be an exception, but overpopulation was already sever; the future had arrived.) Governments and religions enlist support by defending the right to property and the pursuit of happiness, and it is only when a very near future threatens (for example, during a war) that they risk defection by imposing austerity. (p. 7)
366	**37**	**2S3S**	Governments, religions, and capitalistic systems, whether public or private, control most of the reinforcers of daily life; they must use them, as they have always done, for their own aggrandizement, and they have nothing to gain by relinquishing power. Those institutions are the most embodiments of cultural practices that have come into existence through selection, but the contingencies of selection are in conflict with the future of the human species. (p. 7)
367	**37**	**2S4S**	The fact that selection by consequences prepares only for a future like the selecting past is a flaw that, as we have seen, has been successively corrected - the flaw in natural selection by operant conditioning and the flaw in operant conditioning by the evolution of cultural practices. But there is another possible step. Among evolved cultural practices are those of science, and with them we should be able to intervene in the process of selection. We should be abler either to introduce variations (rather than wait for them to occur by chance) or to change the contingencies of selection. Something of the sort has long been done. For thousands of years, people have intervened in the evolution of domestic animals through selective breeding, and they can now do so with greater precision. For the first time it is possible to introduce variations by changing genes. People have always intervened in the development of personal repertoires of behavior either by introducing variations (as by modeling new kinds of behavior to be imitated) or by changing the contingencies of reinforcement. Programmed instruction does both. Only occasionally have people changed the contingencies of selection responsible for cultural practices (although they have sometimes done so to preserve a valued practice that was on the verge of extinction), but people routinely change cultures by introducing new practices as variations to be selected. Rather than wait for further variation and selection to solve our problem, can we not design a way of life that will have a better chance of a future? (p. 7 - 8)

368	**37**	**2S3S**	Perhaps it is time to ask who "we" are. Na answer may be found simply by listing those who are now most active in considering the problem. For the most part, we are scholars, scientists, teachers, and writers for the media. We are the uncommitted - to governments, religions, and capital - and are therefore free to consider a more remote future. But we are free only to the extent that we are indeed uncommitted. If among us there are leaders in government, religion, and business, they are with us only to the extent that they are uncommitted to their respective institutions. Those of us who are scientists can give the best picture of the future, and it need not resemble the selecting past. Much of science is simply a record of what has happened (it is knowledge by acquaintance), but much is also knowledge by description. By analyzing a complex system and applying what has already been learned about its parts, scientists predict events that have never occurred before.(p. 8)
369	**37**	**2S3S4S**	If human nature means the genetic endowment of the species, we cannot change it. But we have the science needed to design a world that would take that nature into account and correct many of the miscarriages of evolution. It would be a world in which people treated each other well, not because of sanctions imposed by governments or religions but because of immediate, face-to-face consequences. It would be a world in which people produced the goods they needed, not because of contingencies arranged by a business or industry but simply because they were "goods" and hence directly reinforcing. It would be a beautiful and interesting world because making it so would be reinforced by beautiful and interesting things. It would be a world in which the population was kept at a safe level because all social and economic incentives for having children had been removed and conception was easily preventable or feely revocable. It would be a world in which the social and commercial practices that promote unnecessary consumption and pollution had been abolished. It would be a way of life that would give the species a much longer lease on the planet Earth. It could all be done without "raising consciousness". Only those who designed the relations between behavior and its consequences would need to take the remoter consequences into account. (p. 11)
370	**37**	**2S3S**	Even if the changes were carefully programmed and moved only slowly in the right direction, they would be resisted as soon as it was clear that they threatened governments, religions, and economic enterprises. Nor would it be possible to turn to the people for support, because they would also be the products of earlier cultures. A designed way of life would be liked by those who lived it (or the design would be faulty), but it would almost certainly not appeal to those who like what they like because they have been taught to like it by a different culture. (p. 12)
371	**37**	**2S3S4S**	We cannot step into the history of life on Earth as if we were not part of it. If people have ever changed the course of evolution, they have done so because evolved cultural practices made it possible. If we cannot intervene, however, we can at least watch. Are there signs, for example, that institutions are growing weaker? Certainly there is no clear move toward a government that governs best because it governs least. Religion is playing a more important role than it has played for some time, and it has turned again to more violent measures. Business and industry have scarcely narrowed the gap between the rich and the poor of the earth. (p. 12)
372	**37**	**2S3S**	In one species, Homo sapiens, the vocal musculature came under operant control and people began to talk to each other and exchange experiences. Elaborate cultural practices evolved, among them science and technology. Unfortunately, they were used to support genetic dispositions that had evolved at an earlier stage. Because food was reinforcing, people raised, stored, and distributed vast quantities of it. Because moving about was useful and exciting, they invented trains, cars, airplanes, and spaceships. Because good things could be taken from other people and then needed to be defended, they invented clubs, guns, and bombs. Because they wished to avoid ill health and the threat of death, they practiced medicine and sanitation. They lived longer and their numbers increased, and they took over more and more of the Earth and brought it under cultivation. They consumed more and more of its irreplaceable resources. In the struggle for what was left, they began to build weapons so powerful that they could bring life on Earth to an end. (p. 13 - 14)

373	**37**	**2S3S**	A few people saw the danger and worried about it, but their proposals conflicted with practices that were supported not only by immediate and hence more powerful consequences but by the out-of-date moral and ethical principles that had been invented to justify them. Those who were able to do so continued to breed at will, consume without restraint, and prepare to defend themselves at any cost. Eventually people no longer worried about the future because there were no people. (p. 14)
374	**37**	**2S3S**	A happier ending might run like this: Those who saw the danger began to do more than talk about it. They began to study humane behavior with methods that had first evolved in physics and biology. They turned from observing what people had done up to that time to observing what people did under carefully controlled conditions. A science and a technology of behavior emerged that were free of governmental, religious and economic ideologies. Better cultural practices were designed. Meanwhile, older practices grew weak as their justifications became suspect. Governments no longer provided order and security. Religions failed to give peace of mind and joined with governments in threatening the peace of the world. Their answers to puzzling questions yielded to the answers of science. Economic institutions lost control as automation destroyed both the need for and the enjoyment of productive labor. Education emerged as the dominant force in the maintenance and transmission of cultural practices. The species survived for many thousand years, and before those visitors from outer space reached Earth, they were met by a similar caravan coming from Earth itself.
375	**38**	**2S4S**	The human species took a unique evolutionary step when its vocal musculature came under operant control and language was born. People could then tell as well as show each other what to do. Extraordinarily complex social environments, or cultures, evolved, and they gave the species its extraordinary power. I shall argue that, at the same time, many of the new cultural practices eroded or destroyed certain relations between organism and environment that prevailed when operant conditioning evolved. (p. 16 - 17)
376	**38**	**2S4S**	Reinforcement, however, has another effect: Behavior that is reinforced is more likely to occur again. At the risk of being seriously misunderstood by critics of behaviorism, I shall distinguish between the pleasing and the strengthening effects. They occur at different times and are felt as different things. When we feel pleased, we are not necessarily feeling a greater inclination to behave in the same way. (Indeed, when we call a reinforcer satisfying rather than pleasing, as Thorndike did, we suggest that it reduces the likelihood of acting in the same way, because satisfying is etymologically close to satiating.) When we repeat behavior that has been reinforced, on the other hand, we do not feel the pleasing effect we felt at the time the reinforcement occurred. Pleasing appears to be the everyday English word that is closet to reinforcing, but it covers only half the effect. I am arguing that cultural practices have evolved primarily because of the pleasing effect of reinforcement, and that much of the strengthening effect of the consequences of behavior has been lost. The evolution of cultural practices has miscarried. It is rather like what has happened in the field of health. The species evolved in an environment with a given mean temperature and humidity, a given purity of water, given kinds of food, and given predators, including viruses and bacteria. Cultural practices have vastly changed all that, because natural selection has been too slow to keep the pace, we suffer many illnesses from which the species must once have been free. The world we live in is largely a creation of people, and nowhere more so than in the West - but in an important sense it is not well made. (p. 17 - 18)
377	**38**	**2S**	Before looking more closely at what is wrong it will be helpful to review five cultural practices that, by promoting the pleasing effects of the consequences of behavior at the expense of the strengthening effects, have eroded contingencies of reinforcement. (p. 18)
378	**38**	**2S**	I begin with an old chestnut, the alienation of the worker from the product of his work. That is Karl Marx, of course, and it is often assumed that Marx meant the deprivation of the worker of the product of his work. A better word is estrangement. The behavior of the industrial worker is separated from the kind of immediate consequences that shapes and maintains the behavior of, say, a craftsman. Alienation can scarcely be exploitation because entrepreneurs are also estranged from the consequences of what they do, and so are the workers in socialist states. (p. 18)

379	**38**	**2S**	The reinforcing effect of money is especially weak when it is paid on contract. The contingencies are aversive. Workers do not work "in order to be paid", if that means that the money they will receive at the end of the week affects their behavior during the week. They work to avoid being discharged and losing the money they would otherwise receive. Most of the time they do simply what they are told to do or have agreed to do. Having assembled part of a television set on a production line, the worker is not then more strongly inclined to assemble another. The contract must remain in force. Workers rarely put in a free day at the factory just because they have been paid for working there at other times. Money is reinforcing when it is paid piece-rate or on commission (technically speaking, when behavior is reinforced on a fixed-ratio schedule), or when it is paid on the variable-ratio schedule of all gambling systems. Wages paid for the amount of time worked do not, strictly speaking, reinforce behavior at all. (p. 19)
380	**38**	**2S**	A second source of erosion of the strengthening effect of reinforcement is closely related. As we have noted, most employers are alienated from what is produced as are their employees. For thousands of years people have "saved labor" either by forcing slaves to work for them or by paying servants or employees. More recently, they have turned to labor-saving devices and robots. The aversive consequences of labor are saved, but the reinforcing ones are lost. Like the worker, the employer does fewer kinds of things and does each one more often. Consider the extent to which labor-saving devices have made us button pushers: We push buttons on elevator, telephones, dashboards, video recorders, washing machines, ovens, typewriters, and computers, all in exchange for actions that would at least have a bit of variety.(p. 20)
381	**38**	**2S3S**	In some parts of America, people who work for others are called "the help", but help does not always have to be paid for. Benevolent cultures help small children, the handicapped, the ill, and the aged. Such cultures are less vulnerable to defection and more likely to solve their problems, but harmful consequences follow when they help those who can help themselves. Helping children do something they can do alone deprives them of reinforcing consequences that would shape and maintain more useful behavior. Helping older people to do things they could do for themselves deprives them of the opportunity to engage in reinforced activities. (p. 20)
382	**38**	**4S**	Perhaps there is no part of the world in which everyone enjoy the right to security and access to goods, but the Western democracies have gone the farthest in that direction. In many ways they may have gone too far. (p. 21)
383	**38**	**2S**	We resist not only the constraints imposed by tyrannical governments and religions but also seat belts, hard hats, and no-smoking signs. We escape not only painful extremes of temperature and exhausting work but also the mildest discomforts and annoyances. As a result, there is very little left to escape or prevent. The strengthening consequences of negative reinforcement that we enjoy as relief have been lost. We are suffering from what might be called *libertas nervosa*. Perhaps there is no part of the world in which no one goes hungry, needs medical care or has no place to live, but Western cultures have gone the farthest in alleviating those hardships. To the extent that we care for our members beyond the point at which they could care for themselves, they are suffering from what might be called *caritas nervosa*. In summary, people who avoid labor and have things done for them escape from many aversive consequences, but beyond a certain point they deprive themselves of strengthening consequences as well. (p. 21)
384	**38**	**1S2S**	The strengthening effect of reinforcement is eroded in a third way when people do things only because they have been told to do them. They buy the car they are advised to buy; they see the movie they are told to see; they shop at the store they are told to shop at. In Western cultures there has been a great expansion of this "rule-governed" behavior. Advice is important, of course. No one could acquire a very large repertoire of behavior during a single lifetime without it. Someone tell us what to do and what consequences will follow, and we do it and the consequences follow; the behavior then becomes part of our reinforced repertoire, and we forget the advice. Until consequences have followed, however, we take advice only because doing so has had reinforcing consequences, quite possibly of a different kind. (p. 21 - 22)

385	**38**	**4S**	The kind of advice called science is usually worth taking because it is more extensive than personal exposure to contingencies. But when we simply do what science tell us to do, the consequences are often long deferred. Some of them are only predicted and have not yet occurred to anyone. The gains are great, but a strengthening effect is often missing. Few people ever do only what science tell them to do. (p. 22)
386	**38**	**1S2S**	A fourth kind of cultural practice that reduces the strengthening effect of reinforcement also involves rules, but the rules are stronger. People tend to act in ways that please or avoid displeasing others, in part because the others respond in inappropriate ways, but they are less inclined to behave well when they are merely observing rules of good conduct. Rules are extraordinarily important, of course, because they enable people to please or avoid displeasing others without submitting to possibly punitive consequences, and to respond in appropriate ways when please or displeased. As with advice, however, people observe rules because of the contingencies under which they learned to do so or because reinforcing consequences have followed when they observed other rules. They are less inclined to behave well than when face-to-face commendation or censure has followed. (p. 23)
387	**38**	**4S**	Reinforcing consequences are further eroded when ethical rules are replaced by laws. The laws of governments and religions are maintained primarily for the sake of the institutions. Consequences such as security or peace of mind also follow for the individual (otherwise, the institutions would not have survived as cultural practices), but they are usually deferred. Moreover, cultural practices change faster than rules and laws, and people therefore often "do what is right" for reasons that are no longer advantageous to anyone. Contingencies of control maintained by governments and religions are at times so powerful that those who respond to them report the exaltation or ecstasy associated with escape from a sever threat of punishment. Others, though, have as strongly resisted such control. In summary, then, when people behave well either by following ethical rules or by obeying the laws of a government or religion, personal strengthening consequences are usually long deferred. (p. 23)
388	**38**	**4S**	A fifth source of the erosion of natural contingencies is different. Many of the practices of advanced cultures appear to *increase* the frequency of immediate reinforcement. The West is especially rich in the things we call interesting, beautiful, delicious, entertaining, and exciting. These things make daily life more reinforcing, but they reinforce little more than the behavior that brings one into contact with them. Beautiful pictures reinforce looking at them, delicious foods reinforce eating them, entertaining performances and exciting games reinforce watching them, and interesting books reinforce reading them - but nothing else is done. Although we look at a nude statue in part because a tendency to look at similar forms has played a part in the survival of the species, looking does not have the effect in this instance. We look at a painting by Cezanne but do not eat the apples. We listen to a piece of music by Smetana but do not swim in the Moldau. Reinforcing effects occur, but they are not contingent upon the kind of behavior with respect to which the susceptibilities to reinforcement evolved. (p. 23 - 24)
389	**38**	**4S**	It may not seem that one could fail to enjoy a life spent looking at beautiful things, eating delicious foods, watching entertaining performances, and playing roulette. But it would be a life in which almost nothing else was done, and few of those who have been able to try it have been notably happy. What is wrong with life in the West is not that it has too many reinforcers, but that the reinforcers are not contingent upon the kinds of behavior that sustain the individual or promote the survival of the culture or species. (p. 24)

390	**38**	**2S4S**	When the vocal apparatus of *Homo sapiens* came under operant control, language was born and with it a much more rapid evolution of cultural practices. These practices brought extraordinary gains, which are seen most clearly in the affluence, health, pleasure, and freedom of the West, but the world was no longer the world in which the species evolved. Early man did not work for others or pay others to work for him. He did not act merely as advised to act (he could imitate others, but only in roughly the same setting). He did not observe rules or obey laws. He did not look at pictures or listen to music or gamble (life was a gamble, but the payoff was life itself). When he had nothing to do, if we may judge from related species, early man simply slept or did nothing. It is easier to describe the contributions of cultural practice than to say what went wrong. To reinforce means quite simply to strengthen, and when the strengthening consequences of behavior were sacrificed for the sake of pleasing ones, *behavior simply grew weak*. That is not a very impressive conclusion, and it is hard to make clear what it means. (p. 26)
391	**38**	**2S**	The cultural practices we have examined weaken behavior in a special way. They change the temporal relation between behavior and its consequences, especially through the use of conditioned and generalized reinforcers. The effect can be corrected by restoring more strengthening contingencies. Once we understand that, our problem may be simpler than we think. (p. 27)
392	**38**	**3S**	In one way or another much of this has been said before. Certainly this is not the first time that anyone has pointed to the damaging side effects of civilization. That was a central theme of the Enlightenment. "Man", said Rousseau, "is born free and he everywhere in chains", but that is only one instance. And certainly this is not the first time anyone has asked, What is the good life? or, How can it be achieved? But there may be something new in the present answer. (p. 30)
393	**38**	**4S**	All such solutions began as personal experiences. They have served as cultural variations to be tested by their effect on the survival of the practicing group. None has been successful beyond the establishment of a fragmentary culture. A solution based on scientific principles may have a better chance. We are beginning to see why people act as they do, and the reasons are of a sort that can be changed. A new set of practices cannot simply be imposed by a government, religion, or economic system; if it were, it would not be the right set of practices. It must play its part only as a variation to be tested by its survival value. The contingencies of selection are beyond our control. Cultures evolve much faster than species, but the kind of change that we need will still take a long time. We must be prepared to wait. (p. 30 - 31)
394	**39**	**1S2S**	Human behavior is selected by its consequences. At first it must have been selected by the physical environment, but later people could talk about consequences. They could give advice and warn each other of danger. They could avoid exposure to the consequences by taking the advice of those who had been exposed to them. Eventually they formulated rules of action, and that led to the laws of science. It was Francis Bacon who pointed to a similarity with the laws of government, but he missed an important difference. The laws of governments and religions are useful. They tell members of a group how to avoid punishment (without being punished), and they tell the group how to punish consistently. The great codifiers of social practices have been justly honored. It was the administration of laws that caused trouble. Those who found themselves in possession of administrative power could never resist using it to their own aggrandizement. To justify themselves, they invented myths – like the divine right of kings, priests, or possessors of wealth. The effect was whole sale exploitation. (p. 36-37)
396	**39**	**2S**	Marx was talking about a special set of cultural practices, a special set of reasons for behaving – namely, wages. They defer the natural reinforcing consequences of craftsmanship, if they do not destroy them. (p. 38)
397	**39**	**2S3S**	Helping those who cannot help themselves strengthens a culture, but helping those who can help themselves destroys it. Everyone agrees that people on welfare would be better off if they were working. That is often a complaint about exploitation – the exploitation of the taxpayer – but the real harm is done to the recipient. Welfare payments are not effectively contingent on behavior. The health-giving side of operant reinforcement is missing. The helping professions have been slow to learn that lesson. Nursing homes find it easier to do things for old people than to let them do things for themselves, and by destroying the all-important contingencies of reinforcement, they make old people sick and miserable. (p. 42)

399	**39**	**3S**	“It is all very well to say that those who are intelligent enough to control their numbers should not do so because more intelligent people are needed, but if we are to design a way of life that will solve the problems of the world at large, it must be a way that stabilizes the population. Even when we were breeding too soon, Walden Two was eliminating all the spurious reasons for having children – the social pressures, the need for children as helpers in the family, accidental conception... and giving everyone who loves children a chance to be with them without breeding them.” (p. 45-46)
400	**39**	**3S**	Frazier was launched on a favorite theme. “Walden Two has solved most of the other problems facing the world today,” he said. “We consume only as much as we need to maintain a friendly, productive, enjoyable life. We waste nothing; everything is recycled. We dress for the weather, allowing the weather indoors to range widely. We scarcely pollute the environment at all. We avoid hazardous wastes. We do it all and still enjoy our lives. Somehow or other the whole world must learn that secret or we are lost.” (p. 46)
401	**39**	**4S**	Human nature, you say, is out of date. It's the product of a world that in many ways was much more immediately threatening than it is today. In that less hospitable world, for example, organisms evolved in such a way that they ate as much as possible whenever they could, especially salt and sugar, which were then in very short supply. And just because that became human nature, we now produce and eat far more than we need, especially the salty and sweet things that taste so good, and we ruin our health and are slowly exhausting the arable land of the world. And when from time to time famine and pestilence decimated the population, it was important that our species, like other species, breed as often as possible. To make sure that that would happen, sexual contact became highly reinforcing, as you put it. And now, as a result, we are filling up the world at a fantastic rate. (p. 47-48)
402	**39**	**3S**	In a precarious world, too, those who survived and reproduced their kind were those who fought well, and they fought best if signs of the damage they inflicted reinforced successful blows. Signs of damage became powerful reinforcers, and now a massive aggression threatens the world. And that's a threat for which evolution could not prepare us. The very human nature that once barely led to our survival will soon end our survival once and for all. (p. 48)
403	**39**	**3S4S**	As Frazier so often did, he came up to the point from an unexpected direction. 'There is a spider that uses its silk to make, not a web, but a net. The spider hangs just above the ground, stretching the net with its legs. When an unsuspecting insect passes underneath, the spider wraps it in the net with lightning speed. It eats the insect and the net, recycling the silk. We must assume that that is all a product of natural selection, but it could not have occurred in its present form as a variation. It is the result of a long series of variations and contingencies of survival in which simpler versions gradually became more complex.” (p. 49)
404	**39**	**2S4S**	“The spider can be caught in a net too – a net made by a member of a different species, with behavior acquired through a different process of selection, operant conditioning. But in a single lifetime no one person could make a net without help. Too many variations would have to occur and be selected by their reinforcing consequences. Instead, netmaking evolved as a cultural practice, in a third kind of selection. Just as operant conditioning takes us beyond the range of behavior due to natural selection, so the evolution of cultural practices takes us beyond operant conditioning.” (p. 49)
405	**39**	**2S3S4S**	“The point is that netmaking did not simply evolve through the accumulation of lucky variations. Instead, people talked about nets, how they were made, and why they worked and how they could be made to work better. Cultural practices evolve, but they are also designed. Can anyone doubt that when a science of behavior tells us how to design better practices – and I don't mean better nations, religions, or business enterprises – we can deal with human nature adequately?” “But I think what was bothering Blair”, I said, “is whether there is time. Can we create a culture that has the chance of a future before our present culture destroys us?” (p. 49-50)

406	**40**	**1S**	Much of behavior studied by ethologists – courtship, mating, care of the young, intraspecific aggression, defense of territory, and so on – is social. It is within easy range of natural selection because other members of a species are one of the most stable features of the environment of a species. Innate social repertoires are supplemented by imitation. By running when others run, for example, an animal responds to "releasing stimuli" to which it has not itself been exposed. A different kind of imitation, with a much wider range, results from the fact that contingencies of reinforcement that induce another organism to behave in a given way will often affect imitative repertoire that brings the imitator under the control of new contingencies is therefore acquired. (p. 53)
407	**40**	**1S**	The human species presumably became much more social when its vocal musculature came under operant control. Cries of alarm, mating calls, aggressive threats, and other kinds of vocal behavior can be modified through operant conditioning, but apparently only with respect to the occasions upon which they occur and their rate of occurrence. (p. 53)
408	**40**	**1S**	The ability of the human species to acquire new forms through selection by consequences presumably resulted from the evolution of a special innervation of the vocal musculature, together with a supply of vocal behavior not strongly under the control of eliciting or "releasing" stimuli. Such as the babbling of children, from which verbal operants are selected. No new susceptibility to reinforcement was needed because the consequences of verbal behavior are distinguished only by the fact that they are mediated by other people. (p. 53-54)
409	**40**	**1S2S**	The development of environmental control of the vocal musculature greatly extended the help one person receives from others. By behaving verbally people cooperate more successfully in common ventures. By taking advice, heeding warnings, following instructions, and observing rules, they profit from what others have already learned. Ethical practices are strengthened by being codified in laws, and special techniques of ethical and intellectual self-management are devised and taught. Self-observation or awareness emerges when one person asks another a question such as "What are you going to do?" or "Why did you do that?" The invention of the alphabet spread these advantages over great distances and periods of time. (p. 54)
410	**40**	**1S2S3S4S**	Verbal behavior greatly increased the importance of a third kind of selection by consequences, the evolution of social environments – cultures. The process presumably begins at the level of the individual. A better way of making a tool, growing food, or teaching a child is reinforced by its consequence – the tool, the food, or a useful helper, respectively. A culture evolves when practices originating in this way contribute to the success of the practicing group in solving its problems. It is the effect on the group, not the reinforcing consequences for the individual members, that is responsible for the evolution of the culture. In summary, then, human behavior is the joint product of (1) the contingencies of survival responsible for the natural selection of the species and (2) the contingencies of reinforcement responsible for the repertoires acquired by its members, including (3) the special contingencies maintained by an evolved social environment. (Ultimately, of course, it is all a matter of natural selection, since operant conditioning is an evolved process, of which cultural practices are special applications.) (p. 54-55)
411	**40**	**4S**	Each of the three levels of variation and selection has its own discipline – the first, biology; the second, operant conditioning; and the third, anthropology. Only the second, operant conditioning, occurs at a speed at which it can be observed from moment to moment. Biologists and anthropologists study the processes through which variations arise and are selected, but they merely reconstruct the evolution of a species or culture. Operant conditioning is selection in progress. It resembles a hundred million years of natural selection or a thousand years of the evolution of a culture compressed into a very short period of time. (p. 55)

412	**40**	**3S4S**	The immediacy of operant conditioning has certain practical advantages. For example, when a currently adaptative feature is presumably too complex to have occurred in its present form as a single variation, it is usually explained as the product of a sequence of simple variations, each having its own survival value. It is standard practice in evolutionary theory to look for such sequences, and anthropologists and historians have reconstructed the stages through which moral and ethical codes, art, music, literature, science, technology, and so on, have presumably evolved. A complex operant, however, can actually be shaped through successive approximation if we arrange a graded series of contingencies of reinforcement. (p. 55)
413	**40**	**2S3S**	A current question at level 1 has parallels at levels 2 and 3. If natural selection is a valid principle, why do many species remain unchanged for thousands or even millions of years? Presumably, the answer is either that no variations have occurred or that those that occurred were not selected by the prevailing contingencies. Similar questions may be asked at levels 2 and 3. Why do people continue to do things the same way for many years, and why do groups of people continue to observe old practices for centuries? The answers are presumably the same: either new variations (new forms of behavior or new practices) have not appeared or those that have appeared have not been selected by the prevailing contingencies (of reinforcement or of the survival of the group). At all three levels a sudden, possibly extensive, change is explained as being due to new contingencies. Competition with other species, persons, or cultures may or may not be involved. Structural constraints may also play a part at all three levels. (p. 56)
414	**40**	**2S**	Another issue is the definition of identity of a species, person, or culture. Traits in a species and practices in a culture are transmitted from generation to generation, but reinforced behavior is "transmitted" only in the sense of remaining part of the repertoire of the individual. Where species and cultures are defined by restrictions imposed upon transmission – by genes and chromosomes and, say, geographical isolation, respectively – a problem of definition (or identity) arises at level 2, but only when different contingencies of reinforcement create different repertoires, persons, or selves. (p. 56)
415	**40**	**1S2S**	(3) The evolution of a social environment replaces the supposed origin of a culture as a social contract or of a social practice as commandments. (p. 57)
416	**40**	**2S3S**	(3) The people do not observe particular practices in order that the group will be more likely to survive; they observe them because groups that induce their members to do so survived and transmitted them. (p. 57)
418	**40**	**4S**	(A computer can be programmed to model natural selection, operant conditioning and the evolution of a culture, but only when constructed and programmed by a living thing.) The physical basis of natural selection is now fairly clear; the corresponding basis of operant conditioning, and hence of the evolution of cultures, has yet to be discovered. (p. 58)
419	**40**	**2S3S**	(3) "Good" is a verbal reinforcer, used to transmit cultural practices that promote the survival of the practicing group. (p. 58)
420	**40**	**1S4S**	(3) A possibly legitimate use of storage in the evolution of cultures may be responsible for these mistakes. Parts of the social environment maintained and transmitted by a group are quite literally stored in documents, artifacts, and other products of that behavior. (p. 59)
421	**40**	**2S**	(3) Many anthropologists and linguists appeal to the organization of cultural and linguistic practices. It is true that all species, persons, and cultures are highly organized, but no principle of organization explain their being so. Both the organization and the effects attributed to it can be traced to the respective contingencies of selection. The same may be said of structure. (p. 59)
422	**40**	**3S4S**	(3) Some anthropologists have contended that cultures must evolve through a prescribed series of stages, and Marx said as much in his insistence upon historical determinism. But at all three levels the changes can be explained by the "development" of contingencies of selection. New contingencies of natural selection come within range as a species evolves; new contingencies of reinforcement begin to operate as behavior becomes more complex; and new contingencies of survival are dealt with by increasingly effective cultures. (p. 59)

423	**40**	**2S3S4S**	Behavior described as the defense of territory may be due to (1) contingencies of survival in the evolution of a species, possibly involving food supplies or breeding practices; (2) contingencies of reinforcement for the individual, possibly involving a share of the reinforcers available in the territory; or (3) contingencies maintained by the cultural practices of a group, promoting behavior that contributes to the survival of the group. Similarly, altruistic behavior (1) may evolve through, say, kin selection; (2) may be shaped and maintained by contingencies or reinforcement arranged by those for whom the behavior works an advantage; or (3) may be generated by cultures that for example, induce individuals to suffer or die as heroes or martyrs. (p. 60)
424	**40**	**2S**	Many issues that arise in morals and ethics can be resolved if we specify the level of selection. What is good for the individual or culture may have bad consequences for the species, as when sexual reinforcement leads to overpopulation or the reinforcing amenities of civilization to the exhaustion of resources; what is good for the species or culture may be bad for the individual, as when practices designed to control procreation or preserve resources restrict individual freedom; and so on. (p. 60)
425	**40**	**2S3S4S**	We could be said to intervene in the process of selection when as geneticists we change the characteristics of a species or create new species, or when as governors, employers, or teachers we change the behavior of persons, or when as behavioral scientists we design new cultural practices. But in none of these ways do we escape selection by consequences. In the first place, we can work only through variation and selection. At level 1 we can change genes and chromosomes or contingencies of survival, as in selective breeding. At level 2 we can introduce new forms of behavior – for example, by showing or telling people what to do with respect to relevant contingencies – or construct and maintain new selective contingencies. At level 3 we can introduce new cultural practices, or rarely, arrange special contingencies of survival – for example, to preserve a traditional practice. (p. 61)
426	**40**	**2S**	Although we can now predict many of the contingencies of selection to which the human species will probably be exposed at all three levels and can specify behavior that will satisfy many of them, we have failed to establish cultural practices under which much of that behavior is selected and maintained. (p. 62)
427	**41**	**1S3S4S**	Social behavior raises a special problem when two interrelated but different kinds of behavior appear to evolve together. If bees returning to the hive dance in ways used by other bees in finding sources of food, what could have been the survival value of the dance before other bees responded to it, and how could a response have evolved before returning bees danced? We must assume that returning bees behaved in ways related to the location of food for reasons unrelated to the food. A bee that had come a long way might show fatigue, a bee coming in a particular direction might make circular phototropic movements, and so on. Once the responses of other bees to these stimuli had evolved, further refinements could occur. (p. 67)
428	**41**	**1S2S**	The evolution of the processes through which behavior changes also needs to be explained. An early example must have been imitation. A structural definition (behaving as another organism is behaving) will not suffice: The dog chasing the rabbit is not imitating the rabbit. Phylogenic imitation could be defined as behaving as another organism is behaving for no alternative environmental reason. But some other reason may first have been necessary. Consider a group of grazing animals subject to frequent predation. Each exhibits a strong tendency to run, in response not only to predation but to stimuli correlated with predators. An example of the latter could be the sudden running of one or more other members of the group, already responding to the predator. At that stage the behavior would not be imitation; it would be released by either of two stimuli- the sight of a predator or the sight of another animal suddenly running But a variation as a result of which one organism imitated another would then have had survival value as redundant support. As the process developed, the imitative model could take full control, and the imitator would then simply do what another animal was doing and for no other reason. (p. 68)

429	**41**	**2S4S**	Operant imitation requires no new evolved process. When organisms are behaving because of prevailing contingencies or reinforcement, similar behavior in another organism is likely to be reinforced by the same contingencies. A general conditioned tendency to behave as others behave supplements phylogenic imitation. Operant modeling then follows: When the behavior of another person is important, modeling is reinforced when the other person imitates. Imitation and modeling play important roles in transmitting the results of exceptional contingencies of reinforcement. Some of the great human achievement were due to extraordinarily lucky accidents. Other people came under the control of the same fortuitous contingencies through imitation, and the behavior was transmitted even more rapidly by modeling. The human species made further progress in the transmission of what had already been learned when its vocal apparatus cam under operant control. A culture may be defined as the contingencies of social reinforcement maintained by a group. As such it evolves in its own way, as new cultural practices, however they arise, contribute to the survival of the group and are perpetuated because they do so. The evolution of cultures is of no further relevance here because no new behavioral processes are involved. (p. 74)
430	**42**	**4S**	Speculation about natural selection is supported by current research on genetics; the evolution of a social environment, or culture, is supported by the experimental analysis of behavior. (p. 75)
431	**42**	**1S3S**	Organisms must have profited from each other's behavior at a very early stage through imitation. To imitate is more than to do what another organism is doing. Pigeons foraging in a park are not imitating each other to any great extent; they are acting independently under similar environmental contingencies. To imitate is to act as another organism is acting because similar consequences have then followed. The evolution of the process can be traced to plausible selective consequences: The contingencies responsible for the behavior imitated may affect another organism when it behaves in the same way. Thus, if one of two grazing animals sees a predator and runs, the other is more likely to escape if it runs too, although it has not seen the predator. Running whenever another organism runs usually has survival value. (p. 77)
432	**42**	**1S**	It was only after a tendency to imitate had evolved that contingencies existed for the evolution of the reciprocal process of modeling. A young bird that would eventually learn to fly without help learns sooner when it imitates a flying bird. Its parents can speed the process by flying where the young bird can see them and in ways that are easily imitated. To say that the parents are "showing their young how to fly" adds nothing to such an account and may imply more than is actually involved. (p. 77)
433	**42**	**2S3S**	The evolution of other kinds of reciprocally helpful behavior is not as easily explained. For example, what would have been the survival value of the dance of the honeybee that was returning from good forage before other bees responded to the dance, and how could responding to it have evolved before bees danced? (The question is not raised by imitation and modeling, because the contingencies that account for imitation do not require modeling.) We must assume that the distance or the direction in which the returning bees traveled had some other effect on their behavior. Perhaps signs of fatigue varied with the distance or phototropic movements varied according to the position of the sun on their return. Once reciprocal behavior had evolved, further variations could make it more effective. Returning bees could dance in more conspicuous ways and other bees could respond more accurately to features of the dance. It is often said that bees have a language, that they "tell each other where good footage is to be found", that the dance "conveys information", and so on. Such expressions, useful enough in casual discourse, add nothing to an explanation in terms of natural selection and may obscure the process at issue. (p. 77-78)

434	**42**	**1S3S**	Contingencies of reinforcement resemble contingencies of survival in many ways. Animals learn to imitate when by doing what others are doing they are affected by the same contingencies – of reinforcement rather than of survival. Once that has happened, contingencies exist in which others learn to model – to behave in ways that can be more easily imitated. If, for example, a door can be opened only by being slid to one side, rather than pushed or pulled, a person will slide it after seeing another person do so, although the other person is not necessarily modeling the behavior. In such an example, both parties may exhibit traces of phylogenic imitation or modeling, but operant contingencies would suffice. A modeler not close to the door could make the kind of movement that would open it if he were close – as a gesture. Again, to say that the models is "showing the other how to open the door" is useful in casual discourse but potentially troublesome in a scientific account. (p. 78)
435	**42**	**1S**	Let us say that two men, A and B, are fishing together. They lower a shallow net containing bait into the water; when a fish swims into the net, it is quickly pulled up. Let us say that A lowers and raises the net and B takes a position from which he can see it more clearly. Anything B does when a fish enters the net will serve as a discriminative stimulus for A, in the presence of which pulling will more often be reinforced by the appearance of a fish in the net. B can model pulling, if he has already learned to model, but nothing is more needed than what we might call a sign of "excitement" at the presence of a fish in the net or a sign of "annoyance" at A's failure to pull. Whatever the behavior, it begins to function as a gesture as soon as it has been reinforced by A's response (and, presumably, by a share of the fish). The behavior patterns of both parties then slowly change as their roles become more sharply defined. B becomes more clearly the observer, moving into the best position to see the fish and gesturing as quickly and effectively as possible, and A becomes more clearly the actor, watching B more closely and pulling as quickly as possible when B responds. (p. 81-82)
436	**42**	**1S**	Let us say that A and B continue to fish cooperatively, a vocal response (perhaps the undifferentiated "uh", requiring no operant control of the vocal cords) is selected by its convenience for B and by the speed and consistency with which it reaches A. We could then describe the episode in either of two ways. In traditional terms, we could say that "when B says 'Uh', he is telling A that there is a fish in the net", and that he uses "Uh" as a word that "means 'fish' or refers to a fish". Or we could say that B is "telling A to pull the net," in which case "Uh" means "pull". (p. 82)
437	**42**	**1S**	Cooperative fishing suggests that A and B share the fish, but the roles of A and B are clearer if one gets the fish and induces the other to behave by other means. If B gets the fish and arranges reinforcing consequences for A, "Uh" would be classified in several different ways according to the kind of consequence arranged. If A pulls because in the past B has punished him for not pulling, "Uh" is a command. If B has paid A, it is an order. If the two are friends, disposed to help each other, it is a request. On the other hand, if A gets the fish and somehow reinforcers B's response, "Uh" would be called a "report" or an "announcement" of the presence of the fish in the net. But although these traditional expressions may be useful in casual discourse, they do not take us very far toward a scientific account. The episode is nothing more than an instance of the reciprocal behavior of two individuals, and the contingencies that account for it are clear. (p. 82)
438	**42**	**2S4S**	When we speak of the evolution of the automobile, we do not mean anything like the evolution of the horse. We mean the evolution of certain cultural practices through which new ways of making automobiles, as variations, were selected by their contributions to a reinforcing product of human behavior. Some products of verbal behavior may be treated in the same way. (p. 88)

439	**42**	**4S**	Facts about what has happened in the past (the facts of history) can be helpful in this sense only to the extent that the conditions described are likely to recur. The facts of science are more helpful than those of history because the relevant conditions are repeated more often. We may speak, then, of the evolution of facts – the facts of daily life, of history, or of science. Such facts are often called knowledge. At issue, however, is not the evolution of knowing or of knowledgeable persons, or of any organ of such a person, or of any condition of such an organ; at issue is a verbal environment or culture. People come into contact with such an environment when they listen to speakers or read books. The sounds they hear and the marks they see affect them as listeners or readers, just as the behavior of the original speakers or writers affected their listeners or readers. (p. 88)
440	**42**	**1S**	Verbal behavior is behavior that is reinforced through the mediation of other people, but only when the other people are behaving in ways that have been shaped and maintained by an evolved verbal environment, or language. At level 3 we could say that other primates have engaged in verbal behavior in artificial verbal environments created by scientists but have not developed a language of their own. (p. 90)
441	**43**	**2S4S**	Sugar is only one of the reinforcers to which a susceptibility evolved in a very different environment and is now out of date. Indeed, it could be argued that the human species has reached its present position largely because cultures have managed to shield the individual from the reinforcing effects of natural environment. (p. 175)
442	**43**	**3S**	In general, by allowing natural contingencies to take control whenever possible we generate behavior that is more likely to be appropriate to any occasion upon which it may occur again, and in doing so we promote the survival of the individual, the culture, and the species. (p. 175)
443	**43**	**2S4S**	It has taken several decades to discover that there are no natural consequences that can be efficiently used to shape the early stages of reading and writing. The behavior is too much the product of an advanced culture. Special contingencies must be contrived (Only later will reading and writing have uncontrived consequences). A number of learning centers in the United States provide a good example. Following instructions from cassette recorders, students responses on work sheets and their behavior is immediately reported as correct or incorrect by a magic-ink effect. There is no natural connection between responding correctly to a word or passage and the appearance of a particular mark on a paper, but under these conditions children learn to read quickly and easily. It is only later that the reinforcers that writers put into their work came into play. (p. 176)
444	**43**	**1S**	By contriving relatively unambiguous social contingencies, the therapist builds a repertoire that will be naturally effective in the client`s daily life. (p. 177)
445	**43**	**2S**	Governmental practices tend to move farther and farther from natural, face-to-face contingencies. We can restore some of the advantages in that control by returning to small groups, such as intentional communities. There are few if any contrived reinforces in Walden Two, for example. The community has been designed in such a way that it naturally reinforces behavior needed to maintain it, without the mediation of a government or industrial organization. (p. 178-179)
446	**43**	**2S**	A command specifies behavior to be executed and at least implies (usually) aversive consequences of not executing it. The rules of religious organizations are codifications of orders and commands; they identify potentially punishable behavior and identify or imply the (usually) punitive consequences of disobedience. The laws of governments are more explicit. (p. 180)
447	**43**	**2S**	Proverbs and maxims are generalized advice, accumulated and transmitted by cultures. The maxim "To lose a friend, lend him money" identifies behavior (lending) and a contingent consequence (loss of a friend). The consequences of observing the maxim are not contrived. The "laws" of science allude to natural consequences and are therefore closet to advice, maxims, and instructions than to the laws of religions and governments. (p. 181)
448	**43**	**2S**	Advice rules, laws and other descriptions of contingencies are important to a culture because they enable the individual to profit from the experience of those who have experienced common contingencies and described them in useful ways. (p. 181)

449	**43**	**2S**	Contrived reinforcers are necessary when natural consequences are long deferred. How do we "take the distant future into account"? We can respond fairly well with respect to the immediate future for several reasons. The selective action of operant conditioning (like natural selection) prepares us for a future more or less resembling the past. We also respond to statements about the future made by those who have experienced a possibly similar past. The statistical predictions just mentioned are based on event that have already taken place, and we observe the laws of logic, mathematics and science because of past consequences of doing so. But what about events that have no precedent - events that have never occurred in the experience of anyone? (p. 181)
450	**43**	**2S3S**	Certain predictions about the future of the world are of this sort. Something may be happening for the first time. It can be predicted with some accuracy, but the future of the species may depend upon whether there can ever be any contingencies of reinforcement, contrived or natural, that will induce us to act upon those predictions. We may "know" that certain things are going to happen but knowing is not enough; action is needed. Why should it occur? That is perhaps the most terrifying question in the history of the human species. It will be answered, if at all, by someone who knows a great deal about contrived reinforcement. (p. 182-183)
451	**44**	**1S4S**	The pathway back to genes can be even more devious. An organism, cannot acquire a large repertoire of behavior through operant conditioning alone in a nonsocial environment. Other organisms are important. A tendency to imitate presumably evolved because doing what another organism was doing frequently made a similar contribution to survival. When one member of a grazing herd sees an approaching predator and runs, other who run also improve their chances of escaping, although they have not seen the predator. Once imitation has evolved, contingencies prevail for the evolution of modeling. If, for example, young birds learn to fly sooner when they imitate their parents, they are more likely to survive if the parents fly in conspicuous, easily imitated ways. The evolution of audible signaling (calls, cries, and so on) was a further advance. (p. 51)
452	**44**	**1S**	Operant behavior is imitated because the same reinforcing consequences are likely to follow. The imitation is important because it "primes" behavior in the sense of bringing it out for the first time. Reinforcing consequences may then take over. Imitation is especially important when the contingencies are rare. In an example that gas recently attracted attention, birds learned to peck through the foil caps of milk bottles. Presumably the behavior of one bird had been adventurously reinforced under especially favorable circumstances and other birds when imitated it. (Too much is read into both phylogenic and ontogenic imitation when it is called "observational learning") There seems to be no evidence that the birds modeled the behavior, that is, showed other birds what to do to get at the milk. (p. 51)
453	**44**	**1S**	Operant behavior can be called modeling only when the behavior of the imitator has reinforcing consequences for the modeler. For example, parents model behavior because the children who imitate them thus need less care or can serve as helpers. That is a deferred consequence, however, which requires special mediation. The mediation seems to require an additional process, which came into existence when an evolutionary change brought the vocal musculature of the human species under operant control. That led to the evolution of verbal behavior, which is different and much more extensive than phylogenetic vocal signaling. People prime behavior by telling each other what to do as well as by showing them. Because verbal behavior has no effect on the physical environment and depends on reinforcement through the mediation of other people, the rout "back to genes" is still more devious. (p. 51-51)
454	**44**	**1S2S**	A culture can be more usefully defined as the contingencies of reinforcement maintained by a group. The contingencies shape the behavior of the members of the group and are transmitted when newly shaped members join in the shaping of others. If the group is confined to a particular part of the world, some characteristic contingencies may be physical, but most will be social. (p. 52)

455	**44**	**1S2S3S4S**	As social environments, cultures evolve through a third kind of variation and selection. Consider another example of social behavior that recently attracted attention. A monkey accidentally dips a sweet potato into the sea water, and the resulting salted, grit-free potato is specially reinforcing. Dipping is therefore repeated and becomes a standard part of the monkey`s repertoire. Other monkeys then imitate the behavior and come under the control of the same contingencies. Eventually, all the monkeys on a given island wash theirs sweet potatoes. Washing would usually be called a cultural practice, particularly if on another island a similar accidental reinforcement had never occurred and the monkeys never washed their sweet potatoes. The survival of a culture is more than a product of contingencies of reinforcement, however. It occurs when practices contribute to the survival of the practicing group and survive with the group. If, for example, washing sweet potatoes prevented the spread of a fatal disease, the resulting contribution to the survival of the group would not be a reinforcing consequence. (p. 52)
456	**44**	**1S2S**	Some practices said to be characteristic of a culture lie beyond showing and telling. One person modifies the behavior of another, for example, by arranging contingencies of reinforcement. The first reinforcers used in that way were probably negative. Stronger members of a group could impose aversive conditions from which weaker members would escape by acting in ways that worked to the advantage of the stronger members. Positive reinforcement presumably came later as a practice because its effects are at least slightly delayed and hence less likely to shape behavior. (p. 52-53)
457	**44**	**1S2S3S**	The distinction is harder to see when survival more closely resembles reinforcement. Governments, for example, operate by maintaining contingencies of (usually) negative reinforcement. Citizens obey the law to escape from or avoid fines and imprisonment. Laws are maintained primarily because the consequences reinforce the behavior of those who compose the government and maintain them. If those who have the power to maintain the laws abuse their power, however, they may generate escape (defection) or attack (revolution). If some sort of equilibrium is reached, both parties enjoy some measure of security or order. Security and order are often called the justifications of government. They contribute to the survival of the group and hence of the practice, but they are not reinforcing consequences, either for governors of governed. (p. 53)
458	**44**	**1S2S3S4S**	Practices involving positive reinforcement have similar by-products which also function in a third type of selection. Those who possess goods can use them to reinforce behavior that produce more goods. Excessive use may lead to countercontrol in the form of strikes and boycotts. If some kind of equilibrium is maintained, everyone may enjoy the possession of a reasonable quantity of goods. But that "justification" of the practice is not contingent on behavior in such a way as to function as a reinforcer. Practices emerging from either positive or negative reinforcement could be said to serve as variations. Some of them are then selected by the survival of the practicing group. Other consequences contributing to the survival of a culture as less like the consequences responsible for the practices. Thus, practical contingencies lead individuals to ask each other questions that result in the self-observation we call being conscious: other questions generate the behavior of self-management we call thinking. Together, these lead to science. (p. 53)
459	**44**	**3S**	Just as it has taken a long time to discover that "the organism if the servant of the gene", so it has taken a long time to discover that the individual is the servant of the culture, and that is the culture that eventually survives or perishes. (Perhaps we have now come full circle and are beginning to understand that the ultimate question is still the survival of the species). (p. 53)

460	**44**	**1S2S4S**	Lumsden and Wilson (1981) speak of a linkage between biological and cultural evolution. "Coevolution", they say, "is a complicated fascinating interaction in which culture is generated and shaped by biological imperatives while biological properties are simultaneously altered by genetic evolution in response to cultural history" (p. 1). But have homo sapiens and human cultures evolved at the same time? Imitation and modeling are shared by other species, but a large part of human culture is due to verbal behavior. Because no other species has acquired operant control of the vocal musculature, it must have appeared very late, when human genetic had reached, essentially its present state. Very little genetic change have occurred "in response to cultural history". Most of science and technology, for example, has evolved during the past 2500years. Must we suppose that Aristotle would have had trouble understanding it? Religion, government, and literature have taken longer, but not very much longer as natural selection goes. In other words, almost all cultural practices appear to have evolved after the species had reached essentially its present genetic condition. Little or no evolution was possible. (p. 53-54).
461	**44**	**2S4S**	Social theorists such as Hegel and Marx and some anthropologists have argued that cultures must also pass though a fixed order or stages. These are all essentially creationist views. What happens is said to be due to the original nature of species, person, or society and therefore somehow "due to genes". The path to genes is more devious, however, when natural selection, operant conditioning, and the evolution of cultural practices are taken into account. (p. 54)
462	**44**	**1S4S**	Similarities among the three levels of selection have often proved misleading. In what sense, for example, can we speak of the "social life" of insects? Individuals in a colony of ants respond to each other differently than people respond to each other in human society. In a colony the behavior is "released" in ways determined by natural selection. In a human society the behavior is largely the product of operant conditioning under social contingencies maintained by a culture. (p. 54)
463	**44**	**1S4S**	To speak of the "language of bees" is to risk a similar misunderstanding. A bee does not really dance to "tell" other bees where nectar and pollen can be found. (Dancing has been selected when other bees have more readily found no current consequences playing any part.) Nor do other bees respond to the dance because of what they "learn" about the location of nectar and pollen. (Their responses have been selected when they have more readily discovered nectar, that consequence having no current effect). Dancing resembles speaking, and responding to a dance resembles listening, but speaking and listening have a different origin. They are shaped and maintained by a verbal environment. (p. 54-55)
464	**44**	**4S**	It is particularly easy to be misled when the effects of contingencies of selection are treated as traits of character. For example, are there altruistic and aggressive genes? If we say that behavior is altruistic if helps another person while harming the helper and aggressive if it harms another person while helping the harmer, there are examples at all three levels of selection. Natural selection presumably explains why a male insect copulates and then dies and why a lion kills and eats a gazelle. Operant conditioning presumably explains why a mother allays her child`s hunger by giving food while hungry herself and why a mugger steals a handbag. The evolution of a culture presumably explains why soldiers die for their country and why one country ravages another. (It is sometimes argued that behavior should be called aggressive only when positive consequences are lacking: the lion must kill and not eat, the mugger must already have plenty of money, and the country must have no need for space or material, but that is only to appeal to unidentified variables among which the same three levels could presumably be distinguished) (p. 55)
466	**44**	**1S2S**	Similarly, it has been argued that all cultures have gods and that there must therefore be a "gene for religion". But social environments share certain practices. People ask for help and, when in great need, do so when there is no one to ask. People thank those responsible for their good fortune and, when particularly fortunate, do so when there is no one to thank. A god is one answer to the question, "Whom are you asking or thanking?" and most often fashioned significantly after one of those most often asked and thanked - a king a lord, a father or mother. (p. 55-56)

467	**45**	**1S2S**	Operant conditioning too, has its limitations. It greatly extends the range of behavior, but it also prepares only for a future that resembles the selecting past. Moreover, only a small repertoire could be acquired during a single lifetime through operant conditioning alone. Those limitations were corrected in turn by the evolution of processes through which organisms received help from other members of their species. When one animal imitates another, for example, it sometimes profits from the consequences of what the other is doing. The advantages are felt in both natural selection and operant conditioning, and they are particularly important when the consequences are rare. (p. 115)
468	**45**	**1S**	Let us say, for example, that by some lucky accident a monkey cracks a particular kind of nut it has never cracked before and that the meat proves reinforcing. The monkey will be likely to crack that kind of nut in the same way again. By imitating its behavior, other monkeys will come under the control of the same contingencies in spite of their rarity. (p. 115)
469	**45**	**1S**	When animals have begun to imitate each other, conditions prevail for the natural selection of modeling. If, for example, there are advantages to the species when young birds imitate their parents and thus fly sooner, additional advantages follow when the parents fly in easily imitated ways where their young can see them. Operant modeling, however, appears to be exclusively human and, even then, is not readily explained. Although parents may show their children how to do things because, for example, the children then need less help, that consequence is deferred. How it can affect behavior is a question of which we shall meet other examples. (p. 115-116).
470	**45**	**1S**	Modeling is a way of showing another organism what to do. It primes behavior in sense of evoking it for the first time and thus exposing it to potential contingencies of reinforcement. Telling is a much more effective kind of priming. Vocal behavior has, of course, many advantages: Animals can respond vocally when they are busy with other things and hear when they are not looking. In the human species, however, vocal behavior is also shaped and maintained by its reinforcing consequences. This is an exclusive feature which gives the species a special advantage and may, in fact, explain all its extraordinary achievements. (p. 116)
471	**45**	**1S2S**	Customary relations between behavior and its consequences are often described in proverbs and maxims, either as injunctions ("Count to 10 in anger", "with the implication", "and you may avoid doing something you would regret") or descriptions of the contingencies ("A soft answer turned away wrath"). Complex contingencies are described in rules and laws, especially the rules for effective action that we call the laws of science. (p. 116)
472	**45**	**1S2S3S**	The kind of helping works to the advantage of those who are helped, but contingencies of reinforcement are more often arranged because they work to the advantage of those who arrange them. When, for example, we ask a subordinate to do something for us and imply an aversive consequence if he refuses, we are freed from doing it ourselves. Three great institutions arrange contingencies of reinforcement primarily because of the consequences for the institutions. Negative reiforcers are the staple of governments, which use them either as punishment to suppress unwanted behavior ("No parking") or, more often, as negative reinforcers to strengthen wanted behavior ("Pay your taxes and avoid a fine"). (p. 116)
473	**45**	**1S2S**	Such an explicit use of contingencies is exclusively human. (The dominance hierarchies of nonverbal species are due to natural selection.). Positive reinforces (capital) are urge staple of business and industry. People are paid when they work or hand over goods. The contingencies require verbal devices, such as prices or contracts, which are beyond the reach of other species. Some religions are essentially systems of ethics: they prime social behavior which may prove to have reinforcing consequences. Some describe consequences said to follow in another world, the contingencies usually being under partial control of authorities in this one. (p. 116-117)
474	**45**	**4S**	The term cultural evolution is often used very loosely. According to the Columbus History of The World (1972), for example, "when we talk about human evolution, we are dealing with two different kinds of processes the evolution of human body and the evolution of human behavior. The latter, cultural evolution, is a bio-social process that falls within the domain of archaeologists and cultural anthropologists" (p. 38). But a "bio-social process", such as "sociobiology", moves too quickly from the evolution of species to the evolution of cultures, passing over a very necessary link between them, the operant behavior of the individual. (p. 117)

475	**45**	**1S2S**	Consider the practice of quenching a fire. Many thousands of years ago someone must for the first time have accidentally thrown water on a threatening fire and watched it go out. If that consequence was reinforcing, the behavior would have been repeated on similar occasions. But such occasions would have been rare. Water would not often be at hand when a fire threatened (and only much later could having it at have reinforced storing it for use). Eventually, however, someone would quench fires often enough, and in such a conspicuous way, that others would imitate the behavior and come under the control of the same rare contingencies. The practice would spread more rapidly when others were shown how to quench a fire, and still more rapidly when they were told. (p. 117)
476	**45**	**2S3S**	The origin and transmission of a cultural practice are thus plausibly explained as the joint product of natural selection and operant conditioning. A culture, however, is the set of practices characteristic of a group of people, and it is selected by a different kind of consequence, its contribution to the survival of the group. That is an important point. Although the controlled use of fire may contribute to the survival of the culture of which it is a part, that consequence is too remote to reinforce the behavior of any member of the group. (p. 117)
477	**45**	**2S3S**	The origin and transmission of a cultural practice are thus plausibly explained as the joint product of natural selection and operant conditioning. A culture, however, is the set of practices characteristic of a group of people, and it is selected by a different kind of consequence, its contribution to the survival of the group. That is an important point. Although the controlled use of fire may contribute to the survival of the culture of which it is a part, that consequence is too remote to reinforce the behavior of any member of the group. The "terrifying problems" mentioned in the first paragraph of this book are also consequences too remote to serve either as punishment to suppress the behavior that is causing trouble or as negative reinforcer to strengthen behavior that will provide a remedy. The first nuclear weapon was designed by scientists and built by workers who were paid by a government that was acting under the threat of a prolonged and destructive war. The fact that a war in which both sides used nuclear weapons would almost certainly destroy the world we know was too remote a consequence to override the immediate gain. People produce and consume vat quantities of goods just because goods are "good" – that is, reinforcing, but the fact that the materials of which they are composed, in both agriculture and industry, will eventually be axhausted and that the by-products of their use will irreversibly foul the environment are consequences too remote to have any current effect. (pp. 117-118)
478	**45**	**3S**	[long-term consequences?] When I wrote this book I thought that we could correct for the weakness of remote consequences simply by creating current surrogates to serve in their place. Our treatment of cigarette smoking is a miniature model of what might be done. Smoking is reinforced either positively by the so-called pleasures of smoking or negatively by the relief from with drawl symptoms. Damaging effects on the smoker's health are adventitious consequences, too remote to punish smoking. When those effects had been discovered, however, something could be done. Smokers could be advised to stop smoking and warned of the consequences ("Smoking can be dangerous to your health"). Advice is seldom enough, however. Consequences which have not yet occurred have no effect. Advice about predicted consequences are remote. Another possibility, however, is to contrive immediate consequences having the effect of the remote ones would have if they were immediate. Reinforce not smoking ("Thank you for not smoking"), and enthusiastically commend those who have stopped. Punish smoking with criticism, complaints restrictions on where one may smoke, and heavy taxes on cigarettes. (p. 118)
479	**45**	**3S**	On a very much larger scale I thought we could find current surrogates for the remote consequences which now threaten the world. Give people reasons for having only a few children or none at all and remove the reasons why they often have so many. Promote ways of life which are less consuming and less polluting. Reduce aggression and the likelihood of war by taking a smaller share of the wealth of the world. A science of behavior would spawn the technology needed to make changes of that sort, and I thought that the science was aborting. (p. 118)

480	**45**	**2S3S**	Design is only a first step, however. Designs must be put into effect, and only by those who can do so effectively. That means governments, religions, and economic enterprises, which control most of the conditions under which we all live. They, however, are under the control of consequences affecting their own survival, which are much less remote and hence more powerful than the survival of the species. Moreover, the effects of these consequences are usually in conflict with it. For example, the legislator who sponsored a proposal to lower the birthrate, limit personal possessions, and weaken national and religious commitments would soon lose the power to sponsor anything. Business and industry cannot turn to the production of goods and services which will have fewer harmful consequences but will be less reinforcing to those who buy them. Religious leaders must make sure that their advice will be taken, and communicants will not take it if taking other advice has cost them reinforcers. Those leaders whose advice concerns consequences in another world must treat this world as expendable. (p. 119-119)
481	**45**	**2S3S4S**	Can some use be made of the fact that the survival of institutions is largely a matter of competition? Governments compete with other governments, religions with other religions or unbelievers, and businesses and industries with other business and industries. A world government, a truly catholic religion, and a global economy would reduce that kind of waste, unless they challenged each other. A combination of all three in some kind of world communism would raise the specie if unrestrained control. When space and other necessities are in short supply, evolution is competition. (p. 119)
482	**45**	**2S3S**	It is probably significant that I wrote this book near the end of a decade in which young people were challenging all three major institutions - government by trashing, stealing, and calling the police pigs, business and industry by refusing to work and begging for the things that needed and organized religion by turning to the unorganized forms of the East. It was kind of nonaggressive anarchy. It survived for a time only because it was treated with remarkable leniency. It could not survive long, because its followers found no replacements for the institutions they abandoned. In that decade, however, my book Walden Two came to life. Published in 1948, it was soon on the point of going out of print. In the 1960s, however, its sales rose exponentially. The community it described was not a hippie commune, but it was free of institutions. The functions of government, economics, and religion were taken over by face to face personal control. (p. 119-120)
483	**45**	**2S3S**	As a pilot experiment in the design of a culture, a community has the advantage that its survival is always a question, and practices are closely watched for their bearing on the answer. One of the things salvaged from the 1960s was a greater concern for the future of the world and its inhabitants, Fortunately, we now have better ways of expressing that concern. Ecologists and other kinds of scientists follow current trends closely and make increasingly reliable predictions about the future of the earth. Teachers and the media tell more people about what is likely to happen. Governmental, religious, and economic practices are undoubtedly beginning to be affected. (p. 120)
484	**45**	**2S3S4S**	It is possible, in short, that we are witnessing the evolution of a true "fourth estate", composed of scientists, scholars, teachers, and the media. If it can remain free of governments, religions, and economic enterprises, it may provide current surrogates for the remoter consequences of our behavior. It could be the quiz that will control the controllers. Nothing short of a better understanding of human behavior will solve our problems, and I still believe that this means better science and better technology. Whether they will evolve in time is the ultimate question. Those who are unhappy about scientific solutions sometimes assure us that we shall solve our problems in other ways when they are bad enough, when the immediate consequences are no longer reinforcing and the remote ones have been sampled. But it is the nature of overpopulation, the exhaustion and pollution of the environment, and a nuclear war that "bad enough" is a point of no return. (p. 120)

Anexo II

CATEGORIAS DE REGISTRO GLENN			
L	**T**	**C**	**REFERENCIA**
1	**1**	**4G**	A distinction is made between contingencies of reinforcement (contingent relations between a class of responses and a common consequence) and metacontingencies (contingent relations between a class of operants and a long-term cultural outcome). (p. 2)
2	**1**	**4G**	A more likely solution to achieving a better world may lie in arranging better contingencies in our current environments to move us toward that goal. We may as well begin now and where we are. (p. 2)
3	**1**	**4G**	Several years ago, in trying to describe some elements of our own approximation of Walden Two at the Center for Behavioral Studies, I labored to distinguish between two kinds of contingencies that seemed to be operating there: 1) contingent relations between a class of responses with a common consequence – contingencies of reinforcement – and 2) contingent relations between a class of operant classes and a common cultural consequence. I called these second kind of contingent relations metacontingencies. I later realized I was translating into daily events, or perhaps clarifying myself, Skinner's distinction between the selections of operant behavior in individuals and the selection of cultural practices in societies. The critical difference, it seems to me, between our world and Walden Two is in the metacontingencies. (p. 2)
4	**1**	**4G**	An operant is a group of responses, of varying topographies, that have been bundles into a functional class as a result of their having produced a common consequence. The contingency of reinforcement is the unit of analysis that describes the functional relations between operant behavior and the environment with which the behaving organism interacts. Contingencies of reinforcement involve a selection process at behavioral level which parallels, and owes its existence to, the phylogenic process called natural selection. Although many – in the human case, most – of the relations that emerge between operant behavior and the environment do so as a result of the individual's history, the process is directly mediated by the organisms biology. (p. 2)
5	**1**	**4G**	The metacontingency is the unit of analysis describing the functional relations between a class of operants, each operant having its own immediate, unique consequence, and a long term consequence common to all the operants in the metacontingency. Metacontingencies must be mediated by socially arranged contingencies of reinforcement. (p. 2)
6	**1**	**4G**	Take, for example, the various behaviors involved in producing the long term consequence of reduced air pollution. Engineers must engage in the various operants involved in designing catalytic converters; assembly line workers must learn to build them and integrate them into working parts of the car; costumers must buy those cars and pump unleaded (sem chumbo) gasoline; refinery personnel must develop and use the process of taking the lead out of gasoline. The likelihood of all these operants occurring without socially mediated contingencies appears to be small. The mediating contingencies are designed and implemented because of the relation of such mediation to long term outcomes such as reduced pollution. (p. 2-3)
7	**1**	**4G**	In at least two ways, verbal behavior provides a critical link between contingencies and metacontingencies. First, verbal behavior in the form of rules bridges the gap between behavior and long term consequences. That is, verbal behavior enables a single act, the statement of a rule, to occur in response to events widely dispersed in time. The rule may then enter, as a discriminative stimulus, into the contingencies of reinforcement that generate and maintain behavior unlikely to occur in its absence. For example, "the rule Hugging my child when she approaches me with a smile results in more smiles" is a verbal behavior under stimulus control of temporally unrelated events. Once the rule has been formulated, it can be used to bring others' behavior under stimulus control of that relationship. (p. 3)
8	**1**	**4G**	The second way verbal behavior enters into metacontingencies is when social reinforcement provides the consequence maintaining behavior under control of the rule until the long term consequences can be discerned. As those who try teach clients or students to reinforce de desirable behavior of others know, the predicted change in the behaviors of the others is too slow in occurring, too distributed across time, and too separated from the agent's behavior to function as reinforcement without social mediation (e.g., graphs, praise, etc.). (p. 3)

9	**1**	**4G**	Technological contingencies involve behavior maintained by non-arbitrary changes in the environment. The reinforces entering into technological contingencies derive their power from their usefulness, value, or importance to the behaving person as well as others. Ceremonial contingencies, on the other hand, involve behavior that is maintained by social reinforces deriving their power from the status, position, or authority of the reinforcing agent independent of any relation to changes in the environment directly or indirectly benefiting the behaving person. (P. 3)
10	**1**	**4G**	Ceremonial control is exemplified by "Do it because I say so". Technological control is exemplified, first, by behavior entering into natural contingencies of reinforcement (leavers are used because they allow building to proceed more quickly) and, second, by contrived social contingencies that mediate the relations between the behavior and ensuing outcomes in technological metacontingencies. ("Do it because it will result in improved sanitation, which will result in improved health") (p. 3)
11		**4G**	The metacontingencies involved in technological behavior bundle together large numbers of operant classes, in many individuals, all of which have a common long term consequence that benefits all those individuals as well as others. Technological metacontingencies require the abstraction of good rules, that is, rules accurately describing the functional relations between behavior and non-arbitrary immediate or long term consequences. These metacontingencies also involve the mediating verbal behavior or rule stating, the consequence for rule following, and the continuous monitoring of results of following the rule. Technological metacontingencies require constant asking: Are the consequences still those predicted? Is the rule still good? (p. 3)
12	**1**	**4G**	According to Veblen's disciple, Clarence Ayes (1944/1962) technological processes move cultures forward - in our own terminology, by increasing the rage and effectiveness of operant behavior in change the environment to enhance individual and group survival and satisfaction. Ceremonial contingencies impede the evolution of operant behavior, especially those operants defining "cultural practices". The ceremonial process forces cultural practices into rigidly define grooves, maintaining them through social control derived from status, position or authority. To the extent that the practices adventitiously result in long term consequences beneficial to the members of the culture, the ceremonial control may not be terribly detrimental. But ceremonial control is not sensitive to the possibilities for constructive change. Ceremonial metacontingencies impede and preclude change of any kind, even when current contingencies produce serious problems. (p. 3)
13	**1**	**4G**	Ceremonial control maintains itself; technological control ensures change. (p. 3)
14	**1**	**4G**	Drastic changes in the educational practices of Walden Two were entirely predictable given the metacontingencies under which the community is portrayed operating. The metacontingencies were designed specifically to allow such change.
15	**1**	**4G**	Let's examine, first, the evidence of abolition of ceremonial control in Walden Two and its effects on cultural practices. Three institutions that have wielded ceremonial control in virtually all cultures have been the family, the church, and the state. … In Walden Two, the family as a functional unit does not exist. Its desirable feature, providing economic and interpersonal security, has been assumed by the community as a hole. … Turning now to the religious authority, its unnecessary in Walden Two because the relation between contingencies and metacontingencies is clearly specified. The role of religious authority has traditionally been to maintain contingencies that promote the survival of the group. It has done so by establishing rules which are usually abstracted from current contingencies (i.e., good rules) and then maintaining them through ceremonial control, even if they become misspecified as a result of changing contingencies. … The state, too, has been dispensed with in Walden Two. This is possible because all members of the community are directly responsible to one another, the community being small enough to give each member direct contact with all the others. … Walden Two is able to so without the state only because its metacontingencies require that outcomes benefit all members. A primary function of the state is to enforce ceremonial metacontingencies and regulate the competition for resources. People have always feared the ceremonial power of the state. (p. 4-5)

16	**1**	**4G**	Since ceremonial control derives its power from authority or status independent of pragmatic (outcome) considerations, ceremonial process often rely heavily on aversive control. (p. 5)
17	**1**	**4G**	The operant behavior of the members of any culture may be classified in terms of the kinds of consequence that the behavior has for the behaving individual and for the culture. (p. 5)
18	**1**	**4G**	By arranging the contingencies of the work environment as described above, Frazier has set up the following metacontingencies. First, it is to the advantage of everyone in Walden Two to conserve resources, because the standard of living, exemplified by the short amount of time spent in work, is directly related to reducing the amount of work necessary to guarantee survival in a comfortable, if not luxurious, environment. This is exactly opposite the metacontingencies in our own culture where individuals compete for available resources, requiring increasing use of resources to compete effectively through production, reducing thereby the amount of resources available (or increasing the cost of using them) for effective competition. Second, only activities necessary for survival and physical well being of the group are given labor credits and all such activities enter into the labor credit system. The credit value of a given activity is adjusted based on its preference value to the members – the more preferred work get less credit. This is eminently rational because work that is valued over other work has reinforcing value over and above that common to all work. In Walden Two the common value is, explicitly, the survival and welfare of the group; Work which is the least reinforcing has only the value of its contribution to the community – but it also giver the worker maximum amount of time to engage in other, more intrinsically reinforcing activities. (p. 6)
19	**1**	**4G**	To help us make our way through wilderness, I suggest we first look closely at our own behavior. Can we separate the technological reinforcers from the ceremonial reinforces and turn our backs on the latter? What can we do to provide a work environment for others that puts them in contact with technological reinforces and mitigates the effect of ceremonial contingencies? Do we dare give affection freely and not hoard it to use it in return for access to ceremonial control? Is there any way that we can arrange even one little system where the behavior of everyone is equally valued, everyone contributes to the group's welfare and partakes equally of the products of the group's efforts? To whatever degree we can do these things, we may progress through the wilderness.
20	**2**	**1G**	A science of behavior focuses on relations between the activities of individual organisms and environmental events, while a science of culture focuses on relations between recurring cultural practices (i.e., interrelated behavior among individuals) and the environments in which those practices occur. The units of analysis differ. (p. 161)
21	**2**	**1G**	The repeatability of behavioral instances allows an analytic unit to emerge. … The behavioral units involve *intraorganism* repeatability, even though the process described are the same from operant to operant, organism to organism, and to an unknown degree from species to species. (p. 161-162)
22	**2**	**1G**	Because cultural practices usually involve the behavior of two or more individuals interacting in systematic ways, it is clear that cultural practices may be "reduced to" the contingencies of reinforcement operating on each individual taking part of the cultural practice. However, such reduction does not fully explain the evolution and maintenance of the practice as such. (p. 162)
23	**2**	**1G**	The issue may be seen as similar to another with which behavior analysis are familiar: While there would be no behavior without an organism, the biological characteristics of the organism cannot by themselves account for its behavior. … but these events do not fully account for behavior as such – as an interaction between an organism and its world. Such explanation requires that the current environment, as well the history of the environment's action with regard to the individual's activities, be taken into account. (p. 162)
24	**2**	**1G**	At the cultural level of analysis, individual behavior becomes the "ground" from which cultural practices emerge and enter into functional relations occurring at the cultural level of analysis. (p. 162)

25	**2**	**1G**	Cultural practices involve consistencies in behavior of many individuals across both time and space. (p. 162)
26	**2**	**2G**	A scientific analysis of cultures cannot be reduced to the behavior of individuals because cultural practices, even though comprised of the behavior of individuals, have outcomes of their own – outcomes that affect the survivability of the culture. (p. 162)
27	**2**	**1G**	A central problem, from my perspective, is to distinguish between the contingencies underlying behavior chance and those underlying cultural development. (p. 162)
28	**2**	**1G**	(Harris, The Nature of Cultural Things 1964, and Cultural Materialism 1979) Those individuals comprise a unit called a nomoclone – a specific set of individuals, who repeatedly take part in one or more specific scenes. The cultural unit that takes account of the replication of behavioral scenes … is called a permaclone by Harris. A permaclone is comprised of individuals engaging in repeated behavioral episodes wherein the individuals in the groups may be replaced over time. (p. 163)
29	**2**	**1G**	The local high school football team is an example of a permaclone. Each year some of the members of the team leave and others come on, while the scenes may remain quite similar from generation to generation or change quickly over a short time or slowly over a long time. (p. 163)
30	**2**	**1G**	Entities involving interrelated behavior of individuals get classified on the basis of similarities in repeated behavioral episodes across individuals as well as groups of specific individuals and groups whose membership can change over time. (p. 163-164)
31	**2**	**1G**	In looking for the causes of cultural evolution, Harris focuses on selection contingencies – ultimately survival contingencies. But the units selected are not organisms (or genes) as in biological evolution, but cultural entities – permaclones whose practices are replicated across generations. (p. 164)
32	**2**		Those practices are classified into three categories – those belonging in the cultural infrastructure, the cultural structure, and the cultural superstructure. A culture's infrastructure (Harris, 1979, pp. 52-53) is comprised of productive and reproductive practices. The infrastructure includes those cultural practices critical to the physical survival of the individuals whose behavior keeps the nomoclones and permaclones interact. … The structure of a culture includes domestic and political practices that support the infrastructure by "maintaining secure and orderly behavioral relations among [the society's] constituent groups and with others societies" (Harris, 1979, p. 51). …Emerging from infrastructure and structure is the cultural superstructure those practices having to do with art, science, games, literature, advertising, rituals and sports (among others). (p. 164-165)
33	**2**	**4G**	If infrastructural practices do not change as the requirements of the infrastructure change, the group together with its practices (the permaclones constituting a sociocultural system) will ultimately fail to survive. If variations in infrastructural practices enhance the balance of production/reproduction, changes in the structure and superstructure may follow, supporting the infrastructural changes. (p. 165)
34	**2**	**4G**	Clear specification of the relation between behavioral selection and cultural selection may help integrate the taxonomic and functional concepts of cultural materialism as well as make possible a synthesis of behavioral and cultural (p. 166)
35	**2**	**1G2G**	I mentioned several times that cultural practices had outcomes; they are empirical and measurable. For example, the outcomes of reproductive practices can be measured in terms of the number of individuals to be sustained by a culture during any given time period. Of vital interest is the rate of reproduction and changes in rate. Similarly, production practices have measurable outcomes, for example, number of bison killed, or yams dug up, or cars rolling off the assembly line. Production cal also be measured in terms of "labor efficiency (calories obtained per calorie expended)"(Harris, 1977, p. 34) or changes in labor efficiency. (p. 166)

36	**2**	**1G**	Similarly, the behavior of several parents in responding to their crying children may have common characteristics (structural and functional), but each parent's behavior has its own source in historical contingencies. Instances of Ms. Martin's picking up the baby comprise a unit (an operant). The relation of the instance to the unit is parallel to the relation between individual organisms and the biological unit called "species". Mr. Bell's repertoire may include an operant unit that resembles Ms. Martin's. We may call that unit "picking up the baby" too. Its critical, however, to distinguish between the similarity in the behavior/environmental relations we observe (which lead us to call both operants "picking up the baby") and the individual histories of the two parents that resulted in their behavior looking "the same" to us. (p. 166-167)
37	**2**	**1G4G**	The behavior of the two parents does not belong to the same behavioral class … because the same behavioral histories do not account for both. Although the histories may be similar, different empirical events actually account for the similarities in behavior. A change in contingencies for Ms. Martin will affect only Ms. Martin's picking up the baby operant; that change in contingencies has no effect on Mr. Bell's picking up the baby operant. Because many individuals in a culture participate in the same cultural practices, it would be tempting to consider their behavior as functionally interchangeable. While that may be so at the cultural level at the behavioral level is not. Each individual's behavior must emerge as a function of specific, historical, behavioral contingencies. Whatever a change in cultural practices involves at cultural level of analysis, it also must involve changes in contingences of reinforcement for the individuals participating in the practice. (p. 167)
38	**2**	**1G**	Sociocultural systems arise from the interrelationships among the contingencies of reinforcement of which individuals' operants are a function. As Skinner (1969, p. 13) put it, "A culture … is the contingencies of social reinforcement which generate and maintain [its members'] behavior." Obviously, the social contingencies are replicated across individuals and generations of there would be no cultural continuity. Harris's permaclones are the entities exemplifying the social contingencies maintained across nomoclones of a single generation and across generations. The systematic replication of interrelated behavioral contingencies comprising a permaclone leads us to the concept of a cultural practice. (p. 167)
39	**2**	**1G**	A culture, of course, is not an unorganized set of social contingencies (any more than an animal is an unorganized set of cells). Conglomerates of contingencies clump together to form cultural practices as conglomerate of cells clump together to form organs in animals. Thus, a cultural practice is a subset of interlocking contingencies of reinforcement and a culture is made up of many such subsets. (p. 167)
40	**2**	**1G**	In summary, a cultural practice is a set of interlocking contingencies of reinforcement in which the behavior and behavioral products of each participant function as environmental events with which the behavior of other individuals interacts. This is the behavioral view of cultural practice. (p. 167)
41	**2**	**1G4G**	Cultural practices must be understood at the cultural level of analysis before a synthesis can be undertaken. We have now reached the point at which the notion of a cultural contingency can be introduced. (p. 167)
42	**2**	**1G2G4G**	Behavioral contingencies involve contingent relations between the specific activity of individual organisms and specific environmental events, and each organism's behavior has a unique history. When the behaviorally potent environment is made up of the actions of others (and their products), and the behavior of those others has been conditioned by similar kinds of contingencies a cultural practice propagates itself. The behavior of any new participant (new-born, new parent, new employee, kindergarten enrollee, etc.) is shaped and instructed by those already involved in the practice. The new participant's behavior is in part a function of those contingencies provided by the others. However, the environmental events comprised of the others' behavior include the behavior of the new participant. (p. 167-168)

43	**2**	**1G**	Since each individual in a culture is unique (having a unique genetic structure and a unique behavioral history), variations in cultural practice are bound to occur. They are function of variations in the specific behavioral contingencies for each participant in the practice. The behavior of each individual participating in the practice has its own consequences. Even so, there are certain "constants" that provide parameters for most participants. For example, in the American practice of building automobiles some constants have been the types of jobs to be done, factory design for assembly lines, pay scales, and supervisory structure. Other elements of the environment can be more dynamic and fluid (specific ways individual supervisors respond to workers, how pay relates to work performance, co-workers' verbal and nonverbal responses to management as well as to objects involved in the task). (p. 168)
44	**2**	**1G4G**	Behavioral contingencies for any specific participant in the American practice of "manufacturing cars" may vary, but the behavioral environment (and the behavior) of all individuals is constrained by physical and institutional structures of the larger environment in which automobiles are manufactured. Those structures also provide the framework for the rapid transmission of practices across changing nomoclones that comprise a permaclone. (p. 168)
45	**2**	**1G2G4G**	The cultural practice, the set of interlocking contingencies supporting the behavior of all the participating individuals, has an outcome, of course. In the above example, the outcome is the number and quality of cars manufactured (measurable in terms of service records, length of car life, drivers with backaches, injuries, or deaths in collisions, etc. Important to note, the outcomes of practices are function of the aggregate behavior of participants in the context of physical and institutional structure of the company. Because the outcome of the practice is contingent on the behavior of so many different people, variations in the behavior of any individual have no measurable impact on the cultural outcome. As long as shifts in individual behavior average out, there is no change in the outcome. If shifts in individual behavior converge to product a changer outcome, no specific individual could affect that outcome in any significant way because the effects of an individual's behavior are lost as a fraction of the aggregate. (p. 168)
46	**2**	**1G2G4G**	The outcome of these practices does affect the viability of the practice as a unit, however. The practice evolved because variations in interlocking contingencies resulted in outcomes that enhances the survivability of the permaclone (which, of course, includes cultural practices). If the continuing outcome of the continuing practice is cars that are bought, the practice is likely to survive. If the outcomes essential for survival of the practice do not occur, disintegration of the specific permaclone or permaclonic system is the result (as in the recent example of American Motors Corporation). (p. 168)
47	**2**	**1G2G3G**	The metacontingency is the unit of analysis encompassing a cultural practice, in all its variations, and the aggregate outcome of all the current variations. The outcomes of the cultural practices must, of course, be specified empirically. For example, the number of children who can read at a certain level of proficiency is the outcome of educational practices. The amount of milk available for drinking is the outcome of farming and dairy practices. The number of children born is the outcome of sex and birth control practices. (p. 168)
48	**2**	**1G2G4G**	The functional relationship between cultural practices and their outcomes feeds back into cultures through selection process. If variations in the practice fail to keep pace with changes in the metacontingencies, the practice is no longer selected. Practices that "fit" their environment produce outcomes that maintain permaclones (i.e., the continuous practices of a group comprised of individuals gradually replaced over time). This is selection of the third kind. (P. 168-169)
49	**2**	**1G2G4G**	Selection at behavioral level and selection at the cultural level may easily be confused because they both involve relations between behavioral events and resulting changes in the environment. Cultural outcomes, however, do not select the behavior of individuals; they select the interlocking behavioral contingencies comprising the cultural practice. Likewise, the behavior of any specific individual has little effect on cultural processes and behavioral processes occur at different levels of organization. (p. 169)

50	**2**	**1G**	Figure 2 depicts the interlocking contingencies of reinforcement that constitute a cultural practice. The practice of "teaching reading" involves a large number of people most of whom never come in direct contact with others participating in the practice. Each individual's participation in the practice is maintained by individual contingencies. Taken together, every participant's behavior and the contingencies maintaining the behavior comprise the cultural practice. Elements in the contingencies include the teaching behavior of teachers and the reading behavior of pupils, the reading materials, written and oral guidelines provided by state agencies, the school board's directives, the principal's instructions, the nonacademic behavior of pupils and teachers in the classroom, the physical layout of the classroom, and any number of environmental events and contexts. Responses and response products of designers, publishers, and salespeople of reading programs plus all the people mentioned above who function as part of the environment are also part of the cultural practice. (p. 169)
51	**2**	**1G2G**	Each of the individuals participating in any variation of an educational practice is behaving as a function of the unique contingencies in which his or her behaviors enter. A teacher's choice of a reading program is a joint function of the verbal behavior of the salesperson, the opinions of colleagues, the philosophically biased statements of the teacher's instructions, and the reinforcement value of the materials themselves for the teacher. Another program might produce a much better cultural consequence (more readers), but individual teachers are not likely to go to the painful process of learning new techniques when behavioral contingencies are stable, that is, continue to support well-learned behavior. (p. 169-170)
52	**2**	**1G2G**	… The practice of teaching reading is seen to have several variations, each producing a characteristic outcome. While the practice as a whole may result in outcomes having a suppressive effect on production efficiency (assuming that production needs required almost everyone to read), one variation of the practice would have a less detrimental (possibly a positive) effect if that effect were produced by the practice as a whole. But the relation between a better variation and production efficiency could easily be obscured and its effect obliterated by the effects of the other variations. (p. 170)
53	**2**	**1G2G**	…cultures whose educational practices produce more readers have a survival advantage (over those that produce fewer readers) if reading behavior is critical in production and/or reproduction practices. However, better educational practices (those that produce relatively more readers) may lose out to worse educational practices for a long time in a complex culture if behavioral contingencies for individuals support the behavior of those involved in the less productive practices. (p. 170)
54	**2**	**1G2G**	A gradual decline in productivity could occur. The decline may or may not be monitored by members of the permaclone or by others; if monitored, the monitors may or may not be able to identify the variations in practice contributing to the decline (or capable of reversing it); if able to identify the problematic practices, people may or may not be able to intervene effectively in changing the behavioral contingencies for enough people to constitute a change in the cultural practice that could result in a "better" outcome. (p. 170)
55	**2**	**1G2G4G**	As long as behavioral contingencies support the behavior comprising the less productive educational practice, cultural outcomes may continue to select that practice so long as the metacontingencies do not change sufficiently to result in dissolution of the permaclone or permaclonic system carrying the practice. Because a cultural outcome is a joint function of behavior of many different people, the outcome may be poorly correlated with the behavior of many of the people engaged in the practice. A cultural practice may produce increasingly ineffective outcomes but continue occurring because the behavior of its individual participants is maintained by stable behavioral contingencies. (p. 170)
56	**2**	**1G2G4G**	In summary, metacontingencies describe functional relations at the cultural level. Those relations involve cultural practices and their outcomes. Cultural practices themselves are comprised of interlocking behavioral contingencies. (p. 170-171)
57	**2**	**1G2G**	The interlocking behavior of individuals constitutes cultural practices, which produce different kinds of outcomes. The three structural components of a culture – its infrastructure, structure and superstructure – are classified in terms of their associated practices and outcomes. (p. 171)

58	**2**	**1G2G4G**	Infrastructural contingencies are those interrelated behavioral contingencies that constitute a production or reproduction practice characterizing a permaclone. Infrastructural metacontingencies are the relationships between these infrastructural practices and their outcomes – outcomes having a direct effect on survival of a permaclone (succeeding generations of people engaging in a continuous cultural practice). Cultural evolution depends on the evolution and maintenance of cultural practices that meet changing production and reproduction requirements, that is changing metacontingencies. (p. 171)
59	**2**	**1G2G4G**	If at one point in time, a permaclone could produce two bison a week by each member's hunting 3 hours a day, and latter they had to hunt 7 hours a day to produce two bison a week, the metacontingencies had changed. Variations in practice that show, halt or reverse such declining efficiency enhance the survival of a permaclone. That does not mean, of course, that such variations always occur. (p. 171)
60	**2**	**1G**	Variations in cultural practices are always occurring because practices involve behavior of succeeding generations of individuals who live in slightly different behavioral environments from individuals of previous generations. (p. 172)
61	**2**	**1G4G**	One important difference that each generation's environment contains concrete tools (e.g., longer spears) and conceptual tools (e.g., the numerical "0") that allow forms of behavior by the current generation that were not possible for previous generations. Like biological evolution and behavioral evolution, cultural evolution has resulted in increasingly complex organizations of entities over time. (p. 172)
62	**2**	**1G2G**	Instability of cultural systems may occur when complexity reaches a point where cultural outcomes consistently fail to feed back into the interlocking contingencies of reinforcement comprising cultural practices. The complexity of the practices obscures the relationship between individual behavior and outcomes of cultural practices. So, behavioral contingencies that might support beneficial infrastructural variations may not be maintained by individuals participating in the practice. (p. 172)
63	**2**	**1G2G**	I shall try to show that as cultural practices become more complex, the outcomes of those practices maintaining the culture have become progressively unrelated to reinforcement in the interrelated behavioral contingencies making up the practice. (p. 172)
64	**2**	**1G2G4G**	Each member of a Paleolithic band must have been engaged directly in food production. Cooperative nonverbal behavior would have enhanced safety and amount of food per capita in the era of big game hunting. Verbal behavior would have resulted in more food. ... While animal proteins were plentiful and fairly easily obtained, and production practices involved only a small number of interlocking behavioral contingencies, the outcome of the practice (food obtained) might be understandable as reinforcement in behavioral contingencies as well as the outcome of a cultural practice. In the simplest case, each participant's behavioral sequence in the cooperative enterprise can be viewed as a chain in which the other participants provide many of the discriminative stimuli and conditioned reinforcers. … Even in this simplest case, however, the outcome for the group (amount of food per capita) was a function of the adequacy of the practice (interlocking contingencies of reinforcement). The behavior of individuals was necessary but not sufficient for survival of the permaclone. Individuals whose behavior was not integrated with others in a cultural practice could have little effect on the outcomes critical to survival of a permaclone. The earliest practices integrated the behavior of individuals because a single event served two functions – reinforcement of individual's behavior and selection of the interlocking contingencies of reinforcement. (p. 172-173)

65	**2**	**1G2G4G**	Infrastructural reproductive practices seem to have similar relation between behavioral contingencies and metacontingencies. Children born in rapid succession made caring for all of them difficult. Limiting the number of births protected the living children and precluded an excessive number of children to feed and carry about. When less aversive birth control practices failed, people apparently have resorted to abortion and infanticide to avoid negative consequences associated with excessive number of live births. People other than pregnant women undoubtedly participated in these practices, both verbally and nonverbally, and their behavior may be understood as avoidance of problems associated with more infants than could be fed and cared for by a nomoclone. … Immediate or delayed the same events served to reinforce (as conditioned or backup reinforcers) the behavior of individuals and to select the cultural practice. (p. 173)
66	**2**	**1G2G**	Separation of consequences and outcomes: A village example. A variation in a cultural practice involves a change in some behavioral component of that practice which is replicated in the behavior of other participants. Such a variation will amount to a change in the behavioral contingencies for still other engaged in the practice. For example, consider a village production practice where some people weave baskets in which others carry water from a river. The baskets leak a little. A weaver who ties a slightly different knot may provide a basket that must be set down periodically in order to tighten the knots and thus prevent excessive leakage during transit. The water carrier is likely to complain and probably instruct the basket weaver to behave differently; if things do not improve the water carrier may provide the basket weaver with a smaller share of the water brought back, or complain to others who may scold or withhold other items. The basket weaver may revert to earlier knot-trying behavior or experiment with other ways to tie the knots. (p. 173-174)
67	**2**	**1G2G4G**	Another kind of knew knot may result in a basket that does not leak at all. Water carries ask for that weaver's behavior in various ways; Other weavers watch that weaver tie the new knot and imitate the behavior. As the new knot becomes the standard knot, the variation of the practice becomes the standard practice. Social reinforcement is now contingent (but delayed) on weavers making baskets that not leak at all. Interlocking behavioral contingencies that produce watertight baskets become the standard practice. Such a practice, brought about by changing behavioral contingencies, results in a state of affairs that allows water storage. (p. 174)
68	**2**	**1G2G4G**	At some point (during droughts, for example), water storage allowed permaclones that had developed water storage practices to survive while those permaclones that had not produced baskets in which water could be stored disappeared; the basket-making and water-carrying practices of the former permaclone survived while replication of the latter's practices ceased. Only some interlocking behavioral contingencies (cultural practices) were selected by outcomes. (p. 174)
69	**2**	**1G4G**	Contingencies of reinforcement account for survival of the behavior of individuals participating in the changing practice described above; metacontingencies account for the survival of the practice. (p. 174)
70	**2**	**1G2G4G**	In the above example, behavioral contingencies constituting a cultural practice changed as variations in the individuals' behavior were reinforced and replicated in the behavior of others. The reinforces provided by others were closely related to a primary reinforce (water) for individual behavior; and efficiency in water production produced a cultural outcome (more water than was needed or immediate survival) that resulted in survival of the permaclone when metacontingencies changed. The outcome of the practice strengthened the permaclone as a unit, while the behavior of individuals was maintained by consequences provided by others. (p. 174)
71	**2**	**1G2G4G**	Individuals participating in a practice maintained the behavior of other participants because their own behavior in doing so was reinforced. When the practice emerged in the culture, the behavioral components remained intact so long as the individuals' behavior was reinforced (or, perhaps, doing otherwise was punished). This practice was not director toward a cultural "end". However, the practice had an outcome that affected survival of the group at a later time. The ability of the group to increase water production during a drought (due to their superior water storing, which resulted from improved basket making) would result in that permaclone's survival (and further replication of that practice). (p. 174)

72	**2**	**1G2G**	Variations in the practice, like genetic variations in species, do not generally occur because of the outcomes they are going to produce. Their occurrence may be stimulated by conditions in the environment (x-irradiation or the behavior of others engaged in the practice) or they may be random (as observed in relation to the level of organization that they affect – bodies and cultural practices). But only sometimes are they selected – when their results allow the carrier (organism or permaclone) to better meet environmental exigencies, thus allowing further replication. (p. 174)
73	**2**	**1G2G4G**	As cultural practices become more complex, social reinforcement of individual behavior remains a matter of individuals' maintaining behavior of others that is reinforcing for those individuals. The cultural outcome of these interlocking contingencies of reinforcement may or may not support cultural survival. (p. 174)
74	**2**	**4G**	The metacontingencies of preagricultural cultures (a few of which exist yet) favored equalitarian societies where redistribution took the form of reciprocity. ... At the behavioral level of analysis, the reciprocity in egalitarian cultures is a function of the equal access to, or control over, reinforcers shared by all members of the community. Equal access negates imbalances in behavioral control that, in the most extreme cases, typify slave/master relations. A master (who controls all access to primary reinforcement) is able to control the behavior of slaves through negative reinforcement and punishment, while the slaves (lacking direct access to primary reinforcement) must positively reinforce the master's aversive behavior if they are to survive. The behavioral contingencies are nonreciprocal. "Built into the structure of any equitable group must be the fundamental requirement that the rules be subject to the same contingencies as the ruled - indeed, that there be no such distinction as rules vs. ruled" (Segak, 1987, p. 150). (p. 175)
75	**2**	**2G4G**	At the cultural level of analysis, egalitarian reciprocity was selected and maintained by infrastructural outcomes that mitigated against accumulation of wealth (no place to store it, no way keep it from spoiling) and excessive intensification (i.e., increasing rate of production). Any preagricultural permaclone in which rank an status based on competitive production emerged did not survive, because the intensification was limited by the "natural" rate of reproduction among the plants and animals that humans foraged. Preagricultural production was thus strictly limited by ecology. Since competition led to intensification and intensification to depletion in preagricultural cultures, any such practices that emerged in such cultures disappeared. (p. 175)
76	**2**	**2G4G**	A different set of metacontingencies prevailed in agricultural economies. The development of agricultural practices allowed long-term intensification to occur without concomitant "sharp depletions and efficiency losses" (Harris, 1977, p. 103), because agriculturists did not wait for nature to take its course. Agriculture evolved because it allowed people to intervene in natural processes in ways that resulted in higher production rates. Agricultural practices, then, brought about a change in infrastructural metacontingencies. Intensification practices that would have destroyed hunter/collector permaclones were selected in agricultural economies because they resulted in more food per capita and related outcomes (e.g., brawnier fighters). The cultural practices that supported such intensification involved a new kind of redistribution - one which nonreciprocal contingencies became prevalent. (p. 175-176)
77	**2**	**1G2G**	Both Harris and Skinner, as well as many others writers, agree that modern cultures are at a crucial crossroad. The entire world faces overpopulation, ecological imbalance, resource depletion, and threat of nuclear annihilation. Our own culture faces serious economic and social problems. A critical problem may be that the outcomes of current practices are so far removed from the behavioral contingencies supporting individual's behavior that unproductive variations of cultural practices continue being replicated. The solution to this problem may involve bringing behavioral contingencies within reach of cultural outcomes. (p. 178)
78	**2**	**1G4G**	Each in his own way, Skinner and Harris outline what need to be accomplished in order to avert calamity. Such accomplishments will necessitate, of course, changes in the interlocking behavioral contingencies that characterize current cultural practices. If anybody is going to suggest how behavioral contingencies can be modified to accomplish those changes, surely it will be behavior analysts. If anybody is likely to provide a cultural analys that will give direction to the changes needed, surely it will be cultural materialists. (p. 178)

79	**3**	**4G**	In "Selection by Consequences" Skinner (1984) discussed selection as a causal force and suggested a role for three kinds of selection in producing behavior. The three kinds of selection were natural selection with its contingencies of survival, behavioral selection with its contingencies of reinforcement, and culture selection with its "special contingencies maintained by an evolved social environment" (p. 478). The "special contingencies" are primarily those maintained by a verbal community and they involve the behavior of speakers and listeners as environmental events in the contingencies supporting the behavior of others. (p. 10)
80	**3**	**1G2G**	From a behavior analytic perspective a culture is "the contingencies of reinforcement which generate and sustains ... Behavior [of members of the culture]" (Skinner, 1969, p. 3). Human cultures always include verbal behavior, which requires speakers and listeners, and involves interlocking contingencies among individuals. The individuals whose behavior is so interlocked are members of the culture. The behavior of each, as speakers and listener, enters into the behavioral contingencies supporting the behavior of the others. These interlocking contingencies may be termed "cultural practices" and they have outcomes beyond the consequences of individuals' behavior. (cf. Glenn, 1988). (p. 11)
81	**3**	**1G2G3G**	The unit of analysis at the cultural level, then involves a functional relation between cultural practices and their outcomes. These "metacontingencies" are to be distinguished from contingencies of reinforcement; the unit of analysis differs. A cultural practice is not an operant (class of responses of a particular individual) but a bundle of functionally related operants of different individuals (cf. Glenn, 1986). Some cultural practices produce outcomes that increase the likelihood that the practice will continue over time and others fail to produce outcomes that maintain the practice's continued existence over time. Practices that promote survival might include those that promote 1) effective actions vis a vis the physical environment, 2) effective action vis a vis people engaging in other kinds of practices (other cultures), and 3) promotion of cohesion among individuals participating in cultural practices. Maximally effective cultural engineering would involve developing practices that led to all three of the outcomes simultaneously. (p. 11)
82	**3**	**1G**	Just as a certain kind of genetic structure is the link between natural selection and behavioral selection, a certain kinds of organismic activity -- operant behavior -- is the link between behavioral selection and cultural selection. The form of a cultural practice is defined by the pattern of interlocking operants comprising the practice. (p. 11)
83	**3**	**4G**	Because cultural analyses have to do with the ways in which the form and function of the behavior of individuals is consistent across members of a culture, anthropologists are interested in precisely that operant behavior which participates in more complex units involving several individuals. (See Harris, 1964, for a thorough and useful taxonomy). The following exposition briefly reviews some key cultural materialist concepts from the perspective of one behavior analyst. The reader should not assume that cultural materialists would necessarily agree that cultural materialist concepts are adequately represented. (p. 11)
84	**3**	**1G2G4G**	Behavior analysts (e. g. Skinner 1984) have used the term "cultural practices" as a generic term for consistencies in behavior across individuals behaving in different places at the same time or at different times. In the interlocking contingencies of reinforcement comprising a cultural practice, each individual participating in the practice provides critical components of the behaviorally potent environment for the other participants. The entire set of repeatedly replicated interlocking contingencies (the practice) is the cultural unit of analysis. (p. 11)
85	**3**	**1G2G**	When interlocking contingencies, in which an extended group of individuals participate, fail to maintain outcomes that keep the individuals alive and behaving with respect to one another, the culture ceases to exist. Of course, some of its member organisms may survive and enter into the interlocking contingencies of another culture, carrying elements of the earlier culture with them. (p. 11-12)

86	**3**	**4G**	There are crucial differences, though, between the contingencies maintaining verbal behavior and those maintaining nonverbal behavior; and those may be important to the various roles verbal behavior may play in cultural evolution. One difference is that the origin and maintenance of verbal behavior in individuals (and cultures) requires mediation by other people who have undergone explicit training to function as listeners (Skinner, 1957). Reinforcing consequences of nonverbal operant behavior can (and usually do) involve a changed environment as direct result of the operant behavior producing those consequences; reinforcing consequences of verbal behavior ultimately hinge on the action of listeners. (p. 12)
87	**3**	**4G**	Verbal behavior may prove to be a two-edged sword. On the one hand, verbal behavior allows individuals (and therefore cultural groups) to respond to their environment in ways that would probably be impossible without a verbal community. For example, verbal behavior allows abstract dimensions of the environment to enter into highly specified stimulus control over uniquely differentiated behavior (verbal responses). On the other hand, powerful contingencies of reinforcement may maintain verbal behavior that precludes effective action, thus maintaining behavior that participates in practices of decreasing cultural value. The next sections of the paper briefly explore such a hypothesis. (p. 12)
88	**3**	**1G4G**	The role of verbal behavior in the evolution of cultural practices must itself have evolved as a function of contingencies supporting nonverbal behavior. Skinner (1986) provided a scenario in which verbal operants emerge and function to coordinate the behavior of two people fishing. (p. 12)
89	**3**	**1G**	Two important points to follow from such a perspective of cultural evolution. First, the origin of verbal communities (speakers and listeners) lies in the contingencies of natural selection and the contingencies of reinforcement responsible for nonverbal behavior. Second, verbal communities support survival only so long as they support nonverbal behavior that is conductive so survival of enough individuals to maintain the contingencies of reinforcement that comprise cultural practices. The possibility appears to exist that behavior comprising structural and superstructural practices that supported infrastructures that originated under one set of metacontingencies might be maintained by reinforcement contingencies that become increasingly out of line with changing infrastructural metacontingencies, and thus with infrastructural requirements. (p. 12-13)
90	**3**	**1G4G**	Examples are given by Harris (1979, 1985) of various kinds of verbal behavior having to do with how framers in a certain area of India behave toward their cattle. The farmers report "No calves are starved to death" and they claim to follow the rule "All calves have the right to life". Such statements are contrary to reports of the ethnographer, who concludes "Male calves are starved to death" based on the facts -- the ratio of male to female calves in the area. The ethnographer deduces that farmers or family members engage in unreported behavior (and possibly unobserved by themselves) that results in more male calves dying than female calves. The ethnographer derives a rule statement (that appears to more accurately reflect the behavioral contingencies): "Let the male calves starve to death when feed in scarce". The act of starving male calves is supported by an environment that does not have the resources to feed all the cattle born, and cows furnish a significant amount of the people's animal protein (milk) while (in some parts of India) only a few bulls are needed for reproduction and plowing (Harris, 1985). Harris's main concern in making these distinctions regarding verbal reports and rule statements is to address the anthropologists' dilemma regarding the source of their data. Harris concludes that the verbal behavior of the Indian farmers is peripheral to understanding bovicide among Indians. The farmer's verbal behavior is inconsistent with nonverbal (bovicidal) practices of the infrastructure. (p. 13)
91	**3**	**1G2G**	From a behavior analytic perspective, the verbal behavior of both the Indian farmers and the ethnographer is under control of additional variables. Furthermore, the verbal behavior of neither, in the present example, is directly involved in the infrastructural practice of bovicide. These verbal responses of farmers and the ethnographer are part of the superstructural practices of their respective cultures. In this part of India, bovicide is, on the contrary, part of the infrastructure -- those practices having to do with production and reproduction and which must satisfy the contingencies imposed by the natural environment if the individuals maintaining the cultural practices are to survive and propagate in enough numbers to sustain the practice. (p. 13)

92	**3**	**1G4G**	Further, in the feeding process, the younger members of the family may be differentially instructed when a new-born calf is male as opposed to female: "Keep Elmer away from Elsie today" and "Give little Elsie plenty of time to suckle". The importance of such instruction is that it can produce effective behavior quickly in the repertoires of those who have not yet come into contact with the contingencies giving rise to the instructing. Since infrastructural practices often involve the coordinated behavior of several people operating on the environment in ways that produce consequences affecting them all, verbal behavior is likely to be the part of the practice that coordinates the behavior of the group's members and speeds up the transmission of a practice to new members. The point important to behavior analysts is that verbal behavior participating in infrastructural practices can be accounted for by the same metacontingencies as account for the nonverbal behavior of the practice. (p. 13-14)
93	**3**	**1G4G**	The Indian farmers' description of their own behavior must be accounted for, however, by contingencies of reinforcement other than those immediately involved in production and reproduction contingencies. Their "verbal report" is part of the superstructural ideology that has functioned to support the infrastructure in the past. Harris (1985) gives a detailed account of the superstructural practice of "cow worship" and the prohibition of eating beef as these practices emerged from infrastructural requirements. Specifically, the land could not support enough cattle to provide adequate amounts of beef to meet nutritional needs for animal protein. Those needs could be me, however, if each family maintained a cow that provided milk over extended periods of time. Out of these infrastructural requirements emerged the superstructural practice of cow worship with its associated prohibition against eating beef. As long as Indian farmers in general and over time survive better by engaging in these infrastructural practices, and in general the superstructural verbal behavior assists in maintaining the infrastructure, the culture's practices are conductive to survival of the farmers, the practices, and the culture itself. (p. 14)
94	**3**	**1G4G**	However, as the above example suggests, certain requirements of the infrastructure may be inconsistent with the ideology of the superstructure. Even though the rules generated by the superstructure prohibit starving any cattle, the need for female calves to survive and produce milk promotes the behavior of selectively culling males. Because the behavior involved in production and reproduction ultimately determines the continued evolution of the culture, the infrastructural requirement of starving males under certain conditions is an imperative. It is not surprising that individuals learn to behave in ways that are conductive to the survival and well being of themselves and their families despite such behavior's being expressly prohibited. (p. 14)
95	**3**	**1G4G**	We are led, then, to consider the possibility that the verbal behavior of individuals can be shaped and maintained as part of a cultural practice that obfuscates the relation between individuals and their environment; and that cultural practices comprised of such verbal behavior may at times contribute to the survival of the culture. Environments change, however, and the environment of homo sapiens changes very rapidly as a result of cultural transmission of operant repertoires. Whatever the role of current cultural practices in supporting extant cultural infrastructures, the danger of miss-describing the relations between ourselves and our environment seems apparent. Given the rapidity with which infrastructural metacontingencies are changing as a result of the human race's production (and reproduction) practices, the danger of superstructural verbal practices that misdescribe relations between ourselves and our environment appears to be significant. (p. 14)
96	**3**	**1G2G**	If the human race is to survive, methods must be devised for controlling population worldwide, conserving natural resources, reducing risk of nuclear holocaust, educating masses of people to participate effectively in increasingly complex environments, enhancing interpersonal relations, and providing opportunities for productive work. New practices are required. Accurate descriptions of behavioral and cultural contingencies appear critical. Just as critical is the incorporation of these accurate descriptions into our standard verbal practices. Both a science of behavior and a science of culture seem critical for developing accurate descriptions of the relations between human and their environment. (p. 14)

97	**3**	**1G2G**	Superstructural practices that involve inaccurate descriptions of the relations between humans and their environment forestall adaptive infrastructural change and thus threaten cultural survival. Inaccurate descriptions compete with accurate descriptions and may support practices that no longer meet infrastructural requirements. Especially in complex cultures, the superstructure may become isolated from infrastructure; and the negative feedback function (Harris, 1979) of superstructure may prove especially dangerous in rapidly changing environments. (p. 14)
98	**4**	**4G**	Many of us, however, are quite unaware that our own behavior contributes to the overall situation; it is difficult to discern how our individual and quite legal actions relate, for example, to an increase in crime rates. Many of us who recognize our own contributions to our society's problems also recognize that even if we behave differently, social problems cannot be alleviated until many other people's behavior changes, too. In short, we are all caught up in a larger system that seems impervious to our small efforts. Yet, dramatic changes do occur - in societies and in individuals. We need to understand how this happens. In other words, we need to know how individual behavior works, how social systems work, and how they are related. Then we can begin to specify the actions most likely to deter and reverse calamitous trends and the conditions under which individuals take such action. By arranging such conditions, lawmakers and judges employers and employees, educators, chief executive officers, and parents can improve our chances of averting threats that face us. (p. 39)
99	**4**	**4G**	Although the theory of biological evolution provided the impetus for "evolutionary thinking", it now may be considered as one example of evolutionary thinking. It is the thesis of this chapter that evolution occurs at biological, behavioral, and cultural levels of organization emerge as products of mechanisms occurring at historically earlier level(s) of organization. (p. 40)
100	**4**	**1G4G**	For it is behavior that keeps the evolutionary equation balance and, paradoxically, it is human behavior that causes the environment to change rapidly, threatening catastrophic imbalance in the equation. And it is cultural practices in which behavior patterns are preserved long enough to produce cumulative change in the environments that sustain the human species. It is also through cultural practices that behavior patterns are preserved long enough to threaten the survival of the whole earth and all living things. (p. 41)
101	**4**	**1G4G**	Operant processes (sometimes in conjunction with other behavioral processes) produce entirely novel forms of behavior during a single individual's lifetime. Second, operant behavior is directly responsible for the emergence of cultural systems. Third, cultural practices are entities that provide environmental context in which operant repertoires emerge in individual humans. (p. 44)
102	**4**	**4G**	Perhaps the critical thing to remember, however, is that the ultimate value of verbal behavior to the survival of verbal species is that it makes possible effective nonverbal behavior that could otherwise not occur. Without verbal behavior, the miracles of modern life would certainly never have occurred; we probably would still be living in caves. But all the verbal behavior in the world can do nothing in the absence of nonverbal behavior to clothe, feed, warm, cure, or protect us. (p. 55)
103	**4**	**1G**	The name of the evolutionary game is to generate behavioral content that results in survival and reproduction of genes, organisms, and species; the survival and reproductive success of our kind is disconcertingly evident. The rampant evolutionary success of the human species took more than the innovation of behavioral selection. Behavioral processes have produced order at another level: the behavior of individual humans has become integrated into units that transcend the lifetime of individuals. The same behavioral processes that lead to as many behavioral universes as there are behaving individuals also result in vast webs of interrelations among the behavioral repertoires of individual humans. These are the elements of cultural units. They have been termed "interlocking contingencies" (Glenn, 1988) to call attention to the dual roles that each person's behavior plays in social processes - the role of action and the role of behavioral environment for the action of others. (p. 56)

104	**4**	**4G**	Cultural processes grow out of and build on behavioral processes in a manner parallel to the way behavioral processes build on the processes of biological evolution. Ontogenically acquired behavioral repertoires were the consequences of the progressive freeing of the behavior of individual organims from genetic micromanagement. However, behavioral processes are entrained by the requirements of survival and reproduction, thus there are limits to the freeing of behavioral content from genetic specification. (p. 56)
105	**4**	**1G4G**	Whereas other animals assume their adult roles relatively early in their life spans, 20 - 25% of the human lifespan is spent preparing for a similar level of independence. Most of the preparation involves acquiring the specific behavioral repertoires needed to survive, contribute to the social practices of the community, and integrate the behavior of the young into those practices. This virtually insures that the social environment (behavior of other humans) will be prominent among those features of the environment that enter into behavioral contingencies. Such ontogenically programmed social behavior (unlike the phylogenically programmed social behavior of some insects) can and does take many forms within and between generations. When interlocking behavioral contingencies are replicated across generations through behavioral processes, this marks the beginning of cultures. (p. 56 - 57)
106	**4**	**4G**	Biologists and many anthropologists tend to agree that rudimentary cultures are evident in many extant primate species, and there is fossil evidence that human forebears were engaged in cultural practices (tool making) over 3 millions years ago. Since then biological, behavioral, and cultural evolution have continued to occur and account for continuous change in the human condition. But the balance of power appears to have shifted (gradually at first and now at an increasing rate) from change through natural selection to change through behavioral and cultural evolutionary processes. The breakeven point, reached a mere 45-55,000 years ago by homo sapiens, has been called "cultural takeoff" (Harris, 1989) (p. 57)
107	**4**	**1G**	What happened? How did cultural entities emerge from behavioral processes? What are the entities that exist at the level of cultures and what is their relationship to behavioral units? [...] To begin answering these questions, we return to behavioral contingencies in which the behavior of other people functions in the role of environment. Consider the following scenario, which is consistent with what we know about human behavior. An infant who has learned to pick up objects, stretches her hand toward a berry, not having yet learned to behave differently toward objects within reach and those out of reach. The berry is out of reach but a juvenile sees the infant reaching. He gives her the berry (having seen others so respond to such infant behavior, and having found it possible in this way to prevent infants from shrieking), and the infant then looks at him contentedly. If no one ever provided the infant with objects out of reach, she would learn to reach only when objects were within reach. If the infant did not cry when lacking the repertoire to obtain berries and such reinforcers, people might be less inclined to notice those early misguided reaches. The infant's built-in (or early acquired) behavior of making eye contact with others may provide additional and perhaps redundant consequences for the juvenile's behavior of mediating between the infant and her environment. With all those elements in place, the juvenile's action reinforces the infant’s reaching and the infant's response reinforces the juvenile's action. The behavior of each is becoming part of the behavioral environment of the other. (p. 57)

108	**4**	**1G**	The behavior of more experienced individuals can enter into the contingencies that shape and sustain budding repertoires of the young only if the behavior of the young has a reciprocal effect. Natural selection endowed our ancestors with the biological equipment that allows environmental events to fashion functional behavioral repertoires from undifferentiated, nonfunctional, movement. But if the process is to occur anew in each newborn, certain critical environmental events (food, cries, perhaps eye contact, the human voice, and touch) must have powerful behavioral functions. These are some of the raw materials out of which human repertoires emerge. By their nature, they rig the game (especially given the long period of helplessness in humans) so that much of the environment that acquires behavioral function is comprised of the behavior of others. Thus the behavioral ecosystem of each individual human is integrated from its inception into a larger system, sometimes termed a "social system", which is comprised of interlocking behavioral contingencies, or social contingencies. (p. 57 - 58)
109	**4**	**1G**	Profound indeed are the effects of the early and sustained enmeshment of the repertoire of each human in an evolving behavioral environment comprised in large measure of the behavior of others. Because the behavior of other humans play such an important role in the contingencies accounting for the behavior of their young, the young become acutely responsive to subtle differences in the behavior of others. (Consider the ability of many children to detect emotion in slight movements and facial expressions of significant adults.) Further, the mere presence of others acquires behavioral functions; for example, it reinforces behavior that keeps the young in fairly close proximity to adults and juveniles, which in turn allows the youngster opportunities to observe, imitate, and learn new behavior with respect to both the social and the nonsocial environments. (p. 58)
110	**4**	**1G**	An established history of social relations provides the foundation of a social repertoire, which can then serve effectively as the behavioral environment for others (providing that the others have behavioral histories sufficiently similar). The process, of course, works in both directions so each individual's repertoire increases in size and complexity. At the same time, each individual's behavior becomes more useful in its role as a behavioral environment for others. Interlocking behavioral repertoires make it difficult, if not impossible, for participating individuals to "go it alone". Also, once the behavior of others is established in the role of behavioral environment, individuals are positioned to operate in cooperative manner to produce changes in the environment that they cannot produce alone. Although evolutionary contingencies may account for each individual's behaving in ways that maximize his or her chances for survival and reproduction (i.e., selfishly), behavioral processes, in the human case at least, surely increase the survival value of cooperative behavior in humans. Interlocking behavioral units that produce changes beneficial to participants in the social contingencies also provide the basis of cultural selection. However, before discussing cultural selection, we must consider the role of verbal behavior in interlocking contingencies. (p. 58)
111	**4**	**1G**	The importance of interlocking contingencies to the emergence of a new level of order lies in the fact that four hands are better than two. They are more than twice as good as two. The coordinated behavior of two people can produce outcomes that could never be achieved by one, or even by two acting independently. When each of the two is both a speaker and a listener, that behavior can be coordinated ever more effectively. Skinner (1986) provided an extended example of the way in which primitive verbal behavior may have initially entered into the behavioral contingencies of two people working together to catch fish. (p. 58 - 59)

112	**4**	**1G**	If A can report that she just saw a snake near where you are standing, you may be able to move before you are bitten. Or if B, whose leg is broken, can tell you in which direction he found a stream yesterday, you may get to the water before you (and he) perish. It is not hard to imagine that accurate reports are worth enough to listeners for them to reinforce the behavior of reporting and describing by speakers. Such reporting behavior may often be initiated by mands: "Have you seen any snakes around these bushes?" "Where did you find that water yesterday?" Such mands set the occasion for verbal interchange. At this point, the verbal behavior of each person is serving as part of the other's behavioral environment. This clearly affords opportunities for complex social contingencies to bring more and more dimensions of the world (both social and nonsocial) into the behavioral environments of participating individuals. (p. 59)
113	**4**	**1G**	To the extent that verbal behavior promoted effective nonverbal behavior, it was likely to be incorporated into social contingencies. The next step was the gradual emergence of cultural practices from such unique social contingencies. (p. 60)
114	**4**	**1G**	Cultural practices involve repetition of analogous operant behavior across individuals of a single generation and across generations of individuals (Glenn, 1988; Malagodi & Jackson, 1989). Many of the specific activities passed from one generation to the next are acquired by individuals trough imitation. Researchers have shown that humans can learn to imitate the behavior of others as a generalized response class (Peterson, 1968). That is, once imitation of several different responses produces reinforcing consequences, new responses can be acquired by imitation in the absence of reinforcement. All that is required is that some instances of imitation be reinforced - a likely eventuality. As pointed out by Skinner (1953), individuals who imitate others are likely to produce the same reinforcers others are producing. (p. 60)
115	**4**	**1G2G**	A cultural practice may be carried out by a single individual engaged in a solo performance. Harris (1989) provided the example of a behavioral unit (washing potatoes) that was acquired by a macaque monkey, then imitated by other until it became a standard part of the repertoire of each member of the troop. Each monkey acquired the operant unit (washing potatoes) by way of imitating another's action. Each monkey's behavior was reinforced by its own consequences (more potato taste, less dirt taste). Although the acquisition of each monkey's operant involved another's behavior as part of its behavioral environment, once the behavior was in their repertoires, the practice was carried out by each monkey individually, and each produced consequences for itself. Thus the necessary elements of a cultural practice are: (1) behavioral content acquired during the lifetime of each participant; (2) behavioral environments of one or more participants that include (but are not limited to) the behavior of conspecifics; (3) the repeated acquisition of the behavior within and between generations. Most cultural practices, however, have an additional element: they involve two or more individuals whose interactions produce consequences for each of them individually and whose joint behavior, in addition, produces an aggregate outcome that may or may not have a behavioral effect. When a cultural practice involves such interlocking behavioral contingencies and associated aggregate outcomes, the stage is set for increasing complexity at the cultural level of analysis (Glenn, 1988). The critical difference between the protocultures of humans and other primates and the cultures of humans appears to be the complexity of the interlocking behavioral relations in human cultures. The glue that was necessary to maintain such interlocking relations was verbal behavior (But see Skinner, 1990, for reciprocal roles of modeling and imitation.). Verbal behavior could emerge only in the context of verbal communities, which had to evolve. Like all other evolutionary processes, such evolution begins slowly and increases in rate of change. No wonder 55,000 years or more passed from emergence of anatomically modern homo sapiens to "cultural take-off" (Harris, 1989).
116	**4**	**1G2G**	From the present perspective, behavior is transformed into cultural level entities when the interlocking behavior of individuals produces aggregate outcomes that could not b achieved by any individual acting alone. (p. 61)

117	**4**	**1G**	What Harris called a "scene" establishes the potential for a cultural level unit. A scene involves two or more people interacting at specific space/time coordinates. Sandy's birthday party on August 10, 1980, constituted a scene. The participants and their interactions with one another and with the party items are an "idioclone". If the scene is replicated in the behavior of the same individuals at later times, the people participating and their interrelated behavior comprise, together, a cultural unit called a "nomoclone". A nomoclone, like an operant, is distributed over time (p. 61)
118	**4**	**1G**	If participants in the scene change over time (Sandy's brother is born between her 4th and 5th birthdays, two first-grade friends are included on her 6th birthday., her cousin moves away between her 7th and 8th birthdays), the cultural unit is called a "permaclone": a cultural practice comprised of repeated instances of interlocking behavioral contingencies maintained by specific individuals, who are replaced one by one by other individuals while the behavioral contingencies remain relatively stable (or evolved gradually) over time. Notice that each occurrence of the practice has a beginning and an end and the occurrences are distributed across The distributed occurrences of nomoclonic or permaclonic interlocking behavior are a cultural unit comparable to the operant unit and the species unit at the behavioral and biological levels, respectively. Permaclones are the source of the power of cultural things. They are evolving behavioral environments into which successive generations of humans are born and to which they are enculturated. (p. 61)
119	**4**	**1G**	The replicating entities in the cultural unit are the operants of individual participants. Variability is endogenous in the cultural practice. The interlocking behavioral contingencies that identify a permaclone may gradually change over time as a result of a variety of factors. Changing personnel and changing physical environment may result in adjustment of the interlocking contingencies to accommodate unique characteristics of the behavior of the newer personnel. Repertoires of regular participants will also be changing over time, as a result of changing contingencies in other parts of their behavioral environment. Because such changes have ramifications on the whole behavioral ecosystem of an individual, these ramifications have some impact on every permaclone in which the individual participates. Most of us are aware, for example, that changes in the work environment may have lasting impact on behavior at home (and vice versa). More precisely, changes in the behavioral contingencies sustaining one's behavior in a work permaclone effect one's behavior as it enters into behavioral contingencies at home. A bidirectional feedback loop could result in considerable change in both permaclones. (p. 61)
120	**4**	**1G**	The variation endogenous to cultural practices arises directly from the fact that cultural practices involve replication of operant behavior in the context of interlocking behavioral contingencies. Variability also arises from the fact that behavioral evolution in individuals rests on the variability underlying behavioral units themselves, this has an indirect effect on variation in a cultural practice. (p. 62)
121	**4**	**1G**	We have discussed the units of replication in cultural practices and described some sources of variability. If natural selection is the mechanism that accounts for increasing biological complexity and behavioral selection accounts for increasing behavioral complexity, how does selection operate at the cultural level? (p. 62)
122	**4**	**1G2G4G**	Behavioral contingencies account for the evolution and maintenance of behavioral units; metacontingencies account for the evolution and maintenance of evolving cultural units - permaclones, permaclonic systems, and supersystems. Metacontingencies are contingent relations between cultural practices and outcomes of those practice. The term "metacontingencies" (Glenn, 1986, 1988) was coined to call attention to the was these cultural-level contingencies are related to behavioral contingencies. First, they are conceptually related in that they involve analogous selection processes. Thus, each involves contingencies of selection. Second, the prefix "meta-" implies a substantive and hierarchical relation, and in fact metacontingencies emerge in the evolution of cultures by building on behavioral contingencies. Thus, metacontingencies are functional relations at the cultural level of analysis whose existence derives from but is not equivalent to behavioral contingencies. (p. 62)

123	**4**	**4G**	Sometimes the term "cultural contingencies" has been used, by myself as well as others, but that term is ambiguous. Cultural contingencies often implies behavioral contingencies, the elements of which are cultural products (either social or material). The contingencies are identified as "cultural" in terms of their content. That is not what I mean by metacontingencies, which is a term that identifies process - specifically, process at the cultural level of analysis. I may be getting at the same point as Vargas (1985) in his use of the term metacontingencies. But the contingencies at the cultural level are not behavioral contingencies writ large, in the sense of more inclusive or more extended in time (as the prefix "mega-" suggests); they involve units the existence of which can only be explained at a different level of analysis from the level at which behavioral relations are understood. (p. 62)
124	**4**	**1G2G4G**	Recall that the behavior of each individual in a set of interlocking behavioral contingencies functions as part of the behavioral environment of the others. Although the examples previously provided have always involved only two interacting individuals, the behavior of any number of individuals may be involved. So long as some level reinforcement (usually provided by the other participants) keeps each behaver participating, the interlocking contingencies are likely to be repeated across time. If 2. . . *n* people reenact a particular scene because the behavior of each has become integrated into a repeated pattern through the reinforcement contingencies provided by others, the entire integrated set of contingencies constitutes an instance of a cultural practice. What accounts for the origin such a unit, its extended survival or its disappearance (lack of behavioral descendants), or its evolution? Variation and selection. As usual, the variation is endogenous (although it may be selected as a characteristic), and selection is exogenous. In the case of cultural practice, the selection agent is the outcome (aggregate effects) produced by the practice (the interlocking behavioral contingencies). The variation is provided by permutations in the behavior of individuals participating in the practice. An extended example follows, accompanied by additional related points. (p. 62 - 63)
125	**4**	**1G2G4G**	Our human ancestors were for thousands of years large game hunters. As predators of large game, those ancestors (like ourselves) had serious anatomical and behavioral deficiencies. But animal foods are extraordinarily nutritious (Harris, 1985) and, when available in large numbers (as in the early days of humanity) large game provided the most cost-efficient food that humans could obtain. By acting in concert, our ancestors were able to obtain more food and better variety per capita than even the most proficient among them could obtain acting alone. The outcomes of the conjoint behavior supported by interlocking behavioral contingencies were of several kinds. Individuals kills were outcomes of instances of the practice, but they also likely served as direct reinforcement for the behavior of people participating in the scene. Now imagine people participating in such a practice whose numbers become too large for them to hunt together effectively. Some permaclonic participants might split off, creating two different populations engaging in the practice, perhaps one moving on to another area where there was less competition. If a variant of the practice emerged in one of the groups, which increased the level of sustenance for that group, that group may have been favored in at least two ways: their sustenance level may have enhanced their survival as individuals (and as participants in the "improved" practice); and they may have become so proficient that they had more time and inclination to interact in more ways with one another and the physical environment. Such increased levels of interaction could have led to the emergence of additional practices over extended periods of time. (p. 63)
126	**4**	**1G2G**	The interlocking behavioral contingencies that could produce cultural products obviously did not emerge overnight. In fact, the archaeological record suggests that thousands of generations were required to reach a point where practices were not limited to those directly related to physical survival. Throughout that time, people were generally better off sticking with one group, because their behavior was more effective when they "grew up with the contingencies," as it were. Thus, their progeny's behavior would become integrated into interlocking contingencies of a particular group. (There would be a propensity to "identify with their group," which is an effect of cultural practices, not a cause.) (p. 63)

127	**4**	**1G2G**	Cultural practices evolved because each new generation of participants benefited by participating in a practice in which adjustments in the previous pattern of interlocking contingencies led to superior outcomes, which selected the interlocking contingencies. But modification of integrated behavior patterns was not the only legacy of previous generations. Some of the products that resulted from that behavior were less ephemeral than good meals. Tools and containers, clothing, and weapons improved by each generation could be passed on to the next, allowing members of each generation to interact with more complex behavioral environments than members of previous generations. (p. 63 - 64)
128	**4**	**1G2G**	The interlocking contingencies were, in short, selected by the aggregate changes in the material environment that resulted from the integrated behavior of participants. Such "cultural outcomes" have the same kind of relationship to interlocking behavioral contingencies as behavioral consequences have to operant units. The cultural practice that defines a specific permaclone is the unit at the cultural level that parallels the operant at the behavioral level. It emerges, as an entity comprised of replicated instances, through the selective function of its outcomes (the aggregate results of the interlocking behavior, often distributed across time). (p. 64)
129	**4**	**4G**	To repeat, behavioral selection and associated behavioral processes (1) emerged as a result of natural selection and (2) account for the content of individual repertoires. Cultural selection and associated culture processes (1) emerged as a result of behavioral selection and (2) account for the content of cultural practices. Although individual repertoires may differ vastly, the same behavioral processes account for all of them; differences in content are the result o differences in characteristics of the behavioral environment that account for each repertoire (in the context of individual genetic differences). Although the content of different cultural practices may differ vastly, the same processes account for all of the practice; differences in cultural content are the result of differences in characteristics of the environment that account for the practices. (p. 64)
130	**4**	**1G2G4G**	Recall that metacontingencies are the contingent relationships between cultural practices and outcomes of those practices. The continuing existence of a practice depends on the effectiveness of the practice in producing outcomes that sustain the existence of permaclones trough which the replicators operate. In the early stages of cultural evolution, interlocking behavioral patterns may have been supported simply by the continuing existence of the participants as living organisms with behavioral units embedded in interlocking contingencies. But the cultural unit that survives or does not survive in any particular instance is the interlocking behavioral contingencies that produce aggregate outcomes. In complex cultures, the instability of permaclones may be a sign that the entire system is becoming destabilized. (p. 64 - 65)
131	**4**	**2G4G**	One might suspect that virtually all permaclones would have at least one member who recognized such outcomes as diminishing food supplies and who proceeded to lead his/her fellows to take remedial action. My guess is that such planned and foresightful adaptation was (and still is) rare. If this sounds counter intuitive, consider the fact that individuals often fail to act in their own self-interest when behavioral contingencies fail to support rational behavior. Even when we can explain the likely effects on our health, we eat foods that clog out arteries, killing large number of us; we inhale smoke that gradually destroys our lungs; we remain sedentary even though exercise would prolong our lives; we poison the air we breathe in our homes rather than coexist peacefully with insects. Malott (1989) suggested that the negative consequences of our behavior are too small with regard to each instance of behavior, and their effects accumulate too slowly for these consequences to function as reinforcement. If single individuals often fail to behave in ways that enhance their own survival, even when they have rules that predict such negative outcomes, consider how much more difficult it would be for a cultural practice to change in the face of outcomes whose accumulating damage will not be seriously felt for another two generations (Skinner, 1987). As in biological and behavioral evolution, cultural evolution has occurred as a result of processes that operate without respect to any future. Cultural practices that exist do so because they fit the environment of a previous time, which is to say that they may not continue to exist. (p. 65)

132	4	1G2G	Although the behavior of humans engaging in cultural practices continuously produces cultural outcomes, most of the behaving individuals never come into contact with even a verbal description of those outcomes, let alone the events that comprise the outcomes themselves. Once some outcome has been specified as resulting from a particular cultural practice, people's behavior in the cultural practice may change as a result of following rules that describe the relations between participants' behavior and the outcome. Such rule-governed behavior is explored by Malott (1988). Although such behavior undoubtedly occurs, I believe it has accounted for extremely little of cultural evolution for two reasons. First, the relations between behavior in specific cultural practices and the outcomes of those practices have rarely been specified; thus, rules describing the relations have rarely existed. Practices have existed, produced outcomes, changed and disappeared while most of us participating in them have had little or no knowledge of this process. Second, individuals, even if they understand that a cultural practice is producing potentially lethal outcomes, can usually make little impact on the practice by taking personal action. The reason that species become extinct, that individuals fail to behave in their own self-interest, and that cultural practices continue despite their overall negative effect is that contingencies of selection can only operate with respect to the present and the characteristics of current entities (biological, behavioral, and cultural) exist in their current form as a result of past environments. Future environments, even when they are the direct outcome of the existence of current organisms, behavior, or cultural practices, can have no effect on the current entities. (p. 65 - 66)
133	4	1G4G	Cultural evolutionary theory accounts for the emergence of cultural practices and their organization in cultures (Harris, 1977). Because human cultures have their origin in human behavioral processes, which in turn have their origin in biological evolution, cultural survival ultimately rests on cultural practices that ensure the survival and reproduction of the carriers of the behavior involved in the interlocking contingencies, and thus in the cultural practices themselves. (p. 66)
134	4	1G4G	In a similarly halting manner, simples cultural practices must have emerged very slowly as humans went variation after variation of interlocking behavioral contingencies, slowly and painfully learning to take an active role in insuring transmission of primitive practices. By fits and starts, verbal interchange may have evolved repeatedly in dyads, triads, and small groups as people learned to say what their elders said in specific circumstances and to provide the behavioral contingencies necessary to get their progeny to do the same. This halting process enhanced survival of those early humans who became better and better able to coordinate their behavior and produce or maintain food, warmth, water, and human contact. (p. 67)
135	4	1G2G3G	As production practices became more complex in a community, several permaclones were require to jointly produce some outcomes, and division of labor became more complex. For example, some people may have worked together to gather grain, others to hunt big game, and others to fish. If the community became very large, two or more permaclones (sets of interlocking contingencies among specific individuals) may have been involved in any given production practice. Recall that instantiations of the practice involve behavior (of individuals) that functions both as action and behavioral environment for others' actions. Practices changed as a result of changes in the behavior of individuals participating, changes in the personnel (thus in behavioral repertoires of participants), and changes in the physical environment (manmade or not). If one permaclone produced more, participants in others could learn by observing the more successful, or by participating with that group for awhile, or possibly, at some point in time, by verbal instruction around a campfire. Those permaclones in which such behavior emerged would have been most likely to produce infrastructural outcomes that maintained the existence of the interlocking contingencies. So it is that such behavior remains as elements in existing permaclones to this day. (p. 68)
136	4	1G2G	The outcomes of production and reproduction practices can be measured in terms of such variables as the number of people to feed, amount of food produced, number of people per room, average life span, and efficiency of tools. The relentless and continuous increase in size of human populations has resulted in continuous intensification of production practices. Thus, practices that produced more goods faster have always been selected, and those practices became increasingly complex as hunting and gathering gave way to horticulture, agriculture, and industrialization. Increasing complexity in production practices required larger communities in which individual people participated in multiple permaclones. (p. 68)

137	**4**	**1G2G**	The permaclones comprising hundreds, perhaps thousands, of small communities must have involved practiced that failed to produce outcomes that sustained the existence of the practice. In some cases, all of the members surely perished; in others, members split off and affiliated with other communities taking elements of their practice with them. The practices of still others changed with a changing environment and were transformed into totally different practices over time. Portions of some communities probably split off, going their own way, and if completely separated from the parent group, their practices evolved along a different path than the practices of the larger group that they left behind. The practices that continued to exist, and those that continued to evolve, did so because the aggregate behavior of participants produced outcomes that sustained the practice. Such outcomes included victory in battle, technological innovation in production and reproduction, domestic and political organization that sustained or enhanced infrastructural practices, and games, myths, or art forms that strengthened the social relations among members of a community participating in infrastructural permaclones. (p. 68 - 69)
138	**4**	**1G**	If we are to make use of what we know of processes, we need to have a clear picture of the nature of the products of these processes. We need to be able to specify, at least within a range of feasibilities, the content of behavioral repertoires that is required to sustain the existence of complex cultural practices conductive to survival of the human race. We also need to be able to specify the content of behavioral contingencies necessary to produce those repertoires. And we need to learn how to bring about the necessary changes in behavioral contingencies. (p. 71)
139	**5**	**1G4G**	Cultural content originates when behavioral repertoires of two or more individuals form an enduring unit that has the possibility of lasting beyond the lifetime of those individuals. Evolutionary processes occurring at the cultural level of analysis account for cultural practices that extend across generations. The units that come into existence as a result of behavioral and cultural evolutionary processes are the content of behavioral and cultural sciences. Science-based solutions to human problems involve making use of knowledge of behavioral and cultural processes to bring about change in behavioral and cultural content. (p. 1)
140	**5**	**4G**	In the domain of cultural analysis, the task of formulating general principles that describe cultural processes may be even more difficult that in the behavioral domain. First, the units of analysis are both verb-like and even more abstract than are behavioral-level units of analysis. Second, cultural units exist over extended time, often beyond the lifetime of individual scientists. Third, it is difficult to create an "experimental unit" (comparable, say, to a pigeon's operant bar press) because the cultural unit will involve the behavior of multiple individuals. Thus, in order to formulate principles that describe evolutionary processes at the cultural level, cultural analysts must rely much more heavily on extensive knowledge of extant, cultural content, which is the business of ethnography. (p. 4)
141	**5**	**4G**	By considering ethnographic information in the context of archeological data, scientists can make inferences regarding past cultural content. Principles of cultural evolution might then be formulated to explain the cultural content. Thus, cultural evolutionists (like evolutionary biologists) begin by working backwards, formulating general principles on the basis of relations currently existing between cultural practices and environmental conditions under which the practices occur. (p. 4)
142	**5**	**4G**	This is similar to Harris's (1979) point that cultural principles must account for both similarities and differences in the practices of different cultures. For example, the same principles must account both for the fact that several Midwestern cultures eschew pork and the fact that pork is a primary food source in American culture, especially in the South (Harris, 1985). (p. 4)
143	**5**	**1G**	There are enough similarities among repertoires, however, to allow most of us to get by; and the reason is that the repertoires of individual humans are formed in the context of cultural practices. When behavioral relations that define some of the content of one organism's repertoire are replicated in the repertoires of other people in a sociocultural system, the replicated behavior is called a "cultural practice". Cultural practices may range in complexity from a simple practice like macaque monkeys washing their potatoes in a stream to a complex practice like the child-rearing practices of a segment of a population (for example, American middle class). The increasing complexity of behavioral repertoires, within and across human generations, and the rapid changes in environments into which humans are born are the results of the increasing complexity of cultural entities. So we turn now to organization at the cultural level of analysis. (p. 5)

144	**5**	**1G4G**	Cultural entities have their own level of organization, although there appears to be little agreement among cultural analysts regarding the nature of the entities so organizes. If cultural evolution is to be explained, cultural entities must be specified in such a way as to clarify the processes that account for their origin. Skinner (1981/86) stated that "a culture evolves when practices [that began with one behaving individual] contribute to the success of the practicing group in solving its problems" (1986, p. 14). Harris (1984/86) criticized the way Skinner "characterizes the contingencies responsible for cultural selection" and Skinner's failure to define "group" (1986, p. 46). Although we will build on both their contributions, integrations will require going beyond both. (p. 5-6)
145	**5**	**1G2G**	Cultural phenomena are built on behavioral phenomena, which is not to say they can be reduced to behavioral phenomena (any more that behavioral phenomena can be reduced to physicochemical events). One cultural-level entity identified by Harris (1964) is a nomoclone. From a behavioral perspective, a nomoclone is a cultural unit comprised of interlocking behavioral contingencies. The interlocking contingencies involve the behavior of two or more individuals, as it occurs in a particular context and is repeated across time. A nomoclone is an instance of a cultural practice, define in terms of the behavior of the specific individuals who participate. It requires repetition of behavioral content which entails repetition of behavioral contingencies. An example of a rather complex nomoclone is Sue and Jim Smith's annual 4th of July party. It can be specified as a nomoclone because 1) the same people are involved every year (Sue, Jim and both their parents), 2) the behavior of each of the individuals is embedded n a series of interactions that produce and outcome that results from their aggregated behavior, 3) the interactions are roughly the same from one year to the next and they produce roughly the same outcome. (p. 6)
146	**5**	**1G2G**	If the interactions and the outcome remain roughly the same even after some of the people are replaced by others, the entity is called a permaclone. Nomoclone or permaclone, the cultural entity is defined by the content of the interlocking behavioral contingencies. No cultural entity would exist without organisms, but it is the behavior of organisms that provide the building blocks for cultural content. (p. 6)
147	**5**	**1G**	Each person in a contemporary sociocultural system acquires his/her behavioral repertoire in the context of many different permaclones. To the extent that the permaclones provide compatible behavioral contingencies, the person's repertoire will be "integrated". In any case, the behavioral content characteristic of a person is a product of the specific interlocking contingencies in which the behavior is embedded. That is, the behavioral contingencies that account for the content of behavioral repertoires, permaclones are identifiable by their content. A permaclone's content is specified by the particular content of the interlocking behavioral contingencies of which it is comprised. (p. 6)
148	**5**	**1G**	Permaclones, like behavioral units, may combine to form more complex cultural units; and those units may be integrated in even more complex units. These cultural-level units clearly are not organized at the level of individual organisms. Their boundaries circumscribe the interlocking behavior of a number of organisms. And it is the interlocking contingencies, not the organisms, that constitute the cultural entities; those contingencies can (and to, if the permaclone continues in existence) form a structure that remains intact even when participating organisms change from time to time. (p. 6)
149	**5**	**1G**	Principles that describe processes occurring at the behavioral and cultural levels are explanatory devices. They explain the origins of extant behavioral and cultural content and specify the means by which new behavior is acquire during the lifetime of individuals and how new cultural practices develop. (p. 7)
150	**5**	**1G**	Although experimental analysis at the cultural level may be difficult, one might ask whether evolutionary processes occur at the cultural level. Do natural selection and behavioral selection together account for the evolution of cultural practices, or does some additional kinds of selection by consequences occur at the cultural level? (p. 7)

151	**5**	**1G**	Cultural practices are what change over time, but the unit of analysis must be clearly specified. One feature required of a cultural unit of analysis is that it be capable of extending in time beyond a single generation. Another feature required (at least if explanation is to remain naturalistic) is that the cultural unit be based on observable objects and/or events. I accordance with the latter requirement, both Harris (1964) and Skinner (1953, 1981/86), take behavior to be the basis of cultural entities. We have previously suggested that each behaving individual's repertoire is a unique behavioral universe; but elements of another behavioral universe to form higher-order entities -- in the present case, cultural units. (p. 8)
152	**5**	**1G**	The unit of evolution (what evolves) in biological evolution is the species; the unit of evolution in behavioral evolution is the operant. The unit of evolution in cultural evolution must be given a name if we are to be able to talk about it. We shall go along with the term permaclone because that term, as defined by previous writers, provides a starting point for us here. The basic elements of a permaclone were elucidated by Harris (1964). Those elements include 1) repeated enactments of a scene, 2) by a group of individuals, 3) the personnel of which group changes gradually over time. Glenn (1988, 1991) examined what "repeated enactments of a scene" might mean from the perspective of a behavior analyst. Such enactments were conceptualized as interlocking behavioral contingencies in which the operant behavior of each participating individual was maintained by contingencies provided by the behavior of others and the products of that behavior. (p. 8)
153	**5**	**1G**	The content of a permaclone is not characterized by the participating organisms but by the behavior of those organisms. Because organisms are so solid and concrete, though, and behavior is so fleeting and evanescent, it is difficult to focus on the behavior as the figure and the organisms as the ground in a permaclone (cf. Hineline, 1986). Perhaps such a focus is even more difficult to maintain with respect to cultural content than it is with respect to behavioral content. (p. 9)
154	**5**	**1G**	Strictly speaking, however, the character of a permaclone is not captured even by focusing on the behavioral content of its participants. It is the interlocking behavioral contingencies that comprise the content of a permaclone. These contingencies are what last across generations and the interlocking contingencies are what change when the permaclone evolves. If the content of permaclones is interlocking behavioral contingencies, then cultural evolution must be accounted for in terms of the origin and maintenance of such interlocking contingencies. Skinner (1981/86) suggested cultural selection is "selection of a third kind". But how does it occur? (p. 9)
155	**5**	**1G2G3G**	If selection by consequences occurs at the cultural level, and the unit of evolution is the permaclone, how do the consequences account for the existence of permaclones? Paraphrasing Glenn (1988), permaclones produce consequences as a function of the aggregate behavior of the interlocking behavioral contingencies. The cultural level of consequences are distinguished from behavioral level consequences in this way: A behavioral consequence is contingent on the activity of a single organism and it selects the behavior of that individual only. A cultural outcome is a change in the environment that results from the aggregate behavior in the interlocking behavioral contingencies that constitute a particular permaclone. The changes in the environment produced by the aggregate behavior of permaclones may then function (either shortly, much later, or in a gradually increasing fashion) to strengthen the interlocking contingencies (constituting the permaclone) or weaken them. (p. 9)
156	**5**	**1G2G**	Cultural consequences will be designated as "outcomes" to distinguish them from behavioral consequences. Such outcomes may affect the future of the permaclone in one of several ways. First, the outcome of the interlocking contingencies (i.e., changes produced in the environment) may render the current practice outdated or insufficient to maintain the unity of the permaclone - thus the permaclone (interlocking behavioral contingencies) may disappear. The population of humans whose behavior comprised the permaclone may scatter and their behavior enter into new permaclones. (p. 9-10)
157	**5**	**1G2G4G**	The failure of various savings and loan institutions is an example of the disappearance of numerous permaclones that resulted from the outcomes of the practices of those permaclones. The individuals who worked at those institutions may be working at other institutions now, but the practices of the extant institutions differ (one hopes) somewhat from the practices of the failed institutions, thus the individual's behavior now participates in a permaclone having somewhat different content. The content of the behavior of those individuals has probably changed also, due to changes in behavioral contingencies for those individuals. (p. 10)

158	**5**	**1G2G4G**	Second, the outcome of a practice may be insufficient to meet environmental requirements and, as a result, the organisms constituting the population whose practices comprise the permaclone fail to survive. In this case, the behavior of its members would not be represented in other permaclones and this "line of cultural descent" would cease entirely. Because sociocultural systems with which we are familiar are so large and complex, it is difficult to imagine circumstances in which a cultural practice has an outcome that results in the death of all the individuals contributing to the outcome. Even when particular permaclones go extinct (interlocking contingencies exist no more), the participants are usually concomitantly participants in other permaclones. For example, although the interlocking behavioral contingencies that constituted Sunshine Savings no longer exist, the people whose behavior comprised parts of those contingencies still exist. The physical survival of people is rarely dependent on the survival of any particular permaclone, at least in modern sociocultural systems. There may have been historical instances, however, where the extinction of particular permaclones resulted in the disappearance of the individuals participating in the practice. (p. 10)
159	**5**	**1G2G4G**	A third kind of outcome of interlocking behavioral contingencies of a particular permaclone may be changes in the environment that enable more effective behavior of individuals and more effective cultural practices. Presumably the entire evolution of sociocultural systems that appears to have occurred has resulted from the increasing complexity of behavioral environments that have been the outcomes of earlier practices. (p. 10)
160	**5**	**1G**	When enough individuals are confronted with the same sorts of troubles, one might consider this a social issue. The similarities in the problems of those individuals must relate in some way to the cultural practices in which those people participate. Such problems may not be resolvable unless the cultural practices themselves are addressed. (p. 10-11)
161	**5**	**1G**	Sometimes it is possible to intervene in ways that result in a particular kind of behavior change in a number of people all at once. Such mass technology is especially important when the behavior at issue poses serious problems for society as well as for the behaving individuals. Geller's work on safety belt use and driving under the influence of alcohol are examples of research on behavior technology designed to impact a highly delimited class of behavior in large numbers of individuals. Geller (in press) has been able to experimentally isolate environmental parameters contributing to the occurrence of DUI and of safety belt use and to devise environmental interventions that change the rate of occurrence in large numbers of people concurrently. Biglan (1991) appears to have taken an additional step in creatively combining the analysis of behavior and of cultural practices to devise interventions that result in reduced rate of smoking of individually unspecified smokers. The actual target of Biglan's interventions is the interlocking contingencies in which smoking behavior is embedded. But the entities targeted of survival and nonsurvival are still behavioral units, not cultural units. (p. 11)
162	**5**	**1G2G**	In order to design solutions to problems emanating from human behavior, we might first ascertain the conditions under which action designed to affect directly the behavior of individuals can make a difference. Geller's work suggests that the repertoires of large numbers of people can be changed by contingencies operating independently on each individual. (p. 11)
163	**5**	**1G4G**	In other cases, the behavior of specified individuals cannot be readily changed because the change agent does not have access to their specific behavioral environments. Further, the changes required may involve so many individuals that intervening in the behavioral environment of each is entirely impractical, even if feasible. In order to deal with these problems, what might be called "contingency management" at the cultural level might be possible. Indeed, such "management" of cultural contingencies does appear to occur but the management occurs with little understanding of the processes involved, so the changes are rarely those that are desired. (p. 11-12)

164	**5**	**1G2G**	For example, if financial support for (and thus continued existence of) a school were contingent primarily on the performance of its soccer team, one would not be surprised if the behavioral contingencies defining that permaclone included allowing students to miss classes to practice soccer. One might also predict that academic performance and classroom conditions would be poor and effective instructional technology lacking. By arranging a contingency between academic progress and financial support for the school, selection would occur for altogether different behavioral contingencies. Such a course of action is not as simples as it may seem, however, as reformers have discovered. Such changes sometimes produce unexpected outcomes. Undesirable behavioral contingencies would be especially likely if "academic progress" could be faked, or redefined spuriously, or so difficult to achieve that failure (extinction/nonsurvival) were inevitable. (p. 12)
165	**5**	**1G2G**	Intervening at the cultural level might best be studied on a small scale. An empirical, and possibly even experimental, approach may be possible if one takes the permaclone as the evolutionary unit and studies it carefully. One might change the outcome criterion gradually. One might monitor closely the changes in interlocking behavioral contingencies that actually occur, much as one monitors the changes in a behavioral unit targeted for intervention. One might try replicating a successful intervention several times before enacting legislation that mandates all the schools in a state or a school district perform to meet a new criterion. One might encourage innovation with respect to the new interlocking contingencies that eventually meet the survival criterion. In this way, cultural analysts may discover the common characteristics of those permaclones that meet the demands of the selection environment. (p. 12)
166	**6**	**1G4G**	Behavior analysis is a cultural system of which the Association for Behavior Analysis is a component cultural system. As cultural systems, they are composed of interlocking behavioral contingencies that constitute their cultural practices. Critical to the survival of both cultural systems in the frequency of interaction with and the nature of content of the behavioral contingencies composing those cultural practices. The strengths if behavior analysis as a cultural system include its disciplinary character and its worldwide community of scientists and practitioners; its ability to be integrated into a scientific worldview; its track record in providing effective solutions to problems of importance to society; and the high levels of intellect, competence, and commitment that are characteristic of its participants. Weaknesses of behavioral analysis are its status as an academic orphan, its relatively small size and its underdeveloped professional identity, and a lack of sociopolitical sophistication among many of its members. Behavior analysis will need to maximize its strengths and mitigate its weaknesses if it is to take advantage of the many opportunities available for growth in the modern world. (p. 133)
167	**6**	**1G**	The union under consideration is the Association for Behavior Analysis (ABA) as well as behavioral analysis in general. Both ABA and behavior analysis exist as entities at the cultural level of analysis. So I turn to some characteristics of ABA as a cultural system. (p. 133)
168	**6**	**1G**	As a cultural system, however, ABA's existence is not coextensive with its members. Rather, ABA's existence is coextensive with some portion of the behavior of its members. Each member of ABA has a behavioral repertoire, some part of which enters into the cultural system of ABA. How does ABA as a cultural system exist, then, beyond the evanescent behavior of its individual members? ABA's continuing existence lies in the interlocking behavioral contingencies that constitute its cultural practices (Glenn, 1988). I shall briefly consider the general characteristics of ABA as a cultural entity. (p. 133-134)

169	**6**	**1G**	ABA exists in the interlocking behavioral contingencies that define its particular cultural practices. The first part of this sentence is about the relation between cultural practices and theirs parts; the second part is about the content of the practices of this particular cultural entity -- ABA. I first consider the characteristics common to all cultural entities and then consider some of the particulars. All cultural entities are composed of interlocking behavioral contingencies, just as all organisms are composed of cells (Glenn, 1986, 1988). Figure 1 schematizes the relations between cultural entities and their parts. In discussing Figure 1, I shall particularize its elements in terms of ABA as cultural entity. Figure 1 shows members of ABA as organisms, depicted as ellipses with clearly defined boundaries. Each members has a behavioral repertoires that extends that member's "presence" in the environment. The repertoires appear somewhat amorphous, and their boundaries are difficult to discern. Each organism, as a concrete object, is a very small part of the natural world, but the behavior of the organism reaches well beyond the boundary of its skin in its effects on the natural world. The hatch marks designate that part of each repertoire that enters into the cultural entity of ABA. The dashed lines connecting repertoires of the members show the interlocking contingencies or reinforcement that are the components of ABA as a cultural system. Nodes on the dashed lines are the products resulting from the behavior entering into the interlocking contingencies. These products are the results of previous behavior and a part of the present environment that enters into the current contingencies. ABA as a cultural entity is the cloudy space that encompasses ABA-related behavior in member repertoires as it enters into interlocking contingencies, as well as the response products of past behavior that enter into current interlocking contingencies. (p. 134)
170	**6**	**1G**	Although all cultural entities exist in the interlocking behavioral contingencies that depend on the behavioral repertoires of individual participants, a cultural entity is also a unique individual. The cultural content of ABA, for example, is not duplicated exactly in any other cultural system. That is so because ABA's cultural content is a function of (a) the particular repertoires of its members and (b) the particular interlocking contingencies that characterize its cultural practices. Thus, ABA as a cultural entity differs from entities having different combinations of practices, and the aggregated products of these entities will differ. (Even when many of the same individuals are members of different cultural systems, the cultural systems may remain quite different from one another.) (p. 134)
171	**6**	**1G2G4G**	ABA's cultural content includes (a) the behavior of the speakers presenting at its conferences and the response products of their behavior; (b) the behavior of the conference listeners and the response products of that behavior; © the social contingencies provided by others for the behavior of the speakers and the listeners (which is more behavior); and (d) the behavior of various committee members, with respect to ABA's goals and objectives, including the behavior emitted at the conference and the behavior emitted throughout the year. ABA's practices have outcomes that are important to ABA's survival as a cultural system. One such outcome is attendance at the convention itself and at the various presentations. A more subtle measure might be frequency of conversation at the convention relating to papers presented and to ABA's business in general. Many different cultural practices characterize ABA, and their outcomes may differentially affect ABA's likelihood of surviving as a cultural system. As a cultural system, ABA itself is part of the larger cultural system we know as behavior analysis. ABA is the locus at which the functions of the other parts of behavior analysis are most likely to become related to one another. In this regard, ABA's role in behavior analysis may be likened to the role of a central nervous system in organisms. Thus, the continuing existence of behavior analysis and ABA are related to one another. Because ABA and behavior analysis stand in a part-to-whole relation, we turn now to behavior analysis as the cultural system that encompasses ABA. (p. 135)

172	**6**	**1G2G4G**	Behavior analysis exists as a cultural system only in terms of the behavior organisms that participate in the practices of behavior analysis. Further, the behavior of participants must enter into interlocking contingencies with the behavior of others if it is to contribute to the evolution of behavior analysis as a cultural entity. For example, imagine that Jodi Student obtained a PhD in the experimental analysis of behavior and promptly relocated to a space station circling the moon, where she continued doing experimental research with her experimental subjects. If Jodi does not report to discuss her results and methods with other behavior analysts, they cannot enter into the cultural entity knows as behavior analysis. Similarly, imagine the Tony Student obtains a MS in applied behavior analysis and takes position at Eastern Outergalactic Developmental Center. He successfully oversees the origin and maintenance of complex behavioral repertoires in people previously designated as having profound mental retardation. Tony's procedures and outcomes contribute to the evolution of behavior analysis as a cultural entity only if they are reported or otherwise enter into the interlocking contingencies that maintain the behavior of other behavior analysts (p. 135)
173	**6**	**1G**	As in the case of ABA, behavior analysis as a cultural system exists in the interlocking behavioral contingencies maintained by participants in the cultural practices of behavior analysis. Like Jodi and Tony, one can practice behavior analysis independently. But one cannot participate in the evolution of the cultural entity or contribute to the survival of the cultural system unless one's behavior enters into interlocking contingencies with other participants in the cultural system. As the very least, the response products of one's behavior-analytic work must enter into the contingencies that maintain the behavior of other participants in behavior-analytic cultural practices. (p. 135)
174	**6**	**1G**	Figure 2 depicts relations among behavior analysis, ABA, the organisms participating in the cultural practices of ABA and of behavior analysis, and the repertoires of those organisms. Members of ABA have behavior-analytic repertoires that extend beyond their ABA-related repertoires. Their behavior enters into interlocking contingencies outside of the cultural practices of ABA. Behavior analysts who are not members of ABA also participate in those interlocking contingencies. ABA and its cultural practices (illustrated in terms of the interlocking behavioral contingencies among its members) constitute a component of the larger cultural entity of behavior analysis. (p. 135-136)
175	**6**	**1G**	As cultural systems, ABA and behavior analysis are, then, interdependent. Whether behavior analysis would continue to exist without ABA may be debatable, but it is highly likely that ABA would not exist without behavior analysis. (p. 136)
176	**6**	**2G**	Only recently has it become clear that the same principles account for the behavior producing the problem outcomes and the behavior producing the valued outcomes. Thus, a single set of principles can be used to develop methods of (a) increasing the complexity of behavioral repertoires and the rates of behavior conducive both to the well-being of the individual behaver and the culture system in which the behavior embedded, and (b) preventing or decreasing the rates of behavior that is not conducive both to the well-being of the individual behaver and the cultural system in which the behavior is embedded. (p. 139)
177	**7**	**1G2G4G**	In The Design of Cultures, Skinner suggested that "there is considerable advantage in considering... Governmental, religious, economic, educational, and therapeutic institutions... Simply as behavioral technologies" (Skinner, 1999, p. 47). In this article, Skinner called for bringing scientific principles of behavior to bear on the design of cultural practices that are likely to enhance the survival of a culture. (p. 14)
178	**7**	**1G2G4G**	In the wake of horrifying events of September 11, it is evident that Skinner's society has neglected at its own peril the opportunity to systematically design and maintain cultural practices that enhance its own survival. And Skinner has said elsewhere "If your culture has not convinced you [to work on its behalf], so mush the worse for that culture" (Skinner, 1969, p. 40). (p. 14)

179	**7**	**1G2G4G**	It is also evident, however, that knowledge of behavioral principles is not enough to insure good design or adequate maintenance of cultural practices with survival-enhancing outcomes. One reason this is true is that behavioral principles are content-free. Although derived from empirically observed events such as tone presentations, lever presses and food deliveries, the principles are not "about" any particulars. Like all scientific principles or process laws, their terms specify classes that are "spatiotemporally unrestricted" (Hull, 1989, p. 92). Specifically, behavioral principles entail terms that specify functional relations between the classes called "operants" or "respondents" and the classes of environmental events designated as "consequences (reinforcing or punishing)", "discriminative stimuli", "establishing operations", "conditionated stimuli", etc. - whatever the formal properties of those events (cf. Glenn & Field, 1994; Michael, 1983). To solve real-world problems, the principles must be used to guide observation and measurement of behavioral and environmental particulars and, controversially these particulars must be analyzed and manipulated in terms of the principles to produce particulars outcomes. (p. 14)
180	**7**	**1G4G**	A second reason that knowledge of behavioral principles is insufficient to accomplish the task of cultural design is that cultural-level principles must also be considered in designing the behavioral technologies that constitute cultural practices. To ignore the principle of "infrastructural determinism" (Harris, 1979, p. 58) is to invite failure of cultural design. In addition, cultural units may enter into cultural level contingencies that subsume the behavioral contingencies described by behavioral principles (Glenn, 1988). This is true even though cultural entities may be viewed as composed of behavioral contingencies and the products of behavior and nothing more (Glenn, in press). (p. 14)
181	**8**	**4G**	Writers from a variety of disciplines recognize that culture is composed of or depends on behavior, but is also somehow more than an unorganized collection of behavioral events. Biologists John Bonner (1980, p. 17), defined culture as "behavior transmitted from one individual to another by teaching and learning". Cultural anthropologist Marvin Harris stated", "human behavior constitutes the cultural field of inquiry" (1964, p.20). However, human responses "are definitely not cultural things", but rather are the empirical events to which scientific operations must be applied to arrive at cultural classifications (Harris, 1964, p. 22, original italics). Behavior analyst W. M. Baum (2000) stated, "culture consists of behavior and... cultural change constitutes an evolutionary process." (p. 2)
182	**8**	**4G**	In the same vein, an explanation of the origin and evolution of cultures requires going beyond the evolutionary and behavioral principles that account for species, characteristics and the learned behavior of individual organisms. Analysis at "another level" is required, but where to begin? B. F. Skinner provided a clue when he pointed out that, in addition to natural selection and operant selection, human behavior was also due to 'the special contingencies maintained by an evolved social environment" (1981, p. 502). One interpretation of Skinner's statement is that the contingencies of an "evolved social environment" function differently than the contingencies maintained by the non-social environment. However, in responding to commentary on his article, Skinner made clear that he was proposing "no new behavioral process", but rather "a different kind of selection" (Skinner, 1988, p. 38, italics in original). In short, the behavior acquired by each individual during his or her lifetime is explained by behavioral level processes, whether the concrete particulars of the behavior/environment contingencies are material or social, and whether they are human-made or the products of other natural processes. However, the particulars of the behavior/environment relations that come to exist in cultural (i.e., the particulars of an evolved social environment) require "a third kind of selection" (Skinner, 1981, p. 502) to explain their existence. (p. 2)
183	**8**	**4G**	Evolution by selection requires variation among entities that are part of a changing (evolving) unit of some kind. Retention of what is selected can be observed only at the level of this more inclusive unit. (p. 3)
184	**8**	**4G**	In the remainder of this paper, I apply Hull's general concepts of replications, interactors, and lineages to the problem of explaining the origin of cultural-level phenomena built up from operant behavior in social environments. My goal is to demonstrate that evolutionary processes are of the same kind, whatever the domains, but that new phenomena result from the interplay of those processes with phenomena already existing. Specifically, I will suggest preliminary answers to the following questions: How could cultural lineages have arisen from the behavior of individual organisms? What constitutes a cultural lineage? What is the nature of the units playing the roles of replication and interaction at the cultural-level? And finally, I will briefly touch on the role of verbal behavior or language in the origin of culture. (p. 4-5)

185	8	1G	Bonnet (1980) cited numerous examples of transmission of learned behavior across individuals within and between generations in many different species. There is always the issue of exactly what is learned by the "receiver" in cultural transmission. Topography? Stimulus function? Spatial orientation? Some combination of these? From a behavior analytic perspective, that which is learned may include any or all of these and the question as regards any particular behavior is an empirical one. For present purposes we focus on questions regarding the processes by which learned behavior is "transmitted". Is it explicitly taught? Is it acquired by imitation? If so, is the learner's imitating proclivity the result of natural selection, learning history, or both, in some combination? (p. 5)
186	8	1G	An often-cited example of the rapid transmission of learned behavior across nonhuman repertoires may provide some guidance in answering such questions. Japanese scientists studied a troop of macaque monkeys living on an island intensively over several years [Kawamura, 1959]. The scientists laid out sweet potatoes on the beach to entice the monkeys to come near so they could be better observed. The monkeys often rubbed the sandy potatoes against their bodies before eating, presumably brushing off much of the sand. A juvenile female, Imo, was observed one day to dip potatoes in a brook before eating them. It is unclear whether Imo rubbed the potato while it was in the water or simply dipped the potato in the water in the first recorded instance of "potato washing". Therefore, no monkey has been observed dipping potatoes in water before eating them. Within 3 years, 11 monkeys had acquired the behavior. Within 5 years"6 adult males and 5 adult females, that is 18,1% [had] acquired sweet potato washing behavior, and 15 of 19 monkeys, aged between two and seven (10 males and 9 females), that is, 78,9% acquired also the behavior" (Kawai, 1965, p. 3). In general, younger monkeys acquire acquired the behavior first and older monkeys took longer after the first observed potato washing "accepted [sweet potato washing] as a normal feeding behavior and learned it without any resistance at all" (Kawai, 1965, p. 8). Harris (1989) called this potato washing by the troop of Japanese macaques a "rudimentary culture" (pp. 62-64), because learned behavior was transmitted across organisms that were interacting with each other. (p. 5-6)
187	8	1G	From the present perspective, a better designation for the observed potato washing behavior would be "pre-culture". The minimal requirements for designating a phenomenon as "pre-cultural" are these: (1) an operant lineage (class) of behavioral instances must originate in the repertoire of at least one organism; (2) instances of that operant must have a stimulus function with respect to the behavior of conspecifics; and (3) contingencies of reinforcement must be repeated in a successive repertoire in order to establish a lineage of learned behavior that replicates across organismic boundaries. Such a lineage is designated here as a culturo-behavioral lineage; These characteristics of pre-cultural phenomena will be expanded upon in the next three sections. (p. 6)
188	8	1G	A single instance of learned behavior will rarely be sufficient as the starting point for cultural transmission; Behavioral variants are no doubt occurring all the time but cultural transmission would be highly improbable if instances of novel behavior typically occurred only once. Furthermore, if a novel act did not make a [useful] difference, repetition in another repertoire would be useless if not actually detrimental. To become part of a cultural process, a behavioral variant must first be established in the repertoire of at least one organism. How could the potato washing operant have come to exist in Imo's repertoire? (p. 6)
189	8	1G	Whatever the historical and current circumstances giving rise to the first instance of Imo's potato washing, one can reasonably assume that Imo's washed potato had even less sand than those she had rubbed against her body. Presumably, the consequence of less-sand/more-potato taste increased the likelihood that the act would occur again - whatever the source of its first occurrence. As a result of the contingency between potato washing and tasty meal, an operant lineage of potato washing arose and survived in Imo's repertoire. The importance of the behavioral consequences of a novel act, leading to the emergence of a behavioral lineage in a repertoire, is easily overlooked in accounts of cultural transmission. But if Imo's act of dipping the potato had resulted in a potato that tasted just like the ones she rubbed against her body hair, it is unlikely that she would have continued dipping potatoes. For a novel behavior to make a difference, either its consequences must differ from those of previously learned behavior, or it must produce the previous consequences more expeditiously. Potato washing is more costly than potato rubbing: often one has to take the potato to the water rather than stand or sit where one is, rib the sand off, and eat. (p. 7)

190	**8**	**1G**	We turn now to the second pre-requisite for cultural-level phenomena: the necessary relation between behavior acquired sui generis by one organism and behavior similar in topography or stimulus control appearing later in the repertoire of another organism. The fact is that Imo's potato-washing subsequently was observed in increasing numbers of Imo's troop within a fairly short time. It seems unlikely that Imo's instructed her colleagues in potato washing, so we presume that one or more troop members saw Imo dip the potatoes before eating them. They may have seen Imo do this once or many times before one of them dipped his or her potato the first time. Thus, Imo's behavior had a stimulus function for the behavior of conspecifics. The behavioral relation between the dipping acts of Imo and the dipping of a second monkey who observed Imos potato washing qualifies as stimulus control relation, specifically one known as imitation. In imitation the activity of one organism has the stimulus function of evoking a similar topography (or controlling relation in the behavior stream of a second organism). (p. 7-8)
191	**8**	**1G**	Instances of the recurring behavior that constitutes an operant lineage can function as cultural-level replicators only if they evoke behavior that is novel in the repertoire of a learner. (p. 8)
192	**8**	**1G**	So, a necessary element for the origin of cultures is the replication of operant behavior across successive repertoires in which the behavior of earlier learners functions as part of the behavioral environment of later learners. The other monkeys did what Imo was doing (or did). As part of the environment of her peers, Imo's potato washing had an evocative function and the evoked imitative acts produced their own consequences, which accounted for operant lineages of potato washing in successor repertoires. (p. 9)
193	**8**	**1G**	Learning in which the behavior of conspecifics functions as part of the behavioral environment of the learner is sometimes called "social learning" and distinguished from "individual learning". As has been pointed out, however, "It s always individuals who learned" (Galef, 1988, p. 12). The inclination to view "social learning" and "individual learning" as fundamentally different rests on a failure to distinguish between process and content. (cf. Glenn & Malagodi, 1991). The same behavioral and biological processes account for learning accomplished by individual organisms, whether the environmental events that enter into the behavioral contingencies include the behavior of other organisms or not. Social learning is distinguished by the content of the learner's environment and not by the processes accounting for the learning. (p. 9)
194	**8**	**1G**	So far, discussion has focused on behavioral level entities (acts an lineages of acts) in the repertoires of individual organisms, and the functional relations between the acts of one organism (as stimulating environment) and the acts of another organism (as learner). The third pre requisite for the emergence of cultural level phenomena forms the bridge between "behavioral things" and "cultural things". I will call these bridging phenomena culturo-behavioral-lineages. (p. 9)
195	**8**	**1G**	In the origin of cultures, culturo-behavioral lineages play a role similar to that played by bio-chemical lineages of replicating molecules in the origin of the organic world. Operant behavior is the element required for the emergence of culturo-behavioral lineages. The repetitions of a novel behavior acquired by one learner and the stimulus function of that behavior for other learners are necessary but no sufficient for the emergence of culturo-behavioral lineages. There must also be repetition of the behavioral contingencies maintaining the originally learned behavior. As in the case of Imo's behavior, is not only important that the novel behavior was imitated by a second learner, bus also, that the second learner's imitative act produce consequences sufficient to maintain its continuing recurrence. Maintenance of the second learner's potato washing would have approximately doubled the number of potato washing acts available as evocative events in the environments of other monkeys. This could more than double the likelihood that a third monkey would imitate, because the probability of imitation could increase as a function of the number of different monkeys seen to be washing potatoes. Variation in the consequences (as variations in the acts themselves) can occur as the behavioral contingencies are replicated in successive repertoires. In fact, variations in any or all elements of the replicating behavioral contingencies would contribute greatly to the variation needed for rapid evolution sometimes seen in cultures. (p. 9-10)

196	**8**	**1G**	I have used the example of culturo-behavioral lineages in which transmission occurs via imitation because those are probably the least complex kind of culturo-behavioral lineage and the most likely to have appeared first in the history of cultural evolution. However, imitation is not the only way that behavior can be transmitted across operant repertoires. What some humans learn the hard way, others can learn by reading or hearing descriptions of the behavior (and, for maximum efficiency, descriptions of the conditions under which the behavior is to occur and the predicted consequences of that behavior.) Whatever the mode of transmission is not just learned acts, but learned behavior/environment relations that are subsequently selected by their reinforcing consequences. To repeat, the behavior of learners in cultural transmission (or the products of the behavior, such as printed words and machines) must, in turn, function as part of the behavioral environments of later learners. In the case of verbal instruction (spoken or written) the instruction reliably must result in listeners' (readers') behaving in relation to their environment as described by the instruction. Thus, even in the more complex case where instruction replaces imitation, repetition of behavioral relations across repertoires requires replication of behavioral contingencies across repertoire. Such replication is the first step in the evolution of cultures. Replicating behavioral contingencies set the stage of the origin of cultural level selection (p. 10-11)
197	**8**	**1G**	What makes the evolution of cultural complexity possible is the several roles that operant behavioral plays in the ontogeny of individual repertoires and in the evolution of cultural phenomena. Culturo-behavioral lineages are viewed here as the substantive link between behavioral processes and cultural process. They are proto-cultural because no cultural-level processes are yet at work; and they are proto-cultural because without them there would be no cultural processes. The distinction between operant lineages and culturo-behavioral lineages rests on the fact that operant lineages are parts of the repertoires of individual organisms and they cease to exist when their host organism dies; A culturo-behavioral lineage exists so long as the operant lineages of any participant repertoires continue being replicated in the repertoires of other participants (p. 11)
198	**8**	**1G**	Cultures would not amount to much if the elements of culturo-behavioral lineages did not become arts of more complex cultural entities. The organic analogs of culturo-behavioral lineages are the first lineages of replicating molecules in the primeval soup. Primitive organic lineages were compose of chemicals that had acquired the capacity to reproduce themselves. From those lineages, natural selection fashioned lineages of increasingly complex interactors -- entities with interrelated components that interacted as cohesive wholes with their environments, resulting in differential replication of their components in subsequent interactors of the lineage. How might a similar transition have occurred in the evolution of cultures? Unless one locates the origin of cultures in the exceptionally creative minds of a few prehistoric humans, one must account for the origin of cultural phenomena and the evolution of cultural complexity in terms of the relations between the behavior of organisms and their environments. (p. 11-12)
199	**8**	**1G**	In the case of Imo and her compatriots, an operant in Imo's repertoire was transmitted to repertoires of conspecifics and those operants were transmitted to more conspecifics (so long as behavioral contingencies maintaining the operants remained in effect.) The point of contact between Imo's operant lineage and the behavior of the first imitator could have been as brief as a single instance in which Imo was observed washing a potato. Whether the imitator first imitated the potato washing after one or after several observations of Imo's washing, once the imitative behavior occurred and was reinforced, Imo's behavior did not need to participate further in the contingencies that maintained the imitator's potato washing. (p. 12)
200	**8**	**1G**	If selection of a third kind works like phylogenic (natural) selection and ontogenic selection (reinforcement), then culturo-behavioral lineages can give rise to more inclusive cultural-level entities that eventually come to function as cultural-level interactors. The following hypothetical scenario develops further the theoretical perspective of this paper by suggesting how cultural-level interactors could have arisen during human history. The scenario is based on guesses regarding likely behavioral content of human ancestors. The point of the scenario is not to suggest particular behavioral events that may have occurred, but rather to suggest the process by which the earliest cultural-level interactors may have emerged from operant contingencies and then been maintained by a third kind of selection. (p. 12)

201	**8**	**1G**	Consider Deke and Sam as members of a species ancestral to our own who spend much of their time hunting animal prey. Being part of a species where sociality has been selected, they have a propensity for observing the behavior of conspecifics and such observation has played a role in the behavior they have acquired thus far. But let us imagine that the hunting behavior of neither has a systematic effect on the behavior of the other, even if they happen to be hunting in close proximity to one another. Sam and Deke each have several operants in their repertoires that pertain to capturing prey animals. The first instances of some of these operants no doubt appeared in their repertoires after they observed more experienced conspecifics hunting, so the various acts of each are 1) elements in their individual repertoires and 2) elements in culturo-behavioral lineages extending into their ancestral repertoires. What we see now is repetition, with variation, of acts that relate to their environments in ways that have been successful at capturing prey for several generations. (p. 12-13)
202	**8**	**1G2G**	Imagine that Sam and Deke happen on a bevy of four small animals that do not scatter in different directions as they are approached by the predators. Instead they all run toward a hollow tree not observable at the moment by Sam or Deke, who take out after their prey. Sam happens to move to the right of the pack of prey and Deke to the left. When one of the prey sees Sam approaching from its right, it changes course and goes left. But when it sees Deke to the left it moves back to the right. Sam and Deke close in the prey, whose actions is swinging from left to right have slowed their approach to the hollow tree, so they manage to kill all their prey and carry them back to the camp. Due to their joint, albeit unplanned and uncoordinated, actions Sam and Deke bring home more prey per capita than they would have, if the prey had run off indifferent directions and Sam and Deke each had been successful in nabbing one. As a result of these fortuitous events, Sam and Deke return with prey in both hands. If Sam and Deke happen to be members of a troop who share food with their troop, others benefit from their good fortune as well (and perhaps provide social reinforcement to the providers). Consider that could happen if Sam became more likely to behave in response to the activities of Deke (as well as the movements of the prey) as a result of the foregoing experience. Over time, even if prey started off in different directions, the position of Deke as well as the movements of the prey could jointly control Sam's chasing. In these cases, Sam would move so as to force the prey in Deke's direction. If Deke were at some point to observe Sam's actions, then he might do the same. The consequences of their interrelated behavior -- more food per hunt or higher probability of food per hunt -- would be likely to maintain the new behavior/environment relations in the repertoire of each. (p. 13)
203	**8**	**1G**	Experimental analysis of cooperative behavior has revealed that behavioral contingencies similar to those portrayed in the above scenario do support continuing cooperative behavior of the individuals involved. For example, Miltaug (1969) found that in a situation where cooperative (interdependent) behavior and independent behavior both produced the same reinforcer, subjects' preferences for cooperative behavior increased as the response requirement per reinforcer increased. Hake and Vukelich (1973) also found that cooperative (interdependent behavior was more likely than independent production of reinforcers when the cooperative behavior entailed less effort. In general, research on cooperative behavior has found that it is well maintained when payoffs for individuals behaving cooperatively meet or exceed payoffs for behaving independently. In short, individuals cooperate when interdependent behavior produces more reinforcement than independent behavior. Cooperative behavior can be viewed, then, as a form of maximization. Thus, Sam and Deke's behavior in participating in the interlocking contingencies was maintained by the reinforcers produced. The interlocking contingencies were a fortuitous side effect of the operant processes accounting for the behavior of each of them. (p.13-14)

204	**8**	**1G4G**	The point critical to the present theoretical perspective, however, is that food that results from the interrelated behavior of Sam and Deke functions in selection processes at two levels. It functions to support the cooperative operants of the participating individuals (Sam and Deke), as did the reinforcers in the experimental studies cited above. And it also selects the interlocking contingencies themselves in which both Dekes and Sam's behavior participates. The operant processes that result in maximizing also result in the emergence of a cultural-level interactors that functions as a cohesive whole with respect to its selection environment. These two levels of selections can be distinguished in terms of the entities functioning as cohesive holes in the two selection processes. The units involved in behavioral selection (i.e., the operant activities of Sam and Deke) exist independently as parts of their separate repertoires. If a Lion ate Sam, Sam's operant behavior could no longer participate in the interlocking contingencies, but Deke's repertoire could remain intact. The cultural-level unit in which his behavior participates can live on if someone else, say Tom, has learned to do what Sam did in hunting episodes. If Tom's behavior replaces Sam's in the interlocking contingencies the lineage of cultural interactions continues to be replicated across hunting occasions with continuing opportunity to be selected (or not). As long as the cultural interactors result in consequences that maintain the interlocking contingencies as a cohesive whole, the cultural lineage continues to be susceptible to evolution by differential selection. (p. 14)
205	**8**	**1G2G**	In this example, the cultural-level interactor comprises the interlocking behavioral contingencies that produce high quantities of food -- food that has the dual function of maintaining the operant behavior of individual participants as well as maintaining the interlocking contingencies that can span the lives of many generations. This dual function provides the bridge to cultural selection processes, which eventually account for highly complex cultural entities. Skinner (1984) proposed a similar dual function for primary reinforcers providing a bridge between natural selection and operant reinforcement in the emergence of the phenomena of operant behavior. Similarly, in the above scenario the earliest cultural consequences were redundant with the operant consequences that maintained the behavior of participating individuals. Only as cultural evolution continued did different consequences come to maintain cultural lineages and the operant behavior that constitutes them, just as different consequences came to maintain gene lineages and operant lineages. (p. 14-15)
206	**8**	**1G2G4G**	The relations between interlocking behavioral contingencies and their consequences have been designated as metacontingencies (Glenn, 1988, 1991) to distinguish them from their component operant contingencies while recognizing the part/whole relation between behavioral and cultural phenomena. In metacontingencies, interlocking behavioral contingencies function as a cohesive unit (a cultural-level interactor) in cultural selection processes. The selecting environment that results in evolution, maintenance, or disappearance of a lineage of cultural interactors eventually comes to have little or no consequent functions with respect to the behavior in the interlocking contingencies. Metacontingencies describe the process by which complex cultural entities evolve -- entities such as universities, legislative bodies, churches, scientific laboratories, and other cultural units composed of many interrelated parts and interacting as a cohesive whole with their selection environments. Cultural-level entities become more complex when the interlocking behavioral contingencies functioning as a cohesive whole come to involve more acts of more organisms; but those acts are maintained by behavioral consequences embedded in the interlocking contingencies themselves. (p. 15)
207	**8**	**1G2G4G**	To summarize, the primary role of operant behavior in cultural selection is that of cultural-level replicator. Repetitions of operant acts under control of the behavior of conspecific are required for the emergence of culturo-behavioral lineages. When the behavior replicated in culturo-behavioral lineages participates in repetitions of interlocking behavioral contingencies, cultural-level selection becomes possible. Cultural-level selections is selection of interlocking behavioral contingencies, not just the behavior of individuals. In fact, different individuals may participate in the interlocking contingencies from one instance of their instantiation to the next. In the transition from operant behavior to cultures, events functioning as reinforcers for individual behavior in interlocking contingencies also functioned as cultural-level selector for the interlocking contingencies as cultural-level units. These interlocking behavioral contingencies contain interrelated culturo-behavioral lineages and they outlive the repertoires of any of their participating organisms so long as they function adequately in the cultural selection contingencies. (p. 15)

208	**8**	**4G**	To preclude misinterpretation of my thesis, I should make clear that I am not denying that natural selection as a causal process is relevant to the origin of human cultures. It is as relevant as chemical bonding is to the origin of organic complexity. But at times, the complex products of one domain can give rise to new processes, which in turn account for the complexity in a new domain. In accounting for the complexity of human behavior, the behavioral processes that account for unique repertoires of individuals must be considered. In accounting for cultural complexity, processes that account for the emergence and evolution of cultural level units that cannot be accounted for entirely by organic evolution and/or the evolution of behavioral repertoires during ontogeny. Those processes are as much a part of the natural world as are the processes giving rise to organic complexity. (p. 16)
209	**8**	**1G2G4G**	Little has been said here about the role of language in the evolution of cultures. The verbal behavior of humans, as well as the lineages of interlocking behavioral contingencies that constitute a linguistic community, have obviously been critical in the evolution of human cultures as we know them. The earliest cultural phenomena in proto-human histories may have pre-dated language, however. The advantages of even rudimentary culturo-behavioral lineages (such as the potato washing lineage described above) for the survival of a species seem evident and the emergence of such lineages among our pre-verbal ancestors seem very likely. Because verbal behavior, by its very nature, involves interlocking behavioral contingencies (as first schematized by Skinner, 1957, pp 38-39), the earliest speaker/listener episodes may have resulted from operant noises made by speakers and the functionally related behavior of listeners who were participating in interlocking behavioral contingencies that produced consequences sufficient to maintain the behavior of each participating organism as well as the interlocking contingencies themselves. Thus, rudimentary speaker/listener repertoires of individual organisms derived from and supported the evolution of increasing cultural complexity as well as increasing complexity of neural organization in hominid lineages. These, in turn, may have resulted in survival of the populations in which such early verbal episodes arose. In any case, evolution of the culturo-behavioral phenomena of language has clearly been a factor in the rapid evolution of human cultures during an exceedingly brief period of Earth's history. (p. 16-17)
210	**9**	**1G2G4G**	The principle of operant selection is examined as a prototype of cultural selection, and the role of the social environment is suggested as the critical element in the emergence of cultural phenomena. Operant contingencies are compared to cultural selection contingencies, designated as metacontingencies. Both of these types of contingency relations result in evolving lineages of recurrences that can become increasingly complex in the number and organization of their elements. In addition to its role in the recurring interlocking behavioral contingencies that constitute cultural organization, operant behavior plays another role in cultures. Although the operants of individuals are functionally independent of one another, the behavior of each person may contribute to a cumulative effect that is relevant to the well-being of many people. Similarly, the outcomes of metacontingencies may also contribute to a cumulative effect. The relation between independently evolving operant lineages, or between independently evolving cultural lineages, and their cumulative effect is identified as a macrocontingency. Macrocontingencies do not involve cultural-level selection per se. Effective cultural engineering requires identifying the macrocontingencies that produce less than desirable effects and altering the relevant operant contingencies or metacontingencies to produce change in the cumulative effects. (p. 133)
211	**9**	**1G4G**	Learned behavior is the substructure of human cultures, and the transmission of learned behavior powers the evolution of human cultures. Human behavior produces cumulative change in human environments, and continually changing environments require continuing behavioral adjustments. Successful adjustments can become embedded in cultural practices and transmitted to later generations. (p. 133)
212	**9**	**1G4G**	Increasingly complex cultures have emerged from the interplay among the human capacity for learning, the contingencies of reinforcement that account for the learned behavior of individuals, and the cultural transmission of learned behavior all in the formative context of physical features of local environments. Over a period of little more than 10,000 years, human cultures have evolved from small bands of hunter-gatherers, presumably showing one another how to produce fire and to fashion simple tools, to huge nationstates in which the integrated activities of hundreds of people participate in producing the fabric used to make clothing sold as Brand X or to make the laws by which millions of people live. Decades of education, formal and informal, are now required to develop and maintain the behavioral repertoires needed to participate in the vast webs of interrelated human behavior that constitute modern culture.' (p. 133)

214	**9**	**4G**	In the sections below, I review the principle of operant selection and the role of human social environments in behavioral contingencies. I then define culture and cultural practices and consider the role of operant behavior in them. Two types of cultural-level relations- macrocontingencies and metacontingencies are distinguished, and the role of behavioral contingencies in each type is explained as a prelude to accomplishing social change. (p. 134)
215	**9**	**1G**	The social environment is defined, for present purposes, as the behavior of other people as it relates to the behavior of a learner or performer. Your question "What is your name?" is part of my social environment. My answering with my name is a social event in your environment. For any particular occurrence of an operant response, the situation may involve social and nonsocial events. One or more consequences also may be either social or nonsocial. Figure 3 provides examples of three-term contingencies in which various combinations of social and nonsocial events might function as situation and reinforcing consequence in operant contingencies. Environmental events are italicized, and boldface identifies social events. (p. 137 - 138)
216	**9**	**1G**	The social character of some or all environmental events in behavioral contingencies distinguishes the content of the environment, not the process by which that environment affects behavior. The behavioral processes are the same, whether the environment that functions to select the behavior is social or nonsocial, and those processes are a biological given. (p. 138)
217	**9**	**4G**	The social content in the contingencies that support most of the learning accomplished by humans is a defining feature of human cultures. Although rudimentary cultures are seen in other species (Bonner, 1980; Harris, 1989), only humans depend almost entirely on cultural transmission of behavioral content for the survival of their species. (p. 138)
218	**9**	**1G**	The combination in humans of learning potential and sociality set the stage for the emergence of culture -a novel kind of phenomenon. Like the word behavior, culture is a mass noun, a category word, and also a word that refers to the particulars that are members of that category (specific cultures). As a category of phenomena, we will define culture here as "patterns of learned behavior transmitted socially, as well as the products of that behavior (objects, technologies, organizations, etc.)." (p. 139)
219	**9**	**1G**	Culture begins with the transmission of behavioral content, learned by one organism during its lifetime, to the repertoires of other organisms. Thus, the locus of cultural phenomena is supraorganismic. Unlike learning, which is localized in repeated temporal relations between the actions of a single organism and other empirical events, the locus of cultural things is supraorganismic because it involves repetitions of the interrelated behavior of two or more organisms; one organism's behavior functions as the situation or consequences in the operant contingencies accounting for the behavior of the other. Such transmission requires no new biological trait or behavioral process, but it does initiate a new kind of lineage: a culturo-behavioral lineage (Glenn, 2003). (p. 139)
220	**9**		Much of the behavioral content of individual human repertoires is similar to the content of many other humans. The term cultural practices refers to similar patterns of behavioral content, usually resulting from similarities in environments. The term metabehavior has been suggested to identify the class of behaviors that constitute a cultural practice (Mawhinney, 1995). The need for a term subsuming a supraorganismic class of behaviors is recognized, but we will use the term macrobehavior here because it is consistent with the other terminology in this paper. (p. 139 -140)
221	**9**		Cultural practices may be important or unimportant for the survival of a culture. An example of a practice not likely to be critical for cultural survival is hairstyling. Many hairdressers may style hair similarly, and this similarity of behavioral content constitutes a cultural practice. Important to note is that such similarity does not imply that the practice is a functional cultural unit. In other words, the behavior of the various hairdressers is not necessarily functionally related to the behavior of any other hairdressers. Individual hairdressers simply may learn over time to cut certain types of hair in certain ways as a result of the consequent look of the product and approval of their patrons. The resulting products (hairstyles) consequently look alike. Neither the hairstyles nor the behavior of the hairdressers are functionally related to one another, even though the behavior of each hairdresser interrelates with the behavior of each of his or her patrons. In this case, the similar behavior of many individuals constitutes a cultural practice, but there is no evidence of cultural transmission and, therefore, no culturo-behavioral lineage exists. (p. 140)

222	**9**	**2G**	On the other hand, there may be a point of cultural transmission that links the behavior of two or more hairdressers. For example, Hairdresser A may demonstrate to other hairdressers a way to style hair, and the others may reproduce the style under the watchful eye of the originator and later with their own patrons. If the hair styled by A is featured in a magazine or seen on customers by other hairdressers, some of them may be able to produce a similar result for their own patrons. These cases involve cultural transmission. Any cultural practice may be made up of independently generated behaviors and also socially transmitted behaviors. The point of these two examples is that similarity in behavioral content of many individuals is sufficient to consider the aggregate behavior a cultural practice, but is not sufficient to assume cultural transmission, and is even less sufficient to assume a common origin. (p. 140)
223	**9**	**1G2G**	Another way of distinguishing among cultural practices is in terms of the complexity of the behavioral content that constitutes the practice. The macrobehavior that constitutes a specific cultural practice may be straightforwardly identifiable operants such as smoking cigarettes; or multioperant patterns of behavior such as styling hair, driving to work, or recycling; or very complex patterns of interlocking behavior of many individuals, such as that involved in auto manufacturing. Whether comprising simple or complex elements, cultural practices all have two characteristics that are important for the present discussion. First, they involve many people engaged in the same repeated actions (behaving individually or in relation to one another) and, second, those actions have consequences-often several different consequences. (p. 140)
224	**9**	**2G**	Consider the behavior of driving to work. A consequence essential to its continuing repetition in an individual's behavior stream is arrival at work. But in most cases, there are other behaviors that could result in arriving at work (e.g., carpooling, using mass transportation, bicycling, or walking). The fact that most people drive to work rather than getting there some other way suggests that additional consequences are involved and that they differ for different behaviors. Figure 4 shows some likely consequences of driving to work versus carpooling. Note that all of the consequences shown in italics depend only on the behavior of the individual worker, and they are experienced within a short time after the behavior occurs. Although the worker does not control the cost of gasoline, he or she does have control over whether more or less of his or her paycheck goes for gasoline, and whether he or she takes more or less time, with more or less convenience, in getting to work. Because of the correlation between the behavior and those consequences, those consequences have some potential to increase or decrease the relative probabilities of driving or carpooling. When multiple consequences have conflicting functions, the overall effect of the consequences may be the algebraic summation of their individual effects (see Skinner, 1953, pp. 218-223). And the effect of each of these consequences is relative. For example, if a worker who drove to work was transferred to a work site much farther from home, the change in relative value of gasoline cost versus convenience might make carpooling more likely than before, especially because the time involved in carpooling versus driving might not differ much for the longer drive. (p. 140 -141)
225	**9**	**2G**	The effect of our worker's behavior on air pollution, shown in boldface in Figure 4, is a very different kind of consequence. It is not only a matter of the consequence being too small, too delayed, or too cumulative for it to have a behavioral function, although all of that is true and important (see R. W. Malott & Suarez, 2004). There is something else that sets apart the effect on air pollution from the other effects of the two behaviors. To wit, even if, by some magic, we were able to give this consequence a powerful function, the consequence itself can be nullified by the behavior of other people. Our worker, mightily motivated to have cleaner air, can carpool for the next 20 or 30 years, but if a lot of other people do not do the same thing, the air is not going to be any cleaner. In other words, cleaner air is simply not under our worker's control. That is, as Hardin (1968) succinctly put the matter, the tragedy of the commons. No matter how much one behaves for the common good, the behavior of others can undo it all. That is the critical difference between the italicized and boldfaced consequences listed in Figure 4. (p. 141)

226	**9**	**2G**	Ulman (1998, p. 209) suggested the term macrocontingency to define "a set of differing actions (topographies) of different individuals under common postcedent control." The term and the definition suggest the standard definition of an operant writ large. It could be parsed in two ways. Macrocontingencies could refer to commonalities in behavior-consequence relations across many individuals, or it could refer to the control exercised by the cumulative effect of all the topographies on the topographies. Ulman makes it clear that the "common postcedent control" is the cumulative effects of those differing actions. As mentioned above, however, the cumulative effects cannot be in a contingent relation with the behavior of any individual; therefore they cannot control (as operant consequences) the behavior of individuals. And although there may be a contingent relation between the sum of the topographies and the cumulative effect, the summed topographies are not part of a lineage that can wax or wane together as a function of the postcedent. If the postcedent has any effect at all on any operant lineages of individual people, that effect is independent of any effect it may have on operant lineages of other people. (p. 141 - 142) Nota de rodapé: Macrocontingencies as here defined can involve different topographies of different people, the aggregate results of which are a change in the environment of many people. Todorov, Moreira, and Moreira (2004) provide examples of such relations. The aggregate results of the differing topographies in their examples, as in the air pollution example here, cannot have a selective function on those topographies because of the poor correlation between the behavior of any individual and the aggregate result.
227	**9**	**2G**	That being said, the notion of some kind of relation that is bigger than operant contingencies seems useful. So I will define a macrocontingency as the relation between a cultural practice and the aggregate sum of consequences of the macrobehavior constituting the practice. Figure 5 shows the relations in a macrocontingency as here defined. The recurring behavior of each person has its own effects, and the relation between the behavior and that effect can alter the probability of the recurrence of that individual's behavior (as in Figure 1). For example, if the behavior is driving to work, then each person's driving-to-work operant is a function of the contingency between driving to work and the operant consequences of that behavior. In addition to those individuated consequences, the combined behavior of all the people (the macrobehavior) has a cumulative effect. This effect cannot function as a behavioral consequence because it is not contingent on the behavior of any individual driver. It is contingent on the macrobehavior of the cultural practice. (p. 142 - 143)
228	**9**	**2G**	An important feature of macrocontingencies is that their cumulative effects are additive. The more widespread a practice, the greater its cumulative effects; the greater the cumulative effects, the more important they are to the well-being of large numbers of people. Each person contributing to the cumulative effect contributes in direct proportion to the frequency of his or her behavior. It is the cumulative effect of the behavior in a cultural practice that constitutes a problem for the people of a culture. To continue with the example, the driving behavior of each individual is as it is because of the relative effects of its multiple behavioral consequences: arriving at work in good time with minimum difficulty and the money spent on gasoline. These consequences that maintain the driving behavior contribute to the probability of driving, but they are not the culturally relevant cumulative effects: gasoline consumption and associated environmental effects. Further, the behavior is not a problem for the individuals behaving-rather it is a solution, albeit not an ideal solution, to the problem posed by their distance from work. As in the case of the behavior of individuals, cultural practices also have multiple consequences. For example, two effects of consumer behavior are that it helps to create jobs and it contributes to degradation of the physical environment. Such incompatible effects of cultural practices are even more difficult to reconcile than similar incompatible effects of individual behavior. That is because the multiple cumulative effects of any given cultural practice are likely to be more advantageous to some people and more disadvantageous to others. In the case of individual behavior, at least the costs and benefits affect the same person. Discussion of macrocontingencies has centered on the cumulative effect of many people "doing the same thing" (allowing for a broad range of topographies). The people could be acting individually (e.g., smoking), or their behavior could be interrelated (e.g., carpooling). Either way, the similarity in operant content of many people is what warrants our calling it a cultural practice. Each time the behavior occurs, it adds to the cumulative effect. So the cumulative effect depends on the number of times the act occurs, and that number is a function of the number of people who engage in the act and the frequency of the behavior of each person. (p. 143)

229	**9**	**2G**	The relation between any particular cultural practice and its cumulative effect may be critically important to the welfare of the people of the culture, and even to the survival of that culture. But a cultural practice (as here defined and as generally, albeit vaguely, understood) cannot participate in a selection process. That is so because a cultural practice is a class of acts that are functionally independent of one another. In other words, recurrences of the acts do not participate in a lineage. They are classified as "the same" in terms of their form and their effects, but the members of the class are not necessarily related by descent, which is a defining feature of evolution by selection (Hull, Langman, & Glenn, 2001). In short, a cultural practice does not evolve as a result of cultural selection, but rather as a result of behavioral contingencies of selection operating on the behavior of many individuals; as a result, a different cultural practice comes to exist. For example, the cultural practice of smoking in public buildings has been replaced in many areas by a practice of going outside public buildings to smoke. The change in the cultural practice is a behavior change of many individuals, each responsive to his or her own social environment. When there is change in the practices that constitute a culture, the change is an emergent side effect of concurrent changes in behavioral lineages of many individuals. The causal mechanism is behavioral selection (i.e., the principle of reinforcement). (p. 143 - 144)
230	**9**	**2G**	If certain human cultural practices, or their cumulative outcomes, threaten the safety of the world, then saving the world will necessarily entail altering the operant contingencies that maintain the behavioral lineages that contribute to those outcomes. Such action requires interpretation of complex phenomena in the language of the experimental analysis of behavior (see Palmer, 1991). (p. 144)
231	**9**	**4G**	It appears that human cultures, too, have been characterized by organizational structures and functions that have become increasingly complex throughout human history. The concept of metacontingencies may help us to understand how that complexity evolved. (p. 144)
232	**9**	**4G**	A clear distinction between the concepts of metacontingencies and macrocontingencies is needed, because early papers introducing the concept of metacontingencies (Glenn, 1986, 1988) combined terminology suitable for discussion of macrocontingencies (as here defined) and metacontingencies (as here defined). The prefix meta- together with the root contingencies is intended to suggest selection contingencies that are hierarchically related to, and subsume, behavioral contingencies. They represent "a different kind of selection," although "no new behavioral process" is involved (Skinner, 1984a, p. 504). Metacontingencies are not a matter of an enlarged class of behavior or more widespread behavioral contingencies; rather, they are the engine of a different kind of selection. The metacontingencies of cultural selection emerged only after social events become prevalent in the behavioral environment of a species that has the human combination of physical and behavioral traits. (p. 144)
233	**9**	**1G2G4G**	The concept of metacontingencies addresses evolution by selection when the lineages that evolve are not the recurring acts of individuals (as schematized in Figure 1), but rather are recurring interlocking behavioral contingencies (IBCs) that function as an integrated unit and result in an outcome that affects the probability of future recurrences of the IBCs. Figure 6 is a schematic of the metacontingencies of cultural selection as it goes on in time The recurring IBCs comprise operant contingencies in which the behavior of two or more people functions as environmental events for the behavior of the others. The outcomes produced by recurrences of the IBCs are not the cumulative effect of the participants behaving individually, but rather the effect of their interrelated behavior. For example, Marta and Todd regularly cook meals together. Marta prepares entrees, sauces, and vegetable dishes with Todd serving as helper, and Todd prepares appetizers and desserts with Marta serving as helper. The timing of each of their activities is based on what they observe the other one doing throughout meal preparation. The outcome of their interrelated behavior is a meal with perfectly timed courses of perfectly prepared dishes. The meal could not be produced by Todd and Marta working in separate kitchens and combining the results of their individual behavior. Thus, it is not the cumulative effect of their individual behaviors. It is the outcome of their interrelated behavior. (p. 144 - 145)

234	**9**	**1G2G4G**	Metacontingencies, then, are the contingencies of cultural selection. They give rise to the organized collections of behavioral contingencies that constitute increasingly complex cultural-level entities. Let us continue with the example of the relation between Todd's and Marta's IBCs and the resulting meals. Variations in the features of the IBCs will result in variations in the outcome, and if the difference in outcomes perpetuates some patterns of the IBCs more than others, cultural level selection has occurred. Note that Todd's behavior is a function of behavioral contingencies that might include the taste of the meals cooked, and Marta's behavior is a function of other behavioral contingencies that might include the taste of the meals cooked. Those behavioral contingencies are necessary for the continuation and evolution of Todd's and Marta's operants, and thus of the IBCs; but they are not necessarily sufficient for the IBCs. The outcome of the IBCs must be more than or different than the meals that either Todd or Marta could produce by themselves to maintain the recurrences of the IBCs. It is this "more than" or "different than" that is the source of cultural evolution and what distinguishes it from behavioral evolution. (p. 145)
235	**9**	**1G2G3G**	Cultural complexity is the outcome of cultural selection that results in nested hierarchies of IBCs (Glenn & Malott, in press). For example, Todd and Marta may open a restaurant where cooking meals is part of a larger pattern of recurring IBCs. Figure 7 shows a nesting of IBC relations in increasingly complex cultural lineages. Whether the larger pattern continues to recur and evolve depends on the outcomes of cooking but also on the outcomes of other IBCs in the situation. The behavior of other people may become part of the larger pattern and contribute substantially to the outcome that maintains the continuing recurrences of the IBC that constitute "the business." Finally, although the IBCs must continue to recur for the cultural lineage to remain in existence, it is not necessary that Todd's or Marta's behavior continues to participate. The behavior of other individuals can replace one or both of theirs as long as that behavior fits well enough into the IBCs to produce the outcome. Perhaps it is worth noting that such replacement of one participant's behavior for another's in a cultural lineage virtually always causes some adjustments in the IBCs and thus always presents both opportunity and threat to the continuing survival of the lineage. (p. 145 - 146)
236	**9**	**1G2G4G**	Like the responses in operant contingencies, the IBCs in metacontingencies can result in both automatic outcomes and socially mediated outcomes that depend on the features of the automatic outcome. For example, Todd's and Marta's IBCs at first had automatic outcomes-meals-that differentially perpetuated some variations of the IBCs. Eventually, the IBCs constituting their restaurant were maintained by the ordering behavior of customers. As in the case of social reinforcers for individual behavior, the socially mediated relation between the IBCs of the restaurant and the sustaining income generated from customer purchases provides a foundation for more complex relations. (p. 146)
237	**9**	**1G2G4G**	The nested metacontingencies of cultural selection are the basis for the evolution of cultural complexity as well as the maintenance (survival) of evolving organizational lineages. Just as components of one operant lineage become embedded in operant lineages of more complex components (as in Figure 2), components of one lineage of IBCs can become embedded in IBCs of greater complexity (as in Figure 7). These more complex cultural entities are the individually identifiable evolving units we know as organizations: individual companies, their parent corporations, schools, school districts, universities, university departments, government agencies, and so on. Each of these units exists as long as it consists of IBCs that produce an outcome that can increase the likelihood that the IBCs will recur. These are all entities that can change or evolve over time or that can disappear as a whole. They are not themselves cultural practices, because each organization is an entity-an evolving lineage of IBCs. (p. 146)
238	**9**	**1G2G4G**	The relation between IBCs and their outcomes has functional parallels to the complex relations of behavioral contingencies. The IBCs produce outcomes, variations in instantiations of IBCs cause differential outcomes, and the future frequency of the IBCs as well as their characteristics are a function of the differential relation between instantiations and outcomes. Changes endogenous or exogenous to the IBCs may result in a variation that produces a different outcome, and that outcome can increase or decrease the probability of recurrences of the IBCs. (p. 147)
239	**9**		From the present perspective, engineering can occur with respect to two kinds of phenomena: macrobehavior and metacontingencies. (p. 147)

240	**9**	**2G**	The macrobehavior of cultural practices can be identified as a problem only when its cumulative effects are recognized, and it often takes a long time to gain understanding of the many effects of specific cultural practices. The only way to do something about the cumulative effects of macrobehavior is to find ways to alter the behavior of as many individual participants as possible. For example, the more individuals who carpool or take public transportation to work rather than drive alone, the greater is the improvement in air quality (or the slower the worsening of air quality). When the number of participants in a practice is large, a change in the behavior of a small percentage of them can make an important difference. If 10% of the drivers in the U.S. carpooled with two other people, a noticeable reduction in air pollution might result. What could bring about such a change in the behavior of 10% of drivers? Considering that each driver's behavior is a function of the operant contingencies in effect, we must consider the consequences of the behavior of driving to work versus the consequences of carpooling, as discussed previously and shown in Figure 4. The assumption is made, for purposes of discussion, that the effects of the behaviors listed in Figure 4 could function as behavioral consequences, with the exception of the effect on air pollution. (p. 147)
241	**9**	**2G**	As matters now stand, attempts by society to engender alternative macrobehaviors are implemented with little understanding of the potential cumulative effects (Nevin, 1998), and little attention is paid to the many operant contingencies that may be maintaining the operant behavior of individual participants in the current practice. Because the macrobehavior of cultural practices is a function of operant contingencies that operate independently, but concurrently and similarly, on the behavior of many people, behavior analysts have rightly called for analysis of the contingencies that maintain the behavior that constitutes the practice. Mattaini (1995), in particular, has argued that behavior analysts should be trained specifically to focus on behavior with cumulative effects that affect the viability of the culture. When interventions are designed to alter the cumulative effect of a cultural practice, they must necessarily identify the operant contingencies that account for the behavior of individuals who participate in the practice. The more individuals whose behavior changes, the greater is the impact on the cumulative effect. This method of cultural intervention entails modifying the operant contingencies that are likely to maintain the behavior of large numbers of people. Biglan (1995) described many of the behaviors of modern American cultural practices that result in undesirable cumulative effects, and he identified many of the socially mediated behavioral contingencies that support those behaviors. Other authors (e.g., Goldstein & Pennypacker, 1998; R. W. Malott, 1998) have offered interpretations of various specific macrobehaviors and suggestions regarding intervention. Under the editorial guidance of Richard Rakos, Janet Ellis, and Mark Mattaini, the journal Behavior and Social Issues has devoted several issues to analyses of macrobehaviors with highly destructive cumulative effects. (p. 147 - 148)
242	**9**	**1G2G4G**	Because much of the operant behavior of modern humans is embedded in organizations that have recurring IBCs, survival of those organizations is, at the very least, important to those humans. The fact that the organizations exist at all, however, suggests that their IBCs were selected by their external environment and, therefore, are an important part of the larger culture, whether or not alternative organizational structures are considered more desirable. Engineering, then, can also occur with respect to the IBCs in metacontingencies. IBCs can be changed in two ways that are analogous to the two ways that species characteristics can be altered. The first is by altering the external selecting environment and waiting for variations in the IBCs to produce outcomes suitable to the new selection contingencies. This amounts to altering the contingencies of selection and letting the chips fall where they may. The second way is similar to ascertaining and altering the genetic characteristics that are endangering a species' existence given the current selecting environment. This tactic entails altering the components of the IBCs so that they are better adapted to the current selecting environment. Planned variations of the recurring IBCs can be designed to produce outcomes more suitable to the demands of the external environment. (p. 148)

243	**9**	**1G2G4G**	Engineering change to enhance the survival of organizations (recurring arrangements of IBCs) requires analyses of current metacontingencies and also analyses of the specific behavioral contingencies that affect the outcome of IBCs. It should be obvious that all of the IBCs and the operant contingencies in complex organizations cannot be analyzed. There must be some way to distinguish between those that can be ignored and those that must be addressed. M. E. Malott (2003) described an approach to organizational change that combines a behavioral systems engineering model with metacontingency analysis. Her collaborations with the personnel in business organizations as well as in at least one institution of higher education (M. E. Malott & Salas- Martinez, 2004) demonstrate the importance-indeed, the necessity-of isolating the IBCs that fail to meet selection contingencies and then identifying the operant behavior that must be altered to bring about the kind of changes in IBCs required by the external environment. In summary, to bring about changes in the organized IBCs that function as evolving cultural units, it is necessary to identify the IBCs that contribute to an outcome and to identify the function of the outcome in sustaining (or not) recurrences of the IBC. Variations can be made in the IBCs by systematically manipulating the behavioral contingencies within them, and the variations may increase or decrease the probability of producing an outcome with a sustaining function. (p. 148 - 149)
244	**9**	**1G2G4G**	Metacontingencies, like behavioral contingencies, involve two kinds of causality, as can be seen by comparing Figures 1 and 3. First, the recurrences of IBCs produce outcomes (analogous to consequences produced by recurrences of operant responses). Second, the outcomes affect the future frequency and other measures of the future recurrences of those IBCs. The contingencies of selection in metacontingencies are between cultural-level units (IBCs) and their selecting environments. Evolving cultural units are recurring cycles of IBCs. Like operants in a repertoire, the recurring entities may become part of increasingly complex entities that form a lineage of their own (see Figure 7). The outcomes produced by a cycle of IBCs can affect future cycles of IBCs, just as the consequences of a behavioral occurrence can affect future occurrences of that behavior. If one is interested in altering the recurrences of IBCs, one can do so by altering the components of IBCs to better meet current selection requirements or by altering the selecting environment. The former strategy would be comparable to genetic alteration and the latter to artificial selection. The IBCs in metacontingencies, like the individual behavior in operant contingencies, recur in lineages that evolve and change as a function of their selecting environments. They are also alike in their relation to macrocontingencies. Just as the similar operant behaviors of many people can contribute to a cumulative outcome, the IBCs of several different organizations may also contribute to a cumulative outcome, as shown in Figure 8. The behavioral lineages of the different people who participate in a cultural practice evolve independently, as do the IBC lineages of the different organizations. But both the behaviors and the IBCs may also contribute to a cumulative outcome that plays no direct role in selection but nevertheless may be important indicators of the viability of the culture. (p. 149)
245	**9**	**1G2G3G4G**	The organizations in Figure 8 could be programs comprising IBCs that produce graduates trained as behavior analysts. Each program produces graduates (among other things) whose performance contributes directly and indirectly to the selection of the recurring IBCs that produce cohort after cohort of graduates. The IBCs that produce behavior analysis graduates constitute a cultural practice and they have cumulative effects, including the number of people prepared for academic appointments, the number of individuals who can be served by professional behavior analysts, the amount of federal funding likely to go to behavior-analytic researchers, and so on. Although individual behavior analysts and the program faculty of individual programs can be moved to action by data on the cumulative effects of the summed behavior or summed IBCs, those effects cannot select any of the individual operant lineages or the individual lineages of IBCs, because there is no lineage of recurring entities that produces those effects. If one is interested in altering the cumulative outcomes of a cultural practice, one must find a way to alter the behavioral contingencies of macrobehaviors or the metacontingencies supporting the IBCs of organized cultural complexity. The more individual contingencies or organizational metacontingencies that are altered, the greater the potential change in the cumulative outcome. (p. 149 - 150)

246	**9**	**1G**	The larger the number of organizations characterized by the same kinds of IBCs, the more likely we are to consider those kinds of IBCs a cultural practice. Statements such as "the cultural practices of Japanese businesses are different from the cultural practices of American businesses" refer to similarities in the IBCs that characterize American companies and similarities in the IBCs that characterize Japanese companies, as well as the differences between the American and the Japanese companies. (p. 150)
247	**9**	**1G4G**	The distinctions made herein among behavioral contingencies, macrocontingencies, and metacontingencies represent an attempt to clarify the complex ways that selection works with respect to the behavior of individual humans and to organizations of IBCs in which much human behavior is embedded. Cultural practices per se cannot evolve. The constituent members of cultural practices do evolve, however, whether they are the operants of individuals or the IBCs of organizational entities with a life of their own, above and beyond the behavior of the particular people who participate in them. (p. 150)
248	**9**	**4G**	Because cultures are human constructions, and their increasing complexity arises from the increasing complexity of the entities that participate in metacontingenices, it seems highly likely that humans can alter at least some elements of their cultures. Unless we understand how cultures arise and evolve, however, it will be difficult to make wise choices regarding what can be changed or should be changed. (p. 150)
249	**10**	**4G**	ABSTRACT: In this paper, we argue that numerous dynamic entities make up organizations and that their complexity can be described systematically. We identify three types of organizational complexity: environmental, component and hierarchical. We define the elements of the contingencies of cultural selection as they apply to organizations and propose that organizational change can be understood in terms of selection processes that are analogous to those of behavioral and natural selection. Key Words: behavioral selection, cultural selection, metacontingency, interlocking behavioral contingencies (p. 89)
250	**10**	**4G**	We suggest that all organizations are cultural entities but not all cultural things are organizations. This is similar to saying that while we believe all verbal behavior is operant behavior, not all operant behavior is verbal. Further, although verbal behavior is operant and organizations are cultural, there is no reason to assume that verbal behavior and organizations cannot (or must) have characteristics peculiar to themselves over and above their inclusion in the general categories of operant behavior and cultural things. (p. 89)
251	**10**	**4G**	Behavior analysts working in the field of organizational behavior management must expand on the traditional activities of behavior analysts because their object of study is organizational behavior. As it turns out, “organizational behavior” means both the behavior of individuals in organizations and the behavior of organizations as functioning entities in their own right. What must be managed is the relation between the behavior of the individuals in an organization and the behavior of the organization as a whole. (p. 90)
252	**10**		Organizations consist of the dynamic interaction of human behavior and its products that affect the behavior and products of other humans. Behavior of all employees, like behavior in the experimental laboratory, is the result of behavioral selection contingencies, or behavioral contingencies for short. These units of analysis are relations between antecedents, behavior and consequences. Some behavioral contingencies make it more likely that behavior of the same kind will occur again. For example, a production schedule (antecedent) cues the worker in a plastic manufacturing plant to set the mold (behavior) for plastic parts. A mold setup is the product of this worker’s behavior. The worker locates the mold, loads it on a forklift, carries it to the press and places it in the press. If the mold is fastened flush between the press doors, the task is completed (consequence). If the mold isn’t flush, the worker manipulates it until it is seated properly. The relation between his actions and the properly loaded press (contingency) affects how mold setup will be performed on the next occasion. Variants of the behavior that achieve properly set molds become increasingly frequent. The repetitions of mold setting behavior of this worker constitute a behavioral lineage. Mold setup is undergoing selection by reinforcement—a process by which a relation between behavior and its consequences increases the future likelihood of that behavior. Mold setup is operant behavior because it operates on its environment. An operant lineage consists of a sequence of operant instances that change over time as a result of behavioral selection contingencies. (p. 90 - 91)

253	**10**	**1G**	Sometimes the behavior of Person A, or the product of that behavior, is the occasion for Person B to do something. B's behavior, or its product, then may set the occasion for Person C to do something. The behavioral contingencies of A, B, and C are intertwined. The same event or object (e.g., A's product) is a consequence of A's behavior and sets the occasion for B's behavior. For example, in manufacturing plastic parts, Worker A gets the mold from a tooling rack and sets it in the press. Worker B sets the dials on the press according to engineering specifications. Worker C molds parts. The behavior of each person becomes part of the environment entering into the behavioral contingencies for others. We call these kinds of relations among the behaviors of two or more people interlocking behavioral contingencies. They are the building blocks of cultural complexity. (p. 91)
254	**10**	**1G2G**	The behavior of A, B, and C may be part of a more inclusive set of interlocking behavioral contingencies that, together, result in an aggregate product: molded plastic parts. These interlocking contingencies are repeated with each molding request; and the repetitions constitute a lineage of interlocking contingencies. Variations in the elements of the interlocking contingencies may result in variations in the quantity or quality of plastic parts. The interlocking contingencies determine the characteristics of the products; and the characteristics of the products determine the customers' acceptance of the product. Customer acceptance is the external environment contingent on the product of the interlocking behavioral contingencies. (p. 91)
255	**10**	**1G**	In organizations, we are interested in the products of the interlocked behavior of multiple individuals; so the behavior of individuals remains the fundamental component of organizations. The evolution of an organization as a whole depends not only on its individuals' behaviors, but also on how those behaviors combine and form units of selection that evolve in their own right. Given the inherent complexity of organizations, the behavior of any individual can rarely be isolated and managed without consideration of its interactions with the behavior of others. (p. 91)
256	**10**	**4G**	We might start our organizational analysis by establishing the boundaries of an entity we want to study. What constitutes an organization? In the broadest sense, an organization consists of a group of people who perform tasks that achieve a particular product. An organization is defined by its products. XYZ manufacturing company consists of all the employees whose integrated activities result in XYZ's manufactured products. If an internal department provided travel services for XYZ employees, its existence would necessarily depend on XYZ's manufactured product. In contrast, a travel agency contracted by XYZ to provide travel services to XYZ's employees is a different organization than XYZ because the agency's existence does not necessarily depend on XYZ's manufactured product. (p. 91 - 92)
257	**10**	**1G2G4G**	Organizations often comprise several systems that contribute to achieving their goals. The term system is used for a variety of relationships between many kinds of separate elements arranged as a whole to achieve an outcome. XYZ needs various systems to manufacture products, such as purchasing, sales, production and shipping. Each system generates a product that relates to the operations of one or more other systems and thereby contributes to XYZ's aggregate product. For example, products of XYZ's systems include purchase orders, purchased items, finished goods, and goods delivered. Each system is composed of subsystems. The production system could include molding, trimming, and packaging subsystems, each one producing a critical component—molded, trimmed and packed parts. A subsystem may have its own subsystems. For instance, molding includes plastic preparation, press set up and plastic injection, and these systems produce adequate plastic, proper set up and injected molds. The least complex cultural system in an organization is one formed by an interlocking behavioral contingency in which two individuals each perform at least one recurring behavior. (p. 92)

258	**10**	**1G2G4G**	Organizations are not static entities. An organization as a whole and its systems are dynamic, always undergoing change. Alterations in internal systems result in changes in the organization as a whole. For instance, the interlocking behavior of a production team could be affected not only by the engineering team directly involved in production, but also by the purchasing, shipping, and other processes in the organization. In addition to the internal dynamics of any process, that process is also affected by alterations in the environment external to the organization, such as changes in the customer and provider organizations. The intrusions of parts of one system into the operations of other systems speak to the permeability of system boundaries. The dynamic interactions between systems elements and the permeability of their boundaries make complexity hard to analyze. Due to the permeability, boundaries of any system are somewhat arbitrary, but delineating boundaries helps to simplify overwhelming complexity. Identifying boundaries does not mean that we can ignore the multitude of ongoing interactions between internal and external entities. It only means that we set aside the more remote influences and focus on the most direct dynamics. Systems analysis, no matter the size of the system, would require minimally the study of the dynamic interactions between its internal components, its relationships to critical systems in the organization, to the performance of the organization as a whole, and to customer demands. (For an account of systems analysis in organizational change, see Gilbert, 1996; Malott, 2001-b; & Rummler and Brache, 1995.) (p. 92)
259	**10**	**1G**	For example, the behavior of the sales force of a pharmaceutical company is integrally related to other organizational systems. It would be short sighted to study only the behavior of the sales people and attempt to design new contingencies of reinforcement to increase sales. We could not know if our changes would have a desired effect on other processes and thus on the organization as a whole. So in addition to analyzing the behavior of the sales force, we must consider such things as the interrelations among sales forces in territories, districts and regions; the influence of marketing, product development, production processes; trends in customer purchases; and the impact of drug regulations on sales performance. (p. 93)
260	**10**	**4G**	In order to target any area for change, no matter how small, we should understand the organization as a whole. The number of variables external to the organization that affect organizational performance determines environmental complexity. The environment outside of the organization is constantly changing in ways that affect internal organization. Some of the ways that the external environment can change are product and service development within an industry, government regulations, mergers, consolidations, bankruptcies and warfare. Other external variables, such as changes in competition, providers and weather patterns may also affect organizations. Figure 1 illustrates environmental complexity. (p. 93)
261	**10**	**4G**	Changes in the external environment drive alterations inside the organization, but changes within organizations also affect the environment. For instance, consider the impact on the economy of a single large merger, a company's hazardous waste, or a terrorist act. Environmental complexity cannot be ignored. Organizations that do not adjust to changes in their external environments are unlikely to survive. (p. 95)
262	**10**	**1G4G**	The number of elements that constitute an organization determines component complexity. The elements might be related to each other as equals or they might be at different levels in a hierarchy. The smallest organizational units of interest are interlocking behavioral contingencies that generate critical products. Organizations tend to be more complex when larger numbers of people participate in their processes. Small businesses of a few employees are generally less complex than large businesses with thousands of employees. Component complexity also depends on the number of processes each system subsumes. For example, in a manufacturing company, the production process might be more complex than the advertising process. This might be because production has more subsystems and/or larger numbers of interlocking behavioral contingencies. The manufacturing process might contain all the interlocking contingencies involved in receiving of raw material, preparation of equipment, scheduling, production, and inventory management. (p. 95)
263	**10**	**4G**	An important implication of hierarchical complexity is that as the levels of management grow, the behavior of those in higher levels becomes increasingly unrelated to critical components of the interlocking contingencies of the lower levels. Unfortunately, as levels of management grow in organizations, these disconnects between levels threaten the organizational success. The performance of the lowest level ultimately determines the success, failure, and survival of the organization. But what happens at the lower level depends on the behavior of managers at higher levels—mainly decision making behavior. (p. 97 - 98)

264	**10**	**1G4G**	The biological characteristics of organisms, the learned behavior of individual organisms and the interlocking behavioral contingencies in organizations are very different kinds of things, but they all change over time as a result of selection. Natural selection accounts for features of the organic world; behavioral selection for features of individual behavior; and cultural selection for features of organizations. Although natural selection does not appear to play a current role in organizational change, the process of natural selection is well understood. Therefore, we introduce the concept of selection by describing its role in biological evolution and its parallel to behavioral evolution. (p. 98 -99)
265	**10**	**4G**	In summary, relations between characteristics of organisms or behavior and their environments determine future frequencies of those characteristics. These relations have been called "contingencies of selection" (Skinner, 1981). Contingencies of selection may also involve relations between organizations and their environments. In the sections below, we attempt to provide a selectionist account of the evolution of organizations, where cultural selection and behavioral selection are both directly relevant. (p. 99)
266	**10**	**4G**	Organizations are cultural entities that change over extended time while retaining their identity as "the same" organization. In this sense, an organization is like a biological lineage. It is composed of repeating generations of events having features that change over time as a result of the way in which variants in the current generation are "received" by their environment. (p. 99)
267	**10**	**4G**	For example, since 1990 many organizations have become adapted to a commercial environment that includes electronic commerce (e-commerce). Before 1990 the environment of organizations with products to sell was one in which buyers and sellers exchanged and transported goods from one place to another. In the late 1990s, advancement of networked computer technology engendered an explosive growth in ecommerce. E-commerce allowed the exchange of goods and services over the world wide web, increasing efficiency and precision in commercial transactions. In North America business-to-consumer e-commerce transactions grew from $11.5 billion in 1998 to $44.5 billion in 2000. Organizations that were set up for e-commerce transactions got the business of organizations by aggressively improving delivery times. Within a few years, airline tickets, hotel reservations, and all kinds of goods and services were available via the web. This rapid change in the external environment selected organizations with technology processes best able to respond to customer demands. (p. 99 - 100)
268	**10**	**1G2G3G4G**	Metacontingencies are relations between interlocking behavioral contingencies and their selecting environments (Glenn, 1989). Together with behavioral contingencies, metacontingencies account for cultural selection and evolutionary change in organizations. In organizations, metacontingencies have three components: interlocking behavioral contingencies, their aggregate product, and their receiving system. The receiving system is the recipient of the aggregate product and thus functions as the selecting environment of the interlocking behavioral contingencies (cf. Brethower, 2000). Interlocking contingencies will cease recurring if there is no demand for their products. Figure 4 illustrates the concept of metacontingency. (p. 100)
269	**10**	**1G2G3G**	Analogous to operant reinforcement in individual behavior, the external environments of organizations deliver selecting consequences. Customers "buy" (or don't buy) the organization's products, shareholders buy or sell their stocks, granting agencies award grants or don't, government regulators award passes or levy penalties, and so forth. Most of these consequences are contingently related, however imperfectly, to the products of the interlocking behavioral contingencies. (p. 100)
270	**10**	**1G2G3G4G**	Consider a restaurant as an organization. The aggregate product of the restaurant's interlocking behavioral contingencies is the food served, and the receiving system is the consumers. The restaurant will survive only if its food and its physical features (ambience) meet the requirements of the selecting environment (people who eat there). The food and the ambience may change as the restaurant's external environment (customer preferences or competition) changes. The systems that contribute to the restaurant's product include purchasing, food preparation, service, financial management, and property maintenance. Each process involves one or more metacontingencies. Serving meals represents one set of interlocking behavioral contingencies involving several people's behavior: the wait staff's turning in the order, the chef's providing instructions, the cook's preparing food and placing it where the wait staff can pick it up. The behavior of each individual is related to that of others in the interlocking contingencies. The aggregate product of these interlocking contingencies is meals served. If the meals are well adapted to demand, consumers are likely to continue patronizing the restaurant. (p. 100 - 101)

271	**10**	**1G2G3G4G**	Other metacontingencies that have different aggregate products also affect consumer demand. For example, the interlocking behavior of the wait staff affects timeliness and quality of service. So multitudes of metacontingencies exist inside the boundaries of the restaurant. The behavior of any individual, as well as the makeup of any of the interlocking behavioral contingencies may contribute to the fitting of the organization's products to the restaurant's environmental demands. An organization as a whole can evolve, or change, as repetitions of its internal interrelated metacontingencies occur over time. The aggregate products generated by the interlocking contingencies vary over time, and the environments in which they exist differentially select those variations. Figure 5 is a diagram of a cultural lineage. It shows three repetitions of the same metacontingency over time. The participants in the metacontingency change across repetitions (illustrated by different shading of the human figures). (p. 101)
272	**10**	**2G4G**	The major parts of an organizational ecosystem are its core systems. In the ecology of an organization, the output of one system directly affects the functioning of other systems. In organizations, core systems are essential parts, directly responsible for generating the aggregate product. For example, food preparation is at the core of a restaurant's success. If the food is bad, no matter how good the service might be, the restaurant likely will fail in the long run. Production is a core system in a manufacturing company; merchandising is a core system in a retail company; sales is a core system in a marketing company (Malott, 1999). (p. 101)
273	**10**	**1G2G4G**	The relations among the systems and their subsystems in an organization constitute a web of interlocking metacontingencies. Whether the organization as a whole meets the requirements of the external environment depends almost entirely on the characteristics of these interlocking metacontingencies. The greater the component complexity of any subsystem, the more interlocking metacontingencies are likely to exist. Hierarchical complexity increases with the number of subsystem levels. In this web of interlocking metacontingencies, any significant mismatch between product generation in a system (or subsystem) and the environmental requirements of a related system (or subsystem) is likely to be detrimental to both systems. (p. 102)
274	**10**	**2G3G4G**	If an organization's systems result in products that match poorly with their external environments, either the environment or the systems must change to sustain the organization over extended time. Because the environment of an organization's subsystems is managed internally, the environment of a subsystem can change so its products better support the organization. Consider, for instance, a manufacturing company that produced plastic components for the automotive and telecommunication industries. To fill a product niche in the health industry, the company started manufacturing plastic connectors used in infant heart transplants. The customer had precise specifications for the product, which required a pollution-free manufacturing environment, imposing significant changes in the production system. A special area was set up for pollution-free molding, unique safety gear was incorporated in the system, the dress code of the workers was altered, and new production specifications were added to the manufacturing information system. Because a poor product could cost the life of an infant, other internal systems were adjusted. For instance, legal agreements with the customers and shipping requirements were changed. (p. 103)
275	**10**	**1G4G**	The interlocking metacontingencies in an organizational ecosystem ultimately determine the course of an organization's continuing evolution. If, over time, a manufacturer's goods are not bought in sufficient quantity to sustain production and invest appropriately for the future, then the organization becomes increasingly less viable in a relatively stable environment. A change in the external environment (e.g., disappearance of a competitor, or reduction in cost of raw materials) represents a change in metacontingencies that can avert extinction and make recovery possible (at least temporarily). (p. 103)
`276	**10**	**2G3G**	A fortuitous change in the external environment may result in an adequate match between an organization's systems and its selecting environment. Such a "saved by the bell" outcome is not typical and organizations do not count on such lucky changes in their external selecting environments. Rather, they focus on changing their internal environments. The more complex those internal environments are, the harder it is to react quickly to changes in the external environment. The safest course of action is to continually monitor the fit between the organization's products and the external environment, to identify current (and predictable future) requirements for continuing adaptedness, and then to plan and rearrange internal metacontingencies. (p. 103)

277	**10**	**4G**	Because the systems in the organizational ecosystem continually affect one another, core systems in a web of organizational metacontingencies must co-evolve for the organization to thrive. Co-evolution is the joint evolution of two systems that have a close ecological relationship. In co-evolution, change in each system is matched by change in the other so that the two systems evolve in relation to one another. Take, for instance, the use of contemporary cash registers in retail establishments. Cash registers now calculate the total sale when a customer purchases several items; maintain a record of each sale and the department in which it was made; record whether the sale was by cash or credit; print the details of the sale on a sales slip, which serves as receipt for the customer; and keep track of the sales tax. This technology could not be adequately implemented without altering several other subsystems, including inventory management. (p. 103)
278	**10**	**4G**	If contingencies of competition exist between core systems, one core system will suffer at the expense of another. By definition, all the core systems are essential to the organization's survival, so in designing metacontingencies in which related systems participate, care must be taken to insure co-evolution rather than competition between systems essential to the organization's capacity to meet the requirements of the selecting environment. Unfortunately, most core systems compete with other systems for resources; and core systems often develop redundancies with other systems in the organization to accomplish their work. For instance, information technology departments typically do not serve the organization's core systems because they are often overwhelmed with convoluted and fractionated technology infrastructure. As a result, core systems, like production in a manufacturing company, often hire computer experts to facilitate the production process. Training departments are similarly redundant in many cases because their personnel are too unfamiliar with critical aspects of the core systems to train employees adequately (Malott, 1999). (p. 104)
280	**10**	**1G3G**	Metacontingencies are the units of analysis in organizational ecosystems, and their interlocking behavioral contingencies constitute the cultural entities that evolve via selection. However, their constituent behavioral contingencies can be analyzed as units of analysis at the behavioral level. Any intervention designed to better adapt an organization to its external environment requires changes in the interlocking metacontingencies. And interventions in the interlocking metacontingencies require changes in behavioral contingencies for the individuals involved. (p. 104)
281	**10**	**1G2G3G**	Not all behavior occurring within the boundaries of an organization is part of the systems that define and sustain the existence of that organization. In fact, organizations change, sometimes in seemingly chaotic ways. Take, for instance, an accounting department that produces reports that no one understands. Although the reports have no function with respect to any other behavior in the organization, a supervisor may continue asking for them. Behaviors like this can go undetected for indefinite periods, surviving because the receiving system (supervisor) maintains the interlocking contingencies that result in the product (the report). Organizations can make significant improvements and reduce costs by constantly analyzing the relevance of the products of individual behavior and of interlocking contingencies to overall organizational performance. (p. 104 - 105)
282	**10**	**2G**	Behavior that seriously impedes the systems critical to the organization's survival is worse than wasteful. An example is a milk processor whose employees fail to wash their hands before milking the cows or who add water to the milk in order to get larger volumes and higher pay. The results of such behaviors result in milk contamination or low quality milk. If these behaviors are widespread among employees, the organization can fail. All of the aforementioned types of behavior are maintained by contingencies of behavioral selection, even those behaviors that have a harmful effect on the organization. More milk results in more pay for the individual, regardless of the milk quality. Only changes in behavioral contingencies can mitigate problems such as these. (p. 105)
283	**10**	**1G3G**	What are the implications of complexity for managing organizational change? Although we can't eliminate complexity, we can manage it. We can manage environmental complexity by aligning the internal systems to the environmental demands. We can manage component complexity by analyzing the sets of interlocking contingencies and their products and eliminating redundancies and disconnects. And we can manage hierarchical complexity by attempting to simplify the levels of management, or reduce the disconnect between tiers. (p. 105)
284	**10**	**1G2G3G4G**	Organizational change means alterations of metacontingencies and behavioral contingencies. Metacontingencies are relations between the demand for aggregate products and the interlocking behavioral contingencies that produce them. Behavioral contingencies are relations between environmental consequences and operant behavior of individuals. The causes of organizational change are cultural and behavioral selection contingencies. (p. 105)

285	**10**	**4G**	What are the implications of environmental selection for managing organizations? First, because organizations evolve over time, any analysis of an organization is merely a snap shot of interrelated metacontingencies at a given time. Repeated analyses allow us to understand the course of an organization's evolution. Second, we alter metacontingencies at all relevant levels of the organization, and implement contingency management for behavior critical to the organization's survival. (p. 105 - 106)
286	**11**	**1G4G**	ABSTRACT: Behavior analysts implement different type of interventions in their efforts to bring about cultural change. In this article, we identify basic elements of interventions having such goals: the number of people whose behavior contributes to the product of interest, the variety of response topographies that help to generate the product, the intervention locus of change, and the selection contingencies involved in bringing about that change. Based on these elements, we distinguish interventions that target selection contingencies from those that do not; and we distinguish those selection contingencies where the locus of change is individual repertoires (operant contingencies and macrocontingencies) from those where the locus of change is cohesive cultural entities (metacontingencies). We illustrate each type of intervention with examples from the behavior analytic literature and discuss some conceptual, practical and methodological implications. (p. 31)
287	**11**	**4G**	In order to provide a framework to help us distinguish between behavioral and cultural interventions, we begin by identifying some of the elements that appear to characterize studies that target something more (or in addition) to the local contingencies of individual cases. We do not suggest that the elements we identify exhaust the possibilities, but they are those that we have found helpful in trying to sort out the various ways behavior analysts have attempted to bring about behavioral and cultural change. (p. 32)
288	**11**	**2G**	Operant behavior almost always involves a product and that product defines the specific operant that a behavioral intervention is designed to change (c.f., Lee, 1988). The reason for intervening to bring about behavior change is usually dissatisfaction with the product. Individuals may be dissatisfied with or threatened by their own behavioral products; for example, a student may be dissatisfied with his test grades. Alternatively, other people may be dissatisfied with the student's behavioral products; for example, parents or teachers may be dissatisfied with a student's test grades. Whoever is dissatisfied may initiate an intervention to change the student's behavior so that the product is more satisfactory. (p. 32 - 33)
289	**11**	**2G**	When the condition causing dissatisfaction or threat is the aggregate product of the behavior of many people, then the problem is considered a cultural problem and cultural intervention may be called for. Behavior change of a single individual will rarely have a discernible impact on the undesirable condition. For example, polluted waterways are the products of a variety of behaviors of many people, some functioning independently and others functioning as part of organizational entities such as manufacturing plants. Polluted waterways are a cultural problem, requiring cultural intervention. Although behavior is what must change to alter the aggregate product, successful intervention will not likely be a matter of observing each individual's behavior and manipulating the specific variables of which the behavior is a function on a case by case basis. Nevertheless, behavioral principles will be useful in designing a cultural intervention. (p. 33)
290	**11**	**2G**	We distinguish here among three sources of aggregate products. First, they may be the sum of the products of people behaving individually. If the recurring behavior of many individuals contributes to an aggregate product, it may have significant impact on the culture. For example, cigarette smoking causes 87% of lung cancer deaths (Ries et al., 2004). (p. 33)
291	**11**	**1G2G**	Another source of aggregate products is the interrelated behavior of many individuals, where each individual contributes to a unique product that is an end in itself. For instance, a congressional bill may be the result of a broad range of behaviors, often occurring only once per person, and involving many different people (staff, legislators, lobbyists, political party members, opposition members, representatives of organizations, etc.). The bill is the aggregate product generated by the behavior of many people working on the particulars of that legislation. Whether passage of a bill improves the well being of members of society is another matter, but the relevance of a bill to behavior change can be assessed (e.g., see Seekins, et al., 1988). (p. 33)
292	**11**	**1G2G4G**	A third source of aggregate products is the organized and recurring interactions of multiple individuals whose interrelated behavior results in the aggregate product. In this case, the product requires not only the behavior of all the individuals but also the recurring interlocking contingencies maintaining the interrelations among behaviors of different people (Malott & Martinez, in press). An example is an assembly plant's production of automobiles. Ongoing assembly of the finished automobiles (aggregate product) could not happen without established and re-occurring interlocking operant contingencies affecting the interrelated behavior of those working in the plant. (p. 33)

293	**11**	**2G4G**	The product of an operant response is a defining feature of the behavior of interest (cf. Johnston & Pennypacker, 1993, p. 67 on defining responses by their result). For example, only that lever pressing of Skinner's rats which closed an electrical circuit (the product or result of the movements) resulted in delivery of food (the consequence). It is also important in applied interventions to distinguish between the product that often enters into the behavioral definition and the consequences manipulated by the intervener. For example, points or social approval may be delivered as a consequence of a child's washing the dishes, whereas the clean dishes are the product that defines the behavior of interest. When the product cannot be manipulated by the intervener, it does not qualify as an independent variable in an experimental analysis, even though it may have a function in the natural environment (Vaughan & Michael, 1982.) For instance, the clean dishes themselves may come to function as a conditioned reinforcer. A similar distinction between product and consequences has been made in the analysis of organizational change (Glenn & Malott, 2004b). For example, some products of a university are its graduates' repertoires and the publications of its faculty and students. The consequences associated with the quality and quantity of those products can include government funding and alumni donations as well as matriculation of a new generation of students. (p. 34)
294	**11**	**2G**	Cultural interventions virtually always entail changes in the behavior of more than one person because cultures are, by definition, the "customs", "practices", "beliefs", or "attitudes" of "a group" or a "society" (Encarta, 2003). However, changes in the behavior of multiple individuals do not necessarily constitute cultural intervention. For example, a multiple baseline across individual subjects would not typically be viewed as cultural intervention because the product of each individual's behavior is of interest in and of itself. The multiple individuals whose behavior is targeted in a cultural intervention are those whose behavior contributes to an unsatisfactory aggregate product. So it is not the number of people whose behavior is targeted that designates an intervention as behavioral or cultural; rather it is whether the product of interest to the experimenters (and others) is the result of the behavior of one or multiple people. (p. 34 - 35)
295	**11**	**2G**	In addition to identifying the number of people whose behavior contributes to the product of interest to a community, it is also useful to consider the number of behavioral topographies/contingencies that contribute to that product or outcome. As we indicated in the section on products, sometimes an aggregate product is the result of many people doing the same thing under pretty much the same operant contingencies. An example is the prevalence of lung cancer (aggregate product) associated with smoking (behavioral topography) presumably maintained by physiological and social reinforcers. In this case an intervention could target the same topography of responses of an unspecified number of people. Other aggregate products are the result of many different behaviors. For example, a polluted river can be the result of many different activities (Todorov et al., 2004). (p. 35)
296	**11**	**1G2G3G4G**	Cultural lineages are more complex than operant lineages because they comprise more than the operant lineages of a single individual. They also comprise more than unrelated replications of multiple operant lineages that contribute to an aggregate product (such as the operant lineages of the many people contributing to ozone depletion). Cultural lineages comprise interlocking operant contingencies that involve multiple people and their re-occurring aggregate product. For instance, the printing of a particular newspaper on any given day requires the interrelated behavior of many individuals whose aggregate product is the daily newspaper. If the interrelations are reliable (that is if the interlocking operant contingencies are stable), the aggregate product can be consistently produced. Although behavior of the same people typically re-occurs, well established interlocking contingencies can remain intact (with variations) when one or a few people are replaced. If changes in personnel (or in the behavior of participating individuals) disrupt the interlocking operant contingencies enough to alter the aggregate product, the product may no longer meet the requirements of the external environment. In the newspaper example, the readership may stop subscribing if the content of the newspaper changes as a result of new personnel's failure to integrate its activities in the interlocking operant contingencies constituting the company. Alternatively, the requirements of the external environment may change, requiring alterations in the interlocking operant contingencies if their product is to meet the new requirements. Thus, the locus of any cultural change that occurs in this example is the interlocking operant contingencies that produce the newspaper day in and day out. In this example, the locus of change in cultural intervention is the re-occurrences of the interlocking operant contingencies and their daily product – the newspaper.(p. 35 -36)

297	**11**	**4G**	Here we relate those distinctions to the concepts of operant contingencies, macrocontingencies and metacontingencies (see Glenn, 2004, for further explication of these concepts). We do not suggest that these distinctions are the only ones possible. But they do help us to discriminate between interventions designed to change conditions produced by the behavior of one individual (behavioral interventions) and interventions designed to change conditions generated by the combined behavior of multiple individuals (cultural interventions). They also help us distinguish among some variations of cultural interventions. (p. 36)
298	**11**	**2G**	When operant lineages of enough people are similar enough in form or product, they may be called a cultural practice. If the behavior constituting a cultural practice has a product that can affect other people, then the aggregate product of the behavior can become a social problem. That is, the aggregate product is dangerous or detrimental to the health, safety or happiness of large numbers of people. The relation between the operant lineages of all people engaged in the cultural practice and the aggregate product is a macrocontingency. This term designates an if/then relation between the behavior of many people and the aggregate product of that behavior. It does not imply that the product functions as a consequence that maintains the behavior constituting the practice. (p. 37)
299	**11**	**2G**	Consider an intervention to alter the relation in a macrocontingency in which drunk driving produces many injuries and deaths. The behavior constituting the practice is driving under the influence of alcohol and that behavior is targeted for any individual in a community who engages in that behavior; the behavioral consequence (e.g., a penalty) is the same for all of them as well. Because an aggregate product (decreased frequency of death and injury in the community) will determine the success or failure of the intervention, this can be viewed as a cultural intervention. (p. 37)
300	**11**	**2G**	Because the cultural practice (drunk driving by many individuals) is not a cohesive whole, but a group of functionally unrelated behaviors, selection of the practice cannot occur. That is, the aggregate product of all drunk driving in the community cannot serve as a functional consequence for the practice and even if it could, the locus of change in the behavior constituting the cultural practice is operant lineages of individual organisms. The individual lineages of the various people can be selected by operant contingencies, but they must change one by one as a result of local contingencies applied to the relevant behavior. (p. 37)
301	**11**	**2G3G4G**	Most known human cultures include many complex organizations such as schools, unions, companies, non-profits, laboratories, restaurants, etc. The function of these organizations is to provide a product that satisfies requirements of its recipients. The recipients may be external individuals or other organizations, or they may be the members of the organization itself. The product is an aggregate product that is the result of recurring interrelated operants of multiple individuals. (p. 37 - 38)
302	**11**	**1G2G3G4G**	The recurring interrelations are due to operant contingencies in which the behavior of some people repeatedly functions as the environment in the operant contingencies maintaining the behavior of others. Call these interlocking operant contingencies. If the inputs that recipients provide contingent on the organization's product function to maintain the re-reoccurrences of interlocking operant contingencies and their product, cultural selection (analogous to operant selection) may be said to account for the cultural lineage of interlocking operant contingencies. The relation between the re-occurrences of the interlocking operant contingencies/their aggregate products and the maintaining inputs is a metacontingency. We call it a metacontingency for two reasons: it involves contingent relations analogous to those in a operant contingency and it contains many operant contingencies within itself. (p. 38)
303	**11**	**1G2G3G**	A critical feature of interlocking operant contingencies is that they survive relatively intact even when some of the operant lineages of some of the participating individuals are altered and even when some of the participants themselves quit, die, retire, or get promoted to another unit within the organization. If the interlocking contingencies maintain enough of the recurring behavior of the changing participants to produce an aggregate product that satisfies its recipients (individuals or organizations), then the interlocking operant contingencies themselves continue undergoing selection. (p. 38)
304	**11**	**1G2G3G4G**	To summarize, metacontingencies are contingent relations between reoccurring interlocking operant contingencies having an aggregate product and functional consequences based on the nature of the product. The repetitions of the interlocking operant contingencies of two or more people constitute a cultural lineage undergoing selection (for elaboration, see Glenn, 2004; Glenn & Malott, 2004b). (p. 38)

305	**11**	**2G**	Sometimes a unique aggregate product results from one or few reoccurrences of the interrelated behaviors of many people. The product may have great value in a culture, so behavior analysts may take some interest in how such a product can be made more likely. Although the behavior is operant, the specific behaviors contributing to the aggregate product may never occur again under similar conditions, so operant selection may not be involved. Of course, the origin histories of reinforcement of the people involved. But the interrelated behaviors form a kaleidoscope of activity that is not, and probably cannot, be repeated, therefore the locus of change is neither in behavioral or in cultural lineages. The locus of change is only in the environment that now includes the novel product of the non reoccurring interrelated behavior. (p. 38 - 39)
306	**11**	**1G2G**	We are distinguishing here between re-occurrences of interrelated behaviors that result in a novel aggregate product (produced by many people) and re-reoccurrences of interlocking operant contingencies that result in re-occurring aggregate products. The novel products of such interrelated behaviors may be organizational entities that, once formed, continue as cultural lineages whose reoccurrences enter into the metacontingencies that account for the stability of organizations that are major components of complex cultures. (p. 39)
307	**11**	**4G**	Distinguishing behavioral and cultural interventions is hard because all cultural interventions involve behavior change and much of the cultural environment of human behavior comprises the behavior of others. In this section, we draw on the behavior analytic literature to illustrate various approaches to the targets of behavioral and cultural interventions. (p. 39)
308	**11**	**2G**	The first example of behavioral intervention is based on Kladopoulos & McComas (2001). They investigated the effects of instruction and feedback on the proper form of foul-shooting performance in three players of a women's NCAA Division II college basketball team. Each player demonstrated correct form more frequently and increased the percentage of baskets made as a result of instruction and feedback. In that study, one behavior was targeted for each of the three players and a operant contingency was implemented between that behavior (foul shooting in correct form) and a functional consequence (feedback). The product of interest was baskets made by each player's foul shooting, so the products were not aggregate. The loci of change were the three independent operant lineages of the three players (see Figure 1). (p. 45)
309	**11**	**2G**	Another study exemplifying behavioral intervention was implemented by Dorsey, et al. (1980). They applied a fine mist of water to the face of each of seven persons with retardation contingent upon a specific behavioral topography (mouthing, hand biting, skin tearing, or head banging) that generated physical damage as a product. They found substantial reductions in the self-injurious behavior of all subjects. Although several subjects participated in the study, Table 2 shows that the product was not aggregate and that the number of people contributing to a product was one. That is, the product of interest to the experimenters was the injuries resulting from that one individual's responses. (p. 45)
310	**11**	**2G**	A macrocontingency is a relation between the recurring behavior of multiple individuals and a state of affairs (product) resulting from the sum of the individual behavioral products. Macrocontingencies define many cultural problems and attempts to solve these problems can reasonably be deemed cultural interventions. In macrocontingencies, the situation justifying intervention is an aggregate product of the behavior of many people and, therefore, the behavior of many people must change in order to rectify that situation. Although interventions designed to alter aggregate products may be cultural interventions, the only selection contingencies involved in a macrocontingency are operant contingencies. Table 3 shows two examples of interventions on macrocontingencies. A study by Jason et al. (1996) illustrates an intervention targeting the behavior in a macrocontingency—that between selling cigarettes to minors and the health risks to teenagers in a local community. The researchers reduced the number of cigarette sales to minors by monitoring such sales in local establishments and implementing civil penalties for selling to minors. The dependent variable in the study was the monthly aggregate sales to minors. The intervention did not target the selling behavior of specific individuals; rather the authors monitored the behavior of any sales clerk in any retail establishment included in the study. This study is a clear example of using behavioral procedures to alter the behavior of multiple, unspecified individuals, with the expected effect of bringing about a change in aggregate health risks to teenagers (see Figure 3). (p. 46)

311	**11**	**2G**	Research by Van Houten and Malenfant (2004) also addresses the relations in a macrocontingency. These researchers targeted the lawful behavior of yielding to pedestrians on the reasonable assumption that a relationship exists between drivers yielding to pedestrians and pedestrian casualties. The researchers used an enforcement program that included decoy pedestrians, feedback flyers, written and verbal warnings for failing to yield, and saturation enforcement for a 2-week period in two high-crash corridors of Miami Beach. During baseline, data were collected on the percentage of drivers yielding to pedestrians. The intervention was introduced first at selected crosswalks without traffic signals along one corridor. A week later, enforcement was shifted to crosswalks along the second corridor. Results indicated that the percentage of drivers yielding to pedestrians increased following the introduction of the enforcement program in each corridor and that these increases were sustained for a period of a year with minimal additional enforcement. Such results suggest that large scale interventions along the same lines would allow testing of the assumed relation between drivers' yielding and pedestrian casualties. In this study the number of people involved in the intervention was multiple and the individuals were unspecified. The same behavior (yielding to pedestrians) was monitored for all the people. The dependent variable was the percent of all the drivers yielding to pedestrians. The aggregate product of ultimate cultural interest was the reduced incidence of fatalities and injuries. The functional consequence of breaking the law was a verbal warning or citation. Given the result, we (as well as the authors) must assume that there were changes in the operant lineages of the individuals whose behavior was consequated and probably the behavior of others who heard about the enforcement activities. (p. 46 - 47)
312	**11**	**1G2G4G**	In a metacontingency intervention, the target of interest is not specific operant lineages but rather the recurring interlocking operant contingencies that produce aggregate products resulting in inputs that maintain the re occurrences. (p. 47)
313	**11**	**4G**	Here the locus of change is the lineage of interlocking operant contingencies with variations of re-re-occurrences over time. Table 4 shows two examples of what we believe are metacontingency relations. The first example is based on Nevin's (2003, 2004) analysis of the relationship between terrorist attacks and government retaliation across several terrorist organizations: various Jewish terrorist groups vs. British authorities (Palestine in 1945-48); Istiqlal vs. French authorities (Morocco 1953-56); FLN vs. French authorities (Algeria 1954-56); IRA vs. British authorities (Northern Ireland, 1971-73); Basque ETA vs. Spanish authorities (Spain, 1973-83); Tamil LTTE vs. Sri Lankan authorities (Sri Lanka 1983-87) and Shining Path vs. Peruvian authorities (Peru 1991-93). Nevin's lagged correlational data suggest that government retaliation "has no effect on the rate or severity of terrorist attacks across several different cultures and time frames" (Nevin, 2004, p. 159). Of course, organizations can't be punished or reinforced any more than people can be; and it is hard to imagine how government retaliation could function as a reinforcer or punisher for the behavior of individuals in a terrorist organization because the retaliatory actions are not well correlated with the operant lineages of any individual members. Although the retaliation could evoke rule statements about avoiding death and enhance the likelihood of some individuals deserting the organization, the organization itself is not likely to go away. Nevin pointed out that what does appear to reduce the frequency of (but not necessarily eliminate) the attacks is the achievement of the organization's political goals. (See also Dixon, et al., 2003.) (p. 48 - 49)

314	**11**	**1G2G3G4G**	What keeps the organization alive and its attacks continuing for years or decades while there is little or no evidence that they are achieving that goal? An attack carried out by a terrorist organization involves planning, organizing, recruiting, training, rehearsing, and no doubt any number of other activities that involve the behavior of many people. As long as the aggregate products of these activities (damage to the targets) result in inputs of money, recruits, equipment, etc., the activities resulting in that product seem likely to continue until the goal is met. But that which continues is more than operant lineages of the participants. The re-occurring interlocking operant contingencies must continue achieving the damage that results in inputs from the external environment. If the organization comprises systematic and recurring relations among the operant contingencies supporting the behavior of its individual members, then the attacks are likely to become increasingly successful due to the continuous selection of those interlocking contingencies having the product selected by the external environment. It may be worth noting that a lone individual committing one or a series of terrorist attacks, like a lone bank robber, can cause serious damage, including human casualties. But when terrorist attacks (or bank robberies) are carried out by effective organizations, the problem is of a different magnitude. The difference lies in the potential longevity of the entity producing the recurring attacks—much longer than the lifetime of any individual. We suggest that the behavior of the individuals in terrorist organizations is maintained by the social and other reinforcers provided by other members. What keeps the organization functioning as a cohesive whole is the metacontingency between the interlocking operant contingencies and the inputs from the external environment. Figure 4 illustrates this type a metacontingency, which involves repetitions of multiple interlocking contingencies of various behaviors. (p. 49)
315	**11**	**4G**	Another example of research that we believe implicitly addresses metacontingencies is a study by Mace, et al., (1992). They scored three classes of events from videotapes of 14 college basketball games during the 1989 National Collegiate Athletic Association tournament: reinforcers (such as points and favorable turnovers), adversities (such as missed shots, unfavorable turnovers, and fouls), and responses to adversities (favorable or unfavorable outcomes of the first possession of the ball following an adversity). They performed within-game and within-team analyses of these data supported the following three findings: First, a team's favorable response to an adversity increased as the rate of reinforcement increased three minutes preceding the adversity; second, basketball coaches called time-out from play more often when being outscored by their opponents; and third, calling time-outs from play was an effective strategy for reducing an opponent's rate of reinforcement. Although the results of the study were discussed in terms of behavioral momentum it is not incompatible to consider the likely relation between the interlocking operant contingencies with their points earned/games won (products) and the results of such products for maintaining the team's integrity throughout beyond the series under study. Consider the elements in Table 4. Each team had multiple players. The behavior of each player was affected in systematic ways by the behavior of the others on their team in the group effort to score against the other team and block the other team's scoring. Behaviors, such as driving the lane, blocking shots, in bounding the ball, shooting foul shots, setting picks, assisting other players to make a basket occurred repeatedly under recurring stimulus conditions and the aggregate products were the team's wins/losses and their record in the National Collegiate Athletic Association tournament. The importance of that product to the future of the team was not discussed in the article, but one could expect that resources such as player and coach recruits and external funding would be affected by that product. The locus of change was in lineages of interlocking operant contingencies for each particular game. (p. 50 - 51)

316	**11**	**2G**	There are cultural interventions that generate significant change as measured by an aggregate product, but the target of the intervention is not operant lineages or lineages of interlocking operant contingencies. These interventions often involve many interrelated behaviors of a configuration of many people behaving in unique circumstances. Table 5 shows two examples of this type of intervention. The first example is the creation of the behavior analyst certification program in Florida (Johnston & Shook, 1987; Shook, 1993; Shook & Eyer, 1995; Starin, et al. 1993). The conditions of the creation of the original program were unique and various people with special repertoires behaved in novel ways. The aggregate product was the certification system in the State of Florida, the first in the U.S.A. The repertoires of operant lineages of most of the individuals involved probably didn't change much. Nor were there systematic re-occurrences of interlocking operant contingencies related to a recurring aggregate product. Therefore there is no known lineage to account for and no evidence of selection. The interrelated behavior and its one-time product were unique. As pointed out by Starin et al. (1993), there are over 1,000 professions regulated in one or more of the 50 US States, and although establishing a certification process might be similar from one discipline to another, each process is unique and involves different people and circumstances. (p. 51 - 52)
317	**11**	**2G**	Another example familiar to many behavior analysts is the formation of the Midwestern Association for Behavior Analysis (MABA), later renamed the Association for Behavior Analysis (ABA). (See Peterson (1978); Morris, et al. (2001); Malott et al. 2002). Again unique circumstances and unique repertoires of key individuals combined to result in the formation of the Association. No lineage of recurring interlocking operant contingencies accounted for the formation of the organization. And much of the behavior that resulted in that formation occurred only once, so operant lineages weren't altered by selection contingencies either. See Figure 5 for a representation of an intervention that involved multiple interrelated behaviors of various individuals but no evident systematic change in operant or cultural lineages. Once an organization is formed, then cultural selection processes involving metacontingencies can account for recurring interlocking operant contingencies with their aggregate products. For instance, once the certification system existed, its interlocking operant contingencies continued, evolving slowly as a result of the acceptability of its products to its individual constituents and other organizations. ABA too has been evolving as the interlocking operant contingencies constituting its governing body and administration adapt to requirements of its members, donors and other organizations. (p. 52)
318	**11**	**1G2G3G4G**	Because behavior analysts are most familiar with operant contingencies, many of the efforts to accomplish cultural intervention attempt to change the behavior of one individual at a time. Focusing on single operant lineages of specific individuals will not get us very far, however, if the goal is to impact the aggregate products in the community at large, such as prevalence of illness or incidence of homicides. Larger scale interventions such as those on seat belt use (Geller & Lehman, 1991; Geller, et al., 1985) have taken us a giant step forward in dealing with cultural level problems. The concept of macrocontingencies suggests that these interventions will more likely be viewed as important by the larger culture if researchers measure the impact of the intervention on the aggregate product that is of ultimate concern to society. Adapting organizations better to the external environment requires considering the elements of the metacontingencies in effect: interlocking operant contingencies with imbedded operant contingencies and aggregate product, and requirements of the external environment. Altering these relations necessitates systems analysis methodologies, involving tools such as process maps, organizational charts and the total performance system (Gilbert, 1996; Malott, 1999, 2001, 2003; Rummler & Brache, 1995). In contrast, to be effective in intervening in macrocontingencies, we don't need to address consistent interactions among participants. (p. 53 - 54)
319	**12**	**4G**	College students were assigned to 2 groups of 4 participants each in a reversal design. On each trial participants chose individually how many tokens to bet, and then collectively chose a row on an 8x8 matrix with a plus or minus sign in each cell. After that the experimenter announced a column that determined whether the group won or lost the bets. Before the trial ended, participants had to distribute their earnings. In experimental condition A the group won in trials after distributing proceeds equally on the previous trial, and in condition B they won only after unequal distribution in the previous trial. Results show that the external contingency on distribution (or, as we suggest, metacontingency) selected the groups' distribution of their earnings. (p. 41)

320	**12**	**1G**	According to Skinner's causal mode of selection by consequences (1953, 1974, 1981) learned behavior and cultural practices are selected by their consequences. Many such consequences are directly, and mechanically, produced by the behaving organism. But most human behavior is under control of social consequences and social antecedent stimuli (Skinner, 1948, 1953, 1974). To describe a social episode it is necessary to identify operant behavior of two (or more) organisms where each organism's behavior is among the environmental variables accounting for the behavior of the other(s) (Skinner, 1953, p. 304). Skinner (1957) and others (e.g., Glenn 1991; Mattaini, 1996) called such interrelated operant contingencies interlocking behavioral contingencies.(p. 41 - 42)
321	**12**	**1G**	The term interlocking contingencies of reinforcement emphasizes that one person's actions or their effects (or features associated with them) function as another person's environment, therefore increasing the relevance of the behavior of each as the significant behavioral environment of the other. (p. 42)
322	**12**	**1G2G3G4G**	It has been suggested that interlocking contingencies of reinforcement can themselves be selected by external consequences in a third level of selection by consequences; and that the contingencies describing relations between interlocking behavioral contingencies and cultural level consequences be termed metacontingencies (Glenn, 1986, 1988, 1991, 2004; Glenn & Malott, 2004; Malott & Glenn, 2006): They comprise a unit of analysis that is distinct from the contingencies of operant reinforcement of individual behavior although their fundamental components include operant contingencies. (p. 42)
323	**12**	**1G2G3G4G**	Metacontingencies are defined as interlocking behavioral contingencies (IBCs) that produce an aggregate effect (that could not be produced otherwise) on which the action of an external environment is contingent. The action of the external environment is called a cultural consequence. Paralleling the contingencies of reinforcement that account for the origin and maintenance of operant behavior, metacontingencies account for the origin and maintenance of IBCs and their effects. The results are lineages of responses (in operant selection processes) and lineages of IBCs (in cultural selection processes). As such, metacontingencies are deemed a unit of analysis (albeit not the only one) of cultural practices (Glenn, 2004). (p. 42)
324	**12**	**4G**	The concept of metacontingency could help account for the origin and evolution of such cultural level entities as schools, legislatures, and businesses, which have cultural practices tailored to their functions in the larger culture. (p. 42)
325	**12**	**1G2G3G**	One feature common to all of the quoted experimental work is their reliance on contingencies of reinforcement as the unit of analysis. These experiments did not deal with the emergence of cultural units of analysis that may arise from relations between interlocking behavioral contingencies (necessarily involving more than one organism) and consequences contingent on the characteristics or effects of those IBCs. (p. 43)
326	**12**	**1G2G3G**	The independent variable in the latter experiments may be viewed as the contingency between the (internal) interlocking contingencies of reinforcement and the consequences external to those IBCs. The dependent variable was the performance of the group as a functional unit. ... Wiggins (1969) worked with ten experimental groups, each one with three players. Roles were assigned to each player: a leader was in charge of making decisions, a secretary had privileged information that could not be shared with the others but could increase the group's probability of success, and a treasurer handled the group's winnings. The leader had to bet more money than the other two, the secretary bet 7 cents, and the treasurer bet 4 cents on each trial. Each group of players was submitted to 10 experimental sessions, each with 30 trials. After individually betting some of their money on each trial, the group's task was to choose a row in a 7x7 matrix. The matrix was placed on a board and cells were marked with either a plus or a minus sign. After the group's choice the experimenter announced his choice of a column. If the cell formed by the group's and experimenter's choice had a plus sign, the players won 30 cents (a "successful" trial). If the cell had a minus sign, the players lost part of their bet (an "unsuccessful" trial). Once money was gained or lost, the players decided what the payment for each player should be, and a new trial began. Thus "success" or "failure" followed in time the group choice of row, but the plus ("success") or minus ("failure") sign was contingent on the players' distribution of tokens in the previous trial. In some conditions, the group achieved a plus signal by distributing money from the previous trial unequally and in other conditions for distributing their money equally. Wiggins' results indicated that the "external contingency" controlled the groups' distributive strategies: Players distributed the earnings equally or unequally depending on the experimental condition. (p. 43 - 44)

327	**12**	**1G2G3G4G**	Wiggins' experiment may be viewed as manipulating metacontingencies to show control over the interlocking behavioral contingencies that produced equal and unequal distributions. However, his data were based on a group design and variables such as the different tasks assigned to each participant may have reduced or increased the probabilities of occurrence of IBCs related to one or other pattern of distribution. The present study was based on Wiggins experimental design, but the experimental question was: if the success (reinforcement) of individual behaviors (like betting money) is made dependent on an effect (equal or unequal distribution of earnings) that is the consequence of other behaviors that can only be emitted if all members of a group concur (the decision of splitting the earnings equally or unequally), will such a consequence differentially select interactions (IBCs) that lead to success? Or else is it possible to change the interactions in a small group by making consequences contingent on an aggregate outcome of group performance? (p. 44 - 45)
328	**12**	**1G2G3G4G**	In this experiment IBCs of unspecified topography, composed mainly of verbal antecedents, behaviors and consequences, resulted in one of two aggregate products: equal or unequal distributions of money among participants (the dependent variable). A [meta]contingency was established by the experimenter's manipulating the relation between the types of divisions and their interrelated IBCs (DV) and the cultural consequence (IV) that is group's "winning" or "losing" on the subsequent trial (as shown in Figure 1). In some conditions, IBCs producing unequal distributions on the previous trial resulted in "winning" on the next trial; in other conditions IBCs producing equal distributions on the previous trial resulted in "winning" on the next trial. (p. 45)
329	**12**	**1G2G3G4G**	The present study shows, as did others (Wiggins, 1969; Elliot & Meeker, 1984; Judson & Gray, 1990; Gray, Judson & Duran-Aydintug, 1993) that the interrelated behavior of individuals in groups changes as a function of consequences upon the products of those behaviors. Furthermore, it shows that changes in the behaviors of individuals and the group interactions are reversible; that is, individual and "group" patterns change when "external contingencies" (Wiggins, 1969) change. Here the relevant independent variable was the metacontingency (i.e. dependency) between a given distribution pattern the aggregated outcome produced by IBCs and the winning of tokens by the group as a whole related to a plus sign (the cultural consequence). (p. 53)
330	**12**	**1G2G3G4G**	Although it took longer for both groups to achieve criterion in the unequal condition (the first condition for Group 2 and the second for Group 1), the stability criterion was reached much faster on subsequent reversals. This result indicates an increasing sensitivity to the relevant experimental conditions. This sensitivity is, possibly, the emergence (via variation in individual player behavior) of patterns of behaviors that allowed for interactions—among players and over trials—which produced the outcomes required by the metacontingency in effect. The selection of behaviors under the control of other member's behaviors is required for the recurrent production of the aggregate outcomes (distributions) and it is this relation between IBCs and their related outcomes that is selected by the cultural consequence manipulated by the experimenter. (p. 53 - 54)
331	**12**	**1G2G3G4G**	The increase in the malleability of the groups' performances may be exemplified by the performance of Group 2 players. Even though Group 2 achieved criterion both when unequal distribution and equal distribution conditions were in effect, Figure 3 shows that players developed what may be called an egalitarian pattern of distribution which resulted in each player betting and winning similar amounts (see Figure 3, sessions 5 to 9) in successive experimental sessions and a general increase in the betting and winnings: over trials each participant won or lost similar amounts, but there was an increase in efficiency. This was achieved by a coordinated pattern of behavior among participants. That is, if the equal condition was in effect, participants bet an equal number of tokens and distributed their winnings equally. In the unequal condition if a player bet more than the others and received more than the others, then on the following trial a second player would bet highest and receive more tokens. At the end of successive trials all players won similar amounts and as a group they won more by meeting the metacontingency requirements. Even if the subjects couldn't describe the rule "equal or unequal divisions result in more gains," they apparently could state to each other how much they must bet at each trial and they surely could socially reinforce or punish the betting or verbal behavior of other group member to fit the required IBC and produce the aggregated outcome and the cultural consequence. Similarly to what happens in some shaping processes in an operant laboratory, it is not necessary that the subject can describe the contingency to behave under its control. (p. 54)

332	**12**	**1G2G3G4G**	If this interpretation has any bearing, the results here reported also show that the selection of IBC's and their aggregate outcomes or products (here, the unequal or equal distributions) was tied up with the selection of individual behaviors that emerged as behaviors in relation to other members' behaviors—in other words, to the selection of interlocking behavioral contingencies. In this interpretation, the recurrence of a given aggregate outcome (unequal distribution or equal distribution) was taken as a measure of the selection of interlocking behavioral contingencies (see Figure 2), and the recurrence of related patterns of individual behavior (here, betting and tokens gathered) in a group as the measure of the selection of the relevant interlocking behavioral contingencies (see Figure 3). In this interpretation the present report may be taken as a cultural analog of selection of operants by contingencies of reinforcement. Specifically, IBCs having products that meet the requirements of metacontingencies arise from variation and are selected by consequences external to the IBCs and their product. (p. 54)
333	**12**	**1G2G3G4G**	The present results indicate that variations in a cultural practice, i.e. recurring interlocking behavioral contingencies that lead to given outcomes, may be selected by consequences if these are made dependent on the IBCs' outcome, or on the very relationship between interlocking behavioral contingencies and their aggregate products. More studies are necessary to increase the generality of the present findings. Further studies should investigate the effects of other manipulations such as the number of group members, or the effects of changes in parameters such as the magnitude of the consequences, or the effects of more reversals of the experimental contingencies. Further studies should also investigate behavioral measures of the effects of the experimental manipulations, such as direct measures of participants' interactions, as well as develop methods for directly controlling dimensions of the IBCs. Future studies should also collect data when participants are substituted for other participants. The effects of such generations on the selected interlocking behavioral contingencies are relevant to the concept of metacontingency because they produce cultural lineages (cf. Glenn, 2004; Glenn & Malott, 2004; Malott & Glenn, 2006). The present study contributes to the behavior analytic literature by providing results from preliminary experimental analysis relevant to the conceptual contributions of Skinner (1953, 1974, 1981) and Glenn (1988, 1991, 2004) and it shows the possibility of taking complex phenomena to the laboratory by building experimental analogs. (p. 55)