



Revista Latinoamericana de Psicología

ISSN: 0120-0534

direccion.rlp@konradlorenz.edu.co

Fundación Universitaria Konrad Lorenz

Colombia

Zagury Tourinho, Emmanuel; Vichi, Christian
Behavioral-analytic research of cultural selection and the complexity of cultural Phenomena
Revista Latinoamericana de Psicología, vol. 44, núm. 1, 2012, pp. 169-179
Fundación Universitaria Konrad Lorenz
Bogotá, Colombia

Available in: <http://www.redalyc.org/articulo.oa?id=80524017016>

- How to cite
- Complete issue
- More information about this article
- Journal's homepage in redalyc.org

redalyc.org

Scientific Information System
Network of Scientific Journals from Latin America, the Caribbean, Spain and Portugal
Non-profit academic project, developed under the open access initiative

Behavioral-analytic research of cultural selection and the complexity of cultural Phenomena

La Investigación Analítico-Conductual de la Selección Cultural y la Complejidad de los Fenómenos Culturales

Recibido: Julio 26 de 2011
Revisado: Diciembre 4 de 2011
Aceptado: Febrero 25 de 2012

Emmanuel Zagury Tourinho

Universidade Federal do Pará, Brasil

Christian Vichi

Universidade Federal do Vale do São Francisco, Brasil.

This paper was supported by the Brazilian National Research Council (CNPq) through a research grant to the first author (304116/2007-6) and a doctoral stipend (480727/2007-4) to the second author.

The authors wish to thank Sigrid Glenn (University of North Texas) and Angelo Sampaio (Universidade Federal do Vale do São Francisco, Brazil) for their contributions and criticisms on a first draft of the paper.

Emmanuel Zagury Tourinho, Universidade Federal do Pará, Centro de Filosofia e Ciências Humanas, Departamento de Psicologia Experimental, Rua Augusto Corrêa, 1, Guamã, 66075-110 - Belem, PA – Brasil. E-mail: eztourinho@gmail.com

Christian Vichi, Fundação Universidade Federal do Vale do São Francisco, Colegiado de Psicologia, Av. José de Sá Manicoba, S/N, Centro, 56304-917 - Petrolina, PE – Brasil. E-mail: christianvichi@gmail.com

Resumen

Varios trabajos conceptuales y experimentales en la literatura analítico-conductual han considerado que es posible hacer frente a los fenómenos sugeridos por BF Skinner como selección cultural de manera heurística. Los conceptos de metacontingencia, contingencias conductuales entrelazadas (CCE), entorno cultural, producto agregado, consecuencias culturales y sistema receptor son herramientas útiles para aplicar el nivel cultural de análisis. El artículo examina las sugerencias de Glenn y Malott (2004) sobre la complejidad en las organizaciones y sugiere que ésta podría ser complementada por las dimensiones: (a) conflicto entre las consecuencias individuales y culturales; (b) la concurrencia de las contingencias que afectan el conducta de cada miembro de un grupo, (c) la especialización de las funciones ejecutadas por cada participante en el sistema. Sugerimos que cuanto más complejo es un sistema social,

Abstract

Several conceptual and experimental studies on the behavioral-analytic literature have suggested that it is possible to address B.F. Skinner's cultural selection phenomena through heuristic approaches. The concepts of metacontingency, interlocking behavioral contingencies (IBCs), cultural milieus, aggregate products, cultural consequences and receiving systems are useful tools for the cultural level of analysis. This paper reviews Glenn and Malott's (2004) perspective on complexity in organizations and suggests complementing it with Norbert Elias' sociological approach, in which increasing complexity in a social system results in (a) increasing conflicts between individual and cultural consequences, (b) greater concurrency of the contingencies that affect the behavior of each member of the group, and (c) the specialization of the functions performed by each participant in the system.

más mediación social es necesario para seleccionar las CCEs y más diferenciadas son las consecuencias culturales del producto agregado.

Palabras clave: Selección Cultural, Complejidad, Metacontingencias, Contingencias Conductuales Entrelazadas

Conceptual studies of social behavior and cultural phenomena, published in the recent behavioral-analytic literature (e.g., Andery, Micheletto & Sérgio, 2005; Glenn, 1991, 2003, 2004; Glenn & Malott, 2004), permit the development of an original and heuristic approach to cultural selection. In particular, the concept of metacontingencies (Glenn, 1986, 1991, 2003, 2004) has been suggested as a potentially important unit of analysis for cultural phenomena. Metacontingencies describe a functional relationship between (a) interlocking behavioral contingencies (IBCs) plus their aggregate product, and (b) a cultural (selective) consequence displayed by a (social) receiving system (cf. Glenn, 2004; Glenn & Malott, 2004). These concepts (further discussed below) have grounded a number of empirical studies on cultural-level selection processes (e.g., Bullerjahn, 2009; Caldas, 2009; Leite, 2009; Pereira, 2008; Tadaiesky, 2010; Vichi, 2004 – all Master's Degree Dissertations), which are beginning to appear in behavior-analytic journals (e.g., Vichi, Andery & Glenn, 2009). Vichi et al. (2009) have provided the first empirical evidence of metacontingencies as proposed by Glenn (2004), thus demonstrating the selection of interlocking behavioral contingencies (IBCs) by cultural consequences.

As the behavioral-analytic approach to cultural phenomena advances, Glenn and Malott (2004) made an important step by identifying some of the dimensions of organizational complexity, which may be extended to cultural complexity in general. These dimensions include: (a) the number of variables external to the organization, (b) the number of components that constitute the organization, and (c) the number of its system levels (or hierarchy).

The aim of the present paper is to discuss the complexity of cultural phenomena. The study starts with a review of some key concepts in the behavioral-analytic literature on cultural selection. Then, we comment on Glenn and Malott's view of the complexity of organizations and

We suggest that the more complex a social system is, the more social mediation is necessary to select the IBCs and the more differentiated the cultural consequences from the aggregate product.

Key words: Cultural selection, Complexity, Metacontingencies, Interlocking behavioral contingencies.

introduce a view of cultural phenomena complexity in modern societies which emphasizes the fact that the individualization process produces original interdependence relations among individuals. Finally, it is suggested that these views of complexity are in fact complementary, and may provide an important reference point for the empirical investigation of metacontingencies.

The Units of Cultural Analysis

Before starting on the main theme of this paper, a brief introduction to its two main concepts – IBCs and metacontingencies – will be useful. IBCs are units of variation, and the metacontingency is the unit of analysis of cultural selection (Glenn, 1986, 1988, 1991, 2004). While the concept of metacontingencies has been revised since its original use by Glenn (1986, cf. Andery, Vieira, Bullerjahn & Amorim, 2008), the revisions are beyond the scope of this paper, and they will not be discussed here (for an historical approach, see Martone & Todorov, 2007). Given this, in this paper only the established definitions of the concepts of IBCs and metacontingencies will be used (cf. Glenn, 2004, Glenn & Malott, 2004, Malott & Glenn, 2006).

Interlocking Behavioral Contingencies (IBCs)

As verbal behavior is primarily a form of social behavior, which almost invariably involves two or more organisms, Skinner (1957/2002, p. 432) described the phenomenon as an “interlocking system of response”. In these systems, one organism acts as the environment for the other's response, and vice-versa.

For example, in a verbal interaction, one can ask a friend about the time, and the friend, under the control of the behavioral product of one's verbal behavior (the sound that stimulates his hearing organ) will probably answer. In

turn, this same person, under the control of the friend's response, may thank him/her and possibly reinforce his/her verbal behavior. Clearly, the environments controlling the response of each one in the behavioral stream are the behavioral products of each other's behavior, which is known as the "social environment" (Skinner, 1953) in a sequence of interlocking contingencies.

In large social groups, the number of organisms is increasingly high—sometimes millions—, as well as possible interactions or combinations of interactions, related to a diversity of possible consequences. For example, people can socially reinforce, punish or extinguish the behavior of others by using diverse and varying patterns of intermittent or continuous schedules based on different behavioral dimensions.

According to Glenn (2004), we are faced with the process of cultural selection when IBCs "function as an integrated unity and result in an outcome that affects the probability of future recurrences of the IBCs" (p. 144). In such circumstances, what is recured are patterns of coordinated behaviors of several individuals interacting with one another, not simply individual behaviors of each one.

These characteristics often make the IBCs complex in cultural systems. But IBCs are not spontaneous, but rather, the product of a third type of selection. We can say that the contingencies controlling these behaviors function in a manner similar to that in which an operant behavior is selected by its consequences.

Metacontingencies and the Selection of IBCs

As stated above, IBCs are selected by their consequences, in the same way as operant behavior, although a different level of analysis is involved—the cultural level. By adopting the functional analysis of behavior, it is possible to explain most human or nonhuman behavior just by describing the contingencies of reinforcement (including IBCs) related to this behavior, although the problem of explaining the contingency remains (Skinner, 1953). What maintains the contingencies (or IBCs) that control the behavior?

When two or more people compound an IBC, there may be considerable changes in the environment. It may even be possible that the coordinated actions of these different people produce something that was impossible

for a single person (i.e. cooperation in the experimental and social psychology literature). If the IBCs of these organisms can change the environment, it is theoretically possible for these outcomes or cultural consequences to select the IBCs, as in a process of biological or ontogenetic evolution.

Note that the probability altered in these relations is not that of the recurrence of the behavior, but of the recurrence of the IBC. This means that it is not necessary for the same organisms to always participate in the IBC, some individuals can be replaced, as long as some members of the previous generation are still present, resulting in the creation of a cultural lineage.

In a cultural lineage, the participants are replaced over time, but the IBCs are maintained. A cultural system will usually have special contingencies designed to shape the repertoires of the new members, in order to ensure that they can replace the outgoing members. In a larger society, these special contingencies would be the education system.

The concept of metacontingency thus addresses the functional relationship between (a) IBCs plus their aggregate product, and (b) cultural consequences (cf. Glenn, 2004; Glenn & Malott, 2004). This is similar to the operant contingency concept, but it refers to the cultural rather than the behavioral level, and to IBCs and their products, rather than to individual behavior. "Metacontingencies, then, are the contingencies of cultural selection. They give rise to the organized collections of behavioral contingencies which constitute increasingly complex cultural-level entities" (Glenn, 2004, p.145). For example, the behaviors of the members of a research group (including senior researchers, graduate and undergraduate students), and their products (tables, figures, articles, texts) are built as a scientific system as the members of the group are exposed to cultural consequences (grants, publications, prizes, etc.) that are contingent not on the individual behavior of each member of the group, but on the coordination of their behaviors plus their aggregate products. These consequences are delivered by a social "receiving system" (cf. Glenn & Mallot, 2004), external to the IBCs (e.g., funding agencies, journal editors, associations, academic institutions, etc.). And the IBCs evolve as the group is successively exposed to those cultural contingencies. Because the cultural consequence is dependent on IBCs, not on individual behaviors, the system is not (permanently) affected when a member leaves the

group (for instance, when a student graduates and is hired to work somewhere else). The leaving member is replaced by a new one, who is then instructed by the old members.

Not only the research group keeps in function when one of its member leaves, but, also, the coordination of the behaviors of its members evolves, giving rise to a cultural lineage, as the group is exposed to successive cultural contingencies, in ways that lead to more complex arrangements and/or more effective functioning (cf. Glenn, 2004). The group may start with a few members and limited competence to develop research and publish papers in the best journals, and become a large leading group, responsible for broad research programs and worthy of large acknowledgement in the scientific community. As usual in evolution, which will depend on successive cycles of variation (of the IBCs), and selection (by cultural consequences).

Some very important achievements of humans depend on the sort of coordination of behaviors suggested by the concept of metacontingencies. The evolution (variation and selection) of IBCs has been essential, for example, to all educational, scientific and economic enterprises that prevail in modern societies. This does not mean that cultural selection is entirely explained by the concept of metacontingency. Perhaps, processes not yet described may account for the evolution of cultural practices in societies. But the proposal of the metacontingency as a unity of analysis of cultural selection has added to behavior analysis the conceptual tools to an effective approach of some phenomena that are beyond the scope of the analysis of individual behavior. And the empirical evidence already provided concerning the selection of IBCs by cultural consequences (e.g. Vichi, Andery & Glenn, 2009) is encouraging. Also encouraging are the data suggesting that we may find in the cultural level analogs of phenomena investigated in the behavioral level, such as discriminative processes (Vieira, 2010), intermitent consequences (Amorim, 2010), and removal of consequences (Caldas, 2009).

Along with the first experimental works on cultural selection, behavior analysts have begun to draw attention to complexity of cultural phenomena, in order to address some very relevant problems found outside the laboratory. The initial approach is conceptual, as it needs to be before we are able to design new experimental analogs of cultural phenomena. In the paragraphs below, we discuss this topic.

The Complexity of Organizations: A Few Comments

Glenn and Malott's (2004) description of a social system and their approach to complexity in organizations may be extended to cultural phenomena in general. A system is conceptualized as "a variety of relationships between many kinds of separate elements arranged as a whole to achieve an outcome" (p. 92), and an organization "consists of a group of people who perform tasks that achieve a particular product" (pp. 91-92). The reference to "a product" suggests that Glenn and Malott are focusing on business organizations, and the examples discussed in their paper confirm this perspective. However, their reference to environmental, compositional and hierarchical complexities is useful for the understanding of complexity in other social systems, as they point out: "Throughout the paper, we use real examples, most of which pertain to profit-based organizations. We are confident that profit-based and other human organizations are as alike with respect to our analysis as soccer playing and reading are alike in operant analyses" (p. 90).

Again, a research group may be considered to be a good example of a complex social system. As a social system, the group encompasses a variety of types of relationships, such as those between graduate and undergraduate students, professors, researchers, and laboratory assistants. This group works as a single system, with specific goals, such as the production of scientific knowledge in the form of publications, presentations at scientific events, and success in obtaining grants for further research.

A system of this type varies in complexity as a function of variables external to the group, such as the number and the nature of the institutional policies regulating publication and the supervision of students, grants received, and the requirements of journals for the publication of manuscripts. The more external components interacting with an organization, the more complex is its environment. It will also vary in complexity according to the number of students and researchers participating in the group, their qualifications, and their products (i.e. undergraduate monographs, dissertations, theses, projects, applications for grants and so on). The more people involved in the organization, the more IBCs there will be, and the more complex its constitution will be (component complexity). Finally, the complexity of the system will vary with the

number of supervisory “layers” involved in the production process. For example, a research team will usually include at least one major scientist, who is responsible for managing the group and supervising his students, Ph.D students, who supervise the Master’s degree students and in turn supervise the undergraduates, and so on (hierarchical complexity).

The more complex a social system, the clearer the need will be for a “receiving system” to select its IBCs. Glenn and Malott (2004) define a receiving system as “the recipient of the aggregate product [which] functions as the selecting environment of the interlocking behavioral contingencies” (p. 100). In a market society, the IBCs of any business organization will be selected by the practices of the consuming market. The same might be said for a scientific system, in which case, the receiving system might be other groups of the scientific community, industry or the society to which the group belongs.

This means that there is a receiving system even if the research group is not linked directly with a profitable market company: “the receiving system may be exclusive to organizations, but may be translated to environmental or societal demand for other types of groups that may not be considered organizations” (Houmanfar & Rodrigues, 2006, p. 14). It should be noted, however, that the receiving system is not the third term of the cultural contingency (as Houmanfar & Rodrigues suggest) – the cultural consequence is – but it is the entity (outside the IBCs) that delivers the cultural (selective) consequences.

A receiving system is expected to exist when the complexity of the social system is so great that its aggregate product is not enough, in itself, to function as the selecting environment. The product of a complex modern organization itself (e.g., cigarettes produced by a tobacco industry) cannot usually select the IBCs. The product is often relevant to a different group or organization (receiving system), rather than the group that produced it. In such circumstances, additional social mediation is often (but not always) needed.

Let us consider a small group consisting of a few families, the livelihood of which is derived from fishery. A number of IBCs can be found in their daily practices of fitting out the boats, harvesting and landing fish, and processing the catch. The fish is the aggregate product of these IBCs and may also play a selective role when it is

the staple food consumed by the members of the group. In such circumstances, aggregate products and cultural consequences coincide. However, the situation changes considerably when the group starts selling the fish and buying other goods. The direct product of the IBCs (the fish) is not enough anymore to maintain the interlocks. The process now requires an external agent (the receiving system) to consume the aggregate product and to display the (cultural) potentially selective consequence (money or credit to afford other goods). The extent to which social mediation is required may make the difference between less and more complex cultural phenomena. With social mediation aggregate products and cultural consequences become differentiated. In complex arrangements, aggregate products become part of what is selected, together with the IBCs that give rise to them. And the selective role is now played by a cultural consequence which differs from the aggregate product. The transition requires increasingly social mediation.

Given this, we may refer to a continuum of cultural phenomena complexity, along which aggregate products and cultural consequences become more and more differentiated. Less complexity may reflect events that function as both aggregate products and cultural consequences, while greater complexity implies greater differentiation between aggregate products and cultural consequences, depending on the processes of social mediation (see Figure 1).

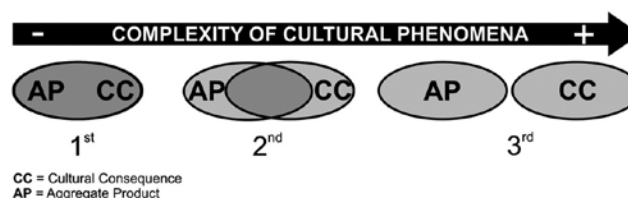


Figure 1. Evolution of the complexity of cultural phenomena. The first, second, and third phases shown represent the extremes and the midpoint of the continuum.

What, then, are the dimensions along which cultural phenomena vary? The more complex the IBCs, the less their probability is affected by the immediate aggregate product itself, and the more they depend on social mediation (receiving systems). These dimensions include the number of external variables, the number of social system components, and the number of system hierarchical levels (Glenn & Malott, 2004). We may add to this list some other dimensions of social groups in modern societies that seem to impact the evolution of cultural practices (some of

which are also relevant to the configuration of “privacy” – cf. Tourinho, Borba, Vichi, & Leite, 2011): the conflicts between (operant) individual consequences and cultural consequences, the concurrency of the contingencies that affect the individual behavior of each participant in a system, and the specialization of the functions performed by each participant in the system. In the next paragraphs, these dimensions, based largely in a set of sociological works will be discussed (Elias, 1939/1990a, 1939/199b, 1994).

Cultural Phenomena Complexity in Modern Societies

Modern societies may be said to be the result, among others, of an individualization process, which means, that the life of the individual becomes less closely identified with the shared history of the group, and increasingly the result of the individual’s personal history. Modern societies are also the result of a civilizing process, which involves the increasing coordination of the behavior of the members of the group, and progressively less room for “impulsiveness”. This process also results in a higher degree of self-controlled behavior (thus, the impact on privacy).

The achievements of modern societies (its industries, science, art, and so on) are both dependent on the emergence of specialized social functions, and made possible by the coordination of behaviors within large populations. Specialization gives rise to greater innovation, and more efficient and productive systems (depending on their context). Watches, agendas, treatises on social behavior, and other artifacts ensure the precise coordination of the behaviors of different people. The modern state and its institutions work together to ensure the conditions necessary for such coordination.

In modern societies, adults are no longer dependent on their original family ties for the majority of their needs, but rather, they depend on a much larger number of people, many of whom are anonymous and physically absent. The reduced dependence on family members and the less visible nature of the new relationships partly account for the individual’s feeling of autonomy. In order to become competent in a labor, for instance, the individual depends less (or nothing) on his family instructions, but cannot be successful unless a number of people work to provide the needed computers, books, buildings, laboratories etc. (and most of these people will probably remain unknown to him/her).

Processes through which modern societies become increasingly complex include features of cultural phenomena that are additional to those described by Glenn and Malott (2004) are suggested in this study, and that may be interpreted with behavior-analytic concepts. In the next few paragraphs, it is commented in a brief way some of these features: the conflicts between behavioral and cultural consequences, the concurrency of contingencies, and the specialization of the functions performed by each participant in the system.

Conflicts between Individual (Operant) and Cultural Consequences

In recent empirical work on metacontingencies (e.g., Bullerjahn, 2009; Caldas, 2009; Lopes, 2010; Pereira, 2008; Tadaiesky, 2010; Vichi, 2004), researchers have manipulated individual and cultural consequences that favor both the individual and the group. In modern societies, however, there are circumstances in which there is a conflict between behavioral and cultural contingencies. For example, participating in a research team will sometimes require the postponement or cancellation of family events, leisure activities, or other personal pursuits. This is typical of modern societies, in which the social groups members share specific interests, but little of their daily lives.

It seems reasonable to assume that we are faced with more complex cultural phenomena when IBCs produce an aggregate product (and a cultural consequence) under circumstances in which individual consequences are negative, concurrently with individual contingencies that would be more favorable to the individual over the shorter term. For example, arriving for a research meeting at the programmed date and time may require leaving home before a family member’s birthday, but makes the meeting possible; taking a bus or sharing the car to go to work may imply less sleeping time, while reducing air pollution. The expression “ethical self-control” is suitable to refer such conflicts, since it links the theme to the literature on self-control, and stress involved social dimensions. Ethical self-control, thus, may be seen as a type of self-control repertoire related specifically to the control of individual actions that provide cultural benefits. This may often involve the loss of a natural reinforcer at the individual level, but will nevertheless produce stronger social reinforcers. The question is what extent such existent conflicts for, and how it might be measured, and it has been possible to

develop experimental analogs of such phenomena. We have approached this question by designing experiments on ethical self-control and cultural selection (Borba & Tourinho, 2009; Silva, Cabral, Souza, Tourinho & Leite, 2009), which establish a conflict between the magnitude of immediate individual consequences and that of delayed group consequences, with individual consequences being contingent on individual operant behavior and cultural consequences being contingent on IBCs.

Concurrency of Contingencies that Affect the Behavior of Each Member of a Group

The behavior-analytic literature on choice behavior (e.g., Herrnstein, 1970; McDowell, 1989) is based on the premise that organisms always respond to concurrent contingencies of reinforcement. This is especially true in the case of individuals in modern society, who are continually faced with multiple possible courses of action, to an extent not found in simpler societies. "In simpler societies, there are fewer alternatives, fewer opportunities to choose ... In the simplest societies, people often have one sole, straight path since childhood: one for women; another for men. Crossroads are rare" (Elias, 1994, p. 110).

In modern societies, individuals from different social classes are faced with different numbers of opportunities to choose, but anyone is faced with concurrent contingencies not found in less individualistic societies.

We might say that social systems function with varying degrees of complexity according to the average number of concurrent contingencies to which their members are exposed. The workers of a car plant, for instance, belong to a cultural system with several alternative concurrent options available to its members engaging, such as leisure activities and alternative work options. But these concurrent contingencies may be more or less numerous. Typically, they are less numerous in small towns, and more numerous in large cities (even though the internet may have changed this in some extent), but this may also vary with the type of work, the economic environment etc.

Cultural phenomena are far less complex when group membership is one of only a few professional, educational, or even social alternatives for the individual. To a certain extent, the group competes with other potential groups for members, offering different concurrent options. Large

multinational corporations, for example, may compete for the best professionals by offering all kinds of advantages and benefits.

Paradoxically, richer academic, economic or social environments imply greater demands for success. In other words, the group will depend on more numerous and diversified social contingencies to keep each member working as expected.

The measurement (and control) of concurrency of contingencies and metacontingencies is not an easy task. It is not even available in most circumstances outside the laboratory. But once this dimension is actually acknowledged as a relevant one, perhaps it is worthy taking it into account in the empirical investigation of cultural selection,

Specialization of the Functions Performed by Each Participant in the System

The more individualized a society is, the more specialized are each individual's social functions, and the greater the need to coordinate the behavior of the members of the group. Individualization means, among others, that people that are originally (e.g., at birth) members of the same group (like a family) gradually share less and less of their environmental histories – their daily lives are much less tied up together. As each one responds to different environments, their repertoires are also much differentiated. Such differentiation is favored by several environmental events found in modern societies, especially economical ones.

The rise of the professions and their gradual differentiation illustrates this process. Not only physicians take care of people, but also nurses, psychologists, nutritionists, etc. Not simply psychologists deliver psychological services, but clinical psychologists, organizational psychologists, developmental psychologists etc. Not simply organizational psychologists provide support for organizational demands, but private business organizational psychologists and public affairs organizational psychologists do so.

In a simple system, the functions performed by each participant in the system is very similar to the ones performed by other members (for instance, in the fishery community). And very often one member can easily substitute other members. The same cannot be said in a university or research institute, for example.

Groups with IBCs that require more specialized responses from its members will depend on a more precise coordination of their behavior. This can be justified due to the fact that groups with complex IBCs not only have more members and more IBCs, but the behavior of each participant in an IBC usually depends on that of many other individuals. This is not to say that there is no coordination or specialization in simpler systems, but only that these systems may show fewer such demands.

Specialization, then, is a different dimension from components number (Glenn & Malott, 2004). The component complexity (Glenn & Mallot) addresses the number of participants in a social system, but each member may or may not perform very specialized functions. Specialization complexity addresses how much specific is the task performed by each member of the group. This may make a great difference for the groups because, when functions are less specialized, members may replace each other, but the same does not happen with systems that comprise very specialized functions.

A simple fishing community is a less complex organization than a modern industrial fishery company, partly because, in the former, it makes little difference if a crew member arrives on board at 5:00 a.m. or 5:10 a.m., whether he/she rows or fishes, begins rowing on the right- or left-hand side of the boat, or stops for a smoke. Under market contingencies, however, much more specialization is observed, and the precision of each member's behavior may make the difference between obtaining the aggregate product or not. On a modern fishery vessel, for example, if a crew member (e.g., the mechanical engineer) fails to do his work with regularity, which may make the difference between being successful or unsuccessful in the market. Similar considerations are true of most modern organizations.

Research teams also tend to evolve specialized functions and the further advance in this direction, the greater precision is needed for the coordination of the behavior of its members in order to guarantee the production of specific outcomes. Researchers must record experimental designs and projects, supervise the collection of data, redefine procedures, analyze results, and so on, while the students will prepare the experimental set-up, recruit subjects, and collect data, and the assistants have their specific tasks, such as the development and running of software. As

the students are being trained in an educational setting, their knowledge and skills often overlap with those of the researchers, albeit with differing levels of responsibility and/or supervision. But the behavior involved in the IBCs must be coordinated, otherwise, when the congress begins, there will be no aggregate product to present to the (scientific) receiving system.

In a non-educational or non-training social setting, the specialization and coordination of actions tend to be more essential, and their cultural consequences more dependent on the limitations of a receiving system. From this perspective, quite different degrees of complexity can be observed in subtly different activities. When half a dozen family members interact to produce a meal, for example, they are engaged in a low-complexity activity involving few IBCs, which are selected by their own aggregate product (coinciding with the cultural consequence), i.e., the meal. By contrast, if two of these same family members set up a backyard business providing informatics support for local companies, they will be involved in a more complex activity, with more IBCs, which are not selected by the aggregate product, but rather by a cultural consequence delivered by the receiving system that consumes their services. If we agree that these three dimensions are relevant to the definition of the complexity of cultural phenomena in modern societies, then our continuum of complexity would be something like that presented in Figure 2.

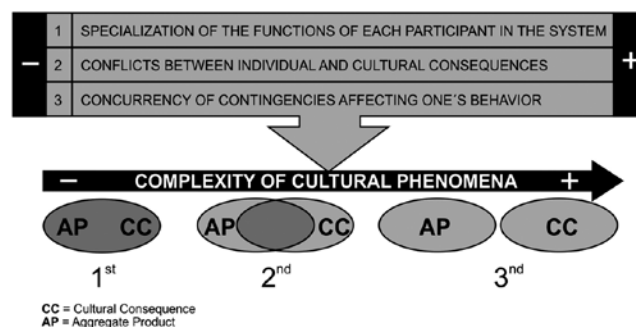


Figure 2. Effects of IBCs (three dimensions: 1, 2, and 3) on cultural phenomena complexity (complexity increasing from left [-] to right [+]). The more complex (+) the cultural phenomenon, the greater is the separation between the aggregate product and its cultural consequence.

Concluding Remarks

If greater complexity in cultural phenomena results in a distinction between aggregate products of IBCs and externally-generated cultural consequences, we may assume

that our unit of analysis comprises a cultural milieu (as proposed by Houmanfar & Rodrigues, 2006), IBCs, and a third term, which will vary according to the complexity of the system. In less complex IBC arrangements, the aggregate product is the third term that maintains the IBCs. As cultural units become more complex (and they usually do in modern societies), cultural consequences are mediated independently by the social environment. Thus, our unit of analysis for cultural phenomena based on the concept of metacontingency might be organized as in Figure 3.

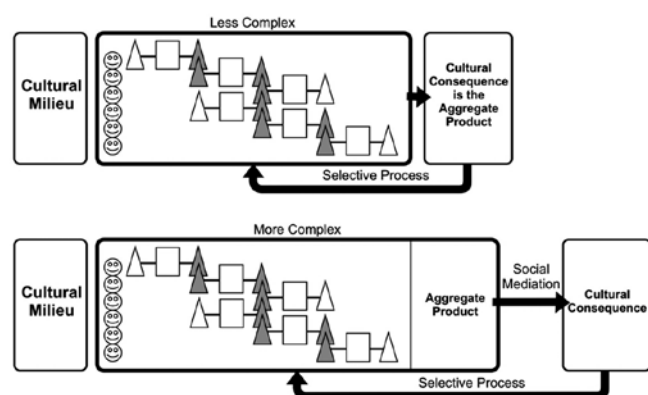


Figure 3. Suggested unit of analysis for a cultural phenomenon. The gray triangles represent the interlocking behavioral contingencies (IBCs).

The sources of complexity mentioned here are additional to those discussed by Glenn and Malott (2004), and they seem to address some very relevant dimensions of complexity of cultural phenomena in our (individualized) societies. They may not be so important in some business organizations (where one finds a more strict control of the environment), as they are in several other systems. It is noteworthy, however, that many organizations are now more and more interested in “multi-task” workers (which reduces specialization constraints), and/or in allowing workers to make their own schedule (which reduces conflicts between individual and cultural consequences).

Discussing the complexity of cultural phenomena represents a step forward in the effort to make cultural selection the subject matter of a science of behavior. It is important and remarkable that such issues are being addressed with behavior-analytic concepts and principles, as a development of Skinner’s original approach. And perhaps they will now be submitted to experimental investigation, which will then lead us to new conceptual refinements.

References

- Amorim, V. C. (2010). *Análogos experimentais de metacontingências: Efeitos da intermitência da consequência cultural* [Experimental analogs of metacontingencies: Effects of intermitente cultural consequences]. Unpublished Master’s Degree Thesis. Pontifícia Universidade Católica de São Paulo, São Paulo, Brazil.
- Andery, M. A. P. A., Micheletto, N. & Sério, T. M. A. P. (2005). A análise de fenômenos sociais: Esboçando uma proposta para a identificação de contingências entrelaçadas e metacontingências [The analysis of social phenomena: An outline of a proposal do identify interlocking contingencies and metacontingencies]. *Revista Brasileira de Análise do Comportamento*, 1(2), 149-165.
- Andery, M. A. P. A., Vieira, M. C., Bullerjahn, P. B. & Amorim, V. C. (2008, september). A evolução do conceito de metacontingência: uma análise por meio a definição e dos exemplos empregados por Sigrid S. Glenn [The evolution of the concept of metacontingency: An analysis of the definitions and examples offered by Sigrid Glenn]. Panel presented at XVII Encontro Brasileiro de Psicoterapia e Medicina Comportamental, Campinas, São Paulo, Brazil.
- Borba, A. & Tourinho, E. Z. (2009). *Efeitos da exposição a macrocontingências e metacontingências na produção e manutenção de respostas de autogerenciamento ético* [Effects of exposition to macrocontingencies and metacontingencies in the production and maintenance of ethical self-management responses]. Research Project, Universidade Federal do Pará, Belém, Brazil.
- Bullerjahn, P. B. (2009). *Análogos experimentais de fenômenos sociais: O efeito das consequências culturais* [Experimental analogs of social phenomena: Effects of cultural consequences]. Unpublished Master’s Degree Thesis. Pontifícia Universidade Católica de São Paulo, São Paulo, Brazil.
- Caldas, R. A. (2009). *Análogos experimentais de seleção e extinção de metacontingências* [Experimental analogs of selection and extinction of metacontingencies]. Unpublished Master’s Degree Thesis. Pontifícia Universidade Católica de São Paulo, São Paulo, Brazil.

- Elias, N. (1990a). *O processo civilizador* (Volume 1) [The civilizing process – Volume 1]. Rio de Janeiro: Jorge Zahar. (Originally published in 1939).
- Elias, N. (1990b). *O processo civilizacional* (Volume 2) [The civilizing process – Volume 2]. Lisboa: Dom Quixote. (Originally published in 1939).
- Elias, N. (1994). *A Sociedade dos Indivíduos* [The society of individuals]. Rio de Janeiro: Jorge Zahar.
- Glenn, S. S. (1986). Metacontingencies in Walden Two. *Behavior Analysis and Social Action*, 5, 2-8.
- 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). New York: Hemisphere.
- Glenn, S. S. (2003). Operant contingencies and the origin of cultures. In K. A. Lattal & P. N. Chase (Eds.), *Behavior theory and philosophy* (pp. 223-242). New York: Kluwer/Plenum.
- 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.
- Herrnstein, R. J. (1970). On the law of effect. *Journal of the Experimental Analysis of Behavior*, 13, 243-266.
- Houmanfar, R. & Rodrigues, N. J. (2006). The metacontingency and the behavioral contingency: Points of contact and departure. *Behavior and Social Issues*, 15, 13-30.
- Leite, F. L. (2009). *Efeitos de instruções e história experimental sobre a transmissão de práticas de escolha em microculturas de laboratório* [Effects of instructions and experimental history on the transmission of choice practices in laboratory microcultures]. Unpublished Master's Degree Dissertation Thesis. Universidade Federal do Pará, Belém, Brazil.
- Lopes, E. B. (2010). *Um análogo experimental de uma prática cultural: Efeitos de um produto agregado contingente, mas não contíguo, sobre uma contingência de reforçamento entrelaçada* [An experimental analog of a cultural practice: Effects of a contingent, but not contiguous, aggregate product on an interlocked behavioral contingency]. Unpublished Master's Degree Dissertation Thesis. Universidade Federal do Pará, Belém, Brazil.
- 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. M., & Todorov, J. C. (2007). O desenvolvimento do conceito de metacontingência [The development of the metacontingency concept]. *Revista Brasileira de Análise do Comportamento*, 3(2), 181-190.
- McDowell, J. J. (1989) - Two modern developments of matching theory. *The Behavior Analyst*, 12, 153-166.
- Pereira, J. M. C. (2008). *Investigação experimental de metacontingências: separação do produto agregado e da consequência individual* [Experimental investigation of metacontingencies: Separating the aggregate product from the individual consequence]. Unpublished Master's Degree Thesis. Pontifícia Universidade Católica de São Paulo, São Paulo, Brazil.
- Silva, B. R., Cabral, P. A. A., Souza, L. B., Tourinho, E. Z. & Leite, F. L. (2009). *Seleção cultural e autogerenciamento ético* [Cultural selection and ethical self-management]. Research Project. Universidade Federal do Pará, Belém, Brazil.
- Skinner, B. F. (1953). *Science and human behavior*. New York, NY: Free Press
- Skinner, B. F. (1957/2002). *Verbal behavior*. Acton: Copley..
- Skinner, B. F. (1981). Selection by consequences. *Science*, 213, 501-514.
- Tadaiesky, L. T. (2010). *Efeitos de contingências de suporte e de metacontingências sobre a seleção de contingências comportamentais entrelaçadas* [Effects of support contingencies and metacontingencies on the selection of interlocked behavioral contingencies]. Unpublished Master's Degree Dissertation Thesis. Universidade Federal do Pará, Belém, Brazil.
- Tourinho, E. Z., Borba, A., Vichi, C., & Leite, F. L. (2011). Contributions of contingencies in modern societies to “privacy” in the behavioral relations of cognition and emotion. *The Behavior Analyst*, 34, 171-180.
- Vichi, C. (2004). *Igualdade ou desigualdade em pequeno grupo: Um análogo experimental de manipulação de uma prática cultural* [Equality or inequality in a small group: An experimental analog of a cultural practice manipulation]. Unpublished Master's Degree Thesis. Pontifícia Universidade Católica de São Paulo, São Paulo, Brazil.

- 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.
- Vieira, M. C. (2010). *Condições antecedentes participam de metacontingências?* [Do antecedent conditions play a role in metacontingencies?]. Unpublished Master's Degree Thesis. Pontifícia Universidade Católica de São Paulo, São Paulo, Brazil.

