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THE METACONTINGENCY AND THE BEHAVIORAL CONTINGENCY: POINTS OF CONTACT AND DEPARTURE

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The nature of the relationship of the concepts of the metacontingency and the macrocontingency with the behavioral contingency is explicated in this paper. We provide an examination of the levels of analysis involved in the behavioral contingency and metacontingency as well as of the parallel between these two types of contingency. In doing so, we identify points of contact and departure between behavior analysis and cultural analysis. We suggest a set of refinements to the metacontingency that would bring about a better parallel of this concept with the behavioral contingency as well as a greater consistency in the associated levels of analysis.

KEYWORDS: metacontingency, macrocontingency, behavioral contingency, interdisciplinary contact, level of analysis, aggregate product lineage, interlocking behavioral contingency lineage

The analysis of cultural practices and their role in cultural survival has broadened the scope of behavior analysis considerably. A number of these formulations (e.g., Biglan, 1995; Glenn, 2004, 1989) have benefited from interdisciplinary contacts; significant among these have been commerce with behavioral anthropology (Harris, 1979). Others have proceeded on more specifically behavioral grounds (e.g., Hayes, 1988; Kantor, 1982; Malott, 1988; Skinner, 1972).

As mentioned by Houmanfar, Hayes, and Fredericks (2001), there is substantial agreement among behavior analysts that cultural practices are conditioned by social or verbal influence. Disagreement arises, however, in the analysis of the selection and maintenance of cultural practices. While some assume that cultural practices are maintained, ultimately, by their relation to cultural survival as an outcome, others provide alternative explanations. For example, Hayes (1988) accounts for the maintenance of cultural practices by reference to the complexity of other contingencies (e.g., strength of an adjustment and strength of a practice) that operate in a cultural context, as opposed to suggesting a final outcome that inevitably connects all practices. Kantor (1982)

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also avoids comments on final outcomes, focusing instead on a number of factors (e.g., group size, history, the characteristics of cultural stimuli) that contribute to the longevity of cultural behavior.

With regard to the interdisciplinary contact, behavior analysis focuses on individual behavior while cultural materialism focuses on group action. This group action or pattern can be viewed as being composed of individual behaviors. Therefore, individual behavior may be regarded as the substrate of cultural practices (Glenn, 1988). However, it is important to recognize that the two disciplines of behavior analysis and cultural analysis ultimately have their own units of analysis and their own principles. Cultural phenomena are not wholly reducible to individual behavior, in much the same way that behavior is not wholly reducible to physiology (Glenn, 2004). The goal of an interdisciplinary perspective on cultural practices and entities, therefore, is not reduction, but rather clarification of the relationship of phenomena across the two levels of analysis (Houmanfar, Hayes, & Fredericks, 2001). Glenn's (1988, 1989, 2004) work on the metacontingency is a significant contribution to helping bridge the relationship between the individual and cultural levels of analysis.

In short, our aim in this paper is to contribute to an understanding of the interdisciplinary interaction between behavior analysis and cultural materialism and discuss the potential for a refinement of said interaction. In presenting this analysis, we discuss the points of contact and departure between behavior analysis and cultural analysis and examine the coherence of the concepts of the metacontingency and the macrocontingency.

A BRIEF OVERVIEW OF THE METACONTINGENCY AND THE MACROCONTINGENCY

The concept of the metacontingency together with the concept of the behavioral contingency allows for the examination of the interlocking behaviors and the behavioral contingencies involved therein that contribute to an aggregate product that meets some environmental demand. According to Glenn (1988, 2004), the metacontingency is parallel to the behavioral contingency, however, they each deal with phenomena at different levels of organization. The behavioral contingency consists of an antecedent, a behavior, and a consequence. The metacontingency, on the other hand, consists of "interlocking behavioral contingencies, their aggregate product, and their receiving system" (Glenn & Malott, 2004, p. 100). The last component, 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. The contingencies are referred to as interlocking because the behavior or the

consequence of one individual's behavior functions as an antecedent for another's behavior. For example, in a typical restaurant, a member of the wait staff takes an order from a customer, the order is then given to the kitchen, the designated cook then makes the meal, and the meal is delivered to the customer by the wait staff. The product or consequence of each behavior acts as the antecedent for the next behavior, i.e., the cook cannot begin making a meal until he or she has received the order from the wait staff, and so on.

In a parallel to the role of the operant in a behavioral contingency, the interlocking behavioral contingencies (IBCs) involved in a metacontingency are thought to be a functional unit, and their outcome affects the probability of future recurrences of the IBCs (Glenn, 2004). The IBCs, therefore, form a lineage – a set of recurring IBCs – that are selected by the environment.

Glenn (2004) also introduced the concept of the macrocontingency, which describes the relations between a cultural practice and the cumulative consequences arising from the prevalence of that practice within a culture that engage in that practice. Macrocontingencies do not form a lineage of recurring IBCs, since the behaviors of the individuals involved are usually disconnected from each other's behavior. For example, consuming a diet high in fat and sugars may contribute to the obesity of an individual and the cumulative effect of many people consuming this diet may result in greater government-funded health care costs for the society. The consumption of a poor diet by each individual is based on his or her eating history, access to different types of food, knowledge about nutrition, and so on. The cumulative effect of rising health care costs cannot function as a consequence for the diet or exercise behavior of the individual, as it is an aggregate outcome of the group practice. No one person can significantly impact the cumulative outcome of higher health care costs via his or her diet or exercise.

Having introduced the concepts of the behavioral contingency, the metacontingency, and the macrocontingency, we shall conduct a closer examination of the levels of analysis involved in the behavioral contingency and the metacontingency, and the parallel between these two types of contingency. We shall also address the difference between the metacontingency and macrocontingency at the cultural level and the interaction between lineages of IBCs and lineages of the aggregate products.

LEVELS OF ANALYSIS

The behavioral contingency and the metacontingency describe phenomena at different levels of analysis, the former at the individual level, the latter at the group or cultural level. The relationship between these levels is similar to the

relationship between the physiological and the psychological levels of analysis. Although behavior may be viewed as composed of muscular, glandular, and neural activity, these components are not included in the three-term behavioral contingency because they are occurring at another level of analysis. Behavior may be considered to have emerged (see Holland, 1998; Johnson, 2001 for examples of other types of emergence) from the coordinated activity of one's physiology. Put another way, behavior is not simply the sum of physiological activity, but is rather more than or qualitatively different from physiological activity. This emergent relationship may be crucial to distinguishing phenomena at different levels of analysis.

Glenn (2004) points out the hierarchical nature of the metacontingency by indicating that "the prefix *meta-* together with the root *contingencies* is intended to suggest selection contingencies that are hierarchically related to and subsume, behavioral contingencies" (p. 144). She further discusses the emergent relationship between interlocked behavioral contingencies and the outcome of these interrelated contingencies by providing an example of two people who prepare meals together, each engaging in different activities based on what the other is doing. According to Glenn (2004), the outcome of these individuals' behaviors is a meal consisting of several courses that are perfectly timed. She also indicates that this outcome is "'more than' or 'different than'" (p. 145) the meals that either of them could produce on their own. The meal is not simply the "cumulative effect of their different behaviors," it is "the outcome of their interrelated behaviors" (Glenn, 2004, p. 145). From this example as well as the assertion of the hierarchical nature of the metacontingency, one might surmise that the outcome of the interrelated behaviors—the meal—is emergent upon the individual behaviors of the two people.

The outcome of IBCs in the metacontingency, therefore, is analogous to the response in the behavioral contingency as both emerge from processes or activities at a lower level of analysis. The IBCs would be considered akin to the physiological components of behavior because each produces an outcome that is "more than" or "different than" its parts. Thus, the metacontingency may benefit from treating the interlocking behavioral contingencies that contribute to the outcome in the same way that the behavioral contingency treats the physiological components of behavior. Just as the contribution of physiology to behavior is implicitly, but not explicitly, recognized in the behavioral contingency, the IBCs' contribution ought to be implicitly recognized in the metacontingency since the latter deals with phenomena at a higher level of analysis. Although the individual participants in the IBCs may vary (Glenn, 2004), the IBCs are nevertheless contingencies for individual behaviors (Sandaker, 2004) and therefore seem to be

out of place when explicitly included in a group or cultural level of analysis. Instead, the emergent outcome, behavior (in the behavioral contingency) or the aggregate outcome (in the metacontingency) ought to be considered the middle term, or what is selected, in each contingency. However, what is selected in the metacontingency, according to Glenn and Malott (2004), is the IBCs that contribute to the outcome. This appears to be an inconsistency between the behavioral contingency and the metacontingency. This position would be equivalent to suggesting that it is the physiological activity rather than behavior that is selected in the behavioral contingency, which would be inconsistent with the level of analysis of individual behavior.

If the metacontingency is a parallel to the behavioral contingency as Glenn (2004) suggests, the former may benefit from establishing a greater parallel with the latter. We will therefore proceed to a closer examination of the parallels between these two types of contingency.

PARALLELS BETWEEN THE BEHAVIORAL CONTINGENCY AND THE METACONTINGENCY

The behavioral contingency, in its basic form, consists of three terms, the antecedent, the behavior, and the consequence. The first and last terms are environmental factors, while the middle term is what is selected and also what is emergent upon the contribution of phenomena occurring at a lower level of analysis. The antecedent occasions the behavior and the consequence affects the future probability of the occurrence of a behavior, i.e., the consequence might be thought of as “doing” the selecting.

In the description of the metacontingency, according to Glenn and Malott (2004), the first term is the IBCs that contribute to an aggregate product – the second term – and the third term is the receiving system. Only the third term in the metacontingency is an environmental factor. The first term (IBC) contributes to the second term (the aggregate product), but neither of these are environmental factors. The receiving system is what “does” the selecting in the metacontingency. However, what is selected is the first term, the IBCs, in the contingency. Moreover, the relationship between the IBCs and the aggregate product is not similar to the relationship between the antecedent and the behavior in the behavioral contingency. The antecedent in the behavioral contingency, an environmental factor, typically occasions the behavior. However, the IBCs in the metacontingency are the components that produce the aggregate outcome.

In order to better preserve the suggested parallel between these two types of contingency, we propose that the first and last term in the metacontingency be factors of the environment, while the middle term be that which is selected.

Moreover, in order to maintain a conceptual consistency, we suggest that the middle term be at the same level of analysis - the group or cultural level - as the other terms and emergent upon processes at a lower level of analysis. Therefore, we believe that both a change to and a reconfiguration of the terms in the metacontingency would enhance our understanding of this concept as well as the role of behavior in the interdisciplinary contact between behavior analysis and cultural materialism.

We take no issue with the middle and last terms of the metacontingency, the aggregate product and the receiving system respectively. However, we suggest that the cultural milieu such as the beliefs, morals, material resources, consumer feedback, and structure (e.g., competition, overarching government policies, organizational policies, rules, etc.) of a culture be included in the first term. Thus, the new relation between the first and second term is not that the former consists of the components of the latter, but rather that the former occasions the latter. We shall further explore this relationship later in this paper. In addition, since it is the middle term that is selected in the behavioral contingency, we suggest that the aggregate product be what is selected by the receiving system.

While the metacontingency as described by Glenn (2004) and Glenn and Malott (2004) is as follows:

IBCs → Aggregate Product → Receiving System

the metacontingency suggested herein is as follows:

Cultural Milieu → Aggregate Product → Receiving System.

Glenn (2004) asserts that it is the IBCs that are selected in a metacontingency, which equates them with the role of behavior in the behavioral contingency. In the latter type of contingency, recurring behaviors with the same functions are grouped together as a class, referred to as an operant. Thus, an operant is a lineage of responses, each of which tends to produce a similar consequence. In the metacontingency, according to Glenn (2004), it is the IBCs that are selected and recurring IBCs are considered a lineage. IBCs that produce successful outcomes become more prevalent while those that do not die out. In addition, variations in IBCs may produce different outcomes and these variations, depending on their relative success, would be more or less likely to recur in the future. This is a close parallel to behavioral evolution, where variations in responding may produce differential consequences that would make the recurrence of these behaviors more or less likely in the future. However, as

demonstrated earlier, the IBCs are occurring at a lower level of analysis than the rest of the terms in the metacontingency and the IBCs are not what the receiving system obtains. Rather, it is the aggregate product that is acquired by the receiving system. The organized practice, since it is composed of IBCs that are contingencies for individual behavior, is amenable to an analysis at the behavioral level. The aggregate product, however, having emerged from the interrelated behaviors in the IBCs, is not wholly reducible to the behavioral level. Accordingly, in our re-interpretation of the metacontingency, the aggregate product would therefore be what is selected by the receiving system.

Variations in the aggregate product would be rewarded or shunned by the receiving system and the recurrence of similar aggregate products would be considered a lineage from this perspective. For instance, the aggregate product of a car is selected by the consumers that buy it. There may be variations in this aggregate product; some cars may have fewer problems over time than others, and consumers who demand reliability from their cars may purchase these cars over variations of other cars that are not as reliable. Thus, the aggregate product of reliable cars would become more prevalent in the culture over other kinds of cars. There are a set of IBCs, such as higher inspection standards for car parts and longer tests of their durability, which may also be indirectly selected by virtue of their contribution to the increased reliability of the produced cars. These IBCs may be duplicated by other car manufacturers in an attempt to generate an aggregate product of a reliable car. Therefore, we might observe an increase in the prevalence of both the aggregate product – a more reliable car in this case – and the IBCs – stricter organizational standards for car parts – that contribute to it. In addition, the cultural background of the society or group would occasion the creation of different aggregate products. For example, the general aesthetic inclinations of the culture might be towards more rounded shapes, which might occasion the production of a variety of cars with curved designs. Another culture might prefer straight lines, which might result in the production of a greater variety of cars with boxy shapes.

This analysis applies to metacontingencies associated with the internal functioning of the organizations as well. The relationship between the metacontingency and the behavioral contingency would be consistent across different organizational levels (e.g., organization, process, task, etc.). In other words, from our perspective, metacontingencies associated with the internal functions (e.g., processes or small metacontingencies) and the entire organization interact in a similar manner with the related IBCs that operate at the behavioral level (see Figure 1). For instance, when analyzing the IBCs and aggregate products of core departments (e.g., production) and integrating departments (e.g.,

human resources) in a given organization, it is still the aggregate products that are subject to selection by internal receiving systems/environmental demand (e.g., other departments). Further, the cultural milieu; internal consumer feedback, organizational policies, material resources, etc. are the settings factors that occasion the occurrence of the associated IBCs that bring about the production of aggregate products which meet the internal consumer (e.g., other departments) demand.

COMPARING THE TWO VERSIONS OF THE METACONTINGENCY

We will use an example very similar to the one about two people cooking together, used by Glenn (2004), to illustrate how the two versions of the metacontingency, Glenn's and ours, would view things differently. Let's say a couple, Gary and Penny, hosts a dinner for a group of friends every weekend. During most weekends, Penny prepares the main entrees, sauces, and vegetable dishes while Gary cuts, cleans, and otherwise assists with the preparation and when Gary prepares appetizers and desserts, Penny serves as the assistant. However, during some weekends, Penny and Gary reverse roles such that Penny takes the lead on the appetizers and desserts and Gary takes the lead on the entrees, sauces, and vegetable dishes. Penny's and Gary's behaviors are interlocked, as their respective activities are based on what the other person is doing during the meal preparation. Each weekend, their dinner guests make comments about the food after eating the meal.

According to Glenn's description of the metacontingency (2004), positive comments by the dinner guests would perpetuate some parts of the IBCs more than others. If the guests liked the entrees and desserts more during weeks when Penny prepared them, those patterns of the IBCs where Penny took the lead on entrees and desserts would be more likely to recur in the preparation of subsequent weekend dinners. However, according to our reconfigured metacontingency, it is the aggregate product that would be selected by the comments of the diners. Thus, the kind of entrees and desserts prepared when Penny took the lead would be more likely to recur in the future. Note that in our description of the metacontingency, since it is the aggregate product that is selected, the IBCs that led to the well liked entrees and desserts need not be perpetuated. It is possible that Penny takes the lead on entrees and desserts and Gary serves as helper for the majority of subsequent dinners. However, Gary might notice that the guests like Mexican entrees more, and that Penny tends to prepare these dishes more often. Thus, Gary may prepare more entrees of these kinds when it is his turn to take the lead. And since there are a variety of Mexican

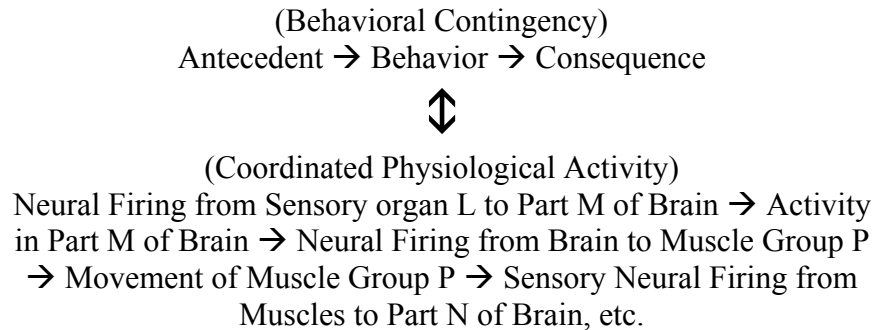
entrees, the meal preparation practices of Gary and Penny may vary greatly from weekend to weekend.

During one week they may spend one hour preparing the components and condiments for tacos and allow their guests to make their own tacos. During another week, they may prepare carnitas, a slow cooked pork entrée, which may require about eight hours of cooking time. The guests may like both dishes equally well, however the IBCs involved in cooking these entrees may not carry over to the preparation of other dishes. The lineage, therefore, would be the recurring aggregate product, Mexican entrees, not necessarily the IBCs involved in their production. Furthermore, the guests are unlikely to care about how much time is spent in the cooking of either entrée or who took the lead in the preparation. As long as the food is Mexican, they are satisfied. No doubt the IBCs that Penny's and Gary's behaviors participate in are foundational to the preparation of the meals. The meals would not occur without their behaviors, however, the aggregate outcome of their interlocked behaviors, the meal, is "more than" or "different than" the cumulative effect of their individual behaviors (Glenn, 2004). The aggregate product, being emergent upon the IBCs is a phenomenon at a different level of analysis than the IBCs. Thus, the reconfigured metacontingency describing the relationship between the meals produced and the dinner guests' reactions to the meals is not explicitly inclusive of the associated IBCs.

It appears to us, therefore, that the relationship between the behavioral contingency and the metacontingency is similar to the relationship that obtains between physiology and behavior. We would like to illustrate this point with an example. Let's say that Barry is a right-handed basketball player who attends regular shooting practice sessions with a coach. During some sessions, Barry shoots the ball from his right shoulder and during other sessions, he shoots it from just above the center of his head. Let's assume that Barry cares about the opinion of his coach and would like to impress her. Barry happens to make a higher percentage of his attempts when he shoots from his shoulder. Barry's coach, therefore, makes more positive comments about his shooting when Barry is shooting from his shoulder. The underlying physiology that contributes to Barry's shooting of the basketball consists of muscular, glandular, and neural activity. As Barry shoots the ball more frequently from his right shoulder we would probably find that the neural connections having to do with motor coordination of Barry's right hand when he shoots from his right shoulder are strengthened. Barry's shooting percentage also increases as he shoots more often from his shoulder now, and completely stops shooting from just above the center of his head. The

three-term contingency would look as follows: Barry's coach asks him to shoot the ball → Barry shoots from shoulder → Barry's coach praises his shooting.

When an aggregate product is selected by the receiving system, the interlocked behaviors that contribute to it may also be more likely to be selected, in much the same way that the physiological relations – neural connections and muscular activity – that contribute to behavior may be strengthened when that behavior is selected by its consequences. Although the underlying physiological components, the neural connections and muscles, that contribute to Barry's shooting are strengthened during these sessions, notice that they are not mentioned in the contingency. A physiological psychologist would, of course, be interested in the neural and muscular activity and would therefore examine how they contribute to the behavior. Although we appreciate the contribution of Barry's physiology to his behavior of shooting the basketball, as behavior analysts, we would insist that the physiological components do not belong in the three-term contingency. The contribution of physiology to behavior may be viewed as follows:



In keeping with this, we suggest that although IBCs contribute to the aggregate product, their function is best recognized at the level of analysis of the behavioral contingency as opposed to the level of the metacontingency.

When we are discussing behavior, the principles of physiology are not adequate to the task of analyzing behavior in its proper context and at its proper level of analysis. Similarly, the aggregate product in our description of the metacontingency – being “more than” the sum of the behaviors that contribute to it – is not properly analyzed using behavioral principles. In addition, an analysis of the IBCs or organized practices that produce an outcome does not require a different set of principles besides behavioral principles. In fact, the IBCs, being interlocking *behavioral* contingencies, are a description at the behavioral level. However, the complexity of a set of IBCs is far greater than the complexity of a

behavioral contingency involved in the behavior of an individual. The interrelated behaviors of several individuals and the contingencies in which their behaviors participate in a coordinated fashion have far more components than an individual behavioral contingency. Nevertheless, this complexity does not preclude a behavioral analysis of IBCs.

Since IBCs may be analyzed in terms of behavioral principles, it might be more in keeping with the behavioral contingency, to think of the interlocked behaviors, rather than the interlocking behavioral contingencies, as what is being selected at the behavioral level. Thus, we might say that it is the individual yet coordinated behaviors of all those that participate in the IBCs at various points in time that is selected. The recurrence of interlocked behaviors that contribute to a successful aggregate product may not necessarily be affected by this outcome. Rather, the behavioral consequences produced by these behaviors may differentially affect their probability of occurring in the future. If the local contingencies of reinforcement support the recurrence of these interlocked behaviors, the aggregate outcome may be more likely to be produced. As an aside, although the IBCs may provide the structural relationships of the behaviors, we feel that the functional aspects are lost when we focus on IBCs instead of interlocked behaviors. The argument that IBCs are subject to selection at the cultural level, therefore, is somewhat confusing. As mentioned by Hayes and Houmanfar (2004), contingencies cannot be the outcomes of processes of selection. Having addressed the relationship between the last two terms in our description of the metacontingency, we will now examine the role of the first term.

THE CULTURAL MILIEU

In the behavioral contingency, the first term, the antecedent is an environmental variable that occasions the second term, the response. In attempting to hold to the parallels between the behavioral contingency and the metacontingency, we advocate that the first term in the metacontingency be an environmental factor; specifically, the cultural milieu of beliefs, material resources, organizational as well as well overarching governmental policies, rules, traditions, morals, institutions, technological progress, and environmental competition. This component is identified in an implicit manner in Glenn's metacontingency description. It is important to note that the cultural environment as identified here would also include the verbal behaviors of the culture, which Glenn (1988, 1989) has pointed out as being important to the development and maintenance of cultural practices. However, these verbal behaviors are not

explicitly included in the terms of the metacontingency according to Glenn (2004).

In our previous example of the couple preparing weekend dinners for their friends, the cultural milieu would consist of several factors including, but not limited to, of the general diet of the society, attitudes prevalent in the culture towards Mexican food, the general level of exposure of the society to Mexican food, and the access to recipes for making Mexican entrees. If the general diet of people in the society not very spicy (spicy meaning hot, in this case – as measured in Scoville units), Gary and Penny are unlikely to prepare very spicy food. If there is no access to the internet or to recipe books in the culture, then Gary and Penny are unlikely to prepare a wide variety of Mexican entrees. If people in the society had an unfavorable attitude towards Mexico, again it is unlikely that Gary or Penny would cook Mexican entrees at all. During the height of the cold war, for instance, Russian food may have been looked upon with disdain by the majority of Americans. During the recent war in Iraq, when the French President, Jacques Chirac was critical of the U.S. government actions, several restaurants in America boycotted French wine and some even poured out their wines into gutters. These factors are likely to affect the incidence of certain aggregate products (French or Russian food, in this case) being made or brought into the community. In addition, those restaurants that may have sold these items may have lost several customers and as a result may have been less likely to do so in the future, until societal attitudes began to shift and the environmental demand for those items began to increase.

METACONTINGENCIES, MACROCONTINGENCIES, AND LINEAGES

From our perspective, an analysis of an aggregate product in terms of the IBCs that contribute to it, as in Glenn and Malott's (2004) view of the metacontingency, or in terms of the disconnected yet cumulative behavioral contingencies that contribute to it, as in the macrocontingency, is best addressed at the behavioral level of analysis, the behavioral level. Therefore, the aggregate outcome, not the IBCs, ought to be explicitly addressed at the cultural level. The means by which this product comes about, however, be it through IBCs (as in an organization) or through the cumulative effect of disconnected yet similar practices (poor diets by various unrelated people in our society that cumulatively increases health care costs), may be analyzed in terms of the behavioral contingency.

The obesity of groups and the resulting health care costs could be reduced through a metacontingent relationship, as in the case of a group of people who participate in a weight loss program in the same weight loss center, or through a

macrocontingent relationship, as in the case of a nationwide media awareness program. However, at the cultural level, the cumulative product of reduced health care costs is what is selected. The practices that bring about that weight loss are analyzable as individual behavioral contingencies, though they may be interlocked, and therefore ought not to be considered in a cultural analysis. Thus, the difference between a metacontingency and a macrocontingency is clear at the behavioral level, but is unclear at the cultural level since what is selected in the culture, in our estimation, is the aggregate product, not the practices that are involved in bringing about the aggregate product. The aggregate product of pollution, for example, may be brought about by metacontingencies (corporate polluters) and macrocontingencies (individual drivers), but no distinction can be made at the cultural level in terms of the behavioral contingencies that are responsible for the pollution. To analyze the behavioral contingencies would require a shift to a lower level, the behavioral level, of analysis. A distinction, however, may be made at the cultural level in terms of the groups (corporations or individual drivers) that contribute to the pollution.

A final factor we would like to address is the interaction between the aggregate product lineage and the lineage of interlocked behaviors. Let us consider an organization such as a graduate student club for behavior analysis at a university. The club may fall under university regulations and may therefore be required to have a graduate faculty advisor, an appointed president and to recruit a minimum number of members. Beyond the university regulations, the club may conduct its business as it sees fit. The cultural milieu of the club would consist of, among other things, the university, the department of psychology, and the general attitudes towards and expectations of clubs. The receiving system of the club would consist of the graduate students who are its members as well as the graduate advisor who oversees the club. The club meets once a month to discuss topics from articles in behavior analysis. The aggregate outcome would be the discussion that emerges from the coordinated activity of its graduate student members. From month to month, the students procure the articles in a different fashion. During one month the articles are copied and distributed into the mailboxes of graduate students by the officers of the club, during another month in a general mailbox in the psychology department, during another month the secretary makes copies and places them in people's mailboxes, during another month only the originals are provided and the students have to make their own copies, during another month the students have to locate the articles from journals in the library and make copies themselves, and during still another month the links for the articles are e-mailed to students since the articles happen to be online. Therefore, the students who receive the articles may have to pick them up

from different places or print or copy them on their own during different months. Students then read the articles and show up at the meeting place for a discussion. Let's assume that a thorough and entertaining discussion is had by all during each of these monthly club meetings and the students and the faculty, the receiving system in this case, are happy with the aggregate product (the quality and quantity of discussion) of the club. Some of the interlocked behaviors recur and therefore constitute a lineage, while other interlocked behaviors do not recur. Although the students receive and read the articles each month and show up for the meeting, there is no consistency in the interlocked behaviors for article delivery from month to month, yet the same aggregate product, a hearty discussion, is attained. Since the aggregate product is recurring, but not all of the interlocked behaviors are, we would argue that it is therefore the aggregate outcome rather than the interlocked behaviors that are selected in this case. As suggested earlier, the interlocked behaviors may also be indirectly selected, but this may not necessarily occur. According to our reformulation of the metacontingency (Cultural Milieu → Aggregate Product → Receiving System), the metacontingency in this example, would look as follows:

University Environment → Informed Discussion → Graduate Students and
Graduate Faculty Advisor.

The interlocking behaviors that bring about this aggregate outcome, during the month when the officers of the club copied and distributed the articles, would be as follows:

(Officer X) Receives Prompt for Copies to be Made → Make Copies of
Articles and Gives them to Y → Y has Received Copies

(Officer Y) Receives Copies from X → Delivers Articles to Mailboxes →
Grad Students have Articles in their Mailboxes

(Students A-K) See Articles in Mailbox → Pick up Articles from Mailbox →
Have Articles in One's Possession

(Students A-K) Articles in One's Possession and Meeting is Upcoming Soon
→ Read Articles → Have Greater Knowledge of Topic

(Students A-K) Have Read Articles and Meeting is in 15 minutes → Drive to
Meeting Place → Together with Other Graduate Students

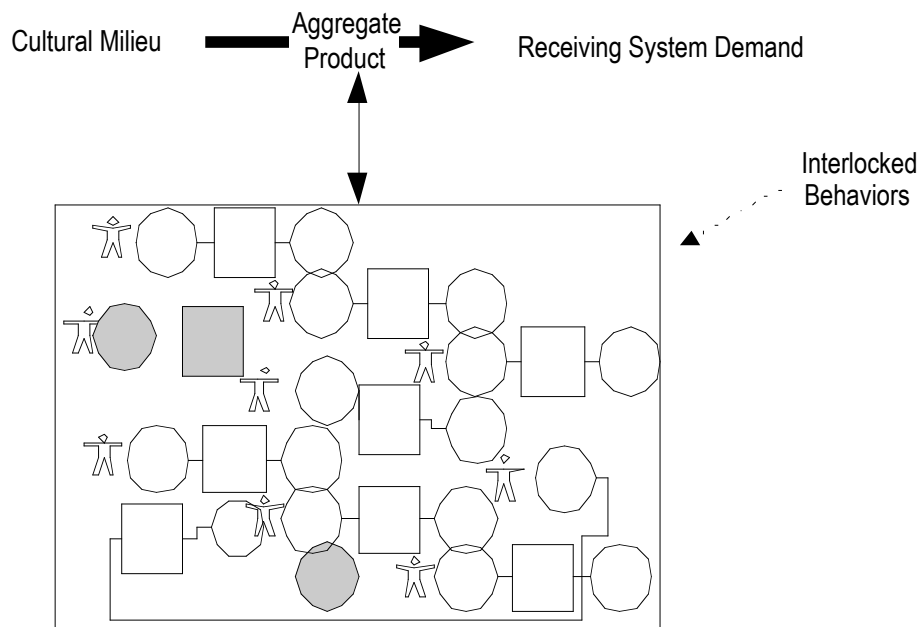
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(Students A-K) Together with Other Graduate Students and Have Read Articles → Speak about Topic → Others Respond to Comments Made

The aggregate outcome of these interlocked behaviors, is a pleasant, informative, and hearty discussion. The discussion is unlikely to be informative if students did not receive the articles, or did not read them, or did not show up to the meeting. Thus, the aggregate product, in this case, cannot occur without the coordinated behaviors of the officers and members of the club. The relationship between the metacontingency and the behavioral contingency, therefore, is across levels of analysis (see Figure 1).

As behavior analysts, if we want to improve the quality of discussion at these meetings, we would manipulate parts of the interlocked behaviors in order to affect the aggregate outcome. Although we suggested that the IBCs may vary during different months, let us assume for the moment that the interlocked behaviors listed above are a standard practice from month to month, i.e., they re-

Figure 1. Modified metacontingency.



recur every month. If the quality of discussion was low during one month because students did not receive their articles, we would examine the interlocked behaviors for a disconnect. Maybe Officer X did not make the copies until a few hours before the meeting, and although Officer Y delivered them to students' mailboxes, most students were not around their boxes just prior to the meeting. In addition, perhaps Officer X has an extremely busy schedule on the days leading up to the meeting. In intervening on this problem, we might arrange the contingencies such that a prompt is sent out to Officer X well before her schedule gets busy, so that the articles are copied and delivered to Officer Y well before the meeting. The manipulation of that one part of the interlocked behaviors might be sufficient to produce the aggregate outcome of an informed discussion, as students may now be receiving the articles in a timely fashion. It must be borne in mind that although we are affecting the aggregate outcome at the level of the metacontingency, our manipulation is at the behavioral level. Moreover, the change and variability in interlocked behaviors do not necessarily result in different aggregate product. In other words, different ways of coordinating the interlocked behaviors can bring about the similar aggregate product which is of the same quality as the previous month. However, what is affected is the cost and/or efficiency (accuracy and speed) by which the aggregate product is generated.

At the risk of belaboring our point regarding the lineage of aggregate products, we would like to consider another example, this time involving the moviemaking industry. The recent film, *Brokeback Mountain*, has been widely acclaimed and has met with success at the box office. The movie explores gay themes, which have traditionally been taboo in our culture. However, there has been a gradual shift in attitudes towards gays and the gay lifestyle in the U.S. Thus, the cultural milieu has been altered from what it previously was. We may consider this change in cultural attitudes as occasioning the aggregate outcome of a movie that deals with gay themes. The critical and commercial success of the movie has to do with the receiving system of movie critics and moviegoers. Our re-interpretation of the metacontingency would therefore suggest that aggregate products of this sort would become more prevalent in our culture in the future. In turn, the selection of this aggregate product would likely also result in the concomitant selection of interlocked behaviors that contributed to the aggregate outcome.

CONCLUSION

The existing description of the metacontingency (Glenn, 2004; Glenn & Malott, 2004), as we see it, sometimes departs from the parallels with and sometimes maintains too close a contact with the behavioral contingency. The

metacontingency, in its current form, may be inherently reductionistic due to its reference to IBCs as one of the terms of the contingency. Given that the IBCs affect individual behavior and that behavior analysis is concerned primarily with individual behavior, the contribution of interrelated behaviors to an aggregate product is certainly of interest to us. This individual level is the level at which we, as behavior analysts, are likely to intervene on societal phenomena. We manipulate the contingencies that interlocking behaviors are a function of with an eye towards altering the aggregate outcome. The aggregate outcome is emergent upon the interrelated behaviors that we are influencing through changing interlocking behavioral contingencies. Some interlocked behaviors may be more likely to result in the desirable outcome than others. If we can arrange contingencies of reinforcement to increase the recurrence of these behaviors, the aggregate product is more likely to occur as well. An analogous, although somewhat simplistic example would be of a scientist working at the physiological level of analysis who might prescribe a medication for depression that acts on the brain in some fashion. If the physiologist provides the individual with a medication that increases activity in parts of the brain involved in an elevated mood and lowers activity in the part of the brain associated with a lowered mood, the individual may be more likely to engage in more activities and report being less depressed.

Fortunately for us, the relationship between the IBCs and the aggregate outcome has been laid out in the extant literature on the metacontingency. The contribution of the IBCs to the aggregate outcome is of primary interest to us as behavior analysts, and we laud Glenn (1988, 2004) for helping make this connection more explicit.

In conclusion, we submit that the metacontingency in its current form is conceptually inconsistent due to its conflation of different levels of analysis. We suggest a reconfiguration of the metacontingency that may help to clarify the relationship between its components as well as its relationship with the behavioral contingency. The ideas proposed here are still at a preliminary level and could be developed and refined further in a more systematic manner. Our suggestions notwithstanding, we feel that the metacontingency is a valuable concept for behavior analysis in creating a bridge with the cultural level of analysis. The concept of the metacontingency has contributed a great deal towards the clarification of the relationship between the cultural and behavioral levels of analysis, however, its development may have been stymied in the past due to its conceptual inconsistency by virtue of its explicit inclusion of the behavioral level within the cultural level. It is our hope that some of the points we are making in this paper may contribute to the further development of the metacontingency and

assist in the clarification of our role as behavior analysts in this interaction between the disciplines of behavioral and cultural analysis.

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