Commit Heresy: Stop Using “Contingency”

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Abstract

The term “contingency” has long been widely used by behavior analysts, but their uses of the term are inconsistent with the vernacular definition of the term. Moreover, the term is not consistently defined by behavior analysts, but is instead used to refer to a variety of relations between and among stimuli and responses. In the interest of reducing jargon and potential confusion, we argue that behavior analysts should stop using “contingency” and related terms.

Keywords Contingency · Terminology · Jargon · Public perception

We commit heresy in this article. We do so by arguing that practitioners should not use “contingency” in their verbal interchanges with people who are not behavior analysts. Moreover, the term is of limited value to behavior analysts when they communicate with one another, and should be avoided in such discourse. We argue these points with full awareness that the term was introduced and popularized by the founder of behavior analysis (e.g., Skinner, 1938, 1969) and has long been widely used in the discipline. Despite this history, or perhaps because of it, the term is used in so many different ways and so inconsistently that it is of far less real value than its popularity suggests, as we briefly explain in this article.

To begin, if “contingency” is a term that you as a practitioner use regularly, please define the term without consulting other sources, and write down or be sure to remember your definition. If you do not use the term, please define it as it seems to be used by your colleagues and accept our congratulations.

“Contingency” in the Vernacular

If gambling were legal, we’d lay three to one odds that your definition of “contingency” is very different from the

definition used by people who are not behavior analysts. We just requested a Google search for “define contingency,” and the first response was as follows (https://www.google.com/search?q=define+contingency&oq=d&aqs=chrome.0.69i59l3j69i57j0l2.4431j0j8&sourceid=chrome&es_sm=93&ie=UTF-8)

“Contingency (noun)

- future event or circumstance that is possible but cannot be predicted with certainty.
‘a detailed contract that attempts to provide for all possible contingencies’
- a provision for an unforeseen event or circumstance
‘a contingency reserve’
- an incidental expense
‘allow an extra 15 % in the budget for contingencies’.

Next, wanting to be sure to rely on a reputable source, we searched for “Oxford English Dictionary synonyms for contingency.” The response (<https://en.oxforddictionaries.com/thesaurus/contingency>) was:

“**eventuality**, event, chance event, incident, happening, occurrence, juncture, possibility, accident, chance, emergency
uncertainty
rare **fortuity**”

Imagine a behavior analyst who confidently tells a teacher, “I’m going to help you arrange contingencies that will greatly improve your students’ behavior.” How can you arrange something that is possible but cannot be predicted with

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certainty? Will you be setting something aside to deal with an unforeseeable but unfortunate behavioral incident, or making a contingency plan? Or simply adding to the petty cash fund? A person familiar with “contingency” as it is used in the vernacular will be confused, not enlightened, when the term is used to describe a proposed strategy to benefit students.

Of course, “contingency” is not a common term in the vernacular. Many laypeople with whom practitioners interact will have no knowledge of “contingency.” Such individuals, if teachers, will be neither informed nor enlightened when told by a behavior analyst “let’s work together to set up productive contingencies for your students.” They may, however, view the term as useless, off-putting jargon. But that risk, like the risk that a person will be confused by a behavior analysts’ unconventional use of “reinforcement,” can be tolerated if the term is especially useful, one that helps behavior analysts communicate with laypeople or with one another or to develop better theories or applied interventions. Unfortunately, and despite its popularity, the use of “contingency” does none of those things.

“Contingency” in Behavior Analysis

If our bet could be continued, we’d give better than even odds that your definition corresponds well to one published in a reputable behavior-analytic book or journal article. But we’d lay ten to one odds that it would disagree with at least one other published definition. We do so because “contingency” is used by behavior analysts to describe a) general relations between and among stimuli and responses; b) dependent (i.e., causal) relations between responses and consequences; c) contiguous, but not dependent, relations between responses and stimuli that follow them; and d) contiguous relations among responses and stimuli that follow them, regardless of whether or not the relations constitute a dependency. These are related, but different, usages that foster confusion and hinder clear communication.

As you know, B. F. Skinner laid the foundation for behavior analysis, and he often referred to “contingencies.” He did so in his seminal book, *The Behavior of Organisms* (1938, e.g., p. 377), wrote another book, *Contingencies of Reinforcement* (Skinner, 1969), with it in the title, and included the term in numerous other works. Detailed analysis of the historical use of “contingency” in behavior analysis is provided elsewhere (Lattal, 1995; Lattal & Poling, 1981), and we will provide only a brief overview of it, with a focus on the different ways the term has been used and the resultant potential for confusion.

Skinner and his colleagues worked to determine how relations between and among environmental events (stimuli) and defined units of behavior (responses) affect the probability of occurrence of such responses. The

orderly relations they disclosed through the experimental analysis of behavior constitute the fundamental principles of a science of behavior. Applied behavior analysts use these principles to help other people. The term “three-term contingency” was, and still is, often used to describe relations among stimuli and responses. Skinner (1969) defined “contingency of reinforcement” as “the interrelations among S^D [a discriminative stimulus], R [a response], and S^{rein} [a reinforcer]” (p. 23). These interrelationships increase the future probability of such responses, and a “contingency of reinforcement” is equivalent to a “schedule of reinforcement.” Whether anything of value is gained by having the two synonymous phrases is open to debate, but the practice has a rich precedent and is not in itself confusing. If behavior analysts only used “contingency” in a generic sense, to refer to relations among stimuli and responses that affect operant behavior (and used appropriate modifiers, like “of reinforcement” to designate the behavioral effects of those relations), there would be little possibility for confusion. We recognize that some, perhaps most, behavior analysts are unlikely to forego use of “contingency,” and as an alternative we suggest that they use the term solely to designate generic relations between and among stimuli and responses. Lattal and Poling (1981) made a similar suggestion more than 30 years ago, with no apparent effect on the discipline at large.

A second, and common, use of “contingency” is to designate a specific relation in which emission of designated responses produce reinforcers. If, for example, an operant chamber were programmed such that a rat received a food pellet each time it depressed a lever, it would not be unusual to say that a contingency exists between lever pressing and food delivery, or that “food delivery is contingent on lever pressing.” Such usage is consistent with the definitions of “contingency” offered by Chance (2014), Donahoe and Palmer (2004), Malott and Shane (2014), Mayer, Sulzer-Azaroff, and Wallace (2013), Millenson and Leslie (1979), and Miltenberger (2015):

Contingency. A dependency between events. An event may be stimulus-contingent (dependent on the appearance of a stimulus) or response-contingent (dependent on the appearance of a behavior). (Chance, 20098, p. 394)

Contingency – a relation in which the occurrence of one event depends on the occurrence of another event. (Donahoe & Palmer, 2004, p. 355)

There is a contingency between Rod’s crying and Dawn’s attending. Put another way, his crying causes, produces, results in her attending. His crying causes the

attention: no crying, no attention or, at least, less attention. So a **contingency** is a *causal relationship*. And **to be contingent** means *to be caused by*. (Malott & Shane, 2014, p. 18).

Contingency refers to the specified dependencies or relations between behavior and its antecedents and consequences. The word “contingent” implies a dependent relation between the behavior and its consequences and/or antecedent (Mayer et al., 213, p. 27, 202).

If there is a contingency between two events, A and B, this means that B will occur if, and only if, A occurs. We say that B is dependent on A, or that A predicts B, because when A occurs, B occurs, but if A does not occur, B will not occur. (Millenson & Leslie, 1979, p. 30)

When the response produces the consequence and the consequence does not occur unless the response occurs first, we say that a contingency exists between the response and the consequence. When a contingency exists, the consequence is more likely to reinforce the response. (Miltenberger, 2015, p. 84)

There is a contingency between Rod’s crying and Dawn’s attending. Put another way, his crying causes, produces, results in her attending. His crying causes the attention: no crying, no attention or, at least, less attention. So a **contingency** is a *causal relationship*. And **to be contingent** means *to be caused by*. (Malott & Shane, 2014, p. 18).

Often, when we behavior analysts say something to the effect that “we need to arrange appropriate contingencies to strengthen desired responses and to weaken undesired responses,” we are using “contingencies” as a synonym for “consequences” But what do we call arrangements in which events follow responses, but the responses need not occur for the events to occur, as in Skinner’s (1948) classical experiment of “superstition” in the pigeon? In this study, eight food-deprived pigeons were exposed to conditions under which food was presented “at regular intervals without regard to the bird’s behavior” (Skinner, 1948, p. 168). Six of them developed consistent, persistent, and idiosyncratic patterns of responding (e.g., turning in circles, thrusting the head into a cage corner, tossing the head upward). Skinner’s explanation of these findings was straightforward:

The conditioning process is usually obvious. The bird happens to be executing some response as the [food] hopper appears; as a result it tends to repeat this response. If the interval before the next presentation is not so great that extinction takes place, a

second ‘contingency’ is probable. This strengthens the response still further and subsequent reinforcement becomes more probable. It is true that some responses go unreinforced and some reinforcements appear when the response has not just been made, but the net result is the development of a considerable state of strength. (p. 168)

In Skinner’s experiment, food delivery was not caused by the responses that were increased in frequency (i.e., reinforced) by it, therefore, the relation between one of the responses in question and food delivery did not constitute a “contingency” as the term was defined by Chance (2006), Donahoe and Palmer (2004), Malott and Shane (2014), Mayer et al. (2013), Millenson and Leslie (1979), and Miltenberger (2015). Skinner, however, referred to it as a “contingency,” and it is certainly a “contingency” in the general sense of a relation between a response and another event. More than a few contemporary behavior analysts use the term “contingency” to refer to two or more events that are juxtaposed in time – that is, “contiguous,” regardless of whether the relationship between or among them is causal.

Catania (1968), Cooper, Heron, & Heward (2007), and Johnson and Pennypacker (1993) describe this usage of the term:

In this more general usage, contingencies describe any relationship, whether it is completely specified by the experimental operations or is an incidental and perhaps fortuitous consequence of the experimental operations. (Catania, 1968, p. 331).

The term contingency appears in behavior analysis literature with several meanings signifying various types of temporal and functional relations between behavior and antecedent and consequent variables...Perhaps the most common connotation of contingency refers to the dependency of a particular consequence on the occurrence of the behavior. The term contingency is also used in reference to the temporal contiguity of behavior and its consequences. (Cooper et al., 1987, p. 42)

Contingency: A relationship between a class of responses and a class or classes of stimuli. Implies nothing about the nature of the relationship or its effects. (Johnson & Pennypacker, 1993, p. 364)

There is obvious precedent for stating that a “contingency” exists between food deliveries and the behaviors of interest in Skinner’s (1948) study, and that food deliveries were “contingent” on those behavior. But there is also precedent for terming the relationship “noncontingent.” For example, Martin and Pear (2010) wrote:

When a behavior must occur before a reinforcer will be presented, we say that a reinforcer is contingent on that behavior. If a reinforcer is presented at a particular time, regardless of the preceding behavior, we say that the reinforcer is noncontingent. (p. 42)

From our perspective, a clearer description of the relation between responses and reinforcers in which the reinforcers *must*, by the nature of the situation, follow designated responses is “response-dependent.” So, the rat described in our example received response-dependent food deliveries or, to be more precise, lever-press-dependent food deliveries. Here, in simple terms, emission of the responses was responsible for, or caused, presentation of the reinforcers. Similarly, when reinforcers follow responses that they affect, but are not actually produced, or caused, by those responses, as in Skinner’s (1948) classic study of “superstition” in pigeons, the reinforcers are response-independent. They are, however, time-dependent, in that food was delivered at specified intervals, regardless of the bird’s behavior. If Skinner had arranged a schedule under which food was available as specified intervals, but was delivered only when a specified behavior, such as a wing-flap or a complete turn to the left, occurred (i.e., a fixed-interval schedule), food deliveries would have been both time- and response-dependent. Similarly, had he arranged food deliveries only after a 10,000 Hz tone was presented and wing flaps increased in frequency, food deliveries would have been response-independent but stimulus-dependent (cf. Chance, 2009). Describing relations in this way appears to

minimize confusion, but the convention is certainly not universally accepted by behavior analysts.

A few behavior analysts use “contingency” not just to describe relations between and among discrete environmental events and specified responses, but also to refer to substantially more complex relations. As an example, consider Fig. 1, which shows Malott’s “three-contingency model of performance management” as applied to some behaviors he considered to be relevant to welfare reform.

Malott has used the three-contingency model to suggest ways to reform welfare (Malott, 1998), to improve education (Malott, 1993), and to improve behavior in organizations (Weatherly & Malott, 2008). It is beyond our purposes to consider the value of these efforts. Rather, we simply want to call attention to the fact that his “contingencies” can include internal states (e.g., fear) and probability of loss, and include more complex relations than the “contingencies” of most other behavior analysts.

As these few examples illustrate, behavior analysts use “contingency” in a number of different, and sometimes contradictory, ways. The same is true of variants of the term, such as “contingent” and “noncontingent.” Many behavior analysts emphasize the value of using precise and consistent linguistic conventions (for examples, see Carr & Briggs, 2011), but the use of “contingency” by the field at large has been neither precise nor consistent. Of course, good behavior analysts tend to be both pragmatists and empiricists. Such individuals might rightly ask us authors, “what evidence do you have that current practices regarding definitions and applications of “contingency” have harmed behavior analysis as a discipline, individual behavior analysts, clients served by behavior analysts, other professionals with whom behavior analysts interact, or anyone else?” The only honest answer is “none at all.” On the other hand, there also is no evidence that verbal practices regarding “contingency” have been beneficial, or innocuous.

Studying “contingencies,” in the sense of relations between and among stimuli and responses, is another matter: Here there is clear evidence of value, as perusal of behavior-analytic books and journals makes clear. In talking about those relations, practitioners and other behavior analysts are well advised to always do two things, and sometimes to do a third. First, focus on determining as clearly as you can what is happening in a particular situation – what, that is, are the temporal and causal relations between and among responses of interest and other aspects of the environment that occur before and after those responses, and what are the actual and (if appropriate) intended behavioral effects of those relations? Do this when conducting a functional analysis or other form of functional assessment, and when designing, implementing, and evaluating an intervention. Second, from the onset, describe those relations to yourself and to others precisely in nontechnical language. Third, when interacting with other

Ineffective Natural Contingency

Performance-management Contingency

Inferred Direct-acting Contingency

Fig. 1 Three-contingency model of performance management applied to welfare reform. From “Performance Management and Welfare Reform: The Three-Contingency Model of Performance Management Applied to Welfare Reform,” by R. W. Malott, 1998, *Behavior and Social Issues*, 8, p. 109. Copyright 1998 by the Cambridge Center for Behavioral Studies. Reprinted with permission

behavior analysts, use established technical terms to refer to those relations when appropriate, as in making a conference presentation or writing an article for publication.

Baer, Wolf, and Risley (1968) listed “technological” and “conceptual systems” as two of the six defining dimensions of applied behavior in their seminal and influential article on the topic. “Technological” refers to describing procedures with sufficient clarity and detail to allow others to replicate them. “Conceptual systems” refers to relating procedures to established principles of behavior. As they clearly indicate with the two examples that follow, lay language is often sufficient for ensuring technological adequacy, but technical terms are requisite when conceptual systems are considered:

To describe exactly how a preschool teacher will attend to jungle-gym climbing in a child frightened of heights is good technological description; but further to call it a social reinforcement procedure relates it to basic concepts of behavioral development. Similarly, to describe the exact sequence of color changes whereby a child is moved from a color discrimination to a form discrimination is good; to refer also to “fading” and “errorless discrimination” is better. (Baer et al., 1968, p. 96)

As an example, consider a situation in which you are working with a young person who frequently engages in self-injurious behavior. Direct observation suggests that parents and other adult caregivers consistently attend to the young person when self-injury begins to occur, but not at other times, and a functional analysis provides good evidence that a) self-injury regularly occurs only in the presence of adults and b) the attention they provide following the onset of self-injury is maintaining the young person’s self-injury. That analysis in-and-of-itself is sufficient to describe what is going on, but in talking with another behavior analyst it would be appropriate to use the term “discriminative stimulus” to refer to the adults in whose presence self-injury occurs, and to use the term “positive reinforcer” (or simply “reinforcer”) to refer to the attention they provide when self-injury occurs. No problem with any of that verbiage, which summarizes the “contingencies” that are largely responsible for self-injury.

But let us go a bit further and pick an evidence-based treatment to reduce the self-injury. One option is so-called “noncontingent reinforcement,” or NCR, which is carefully reviewed elsewhere (Carr et al., 2000; Carr, Severtson, & Lepper, 2009; Tucker, Sigafos, & Bushnell, 1998). Carr et al. (2009) distinguished several variants of NCR; only one was found to be “well established” for reducing challenging behavior. That variant begins with a functional assessment (usually via

functional analysis) to reveal the consequence(s) responsible for the challenging behavior (e.g., self-injury), after which that stimulus (e.g., attention) is delivered under a fixed-time (FT) schedule. FT schedules present stimuli every N units of time, regardless of the participant’s behavior. For example, adults might provide 15-s of attention to a young person every 3 min under an FT 3-min schedule, regardless of how the young person behaved. Studies categorized as “well established” arranged “schedule thinning (ST),” such that the schedule value increased over time (e.g., from FT 3 min to FT 5, 8, and 10 min). Those studies also incorporated extinction (EXT), such that the otherwise scheduled event (e.g., attention) never occurred shortly after the emission of the response of interest (e.g., self-injury). Carr et al. (2009) referred to this kind of treatment as FTST + EXT, which is an accurate and informative technical designation.

But what of the broader designation, NCR? Put simply, it’s a bad one. As Poling and Normand (1999) pointed out, most behavior analysts use “reinforcement” to refer to operations (or processes) that increase the probability of designated responses occurring, or otherwise strengthen such responses. Although the stimuli delivered under NCR procedures reinforced challenging behaviors during the functional assessment phase that preceded the NCR intervention, the intervention itself weakens, not strengthens, challenging behavior, and therefore does not constitute reinforcement. Moreover, if EXT is included as part of the intervention, there is a clear relation between challenging behavior and the stimulus scheduled for delivery under the FT schedule: if such behavior occurs, the stimulus is not delivered. This relation clearly constitutes a “contingency” as the term was defined by Chance (2009), Donahoe and Palmer (2004), Malott and Shane (2014), Mayer, Sulzer-Azaroff, and Wallace (2013), Millenson and Leslie (1979), and Miltenberger (2015).

Many behavior analysts who use the term “NCR” to describe various response-deceleration procedures that have in common time-based deliveries of stimuli shown to reinforce challenging behavior prior to the intervention recognize that the term is not an accurate description, but they continue to use it because of precedent. Poling and Normand (1999) argued that abandoning bad precedent is good practice, and that is sound advice. “Contingency” and its variants are shibboleths for behavior analysts, and we recognize that many of them will be tempted to use the terms for that reason alone. It’s a bad reason, and they should stop.

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Compliance with Ethical Standards

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