

A Discussion of Contextual Variables and Related Terminology in Behavior Analysis

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Although Behavior Analysts have used the three-term contingency to analyze and describe behavior, they also discuss the importance of variables external to the three-term contingency. Many psychologists have addressed the important effect that external variables have on behavior (Bijou & Baer, 1961; Gewirtz, 1972; Goldiamond & Dyrund, 1968; Kantor, 1946, 1959; McPherson & Osborne, 1988; Michael, 1982, 1993; Morris, 1988, 1992; Peláez-Nogueras, 1994, 1996; Schlinger & Blakely, 1987; Skinner, 1931; Wahler & Fox, 1981). This reference list is by no means exhaustive indicating a great deal of attention to the concept of external variables. The underlying concept that each of these authors addresses is similar in nature. Similar enough to comprise a field of literature relevant to a central topic. However, minor differences emphasized by different psychologists have produced a plethora of terms. Undoubtedly, each author used terminology most appropriate to his or her argument and discussion, but the result over time has been unclarity about proper usage and necessity for the numerous terms. Throughout this paper, the term contextual variables will be used when referring to this class of terms. The intended meaning is simply, the encompassing external and internal variables that effect the relationship between a stimulus and a response.

Behavior analysts are not known for their clear communication and education with those outside the field. This may even extend to the education of students within the field. It has been argued that the slow acceptance of behavior analytic principles, as compared to the theories of other fields, may partly be due to this poor grasp of public relations (Maurice, 1997). When arguing about terminology, the ultimate goal of the psychologist must be considered. A distinction must be made between what is needed for the development of basic science and theory, and what is needed for effective application of the results of advancing theory and science. When we only examine the usage of terminology for our own scientific purposes, changes are unnecessary since anyone who is familiar enough with the field to be interested in

what is going on, already knows the terminology. This is incredibly ineffective, however, when transferring to applied work or education.

When examined from this view, some consensus and clarification of terminology used for discussing external variables is helpful and necessary. This argument is bound to be met with opposition, since dropping a term already utilized by some would be objectionable. No suggestion will be made to discontinue the use of any term. Variety in terminology allows for the sometimes necessary scrutiny within the field. The terms that will be discussed all contain subtle differences, which no doubt, prompted the designation of a unique term in the first place. The intention is not to argue that these differences do not exist, or that they are not important. Rather, the intention is to outline some examples of how varied the terminology has actually become and suggest some consensus for the sake of parsimony.

Contextualism as a Frame of Reference

Peláez-Nogueras (1994) addresses the meta-models of mechanism and contextualism (Pepper, 1942) and suggests that behavior analysis has often been associated with the mechanistic models of explanation (see also, Reese & Overton, 1970; Overton & Reese, 1973). This may be due to the traditional behavior analytic focus on the environment for determining behavior and to the belief among some behavior analysts that mechanism is a sufficient model from which to explain behavior (e.g., Marr, 1992). The more recent trend in behavior analysis, however, has been toward contextualism (e.g., Peláez-Nogueras, 1994). In fact, contextualism has been suggested as the world view of behavior analysis (Morris, 1988; Hayes & Reese, 1988).

Although contextualism as a world view has vast implications spanning many fields and approaches, it is helpful as a frame of reference for viewing the complexities surrounding behavioral variables. Peláez-Nogueras (1994) points out, a theory based on contextualism would encompass a holistic view in which responses and stimuli have no psychological meaning apart from the interdependent relation

between their function and context (p. 11). Moreover, using contextualism as a reference suggests that the meaning of behavior emerges from its context (Morris, 1988). Morris and many other behavioral psychologists agree that a better understanding of the determinants of stimulus potency is needed (Bijou, 1996; Gewirtz, 1972; Peláez-Nogueras & Gewirtz, 1997; Wahler & Fox, 1981). To examine context more completely, Morris (1988, 1992) suggests that it be addressed as a conceptual category and as a subject matter of analysis, rather than as a source of variation to be held constant, as has been typical within behavior analysis.

The Conceptualization of Context in Behavior Analysis

Over the years, concerns about the function of context were evident in Skinner's (1931) "third variables," Kantor's (1946, 1959) "setting factors," and Keller and Schoenfeld's (1950) "establishing operations". For a more complete list of terminology, please refer to Table I, which lists thirteen different terms across twenty different psychologists. The relationships to which these terms refer are not identical. For example, some of them refer to the effects of context on the eliciting function of stimuli, some to the effects on the discriminative function, and others to the effects on the reinforcing function. The commonality among all these terms is their reference to variables outside of the three-term contingency which have a great effect on the relationship between stimuli and responses. This common thread is what calls into question the need for such diversity among terms. Regardless of the actual term used, all of these authors in some way reference environmental factors and their effect upon behavior. Interpret "environment" broadly in this context as it can refer to events occurring both outside and within the individual. Some license to collapse terminology, with the understanding that the basic concept is being preserved, would be useful.

A Summary of Select Terms

Some of the terms listed in Table I are more common than others. Additional information on some of the more historical or well known terms may aid in giving the reader more structure. The

following summaries by no means encompass the breath of theory proposed by Skinner, Kantor, Michael, and others included. They are intended rather to give support to the definition listed and explain in some part, how the term came to be established. Once again, a commonality is evident in the weight psychologists give to the study of contextual variables.

Skinner (1931) stated, "the question of third variables is of extreme importance in the description of the behavior of intact organisms" (p. 455). Skinner (1931) originally used the term "third variables" to describe secondary laws which change the primary relationship between stimuli and responses. Skinner referred to biological variables but also included drive and emotion in his concept of "third variables" (for a full discussion of Skinner's "third variables," see Morris, 1996).

Kantor (1946), uses the term "setting factors," to refer to the immediate circumstances defining "which particular stimulus function-response function operates at that moment" (p. 261). Kantor (1959) further illustrated the different interactions of stimuli and responses by outlining four categories which include: (a) "different objects with the same stimulus function," (b) "the same objects with different stimulus functions," (c) "different acts which carry the same response function," and (d) "the same actions which carry different response function," a and d are examples of how history can change the function of stimuli and responses. By including history as a factor in the relationship between stimulus and response, Kantor expanded the concept of contextual variables in a significant aspect.

Since then, more contemporary researchers have expanded on the importance of historical context as a determinant. For instance, Morris's (1992) "unpacking" of the three-term contingency relates a taxonomy of current and historical contextual variables to the relationship between stimuli and response.

Gewirtz (1972) emphasized "contextual determinants" on stimulus functioning. The range of contextual variables discussed by Gewirtz is very broad; however, several distinct factors are identified that could potentially affect stimulus functions. First, the "attributes of the

source" of reinforcement, including gender, age, status, and other variables, affect the strength of the reinforcing stimuli. Second, the "ecology" denotes the gross conditions of an environment that determines which events and behaviors can occur in a particular situation.

Bijou (1996) classifies some of the same type of factors into different categories, the group of which he calls, "setting factors". The first category includes the operations or events concerning physiological states and includes the same conditions that Skinner referred to as third variables (organic needs like food, sleep, air), which can be affected by deprivation and satiation. Physical circumstances comprise the second category. This refers to the influence of background on a figure in reference to the senses (visual, auditory, olfactory, tactile, gustatory), and to the environmental conditions, such as temperature, that effect the entire interaction. The final category refers to sociocultural conditions, such as cultural institutions, the presence and actions of a person or group, and verbal stimuli in the form of spoken or written rules.

The broad categories illustrated by Bijou (1996), appear to offer a clear, complete framework for the study of contextual variables. These categories lend themselves well to the consideration of function, an important inclusion when analyzing a stimulus-response relationship. The above authors, joined by Morris (1988) and Peláez-Nogueras (1994), agree that however variables are classified, seldom does any class alone affect a stimulus-response relation. These variables work in conjunction and cannot be separated, other than for analytic purposes. Whereas multiple contextual variables are always present in a naturalistic setting, the division and classification of variables can be useful when studying possible interactions (Peláez-Nogueras, 1996).

Michael's concept of "establishing operations" differs significantly from that of other behavior analysts. This is most apparent in the terminology he uses. Keller and Schoenfeld (1950) were the first to use the term, "establishing operation," (EO) to describe a "motivational variable". Michael (1982) elaborated on the term by defining an "establishing operation" as an environmental event, operation, or stimulus condition that affects a behavior by momentarily altering the (a) reinforcing effectiveness of other events and (b) the frequency of occurrence of that part of the organism's repertoire

relevant to those consequences. Michael makes a finer distinction with the subcategories of conditioned establishing operations and unconditioned establishing operations. Although Michael's model gave rise to a good deal of criticism (Catania, 1993; Hesse, 1993; McDevitt, 1993), the concepts presented are consistent with earlier models. The goal is still to categories factors for ease in analysis and discussion. Michael actually promotes the analysis of such events as is seen by the wide use his terminology in applied literature and settings.

Peláez-Nogueras (1994) proposes "contextual interactants" to encompass "fundamental classes of variables that interact with the behavior of the organism and with the operative contingencies", (1994, p. 9). (The term "interactants" is borrowed from Oyama, 1985). Contextual interactants can produce relatively stable changes as a result of their reciprocal interaction with the environmental contingencies affecting the organism.

Finally, Morris (1988) uses "contextual conditions" to denote emphasis on phylogenetic, ontogenic, and current contexts. Although the term itself does not denote a significant difference, the definition does in that it recognizes biological background as an inseparable variable effecting the function and potency of stimuli.

Conclusion

All of the terms outlined above have a very significant common denominator; the classifications made aid in the study of how context influences behavior. However, one would have difficulty in making a broad statement that would address the concept of contextual determinants without having failed to address many terms and parts of definitions that were not included. The first sentence in this paragraph is an example of an unsuccessful attempt, as it did not address many of the components discussed by the authors above. The lack in ability to address the topic simply can become detrimental when the development of a technique or learning material is hindered rather than facilitated by a vast amount of terminology.

The level of analysis ultimately determines what terminology an experimenter may use. A broad level of analysis will call for a less precise term than a fine grained analysis. Although an advancing science benefits from precise and accurate terminology, researchers may have been zealots in the past with the development of terminology that was so specific, that it applied to only their work at the time. Some of the above definitions seem to apply this kind of focus. As Behavior Analysis continues to develop as a field of psychology, those who engage in teaching, consulting, applied work, and even those who primarily conduct research, would benefit from an examination of the vast amount of terminology in the field. One particular area has been outlined in the above paragraphs, however, this is by no means a problem limited to this topic. All scientists in all fields must share the results of their endeavors with those in other fields and those in need of their service. The suggestion is made here to be conservative with terminology. As stated earlier, the unique distinctions made by the terms outlines are not unimportant and should not be eliminated completely. Extending the understanding of contextual variables in Behavior Analysis will enable the further advance of knowledge of stimulus-response function, and ultimately, human behavior. Some conservation in terminology at the general level is an important facilitative step in recognizing the full potential of research in the field and full application of behavior analysis outside the field.

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Table 1
Brief history of terms:

Name/Year	Term	Definition
Skinner (1931)	third variables	drive and motivation, also physiological states
Keller & Schoenfeld (1950)	establishing operations	a motivational variable that could effect behavioral emissions
Skinner (1957)	motivational operations	conditions effecting stimuli and the whole interaction
Kantor (1959)	setting factors	circumstances that operate as inhibiting or facilitating conditions in a behavior unit
Bijou & Baer (1961, 1978)	setting events	the selective mechanism for as response in development
Brady (1968)	potentiating operations	conditions that determine the potency of the consequences that functionally define the behavioral process
Goldiamond & Dyrund (1968)	potentiating variables	procedures which potentate the consequence or make the reinforcing event effective
Michael (1982)	establishing operations	any change in the environment which alters the effectiveness of some object or event as reinforcement
Michael (1993)	establishing operations	elaborated previous definition by including unconditional and conditional establishing operations
Sidman (1986)	conditioned stimulus control	a general influencing condition in stimulus equivalence
Schlinger & Blakely (1987)	functional altering contingent-specifying stimuli	a prevailing influencing condition for rule-governed behavior
Gewirtz (1972)	contextual conditions	differing potencies of stimuli
Morris (1988)	contextual conditions	phylogenic and ontogenic context - refers to current and historical context
Peláez-Nogueras & Gewirtz (1997)	contextual interactants	contextual determinants refers to all developmentally relevant factors