

THE INTERBEHAVIORIST

A Quarterly Newsletter of Interbehavioral Psychology

ISSN 8755-612X

Published at the University of Kansas

Volume 17

1989

Number 2

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QUOTATION

Knowledge is proud that he has learn'd so much; wisdom is humble that he knows no more.

- William Cowper

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A Quarterly Newsletter
of Interbehavioral Psychology

ISSN 8755-612X

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The Interbehaviorist is a quarterly publication of news, information, discussion, journal and book notes, book reviews, comments, and brief articles pertaining to interbehavioral psychology -- a contextualistic, integrated-field approach to the natural science of behavior.

The newsletter publishes professional communications that fall between informal correspondence and colloquia, and formal archival publication. As such, the newsletter supplements contemporary journals dedicated to basic and applied research, to the history and philosophy of the behavioral sciences, and to professional issues in the field. The newsletter strongly encourages submission of notes about current professional activities of its subscribers, news and observations about interbehavioral psychology and related perspectives, comments on journal articles and books of interest, more extended book reviews, and brief articles. All submissions should be sent in triplicate to the editor and should conform to the style described in the Publication Manual of the American Psychological Association (3rd edition).

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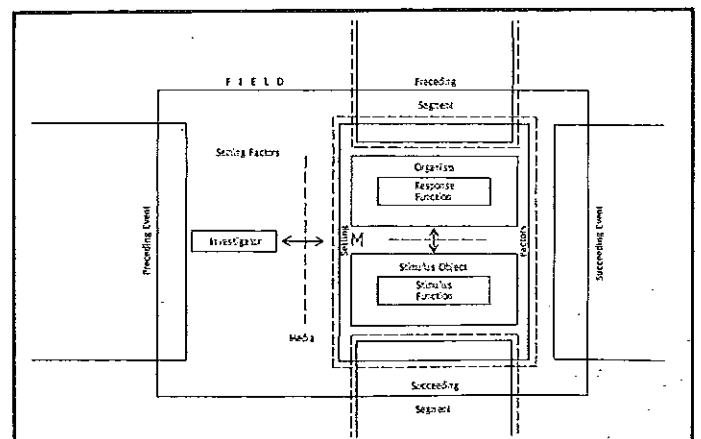
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THE AGORA

This issue contains the final two contributions to last year's Association for Behavior Analysis (ABA) symposium, "An Introduction to Interbehavioral Psychology" -- Paul T. Mountjoy's brief biography of Professor Kantor and Sidney W. Bijou's discussant comments. Paul's contribution was largely drawn from his 1986 (Vol. 41, pp. 1296-1297) American Psychologist obituary, co-written with Jay D. Hansor, hence we reprint that article in full, with permission from the American Psychological Association.

We had commented earlier that we would combine the symposium's papers into a single monograph. Now, however, we will invite the inclusion of a few additional papers, namely those being presented at this year's ABA convention in a same-named symposium (see below). We will keep you apprised as matters develop.

ABA Convention

The 1989 meeting of the Association for Behavior Analysis will be held in Milwaukee, WI, May 25-28. For further information, please contact Shery Chamberlain, ABA/SABA Office, Department of Psychology, Western Michigan University, Kalamazoo, MI 49008 (616-387-4495).

Among the many interesting sessions, two symposia may be of special interest to newsletter readers, the first being An Introduction to Interbehavioral Psychology, chaired by Carmenne Chiasson. This symposium includes papers by Donna M. Cone on "Kantor's Major Contributions," Roger D. Ray on "Explorations in Interbehavioral Methodology," and Dennis J. Delprato on "Clinical Applications," and discussant comments by Paul T. Mountjoy. The second symposium is entitled Basic Behavioral and Linguistic Processes: Multiple Response Methodologies, co-chaired by S. W. Bijou and E. K. Morris. This symposium includes papers by Iver Iversen on "Multiple Response Analyses of Single Reinforcement Schedules," Patrick M. Ghezzi on "Categories of Linguistic Behavior," Marc K. Wruble and colleagues on "Synchrony Analysis of Conduct Disordered Children and Their Mothers," and Magnus Magnusson on "Sequential Analysis of Human Behavior," and discussant comments by Henry S. Pennypacker.

Among other convention papers of clear interest will be Robert G. Wahler's, "An Interbehavioral Model of Child Abuse and Neglect." In addition to these, many other 1988/1989 newsletter subscribers will also be presenting papers and posters: Robert Babcock, Max Brill, Comunidad Los Horcones, Sigrid S. Glenn, Andrew Hawkins, Stephen T. Higgins, Laura Methot, Jay Moore, Robert E. O'Neill, Joseph J. Plaud, Ann B. Pratt, Masaya Sato, Susan M. Schneider, James T. Todd, and Edelgard Wulfert.

Finally, Linda J. Hayes has arranged for a meeting of the Interbehaviorists in ABA Special Interest Group.

Subscription Renewals

This volume's first renewal notice, included in Volume 16(4), produced a 48% resubscription rate by the time Volume 17(1) was mailed -- a figure with which we are pleased. That notice, and the one for Volume 17(1), bring our current renewal rate to 56%. The notice enclosed with this issue is the final notice.

We apologize if we offended readers by commenting on long renewal latencies last Fall. Heavy workload and reading schedules often bring our notices to light only when the stacks of work are pared down during the summertime. Committed professionals and heavy readers, though, are just the readers we value.

New Subscriptions

Noel Smith suggested that we include with the newsletter a subscription form that can be copied and passed around among colleagues. We have done so in this issue. Please distribute copies of it to interested faculty members and students, and retain copies in your files for ready reference and hand out. In the future, we will insert these forms with each volume's first issue.

New Subscribers

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BOOK REVIEW

Recent Changes in Theoretical Orientation
Among School Psychologists

Harry C. Mahan

Oceanside, CA

I was recently asked to review in its entirety the book, The Delivery of Psychological Services in Schools: Concepts, Processes, and Issues, edited by Stephen N. Elliot and Joseph C. Witt (1986). The book covers many aspects of school psychology, the most outstanding of which is its emphasis on theory. Because this emphasis is prominent in only five of the 14 papers included in the volume, it is discussed in more detail in the present commentary than was possible in a general review.

The initial paper of the volume was authored by the editors, Elliot and Witt. In a section entitled "What Are the Major Theoretical Orientations for Service Delivery Systems?" they emphasized, first and foremost, the necessity for theoretical work. This insistence is, in itself, a tremendous advance for psychology, for educational psychologists have for generations been ignoring the necessity of theory, especially elementary textbook writers. If such an orientation is necessary for school psychologists, it must be necessary for other psychologists as well. The theoretical orientation, though, should be selected with care rather than being allowed to establish itself on the basis of custom and tradition.

After presenting reasons why a theoretical orientation is needed in school psychology, Elliot and Witt go on to describe three orientations they have subjected to examination: These are the medical model, the behavioral-ecological model, and Bandura's reciprocal-determinism model. The first is rejected because it is person-centered, with both the causes and the modification of behavior centered within the individual. The behavioral-ecological model is rejected because it presupposes that the environment plays a predominant role in the shaping of behavior, although interactions are stressed to a limited extent. Another objection to this model

is that it is directed primarily toward potentially abnormal cases rather than toward all children. Bandura's model is accepted because it is concerned primarily with events and because cognitive interactions are included. It is more inclusive than the behavioral-ecological model and it has room for beliefs, values, and perceptions which cannot be omitted in any understanding of human interactions.

In the second paper in the book, Ysseldyke's selection, entitled "A Model for Viewing the Practice of School Psychology," elaborates on Bandura's reciprocal-determination orientation and presents diagrams that compare it to the other two positions covered by Elliot and Witt, which Ysseldyke also deems inadequate. However, he modifies the first two types somewhat and, following Bandura, refers to them in different terminology. The first model is referred to as unidirectional and the second as only partially bi-directional. Within the reciprocal-determinism model, "behavior is seen as influenced by the environment, but the environment is seen as partly a function of the person's own making" (pp. 29). This model emphasizes cognitive factors, as these partially determine what external events will be perceived and how information will be organized for future use. Ysseldyke then goes on to explain how this model can be extremely useful to school psychologists. This final step -- application -- is one that is badly needed in various areas of professional psychology.

With Bandura's reciprocal-determinism model having been established in the first two papers as appropriate for school psychology, Bardon (1986) devotes ten pages of his paper to "four approaches compatible with reciprocal-determinism [which] seem especially appropriate to the work of school psychologists: attribution theory, affectance, organizational and group theory, and aptitude-treatment interaction" (pp. 54). This discussion illustrates the relationship between the school psychologists' basic theoretical orientations and the conceptual basis of their approach to considerations of behavior.

Curtis and Zins, in the fifth chapter in the book, discuss school psychology in terms of systems theory,

which they describe by saying that "Basic to systems theory and of central importance to our discussion of the organization of school psychological services is the concept of reciprocal interaction. Operationally, this concept refers to the tendency for a change in any system component to affect other components within the system, as well as the output of the system as a whole" (pp. 110). They then go on to discuss the various aspects and ramifications of systems as they apply to schools and school psychology. Needless to say, this provides school psychologists with considerable insight into the dynamics of the system in which they are functioning.

From the standpoint of the theoretical orientation of the school psychologist, the most important paper in the book is the one by Christenson, Abery, and Weinberg, devoted almost exclusively to this topic. They present what they consider an alternative model to that which prevails at present in school psychology. Theirs, they state, "is based on a developmental perspective, rooted in ecological and transactional theories and affirming a proactive and preventive stance for the school psychologist" (pp. 349).

These authors go into considerably more detail than have those of the preceding papers, and they cite a number of writers who have contributed to the development of their theoretical perspective. Their careful documentation is commendable and adds considerable status to their conceptual position. They refer to this position as a "developmental perspective" (pp. 364) and they describe eleven assumptions upon which it is founded. These assumptions apply specifically to school psychology and they are directly related to the application of the authors' basic theory. In order to clarify the latter, the paper also includes a set of seven defining characteristics, the first five of which apply to all psychology and are clearly interbehavioral in character.

Christenson, Abery, and Weinberg's delineation of their general theoretical position is only the beginning, for their chapter covers not only the development of this position through the work of Lewin, Barker, Wright, Bronfenbrenner, and Gabarino, (but not J. R. Kantor), but also description of the nature-nurture problem (a la Zing-Yang Kuo) and

implications for the application of the position in school psychology. In addition, they have worked out a six-page table that compares and contrasts six school psychology aspects of the developmental-transactional model in considerable detail. All in all, this paper is as good a current presentation of both the foundation and the professional relevance of what many of us refer to as interbehavioral psychology as one could hope to find.

In summary, I found school psychology's recent enthusiastic wholesale acceptance of a set of principles extremely gratifying. That J. R. Kantor (1924, 1926) was not cited is a small matter, and actually, since many people still consider his Principles as dated, this may be for the best. The important thing is that we now have proof that what many of us learned from him many years ago is not only up-to-date in these latter 1980s, but still well ahead of most thinking in the field. Interbehavioral principles are just as fresh and exciting today as they have ever been, whether they be called transactional, developmental, interactional, ecological, or reciprocal-deterministic and they will serve the theoretical needs of psychologists for many years to come. Fortunately, J. R. Kantor's Principles is still in print and a preliminary reading of the relevant chapters of Elliott and Witt will permit young psychologists to have a fuller appreciation of Kantor's contribution than has been possible before. Their acquaintance with his great classic may provide them with the lasting pleasure and enthusiasm with which it has provided me for over 50 years.

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- Kantor, J. R. (1926). Principles of psychology (Vol. 2). Chicago: Principia Press.

The complete reference is: Elliot, S. N., & Witt, J. C. (1986). (Eds.), The delivery of psychological services in Schools: Concepts, processes, and issues. Hillsdale, NJ: Erlbaum.

Jacob Robert Kantor (1888-1984)

Paul T. Mountjoy and Jay D. Hansor

Western Michigan University

Robert Kantor organized scientific values into a coherent entity and implemented a naturalistic system of psychology. This is his permanent contribution and monument.

Born in Harrisburg, Pennsylvania on August 8, 1888, Robert attended the University of Chicago where an early interest in chemistry was soon supplanted by devotion to psychological science. He earned the Ph.D. in 1914 and was an instructor at the University of Minnesota from 1915 to 1917. Marriage to Helen Rich on September 2, 1916 provided him with a long-term collaborator and later a daughter, Helene Juliette. His Ph.D. was awarded in 1917 and he served as an instructor at the University of Chicago from 1917 to 1920. In 1920 he became Assistant Professor of Psychology at Indiana University where he was to remain for 39 years; he was promoted to Associate Professor in 1921 and became Professor of Psychology in 1923.

Following retirement in 1959 Robert continued his productive life, as Visiting Professor at New York University (1952-1963) and then at the University of Maryland (1963-1964). He lectured often at universities and professional societies in the United States, and beginning in 1974 he frequently lectured and presented seminars at various universities in Mexico. He was appointed a research associate at the University of Chicago in 1964 and continued his scholarly activities there until he was fatally stricken on January 31. He died peacefully two days later on February 2 in his 96th year.

Robert's dissertation was the beginning of the critical historical analysis that is the hallmark of his unique contribution to American psychology. The Functional Nature of the Philosophical Categories (1917) constituted an examination of the psychological aspects of the history of philosophy from Anaximander to the Pragmatists. Discernible in this work are the foundations of the scientific values that were to guide his career as he struggled to produce a natural science of psychology. In it he commented on the

barrenness and futility of philosophies of the past and the necessity of considering the actual actions of individuals rather than reified abstractions. These concerns inevitably led to the problem of the definition of the subject matter of psychology.

At the time of Robert's appointment, the Indiana Department was prominent because it boasted the second psychological laboratory established in this country and was in the process of establishing one of the earliest psychological clinics. This eminence in scientific psychology provided a nurturant environment in which Robert flourished and contributed greatly to the continued development of the department. Between 1918 and 1924 alone, Robert published a total of 34 papers, 32 of which reflect his struggle to develop the concepts and terminology that allowed the establishment of an authentic scientific psychology.

Robert entered the lists as a champion of objective psychology in the second decade of the 20th century. Naturalistic viewpoints had been achieved already in physics, chemistry, and biology. Thus, the time was ripe for a scientific revolution in psychology. Robert, however, founded no school of psychology. Instead he proposed a broad group of scientific hypotheses based on minimal assumptions regarding the data of psychology. This was the first modern comprehensive and completely naturalistic program for psychology, that is, the first to advocate complete departure from historically imposed preconceptions.

Robert followed the accepted canons of science in his definition of the primary data of psychology. He proposed that the relationship between two entities in a field be regarded as an event to be studied. In "A Tentative Analysis of the Primary Data of Psychology" (1921) these entities were identified as the stimulus object and responding organism. These names not only indicated his objective posture but also acknowledged continuity with previous workers. Principles of Psychology (1924, 1926) further demonstrated that all phenomena with which

psychologists were concerned could be described and analyzed as a series of natural events. The concept that an organism is in active interbehavior with environmental conditions provided the foundation for all Robert's subsequent work. He successfully avoided any overemphasis on either of those two mutually participating factors in the psychological event.

During the early 1920s, Robert investigated the field of social psychology. He began to construct an event-based social psychology in An Outline of Social Psychology (1929) and Cultural Psychology (1982). Psycholinguistics was of special interest to Robert. His paper, "An Analysis of Psychological Language Data" (1922), represents a departure from both the mentalism rampant at the time and the physiological reductionism of Watson. Detailed analyses of complex linguistic responses are found in An Objective Psychology of Grammar (1936) and Psychological Linguistics (1977).

An objective science of psychology as an independent member of the family of natural sciences was the goal at which Robert aimed during all of his 67 years of productive life following his dissertation. He furthered the attainment of that goal by founding the Principia Press shortly before World War II. Originally a cooperative organization of faculty who represented various scientific fields the press gradually concentrated on his own publications. In 1937 Robert founded The Psychological Record, which still flourishes. From 1968 onward, under the num de plume of "Observer," he published over 50 comments and queries in that journal.

Robert justified the title of his 1947 book Problems of Physiological Psychology on the ground that the area is characterized as "grievously encumbered by a series of paradoxes and perplexities." For him these paradoxes flowed from the perseveration of historical concerns with the relationship between soul and body. The age-old questions remain unanswerable by means of the techniques of modern science because they arose long ago in a culture devoid of empirical analyses and hence are not amenable to scientific methodology.

What was needed was a ruthless rejection of the old philosophy that had

formulated those questions and the substitution of a new scientific philosophy oriented toward events that would lead to scientific questions derived from the events themselves. New categories needed to be derived from investigation of actual events to replace the theoretical preconceptions of bygone eras, in which mentalistic terms were regarded as entities worthy of scientific concern. For him no amount of verbal obfuscation could conceal the nonnaturalistic origins of mentalistic concepts. Robert also decried all efforts to exalt nervous tissues into the exclusive explanatory factor for behavior and steadfastly advocated an integrated field interpretation that would include physiological events as a portion of his vision of a naturalistic science of psychology.

Robert was unmatched as a modern philosopher of science. Psychology and Logic (1945, 1950) pointed to the central role of behavior in the independent enterprise of logic. And logic, or analytic philosophy, was separated rigorously from speculative philosophy (which he derisively labeled specious philosophy). The necessity for rigorous logical analysis of the scientific enterprise was further explicated in The Logic of Modern Science (1953) and Interbehavioral Psychology (1959). In all these works he emphasized that valid scientific work included both an empirical and an analytic (logical) component. Most important to him was the clear statement of the assumptions that guided the development of scientific systems and the banishment of all absolutes from the scientific realm.

Only one scholarly treatment of the history of psychology from a completely naturalistic viewpoint is now in existence and that is his monumental work, The Scientific Evolution of Psychology (1963, 1969). In these volumes Robert returned in part to the topic of his dissertation, but intellectually enriched by nearly a half century of scholarly work he transcended it. It is an analytic panorama of the self-corrigibility of science over two and one-half millenia. The message is clear: In spite of its missteps psychology is an integral component of science and consequently shares in the progress enjoyed by science as a whole throughout the historical

record. All his intellectual activities rested on the assumption that scientific work led to a definite and precise orientation with respect to things and events.

Teaching was a central and valued portion of Robert's life. All his students remember fondly his application of the Socratic technique. Best of all were the sessions that closed with students arguing among themselves. These stimulating interchanges continued between classes, and the next session began with the most assertive class members offering the solutions they had developed.

Following his retirement, there appeared in the Revista Mexicana de Analisis de la Conducta a regular sequence of 16 contributions beginning in 1975. These and the "Observer" comments illustrate not only his continued productivity well beyond the age at which creativity usually ceases, but also the broad range of his interests within psychological science.

Robert retired soon after the death of his wife Helen and moved to Chicago to live with his daughter Helene (now Professor of Archaeology at the Oriental Institute and Department of Near Eastern Language and Civilizations at the

University of Chicago). A house near the university was renovated to serve as a combined office and residence. Robert's second floor workroom/library/bedroom overlooked the garden-like backyard. Here he continued his productive life in surroundings that visitors thought idyllic.

A cultured gentleman, Robert was an exceptionally knowledgeable connoisseur of literature, art, and music. One of his last publications, Tragedy and the Event Continuum (1983) examined a sample of literature in light of his naturalistic philosophy and psychology. His artistic preference favored the Impressionists and especially German Expressionism.

As we write this we have before us what seems to be Robert's last will and testament for psychology. It was found on his work table by his daughter and probably represents his final statement of what psychology must escape to become a natural science. It is appropriate that our summary of his life and achievements should end as did his life: "No spirits, wraiths, hobgoblins, spooks, noumena, superstitions, transcendentals, mystics, invisible hands, supreme creator, angels, demons, "

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Analysis of the Response Function in a Unit of Interbehavior

Sidney W. Bijou

The University of Arizona

In a paper presented at the meeting of the Association for Behavior Analysis, Morris (1988) described a unit of interbehavior in terms of four factors: (1) mutually related stimulus and response functions, (2) medium of contact, (3) setting, and (4) interactional history. He also compared this unit with the behavior-analytic three-term contingency. The present paper is an elaboration of the first factor -- mutually related stimulus and response functions, with an emphasis on the response function.

Although a response function always involves the action of the total individual, a specific psychological act can be analyzed into biological and behavioral factors. Biological factors include the muscular, neural, glandular, receptive, effective, skeletal, tendon, and skin activities characteristic of a species. Psychological factors, in contrast, consist of either a single reaction, such as a reflex action, or a multiple reaction such as problem-solving. The former is an undifferentiated response, while the latter is an interconnected series of reaction systems.

The series of reaction systems in a complex response may be divided into two categories: those precurrent to the completing (consummatory) reaction, as in attending and perceiving, and the completing reaction itself, such as a linguistic response to a friend. All of these precurrent and completing reactions evolve through previous contacts between total functioning individuals and the objects and events which constitute their environment.

The focus of the following discussion is on the nature and categories of precurrent and completing reactions in a complex response function.

Precurrent Reactions

The first reaction in a complex response function is an attending reaction which serves to bring behavior and an object, person, or event into a psychological interaction. The attending reaction prepares an individual for further action with respect to whichever object will be reacted to by subsequent

reactions. Thus, the first precurrent reaction may be said to systematize behavior and facilitate its effectiveness. Considerable research has been done on the properties of attending reactions and the way they function under various conditions (see, e.g., Rabbitt & Dornic, 1975).

The precurrent reaction that follows attending behavior in a complex response function is a perceiving reaction which orients a person to the actualized object or event and its setting. A perceiving reaction involves both discriminative and conceptualizing processes.

Perceiving reactions range extensively. They include (1) discerning the properties of objects, (2) the preliminary activities of choice behavior, (3) apprehending the utterances of a speaker, and (4) the preparatory acts "for comparing and contrasting things, for artistically enjoying, discussing, or speculating about an object" (Kantor & Smith, 1975, p. 176). Perceiving reactions are influenced by an individual's biological make-up, interactional history, and situational factors, such as fatigue, concurrent responses, interest, media of stimulus-response contact, and setting.

The study of perception has been almost as extensive as the field of psychology itself, as evidenced by the once vigorous school of Gestalt psychology which was based primarily on perceptual phenomena. That this movement, spearheaded by Koffka, Kohler, Wertheimer, Lewin, and their students, enjoyed considerable recognition is understandable, considering that perceptual reactions strongly influence both observable and nonobservable completing reactions.

We say that perceptual reactions "strongly influence" rather than "determine" completing reactions because in many instances a perceptual reaction may be followed by one or more additional kinds of precurrent reactions. One such class is meaning reactions which involve further behavior in relation to the actualized stimulus function; these are different in form and function from the perceiving reaction (Parrott, 1986). As

an example of a performative meaning reaction, a person may perceive a small, round metal object as a coin, and then heft it (a meaning reaction) to determine whether it is counterfeit or genuine. Other examples can be found in linguistic and affective reactions.

Another class of precurent reactions which might be included in a precurent chain prior to a completing reaction is imagining reactions involving implicit responses to substitute stimuli. For example, someone might have to visualize the layout of a city before they can give someone directions to the zoo.

Another category of precurent reactions is a cognitive, or knowledge, reaction. Asked by a newcomer about the speed limit in a residential area of the city, we might first have to inquire about the city ordinance governing driving speeds before giving a reply.

Still another class of precurent reactions is feeling reactions which may be generated by the perceptual reaction. A pain in the chest may be perceived as a heart attack and arouse anxiety.

And finally, a class of precurent reactions might take the form of manipulative reactions. These involve interactions with objects and events in different settings to increase the probability of a specific completing reaction. Manipulating reactions play a prominent role in decision-making and problem-solving, as in, for example, transforming research data to see if meaningful relationships emerge among variables.

Completing (Consummatory) Reactions

Completing reactions, which include all of the overt and covert responses in behavioral psychology, may be classified in a number of ways. In an effort to cover this tremendous territory, and yet not become bogged down in minutia, we suggest four basic categories: effective, linguistic, cognitive (knowing), and affective (feeling) (Bijou, 1984). In the discussion to follow, we adhere to the practice of referring to an entire interaction, or a unit or segment, by the name of the completing reaction.

Effective reactions. Reactions that have direct consequences on the object, person, or event interacted with are effective completing reactions. They are essentially operant interactions (Skinner, 1953) with an antecedent stimulus, operant

behavior, a consequent stimulus, and a setting condition or "third variable." The operant behavior is the response function, which can be fractionated for analytical purposes into attending, perceiving, and all the other reaction systems discussed in the previous section.

A simple example readily reveals the essential components. Sitting on the floor playing with his building blocks, a child suddenly notices a small black moving object, identifies it as a water bug, picks it up, carries it outside, sets it down on the lawn, goes back in, and resumes play. The stimulus is the crawling object, the first response to which is an attending reaction which shifts orientation from the blocks to the moving object. The next reaction is one in which the child perceives the black moving object as a harmless bug. The second precurent reaction prompts an effective completing reaction: The child picks up the bug and deposits it on the lawn, returns, and resumes playing with the blocks. Had the black moving object been perceived as a threatening looking spider, the child would have engaged in a different completing behavior -- trying to kill it or possibly calling for help.

Linguistic reactions. There are two kinds of linguistic completing reactions: referential and symbolizing (Kantor, 1977). Referential reactions, which may be gestural as well as verbal-vocal, have indirect effects on the environment. They are related to two separate antecedent stimulus functions, one inherent in the listener, the other in the referent. They may result in either a narrative linguistic episode in which the listener responds linguistically, as in a casual conversation between friends, or in a mediative linguistic episode wherein the listener behaves nonlinguistically, as in passing the mustard at the request of the speaker. Because the speaker and listener functions may reside in the same person, a distinction is made between communicative and expressive linguistic interactions.

Symbolizing reactions, in contrast, are reactions to stimulus functions that are substitutes for something else. They may be orientative alone, as in recognizing the meaning of a caution sign at an intersection, or they may involve the coupling of an orientative and an additional reaction to the object or event symbolized. In our example, the reaction

would be orienting to the caution sign, then stopping and looking to the right and left for approaching vehicles.

Cognitive (knowing) reactions.

Orienting completing reactions are labeled cognitive reactions. Unlike simple symbolizing reactions, they are in interaction with all sorts of stimulus functions rather than with substitute stimulus functions only. Furthermore, cognitive reactions terminate in nonobservable, or implicit, reactions.

Cognitive reactions, which evolve from past interactions with objects and events, vary in their complexity. Some may only be reactions to the elementary properties of things, for instance, discerning the difference between edible and nonedible apples. Some may be reactions in relation to previous experience with an object, person, or event, for example, recognizing a person who was once your elementary school teacher. Some may be reactions to the properties of an object or event and the ability to predict their occurrence under certain circumstances; for instance, water will turn into ice when it is exposed to temperatures below zero degrees celsius. And some may involve understanding the origin, development, and implications of an object or event, such as an appreciation of the geological history of the Grand Canyon.

The careful reader will note that cognitive reactions have been included among the precurrent reactions. There is no contradiction here. Cognitive reactions may be either completing reactions, as just described, or they may be precurrent reactions occurring between a perceiving reaction and an effective or

linguistic completing reaction.

Affective (feeling) reactions.

Affective reactions are predominately glandular and smooth muscle actions. Most often referred to as emotional reactions, they may be tensions in relation to surprising and unexpected events, or diffused pleasant or unpleasant reactions to stimulus functions with histories of positive reinforcement or of aversive stimulations, respectively. The specific biological factors involved include changes in heart rate, respiration, blood pressure, visceral tension, adrenal secretion, and the like. These activities function in accordance with respondent conditioning principles (Skinner, 1953).

Like cognitive reactions, affective reactions may be completing or precurrent reactions, depending on the situation. When precurrent, the completing reactions are effective or linguistic reactions, or both. And, like cognitive reactions, affective completing reactions do not ordinarily modify the object, person, or event interacted with.

Interrelationships Among Interactions

It should be apparent that response functions in complex segments consist of permutations and combinations of precurrent and completing reactions. For example, the effective behavior of opening a sticky door not only fosters strenuous muscular effective activity, but also increases the adrenalin flow and stimulates feeling and linguistic reactions: "Doggone! This door ought to be fixed!" It is possible, however, to identify the dominant interaction or interactions and to observe in what way or ways other interactions are involved.

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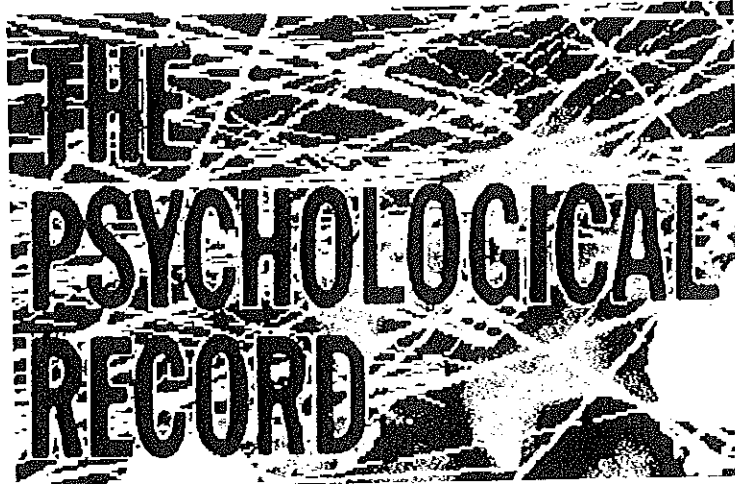
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Author Note: I would like to thank Patrick M. Ghezzi for his astute comments on an earlier draft of this paper.

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