

THE INTERBEHAVIORIST

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THE INTERBEHAVIORIST

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THE INTERBEHAVIORIST publishes 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 also 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 duplicate hard copy and a single computer disk copy (any major word processor; any Mac or IBM disk format) 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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Call for News

THE INTERBEHAVIORIST publishes news about subscribers' activities and information about others' activities that may be of interest to readers. If you have published an article, chapter, or book with an interbehavioral orientation, or have read one published by someone else, particularly if the source is obscure, please let us know about it.

The Agora

Attention Interbehaviorists

With the new academic year ahead we need people to contribute to *The Interbehaviorist*. In particular, we need all readers to renew old subscriptions and submit papers and comments for the newsletter. Also, we would like those of you conducting empirical research to provide us with a short "research note" describing the type of research you are doing. We would like to publish these "research notes" to promote the research being done by our subscribers.

Comments & Queries

This new regular section of *The Interbehaviorist* will begin in the next issue and will provide an opportunity for discourse on a variety of discrete issues of interest to behavior analysts. Short comments, questions, or criticisms are invited from both interbehavioral and non-interbehavioral psychologists. Responses will include answers to questions and clarifications of interbehavioral psychology. Readers are encouraged to submit their own comments in addition to facilitating submissions from colleagues and students. Submissions should be sent to:

The Interbehaviorist
Dept. of Psychology
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Reno, NV, 89557-0062

Notes From the Interbehaviorism Conference in Spain

The Instituto Kantor De Psicología Interconductual recently held its second international conference in Madrid, Espana this July, 1994. The conference featured participants from the United States, Venezuela, Mexico, and Spain. Those attending the conference from the U. S. A. included Linda J. Hayes (paper on learning and memory) and graduate students Cynthia A. Reinbold (paper on changing a culture) and Mark A. Adams (paper on inherited behavior) from the University of Nevada, Reno. In addition Mark A. Swain, also from the University of Nevada, Reno had a paper (Kantor's analysis of causation and probability) read

in his absence. Although communication was somewhat difficult (the conference was entirely in Spanish, except for the translation of the papers from the U.S.A.), some very interesting discussions arose about issues such as the place of causality and realism in interbehaviorism. In particular, there was a reaction to the position of presentism proposed by Linda Hayes, and where this position might eventually take the psychologist, in both applications and philosophy. Also, the possibility of making *The Interbehaviorist* bi-lingual was discussed. At present, these discussions are continuing among members of the Advisory Board.

This was a great opportunity to meet other interbehaviorists, and it was very refreshing to talk to some psychologists who look at the study of behavior in a similar way. Anyone interested in the Kantor Institute should write to:

Instituto Kantor De Psicología
Avenida Pio XII, 97.7 F
28036 Madrid, Espana

Second International Congress on Behaviorism and the Science of Behavior

The Second International Congress on Behaviorism and the Sciences of Behavior will be held October 6-9, 1994, in Palermo Italy. The conference will involve addresses, symposia and discussion sessions covering a variety of topics, including, epistemological and conceptual issues, theory and method, historical studies & practical applications. There will be a small contingent of Interbehaviorists at the conference.

New Faculty at UNR

W. Lawrence Williams, Ph.D. will be joining the behavior analysis faculty at University of Nevada. Lawrence received his Ph.D. from the University of Manitoba and has since spent time at Surry Place Center in Toronto, Canada, as well as doing work in special education in San Carlos, Brazil.

Article

Interbehavioral Psychology: Critical, Systematic and Integrative Approach to Clinical Services

Dennis J. Delprato
Eastern Michigan University

Introduction

Above all else, an interbehavioral approach aims to provide a coherent and systematic science and practice of psychology "from the ground up." The interbehavioral perspective considers it essential for a psychological practice, authentically based on science, to have a completely naturalistic approach to both science itself and psychology in general. With this in view, this chapter first covers historical developments and basic orienting assumptions pertaining to science itself. Next, it sets forth some fundamentals for psychology as a completely naturalistic science. Finally, it presents several assumptions for clinical services themselves, along with practices recommended by them.

Science and Knowing

J. R. Kantor and Interbehaviorism

Kantor took on the ambitious task of developing a coherent philosophy and psychology that centered on scientific understanding of human psychological behavior as the basis of all disciplines, whether conventionally taken as sciences or humanities. This writer is struck by how far Kantor's work goes toward accomplishing one of the earliest aims of the behavior therapy movement, i.e., clinical theory and practice as continuous and harmonious with basic science and theory in a fundamental way. This chapter aims to highlight the systematic advantages of the interbehavioral framework for the behavioral clinician.

At the heart of Kantor's thinking was his early leanings toward and, later, explicit advocacy of, field theory. After trying various terms to refer to the approach he favored, Kantor ended up with *interbehaviorism*. He added *inter* to *behaviorism* to communicate that behavior must *always* be described in field terms. But what does this mean? Kantor used the prefix *inter* to recognize that psychologically the organism's actions are always coordinated with specific conditions such that the two sides are always mutual or reciprocally related (i.e., neither stimu-

lus-->response nor response-->stimulus but response <-->stimulus). Although it is possible for analysts to isolate response or stimulus factors, the actions of reciprocally related stimulus and response factors constitute a single psychological unit. The mutuality of response and stimulus makes response-*function* and stimulus-*function* the relevant constructions for psychologists. These abstractions, although related to physiological and physical factors, are not to be confused with them.

From Lineal Mechanics to Fields/Systems

Although the physical sciences, and to some extent biology, have abandoned lineal mechanism, mainstream contemporary psychology has not. According to lineal mechanism, the fundamental descriptive and explanatory model is cause--->effect. The classic experimental model whereby causes are identified with independent variables and effects with dependent variables continues to reign supreme. The psychological field is

the entire system of things and conditions operating in any event taken in its available totality. It is only the entire system of factors which will provide proper descriptive and explanatory materials for the handling of events. It is not the reacting organism alone which makes up the event but also the stimulating things and conditions, as well as the setting factors. (Kantor, 1969, p. 371)

Descriptions of psychological event (PE)-fields require several factors: $PE = C(k, sf, rf, hi, st, md)$. In this formulation, *k* symbolizes that all psychological events are unique, *sf* represents stimulus-function, *rf* stands for response-function, *hi* is the historical process through which the correlated *sf* and *rf* developed, *st* recognizes that particular *sf*-*rf* coordinations always take place in immediate ecological and organic settings, *md* represents a class of setting factor given separate status as the medium by which the organism contacts the physiological and physical correlates of *sf*, and *C*

communicates that the PE consists of an entire system of interdependent factors.

Kantor's field conception of psychological events helps us capture their complexity without invoking anything fictitious. I find it difficult to imagine any effective clinician who does not take at least a minimal field perspective. This point is nicely illustrated by one of the classic cases of psychological analysis (and treatment). Ellenberger (1970, pp. 361-364) relates Pierre Janet's account of the recalcitrant case of Marie that Janet published in 1889. One component of Marie's plight consisted of depressive and violent episodes marked by sudden termination of menstruation 20 hours after the beginning, a great tremor of the entire body, reports of severe pain ascending slowly from the abdomen to the throat, violent bodily contortions, and other symptoms. If Janet's reconstruction of Marie's history is accurate, from today's perspective it appears that a self-initiated classical conditioning interaction (conditional stimulus = menstruation at 20 hours, unconditional stimulus = cold water, unconditional response = vasoconstriction, shivering, and sequela) was a critical contributor to Marie's condition. Upon her first menstruation at the age of 13, Marie interpreted it as shameful and tried to stop the flow by plunging herself into a large bucket of ice water approximately 20 hours after the onset of menstruation. She was successful. Menstruation suddenly stopped, and Marie returned home shivering violently. For several days after the episode Marie was ill and delirious. She experienced no menstruation until five years later at which time the presenting symptoms appeared.

At the risk of oversimplifying and relying on incomplete assessment, it is rather easy to apply the interbehavioral conception of the fundamental event-field to two important event-fields in the case of Marie. First, at the time of Marie's initial menstruation, sf-rf corresponds to menstruation-as-shameful/undesirable/aversive/to be avoided as a result of one or more historical (hi) episodes in which others directly or indirectly communicated this about a perfectly normal bodily process. Prominent setting factors (st) include distinctive organic conditions concurrent with menstruation and a bucket of cold water. Media of contact (md) for menstrual flow are light for visual contact and the more intimate tactual medium. All named factors are interdependent participants (C) in the field that is uniquely and only (k) Marie's at a particular point in time. A second important event-field in this case

occurs 20 hours into a particular episode of the adult Marie's menstruation several years later. The earlier (hi) self-imposed adjustment of Marie's to her first menstruation has contributed to the establishment of an sf-rf coordination whereby vasoconstriction, shivering, and so on is called forth by conditions 20 hours into menstruation. Setting factors (st) again include distinctive organic conditions concurrent with menstruation and media of contact (md) are light and tactual. All factors in this unique (k) event-field are interdependent (C).

To systems. One hears little about fields in the sense here described in psychology today other than from those impressed with the Kantorian interbehavioral literature. However, although few have recognized it, field theory is rather healthy as found in the form of "system" constructs.

Historico-Critical Analysis

The field/system nature of interbehavioral theorizing is but one of its distinguishing marks. Kantor's macro-historical and historico-critical analysis of the scientific evolution of psychology leaves no doubt that he viewed interbehaviorism as the culmination of the behavioral movement. The *Scientific Evolution of Psychology* (Kantor, 1963, 1969) documents two major developments in Western thought that get at the heart of nonbehavioral and behavioral approaches to psychology. The first, involving departure from naturalistic Hellenic thinking and invention of a nonspatiotemporal world, underlies non- or antibehavioral psychologies. The new nonspatiotemporal world was verbally placed in opposition to the world in which people live—the natural world. The venerable spiritual-material dualism developed, and we see Aristotelian naturalistic soul transformed into supernaturalistic soul-spirit. Spiritual-material dualism became institutionalized in the form of the Church, and the sacred view of the world reigned supreme for centuries. Supernaturalism, based on the idea of an invisible nonspatiotemporal world, made humans the repository in the natural world of a part of the verbally-created spiritual realm said to be confirmed with certainty only by a new alleged way of knowing, revelation. What amounted to a synonym for "life" with purely naturalistic referents was transformed to where the construct—Aristotelian soul—was given supernaturalistic referents and placed inside humans. In the case of humans, spiritual-material dualism is exhibited in the soul-body and mental-behavior distinc-

tion that continues up to the present to haunt those who attempt take a scientific--that is, naturalistic or behavioral, approach to psychological events.

The second major development in Western thought consists of society's gradual transition from extreme supernaturalism to ever more naturalistic thinking. As part of the gradual change from sacred to secular orientations, thinkers transformed supernaturalistic soul to mind, consciousness, and experience; the soul construct became less theological. Critical thinkers gradually altered the referents of soul to where psychological functions were said to be taken over more and more by secular processes. Eventually, a point was reached when soul was given to a so-called new science, a science that was given an impossible task. It was asked to take a radically different (that is, naturalistic) approach to soul and, at the same time, remain the repository of centuries of cultural tradition in the form of insubstantial, spaceless, and timeless soul.

The movement from soul to mind, consciousness, experience, and later, behavior, has been a naturalistic one, but progress in the re-naturalization process has been excruciatingly slow. With the aid of historico-critical analysis of psychology over the centuries, interbehavioral thinkers plunge forthrightly into radical naturalism that opts for the thorough re-naturalization of humans and rejection of all vestiges of mental-physical dualism to complete the final step of the secularization of society and psychology.

Systematics

Critical analysis of the history of a science is one valuable way of advancing knowledge, in particular, by removing cultural obstacles. The interbehavioral perspective adds to historico-critical analysis the broad area of scientific systematics. The argument is that we must examine the logic (or systematics) of a science to clear away impediments to sound knowledge and to most efficiently develop new knowledge. In order to do this, we have to identify the fundamental assumptions that underlie the work we are analyzing. All intellectual enterprises are based on premises or postulates whether or not we explicitly identify them. Assumptions deleterious to understanding are most likely to impede progress when they are not made explicit and thus remain unexamined.

In brief, interbehavioral systematics involves identifying and organizing postulates such that they are (a) open to critical examination and (b) available to serve as guides for workers and students. The most effective practice shows that postulates are not of-

fered a priori as unalterable principles, but are derived from workers interbehaving with their subject matter and altering them as work proceeds. The remainder of this chapter is organized around statements of fundamental interbehavioral assumptions at the levels of basic science, psychology as a science, and the clinical practice of psychology. Given that the ultimate aspiration of the interbehavioral perspective simply is scientific understanding of psychological events and that psychologists have pursued this goal for some time, one would expect to find several familiar points and recommendations. Indeed from a global point of view, perhaps the only novel feature of the interbehavioral approach is the organizing framework it provides. When all remnants of nonscientific (i.e., non-naturalistic) thinking have vanished from how we approach human behavior, interbehaviorism will no longer be necessary, for what it offers (e.g., field/system perspective) will have been incorporated into psychology itself.

Scientific Fundamentals

Essential. Work said to be scientific or based on science must take observation as paramount. Judgments for acceptability of claims at a particular point are to be made with respect to their status from the standpoint of observation and observational inference, not authority, tradition, or logic.

Primary concern. Scientific work is above all else concerned with the nature and operation of events. A major task of basic scientists and practitioners of science is to guard against any received practice, assumption, or behavior on their part that impedes their descriptions and interpretations of events.

Science as behavior-in-culture. Science is inseparable from the behavior of scientists, and scientific enterprises evolve in cultural situations making very difficult the autonomous practice of science within a cultural complex.

Locus of events. Science finds no justification for the culturally-transmitted assumption of a double-world--one in which we live, experience, and find things and another world beyond the boundaries of space-time. Events, be they astronomical, geological, physiological, micro-physical (e.g., quantum), or psychological occur only in a spatiotemporal frame. Any position that promotes the ancient tradition that psychological events such as perceiving, knowing, reasoning, judging, and thinking are uniquely different from seemingly more knowable events because of only the latter's locus in the spatiotemporal is to

be guarded against.

Constructs. Science requires constructs (descriptions, interpretations) that are (a) products that must be derived from interbehaving with events and not imposed upon events from sources such as cultural presuppositions, (b) not to be confused with events, and (c) not all equal. To fail to distinguish between constructs and events is to run the risk of imposing the products of contacts with events upon the original events, as when the scientist of old imbued combustion processes with heat substances or the psychologist permits "attention-deficit disorder" to obscure children's interactions with their world.

Procedures and postulates. A common class of event in basic and applied science consists of the expert interacting with events, as when experimenters arrange for a particular thing to follow occurrences of a given movement of a subject or clinicians pose a particular question to a client and note their reply. Manipulative procedures are events and are not to be confused with constructions such as descriptions and interpretations that observers use to talk about their procedures or about results deriving from procedures. Furthermore, we should distinguish between procedures and the stated or unstated hypotheses and assumptions, called postulates, that contribute to the institution of one procedure instead of another or to particular interpretative remarks.

Knowing and the known. To one who has not explicitly thought of the issue, the concern with knowing and the known may appear an esoteric largess of philosophy. However, the central (so-called epistemological) issue is readily apparent once one realizes the status of events relative to anyone's knowledge of them. Events are spatially and temporally extended. Our knowledge of an event is not the event itself. Cultural tradition passed on formally by philosophers takes knowing as fundamentally different from things known, i.e., nonspatiotemporal. This has led to many ways of attempting to account for how we have the feeling of knowing events; hence, idealisms, realisms, positivisms, empiricism, logical empiricism, conceptualism, constructionism, and phenomenalism. Practitioners of science have no need for any of these. Instead, they take knowing as belonging to the same (spatiotemporal) framework as the things and events known. The scientist's knowing behavior is not to be confused with the known. It never reveals a "reality" behind the knowing activities, never reveals "reality" in mental states called experience, never yields abso-

lute "truth," and is always personal in the sense that knowing is continuous with the knower's current circumstances, cultural background, and unique long-term and short-term developmental history.

Objectivity and subjectivity. As the above implies, to distinguish between objective and subjective knowledge is unjustified and perpetuates the view that experiencing, perceiving, thinking, imagining, feeling, reasoning, judging, and knowing are nonspatiotemporal and "unreal" and only legitimized for science by making these psychological activities analogous to familiar physical and physiological events.

Criteria for valid knowledge. Thinkers have offered various criteria for evaluating knowledge claims. None of them is necessary once we identify and act on the above fundamentals. Taken together, they guide us in making decisions on the soundness of particular claims and sets of claims. The fundamentals presented here assist workers to maximize their knowledge of things and events with the assistance of whatever resources they have available, leading to the further behavior of prediction, if desired. That we reach this perhaps somewhat surprising solution to one of the most recalcitrant of epistemological problems may speak to the advantages of specifying the basics of science as is attempted in this chapter.

Interbehavioral Psychology as Science Field/System as Analytic Unit

The subject matter of psychology consists of the interactions of organisms with other organisms, objects, and events under the auspices of particular settings, contact media, and historical circumstances. Thus, all psychological events are comprised of multifactor, integrated fields or systems. One part of the field does not cause either other parts or the event-field itself. Multiple field factors simultaneously participate in the psychological event. Field factors are not related by way of independence and dependence, but rather by mutual implication or interdependence.

Nature of Participating Field Factors

Physical, chemical, biological, ecological, and socio-cultural factors participate in psychological events. Although in no way properly thought of as causes of psychological events, these events studied by other specialists are always involved and to ignore them is to risk incomplete description and understanding.

The Organism as Participant

The psychological event is never centered in the

organism. It is not located in or at the organism. The organism is a participant in a field of other factors. Psychological events are systemic, not restricted to parts of fields.

Event Evolution: Inorganic and Biological

All psychological events are the outcome of prior evolutions: inorganic (e.g., chemical elements, planets, earth) and biological. Biological evolution has two major phases: phylogenetic (e.g., plants, animals, species) and ontogenetic (begins with the union of the gametes and involves the embryological and biological development of the individual organism). All psychological behavior has bioecological roots, although socio-cultural factors take increasing prominence as psychological development proceeds. Nonetheless, all psychological events are at the same time biological ones.

Event Evolution: Psychological

All psychological event-fields are the outcome of prior psychological evolution. After biological ontogenetic evolution reaches a certain point (before birth in humans) at which the requisite biological foundation is available, psychological evolution begins and is ongoing. Thus, all psychological events are developmental and dynamic.

Event Continuity

As the outcome of a long series of evolutions (inorganic, phylogenetic, ontogenetic, and psychological), psychological events are not unique due to the operation of any nonspatiotemporal processes. There is no break in event continuity from particle impacts to biological activity to cognitive events such as knowing behavior. At no point do any other than naturalistic processes occur. Thus, cognitive and mental cannot and do not refer to occult or nonspatiotemporal events in whole or in part.

Distinguishing Characteristics of Psychological Events

If psychological events are not distinguished from physical and biological ones by their mental (as nonspatiotemporal) make-up, then what, if anything, does make them unique? Clearly, to suggest that psychology takes behavior as its subject matter and this marks it off from other disciplines is erroneous because all sciences take behavior as a fundamental construct. However, the prevalence of the behavior construct throughout science is consistent with the

interbehavioral position that behavior pertains to all events and that events are classified as physical, biological, and so on according to their behavioral characteristics. Psychological behavior is not movement in space, glandular and/or muscular, overt (public) or hidden from observers (private). Psychological behavior has other distinguishing marks and is not yet well classified.

The most striking aspect of psychological behavior is that it is never directly seen. Behavior of concern to the psychologist must always be inferred; it is an abstraction. What the person is doing psychologically is never available to direct observation.

Given that psychological behavior is not directly observed, its status is that of a construct that must be inferred from events. The interbehaviorist argues that when theorists use the construct *mental* to typify the central concern of psychology, it is often possible to identify characteristics of the events from which they derive the construct. Psychological interactions are adjustive (or adaptive) as when the participating organism anticipates and avoids harmful conditions or seeks out circumstances that facilitate its adjustments to the world. Psychological adjustments are historical, specific, integrative, variable, and modifiable. Furthermore, an important class of psychological interaction found with humans is when self-reflection is involved. In contrast to rocks falling down a cliff, persons exhibiting the same physical trajectory may think of their plight; humans, have a point of view concerning participating field factors.

Clinical Practice

Integrative and Eclectic

The radically naturalistic interbehavioral perspective rules out no procedure a priori but does not countenance non-naturalistic postulates. Given the firm distinction between events and procedures, on the one hand, and constructs and postulates, on the other, we recognize that clinical practice has two major divisions. First, there is what the clinician does, what the identified client does, and what others may do, with specific spatial and temporal relationships among the participating factors, all at the event level. Second, there are the postulates clinicians use to guide their work and the interpretations clients, clinicians, and others make of the events. Therapists with the most supernatural postulates imaginable cannot institute nonspatiotemporal procedures, although procedures derived from non-naturalistic presuppositions may

very well be inept. Indeed, given that interbehavioral psychology offers no unique procedures because it is not a theory in the conventional sense, only evidence that procedures based on non-naturalistic postulates are superior to those based on naturalistic postulates would disconfirm it.

Implicit in the interbehavioral position is Kantor's (1963, 1969) macro-and historico-critical analysis demonstrating that the behavioral movement above all represents an increasing tendency for workers to treat psychological events as completely based in the natural (spatiotemporal) world. From this it follows that what is distinctive about behavior therapy is that we expect this class of clinical work to follow postulates that are more naturalistic (scientific) than earlier approaches, and because the postulates are closer to relevant events, stand a better chance of effectively handling real-world problems (events).

The interbehavioral orientation promotes an integrative and eclectic clinical practice. However, the eclecticism is rather far removed from most of what passes for the very socially acceptable brands found today.

Interdisciplinary

In view of the integrated participation in psychological events of nonpsychological factors, clinical services must always allow for interdisciplinary cooperation. The field/system nature of psychological events does not justify the common-practice of many interdisciplinary "teams" in which a biomedical speciality is placed in a position of ultimate authority partly based on the reductionistic assumption that biological factors are underlying causes of psychological behavior.

Fundamental to Problem Resolutions: Modification of Field Factors

The field/system nature of psychological events requires that basic to all problem resolutions is the modification of field factors, including biological, ecological, social, domestic, economic, educational, vocational, and interpersonal conditions, as well as psychological ones.

Nonpsychological Sources of Problems and Solutions

Because criteria for psychological problems are always extra-scientific and extra-psychological (Kantor, 1959) and nonpsychological factors participate at all times in psychological event-fields, the clini-

cian is advised to explore nonpsychological solutions to problems.

All Psychological Problems Require a Complainant

It is not to trivialize psychological complaints to recognize that no problem is found in the absence of a complainant, whether the identified client (see below) is the sole complainant or not. In many cases, the first task of the clinician is to explore the conditions surrounding the complaining: who, when, where, and consequences. Even when acceptable outcomes do not result from modifying complaining itself, few, if any, problems will be adequately handled without addressing the complaining component.

De-emphasis of Intervention/Treatment

The field/system nature of psychological events, their continuity with other classes of events, interdependencies among participating factors, and the continuity of psychological event-fields call for a de-emphasis of conventional intervention and treatment solutions and avoidance of the over-professionalization of what are largely social and moral issues.

Clients are Always "Identified Clients"

Given that organisms are but participants in psychological event-fields, problems are never centered in individuals. Thus, even when individuals other than the presenting client are not obviously participants in the client's problem field, we are advised to think of the nominal client as the identified client.

Psychological Evolution: Developmental Interactions

Behavior therapy took an important step by placing more emphasis than most alternative therapies on clients' contemporary circumstances relative to their histories. Nonetheless, behavioral ontogeny cannot be ignored, and one would expect clinical practice aspiring to scientific foundations to articulate a sound etiological theory. The interbehavioral suggestion here is a thoroughgoing developmental perspective that follows from the fundamental field view that the field at a given instance is a function of the field at a time just past. Like all natural events, psychological behavior fields are naturalistic outcomes of a continuous evolutionary process. Delprato (1987) used the term *developmental interactionism* in referring to this view to recognize the interdependencies in interbehavioral fields.

Fundamental Goal: Actualization of Potentialities

Clarification of the potential and actual phases of event evolution is always important to maintain naturalistic interpretations (Kantor, 1983). Potentiality refers to the "what" of development; the evolution of structures and functions, but in the absence of other factors needed for actualization of another unique event-field. Potentiality and actualization handle the events forming the justification for distinctions between learning and performance, respectively, without the need for hypothetical mental, dualistic, or mechanistic assumptions. Naturalistically, potentialities evolve and when coupled with other particular components, form a new event-field. At the level of problem solution, our basic goal is to assist in the actualization of potentialities which may require development of new potentialities.

Person as Self-Regulatory System

The movement in scientific thinking from lineal mechanism to field/system constructions is of great import for how we view the regulation or control of behavior. The evolution of field/system thinking was a radical development in large part because it approached causality in terms of integrated event-fields instead of causal chains. The double-headed arrow (e.g., organism \leftrightarrow object), representing simultaneity of participating factors, replaced the single-headed arrow and temporal separation of causal factors from effects. Now there is no conventional directionality to causality. Behavior is no longer only an effect implied by its traditional role as a dependent variable. What this means for psychology is that the organism is a self-regulating system. The double-headed arrow of response \leftrightarrow stimulus, e.g., describes the simplest version of a closed-loop feedback-control system (Delprato, 1989; Powers, 1988). Now control is not from outside the system (external) in either the form of what is commonly represented as environmental variables or as mental/cognitive ones.

There are numerous implications of the individual as always a self-regulating system. Despite behavior therapy's less than complete conceptual development of the inherently self-regulatory nature of human behavior, many behavior therapists have emphasized the importance of a self-management model of clinical services and have used various procedures to increase identified clients' active involvement in therapy (e.g., self-monitoring, homework assignments).

One general way of making clinical services more likely to take into account the self-regulatory nature of all behavior is to make them as participative as possible.

Responses are Interdependent (Patterned)

When researchers removed methodological blinders inherited from lineal mechanism, they found that responses are field phenomena, i.e., interdependent or patterned. What this means is that responses are not independent of one another. The patterned nature of responses recommends several strategies and tactics to the clinician, including routine use of multiple-response assessment and incorporation of pattern identification methods such as sequential analytic techniques.

In terms of interventions, response patterning places the indirect modification of responses in a fresh light. If two responses, one of which is problematic, covary, there is no reason why field alterations such as therapeutic contingencies and other factors must always directly contact problematic responses.

One of the most important approaches to clinical assessment and intervention that the interbehavioral system, and especially response patterns, calls for is the constructional model of service delivery (Goldiamond, 1974). Constructional approaches are consistent with the fundamental goal of actualizing potentialities by placing the focus on the construction of behaviors, not their elimination.

Assessment: Behavioral Systems Methodology

The interbehavioral perspective's strong commitment to events makes it favorably disposed to behavioral assessment and functional analysis. Methodology must take into account the temporal continuity of event-fields, multiple classes of participating field factors within each of many domains, interdependencies among participating factors, and varying interbehavioral settings in which event interactions occur.

In Conclusion

In one sense, interbehavioral work is not for students of psychology who are satisfied with the status quo. This little-known approach calls for several new ways of thinking and of providing clinical services. Despite interbehavioral psychology's radical posture when viewed from many conventional points of view, I submit that those who have developed even moderate skills at approaching the world from the stand-

point of what science is virtually uniformly taken as "all about" (i.e., observation and rejection of authority) will find considerable food for thought in the interbehavioral perspective. In essence, interbehavioral psychology is merely a continuation of the idea that psychological events are completely capable of being understood scientifically. It is this feature that makes interbehavioral psychology conventional and integrative rather than yet another theory or system.

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Article

Inherited Behavior: Interbehavioral and Radical Behavioral Interpretations

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Although many scholars do not recommend arguing issues across philosophical positions (Pepper, 1942, for example, calls these "illegitimate arguments"), comparing positions on particular topics can be useful as a means of increasing one's awareness and understanding of one's own position. In this paper we compare the assumptions of radical behaviorism and interbehaviorism on the issue of inherited behavior, providing an avenue for better understanding of each and demonstrating the impact of adopting particular sets of assumptions on our interpretations of particular types of psychological events.

The Inheritance of Behavior

When an individual is considered to be shy an explanation for this characteristic is sought in the substance of the person, as when it is suggested "he was born that way." This is especially true if this person behaves in this manner for an extended period of time. Another example is an athlete who plays a particular sport with little apparent effort. This person is often called a "natural athlete." These examples are statements about the inheritance of behavior. More specifically, a statement of preparedness to behave, where preparedness is seen as an inborn "thing" of some kind. The premise is that a person is born "hard-wired" to behave in certain ways. It is statements of this sort that are implied by a radical behavioral philosophy and that do not fit anywhere within an interbehavioral philosophy.

What exactly is the behavior that radical behaviorists claim to be inherited? According to radical behaviorists, what is inherited in any particular species may be considered as one of three kinds of behavioral relations. Each will be discussed in turn.

Three Behavioral Relations

Behavioral Relation 1

"(A)ll organisms inherit some fairly specific stimulus-response relations called unconditioned reflexes,

for example, the reflex whereby an increase in light striking the retina leads to pupillary constriction" (Michael, 1985.) Another example stated as evidence for the inheritance of unlearned relations between the environment and behavior is blinking when a burst of air is blown into the eye.

In response to this notion, it seems reasonable to consider that there is always some amount of pressure on the eyes. There is never a complete absence of pressure. The organism is biologically constituted in such a way as to blink when exposed to certain environmental conditions. When the amount of wind pressure on the eyes is suddenly increased, the organism responds, usually by blinking. From an interbehavioral position, it is inappropriate to consider this response of blinking as inherited; the reason being that the environment was required in order for the response to occur. Psychological behavior, for interbehaviorists, is the interaction of an organism with its environment. As such, couldn't it just as easily be said that the environment was inherited, not the blinking of the eyes. Radical behaviorists, in other words, seem to be focusing on the organism and neglecting the contribution of the environment to the genesis of psychological behavior.

Where is the evidence that the response of blinking when air is blown into the eyes is inherited? Just because this response occurs in almost all humans, without much time for the organism to develop a history of this type of interaction does not warrant the label of the inheritance.. As was already mentioned, the child does have a history, from the moment they eyes begin to develop, of relative pressure on the eyes. The fact is that the organism did not blink until air was blown into its eyes, and this happened for the first time in its lifetime. That is to say, even unconditioned responses are ontogenic from an interbehavioral perspective.

Behavioral Relation 2

"(S)ome organisms inherit more complex envi-

ronment-behavior relations, previously referred to as instinctive and now more likely to be called released behavior (fixed-action patterns)." Mating behavior and nest building are provided as types of "inherited functional relations." Another example stated as evidence for phylogenetic inheritance of this type of behavioral relation is the rooting and washing that pigs and raccoons exhibit when given tokens.

In experimental situations, with food deprivation as a setting factor, tokens quickly become conditioned to elicit respondent behaviors, such as salivation. Generalization of stimuli that are paired with primary reinforcers, such as food, can provide an ontogenic explanation for conditioned operants, such as rooting and washing of tokens. In this instance radical behaviorists are arguing for the phylogenetic inheritance of this behavior, while interbehaviorists would contend that this behavior is also completely ontogenic in its origins.

Behavioral Relation 3

"(O)rganisms inherit certain capacities to be changed behaviorally by the environment; thus the capacity for reflex responses to be conditioned to novel stimuli (respondent conditioning) and the capacity for some environmental occurrences to increase the future frequency of the type of behavior they follow (operant conditioning)."

Inheritance of behavior in this sense is not denied from an interbehavioral position. This behavioral relation is simply stating that some structures will interact with the environment in different ways. This is most notable in the differences seen in the learning and social behavior of "normal" versus "retarded" individuals. The interbehavioral perspective on this issue is better stated as the inheritance of structures which function in particular ways when confronted with particular types of environmental stimulation, as opposed to the inheritance of behavior, however.

In instances where reproduction of two separate individuals yields a "normal" functioning physiology of an anatomy, whether these people behave like their fathers or are "natural" athletes is greatly determined by environmental conditions. The functions and forms of behavior that develop as an organism interacts with its environment are influenced by an organism's structure and the characteristics of the environment. If there are no pianos one does not become a concert pianist. Hence, although inheritance of the speed of respondent and operant conditioning is not denied,

it does not seem very useful in most situations where comparisons of an individual's behavior are made.

Methods for Identifying Phylogenetic and Ontogenic Variables

The lack of evidence for the phylogenetic inheritance of behavior, or the passing on of phylogenetic contingencies (environment naturally selecting "behavioral traits" of species), is made evident by the methods utilized by radical behaviorists to identify and/or distinguish between ontogenic and phylogenetic variables. Studying "pure" strains is one example. The problem with this type of research is how variations due to environmental or genetic variables are singled out. Skinner cites Plutarch Licurgus, a Spartan, who demonstrated the importance of environment by raising puppies from the same litter to prefer hunted food or food provided on a plate (Skinner, 1966). What does this say about identifying phylogenetic variables? Why does Skinner use this as an example of finding phylogenetic and ontogenic variables? Is he saying that the ontogenic contingencies "took-over" for a genetic predisposition to prefer hunted food or food on a plate? This is only an identification of ontogenic variables. Skinner has let phylogenetic variables become his waste-basket for behaviors that appear unconnected to ontogenic contingencies (although in this example he does not explicitly offer any behavior of the dogs that is phylogenetic in origin). But, the very fact that these behaviors are happening to an individual in its lifetime, makes them necessarily connected to ontogenic variables.

In his article, *The phylogeny and ontogeny of behavior*, Skinner (1966) contends "The contingencies responsible for unlearned behavior (phylogenetically inherited behavior) acted a very long time ago. The natural selection of a given form of behavior, no matter how plausibly argued, remains an inference." Why would Skinner find it necessary to make this inference? It seems that he is allowing himself to make an inference that will never have the opportunity to be anything but an inference. On purely pragmatic grounds (Skinner is undoubtedly a pragmatist) making these inferences seems completely useless.

Skinner makes a good point that when experimenters set up phylogenetic contingencies such as breeding horses for speed, "the contingencies which select a given behavioral trait in a genetic experiment must be shown to play a plausible role in natural selection." But, this can also be explained without an appeal to

the inheritance of behavior. Can it not also be stated that what is bred in the horses is structure (stemming from the gene), not a behavioral trait of "running fast." Skinner is claiming you can breed organisms for the behavior of speed.

What is happening, according to interbehaviorists, takes place at a "suborganismic level." Hayes, 1988 argues against Skinner's notion that the survival of the species and of the culture is a suggestion that selection takes place at a group level. Hayes argues selection takes place at the "geneing" level, a sub-organismic level. What is selected is genes, not behavioral traits, and structure comes from genetic reproduction. What replicates in biological evolution is not the individual and not the species, but the gene.

If two horses that are "fast" reproduce, and this off-spring is raised for speed, as well as bred for speed, why is it that most off-spring of this kind do not become future racing champions? Interbehaviorists contend it is because the behavior of "running fast" is not inherited. The chances that the animal will be faster than average, provided an environment set up to increase and foster the speed of horses is not argued. It is not questioned that organisms come equipped with bodily features that enable them to behave more effectively when exposed to a similar environment than other organisms. For interbehaviorists, the future racing champion is a result of both an inherited structure and an ontogenic history of interactions with an environment. The organism is a necessary condition for behavior to occur, but not a sufficient condition. There must also be an environment for behavior to occur. Therefore, the interbehavioral difference on this issue does not deny inheritance of structure, but does deny inheritance of behavior and/or behavior traits.

Storage of Contingencies and the Reduction of Psychology to Biology

For radical behaviorists, how is it that ontogenic contingencies that operated "a long time ago" are able to be phylogenically passed on? This seems to imply that ontogenic contingencies are stored, somewhere in some genetic material, and then passed on to off-spring. This is a reduction of psychological behavior to physiological functioning. An example is fixed-action patterns. If an animal has inherited nest-building behavior, then it must be alive and functioning for quite some time before nest building behavior can be

seen. If this behavior is inherited, it seems as though it must be somewhere (in the organism), waiting to be released. If the organism has contained this behavior, yet not ever exhibiting it until later life, the only place for it to be contained is in the organism's biology. Interbehaviorists contend that there is no storage of behavior of any kind. All behavior is ontogenic, and must be understood as interactions between organisms and environments.

Conclusions

The principle differences between radical behaviorism and interbehaviorism, as they pertain to the issue of inheritance are: (a) radical behaviorists attribute psychological occurrences to processes of biological evolution, while interbehaviorists contend that all psychological events are ontogenic; (b) radical behaviorists reduce psychological events to biological events, while interbehaviorists sustain psychological events.

The first of these differences may be attributed to differences of opinion as to when ontogenesis begins. For interbehaviorists, once the genetic transfer has occurred to produce a zygote and the organism has reached viability, all that occurs from this point on is ontogenic, including so-called unconditioned reflexes. The radical behaviorist, alternatively, looks for evidence of psychological development or learning at a much later stage to rule out phylogenic origins.

The difference between the two positions on the issue of reductionism is part of a larger set of issues having to do with the nature of explanation. Explanation is achieved by identifying causes in radical behaviorism while in interbehaviorism it is achieved by ever widening descriptions of interrelated factors. Reduction of psychological events to biological events is a useful strategy in the search for causes. It has no utility for a descriptive understanding of psychological events, as is characteristic of the interbehavioral approach.

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Author's Notes

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Special Section on Units of Analysis

*The problem of units of analysis surfaced at the University of Nevada last year among faculty and students working in the area of organizational behavior management. Was the subject matter in this domain somehow different than in other psychological domains? Was an organization just a collection of individuals to which principles of individual behavior could apply or was it something else? And if it was something else, what was it, and what did we, as experts in individual behavior analysis and change, have to offer toward its understanding and manipulation? To answer these questions, we reviewed the literature and surveyed practicing organizational psychologists to identify units of analysis in use in research and application, and we organized an in-house conference to discuss the more general problem of units of analysis in science and in the science of psychology. The conference featured papers by graduate students on a variety of issues. As a result, only a couple of papers had anything to do with organizational psychology. Selected for inclusion in this issue are four that seemed of most potential interest to the readers of *The Interbehaviorist*, none of which has an organizational content as it turns out. However, each makes a point about units of analysis that is applicable wherever this concept is invoked and is held to be significant. Commentary on these offerings to our understanding of this important topic are invited.*

Integrating Levels of Analysis

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While planning this talk it occurred to us that the fact that we were even having this event, a conference on units of analysis, is significant. Prior to beginning graduate study in psychology, I worked in microbiology for several years. In the different labs I worked in I studied single cells, groups of cells, cell colonies, and cell cultures. No one ever suggested that one of these units was more appropriate to microbiology than another. One might be more appropriate to answering a particular question, but all were considered acceptable generally.

Psychology is unique compared to the so called hard sciences in that our subject of study is ourselves, rather than something separate from us. And we can't seem to agree on which unit, or level, of ourselves is the appropriate one for research.

A Skinnerian behaviorist might say the operant is the best unit of analysis, and that the appropriate level is the individual. Meanwhile the social psychologist

might suggest that the dyad or group is a proper level of analysis. Still other psychologists might suggest that we study organizations or cultures.

Coming from a radical behavioral perspective myself, I would argue that levels such as the family, organization or culture are part of the context of the individual. Further, the study of events at any of these levels can tell us something about events occurring at the levels immediately above and below it. At the point where two levels interface, a single unit may be applied to either, and yield useful psychological data.

For, example, where the individual interfaces with the culture, the study of a cultural practice may tell us something useful about the individual, and the study of an individual's behavior may tell us something useful about the culture. Why should we limit ourselves to only one or a few fundamental units when there are many units and levels of analysis currently used by research producing psychologists?

In our undying envy of the "hard" sciences, some say, "but they have fundamental units, and look how far ahead of us they are". Such a statement is, however, inaccurate. The only thing they have that we lack is agreement on their subject matter, and willingness to accept that a subject matter can be understood at many levels, using many different units, to the benefit of the discipline as a whole.

In a discipline as broad as psychology, including biological, experimental, clinical, social, organizational, community and others, there are many levels of analysis from biochemical to individual organism to community or culture. The most appropriate unit of analysis depends on which level one is studying.

Much of the disagreement occurs around whether the psychologist must properly confine her study to the level of the individual, whether it is appropriate to study larger levels, and if so, should the units of analysis be uniform across levels. This disagreement aside, I think we can find some points of agreement. I would argue that there are no cultural, or community, or familial events that do not also involve psychological events occurring in the context of the individual. What the psychologist strives to understand or change, or predict and control, is the behavior of individuals considered at any of several levels of analysis. No matter how such change is measured, it is always change in individuals. The level and unit of analysis may vary—it may be the number of violent acts Johnny commits, the number of violent acts in a high school, in a city, or in the entire country, but one is still talking about the actions of individuals no matter how the numbers are aggregated. Yet we still need to have conferences such as this one, discussing appropriate units and levels of analysis.

Compare psychology to another discipline, a "hard" science, for a moment. Take a simple chemistry experiment you probably saw in elementary or junior high school. To demonstrate diffusion one can take a neutral medium like water, add a red solution to one side of the medium, add a blue solution to the other side, and within a short time diffusion will be complete and there will be a uniform purple solution. There is even a mathematical equation to describe the event.

But suppose the chemist confined his study to individual molecules. He would find that some of the blue ones moved across to the other side while some hardly moved at all, and some of the red ones moved across the other side, and some did not so they are now uniformly distributed and the solution appears purple. It is highly unlikely that the behavior of

individual molecules in the solution could be described by a single equation.

Now imagine that chemistry were like psychology. You'd have the cultural chemist saying, "let's study this purple solution", and the social chemist might ask, "why do these blue molecules now look purple?", and the behavior analytic chemist might ask, "what about this particular red molecule's reinforcement history lead it to move to the other side?", and finally, the family systems chemist might conclude that the blue molecule that didn't move at all came from a dysfunctional compound.

The above example sounds ridiculous in terms of chemistry. The surprising thing is that this is, more or less, what happens in chemistry. The physical chemist will talk about the energy quanta of the single molecule, the analytic chemist about the amount of some compound in the solution, and the organic chemist about the different aggregates of cells. But the physical chemist will not tell the analytic chemist that solutions and molarity are inappropriate levels and units of analysis, or insist that any chemical phenomena be measured in units of single atoms and molecules.

Chemistry is defined as the study of the composition, structure, and properties of substances and the transformations they undergo. That's a pretty broad definition, almost as broad as "the study of human behavior". Yet chemistry is considered a hard science, while psychology is soft.

Some might suggest that this is a poor analogy, and claim that we can't specify the behavior of humans as well as that of molecules, because a human's history is so complex. But to predict the behavior of a particular molecule or atom at any given moment we'd need to know it's pressure, volume, temperature, pH, composition, what other molecules it's been around in the recent past, it's speed of motion and etcetra. And even then the uncertainty principle still applies and the chemist admits that she can't predict precisely what the atom will do.

Perhaps, as objects of scientific study, we are not as different from non-human, and even non-living, subjects as we'd like to think. The problem isn't so much with the subject of study as with those studying it. We are our subject matter, and study ourselves as subject matter, and as subject matter studying subject matter! The chemist and physicist don't do this, they accept, or don't even consider, that units like temperature, bond strength, and electric charge are arbitrary and are constructs. Meanwhile, we psy-

chologists treat such things as temperature as if they are somehow more "real" than our own units and constructs. We speak of our own science as "soft" and imprecise, and of the others as "hard" and exact, and at the same time we demand more of psychology than of chemistry or physics.

The contextualists maintain that the critical criteria is workability. The chemist and physicist have used this criteria effectively all along without even talking about constructs, contextualism, or the proper unit of analysis. If they did so they would still probably be discussing the four elements of fire, water, earth and air, and what unit applies to all of them.

One can talk about human behavior at many levels using many units. The importance to other types of psychologists lies not in the particular subject of analysis, but in the specific units and levels of analysis, and their usefulness when applied at different levels with respect to a general subject matter. In psychology, virtually all units of analysis can be derived from the individual level of analysis. One can look at culture, school, family, or organization and all are

ultimately derived from individuals, and all teach us something about human behavior.

For example, one can understand the three term contingency observing the behavior of individuals in the unit of the operant. And this individual level may be useful in telling us something about cultural practices. Similarly, if one wants to study human's seeming ability to respond to long term contingencies, one must consider the presence of other individuals. One cannot talk about such behaviors as altruism, or getting a Ph.D., without talking about larger units and levels of analysis such as families, institutions, or cultures.

In conclusion, many units and levels of analysis are appropriate in psychology. All share a common denominator of the individual. The important factor is not the particular unit or level, but the interface—how understanding at one level can enhance understanding at the same or another level of analysis. An appropriate unit of analysis is any one that expands our knowledge at any of several levels of analysis including individuals, and groups as large as cultures, as long as such knowledge can be integrated into a body of science, the science of human behavior.

Realism, Nihilism and A Psychological Unit-of-Analysis

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While we are referring to a Realistic philosophical system we should acknowledge two distinct brands of this philosophy which support somewhat divergent views on the nature of scientific observation.

Naive Realism

First, we have *Naive Realism*. This brand of Realism is associated with the assumption that individuals, as observers, are in some direct contact with a *real* ontological reality. This view has the label *naive* because philosophers are often skeptical of a direct-sense relation to the world. However, how many times have we come across statements in academics texts referring to the ability of observers to "systematically compare observations (or perhaps data sets) to what *actually* occurred." Although labeled naive, this type

of Realism in my view, is far from being out of the main stream.

Not-So-Naive Realism

Second, we have another brand of realism which in contrast to the first is referred to as *Not-So-Naive Realism*. Those who accept this brand of Realism also accept a *real* or *objective* world, however, those who practice this brand officially doubt that the products of observation practices correspond to the *actual* state of affairs observed. However, while these Realists may not believe their descriptions reflect a true state-of-affairs some remain certain that rigorous methods will bring them closer and closer to a pristine description of events. In practice, these observers often maintain a humble approach making a conspicuous dichotomy

between events and constructs (e.g., such as some modeling theories).

Implications of Realism

Upon consideration of these issues one might be compelled to ask: "In what way does this philosophical discussion bear upon the question of this conference?" I would say these issues bear important considerations when speaking of the nature of a *unit-of-analysis*. After all, how is such a *unit* determined? What type of impact does this so-called unit have on any particular science? The answers I suggest differ depending on: 1) The analysis of interest; and 2) The explicit and implicit assumptions regarding the nature of elements within any particular unit.

The first point refers most exclusively to the impact the dominant verbal culture has on the pre-scientific description of the analysis. Often verbal practices impact observation practices differently depending on what is observed; for example, the assumption of dualism is more prevalent in some sciences than others. The second point refers to the description of individual elements within any unit. While I admit some questions are best answered experimentally some are forever mired in philosophical verbal interactions--an example is reductionism.

The Nature of a Unit

Therefore, a so-called naive Realist might claim that the unit of analysis is "discovered." In contrast, the not-so-naive Realist might assume this unit is a construction: A construction based on the observation of *physical* events. In this manner, the not-so-naive construction may be understood as incorporeal. That is, any particular unit is not assumed to exist ontologically, instead, it is considered to consist of ongoing *interaction*--interaction which does not assume any type of fixed spatio-temporal geometry--and therefore, "no-thing" may be directly measured or offered up for exhibition. The unit is simply a verbal construction. However, even when described as incorporeal the unit is assumed to be derived from some sort of contact with a *real* or *actual* world; thus, both of these Realisms avoid the nihilistic conclusion that "no-things" exist. In other words, even though a Realist might consider a unit to be incorporeal, the verbal behavior responsible for the development of this unit is assumed itself to have been developed through contact with actual (or "physical") events. For some, this provides solace.

However, questions regarding how one comes to know *reality* when one confronts *reality* is indeed a philosophical question. The question of how this philosophical talk relates to pragmatic unit issues will be answered with an opinion. This opinion is related to the purpose of a unit-of-analysis and nihilism. Let me explain.

Nihilism

While those who adopt a Realistic philosophy may see nihilism as unnecessary (and even damaging) to any analysis, I see a certain type of nihilism as important to maintain the integrity of any scientific unit. This *certain type* of nihilism may be described by comparing it to another nihilistic practice. The first practice maintains this unit and allows it to be modified; the second practice threatens the unit. I will call the first "constructive-nihilism" and the second "deteriorative-nihilism."

Constructive Nihilism

Within the constructive system the unit is considered a verbal construct. That is, the unit is conceptualized as continuous with observing practices and is never understood as a separate phenomena. The unit is "self-sufficient" and does not represent any "thing" which transcends its construction. Its participants and terms relate to one another and eventually relate to the guiding philosophical tenets. Therefore, certain questions do not contact any meaningful characteristic (or referent) of the unit and subsequently have no answer; not because the unit is inadequate, instead it is because the language of the unit eventually folds into itself like mathematics reduce to fundamental axioms. In other words, there are seemingly fundamental questions that may be directed at the unit that cannot be coherently answered because these questions concern basic axiomatic (or assumptive) issues. Einstein (1916) recognized this issue when he wrote: "We cannot ask whether it is true that only one straight line goes through two points. We can only say that Euclidean geometry deals with things called "straight lines," to each of which is ascribed the property of being uniquely determined by two points situated on it." In this manner the unit is complete and any attempt to go beyond the scope of the unit results in the breakdown (or nihilism) of the unit. I consider this type of nihilism appropriate. Here, the observer is forced to deal with a specific level of analysis (e.g., physics, biology, physiology, psychology, etc.) and cannot transplant

the facts of one science to another while maintaining the integrity of the unit or the specific analysis. Notice, in order to accept this view Realism must be rejected. (See Swain, 1993, for further discussion).

Deteriorative Nihilism

Within the deteriorative system the unit is not protected from conflation with other units. This is due to the fact that the unit is considered to be a direct extension of other units. Thus, the psychological analysis may fall to another level (perhaps biology) or may be overshoot to some cultural unit. In psychology these practices are most evident when physiological, biological or sociological units are conflated with psychological units. In the deteriorative system the unit is legitimized only when it is garbled with other units of analysis. The problem then becomes a confusion and lack of clarification between different units and analyses. The unit then becomes an extension of other

studies and the original unit becomes less important. Here, the potential exists for a long and slow deterioration of the original unit while units from other disciplines are contemplated, understood, misunderstood and perhaps adopted. Hence we have psychologists studying physiology, biology, sociology, etc., in the hopes of providing more expertise on psychological issues. It is at this point that the philosophical system needs attention.

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A Search for a Basic and Common Unit of Analysis for Social Scientific Inquiry

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It might be argued that a good definition of the unit of analysis being utilized in a particular field of study is crucial in guiding proper interpretations of particular lines of research as well as the integration of research addressing diverse objects of analysis. Zeiler (1986) underscores this importance noting that the definition of the unit of analysis guides theory and research. With the biological sciences Zeiler indicates that only after some searching and evolution did biologists define the cell as the basic unit of analysis in their field. While the cell could be further reduced to its component parts it offers the simplest structure with properties which define life. Thus, this basic unit of analysis can be reduced or expanded to address varying objects of analysis.

A like unit offered by Zeiler (1986) in the psychological domain of investigation (derived from Skinner's analysis) is $R=f(S)$ where S is a stimulus and R is a response. Kantor (1950), although not explicitly, offers a different unit of analysis for psychology. This unit is what he terms the interbehavioral field in which

stimulus functions and response functions occur simultaneously within a context that includes cultural influences and histories of persons involved. The interbehavioral field can be observed and described (also see Johnson & Morris, 1986, for a discussion of clearly defining units of analysis from a behavioral analytic perspective and Parrott, 1983, for a discussion of different behavioral analytic units of analysis).

Pepitone (1976) in a quite influential article, and others (Steiner 1974; Carlson 1984) also make the implicit argument that clear specification for the appropriate unit of analysis in a given area of study is necessary. Pepitone distinguishes between normative and non-normative influences of behavior defining the latter as individualistic and the former as influenced by the greater collective¹. Pepitone argues that social psychology should be more geared toward study of normative influences of behavior and that much behavior often thought of as idiosyncratic is more often shared among groups or collectives of people suggesting the normative level of analysis as more appropriate.

ate. Pepitone condemns many theoretical perspectives within social psychology for adopting overly individualistic perspectives and thus units of analysis.

The question guiding this discussion is whether or not the more micro units offered by Zeiler and Kantor or the more macro approach suggested by Pepitone are adequate to assess diverse objects of analysis in a broader social scientific domain of study. If we take a step back, or perhaps forward, and begin to ask the question the biologists asked we may decide to adopt a unit of analysis which is a simple and basic unit providing the properties necessary to assess the questions we raise as social scientists. It is important to underscore a distinction central to this line of argument and perhaps one that when not addressed can raise some of the theoretical debates which question the particular units researchers employ. This distinction is that the unit of analysis is that 'unit' which is analyzed in such a way that the analysis of it informs us about our target of analysis. The target of analysis is what has been described earlier as 'objects' of analysis (Ginsburg, 1994). For instance, if mother-infant interaction episodes were our unit of analysis this unit could be used to target parenting style, infant's temperament, or patterns of mother-infant interaction among other potential targets.

When this distinction is made Pepitone's (1976) condemnation might be modified to some degree. If Social Psychologists and perhaps social scientists as a whole chose a unit of analysis which was not too individualistic, nor too broad, but which could be analyzed to assess individualistic research questions there would be less need of debate.

The present article takes the dyad (two persons interacting in a given social context) as its theoretical unit of analysis arguing that this unit might offer a basic starting point from where other research strategies could further reduce to address componential parts or expand to address more macro levels of analysis. In this way this unit may offer important explanations for both normative and non-normative influences of behavior. The dyad as a unit of analysis represents what has been termed a micro-sociological unit of analysis (Turner 1988) but which might be better described as one basic unit for the social sciences. This latter term may be more representative of the present conception since behavior or how the dyad may influence individual behavior, not just the structure and process of interaction is of equal interest.

The basis from which the claim will be made that

the dyad possesses the basic properties to be utilized as a unit of analysis will be guided by the theoretical perspective of Symbolic Interactionism. This perspective has been and remains quite influential in the field of Sociology as well as Social Psychology and may contain tenets which make it useful for all social sciences.

Symbolic Interactionism: A Meadian Perspective

Stryker (1990) indicates that symbolic interactionism has its roots in the Scottish moral philosophers who believed that association processes were key in developing a science of human behavior. According to Stryker, the American Pragmatists (William James, John Dewey, George Herbert Mead) further influenced the theoretical perspective with perhaps George Herbert Mead being the centerpiece to the formalization of symbolic interactionist thinking. Charles Horton Cooley is also credited with Mead as offering clear specifications of the core assumptions of symbolic interactionism. Cooley (1902) argued that self and society are two sides of the same coin and that no individual can exist apart from others. Cooley is perhaps most known for his discussion of the "looking glass self" in which person's see themselves in the reflection of how significant others see them. It is important to note that Cooley is discussing our imagination (perception) of how others see us not how they actually see us (Backman, 1988)². When reflecting upon ourselves in this way we often will experience feelings of "pride" or "mortification". Cooley's approach is an individualistic approach. For Cooley self arises out of reflective thought and imagination and in essence creates a social process (Mead, 1934).

Mead (1934) posits that the social process should be the starting place for social psychological study—"start from the ongoing social process, from that process, mind, self, and society derive" (Stryker, 1990 p. 7). Mead is a self-acclaimed social-behaviorist and in contrast to Cooley does not take an individualistic approach but instead a social approach. Like Cooley however, there can be no individual without the group in Mead's analysis. An individual is an individual based on group membership and the social relationships the person finds themselves in. The individual becomes an individual by "taking the role" or the attitude of the other(s) and reflecting upon himself as an object³. This is the process of self-consciousness and how "self" is created. For Mead, "mind" is this

ability to 'take the role' of the other and is made possible via the communication between persons. Thus language has central importance for Mead. Language is a system of symbols which allow us to gesture others and in so doing we indicate to ourselves as well. This paradox is really the definition of why language is symbolic. It is not separate from the social process but a part of the whole of this process and allows for the complexities of social life to occur. "Language as made up of significant symbols is what we mean by mind. The content of our minds is (1) inner conversation, 'the importation of conversation from the social group to the individual (2)...imagery. Imagery should be regarded in relation to the behavior in which it functions'." (pg. 190-191). This importation process is what is occurring when we take the role of others. We converse with ourselves concerning how certain others (and/or the community as a whole) might act in some situation or the attitudes they hold concerning something. This inner conversation is made up of the same symbols as that which guides the social process in general and in that way is no different in kind than what occurs between two individuals. The importation can be conceptualized as planning behavior. Through it we actively create and effect the situations and environments we find ourselves in. This 'ability' is that which defines at least some of our behavior as not simply responsive (passively or in concert) to an active environment.

Imagery or "mental images"---"can exist in their relation to the organism without being lodged in a substantial consciousness" (pg. 332). Consciousness as such is not some preexisting state or structure but simply the organism in response to the environment at any point in time. Images are symbols of our past experiences brought to bare in a present situation. So as I talk to you over the phone I can see your face. The image of your face is based upon the previous experiences I have had with you.

The discussion of Mead thus far attempts to establish how 'mind' and 'self' are derived from the social process⁴, what is left is society. Society also derives from the social process. Mead does not accept the theoretical position that society is created by individuals already intelligent and with 'selves' who decide to get together. Society is instead created by the same symbols instrumental in creating 'mind' and the 'self'. Society is an emergent process made possible through communication. "Human society, then, is dependent upon the development of language for its own distinc-

tive form of organization" (pg. 235).

Society can be seen as the complex cooperative behaviors of individuals made possible through communication of significant symbols. Again, by 'taking the role' of the other or by indicating to the other through a significant symbol a particular response, which also indicates to the 'self' the same response, cooperative behavior is made possible.

All behaviors are not cooperative or common responses (institutions) made by various individuals in response to certain stimuli. Each of us uniquely interprets the symbols which we use in communication. Although we take the attitudes of other(s) and may utilize these in preparing behavior, behavior isn't determined by this process but occurs as it occurs in a given interaction. This behavioral experience, through symbolization, becomes part of "me", part of my interpretation of others actions, attitudes, as well as my actions and attitudes. In essence, we are active participants in the social process and while being influenced by it we influence it. This is how society emerges, within the social process as does everything else we have discussed thus far.

So, as social scientists, if we can accept such an account of social process and what is derived from it, we can offer descriptions of and gain insights concerning unique individual behavior (idiosyncratic behavior, non-normative behavior) and cooperative behavior (institutional, cultural, normative). The task becomes one of deciding what unit can represent social process in its most simple and basic form.

The Dyad as a Starting Point

Certainly Mead's analysis doesn't suggest central importance to studying the dyad. Equal importance would have to be given to studying the influence of the "generalized other", or the attitudes taken from the community as a whole. However, the dyad may offer a micro analytic unit from which part of the social process or part of what is derived from it can be studied including the 'generalized other' as an object of analysis.

Jonathan Turner (1988) argues that the most elementary unit in Sociology is social interaction. He defines social interaction as " a situation where the behaviors of one actor are consciously reorganized by, and influence the behaviors of, another actor, and vice versa." (pg. 14). He notes that this unit is sociological because in his use of it he is primarily interested in the process of interaction from a structural viewpoint as

opposed to an explicit study of behavior which would be the subject matter of psychology. Radzikhovskii (1984) takes "joint action" as the unit of analysis in studying an individual's behaviors. Influenced primarily from the work of Leont'ev and Vygotsky, Radzikhovskii argues that "joint action" in its simplest form is constituted by a subject (person), object (a primary sign), another subject (person), in short an interaction between two people about something. This communication takes place through signs. The signs become the object and are at the same time separate from it but allow communication about it. What is important here is that in this analysis the other defines the boundary of an individual's behavior. This point is perhaps derived from Leont'ev's statement (cited in Radzikhovskii, 1984, pg. 37) "...Relations to the world are always mediated by man's relations to other people; his activity is always embedded in communication....".

The above two examples are illustrative of how the dyadic unit of analysis can yield information concerning more sociological issues (process of social interaction) and more social psychological issues (individual behavior). Many others have taken the dyad as their unit of analysis as well. Ickes, Bissonnette, Garcia, & Stinson (1990) discuss their Dyadic Interaction Paradigm which utilizes video tape of informal interactions between pairs of subjects. Subjects then view the video tape of their interaction separately and stop the tape at points where they 'remember' having thoughts and/or feelings about their behavior, the others behavior, or at any other important point. The video tape is then presented again but now is stopped by the experimenter for each person separately based upon where the other person had stopped the tape at various points. Subjects then indicate what they believe the other was thinking and/or feeling at these particular points of the interaction. The paradigm seems to offer quite an innovative way to address many social psychological issues, in particular, the reflected appraisal process and its influence upon behavior. Kenny and Albright (1987) also make use of the dyad as a unit of analysis in some of their investigations. Kenny has created a statistical model which allows the researcher to partial out three influences (actor effects, partner effects, and relationship effects) upon person perception derived from dyadic interactions. Analysis can reveal 'Response-set' accuracy which assesses whether a given individual's judgement of others on some criterion corresponds to other's general behavior with the given individual on the same criterion, 'Indi-

vidual' accuracy or the correspondence between other's general ratings of a given individual on some criterion and that individual's general behavior with regard to that same criterion, and 'Dyadic' accuracy or an individual's rating of another individual on some criterion, controlling for the first individual's general ratings of others on this criterion and how others usually rate this specific other person on this criterion, in correspondence to the specific others' behavior with the rating individual on this criterion, controlling for people's general behavior on this criterion and the specific others' general level of behavior on this dimension. This model could easily be employed to target the relationship, the partner or other, or the individual as objects of analysis utilizing the dyad as the unit of analysis.

In a like manner, more and more developmentalists (Baumrind, 1989; East, 1991; Denham, Renwick, & Holt, 1991; and Barthe & Parke, 1993) are taking parent-child interaction episodes as their unit of analysis. This approach has been adopted to identify patterns of interactions which may effect various outcomes (individual and processual) while limiting some of the criticisms levied against developmentalists using self-report methodologies. Many of these researchers and others are utilizing mother-child interaction as a starting point to assess the effects of these interactions upon interactions the child has in other social settings such as peer interactions in preschool.

Finally, Heritage (1984) discusses ethnomethodological studies which often utilize dyadic interaction in attempts to reveal the 'rules' of social interaction. And the 'accounts' literature also contains many examples of utilization of dyadic interaction as the unit of analysis. This is of course a short list of those who use this unit of analysis but does provide examples of research more psychologically oriented and others more sociologically oriented.

Methodological Implications

Blumer's (1966) interpretation of Mead provides some suggestion for how symbolic interaction at the dyadic level might be studied. Blumer argues that since 'mind', 'self', and 'society' are derived from an ongoing social process it does not make sense to break up this process into static structures such as norms, culture, social order, or rules in an attempt to objectively assess the influence or causes these structures may have. This misses the point that it is group life that creates and maintains norms, culture, social order, and

rules. These ought to be targets which are assessed through observing social interaction.

In a like manner 'objective' experimental approaches may involve the observer substituting his views of the field for the actors. For Blumer it makes little sense to break things into independent and dependent variables since these constructed static variables defy the fluid nature of the social process and deny that anything that is defined can be redefined. Blumer suggests descriptive approaches in studying the social process. Through Exploration (observing, interviewing, listening) we aim at gaining a clear picture of some area of social life. Then through Inspection, you can frame what you have described in theoretical form. This may generate new questions to be answered using the same explorative methods. Blumer's approach is a naturalistic approach with a strong emphasis placed upon getting at the views of those who you are studying.

Other important implications of using the dyad as a unit of analysis are offered by Thompson and Walker (1982). To begin they make two important points. First, just because we study two people that doesn't mean we are doing so at the dyadic level of analysis. In regard to this they discuss some research which samples married couples but then aggregates data by gender focusing on individual differences between the sexes. This research may be quite valuable and credible but does not utilize a dyadic unit of analysis.

Second, the dyad as a unit of analysis does not require that two people are studied to gain the information. One member of a dyad can provide information concerning the dyadic relationship. The authors go on to note that "excluding outside observers there are three sources of data which can be used dyadically; the person herself or himself (P), the partner or other (O), and the pair reporting as a unit." (pg.892).

Most of the above described research areas, as well as the methodological issues and approaches suggested by Blumer (1966) and Thompson et al (1982), make an attempt to stick closely to the interactions between people and gain information from the perspective of those studied as opposed to using experimental designs in which independent variables are manipulated to assess their effect upon dependent variables. These contextual approaches to investigation are consistent with Kantor's (1950) specificity principle at the heart of his descriptive scientific approach.

Conclusion

The present investigation centers around illustrating the dyad as a useful unit of analysis for scientific research in the social sciences. An attempt was made to offer a theoretical grounding justifying the use of this unit and why this unit is an important starting point. If we conceptualize all as deriving from and being apart of the social process it may not make sense to study human behavior or psychological phenomenon from an asocial basis. In fact, from a Meadian position you probably can't, all behavior is social. Studying an individual in an isolated context does not in any way eliminate the significant symbols we as individuals share with greater collectives. These symbols still undoubtedly influence our conduct and are modified through our conduct. Isolation of variables in an attempt to establish cause and effect relationships will eliminate contextual features which could add richly to our descriptions and interpretations.

The argument is put forth that the dyad can be utilized to address more typical general psychological events (idiosyncratic behavior) and sociological events. For social psychology, and with regard to Pepitone's (1976) charge that we concern ourselves more with normative behavior, the dyad may be especially well suited for this endeavor. Analysis of dyadic interaction can yield information with respect to cooperative behavior. Although individuals interpret symbols uniquely their shared use leads to cooperative behavior, if you will, conforming behavior, or more precisely normative behavior which is descriptive of the societies from which we are a part.

Perhaps like the cell to the biological sciences, the dyad may provide one basic starting point for the social scientist. It seems to possess qualities which enable it to be utilized to address both micro analytic questions and macroanalytic questions. It would be misleading and most definitely inaccurate to argue that the dyad is the single appropriate unit of analysis for such a broad domain of study. Instead the argument is that it is just one unit which might allow a bridging of research areas within the social sciences offering an integration of diverse ideas and thus enhancing interpretations made and understandings achieved.

Footnotes

- 1 Pepitone's distinctions appear quite similar to Kantor's (1982) distinction between idiosyncratic and cultural behavior with cultural behavior being equivalent to that behavior influenced nor-

matively.

- 2 Backman suggests that few but some have offered "vulgar" interpretations of Cooley indicating that the impact of others evaluations of us can be directly experienced, not mediated by our perceptions or imaginations. It is emphasized here that whether or not the actual views of others about ourselves mesh accurately with our perceptions of others views is of little consequence. In this we are sticking with W. I. Thomas's dictum "If men define situations as real, they are real in their consequences" (Stryker, 1990, p. 7).
- 3 Recent studies influenced by symbolic interaction from both a Meadian and a Cooley school of thought refer to this process as the 'Reflected Appraisal Process' (Felson 1987; Ichiyama 1993; and various others). It is worth noting that it is quite difficult to establish influence from the 'generalized other' as posited in the Meadian model. This derives from extreme difficulty in operationalizing this construct. The difficulties in this operationalization and of other like constructs is a criticism often levied against symbolic interactionism (Stryker 1990).
- 4 If not clear in the above description, what is central to this position is that 'mind' and 'self' are not transcendental bodies or psychic structures or qualities but derivatives of, not independent from, the social process and thus can be addressed through a behavioristic psychology.

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Toward an Integrated Psychology

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The idea that psychology is at least a contributing factor in an individual's behavior has had a long history in Western thought. During the time of the Greeks, Erasistratus used physiological measures to study lovesickness. The role of physiology was discussed in the mind/body debates of the 19th and 20th centuries, addressed in the early writings of William James and first appeared in a modern experiment in 1925 when Riddle used physiological measures to study deception in a poker game (Cacioppo, 1982). With the aid of more sophisticated measures, information from physiology is gaining acceptance as source of psychological understanding (Boneau, 1992).

Psychophysiology has long had difficulty being accepted in the field of psychology which may reflect the conservative nature of science in general and its resistance to new developments. Regarding physiology more specifically, this reluctance may have also been due to the lack of technical sophistication of its methods. Psychologists were right to respond hesitatingly to this incoming information. Today, with the advent of sophisticated research tools, this apprehension must be considered as mere reluctance. Further, the search for invariant relationships or isomorphic one-to-one associations between psychology and physiology and the not surprising lack of consistent findings has also led some to argue for the invalidation of

physiological psychology. One could argue, however, that very little in psychology would withstand these criteria. More recent conceptualizations, however, have been less constricting. Most notably researchers John Cacioppo and Louis Tassinary (1989) advance that physiological mechanisms may or may not be part of some information processing activity and when they are they may or may not be monotonic functions of some arbitrarily selected performance measure. When such functions are found they are useful to the extent that it is possible to address issues of theoretical import by employing psychophysiological measures as a source of data about the organism (Donchin, 1982). Physiological information in the above view can be seen then as an outcome, concomitant, a marker or even by the earlier standard as an invariant of psychological events.

Physiological processes can be construed as components of an individual organism and it is important as scientists of human beings to understand what these components consist of and how they operate. This is especially true when the argument that one's physiology affects one's psychology is considered. It will be seen that evidence is accumulating that supports this argument.

If physiology can be seen as a context of the

individual then a change physiologically represents an internal contextual change such that information coming to an individual is now coming into a different milieu. We can use Dolf Zillmann's ideas about excitation transfer as an example here. Excitation transfer theory suggests that an individual who is physiologically aroused will respond to a subsequent non-related event in a differential manner as a result of this arousal. Excitation transfer theory projects the intensification of subsequent emotional behaviors and emotional experiences as a function of residual excitation from earlier emotional reactions (Zillmann, 1983). The idea of context is especially important when our language is configural description versus causal prescriptions, with the latter necessarily putting constraints on the phenomenon we wish to examine. There exists no logical inconsistency between examining physiology in psychology and a symbiotic relationship between the two fields will serve the effect of one enhancing the other. For example, as it has been argued elsewhere, the very concreteness of physiological data that must be dealt with on their own terms exerts a healthy disinclination to "nerologize" or to attribute nonexistent properties to the universe for the sake of theoretical elegance (Donchin, 1982).

One should be aware that this is not a call for reductionism, rather to use Teitelbaum's (1992) idea simply a reduction to build back up to the level of psychology. Stated differently, psychology's use of physiology is complete when used as a re-synthesis with psychological information with the goal to increase our psychological understanding. Teitelbaum (1992) uses the example of a Martian scientist studying human beings. By applying ever more powerful technology to study more and more molecular processes in their tissue will we Martians ever understand human psychology? The answer is of course no and the need for psychology remains. It cannot grow in isolation, however. Information from relevant fields require examination and psychology's findings need to be viewed in tandem with this information. It is important to note here that physiology as well as subjective experience and overt actions all contain information about human nature but they all also contain irrelevant data and misinformation. One could argue for the supremacy of each as a source of data. To dismiss any source a priori (as has been the case with physiology) is not defensible.

In that physiological techniques provide nonver-

bal, objective relatively bias-free indices of human reaction, historically, they have been relegated to the task of construct validation (for a review see Cacioppo, 1982). Beginning in the 1980's the role of physiology has been expanding in its own right. Numerous journals address physiology in psychology specifically. While the influence of psychology on health has long been examined, physiological processes are now implicated in the effects of facial display and body posture or subjects' attractiveness ratings of stimuli (Adelman & Zajonc, 1989; Miler & Kotses, 1987) as well as sources of long-term marital discord (Bradbury & Fincham, 1988) and social influence (Cacioppo, 1982) and social facilitation (Gale & Baker, 1981).

The examination of physiology has also been flourishing in social psychology. Social psychophysiology, (Cacioppo, Petty & Tassinari, 1989) is characterized by the use of noninvasive procedures to study relationships between actual or perceived physiological events and the verbal behavioral effects of human association. It is a metatheoretical orientation that recognizes the inherent biopsychosocial nature of humans. It is hoped that in examining even basic psychological processes like learning, categorization and emotion the large part social factors play in their occurrences can be explained. For example what is considered an emotion is culturally and biologically determined and therefore the focus of either discipline to the exclusion of the other is incomplete as long as social and nonsocial physiological reactions are not interchangeable (Cacioppo, Rourke, Marshall-Goodell, Tassinari & Baron, 1990)

Physiology has a place in the advancement of psychology. The fear that physiology will replace psychology is unjustified as there will always exist a need for the study of humans in their totality. Physiology can be used to further psychology's goals and to paraphrase Cacioppo (1982), the methods and theoretical constructs of psychology and physiology are not pitted against one another but rather are joined to form a powerful, complemented armamentarium for the study of human behavior.

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