

## EVENTS AND CONSTRUCTS

NOEL W. SMITH

*State University of New York at Plattsburgh*

Psychology has largely ignored the distinction between constructs and events and what comprises a scientific construct, yet this distinction is basic to some of the major divisions of thought within the discipline. Several kinds of constructs are identified and compared with events, and improper use of constructs is noted of which the mind construct is a prime example. After indicating some problems with a failure to maintain the distinction between constructs and events and to establish constructs based on events, a list of criteria for scientific employment of constructs is proposed as a means of clarifying and advancing work in psychology. An example of a construct-based and of an event-based approach provides a contrast in scientific orientation with the implication that only by using the latter can psychology remedy its fragmentation and make advancements as a science.

Psychologists today are not only in disagreement about their subject matter, but their field is highly fragmented in its theoretical and methodological approaches. This is due in part to increasing specializations but also to age-old disagreements about psychology's constructs. Is psychology about consciousness, self, and information processing? Is it the study of a mind and the mind's representations of the world? Is it a study of behavior influenced by a cognitive mind? Is it just behavior? Is it the action of the brain on the organism? Is it interactions of organisms and objects in a context? Or is it action of mind and body? Much of the disagreement stems from the failure to distinguish events from constructs and to build scientific constructs on events from which the constructions are derived rather than starting with constructs and interpreting observed events in accordance with those constructs. That is, the failure is twofold: the confusion between constructs and events and the resulting failure to develop valid scientific constructs. A few scholars such as Skinner (e.g., 1953, 1990) and Kantor (e.g., 1922, 1953, 1981), attacked the problem repeatedly over a period of many decades.

Kantor (1963-1969) attributed the underlying cause for the shortcoming to our spiritistic culture: The constructs come not from observation but from our cultural beliefs. Often constructs which become discredited in science merely take on new names. For example, soul became mind which became brain powers or processing. These constructs continue in use despite their dubious scientific status.

In a book on psychology's theoretical issues, Bem and Looren de Jong (1997) described the volume as a "comprehensive guide" yet did not mention the critical issue of constructs. The authors are in venerable company, for the debates over many centuries about the nature of mind and body also failed to recognize the nature of constructs and their confusion with events, probably because of the influence of cultural assumptions. The confusion continues today as exemplified by Reber and Reber (2001) who state in their psychological dictionary that "one infers a construct whenever one can establish a relationship between several objects or events" (p. 148). It is not the construct that is inferred, for the inference *is* a construct. Objective or scientific constructs as opposed to cultural constructs such as mind in a body are based on the observed interaction of objects or events. They could take the form of a correlation, diagram, description, or other designation.

This paper will address the two topics: (a) the distinction between events and constructs and (b) the proper use of constructs. Because science is built on observations of events from which constructs are derived, a full understanding of the distinction between them and the proper use of the latter is of critical importance in the advancement of science. The failure to make this distinction has been a major impediment in the attempts to develop a science of psychology. In one context or another and to varying degrees this problem has been addressed by others, such as some of those cited here; but this paper will concentrate primarily on this problem and attempt to identify it more distinctly. It will provide examples of uses and misuses and will suggest some criteria that might be applied to scientific investigation. Even with the strong influence of culture that supports misuses, the criteria can provide guidelines toward avoiding some of the hazards.

### *The Distinction between Constructs and Events*

A construct (or construction) is, as the name indicates, something that is constructed rather than an observed event. It is an invention or contrivance. In fact anything that is not an event but represents one or purports to represent one is a construct: a theory, a hypothesis, a principle, a mathematical formula, a measurement. These are all constructed. Even a description is a construct, for it is not the thing that it describes. Scientific work is mostly a procedure of developing constructs; but, as Kantor (1957) noted, "hypothetical entities may not be arbitrarily created" (p. 59). He referred to the precautions necessary for each of three types of constructs. *Descriptive constructs*, he held, are most valid and useful when they derive from contacts with events; they are of decreasing validity and usefulness

when they are (a) analogies, (b) borrowed from other fields such as biology or physics, and (c) total inventions such as brain as a psychological organ. *Explanatory constructs* (causality) may relate psychology to biology, chemistry, and social events but may not be reduced to them. They are more analytical ways of relating things and events than is simple description (Kantor, 1983) but may still be regarded as forms of description. Explanation builds a body of knowledge when one functional description—a description of relations or interactions—is integrated with another that has been functionally related to still others. *Manipulative constructs* are so called because they get restated or modified to facilitate the investigation. They involve problems, theories, and hypotheses that can be validated only if “securely connected with events” (Kantor, 1957, p. 59).

Descartes’s soul, Leibnitz’s monads, Hume’s impressions, Locke’s ideas and sensations, La Mettrie’s brain springs, Kant’s transcendental unity of apperception, Müller’s specific nerve energies, J. S. Mill’s mental chemistry, Titchener’s sensations, Woodworth’s O, Köhler’s isomorphism, and Hull’s drives, to name but a few, are all constructs out of psychology’s history. What is critical to scientific psychology, however, as a number of authors over a period of half a century have noted (e.g., Ebel, 1974; Kantor, 1947, 1953, 1957; Lichtenstein, 1984; Moore, 1998; Observer, 1983; Smith, 1993a, 2001), is whether the construct was derived from an event or was imposed on it. In all of the historical instances cited, the constructs were drawn from traditional cultural sources and imposed on the events. For example, Titchener observed his subjects’ reports on their responses to experimental tasks but assumed he was investigating mental elements and imposed this construct on the reports. These historical constructs are continuous with those of today such as mental representations, storage and retrieval, processing, consciousness, and self that are pervasive in mainstream psychology. The events are the seeing, believing, recollecting, thinking, imagining, and other concrete human actions.<sup>1</sup> An event is anything that happens whether we know about it or not. Events may be examined and known through (a) direct observation with or without use of instruments but with minimal manipulation of the target events, (b) transforming contacts involving manipulation, and (c) remote observations requiring indirect contact and inference (Kantor 1953, pp. 15–16). In scientific work the connection remains firm no matter how many links occur between the target events and the investigator.

The distinction between constructs and events is critical. It determines, for example, whether we treat the brain as a determiner of behavior or a

<sup>1</sup>All events must be actually or potentially observable in some degree. As with all scientific observation, one must devise various ways of making the observations even though most ways are less than perfect. In some cases we may observe the stimulus but not the response or vice versa. But, as with other scientific investigation, we can often examine at least some component of the interaction. In psychology we have an advantage over most other nonhuman sciences in that we can request self-reports (Smith, 1987). In addition, Q methodology (Brown, 1980, 1994–95; Stephenson, 1953) provides an objective means of determining subjective behaviors.

participant, perception as a representation or an organism-object interaction, remembering as storage or as reenactment, intelligence as a power or a description, human activity as mind-body connections or interactions in a context. Wundt held that we cannot know consciousness, only its effects. And he was right to acknowledge that we cannot know an ethereal construct. But did he need to invoke it or could he have simply referred to the responses that he was actually measuring as comprising consciousness? Were Titchener's subjects introspecting their elementary sensations, mental atoms, or making sensory discriminations of objects and events? Posner and Raichel (1994, p. 24) well illustrate the confusion between constructs and events. They provided a graph in which they claimed to have plotted the brain on the horizontal axis and mind on the vertical. They did plot at varying levels of detail the imaging techniques applied to the brain, but the "mind" turned out to be time and was graphed as such. Skinner (1963) pointed out that mind is often used as a "mental way station" to fill in gaps between independent and dependent variables.

As another example of confusing constructs and events, in an effort to justify unobservables in psychology, Bornstein (1988) claimed that "psychologists investigate internal processes such as feelings and motivations" (p. 820). Here he lumped together an event, feelings, and a construct, motivation, under another construct, internal processes. Let's examine each of these. (a) *Feelings*: If one wins a lottery, one's joyous behavior is a real event. A feeling, then, is an event consisting of a person in interaction with the thing felt about, such as joy upon seeing one's winning number. (b) *Motivation*: Why did one buy the lottery ticket? One must have been motivated. But what is a motive? It isn't anything in itself, but it should have a specific referent in identifiable events. Perhaps the purchaser decided that the ticket proceeds go to a worthy cause. A motive is a construct of causality, not an event, but can be a useful summarizing term if it has identifiable referents in which case the construct is a convenient shorthand for the events. However, contrary to Bornstein, we don't investigate the motive as such; for it is only an abstraction, a construct. What we investigate are the specific conditions that lead to a particular behavior, such as the behavior preferred by a teacher or an employer that we refer to as motivated. (c) *Internal processes*: Bornstein's final example and his intended all-embracing one is also a construct rather than an event. It assumes that nature has divided us into two parts, internal and external. If referents for "inner processes" can be specified, then the inner-outer distinction no longer holds; for identifiable events of nature—the joyous behavior of a winning ticket, the desire to support a worthy cause—become the focus rather than a constructed duality of inner and outer. But this construct of internal processes is usually one of mind-body dualism, and dualism has no such referents. It is a category error in Freeman's (2001) terms (after Ryle, 1949)—an error which he attributes to a history of three centuries (actually about twenty-two centuries in the Western World and perhaps 3000 years in India: see Kantor, 1963-1969; Smith, 2001). One world is inside and one outside.

Skinner (1990) called this the “copy theory”—the real world copied into the mind or brain—which requires something to see the copy. It also requires the central nervous system to be a cause of itself.

Bornstein went on to justify unobservables in psychology by way of claiming that gravity is an unobservable that physicists study indirectly. Yet according to theory in physics, gravity is not an unobservable but is an event involving the interaction of bodies in space; and this interaction may be observed, measured, and described mathematically, the measurement and mathematical description being useful constructs derived from the events. It is defined by and consists of these properties and perhaps others that remain to be observed (and which would be constructs if postulated). We may similarly observe events of humans in interaction with their surroundings and describe these interactions rather than starting with cultural constructs and imposing them on the investigations. Schlinger (2003) has described the problem this way: “Rather than constructing formal definitions a priori and then looking for instances of them, scientists must *discover* the definition. . . . This is done by experimentally analyzing behavior and then looking for order therein” (p. 23).

Despite some claims that “theoretical terms” (constructs) and observational terms are equally inferential and unreliable, Clark and Paivio (1989) cited several empirical studies of these terms that support the greater reliability and validity of the latter and the clear distinguishability of the two. The investigators found that “observational terms refer more directly to observable phenomena than do theoretical terms and are relatively more stable and definite in their meanings” (p. 510). Further,

the data suggest that scientists do and ought to maintain distinct attitudes toward observational and theoretical terms when thinking about or communicating scientific ideas. Observational terms have more stable and universal meanings, and participate in statements that can be empirically validated by virtue of their concrete referents. (p. 510)<sup>2</sup>

Kantor (1959) laid out an entire postulate system that can be used as a guide for scientific investigations (see Clayton, Hayes, & Swain, 2005), but even the postulate system starts with observable events on which the constructs are built.

A major choice for investigation is whether a system should be construct-based or event-based. That is, do the investigators begin with constructs with which they interpret events or do they begin with events and develop their constructs from those events? Kantor (1981) argued that “In general a valid logic of science must be founded on a full appreciation of the relations between events and constructs” (p. 6) including the clear distinction between them. Lichtenstein (1984) advanced a similar point:

When one follows carefully what is entailed in scientific work we have a basis for distinguishing among data, investigative

<sup>2</sup>Ironically, the authors couched their studies in constructs whose referential base is questionable.

operations, and constructions. The construction phase becomes particularly important when it is realized that it is here that most disagreement in science arises. Constructs are more likely to be sound when they are derived from direct contact with events whether involving manipulations and measurement or not. Unfortunately scientists when they are in the grip of tradition are usually unaware of the fact. Thus astronomers found circular orbits for the planets reasonable and biologists described in detail the homunculi in sperm cells. (p. 471)

Valid scientific constructs require grounding in events at all stages in the scientific enterprise and such grounding requires recognizing what are constructs and what are events.

### *Constructs with Time-Space Coordinates*

Constructs are necessary in science and, when properly used, always have a concrete referent: They refer to a thing or event. Inferences, which are common in science, are constructs and these play an important role in scientific advancement. In the 5th to 4th century BCE, Democritus observed the behavior of matter and inferred that it was composed of some tiny particles that he called “atoms.” Although he could not verify their existence, they had space-time coordinates that gave them the potential to be observed if they existed. In the 20th century the development of adequate instrumentation finally permitted the verification of these inferred particles. In contrast, the historical constructs imposed on human actions had no time-space coordinates but transcended space and time. For that reason analogies were invented—constructs about constructs—and the brain as a concrete organ became the substitute for these immaterial agents. But as a psychological organ, the brain too is a construct. It clearly performs biological coordinating functions; but, as pointed out by Bennett and Hacker (2001), Delprato (1979), Kantor (1947), and Uttal (2001), no one has observed it also performing psychological behaviors such as thinking, learning, perceiving, desiring, or feeling. With appropriate instrumentation such as positron emission tomography (PET) and functional magnetic resonance imaging (fMRI) scans, one can infer its participation in some of these activities but not as a director, producer, or container of them. By other means we can also observe other participating conditions, such as stimulus characteristics, stimulus and response history, and setting conditions. Yet when psychologists begin with the construct of the brain as the producer of psychological activity they often ignore the equal necessity of these other participants and interpret the event as caused by the brain alone (Bennett & Hacker, 2001; Kantor, 1959, p. 227).

Valenstein (1998) showed that in psychiatry its practitioners frequently assume that behavioral disorders are solely of biological origin and therefore need only a pill for remediation; even pleasure they regard as a product of brain dopamine activity and ignore all else. Thus, brain becomes an imposed construct of director or producer, having no

referent in space-time coordinates. Because a construct is not a thing but an abstraction—only its referent is concrete—it can never be observed and lies forever outside verification. What happens in practice, however, is that investigators observe events but report them as the operation of constructs, such as mind or processing or memory stores and confuse them with the events they observe. Yet things and events are all that anyone anywhere has ever observed or ever can observe. Scientific constructs must have referents in concrete events, events with time-space coordinates. When investigators test hypotheses and theories, which are statements about how things and events may interact with one another, they are actually testing the events which the constructs predict.

### *Circular Constructs*

All too often constructs become circular. Barber (1981) pointed out that hypnosis has been typically defined by a trance state: We know that someone is hypnotized because he or she is in a trance. Then we explain the person's hypnotic behavior by the trance. In other words, the definition of hypnosis as a trance state is not independent of what the trance is supposed to explain. Barber discarded the trance construct completely and described hypnosis as directed imagining that is continuous with other behaviors with which we are familiar. An understanding of hypnosis, he argued, does not require a hypothetical construct of trance. By distinguishing the construct from the event he was able to develop an understanding of hypnosis that fully accounted for the observations with descriptions closely tied to the observations. Circularity also enters into a fundamental construct in psychoanalysis: Freud originally defined libido as sexual needs and then began to use it to explain sexual behaviors. Similarly, it is circular to state that a child is distractible because of attention-deficit hyperactivity disorder (ADHD). The term only refers to the child's interest in something other than what the teacher wants to teach (as in the motivation construct above) and other behaviors that sometimes cluster with it. McHugh (1999) pointed out circularity in such diagnostic categories as dissociation, posttraumatic stress, multiple personality, and attention deficit. An example from dissociation: "Why don't I remember first grade?/Because you have dissociated your memory./How do you know that?/Because you can't remember first grade" (p. 36).

As other examples of circular constructs, over 30 years ago Ebel (1974) pointed to intelligence, motivation, and creativity. We hear that because a person performs certain behaviors she is intelligent and we know that she is intelligent because she behaves in that way. Or we hear that an individual works hard because he is motivated, and we know that he is motivated because he works hard. Ebel compared these explanatory constructs to tree nymphs ("dryads") and other animistic powers of hunter-gatherers. The title of his paper, "And Still the Dryads Linger," indicated his thesis that we have not yet expunged these animistic explanations from psychology. Three decades later we still have not done so. They linger on as intelligence, personality traits, libido,

processing, and others. We even refer to various amounts of intelligence, motivation, and creativity as if they were things with quantity. Constructs such as intelligence are important but should, he contended, be limited to an indication of functional relations; for these relations are all that explanation can be (see also Schlinger, 2003). Kantor (1983) held that explanatory constructs are fundamentally descriptive. They are analytic ways of relating things and events. They occur when one functional description is integrated with another which has already been functionally related to still others. Ebel noted further that we should not allow complexity of our subject matter to

keep us from recognizing our dryads for what they are--partial descriptions that masquerade as causal explanations. This need not keep us from understanding how useless they are in our search for understanding of behavioral phenomena. Let us be on guard against their deceptive pretensions. Let us make behavioral science, limited and imperfect as it is, inhospitable to them. They can only weaken it. (p. 491)

### *The Mind and Consciousness Constructs*

In its various incarnations mind is the major construct in psychology. It is not an observed event but derives from long cultural tradition (Smith, 1993b). If we use mind to refer directly to such events as thinking, knowing, discriminating, and imagining—a merely shorthand summary for those specific events—it can be a useful construct as long as we recognize that it is not those events and does not cause them. If it is considered a separate and unobservable causal force intervening between the world and the body, it does not meet the criteria for a scientific construct. Instead, it is a restatement of the old theological psyche or soul—a thing, process, agent, or power which becomes a reified construct. The following declaration by Simon (1992) illustrates the consequence of reification as well as Freeman’s (2001) category error: “The human mind is an adaptive system. It chooses behaviors in the light of its goals, and as appropriate to the particular context in which it is working” (p. 156). The author turned a construct into a thing and gave it self-acting powers. He began with mind as a construct and used it to explain the behaviors he observed. It is both reified and circular. Oakley (2004) designated hope and despair as a function of the mind which in turn is a function of the brain, thus using brain as a causal construct rather than as a necessary but not sufficient condition; that is, he used it as a determiner rather than as a participant in the event. He fully assumes a Cartesian mind-body interaction: “When an experience is psychological, not physical, it is all in the mind” (p. 32). In Bennett and Hacker’s (2001) review of studies in neuroscience and the interpretations of these studies they conclude

the causal relations between the brain and the body, and the overall conception of the relation of the ‘inner’ to the ‘outer’ that was enshrined in classical dualist thought soldiers on more or less intact, the brain being conceived to fulfill much the same role as the Cartesian mind. (p. 540)

Memory research illustrates the stumbling block of mentalistic constructs. It has invoked mediationism in which memory stores and traces are assumed. Watkins (1990) traced these constructs as far back as St. Augustine in 399. From this history one can conclude that stores and traces have a spiritistic origin. Despite extensive experimental research over a period of many years in which mediationism was assumed, Watkins found that little understanding had been gained. He argued that memory research must focus on the actual events of remembering and its context.

Mind is a cultural construct, not a scientific one (Skinner, 1990). It does not derive from observation but from tradition. We might choose to use it but should be clear about its origins and its character. What we observe either by direct or indirect means are such events as perceiving, learning, speaking, and believing. If we use mind as a summary term for one or more of these, we must not fall into the circularity of giving it power to explain or cause those same events; and we must not lose track of the fact that such events are the referents and that mind does not have an independent existence from them.

These statements about the mind construct apply equally well to the consciousness construct. Its Latin meaning was that of knowing something with others. Thus, it referred to an event, a behavior (Kantor, 1978), and is so used in Stephenson's Q methodology (Brown, 1980, 1994-1995; Smith, 2001; Stephenson, 1953) in which shared knowledge, called "consciring" (from Latin *conscire*, consciousness) occurs through Q sorting. But in recent times it has been used as a construct with great vagueness and confusion as noted by Harré and Lamb (1983), Shapiro (1997), and Smith (1997). Shapiro (1997) observed that

It has been in vogue to agree that the set [of necessary and sufficient conditions for consciousness] is impossible to define; to disagree on what the set consists in; to talk of consciousness as an emergent property of the brain . . . and to discuss the brain as if it controlled, but was not controlled by, the body. (p. 840)

In attempting to define consciousness Sutherland (1996) described it as an "elusive phenomenon"; and, because it had no concrete referent, concluded that "Nothing worth reading has been written on it" (p. 95). The elusiveness is in the confusion that it is a "phenomenon"<sup>3</sup> rather than recognizing it as a construct. Reese (2001) noted that after a century of efforts we are no nearer a satisfactory definition than before. This is because the efforts all begin with the word and assume there must be something to which the word corresponds. By reversing this and starting with observed events, it would be possible to have a term, a construct, that refers to those events.

<sup>3</sup>This assumes that the author means (a) a thing or event rather than (b) the Kantian object of perception mentally represented and as distinguished from the thing-in-itself. If he means the latter, it is beyond the pale of investigation and forever unknowable.

Sometimes consciousness seems to be the same as mind, and at other times the author does not make it clear whether he or she is using the two words to mean the same thing or something different. Over a nearly 50-year period one can find lists of different meanings of consciousness that could equally well apply to mind (e.g., Chapin, 1985; English & English, 1958; Natsoulas, 1978, 1983; Reber & Reber, 2001, Wolman, 1989), but the lists offer little progress in making distinctions between the two, undoubtedly because they are mere words without concrete referent. In one definition Reber and Reber (2001) gave consciousness as “a domain of mind that contains sensations, perceptions and memories of which one is momentarily aware, that is, those aspects of present mental life that one is attending to” (p. 147). Despite the confounding with mind, the definition does give some emphasis to the concrete event of attending but is couched in a framework of traditional constructs and is even considered a container. As Reber and Reber’s definition suggests, consciousness seems to be used in the context of attending and perceiving an object. If so, what is consciousness apart from the perceived color, odor, shape, meaning, and so on? What else is its referent? The word has recently become the topic of a series of conferences and of a great outpouring of books (Shapiro, 1997). Rarely do any of these recognize it as a construct (Smith, 1997). More than a quarter century ago Grossberg (1972) noted that the brain receives a “resident ghost called consciousness” (p. 249), and this has not changed.

### *Modes of Expression*

One sometimes finds recommendations to refer to psychological events as verbs rather than as nouns: sensing rather than sensation, knowing rather than knowledge, thinking rather than thought, imagining rather than imagination. Woodworth (1929) was an early advocate of this procedure.

Instead of “memory,” we should say “remembering,” instead of “thought” we should say “thinking,” instead of “sensation,” we should say “seeing,” “hearing,” etc. But like other learned branches, psychology is prone to transform its verbs into nouns. Then what happens? We forget that our nouns are merely substitutes for verbs and go hunting for the things denoted by the nouns; but there are no such things, they are only the activities that we started with seeing, remembering, and so on. Intelligence, consciousness, the unconscious, are by rights not nouns, nor even adjectives or verbs. They are adverbs. The real facts are that the individual acts intelligently—more or less so—acts consciously or unconsciously, as he may also act skillfully, persistently, excitedly. It is a safe rule, then, on encountering any menacing psychological noun, to strip off its linguistic mask, and see what manner of activity lies behind. (p. 82)

Similarly, White (1939) argued that the mind-body problem would be eliminated if we referred to “minding” rather than “mind.” This recommendation to use verbs alerts us to the fact that we are dealing with events rather than with things. And no doubt this is helpful, but

one cannot turn intelligence or personality into verbs even though they too can only refer to some pattern of actions for which the label is a convenient form of reference. Moreover, even the verb form fails to indicate that the action is actually an interaction; that is, when we think, we think about something; when we sense, we sense something; when we speak, we speak about something. Nevertheless, substituting verbs for nouns wherever possible may help avoid reification.

Consider Kosslyn's (1995) statement: "People experience visual mental images" (p. 6). Do people experience images or do they imagine? The first refers to constructs and the second to events. The assumptions are quite different in the two: traditional dualistic philosophy and reliance on observation, respectively. The former might look primarily to the findings of brain imaging to explain behavior whereas the latter might well include brain activity as a necessary condition but also look to a history of organism-object interactions and the role of the setting or context in which they occur (Smith, 2006). Other modes of expression can invoke either a mind-body dualism or refer to a whole person or a person's behavior. For example, does it take a keen mind to solve complex problems or does it take a person behaving highly intelligently? Does the prima donna's personality cause problems or does she behave inappropriately? Does the playwright use his imagination or does he write imaginatively? In short, do we give the person credit or do we invoke an impersonal construct to carry out the action? Do we start with a construct or an observed event? Note the impersonal and autonomous character of mind in the following passages from Simon (1992) who pioneered the use of computer analogies in cognitive psychology: "It [mind] chooses behaviors in the light of its goals, and as appropriate to the particular context in which it is working. . . . It can learn" (p. 156). Further, "The human mind is an adaptive system. It chooses behaviors in the light of its goals, and as appropriate to the particular context in which it is working" (p. 156). The author has continued to treat the construct, which he apparently does not recognize as such, as a thing and has given it self-acting powers. He began with mind as a construct and not only imposed it on the event of choosing but, in a classical case of circularity, used it to explain the behavior he observed.

### *Proposed Criteria for Constructs*

The following list of criteria for the use of constructs are consistent with the arguments presented here and those advanced by Kantor (1957, 1978, 1981) and supplement the latter. They are proposed as an essential step in achieving a more scientific use of constructs.

- Distinguish carefully between constructs of all types—such as descriptive, explanatory, and manipulative—and the original events.
- Question all constructs derived from traditional cultural and philosophical sources.
- Begin all investigations with observations from which constructs may be derived; avoid starting with constructs and interpreting results in terms of those constructs.

- When means for obtaining critical information are lacking, keep constructs extremely tentative and make sure they have the potential to be observed.
- Note that only constructs derived from observed events have the potential of validity.
- Keep interpretive constructs consistent with the events observed; do not base them on other constructs, such as analogies.
- Take an adequate sample of events so that the interrelationships of events may be observed. This means examining a wider array of events than genes, neurons, reinforcements, stimulus conditions, stimulus and response history, or social processes. Adequate sampling means taking account of the context and its salient components as in research on setting events (Brown, Bryson-Brockman, & Fox, 1986).
- Anchor all constructs such as intelligence, motivation, personality, and attitudes in observed referents and avoid giving them independent existence as things or causes.
- Avoid turning participating conditions or those that may be necessary for the event into determining conditions. For example, the brain is a necessary condition for all psychological events but is only one of numerous necessary conditions that make up the event.
- Avoid adopting unobservables or analogies for what is unknown and regard admission of ignorance as a scientific virtue.
- Use only those constructs that are observable at least in principle, for it is only through observation that science is possible. Brain processing of information has no observability. Though neural events as electrochemical impulses do have observability, such brain constructs as storage, retrieval, and consciousness do not, whereas attending, discriminating, learning, and so forth are concrete actions that do.

### *A Construct-Based and An Event-Based Approach in Contrast*

In the work that Gander (2003) regards as the manifesto of evolutionary psychology, Barkow, Cosmides, and Tooby (1992) assert that the brain receives environmental inputs from the sense organs, makes complex computations, and produces either representations in the mind or behavioral outputs. According to Pinker (1997), these precise mechanical processes of information processing reduce psychology to mental operations or algorithms of the brain which are innate. Identification of such algorithms give scientific rigor to an account of the mind. They provide us with an ability to specify the way the mind has evolved its mechanisms from natural selection in our hunter-gatherer ancestors and has continued the mechanisms to the present generation. These mechanisms, called “mental modules,” provide for innate mate selection, child rearing practices, facial recognition, and dozens of others that proponents have proposed. They are standard to all human minds and can be studied by laboratory experiments or by cross-cultural comparisons.

As an example of one module, parents who are able to provide the best resource investment in their children pass that trait on to their children.

The module enables each parent to unconsciously calculate how much to invest in each child depending on its health, strength, age, and sex. The existence of this module is supported, say the proponents, by the fact that across cultures upper socioeconomic parents invest more in their male children and less in their female children (Gander, 2003). This means that our hunter-gatherer ancestors did the same in accordance with their standing in the tribe: Higher status males would be more aggressive in attaining that status and would support their male children's well-being so that they would pass on the genes and maintain that status. The only reference to events is to those represented by the correlation between socioeconomic status and the investment of resources according to the sex of each child. The evolutionary psychologist presupposes the traditional construct of a human mind and adds that it has evolved by natural selection to enable the species to survive. To this is added analogical constructs of computation, information processing, and algorithms, which Gander (2003) notes give an appearance of modern science. Evolutionary psychologists apparently do not recognize the constructs as such but treat them as events. These constructs they then use circularly to explain the observed correlation so as to provide a seemingly precise and scientific theory of the events.

Evolutionary psychologists are often charged with making up "just so stories" (from etiological folk tales and from Rudyard Kipling stories by that name) such as how the giraffe got its long neck or the leopard its spots. If they began with cross-cultural or laboratory findings then sought other behaviors in such concrete events as cultural behavior (shared stimulus functions: Kantor, 1982) and its evolution, and interactional histories of developing children including both biological and behavioral factors, the charges might be avoided. They might also develop theories whose scientific status rests on constructs tightly drawn from observed events rather than using constructs borrowed as analogies from other sciences. But this would be contrary to their ignoring the extensive body of knowledge, which, as Lickliter (2006) notes, shows that behavior develops on many levels. It would also be contrary to their assertion that interactional history and context have no relevance except as triggers for innate computational processes. Only the putative unfolding of genetic traits is of interest to them. Thus, the constructs preclude the corrections that an event-based approach would provide. It must be added, however, that some evolutionary psychologists, especially those who call themselves "human behavioral ecologists" (e.g., Barrett, Dunbar, & Lycett, 2002) incorporate a broader array of evidence while still placing heavy emphasis on biological reductionism and predeterminism. For example, in a study by Richerson and Boyd (1998) in which group members displayed "ultra-sociality" by behaving altruistically rather than selfishly to individuals within the group, thereby strengthening group living, Barrett et al. (2002) concluded that "the impressive coordination, cooperation and division of labor observed in modern-day western society can be traced back to ancient social instincts combined with modern cultural institutions" (p. 90).

Taking the opposite approach, one that is event-based, in conformity with the criteria, and therefore in marked contrast with evolutionary psychology, is the work of Baxter (1994; 2006) on learning problems in elementary schools. He notes five shortcomings of schools' approaches to these problems: (a) The individual is diagnosed outside the situation in which a problem occurs, often in the office of a school psychologist with a standardized test which usually provides a construct such as perceptual reversal or disorientation, delayed learning, sequential memory reversal, or dyslexia. (b) The specialist who does the evaluation is usually unfamiliar with the interactions of the actual learning situation. (c) The situation gets largely ignored while concentration occurs on the deficits of the learner. In nearly all cases it is the child rather than the instructional method that is deemed to be at fault. (d) Diagnoses are based largely on group averages that say almost nothing about individuals. (e) Modification of the situation is seldom recommended. If delayed learning is said to be the cause, waiting is the remedy. If waiting produces no improvement, no further action occurs.

Baxter's approach is that of "direct learning." In the case of a child who reverses numbers, the child is taught the components of the number and then practices them a few times until the reversal no longer occurs. In teaching numbers the teacher can show that numbers 1-9 fall into three groups according to the direction in which the lines for each is drawn. By clustering those of each group together and teaching each group with an interval of time between them, reversals and other confusions are minimized. Other problems are similarly dealt with by observing the behaviors involved and their context and using teaching methods that address these observations. The success of this event-based approach is supported by a massive study (Stebbins, St. Pierre, Proper, Anderson, & Cerva, 1977) and by follow-up studies of Adams and Engelmann (1996) all of which has been almost entirely ignored (Watkins, 1988). According to Baxter (1994) effective teaching requires "instructional communications, in accompaniment with other interacting variables that define the event, such as those of the teacher-learner interaction, setting, and event history" (p. 37). He has discarded the institutionalized constructs and procedures in elementary education, turned to events as a guide, and opened the door to more promising results.

Similarly, a survey of research that adheres to the above criteria and uses a broad range of methodologies, demonstrates that by moving beyond mind and consciousness and its many derivatives such as biology as a producer and container of psychological events, the way is open to "discovering interdependent relations as they occur in nature and of developing interpretive constructs that adhere to those observed relations" (Smith, 2006, p. 132).

### *Conclusions*

Mentalists and nonmentalists use vastly different approaches to events and constructs. History shows us that it is primarily the construct

of mind-body dualism and the various derivatives from it and reactions to it that have created in psychology such vast disagreements about what comprises its basic subject matter (Kantor, 1963-1969; Smith, 1993a, 2001). These disagreements began to emerge after the Middle Ages when the soul became an increasingly puzzling topic, both logically and empirically. Alternatives to this construct and to biological reductionism have been available since the time of Aristotle as numerous writers have shown (e.g., Everson, 1997; Kantor, 1963-1969; Randall, 1960, Shute, 1944; Smith, 1993a), but when psychologists do not consider the alternatives and allow cultural assumptions from the past to determine the character of various approaches, then problems arise.

Few psychologists, it seems, understand the distinction between constructs and events or how to properly use them in scientific work. As a result, much of psychology is construct-based, and there is little agreement about those constructs due to the fact that they are not anchored in events. This paper has focused primarily on the distinction between constructs and events in order to give heightened visibility to that distinction. A better understanding of the distinction and proper use of constructs could open the way toward a scientific platform for all of psychology, which, by being event-based, would help unite its disparate fragments and facilitate its scientific advancement. This paper attempts to contribute toward that goal.

## References

- ADAMS, G. L., & ENGELMANN, S. (1996). *Research on direct instruction: 25 years beyond Distar*. Seattle, WA: Educational Achievement Systems.
- BARBER, T. X. (1981). *Hypnosis: A scientific approach*. South Orange, NJ: Power.
- BARKOW, J. H., COSMIDES, L., & TOOBY, J. (Eds.) (1992). Introduction. In J. H. Barkow, L. Cosmides, & J. Tooby (Eds.), *The adapted mind: Evolutionary psychology and the generation of culture*. Baltimore: John Hopkins University Press.
- BARRETT, L., DUNBAR, R., & LYCETT, J. (2002). *Human evolutionary psychology*. Princeton, NJ: Princeton University Press.
- BAXTER, C. (1994). An interbehavioral approach to teaching and problem solving in education. *Effective School Practices*, 12(4)/13(1), 34-38.
- BAXTER, C. (2006). *A new and revolutionary psychology of effective teaching: The applied science of interactive communication*. Unpublished manuscript
- BEM, S., & LOOREN DE JONG, H. (1997). *Theoretical issues in psychology: An introduction*. London: Sage.
- BENNETT, M. R., & HACKER, P. M. S. (2001). Perception and memory in neuroscience: A conceptual analysis. *Progress in Neurobiology*, 65, 499-543.
- BORNSTEIN, R. F. (1988). Radical behaviorism, internal states, and the science of psychology: A reply to Skinner. *American Psychologist*, 43, 819-821.
- BROWN, S. R. (1980). *Political subjectivity: Applications of Q-methodology in political science*. New Haven: Yale University Press.
- BROWN, S. R. (1994-1995). Q methodology as the foundation for a science of subjectivity. *Operant Subjectivity*, 18, 1-16.

- BROWN, W. H., BRYSON-BROCKMAN, W., & FOX, J. (1986). The usefulness of J. R. Kantor's setting event concept for research on children's social behavior. *Child and Family Therapy*, 8, 15-25.
- CHAPIN, J. J. (1985). Dictionary of psychology (2nd ed. rev.). New York: Dell
- CLARK, J. M., & PAIVIO, A. (1989). Observational and theoretical terms in psychology. *American Psychologist*, 44, 500-512.
- CLAYTON, M. C., HAYES, L. J., & SWAIN, M. W. (2005). The nature and value of scientific system building: The case of interbehaviorism. *The Psychological Record*, 55, 335-359.
- DELPRATO, D. (1979). The interbehavioral alternative to brain dogma. *The Psychological Record*, 29, 409-418.
- EBEL, R. L. (1974). And still the dryads linger. *American Psychologist*, 29, 485-492.
- ENGLISH, H. B., & ENGLISH, A. C. (1958). *A comprehensive dictionary of psychological and psychoanalytic terms: A guide to usage*. New York: Longmans, Green.
- EVERSON, S. (1997). *Aristotle on perception*. Oxford, England: Clarendon Press.
- FREEMAN, W. J. (2001). Three centuries of category errors in studies of the neural basis of consciousness and intentionality. In W. S. Sulis & I. Trofimova (Eds.), *Nonlinear dynamics in the life and social sciences* (pp. 275-285). Amsterdam: IOS Press.
- GANDER, E. M. (2003). *On our minds: How evolutionary psychology is reshaping the nature-versus-nurture debate*. Baltimore: John Hopkins University Press.
- GROSSBERG, J. M. (1972). Brain wave feedback experiments and the concept of mental mechanism. *Journal of Behavioral Therapy and Experimental Psychiatry*, 3, 245-251.
- HARRÉ, R., & LAMB, R. (Eds.). (1983). *The encyclopedic dictionary of psychology*. Cambridge, MA: MIT Press.
- KANTOR, J. R. (1922). The nervous system, psychological fact or fiction? *Journal of Philosophy*, 19, 38-49.
- KANTOR, J. R. (1947). *Problems of physiological psychology*. Bloomington, IN: Principia.
- KANTOR, J. R. (1953). *The logic of modern science*. Bloomington, IN: Principia.
- KANTOR, J. R. (1957). Events and constructs in the science of psychology; Philosophy: Banished and recalled. *The Psychological Record*, 7, 55-60.
- KANTOR, J. R. (1959). *Interbehavioral psychology: A sample of scientific system construction*. Bloomington, IN: Principia.
- KANTOR, J. R. (1963-1969). *The scientific evolution of psychology* (Vols. 1-2). Chicago: Principia.
- KANTOR, J. R. (1978). Cognition as events and as psychic constructs. *The Psychological Record*, 38, 329-342.
- KANTOR, J. R. (1981). Interbehavioral psychology and the logic of science. *The Psychological Record*, 31, 3-11.
- KANTOR, J. R. (1982). *Cultural psychology*. Chicago, IL: Principia.
- KANTOR, J. R. (1983). Explanation: Psychological nature, role in scientific investigation. *Revista Mexicana de Análisis de la Conducta*, 9, 29-38.
- KOSSLYN, S. M. (1995). *Image and brain: The resolution of the imagery debate*. Cambridge, MA: MIT Press.
- LICHTENSTEIN, P. E. (1984). Interbehaviorism in psychology and in the philosophy of science. *The Psychological Record*, 34, 455-475.
- LICKLITER, R. (2006). Developmental systems and psychological science. In B. D. Midgley & E. K. Morris (Eds.), *Modern perspectives on J. R. Kantor and interbehaviorism* (pp. 173-194). Reno, NV: Context Press.

- MCHUGH, P. R. (1999, Dec.). How psychiatry lost its way. *Commentary*, 108(5), 32-28.
- MOORE, J. (1998). On behaviorism, theories, and hypothetical constructs. *Journal of Mind and Behavior*, 19, 215-242.
- NATSOULAS, T. (1978). *Consciousness*. *American Psychologist*, 33, 906-914.
- NATSOULAS, T. (1983). Addendum to "consciousness." *American Psychologist*, 38, 121-122.
- OAKLEY, R. (2004). How mind hurts and heals the body. *American Psychologist*, 59, 29-40.
- OBSERVER. (1983). Meanings as events and as constructions in psychology and linguistics. *The Psychological Record*, 33, 433-430.
- PINKER, S. (1997). *How the mind works*. New York: Norton.
- POSNER, M. I., & RAICHLE, M. E. (1994). *Images of mind*. New York: Scientific American Library.
- RANDALL, J. H. (1960). *Aristotle*. New York: Columbia University Press.
- REBER, A. S., & REBER, E. S. (2001). *The Penguin dictionary of psychology* (3rd ed.). London: Penguin Books.
- REESE, H. W. (2001). Some recent recurrent issues in the history of behavioral sciences. *The Behavior Analyst*, 24, 227-239.
- RICHERSON, P. J., & BOYD, R. (1998). The evolution of ultra-sociality. In I. Eibl-Eibesfeldt & F. Salter (Eds.), *Indoctrinability, ideology and warfare: Evolutionary perspectives* (pp. 71-95). New York: Berghahn.
- RYLE, G. (1949). *The concept of mind*. New York: Barnes and Noble.
- SCHLINGER, H. D. (2003). The myth of intelligence. *The Psychological Record*, 53, 15-32.
- SHAPIRO, Y. (1997). The consciousness hype: What do we want explained? *Theory and Psychology*, 7, 837-856.
- SHUTE, C. (1944). *The psychology of Aristotle*. New York: Columbia University Press.
- SIMON, H. (1992). What is an "explanation" of behavior? *Psychological Science*, 3, 150-161.
- SKINNER, B. F. (1953). *Science and human behavior*. New York: Macmillan.
- SKINNER, B. F. (1963). *Behaviorism at fifty*. *Science*, 149, 951-958.
- SKINNER, B. F. (1990). Can psychology be a science of mind? *American Psychologist*, 45, 1206-1210.
- SMITH, N. W. (1987). Cognitive interbehaviour. In A. Costall & A. Still (Eds.), *Cognitive psychology in question* (pp. 194-212). Brighton, England: Harvester Press.
- SMITH, N. W. (1993a). Alternatives to recurring problems in psychology. In N. W. Smith (Ed.), *Greek and interbehavioral psychology: Selected and revised papers* (Rev. ed., pp. 169-197). Lanham, MD: University Press of America.
- SMITH, N. W. (1993b). Indo-European psychological concepts and the shift to psychophysical dualism. In N. W. Smith (Ed.), *Greek and interbehavioral psychology: Selected and revised papers* (Rev. ed., pp. 61-71). Lanham, MD: University Press of America.
- SMITH, N. W. (1997). Consciousness: Events or constructs? In L. J. Hayes & P. M. Ghezzi (Eds.), *Investigations in behavioral epistemology* (pp. 147-161). Reno, NV: Context Press.
- SMITH, N. W. (2001). *Current systems in psychology: History, theory, research, and applications*. Belmont, CA: Wadsworth.

- SMITH, N. W. (2006). Interbehavioral research. In E. K. Morris & B. D. Midgley (Eds.), *Perspectives on J. R. Kantor and interbehaviorism* (pp. 111-171). Reno, NV: Context Press.
- STEBBINS, L. B., ST. PIERRE, R. G., PROPER, E. C., ANDERSON, R. B., & CERVA, T. R. (1977). *An evaluation of follow through*. Education as Experimentation series. Vol. IV-A-D. Cambridge, MA: ABT Associates.
- STEPHENSON, W. (1953). *The study of behavior: Q-techniques and its methodology*. Chicago: University of Chicago Press.
- SUTHERLAND, S. (1996). *The international dictionary of psychology* (2nd ed.). New York: Crossroad.
- UTTAL, W. R. (2001). *The new phrenology: The limits of localizing cognitive processes in the brain*. Cambridge, MA: MIT Press.
- VALENSTEIN, E. S. (1998). *Blaming the brain: The truth about drugs and mental health*. New York: Free Press.
- WATKINS, A. J. (1990). Mediationism and the obfuscation of memory. *American Psychologist*, 45, 328-335.
- WATKINS, C. L. (1988). Project follow-through: A story of the identification and neglect of effective instruction. *Youth Policy*, 10(7), 7-11.
- WHITE, L. (1939). Mind is minding. *The Scientific Monthly*, 48, 169-171.
- WOLMAN, B. B. (1989). *Dictionary of behavioral science*. San Diego, CA: Academic Press.
- WOODWORTH, R. S. (1929). *Psychology*. (Rev. ed.). New York: Henry Holt.