

PAIVIO, ALLAN (2007)

*Mind and Its Evolution: A Dual Coding Theoretical Approach*

Mahwah, NJ: Erlbaum

Pp. xii + 517. ISBNs 0-978-0-8058-52-2, 0-8058-5259-X (cloth)

This book's title, hereafter referred to as *Mind*, conceals that it is above all about imagery and memory. Yet most who have attended to experimental psychology for at least part of the last several decades will not be surprised that imagery is its primary focus, given that the author's name is virtually synonymous with imagery research. The purpose of *Mind* is to cover the most recent developments in Paivio's dual coding theory (DCT). In doing so, the book ranges in a sophisticated manner over numerous areas such as fundamental assumptions, empirical and theoretical essentials, prominent alternative theories, neuropsychological findings, and implications for complex behavior such as creative acts and performances that are conventionally assumed to reflect intelligence. Additionally, several chapters are devoted to a DCT perspective of mind as an outcome of evolutionary processes.

Superficially, *Mind* might seem designed to flaunt the so-called cognitive revolution in front of any who find cognitive constructs inherently dualistic and anachronistic. Certainly, during the heyday of classic behavioristic psychology, the discipline did not widely endorse the book's focal constructs—mind, imagery, and memory. However, behaviorism was more a movement to steer study and theory of psychological events in the direction of natural science than it was to shield psychologists from the *events* and *procedures* of mind, imagery, memory, and other mentalistic *constructs* (Kantor, 1963-1969). *Mind* fares quite well on several points for those concerned with upholding a behavioral, that is, naturalistic, character as foundational for psychological events.

First and foremost, to appreciate that *Mind* is *not* representative of the cognitivistic movement that (a) assumes "cognition involves mystical, transspatial processes that are immune to direct observation" (Kantor, 1976, p. 330) and (b) uses cognitive terms "for the resuscitation of psychism into psychology" (Kantor, 1976, p. 331), it is important to recognize that the logical status of constructs rests on the user's particular referents in context. Although Paivio's mind construct possibly could have been more obviously a matter of adaptive action and interaction by which behaviors adjust to surroundings, he in no way adopts mind as one side of a Cartesian dualism. Instead, Paivio's referents to mind are much like the naturalistic renderings found in Kantor (1935) and Ryle (1949). As such, in the most general sense, mind merely refers to the class of naturalistic events that justify acknowledgment of the distinctive discipline of psychology.

*Mind*, above all, is about imagery. It is somewhat ironic that imagery was largely neglected throughout the reign of dualistic experimental psychology

that laid the assumptive foundations of cognitivism, which accepted imagery as a respected visitor. One can only speculate as to what made imagery unwelcome in the precognitivist era. Perhaps the raging “imageless-thought” controversy and its less than glorious demise, along with persistent notions of “in the head” metaphors, made the construct too obviously one best left to those not committed to forging underpinnings of a scientific discipline. It is even more ironic that two of the most outspoken critics of mind-body dualism in psychology did not abandon imagery. Skinner (e.g., 1953, 1974) argued that imagery was a matter of imaging or imagining behavior and noted that as a result of our learning history we frequently engage in particular behavior under a variety of conditions. Imagery is not a sort of quasi seeing, hearing, or smelling of Paris. Instead, imaging Paris is behaving under stimulus conditions different from those that ordinarily occasion seeing, hearing, or smelling features of Paris.

Even earlier and more completely than Skinner, Kantor (e.g., 1924; Kantor & Smith, 1975) offered a coherent theoretical framework for imagery. Like Skinner, Kantor objected to mainstream behaviorism, in part, owing to behaviorism’s inept handling of complex and sophisticated psychological events. An abridged account of Kantor’s interbehavioral theory of images goes as follows. Kantor (1924) classified images as one of several different forms of implicit actions or interbehavior. Implicit actions, in turn, are a class of mediate activities. Central for what Kantor meant by mediate behavior is his distinction between direct and indirect behavior. All behavior is adjustive, and direct behavior occurs when the behavior makes “an actual immediate adjustment” (Kantor, 1924, p. 45) to a stimulus object. Direct behavior to a water glass occurs when the individual reaches to pick it up, diverts his swinging arm to avoid it, or goes to another room to obtain one. A common form of indirect action is when a behavior only refers to a thing such as occurs in language acts. Should indirect behavior result in a change in the object (e.g., it is brought into the vicinity of the behavior), the linguistic act still is an indirect or mediate action as opposed to an immediate adjustive act.

Kantor’s (1924) construct of mediate activities enabled him to incorporate into his theory complex and subtle psychological events that posed problems for elementalistic and reductionistic behavioral theories. Thus his outlook covered areas that posed problems for conventional behavioral psychology. What Kantor came to call interbehaviorism included feelings, knowledge, desiring, thinking, reasoning, and language, all of which include aspects of a mediate character. Implicit interactions constitute a general class of indirect or mediate activities that include those in which either an apparent response (one directly accessible to others) or an inapparent response (not directly accessible by observers other than the behavior) occurs to a stimulus that is absent. Implicit responses are responses that are detached from the stimuli to which the response originally occurred. Given that Kantor maintained the fundamental position that the psychological unit always required an action of an organism (response or series of responses) in interaction with a stimulus or complex of stimuli, he proposed that implicit actions involved response to a substitute stimulus. Years later, in addressing remembering, Tulving (1983) adopted the same stance and suggested that the preferred hypothesis was that all instances of remembering are cued and that research was needed on identifying “invisible” cues (substitute stimuli) in cases when no cues appeared to be present.

In Kantor's system, images represent a multileveled class of vestigial responses, responses left over from previous, primarily perceptual, interactions. It is most important here to recognize that what is vestigial is not simply morphological in nature. As Parrott (1986) emphasizes, Kantor's formulation is based on response-and-stimulus as functional and interdependent units. Thus an image event represents a form of reinstatement of a preexisting interbehavioral field, not merely behaving weakly such that amplification methods could reveal. The actual presence of a substitute stimulus functions to reinstate an inapparent response such that the functional stimulus-response event permits a form of reliving a prior perceptual episode. According to Kantor's analysis, image responses are not especially different from seeing and other forms of perceiving. They are continuous with perceiving responses that are already partially detached from stimuli. Image responses are more detached from original stimuli than are ordinary perceiving responses.

*Mind's* foundation is DCT, where the critical construct is coding. Coding, or encoding, has been a basic construct in cognitive psychology ever since cognitive psychologists adopted information (electronic communication) theory and electronic computing as metaphoric sources. Although early adaptations of information theory to psychology tended to treat information theory as a formal theory that provided models for experiments as opposed to models of the behavior (Bush & Mosteller, 1955; Frick, 1959), proponents of the cognitivistic movement found it convenient to treat the organism as an information extracting, transmitting, and decoding mechanism. The argument went that a nominal stimulus "out there" (per behavioristic stimulus-response theory) was a source of information that was encoded (by behaviors), "transmitted," then decoded, whereupon acts were selected and generated. Encoding thereby entered psychology, only, however, if one ignores prior thinking regarding apperception, Jamesian selective attention, and numerous other attempts to dissociate stimulus-as-structural and nonpsychological from stimulus-as-functional, thus response and stimulus as interdependent elements of a unitary process (e.g., Bartlett, 1932; Kantor, 1924; Skinner, 1938). Despite strong intimations of mentalism in the coding construct, the events of coding can only come down to functional stimulus  $\leftrightarrow$  response units, as was clearly evident in an early compendium by experimental psychologists who contributed to empirical understanding of coding as a factor in remembering (Melton & Martin, 1972). In Skinner's theory, coding is a form of covert operant responding (coverants, Homme, 1965) by which behaviors operate on their environment in accordance with their history.

Given that, in *Mind*, Paivio (a) does not offer a conceptual analysis of coding, (b) does not propose a cognitivistic view of coding calling for a separation of cognition and behavior, yet (c) does maintain as fundamental two constructs of DCT with powerful cognitivistic links (imagery and coding), it is useful to further explore how Kantor's rather comprehensive system assists with matters that could be troublesome from a noncognitivistic perspective. First, in Kantor's (1924) theory, coding is a form of the implicit class of indirect (or mediate) responding involving inapparent responding. I have already relayed that language acts and imaging are two classes of implicit behavior, which takes us to the essence of Paivio's DCT, that is, like the imaging response, the language response is inapparent. The main position of DCT is that humans

have the potential to code encountered, including substitute, stimuli in either linguistic (“verbal”) or nonverbal (images) inapparent systems. The novel empirical set of hypotheses derived from the dual coding systems of DCT revolve around implications of examining variables that should differentially impact imagery and verbal processes in cognitive performances. For example, concrete words generally are easier to remember than are abstract words, which are relatively more difficult than concrete words for us to imaginably encode, suggesting that verbal coding is not uniformly optimal for maximal adjustments.

If *Mind* does not proceed in the tradition of classic mind-behavior cognitivist presuppositions, then how to account for the explicit mediational and representational components of DCT? Mainstream cognitive psychology has been and largely remains under the influence of the classic cognitive model, according to which sensory input activates an end organ whereupon the energy is transmitted to the brain. The end organ and brain function as transducers of the energy to mediate knowledge and yield a mental copy or symbolic representation of the external stimulus that was the source of sensory input. Such thinking carries forth the abstractionist approach to cognitive processes of Newton, Kant, and Helmholtz that won out over the opposing phenomenological, nontransduction model of Goethe, Purkinje, and Hering. In contrast to the phenomenologists who argued for direct perception and knowledge whereby knowers achieve an acquaintance with objects existing independently of them, abstractionists made perceiving and knowing into creative affairs through which the world is illusory, only contacted through mental representations.

Despite the centrality of mediation and internal representations in *Mind*, there is evidence that Paivio does not adopt cognitivist referents to these constructs. The main theoretical tradition for which DCT provides an alternative derives from the abstractionists such as Kant who formulated the essentials of the classic cognitive model. Paivio refers to the modern incarnations of cognitivist abstractionism that concern him as the *verbal memory tradition* or the *language-supremacy view of mind*. As I have already noted, the “dual” component of DCT refers to the equal status afforded to verbal and nonverbal modality-specific inapparent systems. Two major implications of modality-specific systems are that (a) the underlying psychological processes are continuous with the original critical conditions giving rise to them (i.e., perceptual-motor interactions), and (b) because no abstract symbols are created, present and substitute stimulation, rather than mental manipulations of abstractions, are critical for performance.

Paivio’s adoption of modality-specific inapparent stimulus ↔ response systems that are continuous with originating organism ↔ environment interactions as a fundamental postulate goes far toward distancing his referents to the *representation* and *mediation* constructs from the often cognitivist rendering of the terms. This means that when *Mind* suggests the formation of internal representations that mediate learned behavior, it is not an endorsement of classic symbolic cognition, which organocentrically places all critical activity inside the head. According to Kantor’s (1924) theoretical analysis, images (imaging) and subvocalized words more precisely are not substantive representations but representative implicit responses, by which is meant responses similar to those “performed upon a previous occasion while in contact with a stimulus object and now operating without the stimulatory

arousal by that object" (p. 304). Furthermore, acts of memory (remembering) in which imaging or subvocalized verbalization might be interpreted as cognitivistic mediating devices are viewed as involving precurrent components of behavior segments. To take an example from Kantor (1924):

Some thing or a sign . . . may serve as the [substitute] stimulus to arouse an implicit response [image or name] concerning some absent person, an act we ordinarily refer to as remembering. Such an act of recollection [precurrent response] may be the direct intermediary between the stimulus and the act of telephoning the person in question. The act of telephoning constitutes the final adjustment in this particular segment of behavior, and obviously could not occur without the mediation of the implicit reaction. (p. 300)

Kantor's and Paivio's approach to cognitive interactions clearly suggest that the classic cognitivistic movement does not offer the only way of including mediating processes in behavior theory. And I hope to have shown how other important cognitive constructs and performances addressed in *Mind* can be addressed from a naturalistic and monistic perspective. *Mind* is highly recommended as an example of how experimental psychology can address subtle and complex psychological events free from cognitivistic and dualistic postulates that hark back to times when nonspatiotemporal soul was handed to psychology as a subject matter.

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