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ABSTRACT

Briefly reviewed is research on paired-associate learning in which subjects usually are retardates. Paired-associate learning is said to involve mediation of associations for numbers, letters, grouping of numbers or letters, or other groups such as words. It is explained that retardates have been used as subjects in research on paired-associate learning because they tend to de-emphasize spontaneous use of verbal mediators and because studies require a control mechanism, which in this case is the verbal mediator. Mentioned in a brief history are considerations of philosophers, psychologists, and experimentalists. Research studies are cited which deal with such aspects of positive and negative transfer as nonsense syllables, associative strength, serial strength, temporal factors, and directionality. Noted are research studies which focus on such aspects of inhibition and speed as stimuli, overlearning, response competition, and remembering. (MC)

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DTP/hd

PAIRED-ASSOCIATE LEARNING AND RETARDATION: BRIEF HISTORY, POSITIVE AND NEGATIVE TRANSFER, INHIBITION AND SPEED

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Abstract

Paired-associate learning has a history in education, psychology, and philosophy. Do we mediate or do we not mediate associations for numbers, letters, groupings of numbers, groupings of letters, groupings of numbers and letters, words, etc.? Retardates have been considered ideal subjects for such research for they appear to de-emphasize the spontaneous use of verbal mediators. Hence, the verbal mediators can be built into the study and can be controlled. This paper considers some of the key research in paired-associate learning: beginning with a brief history, going to positive and negative transfer, continuing with inhibition and speed, and ending with references.

Brief History

Philosophers recognized that the conventional laws of association between ideas were in need of supplmentation and some suggested the concept of mediated association (Hume, 1886, p. 320; Hamilton, 1861, Vol. 1, pp. 351-354, Vol. 2, pp. 244-245). Psychologists also worked with the notion of mediated association with differing definitions and usages (Ebbinghaus, 1885; Wundt, 1894; Titchener, 1910, p. 386; Atherton & Washburn, 1912). Experimental studies of mediated association on a nonverbal level were also conducted (Prokofiev & Zeliony, 1926; Shipley, 1933, 1935; Brogden, 1939; Lumsdaine, 1939).

McGeoch (1942) noted that "The theory of the existence of mediated associations is an old one which has generated more discussion than straightforward experimental study." In his revision of McGeoch's text, Irion (McGeoch & Irion, 1952) saw no good reason for altering that statement.

Positive and Negative Transfer

Peters (1935) and Bugelski and Scharlock (1952) experimentally demonstrated mediation in verbal learning. Peters, using nonsense syllables, found such mediation in two of his nine experiments where the subjects were able to make use of the common items "perceptually or ideationally present at the time of recall." Peters' conclusion indicated that in verbal material, awareness was necessary. Bugelski and Scharlock considered the hypothesis of "unconscious mediated associations" with an A-B, B-C, A-C model. They verified the hypothesis, or at least that the Ss benefited from prior learning of the A-B, B-C lists without reporting any perceptual or ideational use of the

material. Russell and Storms (1955) used nonsense syllables paired with words and found that Ss did benefit from mediated associations. Their intermediate steps of mediation had to do with past experience (common cultural association chains) and were not learned in the laboratory. In other words, A-B was learned, B-C and C-D were known, and A-D was learned. The Ss could not describe the intervening association items which were assumed to have been operative.

There are many ways that associative strength may operate in paired-associate learning. Russell and Storms presented one way; others have been presented by Gallagher and Reid (1970, Berry and Baumeister (1971), and Wollen and Lowry (1971). Associative mediation, verbal mediation, and positive transfer in paired-associate learning are related to their bipolars, e.g., negative transfer. Spence and Schulz (1965), and Greeno, James, and Da Polito (1971) have evaluated negative transfer. According to the latter authors, negative transfer and forgetting appear to include response competition, associative interference, and unlearning. Intimately related to negative transfer are concepts such as reactive inhibition, proactive inhibition and retroactive inhibition (Briggs, 1954; Johnson & Sowles, 1970; Weaver, Rose, & Campbell, 1971).

Luria (1957) in working with retardates considered them deficient with verbal mediation in paired-associate and other learning. Jensen and Rohwer (1963) probed paired-associate and serial learning in an attempt to resolve differences between these two forms of rote learning. Serial structure and its effect on paired-associate learning was appraised by Pollio and Draper (1966). Luria has presented the

notion that retardates do poorly in some learning tasks because of the lack of association between verbal and motor behavior. Various signal systems were analyzed in several studies by O'Connor and Hermelin (1963). Working in this area, Milgram (1968a) controlled for the effect of mental age and intelligence quotient.

Underwood et al. (1959, 1960) developed a two-stage model of paired-associate learning: response learning and associative learning. Research with this model has been conducted by Prehm and Stinnett (1970); Kellas and Butterfield (1970); and Berry, Baumeister, and Detterman (1971). An issue was raised by Maccoby (1964) as to whether retardates showed a production deficiency or a mediation deficiency. Ellis (1963) formulated a stimulus trace theory to explain retardation and behavioral inadequacy. In the same book, Zeaman and House (1963) consider the role of attention in retardate learning.

Temporal factors have been researched with regard to stimulus-response duration (Nodine, 1969) and interstimulus interval (Murray, 1970). Recall or relearning for one day (Prehm & Mayfield, 1970) or one week (Hawker & Keilman, 1969) were duly noted. Melton (1967) and von Wright (1971) examined the problem of repetition and memory retrieval, massed practice and distributed practice. The speed of learning has also been considered a variable in storage and retrieval. Schieble (1954), Mandler and Huttenlocher (1956), and Underwood and Schulz (1960) investigated this variable.

Verbal transfer and directionality, i.e., forward and backward association, has been studied by Harcum (1953) and Schild and Battig (1969). Asch and Ebenholtz (1962) developed a principle of associative

symmetry and a notion of conceptual symmetry which could include conceptual and logical reversals.

Retardates are considered ideal for paired-associate research since they appear to de-emphasize the spontaneous use of verbal mediators (Jensen & Rohwer, 1963). The verbal mediators can be built into the study and thereby add control. Clark, Lansford, and Dallenbach (1960) used letter-numeral pairs and their subjects had a difficult time inventing verbal mediators to enhance the association within pairs. Related to this associationism are rehearsal (Leicht & Johnson, 1970) or recital (Milgram, 1968b) instructions. Turner and Walsh (1971) used word, sentence, and paragraph mediation, including some reversals.

Inhibition and Speed

Duffy (1957) advanced the notion of "arousal" or "activation" in psychological learning or perception. Ellis (1963) developed a concept of stimulus trace and related it to adequate and inadequate learning. This concept has been specifically considered for the retarded. "Attention" has been emphasized by Zeaman and House (1963) in retardate learning. Its converse, distractibility, has also been noted (Matheny, 1968).

Overlearning and verbal transfer (Harcum, 1953) and repetition and retrieval (Melton, 1967) were investigated. Von Wright (1971) studied the effects of distributed practice on paired-associate recall.

Forward and backward associations have been evaluated (Harcum, 1953; Asch & Ebenholtz, 1962; Schild & Battig, 1966; Turnure & Walsh, 1971). Related to this directionality, Asch and Ebenholtz developed a notion of conceptual symmetry and a principle of associative symmetry.

Mordock (1968) in a review attempted to reconcile apparent differences with regard to retardate deficit or no-deficit paired-associate learning. He suggested simultaneous consideration of meaningfulness of stimulus, of similarity between stimulus and response, and of exposure times for stimulus and stimulus-response.

Briggs (1954) mentioned interference in learning a second paired-associate list because of the influence of the first. In other words, a first list has to be extinguished or unlearned as the second list is being learned. If retardates have an inhibition deficit (a difficulty in extinction or unlearning) the second list would require more trials to criterion. A basic consideration in inhibition: reactive, proactive, or retroactive. Johnson and Sowles (1970) and Heal and Johnson (1970) reviewed in these areas.

Negative transfer has been analyzed by Spence and Schulz (1965) in terms of first-list trials. Greeno, James, and Da Polito (1971) stated that negative transfer and forgetting seem to include response competition, associative interference, and unlearning.

Positive transfer and remembering seem to include response facilitation, associative mediation, and learning. Peters (1935) and Bugelski and Scharlock (1952) experimentally produced verbal mediation. The criterion to determine mediation (versus non-mediation) has usually been trials (correct and/or error) or time. For example, if there were significantly fewer trials to required criterion in mediation items, positive transfer allegedly took place. Speed or rapidity of learning, then, has been a critical variable.

But the speed of learning items on one paired-associate list may also relate to the learning of items on other lists. In other words, considerations between and among lists, not just within lists, may be important. Speed or rapidity of learning may be understood in this sense and has been researched by Schieble (1954), and Mandler and Huttenlocher (1956).

Tulving and Madigan (1970, in their evaluative review of verbal learning and memory, include many articles on paired-associate learning. For a discussion of paradigms, controls, and pseudomediation controls, refer to Mandler and Earhard (1964).

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