Cognitive Dictionaries Inferred from Word Associations

一인지어휘 유형개념 一

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인지 어휘 유형(cognitive dictionary)이란 단어 연상의 반응 어휘를 인지 유형에 따라 분류, 분석하는 것을 가리킨다. 인지 어휘 유형 개념을 McNeill의 언어 발달 연구에 준하여 논의하였다. 즉 아동의 語義 발달은 自作文 形式 표현에서 시작되어 어휘 사용에 이른다는 것이다. 한편 Moran은 범 세계적으로 유아들의 인지 어휘 유형은 단어의 動作的 특성에 주로 의거한다는 것을 발견했는데 이는 언어의 효시에 관한 Piaget나 Bruner의 이론과 일치하는 것이다. Moran의 인지 어휘 유형의 추가 개념은 Bruner의 心像(ikonic representation)에 의한 관계, 기능적 관계(functional representation), 논리적(logical)관계를 포함한 단어의 연합 관계에 반영시켰다.

I. Introduction

Though the study of word associations had its inception in the work of Ziehen and Galton during the nineteenth century, its main use in the early part of the 20th century was in relation to personality assessment in clinical settings (Cramer, 1968). While this aspect has continued to the present time, in recent decades the linguistic components of word associations have been used for the study of thinking and cognition. In the words of Entwisle, "Associations are relevant to the problems of verbal learning and concept formation, to efficiency in problem solving and to creativity..." (Entwisle, 1966, p. 1).

However, cognition and language are both vast and intricate areas of human competence and performance, and it is difficult to devise a comprehensive system to adequately describe the entire gamut of cognition and of language, let alone their relationships to each other (Entwisle, 1966). Nevertheless, Moran (1981) used McNeill's concept of a word dictionary and Piaget's cognitive developmental theory in his research on cognitive dictionaries which he applied to his studies on word associations.

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II. The Concept of Cognitive Dictionaries

While word associations themselves consist of stimulus words (SW) and response words (RW), the production of word responses cannot be said to depend on the contiguity implied in stimulus-response (S-R) theory. Entwisle (1966) quotes McNeill's (1963) finding that his subjects produced associations in much the same way that they generated words in a sentence. If words were grouped on lists as postulated in S-R theory, a prodigious power of memory would be necessary. However, McNeill has shown that speakers assign properties to words which are then contrasted in terms of these properties, making it possible for paradigmatic associations to proceed with minimal contrast between words. Entwisle considers this to be a feasible synthesis of the S-R position and the position of more cognitively oriented theorists.

McNeill (1966) postulated that children acquire a semantic system at an early point in linguistic development. He described a hypothetical word dictionary which has its developmental inception in the holophrastic first words of young children. In the holophrastic phase the semantic system consists of "a dictionary in which words are paired with sentence interpretations. However, a holophrastic dictionary is burdensome for a child's memory and susceptible to ambiguity" (McNeill, 1970, p. 1120). Sentence dictionaries might reduce ambiguity, but the best solution is a word dictionary. With the construction of a word dictionary, the child's semantic competence begins to resemble that of an adult (Katz and Fodor, 1963). As a hypothetical example of a lexical entry in a child's word dictionary, the item "flower" would include a syntactic feature (noun), plus several semantic features, such as (physical object), (living), (small), (plant). Furthermore, McNeill and others have noted that while semantic features appear early in the child's linguistic development, their acquisition is a slower process than the acquisition of the syntactic components of language. That is, syntactic development appears to be complete in many respects by the age of four or five whereas children are still compiling dictionary entries as late as age eight (McNeill, 1970; also see Bruner, 1966).

In their study of the word associations of 100 normal students, Moran and his associates (Moran, Mefford, and Kimble, 1964) found five factors of which three reflected response sets: "functional", "synonym-superordinate", and "contrast-coordinate". In the factor which composed the functional response set, the stimulus word (SW) and the response word (RW) each denoted entities or processes which have a functional relationship, e.g. needle-thread. Another factor was composed of synonyms (where the RW has the same meaning as the SW) and superordinates (where the SW denotes an immediate member of the class or category denoted by RW or vice versa, e.g. vegetable-cabbage). Still another factor was composed of contrast (the RW negates or contrasts with the SW, e.g. dark-light) and logical coordinates (the SW and the RW denote immediate members of the same class or

category, e.g. blue-yellow).

In further research, Moran (1966) delineated another factor related to idiodynamic sets. In this factor, first called "predication associate", SW and RW are adjective-noun or noun-adjective combinations, where the SW denotes an attribute of the object denoted by the RW or vice versa; e.g. red-apple or apple-red. In his later studies, Moran used the term "iconic" to describe the predication associate, and "logical" to denote the two categories, synonym-superordinate and contrast-coordinate.

Moran and his associates found that while the specific response words of his subjects varied over time, the tendency for individuals to give a predominance of one or another specific semantic class of associates was consistent over a four day period in adult men (Moran, Mefford & Kimble, 1964) and over a two year period in 9- to 17-year-olds (Moran & Swartz, 1970). Thus, cognitive dictionaries have been shown to have stability over time.

When he later studied the word associations of young, 4- to 6-year-old children, Moran (1981) found it necessary to include one more category of RWs (i.e., the "enactive" responses) in order to accomodate the responses of his youngest subjects. In the enactive response set, the SW-RW represents a noun-verb or verb-noun relationship, e.g. boy-run or run-boy. He found that the consistency over time of his older subjects apparently does not pertain to the entire developmental span. That is, the youngest children (6 and under) produced primarily enactive responses while responses of adults were more likely to be iconic, functional, or logical. These findings are in keeping with what is sometimes called the paradigmatic shift--a decrease in syntagmatic and an increase in paradigmatic responses in the early elementary school years (Entwisle, 1966). Moran's findings regarding consistency over time, therefore, apply only to older children and adults.

Moran related word associations to cognitive development, particularly using Piagetian concepts in his discussion of the supposedly universal phenomenon of enactive responses in the early years. Inhelder summarizes this position: "For Piaget, language is part of a more general cognitive organization that has its roots in action..." (Inhelder, 1980, p. 133). Bruner (1966) is another cognitive theorist who related enactive representation to early language development.

III. Language in Cognitive Growth

Bruner described three ways in which children represent their experience and organize it for future use. The first means is enactive; that is, the habitual actions the child uses for coping with his world. The second means is ikonic where imagery is all important, and the third means is symbolic where language, freed of action and imagery, is the chief means of representation. These three systems of representation are parallel

and unique, but they are also capable of transference of one to the other (Bruner, 1966, p. 11).

While their theoretical frameworks for the relationship between language and cognition are somewhat different from each other, both Piaget (1954, 1980) and Bruner (1966) stress the enactive mode in early language expression. Enactive representation is the first system to appear. Bruner (1966, p. 12) quotes Piaget's observations which provide a distinct picture of the way in which action provides representation of experience in the young child.

" So also Laurent at 0:7 loses a cigarette box which he has just grasped and swung to and fro. Unintentionally he drops it outside the visual field. He then immediately brings his hand before his eyes and looks at it for a long time with an expression of surprise, disappointment, something like an expression of its disappearance. But far from considering the loss as irremediable, he begins again to swing his hand, although it is empty. After this he looks at it once more! For anyone who has seen this act and the child's expression, it is impossible not to interpret such behavior as an attempt to make the object come back. Such an observation . . . places in full light the true nature of the object peculiar to this stage: a mere extension of the action."

Or consider Lucienne, a month younger:

" At 0:6 Lucienne is alone in her bassinet and, watching what she is doing, grasps the material covering the sides. She pulls the folds toward herself but lets them go at each attempt. She then brings before her eyes her hand which is tightly closed, and opens it cautiously. She looks attentively at her fingers and recommences. This goes on more than ten times.

"It is therefore sufficient for her to have touched an object, believing she grasps it, for her to conceive of it as being in her hand although she no longer feels it. Such a behavior pattern . . . shows the degree of tactile permanence the child attributes to objects he has grasped (Piaget, 1954, p. 22)."

Thus, identification of objects in the sensori-motor stage depends primarily on the actions evoked by them.

The enactive nature of children's representational systems is also seen in the language expression of somewhat older children. When asked, "What is a hole?", many children responded with such statements as "A hole is to dig." The physical action of constructing the hole is what represents the object to the child.

A salient characteristic of action is that it is serial in nature whereas vision is spatial. Bruner (1966, p. 21) emphasizes that the child first gets "the spatial world of vision in correspondence with the serial world of action". This occurs in the first year or two of life. Later, perception and imagery will be freed of action, but the separation may

never be complete.

In ikonic representation, the child represents the world to himself in a perceptual system, that is, by an image or spatial schema that is more or less independent of action. However, the process by which the child frees himself of action-related representation is a long procedure, and manipulation is an indispensible aid to imagery. In the Witkin's Embedded Figures Test, for instance, the task of finding a simple figure within a complex figure may be too difficult for the child unless the imagery is made concrete and the object made amenable to handling or tracking with the finger (Bruner, 1966).

The relation of imagery to children's language can be seen in the much higher percentage of picturable objects in the vocabulary of children compared with the vocabulary of adults (Brown, 1958. Quoted in Bruner, 1966, p. 28). Another interesting language-related ikonic phenomenon is the fact that preschool children often explain the names of objects by their attributes. An animal is called a "cow" because it has horns or a "calf" because the horns are still small, etc. (Vygotsky, 1962. Quoted in Bruner, 1966, p. 31). In this way, the child deals with the perceptual experience or surface of things that catch his attention. In ikonic representation, the child's principle task is to find a way of expressing the structure of the world's appearance.

In his analysis of the third system, i.e. symbolic representation, Bruner (1966) uses language in his search for the proto-symbolic activity which purportedly supports not only language but also other forms of symbolization. The acquisition of symbolic representation free of action or imagery is a complex process beyond the scope of this paper. However, certain features of the symbolic system bear a strong resemblance to the logical responses in Moran's studies of word associations. "Categoriality" is of particular interest. The child uses words to cover classes of things, and these classes are rule governed (Bruner, 1966, p. 32). The acquisition of rule governed classes and their hierarchical systems typically takes place during the school years. That is, six-year-olds are more likely to group according to the surface characteristics typical of ikonic representation whereas older school children are more likely to use rational classification based on the functional properties of things (Olver & Hornsby, 1966).

IV. Conclusions

In this short review, we have discussed the concept of cognitive dictionaries inferred from word associations. These concepts bear promise of a deeper understanding of the relationship between language and cognitive development. The growth of enactive, ikonic, and symbolic cognitive representations as expressed in language fits the enactive, ikonic, and logical associations (i.e. cognitive dictionaries) of Moran's research. The fascinating role of functional use in the acquisition of rational classification as described by Olver

and Hornsby (1966) also provides a theoretical base for the functional responses found by Moran.

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