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In a fast moving world, reading ability becomes increasingly more important. Despite television, radio, and movies, reading is still the most important method of broadening our horizons (5, p. 125). To scan the world events and study the particulars requires good reading skills. Again and again the question is asked if the best possible method of reading instruction is being utilized with our boys and girls (1, p. 79 and 4, pp. 169-170). For that matter, we might ask if we adults are making the most of our ability to identify, interpret, and evaluate facts, so that we can intelligently keep pace with our world. We ask these questions, and educators who specialize in the area of reading try to find "the best way" for us to derive meaning from symbols in the process called reading.

Learning to read involves learning written symbols and what they stand for. At the turn of the century, reading was taught with great emphasis on a phonic approach. According to Webster, phonics uses elementary principles of phonetics, or the study of speech sounds, their production, and their representation in written symbols, to teach reading. Pupils taught by the phonic method memorized the ABC's and learned that each letter and combination of letters represented a spoken sound in the language (3, p. 11). About thirty-five years ago, phonic instruction was minimized and the sight method was considered to be the best. The sight approach to reading instruction is based on the appearance of the entire word (3, p. 12). Since this method is based on the recognition of the word as a whole without reference to the individual letters of which it is composed, it is functionally the same as the visual-visual stimuli in the present study.

This study was set up to compare two ways of learning symbols and their meanings, simulating the phonic and sight approaches to reading instruction. The stimulus apparatus was chosen to create functionally the same situation as is present in phonic and sight methods of reading instruction. The Experimenter used cards that have been used as tests of associative learning (2, pp. 567-571) and as an index for sight or phonic instruction in reading. In the study

kindergarten children and college students were shown and tested with 10 visual-visual stimulus (v-v) cards and 10 visual-auditory stimulus (v-a) cards. The results may have significant implications for the teaching of reading and in learning, with implications concerning multi-sense stimulation and retention.

Subjects and Apparatus

The subjects were taken from two populations. One sample included twenty-seven kindergarten children (Sks), the other included twenty-seven college students (Scs). The Experimenter used 10 v-v and 10 v-a cards, tests A1 and B2 by Gates (2, pp. 567-571). Each v-v card had a simple geometric figure and a drawing on one side with the figure alone on the other side. Each v-a card had a figure on one side and the word to be given verbally printed on the back.

Procedure

The two sets of cards were presented to half the subjects in each sample in the order of v-v cards first, v-a cards second. The sets were presented in the reverse order to the other half of the population samples. Each child in the kindergarten group was seated at a low table across the corner from the Experimenter and given the following instructions: "We're going to play a game with these two piles of cards. The game is to see how many you can remember. On this set of cards (v-a) I want you to look at the symbol and remember what I tell you it means." The Experimenter then began, saying, "This means *man*," at this time exposing the card. On the other set of cards the Experimenter instructed, "On this set of cards (v-v) the picture above the symbol tells you what the symbol means. I want you to remember what picture goes with each symbol." Each card was given approximately a three-second exposure time. After each set of 10 cards, the Experimenter shuffled them and tested the Subject. Cards answered correctly were placed in front of the Subject; those not answered, in a pile next to the Experimenter. This reinforcement was held constant throughout the group of kindergarten subjects.

When tested, each college Subject was given the following instructions: "I have two sets of cards and I want you to learn the symbol and its meaning for each card. After each set you will be tested. On this set of cards (v-v) you will know the meaning of the symbol by the picture above it. Look at the card silently and nod for me to go on if I go too slowly." And, "On this set of cards (v-a) you will know the meaning because I will tell you what each symbol means." When

answered, the cards were placed in separate piles for later scoring. When the Subject answered incorrectly, the Experimenter said *no*; when the Subject said he couldn't remember, the Experimenter said *o.k.* and put it in the same pile. For a correct answer, the Experimenter said *yes* and placed the card on its pile. The Experimenter's tone of voice was kept as constant as possible.

Results and Discussion

The mean scores of the differences for the kindergarten population was 4.40 and for the college population, 1.10. In other words, there was a greater gap between the average number of correct v-a answers and v-v answers for the kindergarten children as compared with a lesser gap between v-a and v-v retention scores for the college students. Both groups performed better with the visual-auditory than with the visual-visual stimuli. The difference, however, is much greater for kindergarten children. A *t* test for matched or paired data in which each Subject served as his own control, showed a t of 11.28 for the kindergarten children significant at the .01 level of confidence and a t of 2.22 for the college students which is significant at the .05 level of confidence.

Our data show that material learned first and last in a series is better remembered than material learned in the middle. We observe fewer errors for the first and last cards than for the middle cards. This phenomenon was possible to observe since the cards were always presented in the order in which they are numbered in the set.

Individual differences were interesting to note, such as how the visual response symbols were identified. This important aspect includes the degree of detail noticed, and the particular name identity given each stimulus. From the set of v-v cards, a catcher's mitt was identified as a hand, mitten, glove, arm, ball glove, and as a right hand. The picture had been given this wide range of meanings. If the symbol had been a word, it too might have been called by all of these names. It has been found that even the best sight reader may insist that a word is *plate* when it is plainly *dish* (5, pp. 125-6). In confusing such synonyms, the sight reader often loses the important details and finer shades of meaning.

Having more than one sense to check what is observed allows discrimination of detail. We have at least five senses with which we perceive stimuli in our environment. When these senses are used in combination a more complete "feeling" for the perception would seem the logical result. When we can use our senses together and as

checks against each other our perception would seem to have greater depth and dimension than any perception gained solely from one sense faculty. One sense alone cannot hope to discriminate between relationships and finer shades of meaning as can a multi-sense experience.

A few subjects whose presentation order was v-a to v-v, commented, "Oh, these are harder," when given the v-v stimuli. This greater difficulty indicated by the present findings leads us to several questions. Does this greater difficulty in learning when only one sense is utilized hold true in all learning? Should multi-sense stimulation be used with a set of symbols in the teaching of reading? Does the cross check made by more than one sense make a sufficient improvement of retention to warrant elimination of the sight method? New systems come along and we are apt to throw out old ones completely. But each theory has an important contribution. And so the key question is, "What are the merits of each new method and what combination of approaches will be the most effective resultant method?" This investigation raises many questions and answers none.

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Alice Ann Geiger carried out this experiment while an undergraduate at Western Michigan University. She is interested in an experimental approach to learning.