Phonetic mediation in four-year-old children*

JOHN L. LOCKE

Children's Research Center, Champaign, Ill. 61820

Twenty 4-year-old Ss recalled more pictures whose labels rhymed than they did nonrhyming pictures, suggesting that Ss of that age are aware of phonetic images and use them in their recoding and storage of nonphonetic stimuli in short-term memory.

Several papers (Kuenne, 1946; Kendler, Kendler, & Wells, 1960; Reese, 1962) have discussed the apparent failure of verbal behavior to mediate between external stimuli and children's overt responses to them. One explanation is that young children do not produce potentially mediating verbal responses (production deficiency); another is that they produce verbal responses which do not mediate performance (mediational deficiency), for some unknown reason (Flavell, Beach, & Chinsky, 1966). Although the potentially mediating responses are expressed as covert phonetic activity (Locke & Fehr, 1970), there has been remarkably little attention to *phonetic mediation*. Most of the work, it seems, has been on reversal shift, discrimination sets, transposition, acquired cue distinctiveness and equivalence, and double alternation (see review in Reese, 1962). This paper reports an experiment in which young children were to recall nonlanguage stimuli discretely classed on the basis of phonetic responses which Ss might make if verbally mediating.

PROCEDURE

The Ss were 20 4-year-olds, run individually. Stimuli were 12 sequences of three pictures, six of which rhymed (e.g. MAN, FAN, CAN) and six of which did not (e.g.,

BEAR, SHOE, DRUM). Ss first were tested for their ability to label the pictures and then were pretrained to the procedure. Each picture was exposed on a slide screen for 5 sec (0.8-sec interstimulus intervals); following a 10-sec delay period, S was asked to orally recall the three pictures. Rhyming and nonrhyming sequences were presented in random order within the restriction that neither could appear more than twice consecutively. A separate group of 12 4-year-olds was run in the same test format with identical stimuli, except that rhyming items were reordered into nonrhyming sequences. This procedure was included so that rhyme-nonrhyme recall discrepancies, if they occurred, could reasonably be attributed to children's processing of spontaneously generated acoustic images rather than the differential ease with which individual items in the two stimulus classes might be recalled.

From previous work (Locke & Fehr, 1970) it is known that 4-year-old children covertly express phonetic activity (recorded electromyographically) during the presentation of pictorial stimuli but not necessarily during a prerecall delay period provided for rehearsal. If this phonetic activity during stimulus presentation has mediating effects, i.e., if Ss are aware of the relevant phonetic features and are storing their implicit phonetic responses rather than the (nonphonetic) stimuli, we should expect Ss to recall more rhyming than nonrhyming items because the retrieval of one label would have the potential of cueing the retrieval of those which are featurally similar to it. In addition, one would also predict

greater sequential confusion in the recall of rhyming items, at least if children's free recall resembles the serial recall of adults (Baddeley, 1966).

ANALYSIS

Ss recalled a mean of 9.50 rhyming and 8.20 nonrhyming items, a statistically significant difference [$t(19) = 2.33$, $p < .05$]. Analysis of sequential confusions showed a tendency toward greater confusion of rhyming items ($\rho = .452$) than nonrhyming stimuli ($\rho = .365$), a nonsignificant difference ($p > .05$) using a sign test. Analysis of data from the additional group of 12 Ss showed no significant difference [$t(11) = 1.31$, $p > .05$] between their mean recall of nonrhyming lists (12.33) and lists of (originally) rhyming items in nonrhyming sequences (11.41).

DISCUSSION

Since the stimuli were presented visually, it must be assumed that Ss added in the phonetic features which accounted for their superior recall of rhyming items. Whether this recoding was performed through acoustic imagery, subvocalization, or both is a question which awaits further experimental investigation.

REFERENCES

- BADDELEY, A. D. Short-term memory for word sequences as a function of acoustic, semantic and formal similarity. *Quarterly Journal of Experimental Psychology*, 1966, 18, 362-365.
- FLAVELL, J. H., BEACH, D. R., & CHINSKY, J. M. Spontaneous verbal rehearsal in a memory task as a function of age. *Child Development*, 1966, 37, 283-299.
- KENDLER, T. S., KENDLER, H. H., & WELLS, D. Reversal and nonreversal shifts in nursery school children. *Journal of Comparative & Physiological Psychology*, 1960, 53, 83-88.
- KUENNE, M. K. Experimental investigation of the relation of language to transposition behavior in young children. *Journal of Experimental Psychology*, 1946, 36, 471-490.
- LOCKE, J. L., & FEHR, F. S. Young children's use of the speech code in a recall task. *Journal of Experimental Child Psychology*, 1970, 10, 367-373.
- REESE, H. W. Verbal mediation as a function of age level. *Psychological Bulletin*, 1962, 59, 502-509.

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