

# Age changes in verbal satiation<sup>1</sup>

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*Age-changes in phenomenal loss of meaning produced by continued repetition of words were studied under two conditions: repetition accompanied by gesture (e.g., tapping while repeating the word TAP); repetition without accompanying gesture. Two hundred and twenty-eight Ss, ranging in age from 8 to 18, were tested. The maximal effect occurred in older Ss where accompaniment of verbal repetition by gesture differentially increased the time and number of responses prior to loss of meaning.*

This study is concerned with the general problem of the relation between motoric and verbal activity (cf., the so-called "motor theories" of thinking, e.g., Jacobson (1932), Max, (1937), Washburn (1916), as well as the recent study by Dowling (1965) on the effect of motor activity on perceptual recognition; also see Rand & Wapner (1967) on posture and memory). More specifically, it derives from a study by Miller (1963) who found that onset of lapse of meaning was delayed when accompanied by a motoric gesture congruent with the meaning of the word repeated (cf., Gibson (1950) for a description of the phenomena, and Amster (1964) for a review of related literature). The present study seeks (1) to assess the generality of this relationship and (2) to determine whether the relationship varies depending upon age.

### Method

S was required to repeat a word continuously, as fast as possible, until it "lost meaning" or "sounded funny." A practice trial was carried out using the word BUTTER. E demonstrated the procedure and S practiced the task until it was clear the instructions were understood. Two words, TAP and BOUNCE, were employed. For each word there were two conditions: (A) Action—the word uttered with an accompanying gesture; (B) No Action—the word uttered without an accompanying gesture. The word TAP was accompanied by a tapping motion on a table-top; BOUNCE was accompanied by S holding a ball in his hand and gesturing as if to bounce it on the floor. (A possible control condition in which an irrelevant action accompanies repetition of the word was not included since Miller (1963) found that action per se, rather than distraction, was the critical variable.) Two trials were administered for each word in each of the two experimental conditions. A double fatigue order was employed in which half the Ss received the order ABBA; the other half received the order BAAB. The four trials for the word TAP always preceded the four trials for the word BOUNCE.

Two hundred and twenty-eight Ss, 19 boys and 19 girls in each of six age groups (mean ages were: 8.2, 10.0, 12.0, 14.0, 16.4 and 18.1 with a standard deviation age ranging from .4 to .6) were tested. IQs of Ss were obtained from school records based largely on the California Test of Mental Abilities and, for a few Ss,

based on the Otis. The mean IQ of the six groups ranged from 105.9 to 109.0; sigmas ranged from 8.4 to 12.7.

The test session was tape recorded, and then converted to a visual record on a Grass polygraph. These records permitted accurate determination of two indices: "Time" and "Number of Repetitions" prior to phenomenal loss of meaning.

The reliability of these measures was assessed by correlating, separately for each age group, the two trials for each word under each experimental condition. The 48 uncorrected reliabilities are all significant and of high magnitude. The average of all of the correlations is .72. The average correlation across age for the "Time" measure is .62 for TAP, and .74 for BOUNCE; the respective correlations for "Number of Repetitions" are .71 for TAP and .74 for BOUNCE.

### Results

The effects of age and experimental conditions were assessed by analysis of variance. Figure 1, Part A, presents means for "Time" and "Number of Repetitions" prior to loss of meaning plotted for each of the six age groups under Action and No Action conditions with the word TAP. The overall effect of action is significant for both measures ( $F_{\text{Time}}=7.22$ ,  $F_{\text{Rep.}}=30.34$ ,  $df=1/222$ ,  $p<.01$ ), indicating that meaning is maintained for a longer time when accompanied by the action. While the overall effect of age is not significant, the interaction Age by Action is significant ( $F_{\text{Time}}=3.40$ ,  $F_{\text{Rep.}}=3.76$ ,  $df=5/222$ ,  $p<.01$ ), with differentially greater efficacy of action in the oldest age groups.

Figure 1, Part B, presents parallel data for BOUNCE. The overall effect of action is less pronounced, appearing only for "Number of Repetitions" ( $F_{\text{Rep.}}=10.84$ ,  $df=1/222$ ,  $p<.01$ ) and not for the "Time" measure. While the overall effects of age are highly significant for both measures ( $F_{\text{Time}}=3.40$ ,  $F_{\text{Rep.}}=3.76$ ,  $df=5/222$ ,  $p<.01$ ), the interaction (Action by Age) is not.

Trend analyses show significant quadratic components in the distribution of age means for all of the curves except those for the TAP-No Action condition. Thus, the significant ontogenetic trends are generally curvilinear, i.e., there is a decrease from ages 8 to 12 and then a subsequent increase with age.

The mean differences between Action and No Action conditions were assessed separately for each age group. The only significant differences ( $p<.05$ ) between means occurred with the word TAP (on both "Time" and "Number of Repetitions" measures) for the oldest age group.

### Discussion

The differential facilitation effect of gesture in maintaining meaning for the oldest Ss may be a function of the better integrative capacity present at later stages of development.

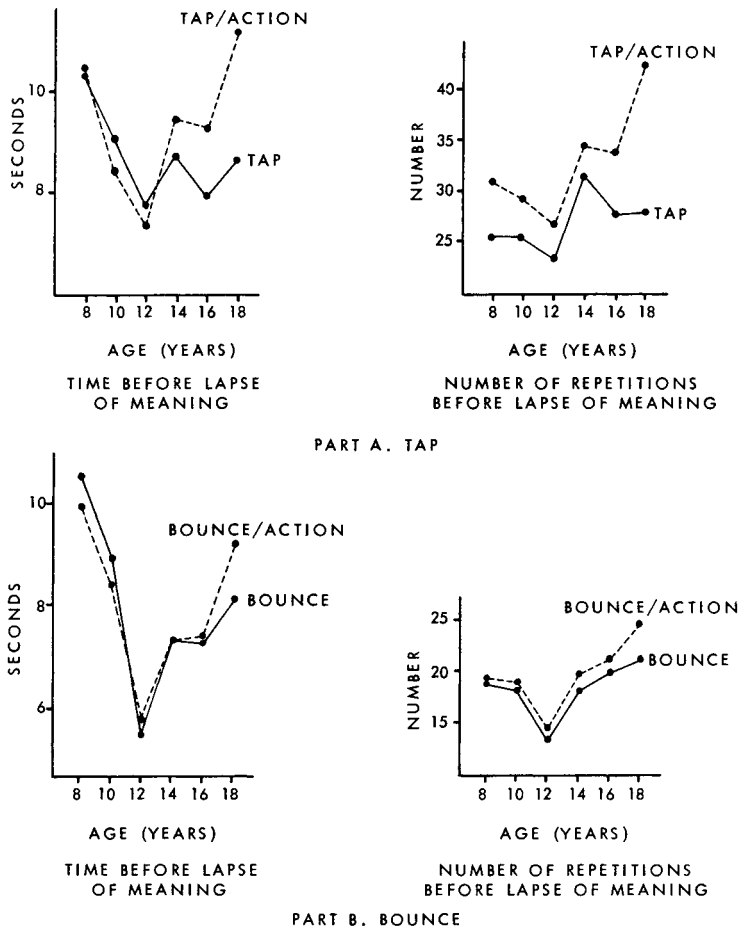


Fig. 1. Age changes in effect of action on verbal satiation.

Great cognitive maturity is probably required to establish an artificial relationship between a word and a gesture. This does not negate the possibility of a spontaneous integration of word and action occurring in a parallel fashion at lower levels of cognitive maturity. An example of such a working relation is the use of the gesture for "cutting" to revive meaning of the word SCISSORS (cf., Weisenburg & McBride (1935) who report that a patient was unable to say scissors unless he moved his fingers as in cutting).

The curvilinear functions obtained for both measures under Action as well as No Action conditions imply that there is not a unitary process at all age levels. The major shifts in the curves occur at 12 years, suggesting that the findings are related to radical shifts in the symbolic function of language that have been noted to occur in this age period (Lennenberg, 1967). For example, it is possible that the high "Time" and "Number of Repetitions" which occur in the youngest age groups are a product of one process, e.g., a perseverative tendency, whereas similar high values in the oldest groups are attributable to another process, a true maintenance of meaning.

Notwithstanding the complexity of interpretation, verbal repetition should prove to be a useful method for the study of the genesis and degradation of meaning relation-

ships once adequate normative data become available.

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