

MEMORY

BY WARNER BROWN

University of California

All the theories concerning retention in memory between the time of impression and the time of recall are reduced by Larguier des Bancel (8) to the two advanced by Plato: either there is a *trace* remaining, notion of the wax tablet; or the image *survives*, notion of the captive bird. The choice between these views depends upon metaphysical, not psychological, considerations. Baillie (2) claims objectivity for the objects of memory-knowledge and concludes that no theory of knowledge can be adequate which takes its start primarily or solely from our sensorial knowledge of the outside world. For Laird (7) memory has become the meeting point of two dissimilar lines of research, to the reciprocal benefit of the philosophy and psychology of today. This is said by one who thinks that the psychological investigations into memory have received a powerful impetus from the pen of Bergson.

The much discussed experiments of Ebert and Meumann on the transfer of training in memory have been repeated by Reed (13). The practice group consisted of eight subjects. They received an amount of practice on nonsense syllables at least as great as that given by Meumann. The control group consisted of six (later five) persons. Seven tests of memory-span and six tests of learning were performed by both practice and control groups before the practice work and after its conclusion. There were some deviations from the technique of Ebert and Meumann, particularly with regard to the amount of work in practice per sitting and the alternation of the methods of learning. In addition to the methods of scoring employed by Ebert and Meumann several others are used by Reed. When the various methods of scoring are considered, and the amounts of the average deviations, it appears that the small apparent advantage of the trained over the untrained group in the second test is not significant. The data show in the tests of learning ability, as well as in the tests of memory-span, that training in learning nonsense syllables does not give, in dependable amounts, increased ability to learn or to remember other kinds of material.

The experimenter makes the suggestion that results reported by Ebert and Meumann may be due to revival of the practice in memorization which their subjects received during their school days. The paper contains contributions to the questions of whole versus part methods of learning and of the effect of the length of series upon the amount and parts recalled.

An individual study is reported by Aschieri (1) of a normal child of eight years and a subnormal child of sixteen, both of the mental age of ten and equally advanced in school. Memory-span, speed of learning, and quality of reproduction are considered. The most valuable conclusion is that subnormal cases as well as normal possess distinctly individual characteristics and never conform strictly to type. Deaf children in the Ohio State School for the Deaf were found by Pintner and Patterson (12) to be much inferior to normal children in visual memory for digits. Their inferiority in this respect was greater than their performance in other tests would lead one to expect. The visual memory of the congenitally deaf was not as good as that of those children who had had some auditory experience. The investigators are lead to conclude that auditory experience and probably auditory images play an important part in the recall of digits presented visually. A predilection on the part of women for memory work is shown by Gates (3). In a long series of examination questions where an option was given between a question involving reasoning and one depending solely on memory women chose the memory questions more frequently and were relatively more successful in answering them than men. Those women who did choose the reasoning questions were relatively unsuccessful in answering them. Other tests given independently to the same subjects showed the women to be superior to the men in immediate memory and in retention. Tests for recall and recognition of words, geometrical figures and nonsense syllables were applied to 638 children in the fourth to eighth grades by Mulhall (10). She found that both forms of memory improve with age and with school grade, but that the younger children in a grade are somewhat better than the older ones. Girls do better than boys with words and syllables but not with geometrical forms.

Seeking a practical test for the ability to associate peoples' names with their persons Gould (6) allowed his subjects to study the names attached to twenty photographs for five minutes. A high correlation results between the ability to recall these names when the pictures are presented alone and the ability to recall the

names of seventeen strangers who were introduced to the same subjects. According to an experiment by Gordon (5) a musical selection is easier for musical subjects to learn than a series of nonsense syllables constructed by making one syllable correspond to each note and presented in the same tempo. But non-musical subjects find the syllables easier to learn. The music was not presented in vocal tones in the manner of the syllables, but was played over on the piano, then sung by the learner, then played again, etc. That the arrangement of the music facilitates the learning process is shown by the increased difficulty of learning the notes presented in reverse order. Myers (11) finds that normal school girls one year after completing a high school course in history are able to associate some fact correctly with forty-five per cent. of a list of names of persons notable in American history. The order of success in the memory test corresponds fairly well with the frequency with which the names are mentioned in text books in the case of military names but not in the case of civilians. This study is one of a series intended to measure the progressive loss in memory for the same individuals over a period of several years.

Morgan (9) finds by introducing noise into the work room that the formation and retention of connections between syllables and numbers is interfered with to a degree which is not compensated for by the greater effort put forth under such adverse conditions. Recitation as a factor in memorizing is analyzed in a monograph by Gates (4). Experiments were made with children from the first to the eighth grades (about forty in each grade), and with fifteen adults, in memorizing nonsense syllables and sensible material consisting of brief biographical statements. The amount to be studied always exceeded what could be learned in the time allotted. The effects of practice, time of day, inequality in test material, individual differences and other possible disturbing factors were controlled by dividing each group of subjects up into squads among whom the successive tests were assigned in such sequence as to equalize all of these factors. The material was studied either by continuously reading over and over or by a certain amount of reading followed by attempted silent recitation with correction by reference to the copy in hand. The amount of time devoted to reading ranged from 100 per cent. down to 20 per cent. by steps of 20 per cent.; and in the case of sensible material down to 10 per cent. The results show a marked advantage for recitation, increasing steadily as the proportion of time devoted to reading is reduced,

until not more than one fifth or two fifths of the time is devoted to reading. The advantage of recitation is greater for recall delayed three or four hours than for immediate recall, and greater for non-sense than for sense. Analysis shows an advantage for recitation arising from articulation, accent and rhythm, localization, the noting of meaning and relations with unusual characteristics of the material, grouping, confidence from testing, increased satisfaction from knowledge of success and absence of monotony. Memorizing with recitation is shown to conform much more closely to the normal process of sensory-motor learning than does memorizing by a series of visual impressions.

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