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# READING READINESS AND THE PERCEPTUAL ABILITIES OF YOUNG CHILDREN

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## Introduction

THE purpose of this article is to raise doubts about the concept of reading readiness. The notion of reading readiness at the mental age of six to eight years is almost universally accepted in the United States and very widely in Britain—by 75% of head teachers according to Morris (1959). Thus, Inglis writes: 'Morphett and Washburne are doubtless correct in asserting that a minimum mental age of six and a half years is required for adequate progress in reading' (1948, p. 70). The theory is so widespread that further citations are unnecessary.

## Reading Readiness and Maturation Theory

Reading readiness is supposedly determined partly by environmental influences on the child such as how much he has been able to play with books, etc., so that his interest in them is aroused, and partly by maturation, 'a biological process which cannot be accelerated by artificial means' (Benda, 1954, p. 1128). According to maturation theory, a child is unable accurately to perceive words or letters before a mental age of six, seven or even eight. This theory is maintained by a number of authoritative writers, e.g., Benda (1954) in Carmichael's *Handbook of Child Psychology*. A number of corroborative views are cited with approval by Smith and Dechant (1961) in their recent textbook on the psychology of reading. The theory is also maintained by some English psychologists, e.g., Vernon (1958). Part of the child's perceptual difficulties allegedly result from '"a syncretist" tendency to see things as a whole' (Vernon, 1958, p. 14), as a result of which he is unable to perceive with accuracy the details of complex figures such as words. This theory is stated by Vernon (1958, p. 20), as follows: 'The normal child of mental age 5-6 years can perceive simple forms without great difficulty. What is less certain is the extent to which he can remember accurately the small differences between a number of similar shapes, like those of the letters of the alphabet. And from the work of Benda particularly it appears likely that his memories of combinations of shapes, as in words, are most uncertain and unreliable'. In the writer's opinion this statement underestimates the perceptual powers of young children by a very considerable margin of error.

Both Benda and Vernon base their maturation theory on studies of children's abilities at reproducing letters or figures by drawing them. According to the Stanford-Binet test a child needs a mental age of seven to be able to copy a diamond accurately. A considerable amount of similar evidence is cited by Vernon and this must be accepted.

However, it is a mistake to argue that this evidence shows that children cannot *perceive* diamonds and similar figures accurately before the mental age of seven. All this evidence shows is that children do not *draw* accurately until this mental age. This is probably because no-one has taught them to draw diamonds, or conceivably because drawing skills are subject to maturation. However that may be, when naming or pointing is used instead of drawing as an index of perceptual ability it is evident that children can make perceptual differentiations at considerably lower mental ages. Further perusal of the Stanford-Binet test shows that children can perceive nonsense letters (squares, rectangles, triangles and irregular shapes) accurately at the mental age of 4—4½ years (Terman-Merrill, 1937 Revision, Form L), and the children on whom this was standardised were probably unpractised.



**Studies of Early Readers**

There is also evidence that children can learn to make the fine perceptual discriminations involved in learning the names of letters and in reading, at mental ages considerably lower than six to eight. Davidson (1931) took three groups of children aged 3-, 4- and 5-years, all with a mental age of 4 years, and taught them to read; almost all the children made considerable progress after four months' teaching involving only 10-15 minutes daily. A second study is that of Bird (1930) who reported that three- and four-year-old children were regularly taught to discriminate letters at the Henry Barnard School over a number of years.

These studies of groups of children in kindergarten show that reading can quite feasibly be taught to children of a mental age of about four years. However, a few studies of individual children taught by parents suggest that a mental age of four is by no means the earliest that children can learn to read or perceive letters. Dolbear (1912) reported the cases of Viola Olerich who learned to read from the age of 17 months and read fluently by the age of 2-11; and of Norbert Wiener, who learned all the letters in two days at the age of 18 months. But these two infants were surpassed by Winifred Stoner (Stoner, 1914), who read by the age of 16 months, and Otto Pöhler, who noticed his own Christian name in a newspaper at the age of 15 months (Dolbear, 1912). Unfortunately, the mental ages of these infants were not recorded, but according to maturation theory they must have had I.Q.s of 500! Good though these performances were, the record for early letter perception seems to be held by Francis Galton, who could identify all the capitals at the age of 12 months (Terman, 1917). If we follow Terman and generously assume that Galton had an I.Q. of about 200, we may infer that accurate letter perception is possible at the mental age of about 24 months.

One of the best documented cases is that of Martha, presented by Terman (1918). Martha showed no signs of early mental powers until her father began intense intellectual stimulation at the age of nineteen months. Her first three words were acquired at fourteen months, which is about average or even backward according to most developmental norms (e.g., Griffiths, 1954). Her father tried to teach her the capital letters at this age and she learned four of them, but progress was very poor. Consequently, endeavours were dropped until she reached nineteen months. At 19 months she learned

all the capital letters in 2-3 weeks, and then all the small letters in a further 2½ weeks. From 20 months she began to learn whole words and mastered 35 words in a month. In the following two months she learned a further 40 words, and by 24 months she had a reading vocabulary of over 200 words. At this stage she could read a number of simple books. Her rate of acquisition of new words was striking and at 24-25 months she learned 20 or more to the hour. Learning frequently took place in one trial. On one day she was shown 51 new words, and thirty hours later correctly recognised 38 of them. This case is especially interesting because there were two other children in the family besides Martha. The eldest was given intense cognitive stimulation of the kind given to Martha and at the age of 11 had an I.Q. of 171. The other child was given no early training and at the age of 9 was of average intelligence.

Turning now to the cases where the I.Q.s of early readers have been measured, the only thorough study known to the writer is that of Fowler (1962), whose daughter, Velia (I.Q. 150-170) learned to identify all capital letters at the age of 21 months and most small letters by 23 months. She began learning whole words at the age of 2 years (M.A. about 3 years), and by 2-9 she had a word recognition reading vocabulary of 250 words.

Four more instances of accurate letter and word perception and learning in children aged between 1 year 10 months and 3½ years have been presented by Diack (1960). Child A at the age of 1 year 10 months learned to discriminate a square among nine nonsense letters (cross, elipse, etc.) in *one trial.* At the age of two (mental age about 2-6) this infant could discriminate perfectly between the word *bus* and a number of other words including 'man', but the discrimination broke down with very similar words such as *but.* When A was just over 3 years she learned to discriminate 18 words in 11 minutes, namely *cat, man, pig, hat, jam, nib, bat, van, ink, cup, dog, net, log, bus, fox, bed, rod, web.* Another child, B, at the age of 3 (mental age about 3-8) made good discriminations between the word *caravan* and highly similar words including *caramel* and *varacan.* Another child, C, at the age of 2 years 4 months (mental age about 3-0) made perfect discriminations of the above eighteen words after 90 minutes of practice. Child D learned to recognise the letters, A, B, C, D, J, O, P, T and Z in five or six minutes at the age of 2 years 4 months (mental age about 2-8).*

## A Further Study

Since there appear to be only three recorded cases of children learning to perceive words with known mental ages of below 3½ years (one by Fowler and two by Diack), it is perhaps worth while for the writer to add to the existing literature by outlining briefly the early perceptual abilities of one of his daughters. This subject (Sophia) learned her first letter at the age of 2-9 (Terman-Merrill, mental age of 3-4, I.Q. 122) by climbing on me and demanding to share my newspaper. I pointed out the letter S and named it and she repeated its sound. This letter was learned perfectly in one trial and was never falsely identified in the succeeding two weeks of letter learning or thereafter. In the next fortnight I showed Sophia a number of letters in the newspaper and in books and at the conclusion of this a day was allowed to elapse and then she correctly identified 20

*Approximate mental ages for these children were kindly supplied by Mr. H. Diack.

letters. The actual time devoted to this learning was of the order of 5-10 minutes a day in all the observations described here, both for letter and whole word learning.

I then turned to whole word learning and typed out eight words on flash cards and Sophia and I played with them for a few minutes. These words were fairly easy to discriminate (the actual words were *Mummy, Daddy, pig, man, school, boy, girl, cat*). The next day Sophia correctly named six of the words. Other cards were added and on the fourth day she had a sight reading vocabulary of 14 words. I then gave her 6 words which were very difficult to discriminate, namely *The, the, she, he, his, her.* These gave Sophia considerably more trouble and it took her four days to master them without error. This difficulty, however, was not a perceptual one. It is now very widely agreed that there are two kinds of memory, first, immediate memory in which we can hold such things as telephone numbers as long as we are not distracted; and secondly, long-term memory into which memories can be stored with more effort and where they are more immune from distractions. It is probable that different neurological mechanisms are involved: for recent reviews from psychological and physiological points of view see respectively Broadbent, 1959, and Konorski, 1961. Now Sophia could quite easily hold the differences between *The, the, he, she, her* and *his* in immediate memory; if I took two or three of them, named them and shuffled them she could identify them without error. This shows that the perceptual discrimination of the words gave no difficulty. The difficulty arose in transferring the short-term immediate memory into long-term permanent storage, as shown by her difficulty in identifying the words correctly on subsequent days. In her first fortnight of whole word learning Sophia was exposed to 32 words in all. At the conclusion of this a further fortnight was allowed to elapse and she then identified 23 of the words correctly on the first trial and a further 7 after a maximum of three false readings (i.e., if I said 'no' she made another attempt and in all cases the word was correctly read after a maximum of three failures). At the end of three months she had a word recognition vocabulary of over 100 words. Up to this time learning the words had been an enjoyable game, but about this time she became resistant to further learning (as Fowler's child did after a somewhat longer period) and the learning was discontinued. After an interval of a further three months she correctly identified 34 out of a little over 100 words. These observations show that it is quite possible for a two-year-old well within the normal range of intelligence both accurately to perceive words and accurately to retain them in memory.

## Discrimination of Reversals and Mirror Images

A final and minor point concerns the difficulty experienced by young children in discriminating reversals (n and u) and mirror images (d and b). Maturation theorists hold that accurate discrimination is delayed by maturation lag until the age of 7-8 years (e.g., Vernon, 1958, p. 27). Two facts argue against this interpretation. One is that the ability to discriminate reversals improves with training in children below the age of 7-8 years (Hildreth, 1934; Teegarden, 1933). A study by Newson (1955) showed that children aged 4-0 to 4-6 were better able to discriminate mirror images after thirty minutes' training than were untrained 5-year-olds, and she concludes that 'The existence of this disability at 5-0 must be taken as being due entirely to lack of experience in the practice of this concept'.

The second is the well-known fact that fully adult animals (rats, octopuses and monkeys) also have great difficulty in discriminating reversals and mirror images (Lashley, 1938; Sutherland, 1959; Harlow, 1945). The fact that these difficulties are present in animals in whom maturation is complete makes it likely that the difficulties of children are due to some fundamental characteristics of the visual system and not merely to delay in maturation. This conclusion has recently been argued by Deutsch (1962).

## Conclusions

Four cases of children successfully identifying whole words with chronological ages below 3 years and mental ages below 3½ years have been cited. This small number is probably not due to many parents having tried and failed to teach their children to read at this age. It seems more likely that few parents attempt this teaching because of lack of interest or acceptance of a variety of psychological dogmas or misunderstood theories. Perhaps the three most common of these are, first, the maturation theory of delayed perceptual powers in infants. It is hoped that sufficient evidence has been cited to convince the reader that this theory is incorrect. Secondly, there is the widely-held belief that early cognitive stimulation has undesirable emotional effects on children. In view of Terman's well-known findings that precocious children, the majority of whom received intense intellectual stimulation, were above average in emotional adjustment, it is difficult to see how this belief can be sustained. Thirdly, the belief that intelligence is largely determined by inheritance has no doubt led to a fatalistic acceptance of whatever mental powers children appear to display. The well-accepted theory that variability in intelligence is largely determined by inheritance does not, of course, preclude the possibility that intense intellectual stimulation may raise the I.Q. very substantially. Indeed, it is probably precisely because very few parents make any serious attempts to teach their children that differences in I.Q. are largely determined by inheritance.

Our conclusion is that sufficient evidence exists to dispose of the theory that children cannot perceive detail accurately until a mental age of 6 to 8. The evidence suggests that accurate perception and learning of whole words are readily accomplished at a mental age of 2½ to 3½ years and probably earlier. Furthermore, many of the studies cited show that children enjoy this learning. With the disposal of the spurious concept of delayed perceptual maturation it seems doubtful whether the concept of reading readiness has sufficient substance to be worth retaining.

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