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هدفت هذه الدراسة إلى تحديد العلاقة بين الذاكرة المرئية التسلسلية والذاكرة المرئية في عملية القدرة على القراءة لدى المعسوريين مقارنتهم مع العاديين .قد توصلت هذه الدراسة على وجود ضعف لدى المعسوريين في إنتاج المعلومات أثناء عملية القراءة. ، قد تمكنت أيضا هذه الدراسة أن توضح أن المعسوريين يحتاجون إلى مدة زمنية كبيرة من أجل معالجة المعلومات مقارنة مع نظراءهم العاديين .

This article attempts to put light on positive correlation between both visual sequential memory and visual memory and reading ability in dyslexics, comparison of memory differences using auditory and visual sequencing tests (Itpa) I have found inferior performance in dyslexics .

Dyslexics need much longer exposure to written language learning .

Memory in dyslexics and controls Subjects .

Aspects of memory have important implications for reading and spelling , in terms of retention of sound / symbol correspondences ; retention and recognition of phoneme and grapheme sequences and so on. One category of written language difficulties is dyslexia which one might describe as an individual difference in cognitive development ; not favoring the easy acquisition of written language skills , see for example Richards 1978 for descriptions as to the nature of dyslexia .

Although many writers make clinical observations on memory deficits in dyslexia , there has been relatively little controlled research in this area. .

Goldberg and Shifiman 1972 found a significant positive correlation between both visual sequential memory and visual memory and reading ability in dyslexia , comparison of memory differences using auditory and

visual sequencing tests (Itpa) have found inferior performance in dyslexia (Stanley 1973)

(Stanley 1973. and Hall 1973) review the passage of information through visual memory store (Iconic memory) , short term memory and long term memory ; examining the recall of arrays of letters using dyslexic and non – dyslexic subjects .

They found that in duration produced an increase in the amount recalled , however the dyslexics performance was inferior to the control group .this was interpreted as a maturational lag in memory.

Scallown (1975) found dyslexics performance was inferior to the controls in both the processing of letters and symbols.

He concluded that dyslexics have specific limitation at the early stages of information processing

The aim of this article is to explore the nature of these short term memory deficits , and information processing models , as well as the concept of maturational lag in terms of perceptual memory skills by using both children and adult subjects.

Method .

Subjects : The main study was taken (A, B) with children and adults ; the studied used matched group design ; subjects matched on age , sex (all male) socio –economic background and intelligence . The experimental groups were individuals who had been diagnosed as dyslexic ; the control groups were average or good readers , for study a forty children were tested , twenty controls and twenty dyslexic , age range 9-11 years ; in study B 14 controls and 16 dyslexics formed the group ; age 17-24 .

Procedures : All subjects in study were given an auditory sequential memory test (WSIC or WAIC) and a visual sequential memory test (ITPA)Study A: (i) Free call . A single string of 7 random digits were tachistoscopcally presented to the subject , who was taken to write down as many as he could remember , in any order ; after presentation . 5 trials each at 0.2; 0.4; 0.7 1 and 2 seconds were given ; scoring was number ; of digits correctly recalled . (ii) Recognition. the procedure was similar to except that the subject was asked to pick out the correct string of digits

from 6 alternatives shown after presentation .Scoring was number of correct strings recognized .(iii) Partial recall .The stimulus cards consisted of an array of digits . These consisted of 3x3;3x4 , 3x5 rows of digits matrices ; and presentation were cued verbally as to which row they were required to recall.

Study B : Serial learning task on a memory drum .This consisted of ten three letter nonsense syllables (cvc) of high association value .These syllables were presented in conjunction with a number cue. The list of ten nonsense syllables took 70 secs to be presented and was followed by a 20 sec rest before the next trial . The experiment continued until the subject reached the criteria of two successively correct trials.

Results .
The dyslexic groups scored significantly less well on both auditory and visual sequential memory tests..
Study: the results for three tasks are presented in table 1.Using analysis of variance dyslexics scored significantly less well on all measures than the control groups (p_{0001}) For task (I) both groups performed significantly better with increase in exposure time (p ,05) whereas for task (I I)only the dyslexic group improved significantly with increased exposure time (,05) for task (I I I)the control group performance increases significantly with longer presentation time up to 7000 msecs , for all arrays , (p,05) however the dyslexic groups performance increases significantly only for the 3x3 array (p.01)

	Presentation time (msecs)				
	200	400	700	100	200
(i) Dys	2.24	2.82	3.08	2.98	4.14
(i)Cont	3.52	3.76	4.32	4.58	5.36
(ii) Dys	2.0	3.1	3.4	4.0	4.5
(ii) Cont	4.0	4.3	4.7	4.5	5.0
(iii) Dys % 3x3	35.2	77.8	52.1	58.2	57.9
Cued 3x4	28.3	34.1	37.8	40.2	44.
Row 3x5	24.9	24.7	22.3	28.7	35.8

(iii) Cont	**3x3**	**58.1**	**60.9**	**67.3**	**79.1**	**78.8**
% Cued	**3x4**	**49.8**	**54.7**	**61.6**	**62.1**	**66.2**
Row	**3x5**	**40.1**	**50.8**	**56.2**	**55.3**	**55.8**

Table 1: Mean correct for study A

Discussion of results.

The poorer performance of dyslexics on the sequential of symbolic information presented serially ; memory tests suggest difficulties in the retention , a key feature in reading and spelling .These features have been described by many writers and of interest here is the finding that adult dyslexics have similar difficulties , suggesting a finite difference in cognition rather a maturational lag in perceptual skills , in delaying written language acquisition in children .

In study A task (i) there is increase in performance in both groups that corresponds to an increase in presentation time of the stimuli , the performance level of the dyslexic group however inferior to that of the control group ; this would suggest that it is deficit of memory recall and not just sequential memory in the dyslexic .

Dyslexics at 200. Mesc have only just passed the level of performance of the controls at 400 mesc presentation time , it would appear ; are slower at processing the information available.

Ellis and Miles 1977 suggest that this may due to deficits in the visual information store .

In task (ii) the control group performance does not increase significantly in length of presentation time suggesting that the subjects have reached a threshold ; or maximum performance . The dyslexics , however ; show a significant increase and so on appear to reach a threshold ; but only reach the level of performance of the controls first trials (ie 200 mesc at 1000mesc)

The control group may be making greater and more profitable use of the visual Information store (Iconic Storage) . At these lower presentation times , if the information about the items and then match it against another item , if the information he has processed from the previous ; item matches

that of the new item then he recognizes it . Obviously the more information he gathers from the first item the less mistakes he will have in correct recognition, it seems that the dyslexics seem less able to process information and having a limited capacity for information and these results cannot be fully explained by maturational lag hypothesis .

In task (iii) dyslexics perform significantly less well in general on such a task than do controls , this is the same for each of the various arrays .In both groups the percentage of the cued row recalled in the 3x3 array is greater than that for the 3x4and 3x5 arrays respectively .this would suggest that each group is only able to process a limited amount of information .As the information available increases , so the percentage recalled decreases .

There seems a threshold of amount of information processed in both groups As we have seen the dyslexic performance is lower , this would indicate that dyslexics have a lower threshold for the amount of information processed .This supports the work by Ellis and Miles(1977) who have found that the dyslexics have a lower threshold or limited capacity for information .

The control group performance increases with an increase in presentation time for those times up to 700 mesc (1000 mesc in the case of 3x3 array and then levels off. The overall increases are for all arrays , possibly after 700 mesc .They are unable to take in any more information The dyslexics percentage recall increase with increase in presentation time is only significant for the 3x3 array .This suggests that for the larger arrays the greater information available and the longer time for which it available causes an information overload and thus a decrease in performance.

An interesting point of the graph for the 3x3 array for dyslexics is the peak better than controls at 400mesc Stanley (1977) has found that dyslexics have a greater persistence of visual information storage .He estimates this to be 30-50% longer than non-dyslexics , which would increase the dyslexics visual information storage from 250mesc to about 400 mesc .This longer duration of visual information storage might cause the peak observed , as subjects would have a longer time in which to read off the information after cueing .In the 3x4 and 3x5 arrays the information threshold has been reached and the extra information may cause interference . Taking three tasks together ; it appears that dyslexics have poorer performance on the

recall task ; whereas in the recognition task the main feature was poor visual information storage; and increased presentation time improved their performance , whereas the control group seemed at maximum performance .Further increase in presentation time would investigate the possibility that the dyslexics were poorer , and in this case , although poorer at visual information storage generally ; if they showed greater persistence would have improved performance when the stimulus array is below their capacity .

Maturational lag is not sufficient to account for the results obtained and they could be explained by a limitation of information capacity. While both groups appeared to have a limitation of information capacity , dyslexics had a smaller capacity hence their poorer performance on memory tasks . This would also explain their poor memory for sequence. The sequence of an array of items contains information, if dyslexics have a smaller information capacity they may not use the information of the sequence; or they may not use it fully hence poor sequential memory.

Conclusion. In general suggest an individual difference in memory processes , and in written language learning one would want to take account of these differences .In simple terms the dyslexic would need a much longer exposure to written language learning ; with considerable over learning and over teaching .There are however some more specific implications . In the recall task, and the sequential memory tests , increased presenting exposure time is of limited value. Here one would suggest presenting the written language to meet the learner. For example instead of learning s-t-r-i-n-g as string six things to recall ; spelling patterns can be taught as units vis .str+ing two elements to recall .Sound /symbol correspondence would need considerable over learning and use of mnemonics ; and the recognition results would suggest that word patterns and letter recognition will require special teaching –possibly as whole or using multisensory techniques .

Finally the recognition of the specific difficulties dyslexic individuals have is of primary importance, both in terms of understanding the problem , as well as planning appropriate teaching.

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