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The Psychology of Reading: Temporal Processing and Reading

A thesis submitted in fulfilment of the
requirements for the award of the degree

Doctor of Philosophy

from

UNIVERSITY OF WOLLONGONG

by

Agnes Au, B.Sc. (Hons.)

Psychology Department

1997

SOURCES STATEMENT

The present thesis describes original research undertaken in the Department of Psychology, University of Wollongong. To the best of my knowledge and belief, any theories and techniques not my own have been acknowledged in the text. The theoretical contributions in this thesis are my own original work and the thesis has not been submitted for any other degree to any other university or institution.

Agnes Au

December, 1997.

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ABSTRACT

Dyslexics exhibit visual and auditory temporal processing deficits and these have been attributed to some abnormality in their sensory systems specialising in processing rapidly presented stimuli - transient systems. As a result, a generalised temporal processing deficit across modalities has been hypothesised. Research also shows a relationship between auditory temporal processing deficits and phonological deficits (deficits in reading nonsense words) and it is suggested that visual temporal processing deficits may be related to deficits in reading irregular words (Farmer & Klein, 1995). In addition, it has been argued that the sustained visual system is involved in reading singly presented words whereas the transient visual system is involved in reading continuous presented text (Hill & Lovegrove, 1992).

Therefore, this thesis investigated in normal readers: 1) whether there is a common temporal processing mechanism across vision and audition; 2) the relationship between auditory temporal processing and nonsense word performance, and between visual temporal processing and irregular word performance; 3) the role of the sustained and transient visual systems in reading single words and continuous text; and 4) whether good readers exhibit better temporal resolution than normal readers.

Results are suggestive of a common temporal processing mechanism across modalities. Visual temporal processing is related to irregular words whereas auditory temporal processing is related to nonsense words. The transient visual system is involved in processing continuous text whereas the sustained visual system is involved in processing single text. "Nonsense word" readers who had better phonological skills tended to perform better in the auditory tasks but "irregular word" readers who had

better whole-word skills did not perform better in the visual tasks. However, once IQ was controlled, the relationship between auditory temporal processing and nonsense words remained but the link between visual temporal processing and irregular words was not found. Similarly, the differential effect of the transient and sustained visual systems in different text presentation was not found when IQ was controlled. Good readers exhibited better auditory temporal resolution and a trend for a faster transient visual system. Although good readers and “nonsense word” readers excelled in the auditory tasks, choice of reading strategies was independent of reading proficiency. Temporal processing was an effective discriminant for good and normal readers but not for whole-word and phonological skills.

Although this experimental work refers only to “normal” readers and not dyslexics, the results are consistent with other dyslexic research. The results implicate the facilitation of phonological skills by auditory temporal perception, but the facilitation of whole-word skills is unrelated to visual temporal perception. This corroborates other research (e.g., Tallal & Stark, 1982) in that temporal processing deficits may only appear in dyslexics who have phonological deficits and that visual temporal processing deficit may be secondary to the auditory one. Consequently, dyslexic subtypes may have different sources of origin and should be considered separately.

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