THE PROPORTION OF EXCEPTION WORDS AND REGULAR WORDS IN A READING LIST INFLUENCES READING STRATEGIES IN BEHAVIOURAL AND fMRI DATA

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There has been considerable functional neuroimaging support for a dual-pathway neuroanatomical model of reading that distinguishes between a ventral whole-word or lexical stream and a dorsal sub-word or sublexical stream. The relative contribution of these two streams while participants read aloud familiar stimuli, however, still remains unclear. This study investigated the relative involvement of the dorsal and ventral streams during reading of highly familiar stimuli by manipulating the proportion of regular words (REGs; stimuli that can be correctly processed by both ventral and dorsal streams) and exception words (EXCs; stimuli that can only be correctly processed by the ventral stream). The behavioural evidence supported modulation of lexical and sublexical pathway contributions. Specifically, when 75% of the words were REGs, both lexical and sublexical information were utilized, as evidenced by the fast reaction times and increased errors for EXCs. In contrast, when 75% of the words were EXCs, participants minimized sublexical processing, as evidenced by fast reaction times and decreased errors for EXCs. Neuroanatomical evidence provided further support, such that reading a REG-predominant list induced recruitment of both ventral and dorsal stream regions, while reading an EXC-predominant list induced recruitment of the ventral stream and the additional employment of a phonological lexical check (via BA6) as response modulation. These results support parallel operation of the dorsal and ventral stream and provide evidence that the extent to which each stream contributes to reading can be modulated

Figure 1. Ventral stream associated areas in yellow and dorsal stream-associated areas in blue. 1. BA6 2. Temporoparietal junction (supramarginal gyrus, angular gyrus, posterior superior temporal gyrus). 3. Inferior occipitotemporal region. 4. Middle and inferior temporal gyri.