COGNITIVE PROCESSES UNDERLYING CHINESE CHARACTER AMNESIA: ORTHOGRAPHIC DECAY IN SEMANTIC AND PHONETIC RADICALS

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The digital age has witnessed handwriting being replaced by digital typing as a primary mode of communication, leading to a decline in handwriting literacy. This is especially worrying for writing systems that are visually complex such as Chinese, where people often have difficulty in orthographic retrieval in handwriting characters (i.e., character amnesia) [1]. While character amnesia is well-documented [2], the cognitive processes leading to its occurrence remains unclear. Recent studies have highlighted the importance of semantic and phonetic radicals in character processing [3]. In this study, we further explored whether incomplete orthographic activation in semantic and phonetic radicals contributes to character amnesia by conducting three experiments employing a priming paradigm. In Experiment 1 (73 participants and 96 target items), participants were cued with a semantic radical, phonetic radical, or an unrelated radical, then handwrote a character according to a dictation prompt (e.g., 点滴的滴 /*dian*$_3$*di*$_1$*de*$_1$*di*$_1$/, meaning “droplet from the word tiny-droplet”) and self-reported their handwriting as a correct, character amnesia, or incorrect response. In an LME model controlling for prime character stroke number, prime character frequency, semantic relatedness and sound similarity between the prime and target character, we found that, compared to unrelated radicals, phonetic but not semantic radicals significantly reduced character amnesia responses (phonetic vs. unrelated: β = -0.47, *SE* = 0.13, *z* = -3.64, *p* < 0.001; semantic vs. unrelated: β = -0.16, *SE* = 0.12, *z* = -1.40, *p* = 0.162); phonetic radicals also helped to reduce character amnesia compared to semantic radicals (β = -0.31, *SE* = 0.13, *z* = -2.36, *p* = 0.018). Experiment 2 aimed to replicate Experiment 1 (71 participants and 96 items), with the exception that participants were shown the target character before self-reporting on their handwriting in order to ensure self-report accuracy. Here, compared to unrelated radicals, both phonetic and semantic radical significantly reduced character amnesia responses (phonetic vs. unrelated: β = -0.55, *SE* = 0.15, *z* = -3.64, *p* < 0.001; semantic vs. unrelated: β = -0.50, *SE* = 0.12, *z* = -4.01, *p* < 0.001) and we did not find a difference between phonetic and semantic radicals (β = -0.05, *SE* = 0.20, *z* = -0.27, *p* = 0.787). In Experiment 3 (105 participants and 69 target items), we further examined whether semantic relatedness could inhibit orthographic retrieval [4]. The results showed that same semantic radical with semantically-related between the prime and target character (R+S+) and same semantic radical without semantically-related between the prime and target character (R+S-), significantly reduced character amnesia responses (R+S- vs. R-S-: β = -0.29, *SE* = 0.11, *z* = -2.68, *p* = 0.007; R+S+ vs. R-S-: β = -0.38, *SE* = 0.09, *z* = -4.19, *p* < 0.001; R+S+ vs. R+S-: β = 0.03, *SE* = 0.12, *z* = 0.25, *p* = 0.806). The findings that phonetic/semantic radical priming reduces character amnesia and the semantic relatedness does not suppress orthographic retrieval suggest that character amnesia is likely due to incomplete orthographic activation of radicals, which is in line with the incomplete activation account for Tip-of-Tongue [5]. Alongside the existing handwriting model [6], we introduce a new sub-lexical route for the semantics to orthography conversion. People could also utilise the importance of radicals in language teaching to better reserve handwriting literacy.

References

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