Lexical frequency and the processing of morphologically-complex words

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Previous studies have found evidence of lexical decomposition in morphologically-complex words; however, the majority of these studies has only included low frequency words (Longtin, Segui, and Halle, 2003; Rastle, Davis, and New, 2004). McCormick, Brysbaert, and Rastle, (2009) tested the effect of lexical frequency on lexical decomposition by looking at both low and high frequency words in a masked priming experiment. The results found no effect of lexical frequency on response time. While this result is expected for models of routine decomposition such as Baayen, Dijkstra, & Schreuder (1997), it is unexpected for certain dual-route models, which predict a difference in priming effects between low and high frequency words, with either absolute or relative frequency (Portin et al., 2008; Hay, 2001). The purpose of my study is to explore further the effect of frequency on lexical decomposition.

The stimuli and procedure described below follow as closely as possible the work of McCormick et al. (2009). First, a set of target and primes was created. Each target had a corresponding pair of primes, where one was morphologically related and the other morphologically unrelated. Relative lexical frequency was determined by comparing the absolute lexical frequency of the target and absolute lexical frequency of the prime, where lexical frequency was determined via CELEX (Baayen, Piepenbrock, & van Rijn, 1993). As was done in McCormick et al. (2009), when the prime was at least 2 times more frequent than the stem, it was described as high frequency and when the prime was no more than half as frequent as the stem, it was described as low frequency. Morphologically-complex pseudoprimes (non-words) that were derived from the stems were also included.

59 participants (all English speakers and at least 18 years of age) took part in a lexical decision task. The experiment was run using PsychoPy, (Pierce, 2007). Participants were seated in front of a computer. A forward mask appeared for 500ms, followed by either a related or unrelated prime for 42ms. The target word was then presented and stayed on the screen until the participant decided whether it was a real English word or not by clicking one of two keys on the keyboard. Response time (RT) and response accuracy were recorded.

The data were analysed using a mixed effects model in R (R Core Team 2016), with RT as the dependent variable. Contradicting the results of McCormick et al., (2009), where there was no effect of lexical frequency on response time, the current study found that response time for related target and prime pairs was statistically significantly faster in the relative high frequency condition as opposed to the relative low frequency condition. These contradictory findings are important as they indicate the need for further research to determine the role of lexical frequency on morphological processing. These results seem to refute the possibility that decomposition is a routine process regardless of lexical frequency (McCormick et al., 2009) and indicate that the effects of decomposition can be seen in low frequency words and not in high frequency words as suggested by models supported by Portin et al. (2008) and Hay (2001).

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