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The Processing Cost of Negation in Sentence Comprehension: Evidence from Eye Movements

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This study investigated the processing cost associated with negation using eye-tracking methodology. Three forms of negation, namely prefixal negation (prefix *un-*), sentential negation (negator *not*) and double negation (*not un-*) along with the base form (no negation) were compared. The stimuli consisted of 20 sets of negated adjectives such as *intentional* vs. *unintentional* vs. *not intentional* vs. *not unintentional*. The comprehension of these negated forms was tested through a congruent or incongruent subsequent context (e.g., If the evidence shows that the fire in the school was *unintentional*, the jury will find the headmaster *guilty/innocent* in court). The eye movements of 25 native speakers of English were recorded and analyzed. The results suggest that negation does not affect early processing or involve any early carry-over effects to the subsequent context as indicated by the insignificant differences in first-pass reading times on the negated adjectives and on the subsequent context. Moreover, no effect was found in the dwell time on the congruent/incongruent word. However, the results of the analysis on the proportion of regressions back to the negated adjectives suggest that participants had difficulty in processing and made more regressions to adjectives with double negation (*not un-*), sentential negation (*not*) and prefixal negation (*un-*) in that order. This was further supported by the dwell time analysis on the negated adjectives. The dwell times were significantly longer for the three negation forms *not un-*, *not* and *un-* in that order. This could suggest that in order for the sentences to be verified, participants had to go back to the negated forms and further process negation. The results provide further support for the processing difficulty associated with negation, suggesting that negation disrupts processing at a later stage in the integration of information. In addition, the results suggest that prefixed words are also a form of negative and involve a processing cost compared with the base form. However, prefixed forms are not as difficult as sentential negation and double negation.

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