

Phonological overlap in German affects English lexical processing in German-English bilinguals

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Ambiguous words range from having unrelated meanings (e.g., German *kiefer* denotes pine trees and jaws) to having related meanings (German *Rad* denotes wheels and bicycles). While ambiguous words with unrelated meanings share only a phonological form, the representation of ambiguous words with related meanings is unclear.^{1,2} In addition to a common phonology, do ambiguous forms with related meanings share further representations?

Cross-linguistic variation provides a tool for examining this question because words that are ambiguous in one language are often unambiguous in another. For example, while *kiefer* and *rad* each designate two meanings in German, separate lexemes are needed in English. Research on bilingual language processing shows that representations from the task-irrelevant language nonetheless become active during comprehension, independent of L2 proficiency.^{3,4,5} We examined the representation of ambiguous word-forms with related and unrelated meanings by testing German-English bilinguals and English monolinguals on words like *jaw* and *bicycle*, whose German translations are ambiguous.

German-English bilinguals (N = 14) and English monolinguals (N = 14) participated in a visual search task. Each trial began with a written English cue, followed by an array of four pictures. The participant clicked on the referent of the cue (the target) or indicated that it was absent. Cues were chosen such that their German translations were ambiguous, and the alternate German meaning ranged from completely unrelated to clearly related to the cue. On critical trials, the target was absent, and a distractor matched the alternate meaning of the German translation (e.g. a picture of a wheel following the cue *bicycle*). We reasoned that more interference from these competitors (compared to unrelated controls) for the Germans would indicate the activation of German lexical representations of ambiguous meanings. Of particular interest was the interaction between language group and semantic relatedness in creating interference. While more interference for the Germans (compared to the English speakers) on the semantically-unrelated competitors would indicate that phonological overlap between German ambiguous meanings had influenced L2 processing, a larger difference between the language groups on the semantically-related competitors would indicate that related German ambiguous meanings overlap beyond the phonological level.

We analyzed accuracy using a linear mixed-effects regression with language group, semantic-relatedness, and competitor/control presence as predictors (Figure 1). There were significant main effects of semantic-relatedness ($p < .01$) and German phonological overlap (competitor vs. control, $p < .01$), and these factors interacted with language group ($p < .05$). While both language groups experienced interference from competitors that were semantically-related, only German-English bilinguals experienced interference from semantically-unrelated competitors. Similar patterns emerged in participants' fixations during the visual search task (Figure 2). These results suggest that phonological overlap between ambiguous words in German created interference for German speakers even while processing English. However, these results do not indicate common representational bases beyond the phonological level for the ambiguous words with related meanings we tested.

Figures

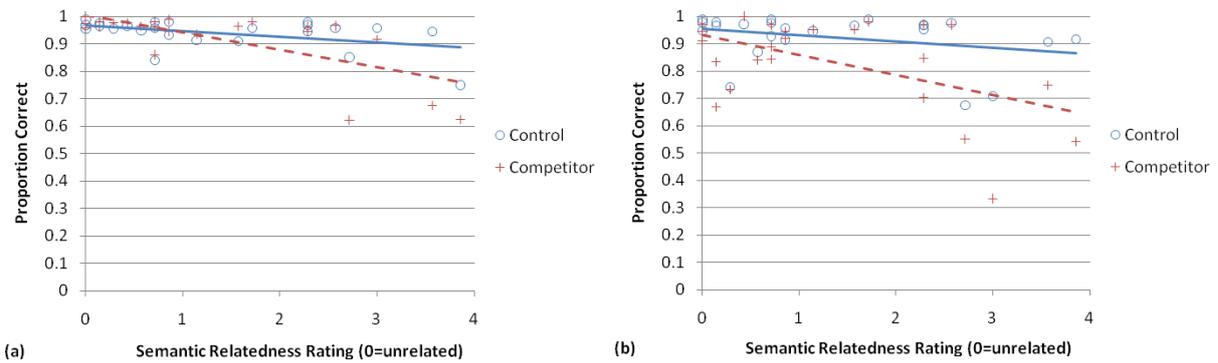


Figure 1. Accuracy for English monolingual (a) and German-English bilingual (b) participants. Competitor-present trials are shown in red and control trials in blue. Accuracy decreased as semantic-relatedness increased ($z=2.667$, $p<.01$), accuracy was lower on competitor-present trials ($z=4.474$, $p<.01$), and there was a significant interaction between these factors ($z=2.862$, $p<.01$), and a further three-way interaction with language group ($z=2.487$, $p<.05$).

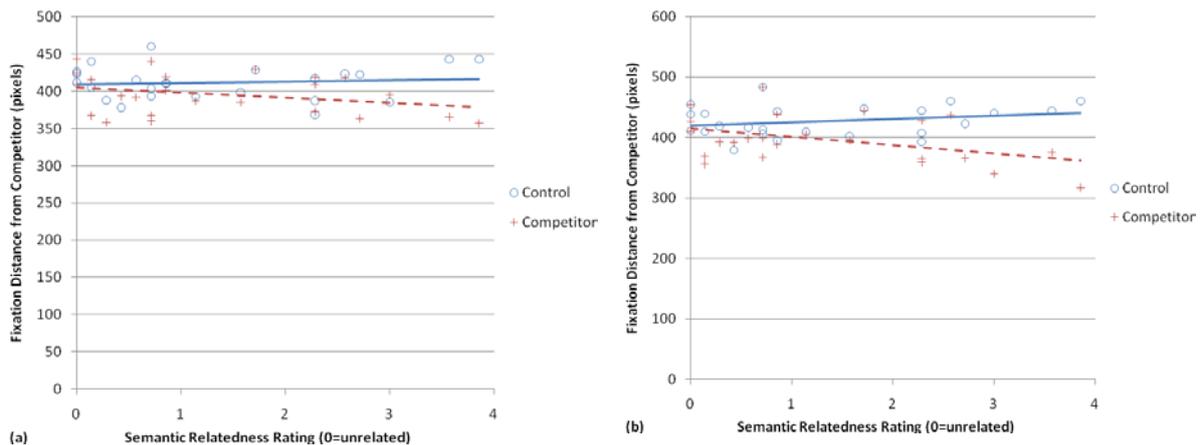


Figure 2. Average fixation distance from the center of the competitor image, on a 800 x 600 pixel display, for English monolingual (a) and German-English bilingual (b) participants. Average fixation locations were closer to the competitor image than control images ($t=4.004$, $p<.01$), and this effect was marginally larger for bilingual participants ($t=1.739$, $p<.1$), and significantly increased as semantic-relatedness increased ($t=2.721$, $p<.01$).

References

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