Magical words and where to find them: Effects of domain knowledge on word processing

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Background: Models of visual word recognition assume that experience influences how we process words. The more often we encounter words or letter combinations, the faster they are retrieved from the mental lexicon (e.g., [1]). In line with that, it has been shown that language experiences within a circumscribed knowledge domain can have a positive effect on word processing for words that are typical in that domain (e.g., [2, 3]). However, the mechanisms underlying this facilitation effect are not well understood as knowledge effects are typically confounded with other person variables. In the present study, we investigated how knowledge about Harry Potter affects word processing and how specific these effects are (see also [4–7]). In two large samples, we measured how familiar participants were with the Harry Potter universe using a knowledge test. In addition, participants worked on a lexical decision task using words occurring frequently in the Harry-Potter books but seldom in other books and vice versa. Analyses aimed at disentangling the effects of Harry-Potter domain knowledge, age, and overall print exposure.

Method: Two studies were conducted in the context of a science dissemination activity. Participants (N=320 and N=480; age range: 6-75 years, M=27, SD=17 years) were administered a lexical decision task and a Harry-Potter test. The lexical decision task consisted of 40 words and 40 non-words. In Study 1, 20 of the words were words that are highly frequent in the Harry Potter books (> 80/mio.) but infrequent in other books (< 10/mio.; e.g. *owl*). The other 20 words were infrequent in the Harry Potter books but highly frequent in other books (e.g. *detective*). In Study 2, the frequency in the Harry-Potter and non-Harry-Potter books was manipulated independently. The Harry-Potter test comprised seven multiple-choice items each assessing knowledge about one of the Harry Potter books. The questions were constructed in a way that they could only be answered if you had read the books, but not by seeing the films. The internal consistency of the resulting scale was very good (α = .85).

Results: Participants varied widely in their Harry-Potter knowledge (M=3.7, SD=2.5). We used participants'Harry Potter knowledge and word type (Harry-Potter-word vs. non-Harry-Potter word) as predictors in a (generalized) mixed-effect model while controlling for age and general print exposure. In Study 1, we found significant interactions between word type and Harry-Potter knowledge in both response accuracy and response time. Participants with low Harry-Potter knowledge had problems to respond to Harry-Potter- but not non-Harry-Potter words (see Figure 1). Study 2 replicated these effects and showed that the processing advantage was specific for Harry-Potter words as Harry-Potter knowledge did not moderate frequency effects for non-Harry-Potter words (s. Figure 2).

Discussion: Results from both studies showed that participants who are more familiar with the Harry-Potter books showed processing advantages for words that frequently occur in Harry-Potter books. Importantly, these effects were highly specific and occurred only for those words that are frequently encountered in Harry Potter books, but not in other books (e.g., *broom, cauldron*). By contrast, words that are frequent in Harry Potter and in other books at the same time (e.g., *parents, dream*) were not affected. In addition, the effect was only connected to participants' experience with Harry Potter books. Both age and general print exposure did not affect the processing of Harry-Potter words, although they moderated frequency effects in non-Harry-Potter words. Overall, our findings indicate that the effects of domain knowledge are highly content-specific and closely tied participants'reading experience. This highlights the need to better approximate participants'cumulative language input in behavioural studies and to incorporate knowledge differences in models of lexical processing (see also [8]).

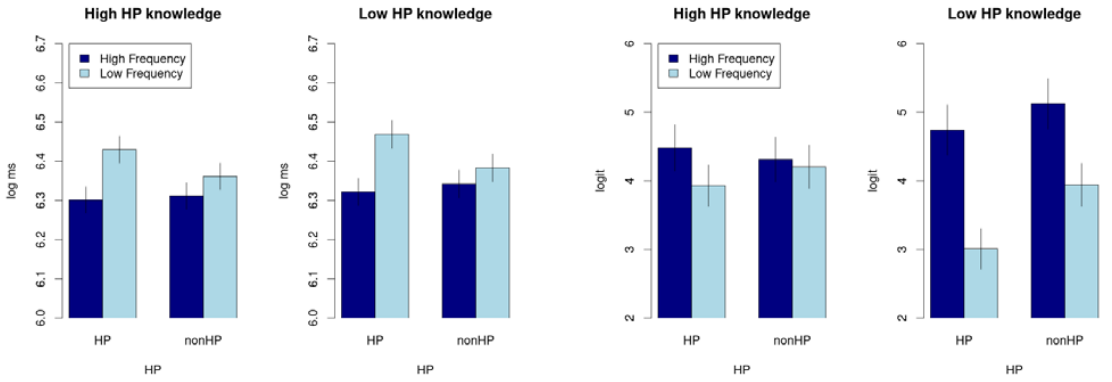

Figure 1: Interactions between Word Type and Harry-Potter knowledge in Study 1 for a) response accuracy and b) response time.

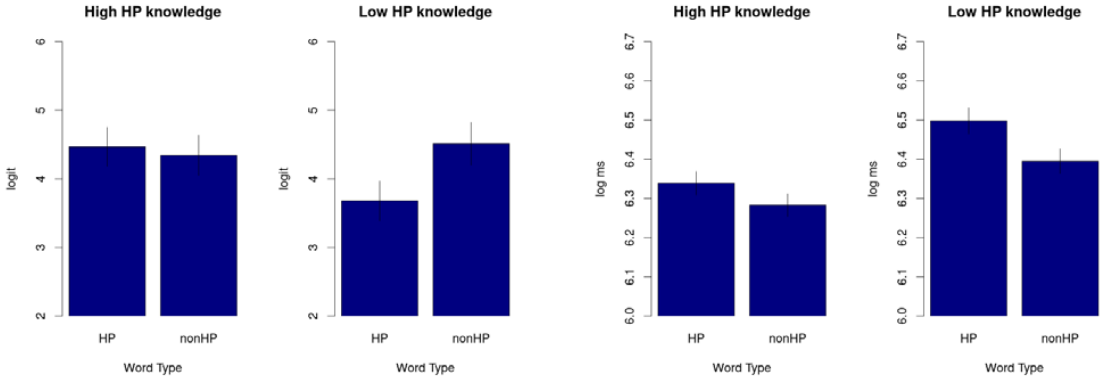

Figure 2: Interactions between Word Type and Harry-Potter knowledge in Study 2 for a) response accuracy and b) response time.

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