The role of morphemic knowledge during novel word learning

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It has been reported that the processing of morphologically complex words differs depending on the morphological family size of the words' constituents (De Jong et al., 2000), that is, the number of morphologically complex words in which a word constituent (or morpheme) such as a stem or a suffix occurs (i.e., family size). Word constituents have a large family size if they are embedded in many morphologically complex words (e.g., *acid* occurs in *acidity*, *acidify*, *acidifier*, etc.) and a small family size if they are embedded in few morphologically complex words (e.g., *skull* occurs in *skulls*, *skullcap*). Studies have shown that word constituents from large family sizes are recognized faster and more accurately (e.g., De Jong et al., 2000). In addition, it has been reported that learners benefit from morphological family size when learning novel affixes (e.g., *-nept* in *sleepnept*; Tamminen et al., 2015).

In the present study, we investigated whether family size also facilitates the acquisition of morphologically complex words that consist of two novel morphemes. This would show whether facilitation occurs without benefiting from pre-existing vocabulary knowledge.

We addressed this question by investigating the effect of the morphological family size of stems on novel word learning and recognition. In addition, we examined whether learners can extract a trained stem from an untrained context. To this end, two sets of novel words containing a stem and a suffix were created and divided into a large stem family size condition (i.e., 4 stems × 4 suffixes = 16 words) and a small stem family size condition (i.e., 4 stems × 2 suffixes = 8 words). A meaning was assigned to each of the novel stems and suffixes. The stems were used to refer to a noun and the suffixes to further specify the noun (e.g., *farsh* + *erp* = *red fish*). Half of the participants were trained with Set 1 and the other half with Set 2. Fifty native speakers of English participated online in a written novel word learning paradigm. In the training phase, participants were presented with two pictures and a novel written word. Participants were asked to associate the novel word with either of the pictures using a keyboard button. Upon pressing a button, they received a feedback regarding whether or not their response was correct.

In the post-training phase, participants performed a recognition task in which they were presented with novel words consisting of a trained stem and trained suffix, a trained stem and untrained suffix, or an untrained stem and untrained suffix. Participants were asked to decide if the presented items were trained or untrained using a button press response.

To examine the effect of morphological family size, responses to novel words containing a trained stem and an untrained suffix were analyzed. The results showed a significant effect of the family size of the stems on response accuracy (β=-0.8, *SE*=0.4). Participants found it harder to reject items containing stems with a large morphological family compared to stems with a small morphological family. However, the effect of family size on response times was not significant (β=$6.1*10^{-5}$, *SE*=$3.3*10^{-5}$; see Figure 1).

In addition, to examine whether the participants were able to extract trained stems embedded in untrained novel words, responses to novel words containing a trained stem and untrained suffix and novel words containing an untrained stem and untrained suffix were compared. Participants' responses were slower (β=$1.74*10^{-4}$, *SE*=$2.5*10^{-5}$) and less accurate (β=-1.9, *SE*=0.3) to novel words made of a trained stem and untrained suffix than to novel words made of an untrained stem and untrained suffix. These results suggest that participants were able to rapidly identify the trained embedded stems which made it more difficult to respond 'no' (see Figure 2).

The current findings suggest that participants benefited from morphological family size. Specifically, participants could extract the trained stems with large family size more rapidly than the stems with small family size.

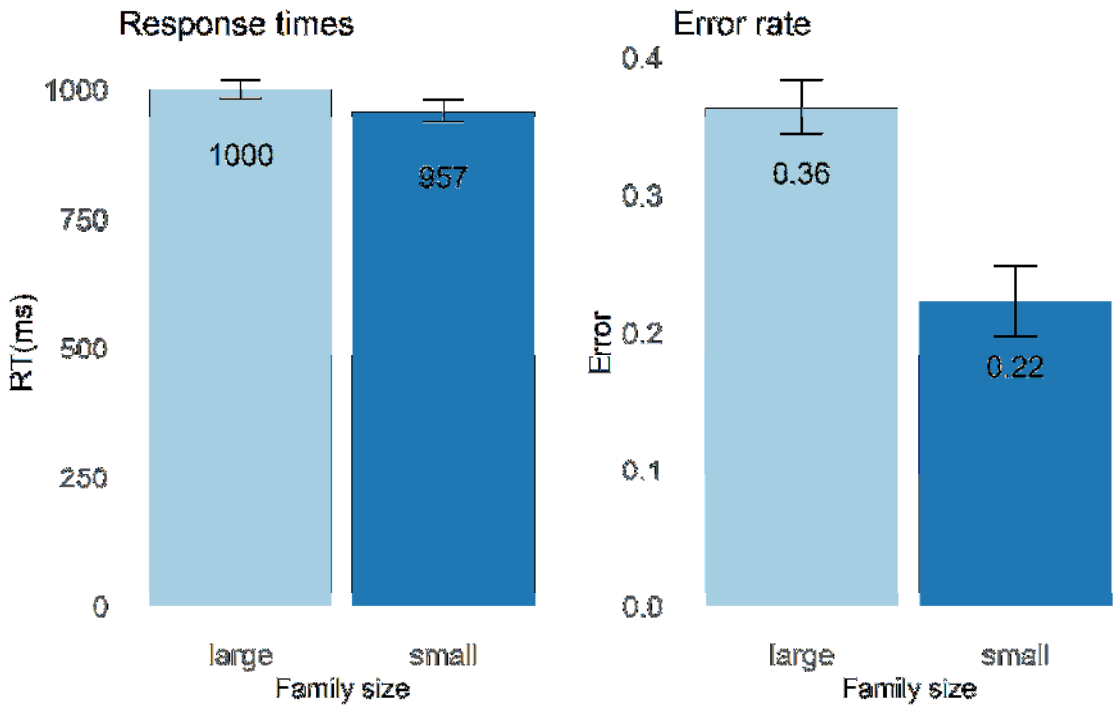

Figure 1. *The effect of morphological family size on response times and error rate (trained stem – untrained suffix)*

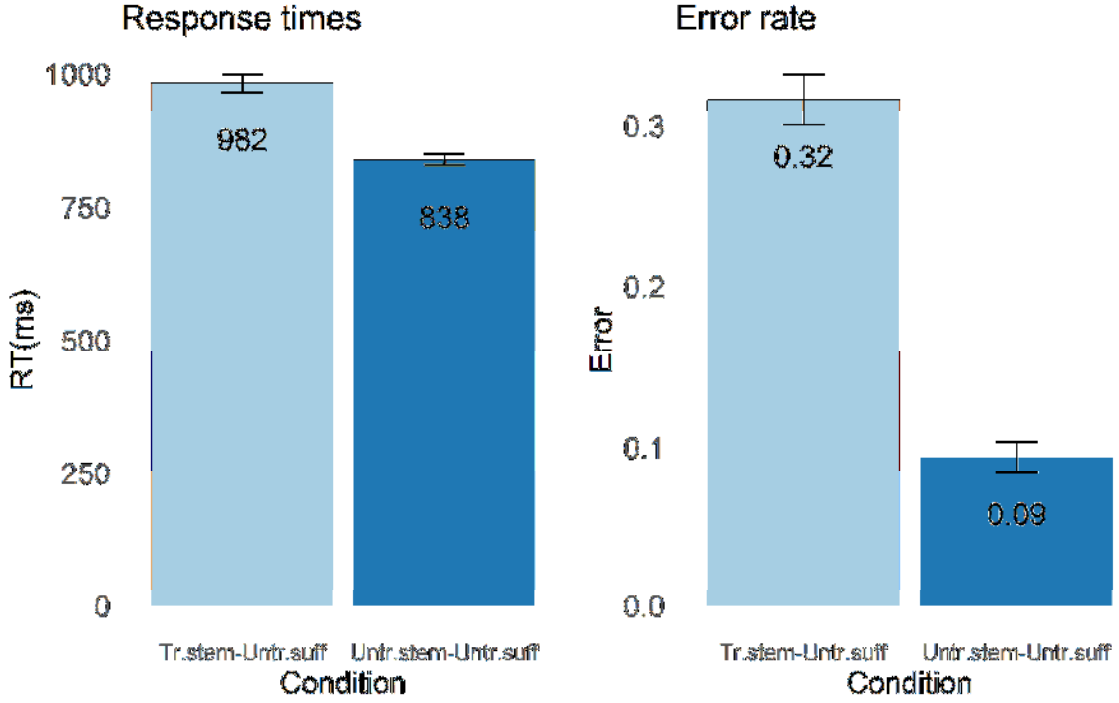

Figure 2. *The effect of condition on response times and error rate (Trained stem-untrained suffix vs. untrained stem-untrained suffix)*

References

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