

Investigating the phonological processing of morphologically complex words  
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A handful of studies have suggested that morphological structure can have gradient effects on phonetic implementation, with articulations tending to be more variable and phonetic rules tending to underapply across morpheme boundaries (e.g., Cho, 2001; Hay, 2003). Based on these findings, we propose the Weak Bonding Hypothesis (WBH), which states that phonemes in adjacent morphemes are more weakly ‘bound’ together in phonological representations than phonemes in the same morpheme. In this paper, we further investigate the effects of morphological structure on phonological/phonetic processing, specifically examining how morphological structure affects duration and vowel space. We find mixed evidence for the WBH.

Sugahara and Turk (2009) found that in Scottish English, rhyme duration is longer in monomorphemic words than in multimorphemic words (paced > paste). While this pattern is consistent with the WBH (e.g., the suffix phoneme fails to trigger compensatory shortening/triggers pre-boundary lengthening, processes that are claimed to be universal), it could also be an artifact of the Scottish Vowel Length Rule, which lengthens vowels preceding morpheme boundaries. We replicated Sugahara and Turk’s experiments with speakers of American English, but were unable to reproduce the effect in two separate experiments. This suggests that rhyme duration may not in fact be generally affected by morphological structure.

In Study 3, we examined the effect of morphology on vowel space. Munson and Solomon (2004) showed that vowel space varies as a function of frequency and neighborhood density. We tested whether the vowel space of suffixed words is similar to that expected of the whole word, or similar to the vowel space expected of their roots. Stimuli included words that are likely to be morphologically decomposed (words where the root is more frequent than the whole word) and words that are more likely to be processed as wholes (words where the whole word is more frequent than the root; Hay, 2003). The results show that the vowel space of suffixed words corresponds to the vowel space of the root rather than the whole word, indicating that phonemes in suffixes do not contribute equally to phonological activation. Though the phonemes in the suffix are clearly active and could contribute to phonological neighborhood density, they appear not to at this stage. This is consistent with the WBH in that these phonemes may not be fully integrated into the phonological representation at this stage, and as a result do not play a role in activating lexical neighbors.

The three studies presented here provide mixed results for the WBH. In studies 1 and 2, we found that rhyme duration is not impacted by morphological composition. In contrast, in study 3 we found that vowel space is impacted by morphological composition. One interpretation of the results presented here is that heteromorphemic phonemes are weakly bound during the stage of processing at which vowel space is calculated, but are strongly bound at the stage during which rhyme duration is established. While it is possible that future research may either entirely confirm or disconfirm the WBH, it is also possible that morphemes are weakly bound in phonological representations at some stages of processing and not at others.

*Keywords:* phonology, morphology, multimorphemic words

## References

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