Stressing the Contents of the Speeded Naming Response

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Cognitive psychologists use reaction time primarily to infer processing load and develop theories of mental architecture and dynamics. Speeded naming latencies are a prime example: A number of perceptual and/or cognitive representations are active during the time between a stimulus presentation and the onset of a naming response, and the processing of these representations presumably affects the amount of time to generate a response. Of course, this logic also entails that the contents of a naming response also reflect processing. However, whereas researchers strive for millisecond accuracy in measuring naming latencies, they usually collect only a coarse measure of naming content: Proportion of subjectively judged errors. This study examined the contents of the naming response for quantitative influences of lexical (e.g., orthographic and phonological) processing.

The particular area of focus was naming responses to printed words. All recent models have been cast in a connectionist framework to some extent, despite their underlying theoretical differences (Coltheart, Curtis, Atkins, & Haller, 1993; Kawamoto & Kitzis, 1991; Plaut, McClelland, Seidenberg, & Patterson, 1996). Moreover, they share a common feature of processing that the connectionist framework offers (but does not require): A continuous output function on the processing units. This means that all models will potentially show activation distributed across alternative pronunciations early in the time course processing (and possibly later as well). Despite this fact, output generation is categorically based on only one alternative pronunciation.

We can see this as a statement about the relation between output representations and articulation; namely, that the contents of a naming response do not reflect lexical representations in a graded manner. Let us refer to this as the *discrete naming* hypothesis. The alternative hypothesis, *blended naming*, states that naming responses can actualize the distribution of lexical activation through continuous sampling in articulatory space.

This study tested the competing hypotheses by priming bisyllabic target words with visually presented bisyllabic primes. Blended naming predicts that articulations can fall between competing stress patterns (i.e., when the prime conflicts in stress with the target). Discrete naming predicts that such a conflict can only cause an increase in naming latency or a complete stress error. To test these predictions, this study implemented acoustic waveform algorithms based on previous work (Mermelstein, 1975; Rabiner & Sambur, 1975) to automatically calculate three stress correlates.

To induce conflicting stress patterns, three experiments primed printed targets with printed bisyllabic words that either conflicted (e.g., the target *conclude* primed with *prelude* (GP) or *seafood* (PH)) or overlapped with the target's stress pattern (e.g., *conclude* primed by *garage* (control)). Overall, the results supported a blended view of naming response generation. First, acoustic measures were validated by correlating with citation stress. Second, naming latency did not show any affect of the prime. Third, target articulations showed reliable acoustic signs of bending towards the prime stress pattern, even though subjects did not name or respond to the prime. Lastly, the prime affected articulations more when both orthographic and phonemic structure overlapped with the target (compared to just phonemic), suggesting that lexical processing played a significant role in the effects.

The results speak to how articulation (and other behaviors) reflects cognitive processing, and in turn, they encourage naming models (and hopefully other cognitive models as well) to explicitly state how representations translate to on-line behavior. Finally, they suggest that the contents of articulation, rather than their timing, may provide a more direct reflection of lexical processes, and therefore a valuable source of evidence for model builders.

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