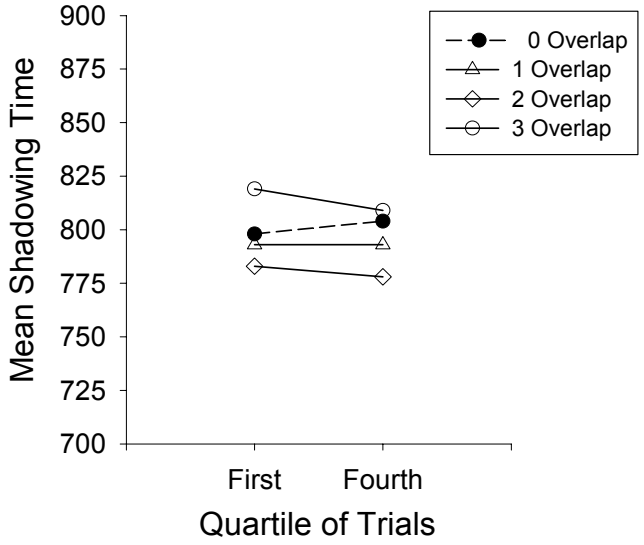
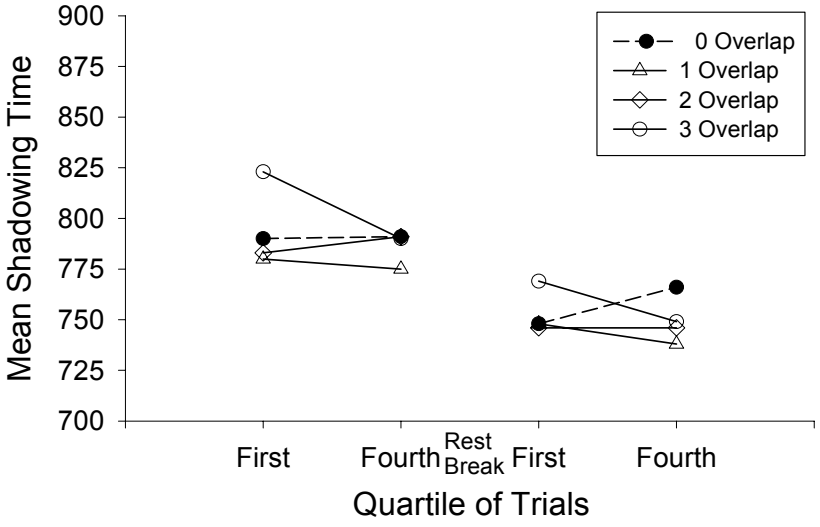
Additional Analyses from Pitt and Shoaf (in press)

General-purpose test of strategic effects

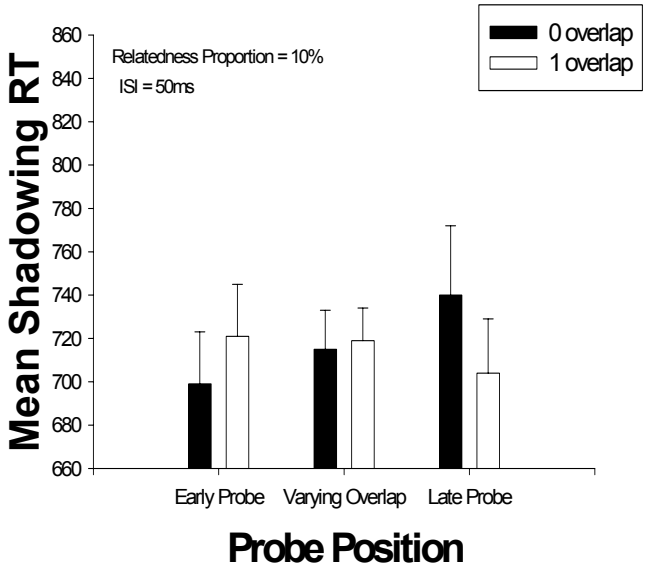
An easy test for response bias effects in an experimental setup is to compare RTs in all conditions in the first and last quartile of data in the testing session. Below are graphs of two such tests using the data from Experiments 1 and 2. The 3-overlap RTs consistently decrease from first to fourth quartile, and the 0-overlap RTs remain constant or increase. Changes in effect size like this can be an indication that response biases are present and might warrant running a probe-position experiment to yield a more conclusive answer.

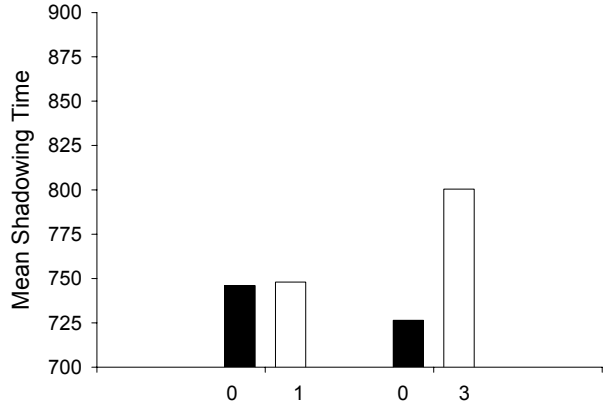




Replication of Experiments 3 and 4 using 1-overlap prime-target pairs

The two graphs below are from replications of Experiments 3 and 4 using 1-overlap word pairs instead of 3-overlap word pairs. The second graph also contains the data from Experiment 4. In brief, a response pattern similar to that found in Experiment 3 is evident in the top graph, though there are some differences. Also note that the slowdown in the early probe position in the top graph does not replicate in the bottom graph, where the experiment ended after trial 37, the first 1-overlap trial. Email me if you want to read a longer write-up of these data.



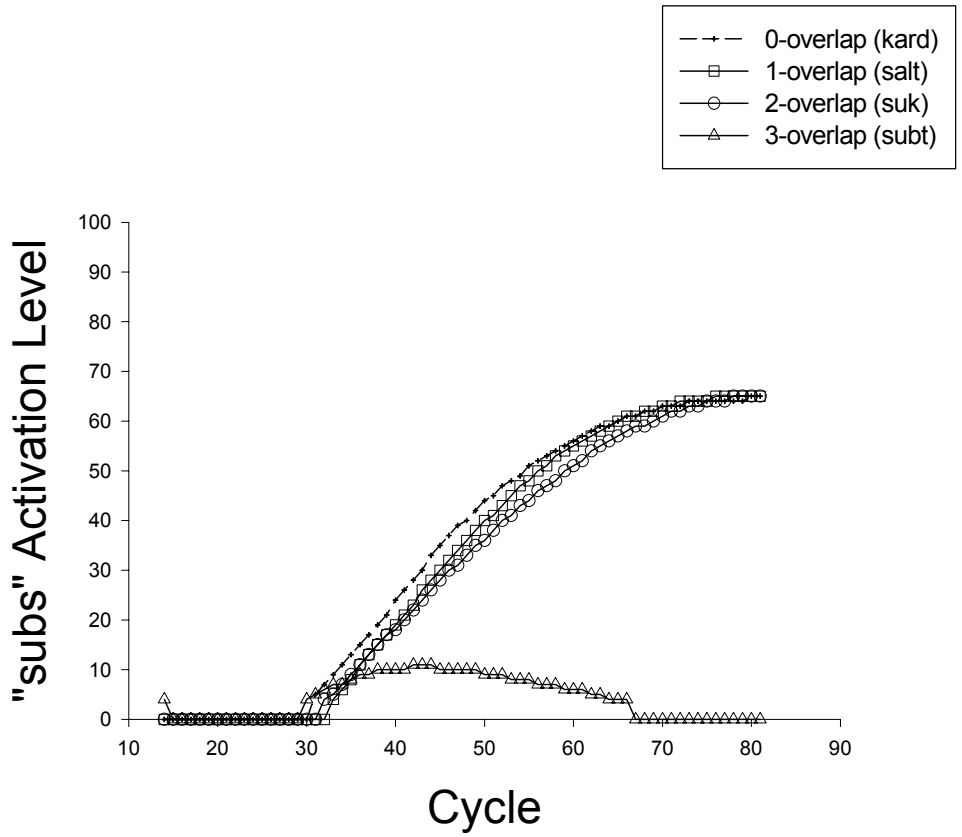


TRACE simulations of word-initial phonological priming

In interactive activation models of phoneme processing, do primes varying in phoneme overlap with a subsequent target cause an increase in activation of the target when the word pair overlaps by one or two initial phonemes, but a decrease in activation when the overlap extends to three phonemes (Slowiaczek & Hamburger, 1992)? We tested this proposal by running the following TRACE simulation.

Priming assumes activation carries over from the last word, so the activation value of the prime (and other members of the overlapping cohort) was adjusted depending on the amount of overlap between prime and target, with the 1-overlap prime having the least (.02) and the 3-overlap prime the most (.06). The silence character (#) was included in the input so that there was a word boundary before target onset. Default values were used for all other parameters.

As overlap increased, activation of the target word ("subs") decreases in the middle of the activation cycle. For 3-overlap primes, the drop is most severe and permanent, with the target never rising again in activation level. Strong inhibition from the prime and its cohort are responsible for this. For the 1- and 2-overlap primes, activation asymptotes at the same level as the 0-overlap prime, but at no point does the activation level of the target exceed that of the 0-overlap prime. This pattern of data holds across many changes in the simulation (altering parameters or the size of the cohort), although the magnitude of the effects will change as well.



Are similar bias effects found cross-modally?

A version of Experiment 2 of Pitt and Shoaf was run cross-modally (auditory prime followed by visual target) to determine whether similar biases would be found in this popular yet very similar paradigm. The same monosyllabic stimuli were used (PRP=50% and ISI=50ms; N=96).

Strong evidence of bias effects were found, as the magnitude of priming switches from a 33ms RT slowdown in the early probe position to a 65ms advantage in the late probe position. Errors differed little across conditions. The size of these effects differ from what was found with auditory-auditory presentation. In the early probe condition, the effect is half the size as with auditory-only presentation. Fewer participants may have noticed the overlap on this first overlap trial, which is not surprising given that the overlap was probably not as immediately obvious given the different modality in which the target was presented. The RT advantage for the 3-overlap condition in the late probe position is at least three times larger than that found in the auditory-only experiment. Over the course of the experiment, participants may have learned how to rapidly encode these short, monosyllabic words into a phonological form to aid comparison with the prime, and thus help responding. Conversely, the dominance of visual processing in most individuals might have led participants to recode the primes visually to improve (i.e., decrease) RT (after the experiments, participants did comment on the "letter similarity" between prime and target). Generalization of these results to longer words, such as morphologically simple or complex words, has yet to be tested.