

Reduction Comes From Facilitation of Levels of Language Production

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Speakers acoustically reduce words when they have been previously mentioned (Prince, 1992), or in contexts that make them probable (Bell et al., 2009). Though these and other factors affect reduction, the mechanism by which they do remains unclear. We present four experiments that investigate how predictability and givenness impact different levels of the production system, with the goal of elucidating such a mechanism. In particular, we propose that facilitation at *any* level of processing should result in (at least) durational reduction, and that facilitation at *multiple* levels should lead to more reduction than facilitation at one, with each level making some contribution.

All experiments had the same general design. In an instruction-giving task, one participant saw objects perform actions on a computer screen, and described them to a partner, e.g. “The accordion rotates right”; the partner then executed the action on her computer. On each trial, both participants saw an array of eight objects (Fig. 1), then some priming information, and then the speaker described the movement of a subset of the objects.

The first experiment used linguistic and non-linguistic priming to investigate the additivity of facilitation. Relative to a no-prime condition, participants heard the objects named aloud or saw them flash (linguistic and non-linguistic conditions). Results revealed a three-way contrast among the durations of the object words, with non-linguistic priming (at the conceptual level) eliciting shorter durations than no priming, and linguistic priming (conceptual and linguistic level(s)) eliciting the shortest durations. Linguistic priming most likely primed more levels of production, and thus elicited more reduction.

This result is compatible with both a facilitation-based and audience design-based explanation, so the second experiment contrasted speaker- and listener-only priming to distinguish the two. Speakers reduced when and only when they saw the prime, with no regard for the listener, suggesting that reduction comes about because of internal facilitation.

The third experiment attempted to separate sheer residual activation (from the prime) and predictability by reducing the prime’s validity. Linguistic priming elicited reduction while non-linguistic priming did not. This again suggests that primed representations lead to reduction, in this case representations at the conceptual or lexical level (due to the speakers’ inability to pre-plan articulation).

The fourth experiment used articulation-level priming, by asking speakers to name the primed object either aloud or to themselves. Naming the object aloud led speakers to reduce the object word more than naming it to themselves, particularly in response to a congruent prime. Once again, the reduction occurred in a condition with an additional facilitated level of representation, in this case the articulatory level.

The first experiment demonstrates that priming at multiple levels leads to more reduction, and the second restricts this effect to speaker-internal facilitation. The third and fourth demonstrate that durational reduction occurs as the result of priming at individual levels of language production, namely the lexical (exp. 3) and articulatory (exp. 4) levels. Together, these experiments support the hypothesis that priming of any portion of language production leads to some amount of reduction.

References

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