

Reduction as A Secret Side-Channel in Human Speech: When Less Clear is More Positive

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Artificial Intelligence systems today adeptly handle many aspects of human language. In particular, almost all synthesized voices are highly intelligible: designed so that every word is clear and easy to understand (Gustafson, Szekely et al, 2023). Humans in dialog are different: their pronunciations can be sloppy or even mumbled. Why do we depart from precise articulation? What purposes does this serve?

Some reasons are well-known (Ernestus & Warner 2011, Cangemi & Niebuhr 2018, Zellers et al. 2018). Of course, people are sometimes just lazy. More interestingly, reduction in certain phrases marks specific nuances, such as definite intention in *gonna* and lack of interest in *dunno*. Statistically, reduction is also more common in predictable words, when speaking casually, and so on. But we asked: what other functions might reduction serve?

In our study, we took 21 minutes from 5 spontaneous American English conversations on diverse topics. The second author annotated every word or phrase for degree of reduction and the first author independently annotated for occurrences of 11 pragmatic functions. There was an unexpected and strong connection between reduction and phrases conveying positive assessments, such as *oh, wow, that's interesting, I thought, it was a good, opportunity, because I want to do my Ph.D.; and it was, it was pretty cool*, where underlining marks reduced words.

This finding illustrates that attending to phonetic detail can reveal how people in dialog control subtle properties of their speech to help convey subtleties of meaning. This connection is unknown to speech technology, and indeed, at a conscious level, unknown even by speakers themselves. It is thus a kind of “secret side-channel” in dialog, that is, for now, shared among only humans.

[~290 words]

Cangemi, Francesco, & Oliver Niebuhr (2018). Rethinking reduction and canonical forms. pp 277-302, In *Rethinking reduction*, F. Cangemi, M. Clayards, O. Niebuhr, B. Schuppler, and M. Zellers (eds.). De Gruyter, 2018.

Ernestus, Mirjam, and Natasha Warner (2011). "An introduction to reduced pronunciation variants." *Journal of Phonetics* 39. pp 253-260. 2011

Gustafson, Joakim, Eva Székely, Simon Alexandersson, and Jonas Beskow. (2023) "Casual chatter or speaking up? Adjusting articulatory effort in generation of speech and animation for conversational characters." In 17th International Conference on Automatic Face and Gesture Recognition (FG), IEEE, 2023.

Zellers, Margaret, & Barbara Schuppler and Meghan Clayards (2018). Introduction, or: Why rethink reduction? pp 1-24, In *Rethinking reduction*, F. Cangemi, M. Clayards, O. Niebuhr, B. Schuppler, and M. Zellers (eds.). De Gruyter, 2018.