When are gaps understood as symptoms or signals?

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Introduction. The way an utterance is delivered can have profound effects on speech processing [1]. One example of this are *filled pause*s (**FP**s) (*um* or *uh*). Listeners adjust their attention to upcoming speech based on FPs [2][3][4] as FPs are attributed to production difficulties [5]. In our investigation, we examine *unfilled pauses* at turn exchanges, e.g. *gaps.* Like filled pauses, gap lengths have been argued to be a *symptom* of production and comprehension mechanisms [6]. However, unlike filled pauses, gap lengths can also *signal* additional meanings, especially for polar (yes/no) responses: affirmative responses usually have shorter gaps, whereas "no" responses are preferred with longer gaps. [7] has argued that this is driven by sociolinguistic factors such as politeness for *polar answers*. Likewise, [8] has a similar explanation for the effect of gaps on *scalar implicatures.* An alternative explanation is that gap length is predicted by question bias: predictable answers should have shorter gaps, whereas less predictable ones should have longer gaps. However, often polar questions are often (~30-40%) not answered with response particles (yes/no)[9], hence rendering bias a less informative cue. Here, we test an additional explanation: gaps might carry meaning independent of biases and politeness factors. To do this, we tested how gaps affect the meaning of *no* responses (to negated antecedents) and *scalar implicature*s (**SI**s - trials with *some* ("einige"). ***Experiment***. Thirty native German speakers collaborated with a confederate on an interactive picture-matching task (*wizard of oz paradigm*). Although the participants believed that the both they and confederate communicated over a live feed, the confederates responses' were pre-recorded and were cued after the participant read a question. Participants simultaneously saw an image depicting an answer and heard a confederate's response, which either *matched* the picture or not (*mismatch*). The experiment had a 2 x 3 Latin-squared design with answer type (*einige* (some) vs. *nein*(no)) and pause type (*no pause (NP)*, *filled pause (FP), unfilled pause (UFP*) as factors. All trials were embedded under different contexts and participants read a question with a positive antecedent ("*Are the tomatoes crushed?*") for *einigie* (some) trials or a negative antecedent ("*Are the tomatoes not crushed?*") for *nein* trials ("no" can either *affirm* negative antecedents or *reverse* them [10][11]). Both response (force-choice) as well as time-course measures (mouse-tracking) were collected. An additional factor was answer type: *match* (yes responses when confederates responses matched the picture) and *mismatch* (no responses when confederates responses did not match the picture). ***Predictions*.** If responses (match v unmatched) for UFPs are processed similarly to tFPs, then UFPs are interpreted as symptoms of production. If their processing profiles differ across matches and unmatched, then this would show that UFPs are processed as signals.***Results (SIs)*** Overall, participants' showed implicature rates for SIs close to the control conditions (ceiling). Participants had more direct answers to target for *einige* (some) matched trials vs. mismatched trials for NPs (replicating delay for SIs), though this effect went away for both FPs *and* UFPs, $t=4.6$ $p < .001$. ***Results (no)****Nein* (no) trials showed much more variation, although differences across pause types were not statistically significant (p's >.36). Participants' mouse paths were more direct to targets than for matched trials with NPs and FPs than for unmatched trials, but this was the opposite for UFPs, $t=2.92$, $p < .02$. ***Discussion*** The data for that *einige* (some) trials were interpreted similarly to filled pauses. This was not the case for *nein* (no) trials: gaps (unfilled pauses) were more likely to bias towards interpreting *nein* as reversal (*no*) of the negative antecedent, i.e., *no, the tomatoes are indeed crushed* (equivalent to German *doch*)*,* whereas participants in no pause and filled pause conditions had more direct responses to affirmative readings i.e., *yes, the tomatoes are not crushed*. Taken together, these findings suggest that in lack of strong question bias and politeness constraints, unfilled pauses are interpreted as hesitation markers for non-polar responses (some), but seem to carry meaning independently of these factors for polar answers, at least for *no*. Results from a second experiment testing the influence of prosody are currently being analyzed.

References: [1] Clark. (1996) *Arenas of Language Use*.[2]Clark & Fox Tree (2002). Using uh and um in spontaneous speaking. *Cognition*. [3]Ferreira,, & Bailey (2004). Disfluencies and human language comprehension. *Trends in Cog Sci* [4] Corley & Stewart. (2008). Hesitation disfluencies in spontaneous speech: The meaning of *um. Lang & Ling Compass. [5]* Arnold, Hudson-Kam,& Tanenhaus, (2007). If you say thee uh you are describing something hard*JEP:LMC.[6]* Levinson, & Torreria, 2015. Timing in turn-taking and its implications for processing models of language *Frontier in Psych. [7] Bögels, Kendrick & Levinson 2015.* Never say no… How the brain interprets the pregnant pause in conversation, *PLOSone.* [8] Bonneferon, Dahl, & Hartgraves (2015). Some but not all preferred turn markers help to interpret scalar terms in polite contexts. *Thinking & Reasoning*.[9] de Marneffe, Grimm, & Potts (2009). Not a simple yes or no: uncertain in polar answers. *SIGDIAL.*