



Scalar inferences and working memory

- Previous studies suggest that low working memory and high cognitive load make people less likely to assign an upper-bounded interpretation to *some* (De Neys & Schaeken, 2007; Dieussaert et al., 2011; Marty et al., 2013; Marty & Chemla, 2013)
 - Making scalar inferences may require extra processing resources
 - But these studies are based on explicit judgments
- Present study: investigate the role of individual cognitive differences on *implicit* inferencing in self-paced reading

Methods

- Materials:** 48 target vignettes, contrasting Context (upper-bound ["all"] vs. lower-bound ["any"]) and Explicitness (*some* vs. *only some*):
 - Some vignette:** **Mary was preparing to throw a party for John's relatives. / She asked John whether (all / any) of them were staying in his apartment. / John said that / (some of them / only some of them) / were. / He added / that / the rest / would be / staying / in a hotel.**

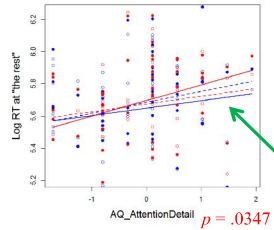
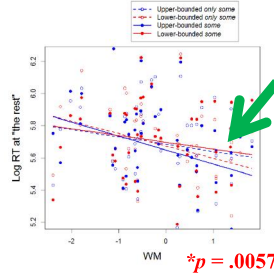
- Faster reading times are usually observed at *the rest* in upper-bound than lower-bound contexts, because a scalar inference is likely to be realized in the former but not the latter (Breheny et al., 2006; Bergen & Grodner, 2012; Politzer-Ahles & Fiorentino, 2013; Hartshorne & Snedeker, submitted).

- Fillers:** 48 as above but without "the rest"; 48 with "all of" in the critical quantifier position (and without "the rest"); 48 with other quantifiers in the critical quantifier position

- Procedure:** Non-cumulative moving-window self-paced reading, comprehension questions on 33% of trials

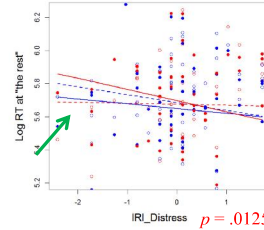
- Participants:** 48 native English speakers (28 from Politzer-Ahles & Fiorentino, 2013)
- Last 20 speakers performed half of the trials with concurrent memory load; data from these trials are not reported here

Individual difference results at "the rest"

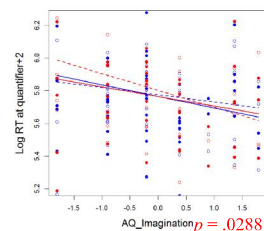
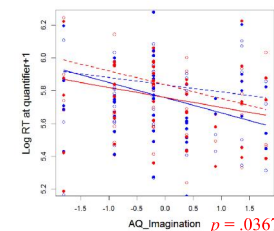
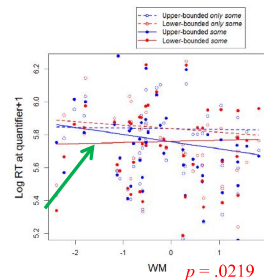
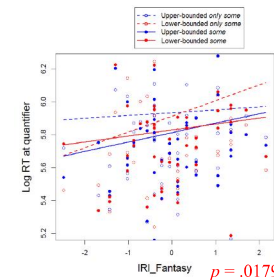


Individual difference measures (m=12)

- Working memory (WM): average of Reading Span and Count span composite scores
- Executive function: flanker effect for incongruent items
- Autism-Spectrum Quotient (AQ) subscales
- Interpersonal Reactivity Index (IRI) subscales
- Logical ability: truth-value judgments to informative and underinformative sentences
- Outliers were replaced with mean +1 IQR*5, and all measures were sphered



Individual difference results at the quantifier



Discussion

At "the rest"...

- Slowdown for lower-bounded sentences was driven by high-WM participants
- Numerical trend towards contribution from participants with poor scores on AQ-AttentionToDetail and IRI-Distress; there were not *a priori* predictions about these subscales

At the quantifier...

- While not significant, there was a trend towards high-WM participants slowing down for lower-bounded *some* (as predicted if inferences are made by default) and low-WM participants slowing down for upper-bounded *some* (as predicted by context-driven models).
- No other predictors showed this kind of interaction (greater context effect for *some* than *only some*).

- These results are exploratory and require cross-validation, but suggest that **working memory** plays a role in realization of scalar inferences, offering converging evidence with results from explicit judgment tasks.

- Consistent with previous experiments (Hartshorne et al., 2013; Politzer-Ahles & Fiorentino, 2013; Hartshorne & Snedeker, submitted), effects are mainly observed at "the rest" and are difficult to detect at the quantifier.

- (But see our poster in Session II)

References

- Bergen & Grodner (2012). *J. Exp. Psych: LNC*, 38, 1450-1460.
- Breheny et al. (2006). *Cognition*, 100, 434-63.
- De Neys & Schaeken (2007). *Exp. Psychol*, 54, 128-133.
- Dieussaert et al. (2011). *Q. J. Exp. Psychol*, 64, 2352-2367.
- Hartshorne & Snedeker (submitted).
- Hartshorne et al. (2013). *Proceedings of Cog Sci*.
- Martin et al. (1988). *J. Mem. Lang.*, 27, 382-398.
- Marty & Chemla (2013). *Front. Psychol*, 4.
- Marty et al. (2013). *Lingua*, 133, 152-163.
- Politzer-Ahles & Fiorentino (2013). *PLoS ONE*, 4.