The role of functional-pragmatic constraints on reflexive and non-reflexive object pronoun understanding: Evidence from a set of Preregistered studies.

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Introduction. Consider the sentences 'Samuel said that Oliver washed himself' and 'Samuel said that Oliver washed him'. Why does 'himself' mean 'Oliver', and 'him' mean 'Samuel'? Traditionally the answer has been determined by (possibly innate) grammatical constraints known as binding principles (Chomsky, 1981; Reinhart & Reuland, 1993): informally, the reflexive 'himself' must take its meaning from the SUBJECT of the sentence (*Samuel*), whereas the non-reflexive 'him' must *not* take its meaning from the SUBJECT of the sentence (i.e., could be *Oliver* or *someone else*). The present set of studies do **not** argue for the non-existence of binding principles (since it is unclear whether proving a negative is possible), but instead report that the lion's share of the data can be explained by a real-world functional-pragmatic framework - for which the existing literature has so far mostly argued only from example sentences (see Ambridge et al, 2014; Kuno, 1987) rather than reporting empirical data (but see Kaiser et l., 2009). This was investigated with a series of functional-pragmatic manipulations that are different ways of operationalizing a single underlying construct under which the referent is determined by the listener's inference about *what the speaker meant to convey*, in the knowledge that speakers tend to choose their words carefully, taking the listener's knowledge into account.

Method. The effect of functionalist-pragmatic manipulations (for examples see the results below) on native English speakers' understanding of reflexive and non-reflexive pronouns was assessed across:

(i) Six pronoun interpretation experiments for rating the likelihood that 'himself' (Exp.1-3) and 'him' (Exp. 4-6) referred to the SUBJECT or OBJECT, using a 100-point scale (adults: Exp.1 N = 134, Exp.2 N = 200, Exp.3 N = 70; Exp.4-6 N = 70 each with different participants).

(ii) A forced choice pronoun completion paradigm (with accompanying animations) that asked participants to complete the sentence using either 'himself' or 'him' (N = 60 for Exp.7a: adults; N = 45 for Exp.7b: children aged M =6;10 ranging 6;4-7;8, 22 female).

Results. Linear mixed effect models were fitted to the data in R using the lme4 package. In **Exp. 1-6**, for reflexive sentences (e.g., 'Samuel told Oliver about himself') and non-reflexive sentences (e.g., 'Samuel told Oliver about him'), OBJECT ('Oliver') vs SUBJECT ('Samuel') interpretations were more likely when:

(i) The likelihood of the relevant scenario is higher on an OBJECT than SUBJECT reading (see x-axis of Fig.1-6; e.g., 'Samuel [**asked**>told] **Oliver** about [himself/him]'): e.g., Exp.1 b = 14.37, SE= 1.63, p < .001, CI [11.17 – 17.57] (similar results were found in Exp.2, Exp.4, and Exp.5). Likelihood effects were more pronounced when a non-authoritative character (e.g., '*pupil*') was the OBJECT ('The headteacher asked the **pupil** about [himself/him]') rather than the SUBJECT (see by-shape distribution of Figures 5 and 6 for the unique power-relation manipulation).

(ii) The SUBJECT was of low definiteness (e.g., '[**The man/A man/Someone** > Samuel] asked **Oliver** about [himself/him]'): e.g., Exp.3 b = -3.57, SE= 0.61, p < .01, CI [-4.76 – -2.37] (similar results for Exp.6). For visualisations, see the by-colour referential conditions in Fig.1 and Fig.4.

(iii) The OBJECT was topicalized via prior mention (e.g., 'Oliver opened the door and stepped into the office. Samuel verbed **him** about [himself/ him]'): e.g., Exp.5 b = -10.60, SE= 1.12, p < .001, CI (-12.79 – -8.42) (similar results were found in Exp.2, Exp.3, and Exp,6). For visualisations, see the by-colour prior-mention conditions in Fig.2, Fig.3, Fig.5, & Fig.6.

In **Exp.7**, both adults and children produced *himself* over *him* significantly more often when the PATIENT character who had an action done to them was an AGENT in executing that action ('Samuel **brushed** paint all over [himself vs him]'; adult M = 99% [SE = 1.36], child M = 81.4%, SE = 2.40) rather than being stative ('Samuel **has** paint all over [him vs himself]': adult M = 59.98% [SE = 2.29]; child M = 71.7% [SE = 2.50]). This was a significant difference both for adults and for children (e.g., children: OR = 2.57, SE = 0.63, p < .01, CI [1.59 – 4.16]). We attribute this to the specialized meaning of 'himself': a male who is seen from his own point of view and/or instigates the event or scenario of which he is also the target.

Conclusion. Our findings yield evidence that the understanding of 'himself' and 'him' can be explained by the single underlying construct of *what the speaker most likely intends to convey*, given both the choice of words (e.g., 'Samuel' vs 'a man') and knowledge about the world (e.g., that a *lawyer* is more likely to grill a *suspect* about a picture of the *suspect* than about a picture of the *lawyer*). Together, these findings are compatible with a functional-pragmatic framework of pronoun resolution.

Fig. 1 (left panel; Exp.1) & **Fig 4** (right panel; Exp.4). Effects of event-likelihood (x-axis) and referential-hierarchy (by colour) on pronoun interpretations (y-axis: 0 =SUBJECT, 100 =OBJECT).

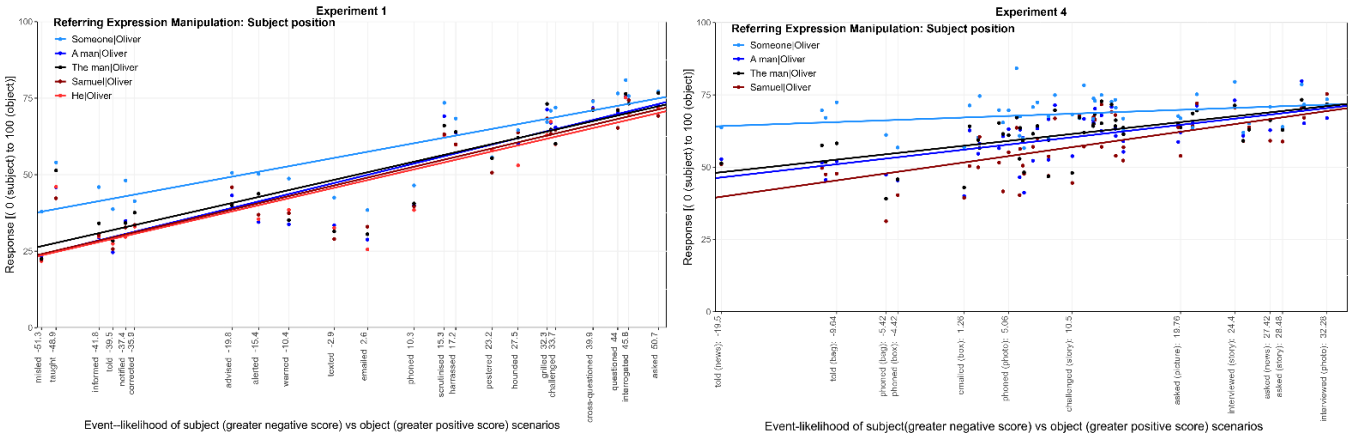


Fig. 2 (left panel; Exp.2) & **Fig 5** (right panel; Exp.5). Effects of event-likelihood (x-axis) and prior-mention (by colour) on pronoun interpretations (y-axis: 0 =SUBJECT, 100 =OBJECT).

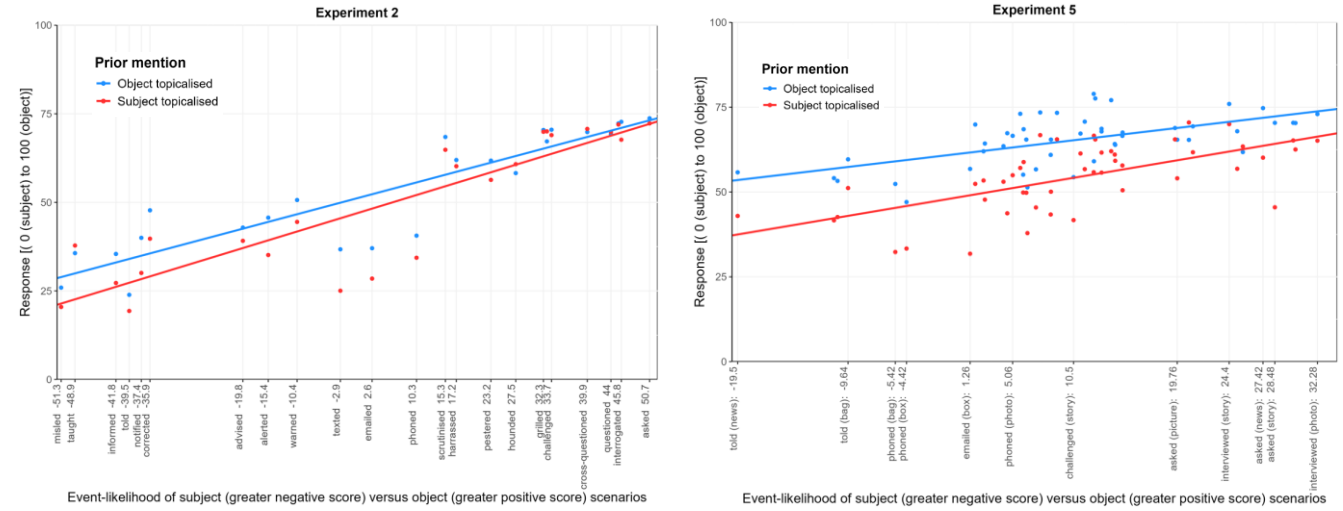
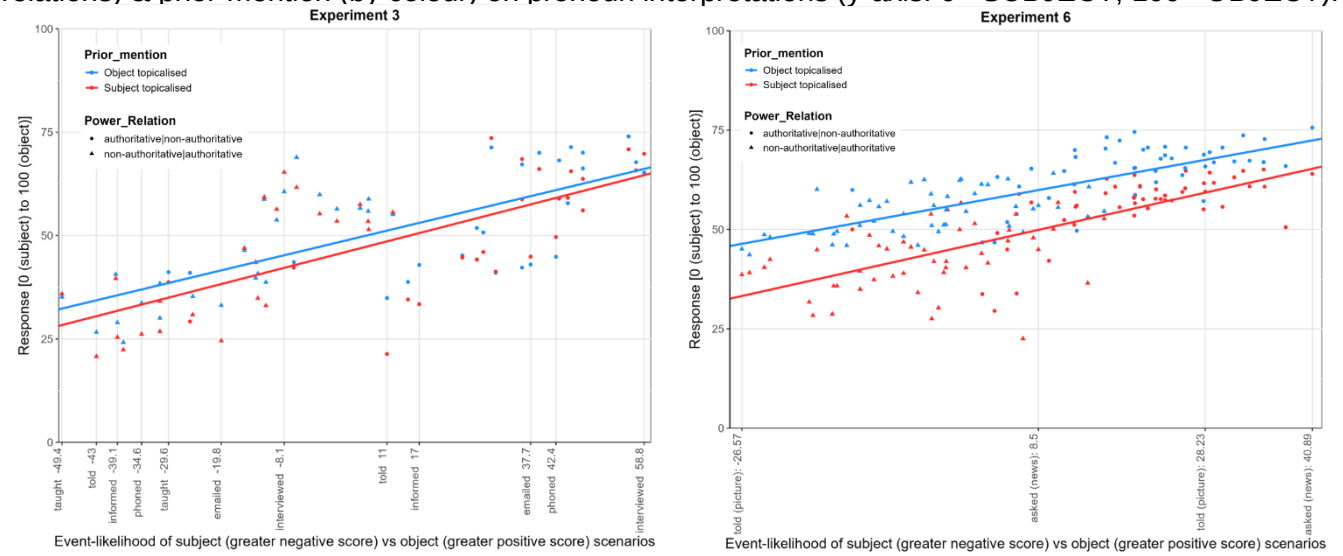


Fig. 3 (left panel; Exp.3) & **Fig 6** (right panel; Exp.6). Effects of event-likelihood (x-axis; by-shape power-relations) & prior-mention (by colour) on pronoun interpretations (y-axis: 0 =SUBJECT, 100 =OBJECT).



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