

Canonical Argument Alignment Modulates Gap, but not RP, Acceptability in English

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Introduction: Resumptive pronouns (RPs), across languages with both grammatical and ungrammatical resumption, have been claimed to serve a functional role in facilitating complex filler-gap dependency resolution. Previous English studies argued for this facilitatory role by increasing dependency length [1,2]. However, other factors can affect complexity, even when dependencies are short. Animacy and argument structure (mis)alignment are two such factors, and ones which strongly determine the difficulty of short object relative clauses (ORCs) in English [3,4]. In Hebrew, where (some) RPs are grammatical, it has been observed that they are preferred or obligatory when argument alignment is non-canonical [5,6], for example in ORCs when the object is animate and the subject is inanimate [7,8]. To understand whether this pattern is language-specific, or reflects a more general property of pronoun use, we sought to extend the finding to English, a language where RPs are mostly intrusive/ungrammatical.

Materials and Methods: We adopted the design of [8], creating 48 sentences with ORCs, crossing DEPENDENCY (Gap, RP) and RC SUBJECT ANIMACY (Animate, Inanimate) within items, and RC VERB TYPE (Obj-Exp, Anim-Theme, Inan-Theme) between items, given in (1). RC VERB TYPE refers to the predicate's entailments on the Object, thereby manipulating the thematic role (Experiencer, Theme) and animacy of the RC filler. Within each Verb Type, there were 16 distinct predicates corresponding to the given argument structure frame. 60 participants were recruited via Prolific. Target sentences, along with 52 fillers, were presented using RSVP. Following the completion of each sentence, participants rated the acceptability of each sentence on a scale of 1-6.

Results: Acceptability ratings were analyzed using ordinal mixed-effects regression, with a cumulative logit link function, in *brms* [9]. Figure 1 summarizes mean acceptability ratings, and Table 1 summarizes our modeling results. We observed a main effect of DEPENDENCY, reflecting overall higher ratings for sentences with Gaps vs. RPs ($\beta = 2.82$, 95% CI: [2.65, 2.99]). Within Verb Types, we observe higher ratings for sentences with Inan-Theme verbs vs both Anim-Theme and Obj-Exp verbs ($\beta = 0.51$, 95% CI: [0.04, 0.99]), and find no difference in ratings for Anim-Theme and Obj-Exp verbs ($\beta = -0.26$, 95% CI: [-0.67, 0.15]). We also found an interaction between VERB TYPE and RC SUBJECT ANIMACY, indicating higher ratings for Inan-Theme sentences with Inan. RC Subjects vs. Anim-Theme and Obj-Exp sentences with Inan. RC Subjects ($\beta = -0.60$, 95% CI: [-1.00, -0.20]), but no three-way interaction with DEPENDENCY.

Discussion: Using an acceptability judgment task, we found a clear effect of argument structure alignment on the acceptability of gaps in English ORCs, corroborating previous findings from production and reading time tasks [3,4, i.a]. RPs uniformly received very low ratings, also consistent with previous findings [2]. Crucially, having misaligned arguments neither independently improved RP acceptability nor caused it to exceed gap acceptability. So while English speakers may succumb to the same functional pressures on filler-gap dependency formation as do Hebrew speakers, RPs are not independently made more accessible by those same pressures. Rather our results support the idea that language-specific grammatical cures – pronouns in Hebrew, or in Irish [10]; passivization in English [3,7] – are what's needed to alleviate the common affliction of ORCs.

(1) That's the ...

- a. juror that the {felon | rumor} is bound to upset { __ | her} ... [Obj-Exp]
- b. comet that the {cadet | laser} is likely to vaporize { __ | it} ... [Inan-Theme]
- c. artist that the {expert | theory} is expected to convince { __ | him} ... [Anim-Theme]



Figure 1: Mean Acceptability Ratings (error bars represent S.E.)

| | β | Est. Error | 95% CI | References: |
|------------------------------------|--------------|-------------|-----------------------|---|
| VerbType: A-T vs O-E | -0.26 | 0.21 | [-0.67, 0.15] | [1] Hofmeister & Norcliffe, 2014. In <i>The Core and the Periphery</i> , Stanford: CSLI. |
| VerbType: I-T vs (A-T, O-E) | 0.51 | 0.24 | [0.04, 0.99] | [2] Meltzer-Asscher, 2021. <i>Ann Rev Ling</i> |
| Dependency | 2.82 | 0.09 | [2.65, 2.99] | [3] Gennari & MacDonald, 2008. <i>JML</i> ; [4] Traxler, Williams, Blozis, & Morris, 2005. <i>JML</i> . |
| Subject-Animacy | 0.57 | 0.07 | [0.42, 0.71] | [5] Belletti & Rizzi, 1998. <i>NLLT</i> ; [6] Landau, 2009. <i>MIT Press</i> ; [7] Fadlon et al. 2019, <i>JML</i> . |
| (A-T vs O-E) * Dep. | -0.15 | 0.17 | [-0.50, 0.19] | [8] Cartner et al., 2022. <i>HSP 2022</i> ; [9] Bürkner, 2017. <i>Journal of Statistical Software</i> ; |
| [I-T vs (A-T, O-E)] * Dep. | 0.55 | 0.20 | [0.15, 0.94] | [10] McCloskey 2017, <i>Asking the Right Questions: Essays in Honor of Sandra Chung</i> . |
| (A-T vs O-E) * S-An. | -0.14 | 0.17 | [-0.48, 0.19] | |
| [I-T vs (A-T, O-E)] * S-An. | -0.60 | 0.20 | [-1.00, -0.20] | |
| Subj-Anim. * Dep. | 0.73 | 0.14 | [0.45, 1.01] | |
| (A-T vs O-E) * Dep. * S-An. | 0.14 | 0.34 | [-0.52, 0.82] | |
| [I-T vs (A-T, O-E)] * Dep * S-An. | -0.68 | 0.40 | [-1.47, 0.09] | |

Table 1. brms results for Acceptability Ratings