**(A)symmetries in Tagalog relative clause processing**

Relative clauses with subject-gaps (SRCs) are easier to process than relative clauses with object-gaps (ORCs). This asymmetry extends across languages and methods (Kwon et al., 2010). The three classes of proposals emphasize distinct aspects of the dependency to account for this:

| | |
|---|---|
| **Structure-based** | Fewer syntactic projections intervene between the head noun and the gap in SRCs than in ORCs (O'Grady et al., 2003) |
| **Memory-based** | Fewer constituents intervene between the head noun and the gap in SRCs than in ORCs and thus, there are fewer incomplete dependencies to keep track of (storage: Hsiao & Gibson, 2003) there are fewer cues competing in memory (similarity-based interference: Lewis & Vasishth, 2005) |
| **Experience-based** | SRCs are more abundant than ORCs (frequency-based: Roland, Dick, & Elman, 2007) or the relative order of elements more closely resembles main clauses in SRCs than in ORCs (main clause similarity: Diessel & Tomasello, 2005) |

Several factors may modulate this asymmetry, such as the animacy of the head noun (Mak et al., 2006), the referential type of intervening elements (Gordon et al., 2004), and the relative order of the head noun and the RC (Wagers et al., 2018).

We examined Tagalog, which has both head initial and head final RCs (Aldridge, 2016). Holding animacy constant, we asked whether (i) SRCs are easier to process than ORCs, and (ii) if so, whether head/RC order and the pronominality of interveners affect the asymmetry. We also leveraged other features of Tagalog to help us evaluate the empirical coverage of the accounts above. First, ORCs are more frequent than SRCs in Tagalog (Nagaya, 2019) and thus, we might expect a reversal of the asymmetry under a frequency-based account. Second, the most frequent types of co-arguments inside RCs are pronouns (Pizarro-Guevara, 2014) and thus, we might expect neutralization when the intervening co-argument is a pronoun under a frequency-based or a similarity-based interference account. Third, the word order in main clauses is mediated by two pressures: agent-first and *ang*-last (Kroeger, 1993) and thus, we might expect an asymmetry in head-initial RCs and a neutralization in head-final RCs under a main clause similarity account.

Using a picture selection plus confidence rating task (Figure 1), we found that Tagalog shows an asymmetry, which is consistent with RC-acquisition studies in Tagalog (Pizarro-Guevara, 2014; Tanaka et al., 2019). More importantly, this can be neutralized by (i) head/RC order and (ii) the pronominality of the co-argument.
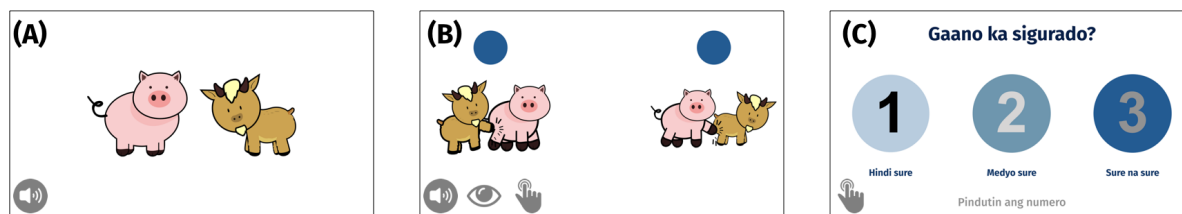


**Figure 1.** Sample of a typical trial. (A) Participants heard a recording that introduced the two characters. (B) They saw two pictures, heard a recording that contains the RC, and chose the picture they thought corresponded to what they heard. Eye-movements were also recorded (analysis not reported here). (C) They rated how confident they were with the response.

**Exp. 1: RCs with full NP co-arguments.** We constructed 16 items, crossing whether the head was initial or final (HEAD: HI, HF) and what the intended parse was as signaled by the voice (PARSE: SRC, ORC). See Table 1. Participants were more accurate and confident in SRCs than in

ORCs when the RC was head-initial ($p = .02$). See Figure 2. They were faster to offer responses when the RC had an SRC interpretation ($p = .01$), regardless of head/RC order, and when it was head-initial ($p < .001$). See Figure 2. In sum, the SRC-ORC asymmetry in interpretation was ultimately neutralized in head-final RCs, but choice latencies still indicated an SRC preference.

**Exp. 2: RCs with pronominal co-arguments.** We constructed 16 items following the design of exp. 1, except now the co-argument was a pronoun. See Table 1. Participants showed comparable accuracy and confidence in all four conditions. See Figure 2. Even under these conditions of near-identical accuracy and confidence, there was still a RT advantage for SRCs compared to ORCs, but it was largest for HI, $\Delta = 452$ *ms,* than it was for HF, $\Delta = 243$ *ms* ($p < .001$). See Figure 2. In sum, even when the pronominality of the co-argument ultimately neutralized the asymmetry, their RTs still indicated an asymmetry, especially in head-initial RCs.

**Table 1.** Sample items for exps. 1 and 2. Head nouns are underlined. RCs are demarcated by "[ ]". Co-arguments are **bolded.**

|  |  | Experiment 1 | Experiment 2 |
|---|---|---|---|
| Context |  | There is a pig and a goat. Sometimes they like to kick. Sometimes they like to be kicked. | There is a pig. Sometimes it likes to kick. Sometimes it like to be kicked. |
| HI | SRC | *baboy* [*na    sumisipa  ng=**kambing**]* <br> pig    [LNK  kick.AV     GEN=goat] | *kambing* [*na    sumisipa    sa=**kaniya**]* <br> goat    [LNK  kick.AV     DAT=3SG.DAT] |
| HI | ORC | *baboy* [*na    sinisipa      ng=**kambing**]* <br> pig    [LNK  kick.PV     GEN=goat] | *kambing* [*na    sinisipa     **niya**]* <br> goat    [LNK  kick.PV     3SG.GEN] |
| HF | SRC | [*sumisipa   ng=**kambing**  na]   *baboy* <br> [kick.AV     GEN=goat     LNK] pig | [*sumisipa   sa=**kaniya**    na]   *kambing* <br> [kick.AV    DAT=3SG.DAT  LNK] goat |
| HF | ORC | [*sinisipa     ng=**kambing**  na]  *baboy* <br> [kick.PV     GEN=goat     LNK] pig | [*sinisipa     **niya**      na]  *kambing* <br> [kick.PV    3SG.GEN  LNK] goat |
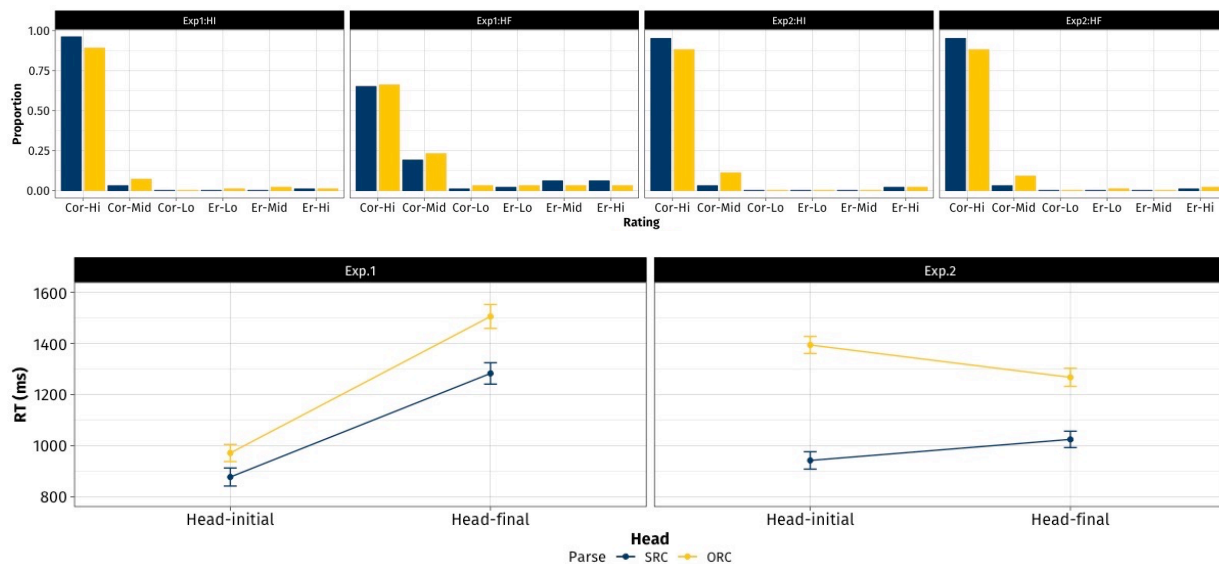


**Figure 2.** The top panels represent the distribution of confidence ratings (Hi, Mid, Lo) by accuracy (correct = Cor, incorrect = Er). The first two panels represent exp. 1 (HI and HF, respectively) and the last two panels represent exp. 2 (HI and HF, respectively). The bottom panels represent the participants' response times (in *ms*) of correct responses for exps. 1 and 2, respectively

**Discussion.** Our results suggest that a purely structural account is untenable, especially when we consider the cases where the asymmetry is neutralized. However, the lingering "footprint" of the asymmetry suggests that structural information is a necessary ingredient of any account.