The effects of derivational properties on the processing of structurally congruent phrases: Evidence from resumptive pronouns in Egyptian Arabic and English

OVERVIEW: Research on bilingual sentence processing has argued that structures which fully overlap in surface word order across two languages do not distinctly belong to either one of a bilingual's languages, but are instead shared across both [1]; however, it is unclear to what extent the derivational properties of these structures play a role in this sharedness. In this paper we investigate bilinguals' sensitivity of two structures that ultimately result in overlapping word orders across their two languages but are argued to have different derivational properties in their formation. We focus on filler-gap dependencies with and without resumptive pronouns (RPs) in Egyptian Arabic, a language argued to have *grammatical* RPs required at the tail end of all nominal A-bar dependencies [2], and English, a language argued to have *intrusive* RPs inserted due to poor production planning in difficult to process structures, such as syntactic islands [3]. Using data from code-switched filler-gap dependencies, we ultimately argue that at least a subset of clause-initial (seemingly displaced) wh-questions in Egyptian Arabic are formed via movement, similar to English. We propose that bilinguals' sensitivity to code-switched structures can illuminate grammatical sensitivities that may have been made opaque in unilingual contexts.

METHODS: We conducted a four block experiment administered within one experimental session. In the first and second blocks we tested bilinguals' acceptability of RPs in unilingual Egyptian Arabic (block 1) and unilingual English (block 2) island/non-island contexts. In the third and fourth blocks we tested the same speakers' acceptability of RPs in code-switched Egyptian Arabic-to-English (block 3) and English-to-Egyptian Arabic (block 4) island/non-island contexts. Each block used the same 2X3 factorial design crossing *island presence* (present vs. absent) and *clause type* (matrix subject, embedded: no RP, embedded: yes RP) [4]. This can be seen in the Appendix of this abstract. 42 self-reported Egyptian Arabic/English bilinguals were recruited. Participants were asked to listen to a given sentence and rate its acceptability on a 7 point Likert scale. When present, RPs were cliticized onto the verb. Two linear mixed effects models were constructed (fixed effects = z-scored rating, *island presence*, & *clause type*; random effects = *participant, item*): the *no RP model* restricted *clause type* to (matrix subject, embedded: no RP), and the *yes RP model* restricted *clause type* to (matrix subject, embedded: yes RP). In all code-switched conditions, the code-switch location occurred immediately between the matrix verb and the embedded CP.

BLOCK 1 and BLOCK 2: Unilingual conditions

In block 1, both models revealed no effect for the interaction of *clause type* and *island presence* (no RP model: *p* = .85, yes RP model: *p* = .22). This indicates participants' insensitivity to island structures in Egyptian Arabic, with or without an RP, which is expected based on the assumption that RPs in Egyptian Arabic are grammatical elements.
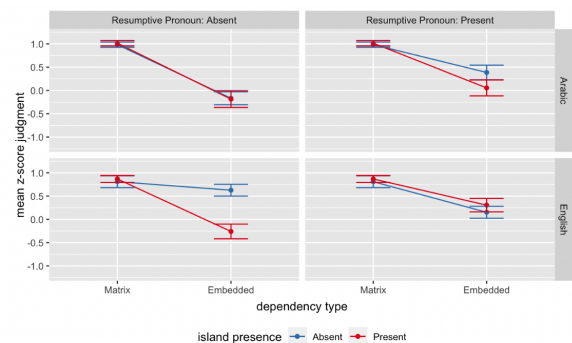

Figure 1: Interaction plot output for our *no resumptive pronoun* and *yes resumptive pronoun* models in both unilingual Egyptian Arabic and unilingual English sentences from blocks 1 and 2.

In block 2, the *no RP model* revealed a main effect for the interaction of *clause type* and *island presence* ($p < .001$), while the *yes RP model* revealed no effect ($p = .67$). This indicates the presence of an island effect in the absence of an RP, that is ameliorated in the presence of an RP, which is also expected. Interaction plots can be seen in Figure 1.

BLOCK 3 and BLOCK 4: Code-switched conditions In block 3 and block 4, the *no RP model* revealed a main effect for the interaction of *clause type* and *island presence* (block 3: $p < .05$, block 4: $p < .05$), indicating that both contexts were sensitive to the presence of an island. Under the assumption that the EPP features on matrix C determines whether or not an element has moved, and consequently the island sensitivity of A-bar dependencies [5], this is expected for the code-switched contexts that begin in English (block 4) but not the contexts which begin in Egyptian Arabic (block 3). The *yes RP model* revealed no effect for the interaction of *clause type* and *island presence* in block 3 ($p = .09$) but a significant effect in block 4 ($p < .001$). Interaction plots can be seen in Figure 2.
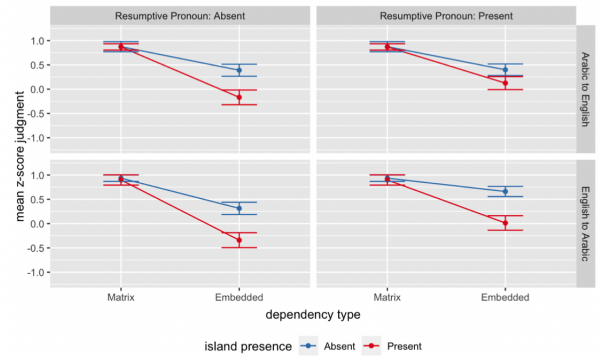

Figure 2: Interaction plot output for our *no resumptive pronoun* and *yes resumptive pronoun* models in both code-switch Egyptian Arabic to English and code-switched English to Egyptian Arabic sentences from blocks 3 and 4.

DISCUSSION: To explain these results, we suggest that the island sensitivity found in the Egyptian Arabic-to-English code-switched conditions indicates island sensitivity in unilingual Egyptian Arabic sentences. However, this sensitivity is masked by a morphophonological requirement which makes resumptive pronouns obligatory when the gap is in the phonological local domain of a *leaner* [6]. We argue that because English does not share this morphophonological requirement, code-switching within an English embedded clause reveals Egyptian Arabic's sensitivity to island structures.

APPENDIX: Sample Stimuli, non-island contexts (embedded conditions)
    Block 1: anhii risalaa$_i$ el-wazeer 'aal inn el-ra'ees katab–(__/ha$_i$)?
    Block 2: Which speech$_i$ did the ambassador claim that the president wrote-(__/ha$_i$)?
    Block 3: anhii risalaa$_i$ el-wazeer 'aal | that the president wrote-(__/it$_i$)?
    Block 4: Which speech$_i$ did the ambassador claim | inn el-ra'ees katab–(__/ha$_i$)?
Sample Stimuli, island contexts (embedded conditions)
    Block 1: anhii risalaa$_i$ el-wazeer zi'il lamma el-ra'ees katab–(__/ha$_i$)?
    Block 2: Which speech$_i$ was the ambassador upset when the president wrote-(__/ha$_i$)?
    Block 3: anhii risalaa$_i$ el-wazeer zi'il | when the president wrote-(__/it$_i$)?
    Block 4: Which speech$_i$ was the ambassador upset | lamma el-ra'ees katab–(__/ha$_i$)?

References: [1] Loebell and Bock, 2003, *Structural priming across languages.* [2] Soltan, 2012, *On licensing wh-scope: wh-questions in Egyptian Arabic revisited* [3] Morgan & Wagers, 2018, *English resumptive pronouns are more common where gaps are less acceptable.* [4] Tucker et al., 2019, *Resumption ameliorates different islands differentially: Acceptability data from Modern Standard Arabic* [5] Sprouse et al., 2012, *A test of the relation between working-memory capacity and syntactic island effects* [6] Rasin, 2017, *Two Types of Resumptive Pronouns: A Minimal Account of Hebrew Interpretive Asymmetries*