

## PROCESSING EMBEDDED QUESTION ISLANDS IN SPANISH: EVIDENCE FROM THE MAZE TASK

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Embedded questions (EQs) are *islands*, i.e. syntactic domains that disallow the establishment of filler-gap dependencies (FGDs). This is illustrated for *whether* EQs islands in (a). The establishment of a FGDs inside an EQ yields a violation known as an *island effect*. An island effect can be quantified through a factorial design that defines it as a monotonic superadditive interaction, i.e. unacceptability beyond processing factors that independently lower ratings [e.g. 1,2]. Acceptability studies using the factorial design have found differences in island effect sizes: e.g. in English, *whether* EQ island effects are smaller for complex fillers (e.g. *which book*; b) than for bare fillers (a) [1,2]. Recent studies using the Maze Task reported effects in island processing mirroring those reported in acceptability: speakers were more willing to establish a FGD inside islands that yield smaller island effects in acceptability (e.g. b), than inside islands that yield larger island effects (e.g. a) [3]. Here we examine whether contrasts in island effect sizes that are *associated with qualitative differences in acceptability* manifest during processing, too. We investigate this in Spanish, which shows such differences between two EQs: in previous work on sentences with complex *wh*-fillers, FGDs inside *when* EQs (e.g. c) yielded a large island effect and ratings below the midpoint of the scale, while the same dependencies inside *whether* EQs yielded a small island effect and ratings above the midpoint of the scale [4]. We investigate whether this contrast is also observable in EQ processing with the Maze Task [5,3]. In this task, participants read sentences word-by-word and at a critical point choose between two possible continuations of the sentence (forced choice), one compatible with positing a gap inside the EQ, and one that is not. If the *when* vs. *whether* contrast can be detected during processing, fewer gap continuations are expected in *when* EQs than in *whether* EQs.

**METHOD.** 48 native speakers of European Spanish took part in the experiment. Materials comprised 48 experimental items that crossed the factors QUESTION (*wh* vs. *yes/no*) and EMBEDDED CLAUSE (*that* declarative vs. *whether* EQ vs. *when* EQ) (Tab. 1). Each of the resulting 6 conditions had two continuations after the embedded verb: (i) a preposition, compatible with an object gap, or (ii) a possessive, indicative of a filled gap. The *yes/no* conditions established the proportion of gap selection when gaps are not expected; the *wh*- declarative condition established the proportion of gap selection when gaps are expected. *Wh*- *whether* and *when* conditions are the critical island conditions. Choices at the first choice point were analyzed with mixed logit models that tested for main effects of Question, Embedded Clause, and their interaction for the critical comparisons: *that* vs *whether*, *that* vs *when* and *whether* vs *when*.

**RESULTS.** Fig. 1 shows the proportion of gap selection by condition at the first choice point. Results indicates that prepositions (i.e. gaps) were selected less often inside *when* questions than inside both declarative clauses ( $\beta = -3.264$ , SE = 1.012,  $p < .001$ ) and *whether* questions ( $\beta = -1.149$ , SE = .323,  $p < .001$ ). There was no evidence that gaps were chosen less often inside *whether* EQs than declarative clauses.

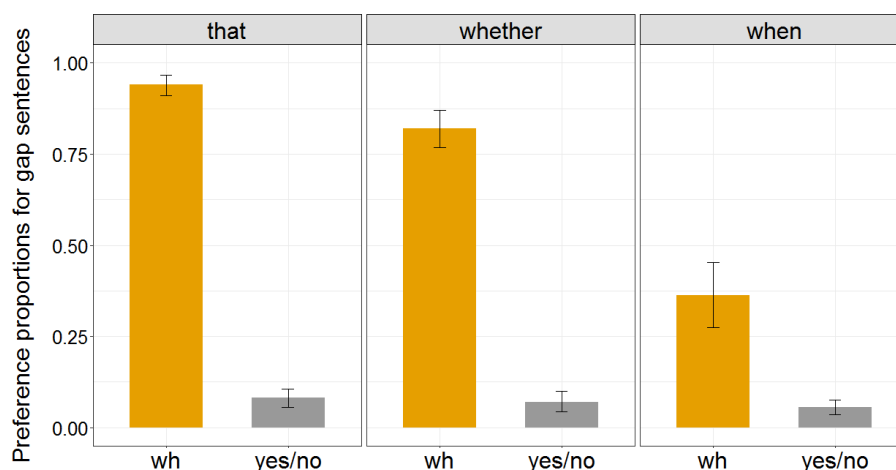
**DISCUSSION.** Our findings mirror previous acceptability patterns: FGDs are established less often inside islands that yield larger island effects and obtain ratings below the midpoint of the scale (i.e. *when* EQs) than inside islands that yield smaller island effects and obtain ratings above the midpoint of the scale (i.e. *whether* EQs). The cause of this contrast might be that *when* shares with the *wh*-filler a syntactic operator feature that both *whether* and the declarative complementizer lack. This shared feature may prevent the integration of the *wh*-filler inside *when* EQs, either because such a dependency violates a formal constraint (e.g., featural Relativized Minimality), or because *when* caused similarity-based interference for the retrieval of the filler at the gap position [4,6,7]. The reason why gaps were chosen more often inside *when* *wh* EQs than inside *when* *yes/no* EQs ( $\beta = 7.925$ , SE = 1.379,  $p < .001$ ) could be that the similarity between *when* and the *wh*-filler was only partial, as the latter was complex and hence also bore a noun feature.

**Examples of embedded question islands** (the *wh*-filler is in bold, the island domain is italicized, and the asterisk indicates unacceptability):

- (a) \***What** do you wonder *whether we dropped* \_\_\_?
- (b) \***Which book** do you wonder *whether we dropped* \_\_\_?
- (c) \***Which book** do you wonder *when we dropped* \_\_\_?

**Table 1.** Sample experimental item. There were six conditions by item, each with two alternative continuations (the first choice point is underlined>).

Declarative, wh	¿ <b>Qué abrigo dijo la señora que habíamos colocado</b> ... 'Which coat did the lady say that we had put ...
Declarative, yes/no	¿ <b>Dijo la señora que habíamos colocado</b> ... 'Did the lady say that we had put ...
Whether, wh	¿ <b>Qué abrigo preguntó la señora si habíamos colocado</b> ... 'Which coat did the lady ask whether we had put...
Whether, yes/no	¿ <b>Preguntó la señora si habíamos colocado</b> ... 'Did the lady ask whether we had put ...
When, wh	¿ <b>Qué abrigo preguntó la señora cuándo habíamos colocado</b> ... 'Which coat did the lady ask when we had put...
When, yes/no	¿ <b>Preguntó la señora cuándo habíamos colocado</b> ... 'Did the lady ask when we had put...
Preposition (gap)	... <b>en</b> la cómoda del dormitorio? '... in the bedroom drawers?'
Filled object (filled gap)	... <b>su</b> jersey en la cómoda? '... her sweater in the drawers?'



**Figure 1.** Proportion of gap choices (i.e. preposition choices) by condition at the first choice point. Error bars represent standard error.

**REFERENCES.** [1] Sprouse et al. (2016) *Nat Lang Linguist Theory* 34; [2] Sprouse & Messick (2015) 46<sup>th</sup> NELS poster; [3] Villata et al. (2020), CUNY 2020 poster; [4] Pañeda & Kush (submitted) Spanish embedded question island effects revisited: An experimental study; [5] Forster et al. (2009) *Behav Res Methods* 41(1); [6] Villata et al. (2016) *Lingua* 179; [7] Atkinson et al. (2016) *Front Psychol* 6.