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On the weak vs. strong island distinction: experimental evidence from Spanish.

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1. Introduction

Goals: explore the contrast between different islands in Spanish, and the variation of island effects across different constructions to reveal (a) which structures are indeed islands and (b) whether there is any gradience in the strength of island effects.

Summary: we report and discuss the findings from an acceptability judgment task that tested five different islands in Spanish (*wh*-islands, *whether* islands, complex NP islands, adjunct islands and relative clause islands), for a relative clause extraction. In order to tease apart fine-grained contrasts between different constructions we applied the factorial definition of island effects (Sprouse et al. 2012).

2. Background

Gradience in island effects: the *weak* vs. *strong* island distinction.

Islands can come in two different 'varieties' –***weak*** and ***strong***:

→ This distinction can referred to the extraction possibilities: while strong islands block all kinds of extractions, weak islands block certain types of extraction elements.

→ This distinction can also refer to the strength of the island effect (see i.a. Cinque 1990, Boeckx 2012): while strong islands show a strong deviance, weak islands are not 'strongly felt'. Examples in (1) illustrate this (judgment from Boeckx 2012):

(1) a. COMPLEX NP ISLAND: STRONG ISLAND
*Which girl did Sonia refute [the claim that Bill kissed__]?
b. 'WHETHER' ISLAND: WEAK ISLAND
??Which girl did Sonia wonder [whether Bill kissed __]?

This contrast is not always straightforward, and has led authors to propose different explanations for islandhood in each case (e.g., Rizzi (1990)'s *Relativized Minimality*).

Regarding Romance languages, and Spanish in particular, a lot of variation has been found as well (see, e.g. Torrego (1984) regarding *wh*-extraction, or Saab and Zdrojewski (2012) who report variation of repair effects depending on the island type).

Factorial definition of islands & DD-scores (Sprouse et al. 2012)

- A **factorial design** isolates different factors that can affect the acceptability of a sentence –i.e. the distance between the antecedent and the gap ('length') and the structural complexity of the sentence containing the dependency ('structure').

  → the simplest reductionist theory predicts that the relationship between the two processing costs should be *linearly additive* (i.e. no interaction)

  → a *super additive* effect is found if the overall difference is greater than the sum of the individual differences (i.e. interaction)

  – Motivation for using a factorial design:
    - ∗ Many theoretical proposals regarding the origin of islands were based on informal judgments, often times lacking systematic comparisons between different structures.
    - ∗ Most studies only consider the deviance of the island itself, informally comparing different islands without taking into consideration the base-line, non-island condition, which might already show a difference between to begin with.

- **DD scores capture** the strength of the superadditive interaction:

  → a positive DD score reflects a super additive interaction, and the larger the DD, the larger the interactions, which is interpreted as a stronger island effect; on the contrary, a DD score of zero represents no interaction at all (i.e. no island effect).

How to calculate DD-scores? first, we calculated the difference (D1) between the NON-ISLAND/OBJECT condition and the ISLAND/OBJECT condition. Second, we calculated the difference (D2) between the scores in the other two conditions (i.e. NON-ISLAND/SUBJECT and ISLAND/SUBJECT). Finally, we calculated the difference between these two difference scores.

3. Experimental Design

- **Task:** Acceptability judgment task (Likert scale 1-7) on Ibex Farm
- **Participants:** 41 native speakers of *Rioplatense* Spanish, recruited on social media
- **6×2 design:**
  - construction type: non-islands, *wh*-islands, *whether* islands, CNP islands, adjunct islands and RC islands
  - two extraction types: subject and object
  - one dependency type: relative clause dependencies
- **Experimental items:**
  - 36 lexical items
  - Grammatical (N=18) and ungrammatical (N=18) fillers were included
  - Each participant rated a total of 72 sentences
- **Analysis:**
  - Each island type analyzed separately with linear mixed-effects models on z-scores
  - Fixed factors: extraction type (i.e. subject and object) and island type
  - Random intercepts: participant and item

Sample stimuli

examples in (a) are subject extractions; examples in (b) are object extractions.

(2) Non-island
a. Sonia vio al profesor que escuchó que Bruno contrató a Daniel.
Sonia saw DOM.the professor that heard that Bruno hired DOM Daniel
'Sonia saw the professor that heard that Bruno hired Daniel.'
b. Sonia vio al profesor que Daniel escuchó que Bruno contrató.
Sonia saw DOM.the professor that Daniel heard that Bruno hired.
'Sonia saw the professor that Daniel heard that Bruno hired.'

(3) *Whether* island
a. Sonia vio al profesor que preguntó si Bruno contrató a Daniel.
Sonia saw DOM.the professor that asked if Bruno hired DOM Daniel
'Sonia saw the professor that know whether Bruno hired Daniel.'
b. Sonia vio al profesor que Daniel preguntó si Bruno contrató.
Sonia saw DOM.the professor that Daniel asked if Bruno hired.
'Sonia saw the professor that Daniel know whether Bruno hired.'

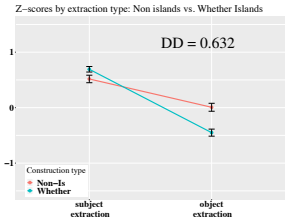
(4) *Wh*-island
a. Sonia vio al profesor que preguntó quién contrató a Daniel.
Sonia saw DOM.the professor that asked who hired DOM Daniel
'Sonia saw the professor that asked who hired Daniel.'
b. Sonia vio al profesor que Daniel preguntó quién contrató.
Sonia saw DOM.the professor that Daniel asked who hired.
'Sonia saw the professor that Daniel asked who hired.'

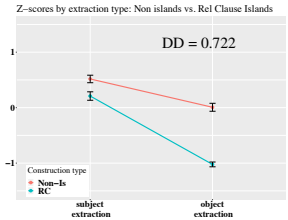
(5) Complex NP island
a. Sonia vio al profesor que escuchó el rumor de que Bruno contrató a Daniel.
Sonia saw DOM.the professor that heard the rumor of that Bruno hired DOM Daniel
'Sonia saw the professor that heard the rumor that Sonia hired Daniel.'
b. Sonia vio al profesor que Daniel escuchó el rumor de que Bruno contrató.
Sonia saw DOM.the professor that Daniel heard the rumor of that Bruno hired.
'Sonia saw the professor that Daniel heard the rumor that Bruno hired.'

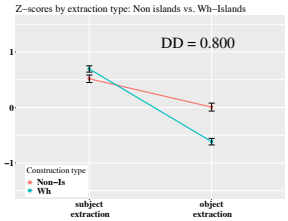
(6) Adjunct island
a. Sonia vio al profesor que se alegró cuando Bruno contrató a Daniel.
Sonia saw DOM.the professor that got.happy when Bruno hired DOM Daniel
'Sonia saw the professor that got happy when Bruno hired Daniel.'
b. Sonia vio al profesor que Daniel se alegró cuando Bruno contrató.
Sonia saw DOM.the professor that Daniel got.happy when Bruno hired.
'Sonia saw the professor that Daniel got happy when Bruno hired.'

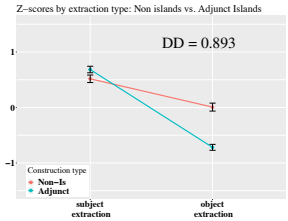
(7) Relative Clause island
a. Sonia vio al profesor que escuchó que los empleados que contrataron a D. renunciaron ayer.
Sonia saw DOM.the professor that heard that the employees that hired DOM D. resigned yesterday
'Sonia saw the professor that heard that the employees that hired D. resigned yesterday.'
b. Sonia vio al profesor que D. escuchó que los empleados que contrataron renunciaron ayer.
Sonia saw DOM.the professor that D. heard that the employees that hired resigned yesterday
'Sonia saw the professor that Daniel heard that the eomplyees that hired resigned yesterday.'

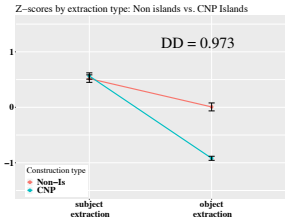
4. Results: Z-scores and DD-scores











* DD=DD-scores
- main effect of island type ($p<0.0001$)
- main effect of extraction type ($p<0.0001$)
- significant interaction ($p<0.0001$)

→ DD scores show that **there is a super additive effect** in all constructions, henceforth, we can conclude that **all constructions are indeed islands**.

- Do some islands give rise to a stronger effect?
  - the analysis on DD scores showed that there is no effect of DD type ($p = 0.068$), namely, there doesn't seem to be a difference regarding the strength of the island effect across the different constructions
  - to support these results, an analysis using Differences scores (i.e. D1 and D2) was run: we found a main effect of island type ($p<0.0001$), a significant effect of extraction type ($p<0.0001$), but no significant interaction ($p = 0.2$).

→ We conclude that **there is no difference regarding the strength of island types overall**, but it might be some difference between particular islands.

5. Discussion and preliminary conclusions

- Our experiment shows that the five constructions tested exhibit supper-additive effects, that is, **the five constructions should be considered islands in Spanish**.
- There is no difference regarding the strength of the island effect; in this respect, there is **no clear evidence to maintain a distinction between the different island types**.
- Regarding previous claims, it is possible that when authors refer to some islands as having a 'stronger effect' than others (e.g. RC islands vs. *wh*-islands), they only consider the deviance of the island itself, and not the fact that in the non-island condition, one type shows a larger degradation to begin with.
- The results obtained in this study emphasize the prominent place that formal experimental work deserves in linguistic theory.