

Remarks on labeling theory and the experimental study of wh-islands

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Abstract

The goal of this squib is to draw attention to the way experimental research on wh-islands can inform the discussion on the labeling approach to movement (Chomsky 2013 and related work).

Keywords: labeling, Null Subject Languages, wh-islands, Spanish.

1. Background

Chomsky (2013 and subsequent work) puts forward a labeling approach to syntactic movement. Within this framework, syntactic objects, SOs, need labels (information regarding their category) to be interpreted at the interfaces. Combinations of a head and an XP are unproblematic; the labeling algorithm will select H as the label, due to minimal search considerations, and the SO might be transferred to the interfaces:

$$(1) \quad \text{SO} = \{\text{H}, \text{XP}\}$$

When two phrases do not share their most relevant feature, the labeling algorithm fails. That is the case for β in (2a), as EA and v^* don't share their most relevant feature. The issue forces EA to move, thus motivating subject movement to TP, (2b):

- (2) a. T [_β (EA) [_v* [V IA]]]
 b. C [_α EA TP]

Since EA and TP share their most salient feature (phi-features) in (2b), the labeling ambiguity problem caused by the raising of the subject is trivially solved without any further movement operations. The empirical basis of this proposal relies partially on locality facts to be reviewed in this squib through the lens of experimental research on the topic. Specifically, while Chomsky's (2013) discussion of locality focuses on that-trace effects primarily, Chomsky (2014) extends the proposal to wh-islands. In doing so, he adopts the received view on wh-islands: in English, there is an asymmetry in the locality properties of wh-subjects and wh-objects (see the Empty Category Principle, ECP, Chomsky 1981). Specifically, he relates the following contrast between subject and object extraction, (3a) and (3b), respectively, to the fact that copies are arguably invisible to the labeling algorithm:

- (3) a. *Which dog do you wonder if t likes the bones?
 b. Which bones do you wonder if the dog likes t?

In particular, the extraction of the subject prevents the embedded TP from being labeled in (3a), as T cannot label itself and the copy of the subject, being invisible, cannot help. (3b), in contrast, is grammatical since there is no labeling issue.

This same received view claims that, while wh-subjects are sensitive to wh-islands in English, (3a), this is not the case in NSLs like Spanish. In this language, wh-subjects pattern with wh-objects, (4a) and (4b) respectively, in that both can escape from wh-islands:¹

- (4) a. ¿Qué perro no sabes si t aprecia los huesos?
 what dog not know.2sg if likes the bones
 b. ¿Qué huesos no sabes si el perro aprecia t?
 which bones not know.2sg if the dog likes

Chomsky (2014) follows an early line of thought which argues the rich verbal agreement of NSLs to be responsible for the behavior of the subject. Specifically, he captures this intuition by positing that in NSLs, the richness of TP allows it to be labeled without the copy of the subject; thus, the locality restriction found in English in (3a) does not apply.

The literature on the labeling approach to movement has attempted to capture the crosslinguistic variation in the properties of T in at least in the following ways: Rizzi (2015) adopts a traditional analysis focusing on the availability of null expletives in NSLs. Within this alternative, the subject would be extracted from a postverbal position and would not have to go through Spec, TP, where the null expletive is sitting. This allows the subject to avoid being frozen in that position, in contrast to English (see Ortega-Santos 2016 for Spanish). Thus, wh-subjects may escape wh-islands in NSLs. In turn, Gallego (2017) puts forward an alternative concerning the properties of

¹ The change from *wonder* in English to Spanish *no sabes* is motivated by the need to control for an independent factor, namely, the fact that the most natural translation of *wonder*, namely, *preguntarse*, shows idiosyncratically strong island effects (Torrego 1984).

T. According to this view, T is a copy of C in English and, as a copy, it is invisible to the labeling algorithm. Thus, the presence of the subject in TP is necessary for TP to be labeled in this language. In contrast, in Spanish T and C are independent lexical items and, thus, T may label itself. Gallego's proposal can help explain (4a) given that the copy of the wh-subject is not needed to label the embedded TP; thus, the wh-subject may escape the wh-island and move to the main Spec,CP. Still, as discussed in the next section, experimental research reveals a different picture of wh-islands effects in NSLs and beyond.

2. Wh-islands: The view from experimental syntax

This section notes the relevance of experimental research on wh-islands for the labeling approach to movement, following earlier discussion in Ortega-Santos (2024). The discussion is updated with novel observations.

With regard to the locality of wh-subjects, Ortega-Santos et al. (2019) provided experimental evidence that wh-islands are active in Iberian Spanish and that, most importantly, wh-subjects are sensitive to them contrary to what Chomsky's labeling approach to movement assumes (see Pañeda Rodríguez et al.'s 2024 for a recent overview of the experimental study of wh-island in Spanish, including discussion of individual variability; see Sprouse et al. 2016 for Italian and Schoenmakers et al. 2024 for Romanian, specifically, for wh-objects in both cases). In particular, these works follow Sprouse et al.'s (2016) factorial design aimed at teasing apart various factors affecting the perception of acceptability: (i) presence/absence of island ((5a) vs. (5c)); (ii) long/short wh-movement ((5a) vs. (5b)); (iii) island violation (present/absent, (5b) vs. (5d)) (data from Ortega-Santos et al. 2019, adapted from Sprouse et al. 2016):²

- (5) a. *Short wh-movement, non-island*
 ¿Quién_i t_i piensa que Pablo escribió el informe?
 'Who_i t_i thinks Paul wrote the report?'
 b. *Long wh-movement, non-island*
 ¿Quién_i piensas que t_i escribió el informe?
 'Who_i do you think t_i wrote the report?'
 c. *Short wh-movement, island (no violation)*
 ¿Quién_i no t_i sabe por qué Juan escribió el informe?
 'Who doesn't know why Juan wrote the report?'
 d. *Long wh-movement, island (potential violation)*
 ¿Quién_i no sabes por qué t_i escribió el informe?
 'Who_i don't you know why t_i wrote the report?'

By taking these factors into account, the analysis can reveal whether the perception of unacceptability of the island is independently explained by them or whether there is a separate effect of the wh-island violation (superadditivity; z-scores were used to control for potential biases in the use of a 7-point Likert scale by the

² According to Torrego (1984), wh-islands in Spanish are only induced by embedded wh-elements which force inversion, which adds a certain degree of complexity to the English-Spanish contrast assumed in section 1. In the experiment, the intervening wh-element, *por qué* 'why', was chosen due to the fact that it does not cause inversion.

various participants). Both English and Spanish were tested with closely-matched stimuli to ensure crosslinguistic comparability. The mean rates and standard deviation per condition were as follows, where the Long + Island condition received the lowest ratings, as expected if there is a wh-island violation:

	Non-island				Island			
	Short		Long		Short		Long	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Spanish	.824	.518	.888	.466	.214	.859	-.872	.748
English	1.038	.580	1.248	.599	.289	.773	-.861	.769

The differences-in-differences score (DD score) for L1 Spanish is 1.15; for English, 1.36. That is to say, the effect of the wh-island violation in both Spanish and English is not the result of the sum of those factors (length of movement and presence of the island). It corresponds to a separate and distinct effect of the island violation on the perception of acceptability.³

These results are relevant for theorizing on the labeling approach to movement in the following way: They suggest that (a) the syntax of Spanish and English is more similar than previously thought in that both languages show similar locality restrictions in the syntax of wh-subjects, and (b) there is, a priori, less variation than standardly assumed in the locality properties of wh-islands. The former observation means that T, allegedly, cannot label itself in any NSLs either, contrary to Chomsky's proposal on the assumed contrast in (4). This being said, differences in the properties of subjects in these two languages (e.g., the (un)availability of null subjects in finite contexts or the (un)availability of postverbal subjects) cannot be ignored, a fact that makes these results even more puzzling.

With regard to the locality of wh-objects, crucially for current purposes, experimental research using the said factorial design has also provided evidence for the fact that wh-objects are subject to wh-islands in Spanish and English. Specifically, Pañeda et al. (2024) tested both languages using the same methodology and matched stimuli. For structures involving the main verb *know* and the embedded wh-word *why* (the closest stimuli to Ortega-Santos et al. 2019), the results are as follows, where the DD score for L1 Spanish is 1.3; for English, 1.09:

³ The research on islands through the use of factorial designs is part of an ongoing debate on whether islands are codified in the grammar as opposed to being perceived as unacceptable due to processing difficulties inherent to these structures (e.g., see Phillips 2003, a.o.). In the case of wh-islands, these arguably include a Minimality violation (Rizzi 1990), which is known to be hard to process for independent reasons (see Ortega-Santos 2011, 2024 for detailed discussion on the processing of wh-islands and Minimality-like constraints on the parser, building on work by Lewis and Vasisht 2005, and Gordon et al. 2001, a.o.). Still, Pañeda Rodríguez (2022) provided evidence from Spanish that wh-islands are indeed part of the grammar, given that speakers with higher working memory span and less susceptible to memory interference effects do not find them more acceptable. See Pham et al. (2020) for related evidence from English. For a critical discussion of the factorial design and research on islandhood, see Kim (2021).

	Non-island				Island			
	Short		Long		Short		Long	
	Mean	SD	Mean	SD	Mean	SD	Mean	SD
Spanish	.386	.671	.366	.581	.147	.674	-1.175	.536
English	.761	.342	.431	.581	.539	.498	-.879	.558

Given their results, the assumed contrast between the extraction of wh-subjects vs. wh-objects from wh-islands in English, (3), and the immunity to wh-islands for both wh-subjects and objects in Spanish, (4), is not empirically correct. If true, the argument that (a) copies are invisible to the labeling algorithm and (b) T can label itself in NSLs, is based on questionable evidence, a fact that calls for further research. To reconcile these facts with the labeling approach as it stands, it is possible to capture the data through independent mechanisms, e.g., by positing the existence of a particularly strict form of Relativized Minimality. To the best of my knowledge, no such approach has been developed so far, as these wh-island facts are at odds with the received view. Overall, this observation stresses the importance of so-called data triangulation, that is to say, gathering data through various methodologies (see Gupton and Leal 2021 and references therein), particularly for subtle acceptability nuances or for contexts where processing factors may play a role in the perception of acceptability.

To conclude, the labeling approach to movement provides some relevant ways of analyzing crosslinguistic variation in wh-islands (Chomsky 2014). Unfortunately, failure to incorporate novel generalizations concerning the distribution of wh-islands across languages calls into question the empirical adequacy of the proposal. An alternative whereby wh-islands arise from independent factors (e.g., a strict enforcement of Relativized Minimality) might be able to explain the data while preserving the original technology of the labeling approach.

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