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Successive Cyclic Movement and Subject Positions
A Contrastive Study of Embedded Subjects in Italian and Spanish

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Abstract This paper investigates subject distribution in biclausal wh-questions in Italian and Spanish through a crosslinguistic web-based acceptability judgement experiment. We tested the effects of successive cyclic movement, subject position, and verb type in the two languages. The results show that long-distance wh-movement triggers subject inversion in the embedded clause in both languages, with postverbal subjects rated more acceptable than preverbal ones. In short movement contexts, when no wh-extraction takes place from the embedded clause, Spanish allows both SV and VS, while Italian favours SV. These results provide experimental evidence for the syntactic effects of successive cyclic movement and show that the wh-verb adjacency requirement banning subject interpolation is structural rather than merely superficial.

Keywords Subject inversion. Subject position. Wh-movement. Acceptability judgement experiments. Italian. Spanish.

Summary 1 Introduction: Subject Inversion in Wh-Questions. – 2 The Experiment: Methodology. – 3 Experimental Results. – 4 Discussion: Assessing the Experimental Hypotheses. – 5 Permissive and Restrictive Romance Languages: Spanish vs Italian. – 6 Conclusions.

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1 Introduction: Subject Inversion in Wh-Questions

Subject position has been a central issue in generative syntax since early work on the subject's movement from its thematic position within VP to higher functional projections. In Romance languages, however, the alternation between preverbal and postverbal subjects is closely linked to information structure, with postverbal subjects typically associated with focus (e.g., Belletti 2004; Bentley, Cruschina 2018; Cruschina 2022). Within the Cartographic framework, preverbal subjects occupy higher discourse-related positions, while postverbal subjects remain in lower vP/IP positions.[1] This paper examines a syntactically determined instance of subject placement, namely obligatory subject inversion in wh-questions (cf. Rizzi 1996; 2001; Cardinaletti 2007; Goodall 2010). Focusing on long-distance wh-movement in Italian and Spanish, and building on earlier observations by Calabrese (1982) and Torrego (1983; 1984), we investigate whether subject inversion extends to embedded clauses through two parallel acceptability judgement experiments.

Both in Italian and in Spanish direct wh-questions with bare wh-elements, no constituent can intervene between the wh-phrase and the main verb; so, when it is not null or left dislocated, the matrix subject typically occurs postverbally. See Cardinaletti (2007; 2021) for Italian. Since Calabrese (1982) and Torrego (1983; 1984), it has been observed that this type of subject inversion triggered by wh-movement occurs not only in the matrix clause of wh-questions, with short movement, but also in embedded clauses with long-distance wh-movement, that is, when a wh-phrase extracted from an embedded clause transits through the embedded CP and moves successive cyclically towards its final landing site. With wh-movement from an embedded clause, the embedded subject must be postverbal, as shown in (1b) for Italian and (2b) for Spanish:

(1) Italian (Calabrese 1982, 39-40)

a.	??	Che cosa	gli	hai	detto	che	Carlo	ha	fatto?
		what thing	him.DAT	have.2SG	said	that	Carlo	has	done
b.		Che cosa	gli	hai	detto	che	ha	fatto	Carlo?
		what thing	him.DAT	have.2SG	said	that	has	done	Carlo

'What did you say Carlo has done?'

1 See Cardinaletti 2004; Rizzi 2005; Rizzi, Shlonsky 2006; Bocci 2013, and Rizzi, Bocci 2017.

(2) Spanish (Torrego 1984, 109)

a. * ¿Qué pensaba Juan que Pedro le había
what thought John that Peter him.DAT had.3SG
dicho que la revista había publicado?
told that the journal had.3SG published

b. ¿Qué pensaba Juan que le había dicho
what thought John that him.DAT had.3SG told
Pedro que había publicado la revista [*t*] ?
Peter that had.3SG published the journal
'What did John think that Peter had told him that the journal had published?'

Judgements about subject positions in embedded contexts, however, are not as clear-cut as for matrix subjects. We therefore decided to conduct two acceptability judgement experiments, one for Spanish and one for Italian, to investigate the acceptability of preverbal and postverbal subjects in different types of biclausal wh-questions.

Building on Calabrese (1982) and Torrego (1983), we hypothesize that in long-distance wh-questions, postverbal subjects in the embedded clause should be rated as more acceptable than preverbal subjects (Hypothesis 1, H1) in both Italian (H1a) and Spanish (H1b). We also investigated subject distribution in biclausal wh-questions where the wh-element is extracted directly from the matrix clause. Since no wh-copy/trace occurs in the embedded CP, nothing is expected to trigger inversion of the embedded subject. Even so, a Spanish-Italian contrast is predicted by Leonetti (2017), whose account of the syntax-information-structure mapping is detailed in Section 5: Spanish allows preverbal and postverbal subjects interchangeably, whereas Italian – where inversion must be licensed by a trigger, either a wh-element or focus on the subject (see Belletti 2004) – prefers the unmarked SV order. The same patterns are expected in the complement clauses of short-movement wh-questions, where no wh-element is extracted (Hypothesis 2, H2): in Spanish the embedded subject should be acceptable both preverbally and postverbally (H2b), while in Italian it should be preferred preverbally (H2a). This pattern was indeed observed for Italian by Bocci and Cruschina (2018), through a forced-choice task.

2 The Experiment: Methodology

We conducted a cross-linguistic acceptability judgement experiment based on written stimuli, designed to test the acceptability of biclausal wh-questions featuring preverbal or postverbal subjects in the embedded clause in both Italian and (European) Spanish. Target

questions were embedded in short fictional scenarios that provided a plausible discourse context. Native speakers of Italian and Spanish were asked to rate the acceptability of the target questions (presented in blue) on a 7-point Likert scale (-3 = completely unnatural, +3 = perfectly natural).

2.1 Design and Experimental Materials

The experiment crossed four binary factors: (i) *wh-dependency* type (*short extraction from matrix clause* vs. *long extraction from embedded clause*), (ii) embedded *subject position* (*preverbal* vs. *postverbal*), (iii) *verb type* in the embedded clause (*transitive* vs. *intransitive*), and (iv) *language* (*Italian* vs. *Spanish*). The factors *wh-dependency* and *subject position* were manipulated within items, whereas *verb type* was manipulated between items.

The combination of the first three linguistic factors resulted in sixteen experimental conditions (8 per language). Examples of the experimental items are shown here below, with an embedded transitive verb in Italian (cf. 3-4) and with an intransitive verb in Spanish (cf. 5-6):

(3) CONTEXT: 'Francesco is the new philosophy teacher at a high school in Catania. On his first day at work, a colleague tells him about an unpleasant incident that has not been addressed. Feeling puzzled, Francesco asks:'

a. A chi hai detto che gli studenti ti (short/SV)
to who have.2SG said that the students you
hanno insultato?
have.3PL insulted

b. A chi hai detto che ti hanno insultato (short/VS)
to who have.2SG said that you have.3PL insulted
gli studenti?
the students
'Who did you tell that the students insulted you?'

(4) CONTEXT: as in (3).

a. Chi hai detto che gli studenti hanno (long/SV)
who have.2SG said that the students have.3PL
insultato?
insulted

b. Chi hai detto che hanno insultato (long/VS)
who have.2SG said that have.3PL insulted
gli studenti?
the students
'Who did you say the students insulted?'

(5) CONTEXT: 'Pablo's marriage has come to an end. The arguments at home have now given way to disputes in court. Pablo is talking with a friend, who, to avoid misunderstandings and plan the next steps, asks:'

a. ¿A quién han dicho que el abogado te ha mentido? (short/SV)
to who have.3PL said that the lawyer you have.3SG lied

b. ¿A quién han dicho que te ha mentido el abogado? (short/VS)
to who have.3PL said that you have.3SG lied the lawyer
'Who did they tell that the lawyer lied to you?'

(6) CONTEXT: as in (5)

a. ¿A quién te han dicho que el abogado ha mentido? (long/SV)
to who you have.3PL said that the lawyer have.3SG lied

b. ¿A quién te han dicho que ha mentido el abogado? (long/VS)
to who you have.3PL said that have.3SG lied the lawyer
'Who did they tell you that the lawyer lied to?'

The same introductory scenario was used for all variants of an item. The matrix verb was always 'say' (Italian *dire*, Spanish *decir*). With transitive embedded verbs, the wh-phrase was the matrix indirect argument in short extraction and the embedded direct object in long extraction; with intransitive verbs, it was always an indirect complement, of either the matrix or the embedded verb.[2] To make the extraction site unambiguous, a clitic pronoun saturated the relevant argument position in the matrix or embedded clause. Crucially, apart from the subject in the relevant conditions, no constituent (argument or adjunct) followed the embedded verb, preventing any interaction between subject inversion and postverbal constituents. This control was particularly relevant for Italian, where postverbal constituents, especially direct objects, are known to heavily constrain subject inversion (see Belletti 2001; 2004; Cardinaletti 2001; 2007, a.o.).

2 In both languages, inversion in wh-questions depends on the type of wh-phrase: non-D-linked arguments strongly favour it, while some adjuncts ('why', 'how come') and D-linked phrases more readily allow non-inverted orders (Torrego 1983; 1984; Suñer 1994; Rizzi 1997; 2001; Goodall 2010). We thus restricted our materials to argument wh-phrases, leaving other types for future work.

Furthermore, the scenarios introducing the target questions were constructed so as not to favour a topic interpretation of the embedded subject, thus preventing participants from interpreting postverbal subjects as right-dislocated topics.[3] Indeed, under appropriate discourse conditions, topical subjects can undergo right dislocation, overriding the syntactic constraints that normally govern subject inversion (Belletti 2004; Cardinaletti 2001; 2007). For the same reason, in the written stimuli, postverbal subjects were never preceded by a comma separating them from the immediately preceding verb. Right-dislocated constituents typically form independent intonational phrases (Bocci 2013; Bocci, Avesani 2015), and a comma is commonly used in writing to signal their prosodic phrasing as independent prosodic constituents. The materials tested in Spanish and Italian were designed to be as similar as possible, differing only in minor adjustments required to ensure naturalness in each language version.

Following this design, we created 24 items for each language: 12 with a transitive verb in the embedded clause and 12 with an intransitive verb. Each item was manipulated for embedded subject position and type of wh-movement, resulting in four distinct variants and yielding a total of 96 experimental stimuli per language. The 96 stimuli were distributed across four lists following a Latin Square design. Each list included twenty-four experimental trials, to which we added 48 filler trials. Like the experimental items, fillers were embedded in short contexts. The target sentences in the filler trials were declarative sentences in which the surface position of the focused constituent varied. As a result, each list contained 72 trials in total. On average, the experiment lasted approximately twenty minutes.

2.2 Procedure and Recruitment

The experiment was created and hosted on PCIbex (Zehr, Schwarz 2022). Each session began with a brief description of the study and the task, followed by a consent form. Participants then completed a short questionnaire on their linguistic background. In particular, we asked whether they were native speakers of Italian/Spanish, whether they were living in Spain/Italy at the time, and whether they suffered from any reading, speech, or hearing disorders. After this, they received a more detailed explanation of the task and took

3 Following Cardinaletti (2007; 2018; 2021; 2024), we assume that, in the contexts under consideration, postverbal subjects are not right-dislocated, but remain in their first-merge position, namely, in Spec-vP.

part in a short familiarization phase consisting of three practice trials, analogous to the filler items. Then, the experimental phrase started and each participant was randomly assigned to a list and presented with 72 trials. The experiment ended with a debriefing page illustrating the hypothesis of the experiment.

The cross-linguistic experiment involved two groups of native speakers, Italian and Spanish, who were tested with equivalent materials and procedures. The only difference concerned the recruitment method: Spanish participants were contacted through social media and took part voluntarily, whereas Italian participants were recruited on Prolific.com and received a £3 compensation for their participation.

3 Experimental Results

In total, we collected responses from 214 participants tested in their native language. Two Italian participants who reported that Italian was not their native language were excluded, leaving 110 Italian and 102 Spanish participants (N = 212), all native speakers residing in the relevant country and reporting no language-related difficulties.

Given the nature of our hypotheses, which concern both shared and language-specific effects, we adopted a single cross-linguistic model. Modelling the two languages jointly is essential because the predicted cross-linguistic contrasts (H2) reside in the interactions: it allows us to test directly whether, under short extraction, subject position has an effect in Italian (H2a) but not in Spanish (H2b) – a comparison difficult to assess if each language were analyzed separately, since the Spanish hypothesis would coincide with the statistical null hypothesis.

The acceptability ratings were analyzed using a linear mixed-effects model including all main effects and their interactions (*wh-dependency* × *subject position* × *verb type* × *language*). All categorical predictors were deviation-coded (±0.5), so that the intercept represents the grand mean and coefficients correspond to deviations from it; each contrast expresses the difference between *short* and *long* wh-dependency, *preverbal* and *postverbal* subjects, *intransitive* and *transitive* verbs, and *Italian* and *Spanish*. The model included random intercepts for *participants* and *items*, and uncorrelated random slopes for *wh-dependency*, *subject position*, and *verb type* by *participant*, and for *wh-dependency* and *subject position* by *item*; since the two language groups were tested on distinct materials (24 items per language), *item* was nested within *language*. Model fitting was performed with the lme4 package (Bates et al. 2015) in R, with p-values obtained via lmerTest (Kuznetsova et al. 2017).

The mixed-effects model revealed significant main effects of *subject position* (β = −0.48, p <.001), with postverbal subjects rated more acceptable than preverbal ones, and of *verb type* (β = −0.68, p <.001), with transitive verbs rated higher than intransitives; *language* showed no main effect (β = −0.23, p =.17). These were qualified by significant interactions of *wh-movement* with *subject position* (β = 1.25, p <.001) and with *verb type* (β = −0.75, p <.001), and by two cross-linguistic interactions, *wh-movement* × *language* (β = −0.73, p <.001) and *verb type* × *language* (β = −0.42, p =.025). Crucially for our hypotheses, the three-way interaction of *wh-movement* × *verb type* × *language* was significant (β = 1.26, p <.001), and that of *wh-movement* × *subject position* × *language* approached significance (β = −0.32, p =.054); both are decomposed through the estimated marginal means below. Figure 1 offers a visual overview of the model's predicted means for each condition.

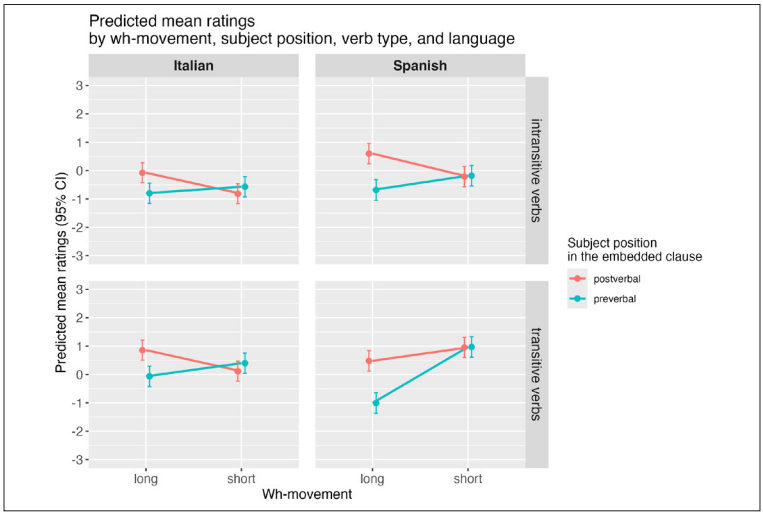


Figure 1 Predicted mean ratings for wh-questions by wh-movement type (short vs. long), embedded subject position (preverbal vs. postverbal), embedded verb type (transitive vs. intransitive), and language

We decomposed the two significant higher-order interactions using estimated marginal means (EMMs; emmeans, Lenth 2024), with Holm's correction for multiple testing. Collapsing across subject position, the *wh-movement* × *verb type* × *language* interaction revealed a divergence between the two languages: in Italian, *short* and *long* wh-movement were statistically comparable for both verb classes (all contrasts n.s., absolute differences < 0.2, p >.1), whereas in Spanish short questions with *transitive* verbs were rated substantially higher than their long counterparts (diff = 1.22, p <.001),

a difference absent with *intransitive* verbs (diff = 0.22, p =.67). This transitive-only advantage of short over long movement, observed only in Spanish, is addressed in Section 4.2; since it emerged averaging across *subject position*s, it should be interpreted with caution.

We then examined the *wh-movement* × *subject position* × *language* interaction, which bears directly on H1-H2. As predicted by H1, in both languages postverbal subjects were rated more acceptable than preverbal ones under long-distance extraction (Italian: −0.08 vs. −0.80, diff = −0.82, p <.001; Spanish: 0.60 vs. −0.68, diff = −1.39, p <.001). In line with H2, a cross-linguistic divergence emerged in short wh-questions: in Italian preverbal subjects were rated higher than postverbal ones (−0.57 vs. −0.82, diff = 0.27, p =.015), whereas in Spanish the two configurations did not differ reliably (−0.18 vs. −0.21, diff = 0.02, p =.82). See Figure 2.

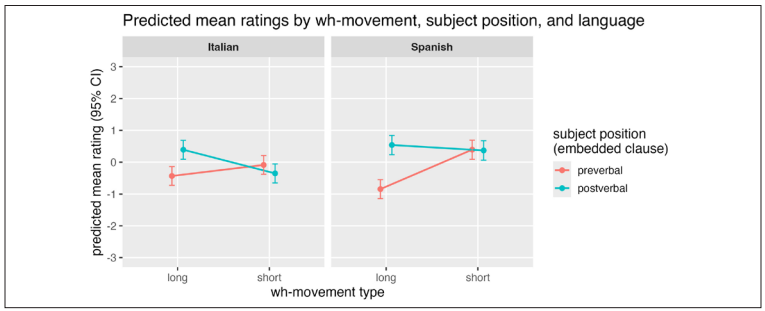


Figure 2 Predicted mean ratings by subject position (preverbal vs. postverbal) across wh-movement type (short vs. long) and language, illustrating the three-way interaction, averaged across embedded verb type

This pattern supports the predicted cross-linguistic asymmetry: both languages prefer postverbal subjects under long extraction, but only Italian reverses this preference under short extraction, as expected from H2. A direct contrast-of-contrasts between the two language-specific short-extraction effects did not reach significance (p =.11), best interpreted as limited statistical power rather than evidence against the asymmetry. A Bayesian estimation (brms; Bürkner 2017) confirmed the same direction, with 94% of posterior samples favouring a larger preverbal-postverbal difference in Italian than in Spanish (median Δ = 0.24, 95% HPD = [−0.06, 0.53]).

4 Discussion: Assessing the Experimental Hypotheses

Our findings show that in biclausal wh-questions, successive cyclic movement triggers subject inversion in both Italian and Spanish, in line with H1 (see §1). The presence of intermediate chain links

in the embedded CP favours postverbal over preverbal subjects in both languages, confirming the generalizations of Torrego (1983) for Spanish and Calabrese (1982) and Cardinaletti (2021) for Italian. Under short movement, by contrast, the distribution diverges: as expected under H2b, in Spanish the embedded subject is equally acceptable preverbally and postverbally, whereas Italian conforms to H2a, with the unmarked SV order judged significantly more acceptable than VS.

4.1 Acceptability Effects of Inversion and Non-Inversion

Besides the evidence supporting our main hypotheses, the results invite two broader considerations.

First, the lack of subject inversion in an embedded clause from which wh-movement originates leads to a marked decrease in acceptability in both languages, an effect that appears even stronger in Spanish than in Italian. This finding suggests that the adjacency requirement between the wh-phrase and the verb is enforced not only when the wh-element is overtly realized but also when it is represented by an intermediate trace or copy. The constraint therefore cannot be reduced to a purely surface condition.

At the same time, the presence of an intervening preverbal subject in an embedded clause appears to have impact on acceptability not as strong as an equivalent intervention in the matrix clause – that is, between the final landing site of the wh-phrase and the verb. Although our experiment did not directly compare these configurations, native-speaker intuitions – and the descriptive tradition – converge on the idea that the adjacency requirement is stricter in matrix contexts. For instance, leaving aside why-questions and D-linked wh-phrases, Rizzi (1996) and Cardinaletti (2007) judge preverbal subjects in matrix wh-questions unacceptable in Italian.[4]

Second, our findings reveal an asymmetry in the strength of inversion-related effects in Italian embedded clauses: the lack of subject inversion under long-distance wh-movement – i.e., in the presence of a structural trigger – leads to a sharp drop in acceptability, whereas the presence of inversion under short movement, where no such structural trigger occurs, results in a milder but still significant penalty. Although we do not yet have a formal account of this asymmetry, we do not think it should be

4 The milder deviance of preverbal subjects under long-distance wh-movement, compared to matrix questions, may relate to indirect questions, where the lack of inversion likewise lowers acceptability, though less sharply than in direct questions (Bocci, Pozzan 2014; Bocci, Cruschina 2018). We leave this for future research.

attributed to a reinterpretation strategy whereby postverbal subjects are reanalysed as right-dislocated constituents to rescue acceptability. As discussed in Section 2, our design discouraged such an interpretation, since the contexts did not favour right dislocation and the stimuli lacked the comma that typically signals its prosody; moreover, as native speakers of Italian, we share the intuition that a postverbal subject without a structural trigger is not as degraded as the lack of inversion when a trigger is present. If this intuition is on the right track, a plausible formal explanation should be sought in the featural content encoded in SubjP (Cardinaletti 2004; Rizzi 2005) and in the mechanisms through which the Subject Criterion is satisfied in Italian (Rizzi 2006).

4.2 Acceptability of Short and Long-Distance Wh-Questions

Tangentially to our main goal, the data reveal an unexpected pattern in the overall acceptability of short- vs. long-distance wh-questions. On psycholinguistic grounds, shorter dependencies impose lower processing costs, so short movement should be rated more acceptable than long, regardless of subject position. Our results do not confirm this: no general short-movement advantage emerged, except in Spanish with transitive embedded verbs, and scores were unexpectedly low for unambiguous short-distance questions in Italian. The puzzle is thus why short questions scored so low, not why long ones scored so high. We can only speculate.

The matrix verb in our stimuli was always 'say' (*decir*), reported to promote closure of a wh-dependency less effectively than other, more complex verbs (Lassotta et al. 2016, 2024). Participants may therefore have delayed closing the dependency after the verb, waiting for the morphosyntactic cue – a clitic in the embedded clause – that disambiguated the extraction site. Such delayed closure runs against parsing principles like the Active Filler Strategy (Frazier, Clifton 1989), Late Closure, and Minimal Attachment (Frazier 1979), but the weak closure-promoting force of 'say' makes it plausible; if so, the low ratings for short-distance questions would reflect processing-related uncertainty rather than grammatical deviance. For Italian, we cannot exclude an effect of implicit prosody (Fodor 2002): Bocci et al. (2021; 2024) show that long-distance wh-questions have a specific disambiguating prosody, which some participants may have projected during silent reading and then revised.

5 Permissive and Restrictive Romance Languages: Spanish vs Italian

Having established experimentally that the two languages converge under long-distance movement but diverge under short movement – Italian preferring preverbal subjects, Spanish showing no SV/VS asymmetry – we can now address a broader question: why does Spanish tolerate postverbal subjects more freely than Italian? This contrast, observed when no structural trigger for inversion is present, can be interpreted in light of Leonetti's (2017) distinction between restrictive and permissive Romance languages, which captures systematic differences in how syntax interfaces with information structure (see also Cruschina, Mayol 2025a; 2025b).

Leonetti proposes that Romance languages fall into two groups according to how syntactic structures are mapped to information structure. Restrictive languages, such as Italian, enforce a tight correspondence: marked syntactic structures are permitted only when a specific informational partition exists, and given partitions are typically realized through marked word orders, including dislocations and inversions. By contrast, permissive languages like Spanish allow a more flexible relationship, granting greater freedom in how informational partitions are expressed and in the conditions under which marked word orders may appear.

Among the phenomena Leonetti (2017) discusses is the availability of postverbal subjects in broad-focus configurations in simple matrix clauses, not limited to unaccusative verbs.[5] Our data show that this availability extends to embedded contexts. In Italian, by contrast, postverbal subjects are acceptable only under specific conditions: with unaccusative verbs, when the subject is narrowly focused or heavy (see Belletti 2004; Bianchi, Bocci, Cruschina 2018; Cardinaletti 2018), or, as our results show, under wh-extraction (see Calabrese 1982; Cardinaletti 2021). Consequently, postverbal subjects are excluded – judged less acceptable – in embedded contexts under short movement.

6 Conclusions

In this paper, we have shown that successive cyclic movement has tangible syntactic effects, yielding postverbal subjects not only in simple direct wh-questions but also in the embedded clause

5 The distinction between restrictive and permissive Romance languages is further supported by the studies on the position of the subject in why-questions. See Bianchi et al. 2017 and Krieger 2024.

of biclausal wh-questions under long-distance movement, where intermediate chain links trigger inversion in both Spanish and Italian. Under short movement, where no such links are present, the two languages diverge: Italian prefers the unmarked SV order, confirming Bocci, Cruschina (2018), whereas in Spanish preverbal and postverbal subjects are equally acceptable. We have related this difference to Leonetti's (2017) distinction between restrictive languages such as Italian and permissive languages such as Spanish in the mapping between syntax and information structure.

Our findings also have important theoretical implications for broader issues that remain open to debate. In particular, the observation that subject inversion occurs even in embedded clauses under long-distance movement suggests that the adjacency requirement between the wh-phrase and the verb cannot be reduced to a merely superficial condition or linear constraint (see Cardinaletti 2007). Instead, this pattern points to a deeper syntactic source related to the mechanisms governing successive cyclic movement.

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