

Subject Islands, Reconstruction, and the Flow of the Computation

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Recent research has highlighted a remarkable variability in subject island effects. Focusing on intransitive verbs and adjectives, we argue that islandhood is determined at the syntax-semantics interface: subjects qualify as islands when they are interpreted outside the predicative nucleus of the clause, in a categorical LF structure (Ladusaw 1994); they are transparent for extraction when they undergo total reconstruction into the predicative nucleus, giving rise to a thetic structure. The thetic/categorical interpretation depends on various factors (most notably the stage-level versus individual-level nature of the predicate), whose interaction accounts for the observed variability of island effects, as shown by our experimental evidence. The relevance of subject reconstruction need not be stipulated; rather, it follows from a top-down-oriented computation, in which movement dependencies are implemented by a storage-and-retrieval mechanism.

Keywords: subject islands, reconstruction, categorical structure, thetic structure, top-down computation

1 Introduction

In the traditional typology of island constraints, subjects were classified as strong islands (see Szabolcsi and Den Dikken 1999). Recent research has highlighted the fact that not all subjects give rise to equally robust island effects; however, different empirical generalizations have been proposed, and the issue remains controversial (see Stepanov 2007, Jurka 2010 for general discussion).

In this article, we investigate extraction from the subject of intransitive predicates in Italian (both unaccusative and unergative), and we propose that subjects qualify as islands only when they are part of a categorical LF structure (in the sense of Ladusaw 1994), whereby they are interpreted outside the predicative nucleus of the clause; when instead they are included in a thetic structure, they undergo total reconstruction into the thematic position and they are transparent for extraction. The categorical versus thetic interpretation of a clause is determined by the interplay of different factors, most notably the stage-level versus individual-level nature of the predicate and, in Italian, the preverbal versus postverbal position of the subject. This complex interplay

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accounts for the inherent variability of acceptability judgments for sentences that are amenable to either a categorical or a thetic construal.

The link that we establish between transparency and subject reconstruction is at first blush conceptually problematic; as a matter of fact, in an architecture that adopts a covert cycle separate from overt syntax, such a connection could not even be stated. We show that the proposed constraint follows naturally from a left-right (Phillips 1996), top-down computation (Chesi 2007, 2012).

The article is organized as follows. In the remainder of this section, we compare three recent approaches to subject island effects, and we argue that among these, only the presuppositionality-based account (Diesing 1992, Jiménez Fernández 2009) is compatible with the observed variability of acceptability judgments. In section 2, we review Diesing's reduction of island effects to the derived LF position of presuppositional noun phrases, and the reinterpretation that Ladusaw (1994) offered in terms of categorical versus thetic structures.

In section 3, we advance the central hypothesis that only categorical (nonreconstructed) subjects are islands for extraction; thetic (reconstructed) subjects are not (Extraction from Subject Constraint). This makes precise empirical predictions. Since individual-level predicates require a categorical structure, we expect their subjects to uniformly block extraction. On the contrary, stage-level predicates are compatible with either a categorical or a thetic structure; hence, they are predicted to have a nonuniform behavior.

In sections 3.1 and 3.2, we present experimental evidence from Italian showing that subjects of intransitive individual-level predicates (both unaccusative and unergative) are uniformly islands irrespective of their position, whereas subjects of intransitive stage-level predicates can be transparent, but only when they are postverbal. The lack of transparency of preverbal subjects indicates that in Italian, these subjects are interpreted as categorical; in English, instead, a preverbal subject allows either a categorical or a thetic interpretation. In section 4, we suggest that this crosslinguistic difference is related to the availability of a postverbal "free inversion" position in Italian, which is clearly noncategorical. We then discuss a natural implementation of the categorical/thetic divide in terms of a dedicated "subject of predication" position in the preverbal field (Cardinaletti 2004, Rizzi 2006).

In section 5, we turn to the theoretical motivation of the proposed Extraction from Subject Constraint, and we show that it follows naturally if we reverse the direction of the computation from bottom-up to top-down. In section 5.1, we sketch the top-down Minimalist grammar that we adopt and we analyze the islandhood of nonreconstructed subjects. In section 5.2, we introduce a top-down implementation of total reconstruction, which does not require undoing a previous step of the derivation (see Barker 2009). In section 5.3, we show how the Extraction from Subject Constraint follows from such a system. Finally, in section 6 we offer a synthesis and some concluding remarks.

1.1 The Controversial Assessment of Subject Island Effects

In the principles-and-parameters framework, subjects were considered absolute islands for extraction, and their islandhood was derived from very general constraints like Huang's (1982) Condition

on Extraction Domain (CED), Kayne's (1983) Connectedness Condition, or Chomsky's (1986) barriers system. In the more recent Minimalist literature, instead, it has been argued that not all subjects are islands. However, from the empirical viewpoint the assessment is controversial, and consequently, different syntactic factors have been argued to be relevant. We briefly review three prominent proposals.

1.1.1 External versus Internal Merge According to Takahashi (1994) and Stepanov (2007), subjects qualify as islands when they occupy a derived position. This is illustrated by a contrast like (1a) versus (1b): in (1a), the preverbal subject is in a derived Spec,TP position and blocks extraction of the *wh*-phrase *who*; in (1b), instead, the postcopular subject is in the external Merge position and is transparent for extraction.

- (1) a. ?*Who does [a picture of *t*] hang on the wall?
 (Stepanov 2007:80, (1a))
 b. Who is there [a picture of *t*] on the wall?
 (Stepanov 2007:92, (31))

In Takahashi's analysis, the islandhood of derived subjects follows from the interplay of two independent constraints. The Shortest Move principle requires an extracted phrase to first adjoin to the constituent it is extracted from; the Chain Uniformity Condition, however, bans adjunction to a phrase occupying a derived position. When in (1a) we try to extract *who* from the derived subject, adjunction to the subject violates Chain Uniformity, and direct extraction violates Shortest Move; hence, there is no legal derivation. In (1b), instead, *who* can adjoin to the subject located in its base position, so as to comply with Shortest Move without violating Chain Uniformity.

1.1.2 External versus Internal Argument Takahashi's (1994) proposal predicts that *all* subjects occupying a derived position are islands. This prediction is called into question by the following data:

- (2) *Of which car did [**the (driver, picture) *t***] cause a scandal?
 (Chomsky 2008:147, (6b))
 (3) Of which car was [**the (driver, picture) *t***] awarded a prize?¹
 (Chomsky 2008:147, (7b))

Chomsky (2008) argues that, irrespective of their base or derived position, subjects are islands if they are external arguments, as in the active sentence (2), but not if they are internal arguments, as in the passive sentence (3). This is because an external argument, located at the edge of the v*P phase, is not in the search domain of v* and cannot be searched for the PP complement/goal.

¹ As the reader will immediately notice, the acceptability of (3) contrasts with the unacceptability of Stepanov's (1a). A crucial difference concerns the stranding of the preposition *of* in (1a) as opposed to its pied-piping in (3). For discussion, see footnotes 9 and 32.

1.1.3 Discourse Linking Chomsky's (2008) approach predicts that all external arguments are islands for extraction. But even this empirical generalization has been challenged. Jiménez Fernández (2009) points out the following contrast in Spanish, involving two instances of extraction from an external argument:

- (4) a. ¿[De qué cantante] te parece que [**algunas fotos** *t*] han escandalizado
 of which singer you seem that some pictures have shocked
 a la audiencia?
 to the audience
 'Of which singer does it seem to you that some pictures shocked the audience?'
 (Jiménez Fernández 2009:127, (57b))
- b. ¿¿[De qué cantante] te parece que [**las fotos** *t*] han escandalizado
 of which singer you seem that the pictures have shocked
 a la audiencia?
 to the audience
 Intended: 'Of which singer do you think that the pictures shocked the audience?'
 (Jiménez Fernández 2009:129, (60a))

In (4a), the subject is an indefinite introduced by a weak determiner (*algunas* 'some'), whereas in (4b), the subject is definite and specific. Accordingly, Jiménez Fernández proposes that the crucial property determining islandhood is discourse linking (D-linking)—a special kind of existence presupposition, whereby the subject denotation is, or belongs in, a set of entities that is already familiar in the context (in (4b), a set of pictures) (see Pesetsky 1987). By hypothesis, D-linking turns a DP into a strong phase, which is impenetrable for any external probe—whence its islandhood.

1.1.4 Experimental Evidence Jurka (2010) and Jurka, Chizuru, and Omaki (2011) experimentally investigated the predictions of the first two approaches in German, English, and Japanese. Their findings from German do not support the Takahashi-Stepanov hypothesis, because in-situ external arguments turn out to be significantly less transparent than internal arguments. Chomsky's approach is not confirmed either, because in English, extraction from derived subjects shows no significant difference according to whether the predicate is unaccusative/passive or unergative/transitive.

The authors take this evidence to support the original CED-based asymmetry between subjects and internal arguments, and they derive it from Nunes and Uriagereka's (2000) Multiple Spell-Out account of strong islands. On the other hand, they observe that their study participants actually accepted some CED-violating extractions; that is, the participants' acceptability judgments do not directly mirror the clear-cut grammaticality opposition that the theoretical account predicts.

We are convinced by Jurka's claim that experimental methodology is the only rigorous way to empirically assess island effects, and consequently, we decided to adopt this methodology in our study (see sections 3.1–3.2). On the other hand, it seems to us that the theoretical approach adopted by Jurka does not allow him to incorporate in his analysis any interface effects that might

account for the nuanced acceptability judgments; in particular, he does not investigate the potential role of presuppositionality. In this article, we aim at developing a theoretical framework that may integrate purely grammatical constraints with contextual/interface factors in a single, coherent analysis.

1.2 A Starting Hypothesis

The three approaches reviewed in sections 1.1.1–1.1.3 agree with respect to two ‘‘extreme’’ cases (see Jurka 2010:sec. 3.1.3.4): on the one hand, an unmoved and non-D-linked internal argument is transparent for extraction (see (5)); on the other hand, a D-linked external argument occupying a derived position blocks extraction (see (6)). For ease of exposition, we abbreviate the three proposals as follows: derived subject position (DS), external argument (EA), D-linking (DL).

- (5) il personaggio di cui è stata pubblicata – DS – EA – DL
 the personality of whom is been published
[un’intervista ____]
 an interview
 ‘the personality of whom an interview has been published’
- (6) ?*il personaggio di cui **[l’intervista ____]** ha + DS + EA + DL
 the personality of whom the interview has
 provocato uno scandalo
 raised a scandal
 Intended: ‘the personality of whom the interview caused a scandal’

All the other cases in which the three factors disagree constitute a *gray area* where acceptability judgments are unstable from speaker to speaker, and from one example to the next. (7) is an illustrative paradigm.²

- (7) a. il personaggio di cui è stata pubblicata – DS – EA + DL
 the personality of whom is been published
[l’intervista ____]
 the interview
 ‘the personality of whom the interview has been published’
- b. il personaggio di cui **[l’intervista ____]** è stata + DS – EA + DL
 the personality of whom the interview is been
 pubblicata ieri
 published yesterday
 ‘the personality of whom the interview was published yesterday’

² In this paradigm, a definite subject is taken to be D-linked and an indefinite to be at least potentially non-D-linked. This is a simplification, but it is not problematic for our illustrative purposes here (see further footnote 8).

- c. il personaggio di cui **[un'intervista ____]** è stata +DS –EA –DL
 the personality of whom an interview is been
 pubblicata ieri³
 published yesterday
 'the personality of whom an interview was published yesterday'
- d. il personaggio di cui mi ha scandalizzato –DS +EA –DL
 the personality of whom me has scandalized
[un'intervista]
 an interview
 'the personality of whom an interview scandalized me'
- e. il personaggio di cui mi ha scandalizzato –DS +EA +DL
 the personality of whom me has scandalized
[l'intervista]
 the interview
 'the personality of whom the interview scandalized me'
- f. il personaggio di cui **[un'intervista]** mi ha –DS +EA –DL
 the personality of whom an interview me has
 scandalizzato
 scandalized
 'the personality of whom an interview scandalized me'

We believe that this observation should be taken very seriously: it is an *empirical fact* to be explained, and not a failure to properly idealize the data (as a matter of fact, the gray area is much more extended than the small subset of clear-cut cases like (5)–(6)). Consider then from this perspective the three factors listed above. Factors DS and EA are categorical, in that they refer to easily identifiable structural properties of the subject: therefore, they predict different but equally consistent patterns of acceptability. Only factor DL is compatible with the observed variability, since (as is well-known) certain noun phrases are ambiguous between a D-linked and a non-D-linked interpretation.

On these grounds we assume, as a starting hypothesis, that D-linking (presuppositionality) is the crucial factor that is responsible for subject island effects, and we preliminarily hypothesize that factors DS and EA may be relevant to the extent that they contribute to determining a D-linked interpretation of the subject.

2 Presuppositionality and Island Effects

Our starting hypothesis is not novel: the idea that presuppositionality induces islandhood has been proposed by Diesing (1992). In exploring the interpretive properties of indefinite noun phrases,

³ An anonymous *LI* reviewer judges this example grammatical. We find it slightly better than (7b), but still worse than (5), and therefore we believe that it falls in the "gray area." Given the instability of such judgments, our claims will be based on experimental results (section 3.1).

Diesing builds on Carlson's (1977) distinction between *individual-level (i-level) predicates*, which express a stable and characterizing property of an entity, and *stage-level (s-level) predicates*, which express a transitory property. Crucially, i-level predicates allow only for presuppositional subjects, whereas s-level predicates are compatible with both presuppositional and nonpresuppositional subjects. For instance, in (8a) the i-level predicate *altruistic* induces a presuppositional interpretation of the subject bare plural (whereby the set of firemen is presupposed to be non-empty). On the contrary, in (8b) the s-level predicate *available* allows for a reading whereby the existence of firemen is not presupposed; rather, it is *asserted* that there exist some available firemen.

- (8) a. Firemen are altruistic. (i-level)
 b. Firemen are available. (s-level)

Diesing captures this asymmetry in syntactic terms. On her analysis, i-level predicates are control predicates, whose subject is generated outside VP; on the contrary, with s-level predicates the subject originates inside VP, and even if it raises to a VP-external position, it may undergo reconstruction. Diesing then proposes the Mapping Hypothesis, whereby, at the interface, (a) VP-external indefinites receive a presuppositional interpretation, and (b) VP-internal indefinites are nonpresuppositional and are bound by default Existential Closure applying at the VP level.

The Mapping Hypothesis implies that presuppositional indefinites occupy a VP-external position at LF. Such a derived position is not transparent for extraction;⁴ therefore, presuppositionality entails islandhood. As a matter of fact, the necessarily presuppositional subjects of i-level predicates are islands, as in the German example (9a), whereas subjects of s-level predicates can be transparent for extraction, as in (9b).

- (9) a. *Was sind für Schuhe wasserdicht? (i-level)
 what are for shoes waterproof
 Intended: 'Which kind of shoes are waterproof?'
 b. Was sind für Karotten im Kühlschrank? (s-level)
 what are for carrots in.the refrigerator
 'What carrots are in the refrigerator?'
 (Diesing 1992:40, (41a–b))

Although its empirical consequences are quite interesting, Diesing's Mapping Hypothesis seemed rather stipulative. However, Ladusaw (1994) proposed a reinterpretation of it in terms of the distinction betweenthetic and categorical judgments. To characterize these very roughly, we may say that athetic judgment is a simple judgment whereby one accepts or rejects the existence of an object (or eventuality); a categorical judgment is instead a compound judgment, whereby one first accepts the existence of an object, and then accepts or rejects the judgment that this object has a certain property (see also Kuroda 1972, 2005).

⁴ In Diesing's approach, this is because a noun phrase occupying a derived position is not L-marked (i.e., it is not in a position related to a lexical head), and hence it qualifies as a barrier for extraction (in Chomsky's (1986) barriers system).

Rephrasing this distinction in the terms of model-theoretic semantics, Ladusaw proposed that thetic judgments correspond to semantic structures where the subject is interpreted as part of the description of an eventuality; therefore, it is interpreted *within the predicative nucleus* of the clause, where it falls in the scope of unselective Existential Closure.⁵ By contrast, categorical judgments correspond to structures where the subject is quantificational and combines with a property (of type $\langle e, t \rangle$); therefore, the subject is compositionally *external* to the subtree that denotes the relevant property.

Syntactically, this means that the subject is interpreted in different positions *at the interface*. Even if it moves to IP for syntactic reasons, the subject of a thetic structure will undergo reconstruction into the base position (see (10)). On the other hand, the subject of a categorical structure must occupy a high derived position at the interface; if we assume—*pace* Diesing (1992) and Kratzer (1995), and in line with more recent assumptions—that all subjects originate within *v*/VP, then the subject of a categorical structure necessarily raises from its thematic position, and cannot undergo reconstruction into it (see (11)).

(10) $[\text{IP} \dots (\exists) [\text{vP} \dots \text{DP}_{[-\text{presupp}]} \dots]]$ (thetic structure)

(11) $[\text{IP} \dots \text{DP}_{i[+\text{presupp}]} [\text{vP} \dots e_i \dots]]$ (categorical structure)

Presuppositionality follows as a side effect of the thetic/categorical divide: the subject of a thetic structure—which asserts existence—must lack any existential presupposition (and a fortiori D-linking), whereas in a categorical structure, the subject must be presuppositional.

In the following section, we build on Ladusaw's proposal in order to link subject island effects to the type of syntactic structure that is required at the interface with the interpretive component.

3 The Extraction from Subject Constraint

With this characterization of the syntax of categorical versus thetic structures, we can now formulate a constraint on extraction from subjects.

(12) *Extraction from Subject Constraint (ESC)*

Only a subject occupying a thematic position *at the interface* is transparent for extraction.

In the Minimalist approach, a thematic position corresponds to an argument's "first Merge" position. We maintain for concreteness that the thematic position of the subject is VP-internal with unaccusative predicates and Spec,vP with unergative predicates; however, even more refined hypotheses (e.g., Ramchand 2008) are compatible with our argument. Below, we will provide experimental evidence to the effect that it is irrelevant for extraction whether the thematic position of the subject is the internal or external argument position (*pace* Chomsky 2008).

The ESC implies that only a subject that is totally reconstructed into a thematic position is transparent for extraction. In light of the thetic/categorical opposition discussed in section 2, this amounts to the following constraint:

⁵ Alternatively, a predicate-internal indefinite subject can be interpreted via predicate restriction (Chung and Ladusaw 2005).

(13) Only the subject of athetic structure is transparent for extraction.⁶

Recall now that *i*-level predicates are only compatible with a categorical structure, whereas *s*-level predicates are compatible with both a categorical and athetic structure. We then have the following empirical predictions:

- (14) a. The subject of an *i*-level predicate is never transparent for extraction.
 b. The subject of an *s*-level predicate is transparent only if it is part of athetic structure (hence, nonpresuppositional).

(14a) predicts clearcut unacceptability (although it must be noted that some predicates are ambiguous between an *i*- and an *s*-level interpretation; see Diesing 1992:chap. 2).⁷ (14b) leaves room for a fair degree of variation: the acceptability of extraction will depend on whether the overall context favors a categorical or athetic interpretation of the relevant sentence. One relevant factor is, of course, the nature of the subject: if it is a strong quantifier or a presuppositional definite description,⁸ it must be interpreted outside the predicative nucleus, forcing a categorical structure.

⁶ An anonymous *LI* reviewer points out the following prediction of (13): in Japanese, categorical *wa*-marked subjects should be islands, whereasthetic *ga*-marked subjects should be transparent. This prediction seems to be borne out: in (ia), the *ga*-marked subject is not an island for extraction, whereas in the parallel example (ib), the *wa*-marked subject is.

- (i) a. ?**Nani-o** John-ga [Mary-ga *t* katta] koto]-ga mondai-da to] omotteru no?
 what-ACC John-NOM Mary-NOM bought fact-NOM problem-is COMP think Q
 Intended: 'What does John think that [the fact that Mary bought *t*] is a problem?'
 (Saito 1994:226, (84b))
 b. ***Nani-o** John-ga [Mary-ga *t* katta koto]-wa mondai-da to] omotteru no?
 what-ACC John-NOM Mary-NOM bought fact-TOP problem-is COMP think Q
 Intended: 'What does John think that [the fact that Mary bought *t*] is a problem?'
 (Shoichi Takahashi, pers. comm.)

On the other hand, *wa*-marked phrases may not be a uniform class (Kuroda 2005, Vermeulen 2011).

⁷ As an illustration, the *i*-level adjective *simpatico* 'likeable' becomes compatible with a phasal adverbial like *ormai* 'by now' when a specific 'point of view holder' is made explicit.

- (i) Gianni è (?*ormai) simpatico.
 Gianni is by.now likeable
 'Gianni is by now likeable.'
 (ii) Gianni mi è (ormai) simpatico.
 Gianni to.me is by.now likeable
 'By now, Gianni has become likeable to me.'

⁸ It must be noted that on Ladusaw's analysis, definiteness does not necessarily imply presuppositionality (Ladusaw 1994:5–6); as a matter of fact, the judgment about (15c) is not clear-cut for our informants. It seems that, at least in English, definite noun phrases are not always interpreted as presuppositional.

- (i) There was the air of the successful businessman about him.
 (Abbott 2001:12, (26b))
 (ii) There is the outline of a human face hidden in this puzzle.
 (Abbott 2001:12, (26c))

Here, the definite article seems to mark uniqueness independently of familiarity/presuppositionality. We know of no comprehensive account of presuppositional and nonpresuppositional definites (see Abbott 2001, Roberts 2003 for relevant discussion). From the perspective of the ESC, nonpresuppositional definites are not expected to be islands; the instability of judgments with definite subjects probably relates to a potential ambiguity between a presuppositional and a nonpresuppositional reading.

In (15), we provide a prototypical paradigm to test the predictions in (14). (15a) exemplifies extraction from an indefinite subject with an *i*-level predicate; this is predicted to be unacceptable, because the structure is necessarily categorical. (15b) exemplifies extraction from an indefinite subject with an *s*-level predicate (the *s*-level interpretation is enhanced by the phasal adverbial *already*); this is predicted to be significantly more acceptable than (15a). Finally, (15c) exemplifies extraction from the definite subject of an *s*-level predicate; assuming that the definite subject is presuppositional (see footnote 8), extraction is expected to be degraded with respect to (15b). Preliminary testing with some native speakers indicates that these predictions are on the right track.⁹

- (15) *Context*: An art collector has ordered reproductions of a number of masterpieces: some big-size reproductions and a small-size one for each.
- a. ?*Of which masterpiece is [one reproduction ____] absolutely perfect?
 - b. Of which masterpiece is [one reproduction ____] already available?
 - c. ?Of which masterpiece is [the small-size reproduction ____] already available?

In order to systematically test these predictions, we performed an experiment with native speakers of Italian, to which we now turn.

3.1 Experimental Evidence

In preparing the experimental materials, we had to take into account two syntactic properties of Italian.

First, in main interrogative clauses subject inversion is obligatory, as (16a–b) show (see Rizzi 1996). On the other hand, under long-distance movement of the interrogative phrase, subject inversion is not mandatory, (16c).

- (16) a. Quale libro avrà comprato Gianni per Maria?
 which book will.have bought Gianni for Maria
 ‘Which book has Gianni probably bought for Maria?’
- b. ??Quale libro Gianni avrà comprato per Maria?
 which book Gianni will.have bought for Maria
 Intended: ‘Which book has Gianni probably bought for Maria?’
- c. Quale libro pensi che Gianni avrà comprato per Maria?
 which book (do you) think that Gianni will.have bought for Maria
 ‘Which book do you think that Gianni has probably bought for Maria?’

⁹ The examples in (15), like (3), involve pied-piping of the preposition rather than extraction of the complement of the preposition. According to Jurka (2010:chap. 5), the pied-piping case is actually not an instance of extraction: the PP is base-generated in a hanging topic position.

(i) Of which cars was it the case that the hoods (of those cars) were damaged by the explosion?
 (Jurka 2010:151, (10))

However, it seems to us that such a nonextraction analysis can hardly account for the different degrees of acceptability in (15). See also footnote 32 for a different proposal on the pied-piping/P-stranding contrast. (In the appendix, section A.4, we provide evidence against a nonmovement approach.)

Therefore, to be able to test the islandhood of preverbal subjects, we consistently used examples of *long-distance wh*-extraction from the subject of a complement clause.

Second, as is well-known, Italian differs from English in allowing “free subject inversion” (i.e., subject inversion not contingent on local *wh*-movement); thus, in principle *i*- and *s*-level predicates might combine with either a preverbal or a postverbal subject in the complement clause. We decided to uniformly test extraction from both positions. However, free inversion is sensitive to a number of constraining factors when the subject is not narrowly focused (see section 4.2); in particular, *transitive predicates* severely restrict the possibility of free inversion, especially when the internal argument remains within the VP (for discussion, see Alexiadou and Anagnostopoulou 2001, 2007, Belletti 2004). For this reason, it was impossible to fit transitive predicates into our experimental design, and we restricted our investigation to intransitives.

The experimental paradigms are exemplified in (17). We tested the possibility of long-distance *wh*-movement from a preverbal and a postverbal subject both with *i*-level predicates and with *s*-level ones. The two types of predicates were discriminated by the possibility of cooccurrence with phasal adverbs like *già* ‘already’ and *ancora* ‘still’. Both unaccusative and unergative predicates were tested. Other factors were kept constant, as follows:

- The extracted *wh*-PP always contained a lexical restriction (this factor is known to favor extraction; see Cinque 1990b, Starke 2001 for discussion).¹⁰
- The subject was always a nonpartitive indefinite (since partitives are inherently presuppositional; see Enç 1991).
- The predicate was an adjective (the unaccusative/unergative opposition for adjectives is discussed in detail below).

(17) *Context*: A discussion between two experts on constitutional law.

a. [*i*-level, preverbal]

Di quale articolo ritieni che [una revisione ____] sarebbe
of which section (do you) think that a revision would.be
incostituzionale?
unconstitutional

‘Of which section do you think that a revision would be unconstitutional?’

b. [*i*-level, postverbal]

Di quale articolo ritieni che sarebbe incostituzionale [una
of which section (do you) think that would.be unconstitutional a
revisione ____]?
revision

‘Of which section do you think that a revision would be unconstitutional?’

¹⁰ As Cinque (1980) discusses in his seminal article, in Italian it is possible to extract from a DP only a genitive PP headed by the preposition *di* ‘of’ that qualifies as the *subject* of DP—that is, occupies the most prominent position within the DP. See also Longobardi 1991 and, for a recent reformulation, Cinque 2011. For an explanation of Cinque’s generalization within the derivational approach that we adopt, see the appendix, section A.3.

c. [*s-level, preverbal*]

Di quale articolo ritieni che [una revisione ____] sarebbe ormai
 of which section (do you) think that a revision would be by now
 opportuna?
 timely

‘Of which section do you think that a revision would be timely?’

d. [*s-level, postverbal*]

Di quale articolo ritieni che sarebbe ormai opportuna [una
 of which section (do you) think that would be by now timely a
revisione ____]?

revision

‘Of which section do you think that a revision would be timely?’

The data were collected with a controlled judgment elicitation technique.

The experimental items consisted of 8 paradigms like (17), with 4 variable combinations each (2 subject positions \times 2 predicate types). The items were divided into four different experiments (Latin Square design): in each experiment, each of the four conditions (a–d) was tested with two items, so that only one example was extracted from each paradigm. The items were interspersed with an equal number of fillers, with various degrees of acceptability, and were presented in a randomized order. All participants performed one experiment at a time, with breaks in between, via an online interface. They were asked to indicate the degree of acceptability of each presented sentence on a continuous bar with 400 points. Figure 1 shows a screenshot of the data presentation.

Study participants were 13 adult native speakers from northern and central Italy, who were recruited personally or by e-mail by the investigators.

The data were collected through an online interface implemented with Osucre (Van Acker 2007), and the results were analyzed with R using a within-subject analysis, 2-way ANOVA.

At first, we observed a great variability in grammaticality judgments (figure 2). Despite this, two interesting results emerged. First, although there is no significant dependence of acceptability on verb type ($F(1, 12) = 3.41, p = .09$), there is a significant effect of subject position ($F(1, 12) = 8.58, p = .01$). Second, and more important, we found a strongly significant effect of the *interaction* between subject position and verb type ($F(1, 12) = 8.58, p = .003$); see figure 3.

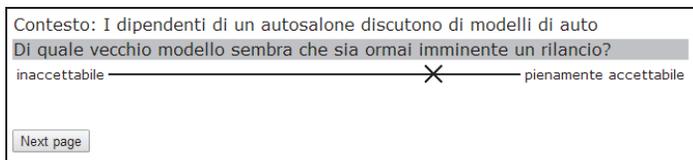


Figure 1
 Experiment screenshot

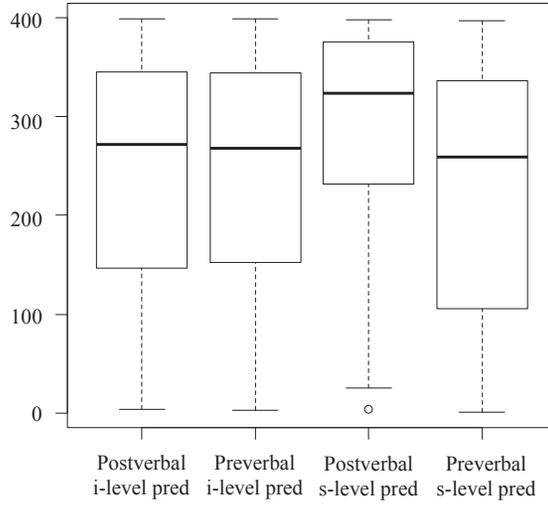


Figure 2
Distribution of grammaticality judgments per condition (verb type × subject position)

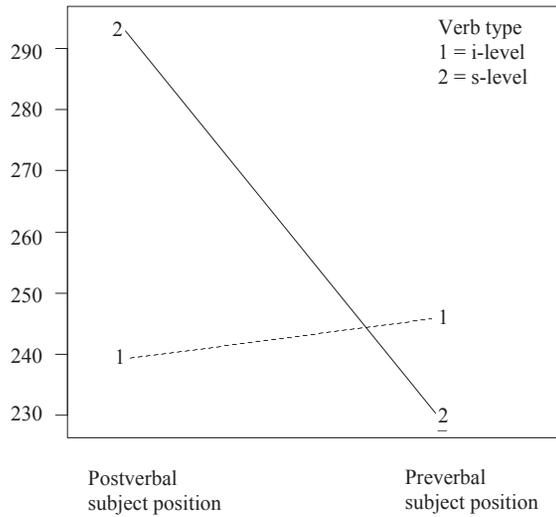


Figure 3
Variable interaction: verb type × subject position

3.2 Discussion

The experimental results show that in itself, the type of predicate (i- vs. s-level) is not a significant factor, while the position of the subject (pre- vs. postverbal) is significant. When the two factors are combined, however, a much stronger asymmetry emerges.

As shown in figure 3, in the case of i-level predicates the different subject positions in conditions (a) and (b) do not yield a significant difference ($F(1, 12) = 0.33, p = .6$). This is consistent with the ESC, given that i-level predicates can only inhabit a categorical structure; thus, even if the subject appears postverbally, it cannot be interpreted in the thematic position at the interface. (There is actually independent evidence that free subject inversion is deviant with i-level predicates; we return to this point in section 4.2.)

On the contrary, in the case of s-level predicates the difference between extraction from a preverbal subject and extraction from a postverbal subject is highly significant ($F(1, 12) = 13.56, p = .003$). At first sight, this is not expected under the assumption that Universal Grammar allows for total reconstruction of the subject inthetic structures. In fact, the low degree of acceptability of extraction in condition (c) contrasts with the reported acceptability of extraction from preverbal subjects of s-level predicates in English, as in (3), for example, repeated here.

- (3) Of which car was [the driver ____] awarded a prize?

From the perspective of the ESC, the island effects observed in condition (c) lead us to hypothesize that in Italian, as opposed to English, preverbal subjects of intransitive predicates resist reconstruction even when the predicate is s-level.

Interestingly, this hypothesis is independently supported by evidence concerning scopal interactions. It has long been noted that in Italian, contrary to English, preverbal subjects tend not to reconstruct into the scope of a lower operator. Consider for instance the contrasts in (18)–(20) (the English examples (18a) and (20a) are from McCloskey 1997:207, (11)).

- (18) a. Every player didn't score. (✓ not > ∀)
 b. Ogni giocatore non ha segnato. (* not > ∀)
 every player not has scored
 'Every player didn't score.'
- (19) a. A unicorn seems [t to be in the garden]. (✓ seem > ∃)
 b. Un unicorno sembra [t essere nel giardino]. (?* seem > ∃)
 a unicorn seems to.be in.the garden
 'A unicorn seems to be in the garden.'
- (20) a. Most guests might be late. (✓ might > most)
 b. La maggior parte degli ospiti potrebbe essere in ritardo. (?* might > most)
 the major part of.the guests might to.be late
 'Most guests might be late.'

(18) shows that a universally quantified subject can be reconstructed in the scope of negation in English, but not in Italian. Similarly, in the English example (19a) the existentially quantified

subject can be reconstructed in the scope of the raising verb *seem*, whereas the same is impossible in Italian (19b). This evidence suggests the following descriptive generalization:

(21) In Italian, preverbal subjects tend not to reconstruct.

Intuitively, this tendency may be related to the availability in Italian of one further subject position, namely, the free inversion position; we refer in particular to free inversion under broad focus in declarative clauses.¹¹ The exact nature of the free inversion position is controversial: it may be the internal argument position with unaccusative predicates and the external argument position with unergatives (Longobardi 2000); alternatively, Belletti (1988) has argued that only indefinite unaccusative subjects fill the internal argument position, whereas definite unaccusative subjects, and all unergative subjects, are adjoined to VP.

Independently of their exact location, there is evidence that freely inverted subjects under broad focus are *internal to the predicative nucleus* of the clause (they are not preceded by an intonational break, and they undergo negative concord); hence, from the present perspective, they do not give rise to a categorical structure and, even if they do not directly occupy a thematic position, they can be reconstructed into it. (The noncategorical status of postverbal subjects is independently argued for by Cardinaletti (2004:151).) The transparency of postverbal subjects in condition (d) of our experiment is then predicted by the ESC, given that they are internal to the predicative nucleus and yield a thetic interpretation.

As for preverbal subjects, we can reason as follows. Plausibly, free inversion involves a more economical derivation than movement to the preverbal position.¹² By local economy of derivations, a thetic structure will be implemented by free inversion wherever this is syntactically possible: consequently, in any clause where free inversion is possible, a preverbal subject will be interpreted as categorical, and it will fail to reconstruct. That is, the fact that two surface subject positions are available leads to a ‘specialization’ that minimizes the reconstruction (or covert raising) steps.¹³ (21) can then be restated more precisely in the following terms: in any clause where free inversion is possible, movement to the preverbal subject position implements a categorical structure, hence disallowing reconstruction.¹⁴ The ESC cannot be satisfied, and the preverbal subject gives rise to robust island effects.

¹¹ We leave aside inversion in matrix interrogative clauses like (16a), which might involve a different structural position (see Guasti 1996:sec. 5.6). We also leave aside narrowly focused subjects and postverbal subjects that are preceded by an intonational break: these allow for inversion under different conditions than subjects under broad focus (Pinto 1997), and they have a different syntax (Longobardi 2000, Belletti 2004).

¹² If the inverted subject is in a thematic position, this option is more economical by definition; if it occupies a position in the edge of vP (Belletti 1988, 2004), it remains within the phase boundary, whereas movement to the TP layer will require crossing the vP phase boundary.

¹³ A similar suggestion for German can be found in Bayer 2006:7n5. For recent discussion, see Bobaljik and Wurmbrand 2012 (on which, see also footnote 35).

¹⁴ This line of reasoning leads us to expect that, when free inversion is syntactically blocked and movement is mandatory, the preverbal subject is not necessarily interpreted as categorical (see also Cardinaletti 2004:152, (145)); hence, it should allow for reconstruction and satisfaction of the ESC. This prediction remains to be investigated.

On the other hand, English lacks free inversion: the subject must move to a preverbal position, and the only way to obtain athetic structure is by reconstruction. Since there is no more economical option, preverbal subjects of s-level predicates can be reconstructed (see (18a), (19a), (20a)), and when they are, by the ESC, they are transparent for extraction (see (3), (15b)). This accounts for the less robust island effects of preverbal subjects in English.

At this point, we can also reconsider the role of the two other factors that have been identified in the literature as conditioning factors for islandhood, as discussed in sections 1.1.1–1.1.2.

As for factor DS (derived vs. base position), we have shown that derived subjects qualify as islands only to the extent that the derived position favors a categorical interpretation of the subject; this is robustly the case in languages like Italian (see (21)), but not in English.

As for factor EA (external vs. internal argument), we believe that internal arguments tend to be more transparent than external arguments because, for the most part, unaccusative and passive predicates describe a *change of state*, which cannot constitute a characterizing property of the internal argument; hence, these predicates qualify as s-level, and they are compatible with athetic structure.

In section 1.2, we argued that factor EA cannot account for the observed variation in acceptability judgments. Nevertheless, it is important to consider cases where the empirical predictions of the ESC differ from those of EA. It can be shown that unaccusativity is neither a necessary nor a sufficient condition for the transparency of the subject.

Cinque (1990a) identified a number of empirical tests to distinguish unergative from unaccusative adjectives in Italian; we consider only three of them here. One standard unaccusativity test is the possibility of cliticizing *ne* out of the subject, as exemplified in (22a).¹⁵

- (22) a. Ne sono note le tendenze.
of.them are well.known the tendencies
‘Their tendencies are well-known.’
(Cinque 1990a:7, (13b))
- b. *Ne è stata ingiusta la condanna.
of.them is been unjust the condemnation
Intended: ‘His/Her/Their condemnation is unjust.’
(Cinque 1990a:7, (17b))

A second unaccusativity test is the ability or inability of the adjective to occur in an adjunct ‘as’-clause.

¹⁵ One anonymous *LI* reviewer calls the *ne*-cliticization test into doubt. It has long been noted that *ne*-cliticization is sometimes possible out of apparently unergative subjects; see Calabrese and Maling 2008:sec. 6 for discussion and references. Note however that, for the purposes of our argument, *ne*-cliticization is just one of the possible tests for unaccusativity; even if it turned out to be unreliable, we could make our point by using Cinque’s other tests.

- (23) a. Come era [prevedibile ____], Gianni non è venuto.
 as was foreseeable Gianni not is come
 ‘As was foreseeable, Gianni did not come.’
 (Cinque 1990a:20, (43b))
- b. *Come era [possibile] ____, Gianni ha vinto.
 as was possible Gianni has won
 Intended: ‘As it was possible, Gianni has won.’
 (Cinque 1990a:20, (44c))

A third test is the selection of the particle *di* to introduce an infinitival complement, as exemplified in (24): only unaccusative adjectives select the particle.

- (24) a. Non gli era noto *(di) essere così famoso.
 not him was known *di* to.be so famous
 ‘He didn’t know that he was so famous.’
 (Cinque 1990a:23, (53a))
- b. Mi è impossibile (*di) aiutarti.
 to.me is impossible *di* to.help.you
 ‘It is impossible for me to help you.’
 (Cinque 1990a:23, (54a))

Cinque also considered transparency for extraction to be an unaccusativity test. However, on closer inspection we can see that the subject of an s-level predicate can be fully transparent for extraction, as in (25a), even if it fails the three unaccusativity tests, as in (25b–d).

- (25) a. [Di quale legge] ritieni che sarebbe utile [una revisione ____]?
 of which law (do you) think that would.be useful a revision
 ‘Of which law do you think that a revision would be useful?’
- b. ?*(Di questa legge), **ne** sarebbe utile [una revisione ____].
 of this law of.it would.be useful a revision
 Intended: ‘As for this law, a revision of it would be useful.’
- c. ?*Come era utile, abbiamo controllato i documenti.
 as was useful (we) have checked the documents
 Intended: ‘As it was useful, we checked the documents.’
- d. E’ utile (*di) discutere.
 (it) is useful *di* to.discuss
 ‘It is useful to discuss.’

Thus, unaccusativity is not a necessary condition for transparency (*pace* Cinque 1990a, Chomsky 2008).¹⁶

¹⁶ Note that in our experiment, two of the eight experimental paradigms included the adjectives *necessario* ‘necessary’ and *frequente* ‘frequent’, which fail these unaccusativity tests.

The reverse dissociation is also observed: as (26)–(27) show, if an unaccusative predicate is i-level, its subject blocks extraction (*pace* Kratzer 1995), be it in preverbal or postverbal position. I-level unaccusatives are rare, and we exemplify here with verbal predicates (unaccusativity is witnessed by the selection of the *be*-auxiliary).

- (26) a. *[Di quale regione] sembra che [alcuni dialetti] appartengano alla famiglia
of which area seems that some dialects belong in.the family
germanica?
Germanic
Intended: ‘Of which area do some dialects seem to belong in the Germanic family?’
- b. *[Di quale regione] sembra che vi appartengano [alcuni dialetti ____]?
of which area seems that in.it belong some dialects
Intended: ‘Of which area do some dialects seem to belong in it?’
- (27) a. ?*[Di quale dialetto] sembra che [molti tratti] derivino dal substrato
of which dialect seems that many features derive from.the substrate
celtico?
Celtic
Intended: ‘Of which dialect do various features seem to derive from the Celtic substrate?’
- b. *[Di quale dialetto] sembra che ne derivino [molti tratti ____]?
of which dialect seems that of.it derive many features
Intended: ‘Of which dialect do various features seem to derive from it?’

The ungrammaticality of extraction in (26)–(27) shows that unaccusativity is not a sufficient condition for transparency either.

In order to experimentally prove the irrelevance of EA, we carried out an additional test, with a design similar to that of the first experiment, but focusing only on the relevance of verb type (unergative vs. unaccusative) in the extraction from a postverbal subject inthetic structures.

- (28) a. [Di quale soprano] **risuonava** nel teatro [la mirabile voce]? (**unergative**)
of which soprano **sounded** in.the theater the wonderful voice
‘Of which soprano did the wonderful voice sound in the theater?’
- b. [Di quale soprano] si **levava** nel teatro [la mirabile (**unaccusative**)
of which soprano REFL.CL **arose** in.the theater the wonderful
voce]?
voice
‘Of which soprano did the wonderful voice arise in the theater?’

We constructed eight minimal pairs of sentences like the one in (28). In preparing the experimental items, we identified one factor that affects the possibility of athetic interpretation with unergatives. Unergatives are typically *activity* verbs: when their subject is [+animate], it is inter-

preted as a volitional causer; hence, its existence is presupposed with respect to the event described by the verb. However, with [–animate] subjects of ‘‘emission verbs,’’ as in (28), the subject (even if definite; see the appendix, section A.4) is not presupposed, and athetic interpretation is possible.

After constructing the pairs of experimental items, we split them into two pseudorandomized lists (with a balanced number of items and fillers of various degrees of acceptability) and we administered the lists to 20 adult native speakers from northern and central Italy, so that each subject was exposed only to one sentence per pair. The EA hypothesis predicts a significant difference between the two conditions; that is, extraction from unergative subjects should be significantly worse than extraction from unaccusative subjects.

We analyzed the results using within-subject analysis, 1-way ANOVA, and we found *no significant effect of verb type* ($F(1, 19) = 0.007, p = .932$) with respect to grammaticality judgment. Despite great variability, we could observe (figure 4) that in both conditions the median of judgments fell well above 3/4 of the grammaticality scale, and that the distribution of judgments was mostly within what we can call the ‘‘acceptability range.’’

These experimental results confirm that unaccusativity in itself is not a relevant factor. To conclude, we surmise that internal argument status (EA) favors the transparency of the subject only to the extent that it favors a nonpresuppositional reading in athetic structure.

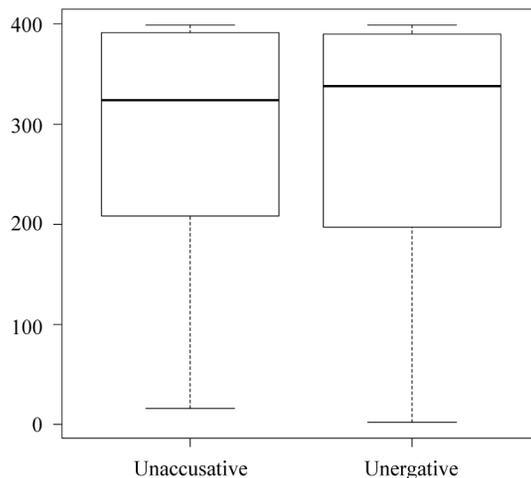


Figure 4

Distribution of grammaticality judgments between unergative and unaccusative conditions

4 Subject Positions and the Categorical/Thetic Divide

4.1 The Categorical Subject Criterion

Recall that we assumed above that all subjects originate within the “first phase” vP, where argument structure is determined. However, a transparent syntax-semantics mapping can obtain only if the subject of a categorical structure is external to the predicative nucleus at the interface (see (11)), whereas the subject of a thetic structure is internal to it (see (10)). How can the syntax implement this opposition?

A specific proposal was advanced by Cardinaletti (2004:151–154). Cardinaletti (1997, 2004) argued that there must be at least two distinct subject positions in the preverbal field (see also Shlonsky 2000). One type of evidence is reported in (29): a referential subject can be separated from the predicate by a parenthetical clause (29a), whereas a semantically vacuous expletive cannot (29b).

- (29) a. John/He, as you know, is a nice guy.
 b. *There, as you know, was a man in the garden.
 (Cardinaletti 1997:45, (46a–b))

Cardinaletti proposed two distinct preverbal subject positions, as in (30).

- (30) [_{SubjP} DP [(parenthetical) [_{Agr_sP/TP} DP . . .]]]
 (Cardinaletti 2004:137, (80))

The higher position, Spec,SubjP, is reserved for the element that qualifies as the *logical subject of predication*; by its very nature, this position cannot be filled by the expletive in (29b). The lower subject position, instead, implements subject agreement and checks nominative case. Cardinaletti argued that when a phrase fills Spec,SubjP, the sentence receives a categorical interpretation; when Spec,SubjP is empty, the sentence receives a thetic interpretation.

Rizzi (2005) rephrased Cardinaletti’s hypothesis in terms of the so-called Subject Criterion. A criterion is a requirement that must be satisfied at the syntax-semantics interface: the specifier of a functional head endowed with a “scopal” feature must be filled by a syntactic constituent sharing the relevant feature. In the case at hand, Rizzi proposed that the criterial head Subj of (30) carries an [aboutness] feature that must be matched by a DP filling its Spec at the interface.

Note that it is an intrinsic property of criterial configurations that the element satisfying a criterion cannot be removed from the criterial position (“criterial freezing”; Rizzi 2006, 2010),¹⁷ which means that it cannot undergo further movement steps and, crucially for our purposes, it cannot undergo reconstruction.

We will then adopt the following reinterpretation of the Subject Criterion:

- (31) The Subject Criterion implements the categorical/thetic opposition.
 a. When a subject moves to the criterial position (Spec,SubjP), at the interface it is interpreted as external to the predicate, giving rise to a categorical structure.

¹⁷ Rizzi (2006) argues that in the case of *wh*-phrases, criterial freezing blocks further movement of the criterial goal, but not subextraction from it. Following Rizzi (2001), we assume that in *wh*-movement chains it is possible to reconstruct just the nominal restriction of the *wh*-phrase.

- b. When a subject moves to the lower, noncriterial position, it is totally reconstructed into the thematic position, so that at the interface it is included in the predicative nucleus, in the scope of Existential Closure.¹⁸ This gives rise to a thetic structure.

We regard this as a conceptually elegant implementation of the categorical/thetic opposition. Note, however, that the adoption of the Subject Criterion is not a strictly necessary ingredient of our analysis: all that is necessary is that in some way, subject reconstruction is blocked in the derivation of categorical structures, whereas it is mandatory in the derivation of thetic structures.

4.2 Free Subject Inversion

In the previous discussion, we assumed that the free inversion position (under broad focus) qualifies as a noncriterial position, since it is internal to the predicative nucleus of the clause. In this respect, our reinterpretation of the Subject Criterion in (31) makes a clear prediction: since *i*-level predicates require a categorical structure (with a criterial subject), they are expected to be incompatible with free inversion, contrary to *s*-level predicates. This is indeed the case, as shown in (33).¹⁹

- (32) a. Sono disponibili alcune guide turistiche. (s-level)
 are available some guides tourist
 ‘Some tourist guides are available.’
 b. Sono imminenti piogge torrenziali.
 are imminent rainfalls heavy
 ‘Heavy rainfalls are imminent.’
- (33) a. *Sono poliglotte alcune guide turistiche. (i-level)
 are polyglot some guides tourist
 Intended: ‘Some tourist guides are multilingual.’
 b. *Sono dannose piogge torrenziali.
 are harmful rainfalls heavy²⁰
 Intended: ‘Heavy rainfalls are harmful.’

¹⁸ In a single-cycle system, this simply means that the noncriterial position is invisible at the interface.

¹⁹ The examples in (32) are grammatical if the subject is narrowly focused (see footnote 11).

²⁰ An anonymous *LI* reviewer suggests that free subject inversion is also ungrammatical with the nonunaccusative *s*-level predicate *utile* ‘useful’.

- (i) *Sono utili piogge torrenziali.
 are useful rainfalls heavy
 Intended: ‘Heavy rainfalls are useful.’

This suggests that free inversion is sensitive to unaccusativity, rather than to the *s*-/*i*-level nature of the predicate. However, we believe that in (i) the adjective is naturally interpreted as *i*-level (i.e., heavy rainfalls are useful *in general*); if the context disambiguates in favor of an *s*-level interpretation, we find free inversion fully acceptable. Compare (i) with (ii).

- (ii) In questo momento, sarebbero utili nuove iniziative.
 in this moment would.be useful new initiatives
 ‘In this moment, new initiatives would be useful.’

The unacceptability of (33a–b) supports the idea that the interface maximizes faithfulness to the surface positions, and therefore, a freely inverted subject lying within the predicative nucleus cannot undergo covert raising to yield a categorical structure. In criterial terms, this means that the Subject Criterion must be satisfied overtly (see Cardinaletti 2004:154 for a similar claim).

Note that the deviance of free inversion with i-level predicates by itself explains the unacceptability of the examples in condition (b) of our first experiment, with an i-level predicate and a postverbal subject (see (17b)). As a matter of fact, the acceptance rates for this condition were slightly lower than for the (a) condition involving a preverbal subject (in sharp contrast to the asymmetry observed with s-level predicates); see figure 2.

One problem that exceeds the limits of this discussion is under what conditions free subject inversion (under broad focus) is licensed. We have shown that the presence of an s-level predicate is a necessary condition; however, it is clearly not a sufficient condition. As already mentioned, with transitive verbs inversion is restricted (Alexiadou and Anagnostopoulou 2001, 2007, Belletti 2004). Even with intransitive s-level predicates, free inversion under broad focus is not always felicitous. In particular, Pinto (1997) argues that for it to be possible, there must be a covert deictic locative argument that satisfies the EPP (Extended Projection Principle) in the place of the syntactic subject (see also Cardinaletti 2004:153). If this is a correct generalization, we may assume that in free inversion clauses the covert locative argument qualifies as the categorical subject; that is, it satisfies the Subject Criterion. Alternatively, it is possible to maintain that free inversion under broad focus implements a thetic structure (as advocated most prominently by Lambrecht (1994)). The choice between the two analyses depends on a wider range of hypotheses than we can possibly discuss here; for present purposes, the only crucial point is that the free inversion position is noncriterial, and this is consistent with both views.

4.3 *Intermediate Summary*

To sum up, we have proposed that the islandhood of subjects is determined by their criterial status in a categorical structure: a criterial subject is frozen in place; hence, it cannot undergo reconstruction into a thematic position so as to satisfy the ESC, repeated here for convenience.

(12) *Extraction from Subject Constraint*

Only a subject occupying a thematic position *at the interface* is transparent for extraction.

We have provided experimental evidence that supports our proposal, with the proviso that in Italian, preverbal subjects are interpreted as criterial much more commonly than in English—a fact that is plausibly related to the availability of free subject inversion in Italian, as opposed to English.

5 A Top-Down Perspective

In our previous discussion, we left pending a serious concern: the ESC (12) strongly looks like a representational LF filter, and as such, it is hardly compatible with a derivational view of the grammar like the one endorsed in the Minimalist framework. Furthermore, in the case of successful extraction from a preverbal subject (in English), satisfaction of the ESC requires a *total recon-*

struction step, which literally “undoes” the previous A-movement of the subject.²¹ In this section, we argue that both problems can be overcome if we abandon the standard bottom-up orientation and instead assume a top-down derivation along the lines proposed by Chesi (2012).²²

5.1 Sketch of a Top-Down Left-Right Grammar

5.1.1 Phrase Structure In a top-down left-right derivation, we start building a structure from the root of the tree and we expand it, constituent after constituent, according to

- (a) the minimal set of *functional features* that are expected within each phrase, according to the grammatical constraints that are part of human linguistic competence, and
- (b) the *selection requirements* of any lexical items introduced in the computation.

We will prefix functional features (a) with the “+” sign to distinguish them from lexical features. We assume that a lexical feature licenses a set of associated functional features, and we follow Grimshaw (1990) in taking the lexical feature to determine the category of all projections dominating the related functional features.

In a top-down left-right derivation, the grammatical inventory consists of a *lexicon* and a set of *nonterminal well-formed trees*.²³ For example, when a noun phrase must be expanded, the system inspects the grammatical inventory and obtains a set of features as the legal grammatical expansion of the noun phrase: the minimal set of features expected will be the ordered set (+D, N). These features will be lexicalized/expanded sequentially, in the order indicated, yielding the extended projection [_N +D N]. (For convenience, in the following discussion we will maintain the traditional labels DP, CP, QP, and so on, whenever the internal feature composition of the phrase is irrelevant.)

The expansion proceeds by picking up aggregated information from the grammatical inventory (either a lexical item or a nonterminal tree) and by inserting lexical items according to their feature specification: +D is the functional feature associated to those lexical items that can expand/lexicalize this functional position.²⁴

²¹ We may try to avoid total reconstruction by adopting Sauerland and Elbourne’s (2002) hypothesis of PF movement for noncriterial subjects: these would undergo movement to the noncriterial position only in the PF branch of the derivation. Although we cannot fully discuss this possibility here, it seems to us that a solution along these lines would not be sufficiently general. In particular, the islandhood of presuppositional objects as in (i) (Diesing 1992:chap. 4) still requires reference to the covert interface position derived by Quantifier Raising (QR).

(i) ?*Who did you see [every picture of ____]?
(Diesing 1992:97)

Thus, reference to the interface position of an argument seems to be unavoidable if we want to account for the correlation between presuppositionality and islandhood in a general way. We return to QR in section 5.3 (see in particular footnote 34).

²² It is important to stress that the top-down approach adopted here is meant as a model of the grammar itself, and not a model of sentence processing; as a matter of fact, we will argue that it allows for a principled account of the ESC at the theoretical level. At the same time, the top-down model is explicitly meant to be processing-friendly with respect to both generation and parsing; see Chesi 2004:171–173, 195–199 for discussion.

²³ These are similar to the elementary (initial) trees in Tree Adjoining Grammar (Joshi 1985).

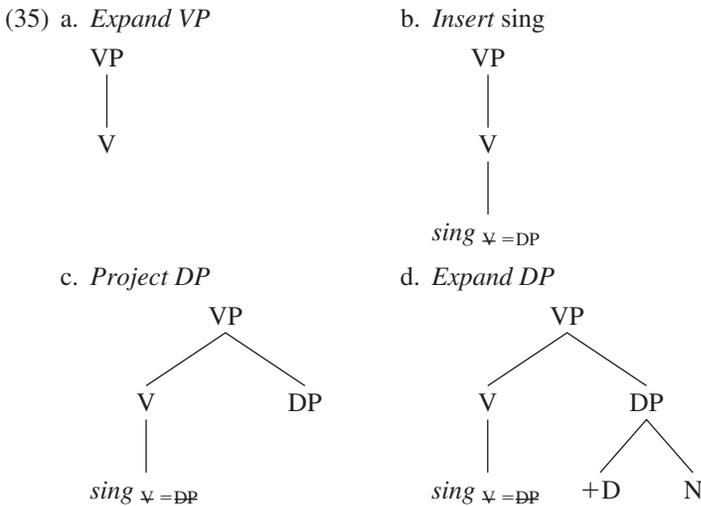
²⁴ Notice that also phonologically empty elements (e.g., *pro*) can “lexicalize” (in the relevant sense) a functional feature.

From this perspective, the grammar and the lexicon are finite inventories of finite sets of features, as shown in the toy example (34). The expansion of each constituent consists minimally of one lexical feature (the lexical head) and a set of associated functional features.

(34) <i>English toy grammar</i>	<i>English toy lexicon</i>
DP: (+D, N)	<i>the</i> : (+D) <i>of</i> : (+P)
PP: (+P, +D, N)	<i>boy</i> : (N) <i>John</i> : (+D, N)
CP _{declarative} : (+S, ²⁵ +T, V)	<i>who</i> : (+wh, +D, N)
CP _{wh} : (+wh, +T, +S, V)	<i>sing</i> : (V, =DP)
...	...

In this formalism, following Stabler (1997), the thematic requirements of lexical items are encoded by *select features*, which are identified by the “=” prefix. For instance, in (34) the verb *sing* (unergative entry) has a single select feature (=DP), expressing the thematic requirement for a single argument (the subject).

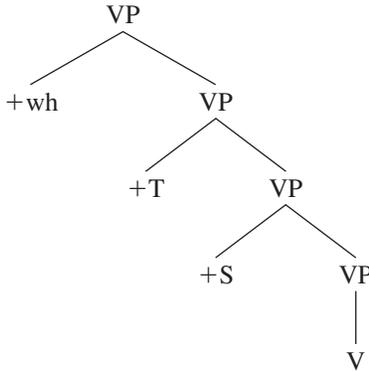
The select features carried by lexical heads introduce *expectations* that trigger phrase expansion, as shown in the toy derivation (35). After the computation of the functional layers of the extended projection of V (here omitted for simplicity), the V head is lexicalized by inserting the terminal *sing* (35b). The latter introduces into the derivation a single select feature =DP, which triggers the projection of a DP category (35c). DP is then expanded by introducing the minimal set of features that represents a legal expansion, that is, (+D, N) (35d), which will subsequently be lexicalized.



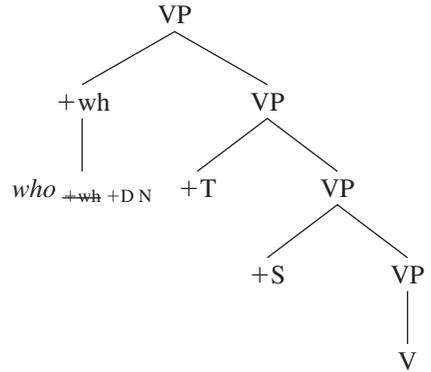
²⁵ We return below to this feature, which will be crucial in our analysis of subjects (see also footnote 31).

5.1.2 *Movement* The top-down left-right approach implements a nonlocal (movement) dependency by introducing the *wh*-element into the derivation as soon as the (criterial) +*wh* functional feature is processed in the left periphery of the clause. From a left-right perspective, this will be the first feature to be computed; see (36a).²⁶

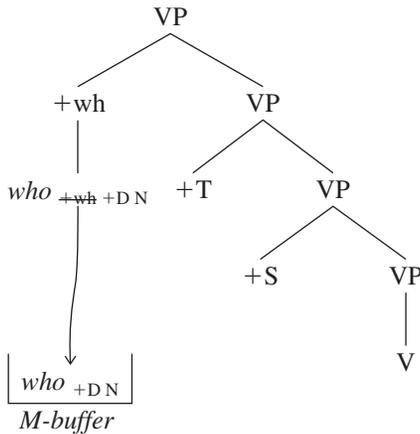
(36) a. *Project CP_{wh}*



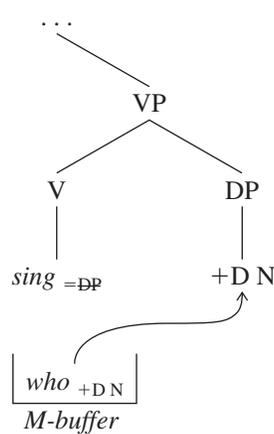
b. *Lexicalize +wh with who: (+wh, +D, N)*



c. *Who (+D, N) features "storage"*



d. *(+D, N) features "remerge"*



The lexicalization/expansion of the +*wh* feature by *who* introduces into the derivation the features (+*wh*, +D, N) (36b). Crucially, the (+D, N) features that qualify *who* as an argument are not expected in the functional position. The fact that these features are not expected forces phrasal movement, but in a reversed perspective: the unexpected features are moved into a *memory buffer* (M-buffer), which is a last-in first-out memory (36c). The features are retrieved

²⁶ As discussed above, the projection levels above the functional features associated to a lexical head are labeled by the lexical head; thus, the clause is labeled VP in (35).

from the M-buffer and *remerged* in the structure as soon as²⁷ a compatible select feature is introduced into the derivation by a lexical head: in (36d), the verb *sing* introduces a =DP feature that triggers Rmerge of *who* and discharges it from the M-buffer.

Any dependency must be discharged by remerging the stored element in an appropriate position: this corresponds to the requirement that the M-buffer be empty at the end of the derivation.

(37) *Success Condition*

At the end of the derivation, the M-buffer must be empty.

In this system, the notion of successive-cyclic movement can be incorporated if we assume that the top-down derivation is divided into phases.

- (38) A *phase* is the minimal computational domain in which the system processes the smallest set of features that consists of one lexical feature (e.g., N or V) and the related set of functional features.

Crucially, phases have a different status depending on their relation to the superordinate phase (except for the root phase).

- (39) a. A phase that constitutes the expansion of the last select feature of a lexical head H is computed sequentially with respect to the superordinate phase HP headed by H, because after the computation of H and the projection of its last select feature (see step (36d)), HP is closed. We will call this a *sequential phase*.
 b. Phases that result from the expansion of a functional feature, or of a select feature that is not the last one, are instead computed while the superordinate phase is still not concluded; hence, these qualify as computationally *nested phases*.²⁸

Note that a preverbal subject necessarily constitutes a nested phase. This is due to the fact that, in a top-down derivation, the preverbal subject is computed before the lexical V head of the superordinate phase; consequently, while the preverbal subject is computed, the superordinate phase is still open.

We assume that an element that is first inserted into a certain phase must be fully licensed within that phase or in a position selected by the lexical head of that phase. Each phase has its own M-buffer, and successive-cyclic movement proceeds by transmitting the content of the M-buffer of one phase to the M-buffer of another phase. The inheritance between the M-buffers of two different phases is regulated by the following principle (see Bianchi and Chesi 2006, Chesi 2007, 2012):

²⁷ This implies that the system retrieves featurally compatible elements from the M-buffer to satisfy a select requirement before accessing the grammatical inventory. In more familiar terms, ‘‘Move’’ (internal Merge) preempts ‘‘external Merge.’’

²⁸ The distinction between *nested* and *sequential* phases corresponds to the distinction between *true* and *tail* recursion (in the algorithmic sense of Abelson and Sussman 1996).

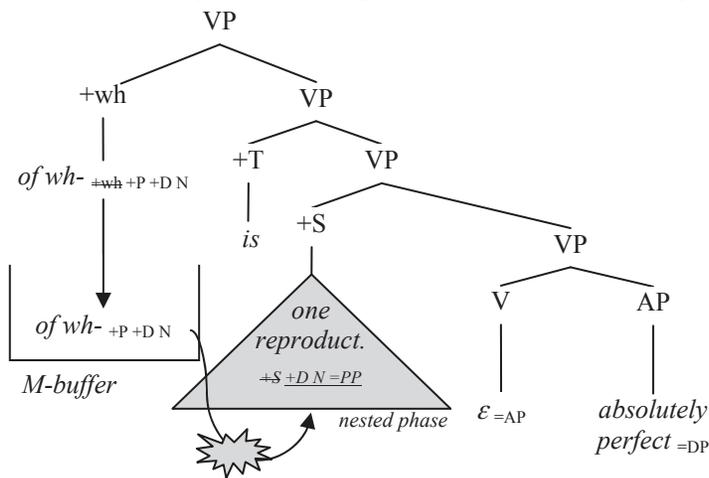
- (40) Computational nesting preempts inheritance.
 - a. Nested phases cannot inherit the content of the M-buffer of the superordinate, containing phase.
 - b. The sequential phase, instead, can inherit the content of the M-buffer of the preceding phase.

The conceptual motivation for this inheritance asymmetry between sequential and nested phases comes from considerations of computational complexity (see Chesi 2007:sec. 3). Intuitively, each time an unresolved dependency is inherited by a sequential phase α (by (40b)), we evaluate all the selected positions within α . If no compatible select feature is found, phase α is closed and the dependency is again inherited by the next sequential phase. For k maximum selected positions in each phase and for s sequential phases, the maximum number of potential Rmerge positions to be evaluated is $k \cdot s$, yielding a *linear* increase of complexity.

Suppose now that we allowed a dependency to be inherited by a nested phase: whenever a nested phase α inherits a dependency, we must evaluate not only the (at most) k selected positions within α (in addition to those of the matrix phase), but also any k selected positions within each phase that can be nested in α itself, and so on. This yields at best an *exponential* increase of complexity. By preventing a long-distance dependency from being discharged within a nested phase (40a), we thus prevent such an exponential complexity increase (see the appendix, section A.5, for more details).

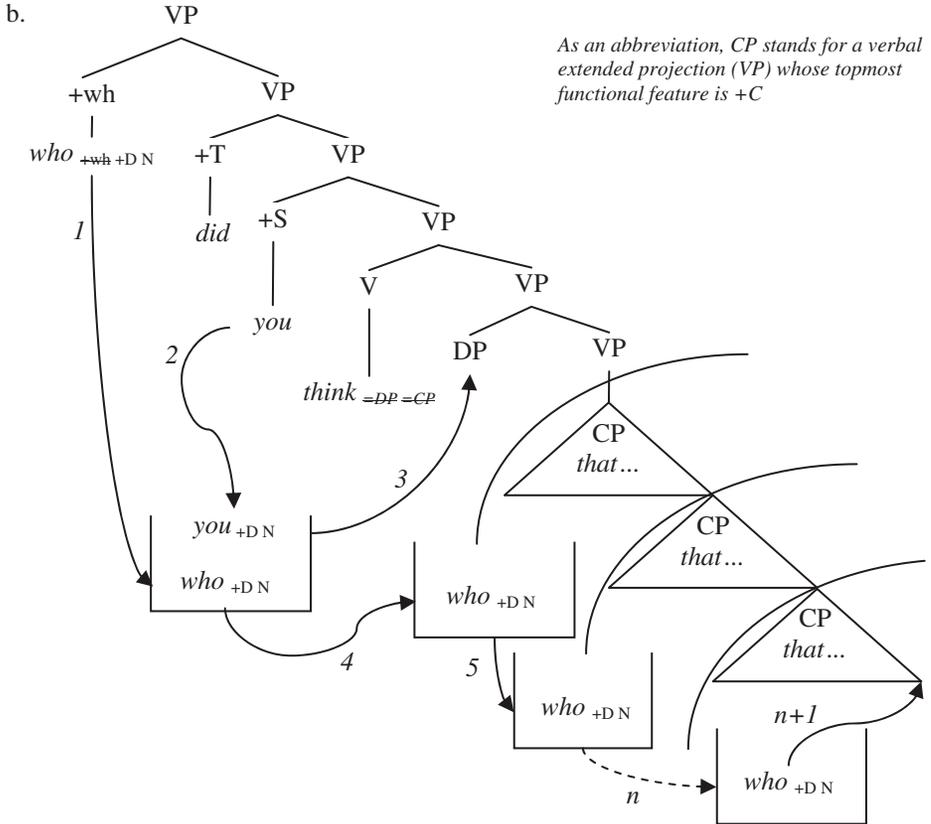
The distinction between sequential and nested phases accounts for the difference between left-branch islands and successive-cyclic extraction from complement clauses. Consider first the extraction of *who* from a preverbal subject in (41) (= (15a)). The *wh*-phrase is stored in the M-buffer of the matrix verbal phase. The derived subject constitutes a nested phase, expanding a functional feature $+S$; consequently, by (40a) it cannot inherit the *wh*-phrase from the M-buffer of the matrix phase. This accounts for the subject island effect.

- (41) a. ?*Of which masterpiece is [one reproduction ____] absolutely perfect?
- b.



In (42), instead, successive-cyclic movement obtains via inheritance between sequential phases, as schematically illustrated in (42b) (where the numbered arrows indicate the order of the derivational steps).

(42) a. Who did you think [that David said [that Lou claimed [that Andy hated ____]]]?



The *wh*-phrase *who* is stored in the M-buffer of the main phase and it is cyclicly inherited by the M-buffers of the sequential phases, until the lexical head of the most deeply embedded CP (*hated*) introduces a selectional requirement that triggers the Remergence of the *wh*-phrase.

5.2 Reconstruction in a Top-Down Grammar

In the system we have sketched so far, a moved element is first computed in the derived position and is stored in the M-buffer, so as to be later remerged in an appropriately selected position. This allows for a novel view of the phenomenon of reconstruction: it is not necessary to covertly “undo” a previous step of the derivation, so as to place a moved element back in its base position, as in the bottom-up derivation; rather, it is sufficient to *delay* the interpretation of the moved

constituent until after it has been remerged in the selected position. The view of reconstruction as delayed interpretation is due to Barker (2009), in the framework of a general left-to-right interpretation process, which is clearly consonant with the top-down left-right syntactic approach that we endorse. Here, we adopt Barker's core idea for the immediate purposes of our analysis; a more comprehensive evaluation of Barker's proposal, and a thorough discussion of the many intricacies of reconstruction, remains to be developed in future research.

To exemplify the core idea, in (43) delayed evaluation allows the anaphor contained in the *wh*-phrase to be interpreted in the Rmerge (selected) position of the *wh*-phrase, whose computation follows the computation of the anaphor's antecedent (*every boy*).

(43) [Which picture of himself_i] did every boy_j hate ⟨which picture of himself_i⟩?²⁹

Furthermore, there is evidence that it is necessary to delay not only the interpretation, but also the completion of certain moved constituents. Consider for instance remnant VP topicalization.

(44) [_{VP} Criticized t_1 by his boss] John₁ has never been t_{VP} .
(Müller 2000:530, (14a))

The topicalized VP contains, in the internal argument position, a trace that is bound by a linearly following phrase (*John*). In terms of a top-down computation, this requires that we store in the M-buffer an *incomplete* VP, whose internal argument will be introduced later in the derivation. In turn, the dependency of the internal argument will be discharged into the VP after the VP itself has been discharged from the M-buffer and remerged in the postauxiliary position.³⁰

Although we cannot fully address the phenomenon of remnant movement in this article, we take (44) to indicate that delayed completion must be allowed by the grammar; hence, we will let the system store in the M-buffer a yet incomplete constituent containing a ‘‘gap’’ (i.e., an unsatisfied select feature), and we will delay both its completion and its interpretation until after the constituent has been remerged.

(45) Discharge of a dependency into a moved constituent α can be delayed until α itself has been discharged from the M-buffer.

(A derivation involving delayed completion is schematically represented in (51) in the appendix.)

5.3 The Extraction from Subject Constraint as a Derivational Effect

Hypothesis (45) allows us to reduce the ESC (12) to a derivational constraint. This can be shown in two steps.

²⁹ For a treatment of binding in this top-down system, see Bianchi and Chesi 2010.

³⁰ We assume that the VP is selected by the auxiliary. Recall that the Success Condition (37) requires that by the end of the derivation, all the moved phrases—here, both the remnant VP and the extracted argument—be discharged from the M-buffer.

1. The ESC prohibits extraction from a derived subject that fails to reconstruct. In a top-down derivation, this is because the completion and interpretation of the subject cannot be delayed. Recall that the derived position constitutes a nested phase, and by (40a), it cannot inherit the M-buffer of the superordinate phase, so as to allow for the discharge of the extracted phrase (see the discussion around (41)).
2. The ESC allows for extraction from a “totally reconstructed” subject. In a top-down derivation, this is because by (45), we can delay the completion and interpretation of the subject. The incomplete subject is remerged in the thematic position, which constitutes a sequential phase and can inherit the M-buffer of the superordinate phase; then, the yet unsatisfied selectional requirement of the subject’s lexical head triggers the discharge of the extracted *wh*-phrase from the M-buffer.

The ESC now follows from a basic asymmetry between categorical and thetic subjects.

1. In the case of thetic (noncriterial) subjects, interpretation is delayed until after the subject has been remerged in the thematic position, where it is interpreted as part of a description of an eventuality, in the scope of Existential Closure (see section 2). Hence, the subject need not be completed in the derived position.
2. On the contrary, categorical subjects are completed and interpreted as soon as they are computed in the derived (criterial) position. This is because their interpretation is independent from that of the property denoted by the rest of the clause (again, see section 2).

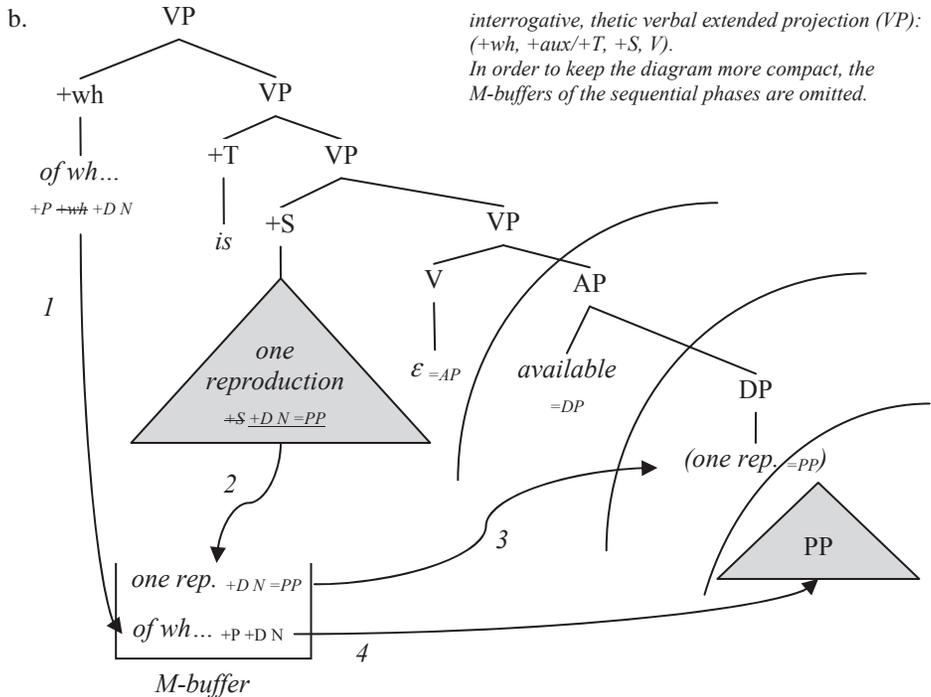
In other terms, the crucial effect of the Subject Criterion is to force the criterial subject to be immediately completed and interpreted.

Let us examine the two options in more detail. We propose that in the case of a noncriterial subject, delayed completion is allowed by the fact that the (+D, N) features of the subject are not expected in the preverbal (noncriterial) position, which expands a “bare” +S feature.³¹ Consequently, the subject—even if incomplete—is stored in the M-buffer, so as to be later discharged in the selected position, where the (+D, N) features are expected (as the legal expansion of a selected DP phase). Completion and semantic evaluation are thus deferred until after the subject has been discharged.

To see this more concretely, consider the derivation schematically illustrated in (46b).

- (46) a. Of which masterpiece is [**one reproduction *t***] already available?

³¹ We assume that +S is the functional feature associated with nominative case. In languages like English and Italian, where such a feature is morphologically unexpressed, it can be lexicalized with an empty item. More precisely, an expected +S feature is first expanded by a nonterminal tree like $DP_{\text{Subj}}: (+S, +D, N)$; then, +S is lexicalized with the empty nominative marker $\varepsilon: (+S)$.



The *wh*-PP is computed in the derived position and is stored in the M-buffer (*step 1*). After the computation of the auxiliary, the noncritical subject is computed. This expands a bare +S feature, and therefore, the computation of the subject introduces unexpected (+D N) features; consequently, the subject is stored in the M-buffer, even though an internal select feature of the N head (=PP) is yet unsatisfied (*step 2*). When the adjectival head is computed, it introduces a select requirement =DP, which triggers the Remerge of the subject phase (*step 3*). At that point, the M-buffer of the remerged subject may inherit from the M-buffer of the superordinate phase the *wh*-dependency of the *wh*-PP (*step 4*); the yet unsatisfied =PP select feature of the noun head (*reproduction*) triggers the discharge of the *wh*-dependency, and the *wh*-PP is remerged. Thus, at the end of the derivation all the selectional requirements are satisfied and the M-buffer is empty, complying with the Success Condition (37).³²

As for the criterial subject of a categorical structure, we propose that the (+D, N) features of the subject are instead expected in the criterial position, which expands a cluster of features (+S, +D, N). Consequently, the criterial subject is immediately completed and interpreted.

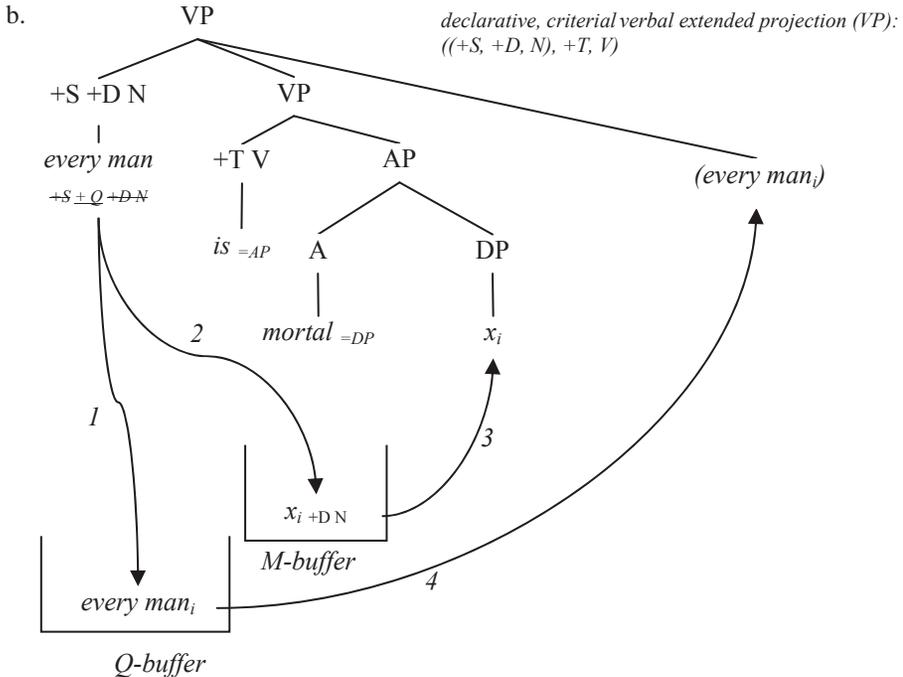
³² (45a) is unacceptable if the preposition *of* is stranded within the subject island.

(i) *Which masterpiece is [one reproduction of ____] already available?

The asymmetry between (i) and (46a) follows from the fact that in (i) the stranded preposition indicates that the selectional requirement of the noun head (*reproduction*) has already been processed in the preverbal subject position; this prevents delayed completion and evaluation in the thematic position.

Recall that on Ladusaw's (1994) proposal, the rest of the clause is interpreted as a property that is predicated of the categorial subject. To this effect, it is necessary to apply abstraction over a variable hosted in the thematic position of the subject. This can be achieved if the categorial subject undergoes QR in the way we developed in Bianchi and Chesi 2010, which we summarize here by means of an illustrative example, (47b).

(47) a. Every man is mortal.



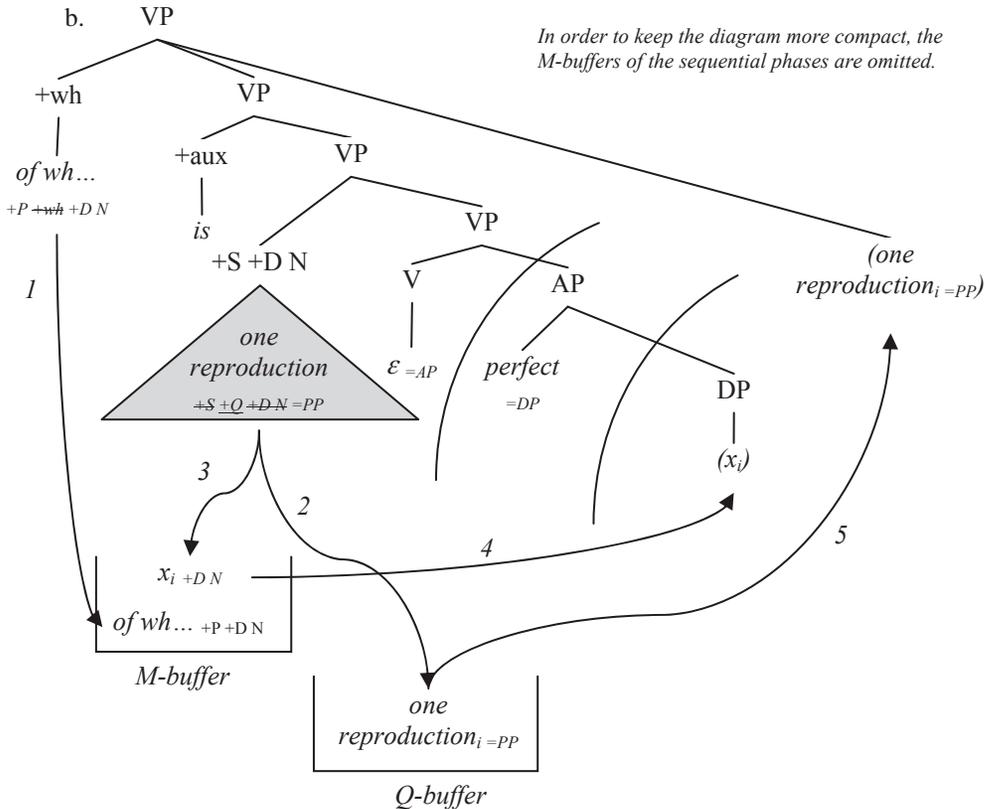
The subject QP *every man*, after being computed in the criterial position, is stored in a dedicated memory buffer, the Q-buffer, together with a binding index i (*step 1*); furthermore, an indexed variable x_i is stored in the M-buffer (*step 2*). When the adjectival head is processed, it introduces a selectional requirement =DP, which is satisfied by discharging the variable from the M-buffer into the thematic position (*step 3*). At this point, the matrix phase is complete; the subject QP is then retrieved from the Q-buffer and is attached to the structure (*step 4*). Lambda-abstraction over the variable carrying the stored index i will yield the QP's scope.³³ Following Ladusaw's insights, this mechanism can be generalized to all criterial subjects: even when they are not inherently quantificational, they are lifted to quantifier type and undergo QR.

Consider now the derivation for a case of extraction from a criterial subject, as exemplified in (48). Here, the dependency of the *wh*-PP cannot be discharged into the subject phase that

³³ As the reader will notice, this is just a syntactic (simplified) version of Cooper storage. For discussion and empirical justification, see Bianchi and Chesi 2010.

expands the criterial position, because the latter constitutes a nested phase (see (40b)). On the other hand, since the subject undergoes QR (*steps 2, 3, and then 5*), what is remerged in the thematic position is just a variable (*step 4*), which does not introduce any selectional requirement; consequently, the dependency of the extracted *wh*-PP cannot be discharged in the thematic position either. The derivation thus violates the Success Condition (37), since the *wh*-dependency cannot be discharged.

(48) a. *Of which masterpiece is [one reproduction t] absolutely perfect?



Note that in this system, with a parallel top-down syntactic and semantic computation, the “frozenness” of categorial (criterial) subjects need not be stipulated; rather, it follows from the fact that they must be interpreted independently from the rest of the clause.³⁴

³⁴ The QR-based proposal can also be extended to account for the islandhood of presuppositional QPs in general (Diesing 1992; see footnote 21 above): even if it fills a selected position (e.g., internal argument), the QP cannot constitute a sequential phase, because the computation of the superordinate phase must remain open until the QP is attached in the scope position (see Bianchi and Chesi 2010 for details).

6 Summary and Concluding Remarks

To sum up, we have argued that the islandhood of subjects derives from the following constraint:

(12) *Extraction from Subject Constraint (ESC)*

Only a subject occupying a thematic position *at the interface* is transparent for extraction.

Adopting Ladusaw's (1994) distinction between thematic and categorial semantic structures, we have argued that the ESC can only be satisfied by the nonpresuppositional subject of a thematic structure, which is fully reconstructed in its thematic position so as to be interpreted within the predicative nucleus of the clause. On the contrary, all subjects of categorial structures are predicted by the ESC to be islands.

Since i-level predicates can only inhabit categorial structures, their subjects are predicted to be islands, a prediction supported by our experimental evidence (section 3.1). On the other hand, subjects of s-level predicates can be interpreted as thematic, so as to comply with the ESC. In English, such subjects can be fully reconstructed from a preverbal position; in Italian, on the contrary, such subjects must occupy the "free inversion" position (at least in intransitive clauses), while preverbal subjects are interpreted as categorial, fail to reconstruct, and hence cannot satisfy the ESC. This shows that the status of preverbal subjects is not uniform across languages, and accordingly, different patterns of island effects emerge.

This proposal has several potential ramifications, both empirical and conceptual, which remain for future research.

At the theoretical level, the adoption of the thematic/categorial divide raises the question of its relation with Information Structure. Lambrecht (1994) explicitly identifies a thematic structure with a broad focus sentence; on the other hand, Rizzi (2005) argues that even in a broad focus sentence a preverbal subject can be criterial (see also Kuroda 2005 for relevant discussion). As for topics, Ladusaw (1994) explicitly argues that a topic constitutes the subject of a categorial structure. These issues will have to be thoroughly addressed in future research.

From the comparative viewpoint, we plan to test with English-speaking participants conditions (17a) (i-level, preverbal) and (17c) (s-level, preverbal) of our first experiment. Since English does not have free subject inversion, our proposal predicts that here the preverbal subject of an s-level predicate can be either categorial or thematic; hence, extraction in condition (17c) should be significantly better than in Italian.

Furthermore, we plan to extend our approach to the subjects of transitive predicates. Note that a transitive subject, even when remerged in its thematic position, is always followed by an internal argument: then, if we define a sequential phase as the *last* phase that is selected by a lexical head, transitive subjects would never be sequential, and we would predict them to be uniformly islands. At first sight, this seems too strong, in the light of the acceptability of (4a); however, acceptable instances of extraction from transitive subjects seem exceedingly rare. This issue remains for future research. A related issue on the agenda is a precise characterization of the conditions under which free subject inversion is possible.

To conclude, this analysis reconciles two apparently conflicting desiderata:

- (a) to reduce islandhood to a general constraint on the syntactic computation;
- (b) to account for the inherent variability of acceptability judgments in this area.

As for (a), subject island effects are due to computational nesting of the categorical (criterial) subject position (by (40a); see also Bianchi and Chesi 2006). As for (b), we have shown that the instability of acceptability judgments can be explained by the interplay of different factors in determining the categorical versus thetic structure of the relevant clause. In particular, a thetic structure is possible only if the predicate is s-level and the subject is compatible with a nonpresuppositional interpretation. Given that the s-level/i-level divide is not always clearcut and that s-level predicates are compatible with both a categorical and a thetic structure, it follows that the semantic structure is not always univocally determined; in such cases, the acceptability of extraction from the subject is expected to display a certain instability across different contexts, depending on the factors described above. In this way, subject island effects are not directly reduced to an ultimately interpretive distinction; rather, they follow from a computational constraint, (40), that affects differently the syntactic structures yielding the two types of interpretation.

The idea that overt extraction is sensitive to LF reconstruction is impossible to state in a system with separate overt and covert cycles; it can be stated, but it remains completely stipulative, in a bottom-up system with a single cycle, as in the recent Minimalist approach. From this perspective, extraction from the first Merge (i.e., thematic) position of a subject should be either possible or impossible independently of whether the subject subsequently moves to a derived position and possibly undergoes reconstruction; in other terms, the *following* derivational history of the subject should simply be irrelevant. As far as we can see, the only way to capture the islandhood of categorical subjects in a bottom-up system is to establish a direct correlation between the semantic property of presuppositionality and some narrow syntactic property like strong phasehood (as proposed in Jiménez Fernández 2009). The problem is that it is hard to find supporting evidence for this correlation independent of the very extraction facts that the correlation is meant to explain.

We have shown that this problem dissolves if we reverse the orientation from bottom-up to top-down. The crucial difference is that, in a top-down derivation, the “derived” (nonselected) position is computed before the selected (thematic) position. Since the syntactic and semantic derivations proceed in parallel, we can immediately determine whether the subject must be completed and interpreted in the derived position (categorical interpretation) or whether its completion and interpretation can be delayed until it is remerged in a selected position (thetic interpretation). In this way, the interplay of interpretive and syntactic facts that is expressed by the ESC can be captured directly. Moreover, the top-down perspective allows for an implementation of total reconstruction that is conceptually more natural than the standard bottom-up alternative, in that it does not involve “undoing” a previous derivational step.³⁵

³⁵ A different view of reconstruction has been proposed by Bobaljik and Wurmbrand (2012), in a system where different PF forms compete to spell out a given LF structure: reconstruction then consists in a dependency where the lower link is interpretively relevant, but it is the higher link that is spelled out. This improves upon the earlier view of reconstruction as “undoing movement”; however, it is not clear to us why the possibility of extraction from a subject should be affected by the subsequent LF-PF pairing. A more systematic evaluation of Bobaljik and Wurmbrand’s proposal remains for future research.

The reader may have gotten the impression that the top-down implementation of movement by means of memory buffers is more complex than the standard Minimalist view of movement as ‘‘internal Merge.’’ However, we wish to stress that the Minimalist Move operation is actually more complex than meets the eye: in order to implement the probe-goal relation, it requires (at least) a search algorithm that must inspect the features of all the potential goals in the probe’s searching domain until it finds a compatible one. This observation suggests that the complexity of a computational operation should not be assessed exclusively on the basis of the definition of the operation itself; it should be assessed as well on the basis of the number of relations that must be evaluated in order for its computation to be successfully performed.

Appendix

In this appendix, we provide a synopsis of the text proposal (section A.1) and a schematic top-down derivation of ‘‘extraction via reconstruction’’ (section A.2). We then develop some extensions of the arguments we gave in the main text. In section A.3, we show how our proposal subsumes Cinque’s (1980) generalization on subextraction from DPs (cf. sections 3.1 and 5.2); in section A.4, we discuss the reasons why DP subjects of unergative predicates yield better results when the DP is definite (in our second experiment, section 3.2) and we refute Longobardi’s (1991) claim that in the case of definite DPs, no real extraction is involved. Finally, in section A.5 we develop our argument on how the nested phase/sequential phase divide derives from complexity considerations on unbounded movement (cf. section 5.1.2).

A.1 *Synopsis of the Proposal*

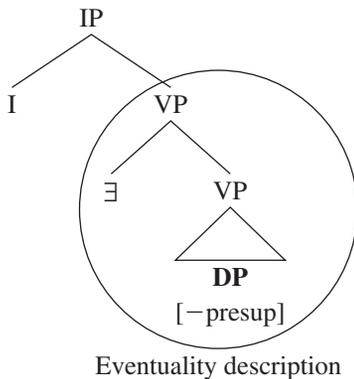
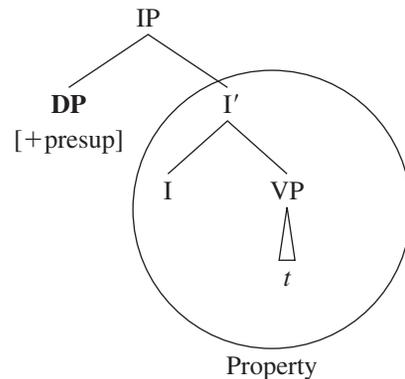
In this article, we have provided experimental evidence from Italian that extraction from the subject of intransitive predicates is sensitive to the individual-level versus stage-level nature of the predicate (first experiment, section 3.1), rather than to the unaccusative versus unergative opposition (second experiment, section 3.2). Specifically:

- (a) In Italian, postverbal subjects allow for extraction only if the predicate is stage-level.
- (b) In Italian, preverbal subjects are uniformly islands, with both individual-level and stage-level predicates.

In English, instead, the preverbal subject of a stage-level predicate can be transparent for extraction.

These empirical observations have been analyzed on the basis of Ladusaw’s (1994) characterization of categorical versusthetic semantic structures.

- (c) In athetic structure, the subject is interpreted within the predicative nucleus of the clause, it is bound by Existential Closure, and it is nonpresuppositional (49).
- (d) In a categorical structure, the subject is interpreted outside the predicative nucleus of the clause, and it is presuppositional (50).

(49) *Thetic structure*(50) *Categorical structure*

I-level predicates require a categorical structure, whereas s-level ones are also compatible with a thetic structure. The syntax of the two types of structure is different in English and Italian.

- (e) In English, a thetic structure arises via reconstruction of the preverbal subject of an s-level predicate (except for existential *there*).
- (f) In Italian intransitive clauses, on the contrary, a thetic structure requires free subject inversion under broad focus, which gives rise to a noncategorical interpretation of the subject. On the other hand, preverbal subjects are interpreted as categorical even when the predicate is stage-level: they are “criterial” in the sense of Rizzi 2005 and fail to reconstruct into the predicative nucleus. (There may be exceptions to the categorical interpretation of preverbal subjects in cases where free inversion is excluded for independent syntactic reasons.)

With this background, the pattern of extraction can be derived from the Extraction from Subject Constraint, repeated here.

(12) *Extraction from Subject Constraint (ESC)*

Only a subject occupying a thematic position *at the interface* is transparent for extraction.

The ESC implies that only the subject of a thetic LF, which is totally reconstructed into a thematic position, is transparent for extraction. This condition is only satisfied with (certain) stage-level predicates that do not impose a presuppositional interpretation on their subject.

- (g) In English, such subjects are realized in preverbal position and undergo total reconstruction; hence, (thetic) preverbal subjects can be transparent.
- (h) In Italian, instead, such subjects must be realized by means of free inversion (at least when this is syntactically possible); freely inverted subjects are thus transparent, whereas preverbal subjects are always categorical, and they are always islands.

We have then shown that the ESC follows naturally from a top-down, left-to-right oriented system. In a top-down computation, we first compute a moved element in its derived position, we then store it in a memory buffer, and we discharge it in a thematic position after the selecting lexical head has been computed. By hypothesis, an extracted PP cannot be discharged into a preverbal subject because this constitutes a *computationally nested phase* (i.e., a phase that must be computed while the computation of the superordinate phase is still open). Following Ladusaw (1994), categorial subjects must be completed and interpreted in the preverbal position, outside the predicative nucleus of the clause; their islandhood follows from computational nesting.

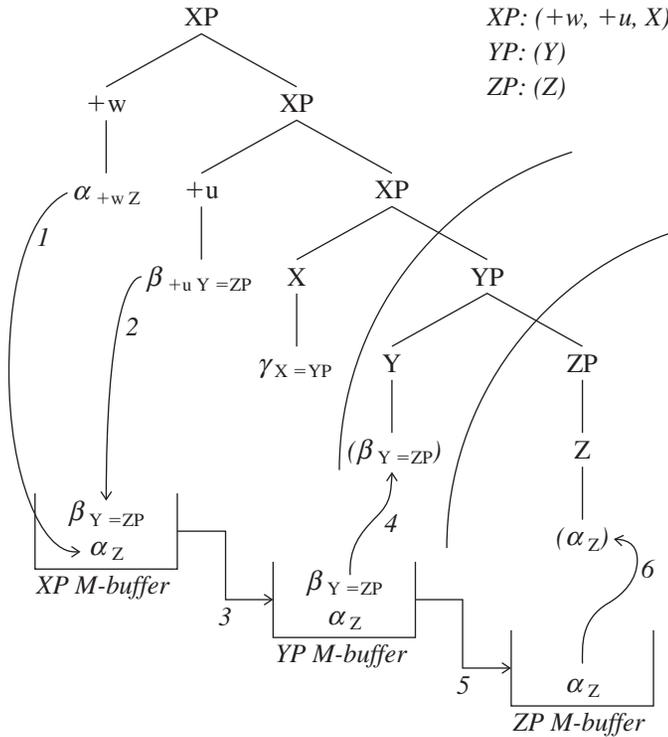
On the other hand, a thetic subject must ultimately be interpreted within the predicative nucleus; even if it occupies a derived position, its completion and interpretation are delayed until after it has been remerged into a thematic position. This “reconstructed” position constitutes a sequential phase, whose computation is *not* nested within that of the superordinate phase; it is therefore possible to discharge into it the *wh*-dependency of an extracted PP. This accounts for the transparency of thetic subjects.

A.2 Schematic Top-Down Derivation of “Extraction via Reconstruction”

For completeness, we include here a schematic representation of the derivation type allowed by (45) (i.e., “Discharge of a dependency into a moved constituent α can be delayed until α itself has been discharged from the M-buffer”). In (51), α , β , γ are phrases endowed with the indicated features; XP, YP, and ZP are phases headed by X, Y, and Z categorial features, respectively, and selected by =XP, =YP, and =ZP features; +w and +u are functional features.

The computation of the root phase XP starts with the computation of a *wh*-phrase α of category ZP, which is in an unselected position and is therefore stored in the M-buffer of XP (*step 1*). Next, a second phrase (β , of category YP) is computed and stored in the same M-buffer (*step 2*); crucially, β 's head still carries an unsatisfied selectional requirement (=ZP), an instance of delayed completion. When the matrix phase head X is computed, it introduces a selectional requirement =YP, which triggers the expectation of a sequential phase of category YP. The sequential phase inherits the M-buffer of the matrix phase (*step 3*); from this, β (of the required category YP) is retrieved and remerged, satisfying the matrix head's selectional requirement (*step 4*). The remerged YP still includes an unsatisfied selectional requirement =ZP. This triggers the expectation of a sequential ZP phase, which inherits the M-buffer from YP (*step 5*); =ZP is satisfied by retrieving and remerging α (*step 6*). Thus, at the end of the derivation all the M-buffers are empty, in compliance with the Success Condition.

(51) Schematic derivation



A.3 Deriving Cinque's (1980) Generalization

Cinque (1980) showed that in Italian, subextraction from a DP is very constrained: it is possible to extract only a genitive PP headed by the preposition *di* 'of' that qualifies as the subject of DP, that is, occupies the most prominent position within the DP (see also Longobardi 1991, Cinque 2011). From a top-down perspective, Cinque's generalization follows from two considerations.

First, let us assume that the derivation favors the integration of a moved constituent within the original phase (cf. the Minimal Chain Principle for parsing; De Vincenzi 1991); the dependency is discharged in the sequential phase only if there is no compatible selected position for it. That PPs headed by prepositions other than *di* 'of' cannot be extracted (Cinque 1980:48–49, (1)–(5)) is due to the fact that these PPs may qualify as adjuncts (or arguments) of the matrix verbal phase, and this (more local) construal is chosen whenever possible. This is confirmed by the marginality of (52a), where the matrix verb *parlare* 'to speak' optionally takes an 'of'-PP as its argument; the availability of this construal, (52a'), blocks the discharge of the 'of'-PP into the inverted subject. In (52b), instead, the matrix predicate cannot select an 'of'-PP, and the clause-initial PP can be construed as an internal complement of the inverted subject.

- (52) a. ??[Di quale ministro]_i aveva già parlato [il portavoce _____i]?
 of which minister had already spoken the spokesman
 Intended: ‘The spokesman of which minister had already spoken?’
 a’. [Di quale ministro]_i aveva già [parlato [il portavoce] _____i]?
 ‘Which minister had the spokesman already talked about?’
 b. [Di quale ministro]_i era già noto [il portavoce _____i]?
 of which minister was already known the spokesman
 ‘Of which minister was the spokesman already known?’

Second, recall that in the top-down derivation, an element stored in the M-buffer must be remerged in a compatible selected position before any new lexical item is taken from the lexicon (in standard terms, ‘Move preempts Merge’; see footnote 27); therefore, we expect that once the extracted PP has been inherited by the subject DP phase in the ‘reconstructed’ position, this PP must be remerged with the phase head before any other postnominal argument can be added. Therefore, the remerged PP can only satisfy the *first* select feature of the subject’s N head; that is, it is interpreted as the ‘subject’ of the DP. This explains the contrast between (53) and (54) (Cinque 1980:55, (17a), (20a)).

- (53) *L’icona, [PP di cui] è stato scoperto [il furto del custode ____] . . .
 the icon of which has been discovered the theft of.the custodian
 Intended: ‘The icon, the custodian’s theft of which has been discovered . . .’
 (54) Il custode, [PP di cui] è stato scoperto [il furto ____ dell’icona] . . .
 the custodian of whom has been discovered the theft of.the icon
 ‘The custodian, whose theft of the icon has been discovered . . .’

A.4 On Extraction from Definite Subjects of Unergatives (Longobardi 1991)

In many cases of extraction from an unergative subject, a definite subject, as in (28a) (repeated here), sounds much more natural than an indefinite one.

- (28) a. [Di quale soprano] **risuonava** nel teatro [la mirabile ____] (unergative)
 of which soprano **sounded** in.the theater the wonderful
 voce ____]?
 voice
 ‘Of which soprano did the wonderful voice sound in the theater?’

In this respect, the data differ from those of the first experiment, and they fall under a criticism raised by Longobardi (1991:82–85). Longobardi noted that in (55) (= his (77a)) extraction from a definite subject is better than from an indefinite one.

- (55) Quell’uomo politico, di cui ci ha telefonato *un segretario / ?il segretario . . .
 that politician of whom us has phoned a secretary / the secretary
 ‘That politician, whose secretary/a secretary of whom called us . . .’

Longobardi argued that when the subject is definite, there is no real *wh*-extraction. The definite DP, whose head is a relational noun, allows a ‘‘possessive’’ interpretation in which the possessor remains implicit, as in (56).

- (56) A proposito di Maria, ci ha telefonato il segretario.
 speaking of Maria us has phoned the secretary (= Maria’s secretary)
 ‘Speaking of Maria, her secretary called us.’

According to Longobardi, the variant of (55) with a definite subject can be rescued by interpreting the *wh*-phrase as a topic-like constituent, ‘‘with the article marginally acting as a resumptive position for it,’’ akin to (56). In other terms, the marginal variant is not a real instance of extraction.

Note however that ‘‘possessor resumption’’ as in (56) is possible with a partitive subject; see (57). In (58), on the contrary, extraction of a *wh*-PP from a partitive subject is significantly degraded. This contrast is unexpected under Longobardi’s account.

- (57) A proposito di Maria, ci ha telefonato uno dei figli.
 speaking of Maria us has phoned one of.the sons
 ‘Speaking of Maria, one of her sons called us.’
- (58) *Maria, di cui ci ha telefonato uno dei figli . . .
 Maria of whom us has phoned one of.the sons
 Intended: ‘Maria, one of whose sons called us . . .’

Therefore, we conclude that even with a definite subject, genuine extraction is involved. The degraded status of extraction when the subject is indefinite is due, we believe, to a confound: with a relational or inalienable possession noun, a nonpartitive indefinite is marginal to begin with (compare, for example, *??un figlio di Maria* ‘one son of Maria’s’ with *uno dei figli di Maria* ‘one of Maria’s sons’, or **una mole del castello* ‘one mass of the castle’ with *la mole del castello* ‘the mass of the castle’).

A.5 Inheritance and Computational Complexity: Nested versus Sequential Phases

In section 5.1, we briefly mentioned that principle (40) (an unresolved dependency can be inherited only by a sequential phase, never by a nested phase) follows from computational complexity considerations. We want to expand this point briefly here. From an algorithmic perspective, a movement dependency significantly increases the complexity of the problem of which dominance relations have to be associated to a given set of precedence relations; at worst, any item could be remerged into any lower position. Hence, the complexity order of the problem is exponential on the number of nodes to be recursively expanded. This is not a satisfactory result, since the growing rate of the searching algorithm would make the problem quickly intractable (Chesi 2012: 159–170).

If movement is limited within the phase boundaries, the complexity of the problem is dramatically reduced: for any moved element, there would be only one possible ‘‘landing site’’ position

within each phase (i.e., a selected position). Consider a structure where only one item is moved. Assuming that each phase head selects at most 3 positions (Pesetsky 1982) and that (in the worst case) all of them must be evaluated before successfully discharging the moved item, each time a sequential phase is opened, the number of possible landing sites increases by 3: for s sequential phases, $3s$ is the highest number of possible landing sites to be inspected. This is a *linear* complexity growth.

On the other hand, assume that k is the (maximum) number of nested phases that can expand k functional features while a superordinate phase is not closed yet, and that all of them can be expanded, each introducing k more nested phases, and so on up to n times (n an arbitrary number): we then obtain at worst $3k^n$ possible landing sites to be evaluated (3 is the number of potential discharge positions within each nested phase). This is an *exponential* complexity growth.

Since the inheritance constraint (40) effectively prevents a long-distance dependency from being discharged into a selected position contained in a nested phase, we thus prevent the predicted exponential increase of the complexity of the computation.

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