Pronouns, agreement and classifiers: What sign languages can tell us about linguistic diversity and linguistic universals *

Kearsy Cormier

Abstract

The search for linguistic universals (and understanding universals in the face of diversity) is one of the key issues in linguistics today. Yet the vast majority of the linguistic research has focused only on spoken languages. Sign languages constitute an important test case for theories on universals and diversity, since a language “universal” only deserves this name if it holds both for signed and spoken languages, and languages in a different modality surely have much to teach us about the full range of diversity within human language. In this paper I consider three morphosyntactic phenomena found in sign languages that have traditionally been assumed to be the same as spoken languages but which, on closer inspection, reveal some fundamental differences relating to particular affordances of the visual-spatial modality. In order to understand these differences in more detail, linguists must consider the multimodal nature of human language (including gesture) rather than just the classic linguistic characteristics which are the exclusive focus of much work in mainstream approaches to the study of language.

Keywords: sign language, universal, pronoun, agreement, classifier, gesture

1 Introduction

In the early twentieth century, natural sign languages used by deaf communities were incorrectly considered by many linguists and other scholars of language either as gestural systems that did not display the defining characteristics of language, or as codified manual communication systems based on spoken language (e.g., Bloomfield, 1933). William Stokoe (1960) was the first to recognise and outline the phonological patterning of a sign language (specifically, American Sign Language or ASL). In the 1970s and 1980s, research on ASL and other sign languages began to flourish. The main goal of much of the early work on sign languages (e.g., Klima & Bellugi, 1979) was to provide much-needed evidence that sign languages were ‘real’ languages. One way to justify the linguistic study of sign languages was to propose analyses which claimed that they are also subject to the principles and constraints of Universal Grammar (UG). A number of scholars found evidence for UG constraints in ASL, such as the Wh-Island Constraint, Subjacency, and the Empty Category Principle (Padden, 1983; Lillo-Martin, 1991; Romano, 1991). Descriptive research on sign languages within non-generative frameworks has, however, always co-existed alongside work within UG approaches, with some scholars questioning the notion that signed and spoken languages are based on shared universal principles of grammatical organisation (e.g., Mandel, 1977; Deuchar, 1984). Recently, Liddell (2003) has used the frameworks of mental

* Figures 1a-c are from the BSL Corpus Project data of spontaneous conversations between deaf native and near-native signers from various locations around the UK (Schembri, Fenlon, Rentelis, & Cormier, 2014). Figure 3 is from BSL SignBank (Fenlon et al., 2014). Thanks to Perry Connolly, Sannah Gulamani and Sandra Smith for acting as models for the remaining figures. Some of this paper has been adapted from Cormier, Schembri and Woll (2010), which also includes discussion of grammaticalisation of manual and vocal gestures in signed and spoken languages. Any errors in the current paper are my own.
space theory and cognitive grammar to explore how gesture and sign language are intimately related, and to show that this sign-gesture fusion results in some typologically unique structures, such as indicating verbs.

Many sign language linguists accept that sign languages consist of both traditionally “linguistic” properties (e.g., that sign languages include symbolic, combinatorial, discrete elements and exhibit duality of patterning) together with gestural properties (e.g., gradient patterns, such as those found in gestures referring to size). However, those working within generativist/formalist frameworks have attempted to fit some of these properties into existing UG models, downplaying some of their distinctive characteristics (e.g., Sandler & Lillo-Martin, 2006). A significant degree of abstraction is required for these frameworks to handle gestural/gradient properties of sign languages, and some properties of sign languages have not been fully incorporated into such models. Researchers have focussed instead on some of the abstract syntactic properties of sign language structures (e.g., Benedicto & Brentari, 2004; Sandler & Lillo-Martin, 2006). Some of the structures which have received the most attention include pronouns, classifier constructions and agreement verbs. These are the structures I will focus on in this paper.

Before continuing to discuss these constructions, it is necessary to clarify some issues relating to terminology. Because the earliest sign language researchers were aiming to justify the linguistic study of sign languages, a considerable amount of terminology was borrowed from spoken languages. Some of these terms have been more widely accepted than others for sign languages (cf. Schembri, 2003). Therefore it is worth remembering that although I will use the terms ‘pronouns’, ‘agreement verbs’ and ‘classifiers’, these structures are each known by other names, and they overlap with other structures in form and function. Differences in terminology and the nature of the overlap contribute to the controversial nature of these structures.

Researchers such as Haspelmath (2007) and Evans and Levinson (2009) have previously cautioned against assuming pre-existing categories across languages, even within just spoken languages. As we will see here, this is even more important when considering language across modalities.

2 Pronouns

Pronominal systems have been identified in sign languages at least as far back as the mid-1970s (Friedman, 1975). Since then, the term ‘pronoun’ has been widely used to refer to signs in various sign languages which have the function of personal pronouns – that is, deictic-pointing signs which refer to signer, addressee, and non-addressed participants. Examples from British Sign Language (BSL) signers are shown in Figure 1a-c.
Additionally, pointing with an extended index finger as shown in Figure 1 has many functions within sign languages. These functions include use as a pronominal, adverbial (i.e., locative), and determiner. Locative pointing signs point to a location to refer to that (or some

---

1 As is conventional in the sign language literature, English glosses for signs are given in small caps (e.g., MAN) and signs which require more than one English word for translation are glossed with hyphens between words (e.g., ICE-CREAM). INDEX is used for pointing, including pronominal, signs. For these and other signs that are directed towards or located at particular locations in space, a subscript is used to indicate these locations: 1 for the signer, 2 for the addressee, and letters (a, b, c, etc.) for non-addressed participants. Indicating/agreement verbs and classifier constructions are glossed with a subscript indicating that the verb moves from the body or a neutral location to a location in space (e.g., →b) or from one location in space to another (e.g., a→b). Note that the similar glossing conventions for indicating/agreement verbs and classifier constructions are not meant to imply similar linguistic analyses. There simply are no standard ways of notating these structures.
other) location; these have an adverbial function (meaning ‘here’, ‘there’, ‘in this/that location’, etc.). Determiners are linked to nouns and occur within a noun phrase; their function includes establishing a location in space for a referent which may or may not be referred to later. Demonstrative pointing signs (as subtypes of pronominal signs or determiners) point to a location to refer to an object or concept (meaning ‘this’, ‘that’, etc.). Pointing signs are often ambiguous between these various functions (Emmorey, 2002; Fenlon, Schembri, Rentelis, & Cormier, 2013; Johnston, 2013).

Most sign language researchers either assume or explicitly argue that pronominal signs are distinct from pointing gestures as used by non-signers. There is clearly one way in which this is true. Pronominal signs have the same kind of syntactic distribution as pronouns in spoken languages, but not of pointing gestures used by non-signers. Pronominal signs serve as verbal arguments (as in (1)) and they may substitute for noun phrases (thus (2a) can be used instead of (2b) or (2c)). Those working within generative models would argue that they are also subject to binding conditions. Thus, it is argued that in sign languages, as in spoken languages, a personal pronoun cannot occur within the same clause as a co-referential antecedent. A reflexive pronoun would be required instead (Padden, 1983), as in (3).²

(1) Pronominal signs as verbal arguments

\[ \text{INDEX}_a \text{ NOT-LIKE INDEX}_b \]
S/he\(_a\) doesn’t like him/her\(_b\).

(2) Pronominal signs substituted for noun phrases

a. \[ \text{INDEX}_a \text{NP} \text{ NOT-LIKE STRAWBERRY} \]
S/he\(_a\) doesn’t like strawberries.

b. \[ \text{INDEX}_a \text{BOY} \text{NP} \text{ NOT-LIKE STRAWBERRY} \]
The boy\(_a\) doesn’t like strawberries.

c. \[ \text{YOUNG BOY} \text{NP} \text{ NOT-LIKE STRAWBERRY} \]
The young boy\(_a\) doesn’t like strawberries.

(3) Pronominal signs and reflexives

a. \[ \text{FATHER LIKE INDEX}_a \]
Father\(_a\) likes her/him/it.
*Father\(_a\) likes himself.

b. \[ \text{FATHER LIKE SELF}_a \]
Father\(_a\) likes himself.
*Father\(_a\) likes her/him/it.

Although there may be cases where pointing gestures are used instead of pronouns in spoken languages, it seems that English speakers, at least, do not regularly stop an utterance, use a pointing gesture instead of using a pronoun, and then finish the utterance. Instead, pointing gestures in non-signers appear primarily to be used as co-speech gestures, i.e. simultaneously with speech (e.g., McNeill, 1992; Enfield, 2009).

Although syntactic distribution makes pronominal signs more like pronouns, there is clearly one way in which pronominal signs differ from pronouns in spoken languages and that is in the marking of participant roles. Some work on the pronominal system of ASL has assumed a three-person system (Friedman, 1975; Padden, 1983; Berenz, 2002; Alibasic

² As noted by Levinson (1987, 1991), whether these patterns result from UG principles or reflect more general pragmatic constraints is not clear.
Ciciliani & Wilbur, 2006; Meurant, 2008), similar to that found in many spoken languages, on the assumption that there is a grammatical difference between the direction of pointing and/or the alignment/misalignment of pointing with eyegaze as shown in Figures 1a, 1b and 1c. This analysis has been considered problematic since there is no finite, listable set of non-first person forms or location values to which a sign might point (e.g., Meier, 1990; Rathmann & Mathur, 2002), and because similar patterns of directionality of pointing with eyegaze along with the listability issue have been documented in co-speech pointing gestures (e.g., Kita, 2003a). The only potential difference between pronominal signs and pointing gestures in terms of participant role marking may be in sign languages which have lexicalised a first person plural pronominal sign that is different from what we would expect from a sign that points to location(s) associated with its referent(s), such as ASL in Figure 2 (BSL also has a similar lexicalised first person plural pronominal sign, slightly different in movement and orientation).

Figure 2. ASL pronoun **we**

The reason why a first person plural form becomes lexicalised in some sign languages (in contrast to the singular) is likely related to the semantics of typical first person plurals (i.e., first person plus others versus multiple first persons). So this may be an issue related to number/plurality rather than participant role marking in particular. Overall, there is no convincing evidence for grammatical person marking in the singular for pronominal signs in any sign language described to date. Instead, in the singular, pronominal signs appear to index participant roles in ways very much like pointing gestures used by non-signers. This is reflected in analyses by Liddell (2000a, 2000b, 2003) and McBurney (2002) who have argued that pronouns are composed of discrete morphemic elements (e.g., handshape) which combine with gestural elements (e.g., location/direction).

Other properties such as referentiality, number/plural marking, and grammaticalisation patterns are either shared across pronominal signs, spoken language pronouns and pointing gestures (in the case of referentiality) or further evidence is needed to determine whether and to what extent pronominal signs are more like pronouns or more like pointing gestures used by non-signers (in the case of number/plural marking and grammaticalisation). Overall, it appears that pronominal signs in sign languages cannot be characterised exclusively either as personal pronouns, or as pointing gestures, but instead have characteristics of both. For more detailed discussion of these issues, see Cormier (2012) and Cormier, Schembri and Woll (2013).

3 Agreement

In addition to pronominal signs which have a pointing function, sign languages also have a class of verbs which have similar functions. These are referred to as ‘indicating verbs’ (Liddell, 2000b) but are more widely known as ‘agreement verbs’ (or ‘agreeing verbs’) in the
sign language linguistics literature (e.g., see Mathur & Rathmann (2010) for an overview). An example of an indicating verb in BSL is the sign glossed as PAY. In its citation form, this sign is produced with a movement away from the signer (see Figure 3). The movement and orientation of the dominant hand may be modified so that its movement is directed at physically present referents in the space around the signer’s body, or towards locations associated with absent referents. Thus, the dominant hand in the sign PAY can be moved from a location in front of the signer towards the location of the addressee to mean ‘I pay you.’ To represent ‘you pay me’, the orientation of the dominant hand and direction of its movement is reversed, moving from the location of the addressee towards the signer’s body.

Figure 3. BSL indicating verb PAY

Padden (1983) first analysed this subset of verb signs as marking person agreement in American Sign Language (ASL), building on earlier work by Friedman (1975), Kegl (1977, cited in Wilbur (1987)), Fischer and Gough (1978) and Meier (1982). In many descriptions of indicating verbs, it is the modification of the initial and/or final location and/or orientation of the hand(s) that has been analysed as a morpheme marking person agreement (e.g., Padden, 1983; Rathmann & Mathur, 2002). The location and/or orientation modifications of the citation form’s formational structure have been widely considered to be analogous to the various suffixes that mark person and number agreement in spoken languages such as Spanish (e.g., yo habl-o ‘I speak’ versus ella habl-a ‘she speaks’). When referents are present, these verbs point to the locations of these referents. When referents are not present (e.g., with non-addressed participants), Padden (1983) suggested that the particular form is dependent on a number of conditions, including that the third person argument is assigned to a location in the space around the signer’s body. For example, in the BSL clause in (4), the subject argument WOMAN is followed by a pointing sign that is directed towards a particular locus, and WOMAN is thus associated with this location in space. The ‘agreement’ is then marked in the verb sign SEND, with its initial location associated with the subject locus, creating a clause meaning ‘the women sends flowers to someone’. All subsequent reference to the subject argument should use the same locus. In this analysis, directing an indicating verb from the initial location assigned to the subject noun phrase to some other location (not here assigned to a particular object argument) is analogous to adding an person agreement affix.

(4) WOMAN INDEX a SEND a→b FLOWER
The woman sends the flowers to someone.
Liddell (2000b, 2003) has argued, however, that the directionality of indicating verbs is often controlled by the real or imagined location of the referent, not by any feature that might be construed as a formal or semantic property of a controller noun phrase, which is what grammatical agreement entails (Corbett, 2006). Consider the BSL clause in (5). As is also true of ASL (Liddell, 2000b), if this were produced in the presence of the referent of the object argument in question (i.e., if the actual mother being referred to was standing near the signer and the addressee), then the sign \textsc{ask→a} would begin its movement at the chin and move towards the location of the mother standing nearby. We can see that, in this instance, the location of the referent of the object noun phrase \textsc{mother} is not a formal nor a semantic property associated with the noun phrase itself. It is a transient property of the referent (because the mother can move to another location), not of the noun phrase in clause (5). It is not the case that spatial modifications of the indicating verb ‘agrees’ with any of the linguistic properties of the relevant noun phrase, and it certainly cannot be said that it ‘agrees’ with the location of the actual referent herself, as the location of the mother in the real world does not form part of the grammar of BSL.

(5) \textsc{index1 ask→a mother}
I asked mother (something).

Unlike the example in (4) above, in many instances there is no relationship between the locus towards which an indicating verb is directed and any properties of the associated noun phrase. In the clause in (5), the specific lexical variant of the sign \textsc{mother} is produced on the ipsilateral side of the forehead. The sign \textsc{ask→a}, however, may be directed to any location away from the signer, and not at the location of the sign \textsc{mother} at all. Furthermore, if the signer is representing a child asking his or her own mother, then the height of the child’s mother in relation to the child may be represented by directing the sign \textsc{ask→a} away and up from the signer’s body, as in Figure 3. Thus, the locus towards which the verb \textsc{ask→a} is directed here does not reflect any formal property of the associated noun phrase at all (i.e., it is not directed to the ipsilateral forehead location of the sign \textsc{mother}), nor any semantic properties, given that the height of the individual concerned is not part of the semantics of the sign \textsc{mother} (cf. Liddell, 2000b).

![Figure 4. BSL \textsc{ask→a}](image)

Other arguments for an agreement analysis centre on the conventionality of directionality of pointing behaviours in these verbs. Aronoff, Meir and Sandler (2000) and Meier (2002) suggest that if the directionality of indicating verbs was gestural (as suggested by Liddell, 2000b), then one would expect to see considerable variation with respect to the locations towards which indicating verbs may be directed. Yet, the directionality of indicating
verbs appears to be constrained: for example, the ASL indicating verb \textit{GIVE}_{a\rightarrow b} is directed towards locations associated with the referent represented by the ‘indirect object’ and ‘subject’ noun phrases, but not to the location associated with the referent of the ‘direct object’ (Aronoff et al., 2000; Meier, 2002; Lillo-Martin & Meier, 2011).

This argument appears to assume that adult pointing gestures are themselves not conventionalised nor constrained in any way. Work on pointing gestures by Kita (2003b), Kendon (2004) and Cooperrider (2014) indicate that there are regularities in the use of pointing, and that this class of gestures interacts in patterned ways with grammar, culture and conceptual structure. Cooperrider (2014), for example, found that the use of body-directed pointing gestures indicating the speaker reflects information structure in the co-occurring speech, and in some cases appears to interact with the number and case of the accompanying pronoun.

Liddell’s (2000b) alternative analysis is that indicating verbs represent a fusion of a lexical element with a pointing gesture. This does not mean that which verbs are indicating verbs should be predictable nor that they will not vary cross-linguistically. The way that the set of indicating verbs behaves in each language is conventionalised. Liddell (2003) proposed that each sign language’s set of indicating verbs and their properties are listed in the mental lexicon, and thus they may vary from one sign language to the next. This evidence, along with evidence from acquisition, psycholinguistic studies, neurolinguistic studies, work on emerging sign languages and grammaticalisation and sociolinguistic variation and change, all point toward an analysis which is very different from the canonical notion of grammatical agreement proposed by Corbett (2006). Instead, Liddell (2000b) argues, this aspect of sign language grammar represents a typologically unique fusion of lexical items and pointing gestures that is used for reference tracking. For more detail discussion of these arguments, see Schembri and Cormier (under review).

4 Classifiers

The term “classifier” is another which has been borrowed from spoken languages to apply to a particular phenomenon in sign languages. Specifically, the term “classifier” has been used to refer to the handshape element in verbs of motion, location and handling since the 1970s (e.g., Frishberg, 1975; Supalla, 1978). These handshapes represent categories of entities which have some shared characteristics (e.g., two-legged entity, vehicle, or upright being such as \textit{STICK-SHAPED-ENTITY-MOVE} in Figure 5), or they represent handling or manipulation of an object, or the handled object itself, such as \textit{HANDLE-FLAT-OBJECT} in Figure 6. These handshapes are moved or located within the signing space gradiently to represent movement and location of the referents (Liddell, 2003).

![Image](Image_url)

\textbf{MAN} \hspace{1cm} \textbf{STICK-SHAPED-ENTITY-MOVE}_{a\rightarrow b}

‘The man moved/walked (from location a to location b).’

Figure 5. Entity classifier construction in BSL
Researchers such as Supalla (1978) originally suggested that sign language classifier handshapes resembled classifier morphemes occurring in Athabaskan languages such as Navajo (Allan, 1977). More recently it has been shown this comparison is not appropriate, primarily because of prior misinterpretation of the Navajo data presented by Allan (Grinevald, 2000; Aikhenvald, 2003). Schembri (2003) outlines defining criteria of spoken language classifiers, based on Grinevald’s (2000) typology, which distinguishes classifier systems from other types of classificatory systems. Specifically, Grinevald claims that classifiers are overt morphemes which constitute amorphosyntactic subsystem, are semantically motivated, do not classify all nouns in the language, and are subject to pragmatic and discourse conditions. Schembri (2003) notes that sign language classifier handshapes are problematic for nearly all of these criteria. Other researchers have observed this as well, which has led to a wide range of terminology other than “classifier” to refer to these morphemes, including ‘polymorphemic signs’, ‘polycomponential signs’, ‘depicting signs’, ‘depicting verbs’, ‘depicting constructions’ and a range of others. Schembri (2003) concludes that classifier handshapes in sign language verbs of location and motion, but not in handling verbs, do share some characteristics with verbal classifiers in spoken languages, a view also shared by others (Zwitserlood, 2003; Sandler & Lillo-Martin, 2006). Additionally, these handshapes appear to be incorporated into typologically unique constructions that involve fusions of categorical and gradient properties (Liddell, 2003) and share some features with gesture (Schembri, Jones, & Burnham, 2005; Marshall & Morgan, 2014). For more discussion of these features, see Schembri (2003) and Cormier, Quinto-Pozos, Sevcikova and Schembri (2012).

5 Gesture and Language

There are many characteristics of sign languages which have strong gestural components (Liddell, 2003), including but not limited to pronominal signs, agreement verbs, and classifier constructions. The importance of gestural elements in language is, however, not unique to signed languages. As well as the examples mentioned above there is a very close relationship between spoken language and gestures of the hands and other visible articulators (Kendon, 2004; Enfield, 2009). The form and function of co-speech gestures differ cross-linguistically (Kita & Ozyurek, 2003), and research indicates that speech and gesture develop together in
children (Stefanini, Bello, Caselli, Iverson, & Volterra, 2009), as well as in adults learning second languages (Brown & Gullberg, 2008). This evidence argues strongly for a united view of language and gesture as part of the same cognitive system (McNeill, 1985). When language is considered from this multimodal perspective, then what appear at first to be stark differences across signed and spoken languages then start to look much more similar (Kendon, 2008).

6 Conclusion

Here I have raised issues about the use of the terms ‘pronoun’, ‘agreement’ and ‘classifier’ in the sign linguistics literature, not to proscribe the usage of these terms, but to echo Haspelmath’s (2007) and Evans and Levinson’s (2009) concerns about the use of terminology for comparable constructions across languages, and particularly across modalities. Where there is initially sufficient evidence to support the borrowing of terminology from spoken languages in sign language description, this approach can be useful, at least until more detailed analyses become available that argue against such accounts. My main point here is to urge linguists to be careful in applying terminology from one language/family/modality to another, and to consider the appropriateness and usefulness of doing so.

Additionally, in order to properly evaluate linguistic diversity and possible language universals, it is crucial to take a broad view of language as a multimodal system. Gesture plays an important role in both spoken and signed languages—if linguists are to take the role of sign languages in an understanding of the human language capacity more seriously, then this cross-modal comparison requires a more thorough description of the composite, audiovisual nature of utterances in spoken language communication.

References


Strong islands, resumption, and reconstruction*

Ezekiel J. Panitz

Abstract

Under what is arguably the standard view of strong islands (SIs), SIs constitute absolute barriers to movement: whenever movement takes place across an SI, ungrammaticality ensues. This view of SIs contrasts with an alternative view, under which movement can indeed take place across SIs, albeit only under specific conditions (e.g., when the moved expression leaves behind a resumptive pronoun). The present study evaluates these two views of strong islandhood through an examination of reconstruction in Hebrew and Brazilian Portuguese (BP). Based on the results of an online survey, it is argued that there is a class of Hebrew- and BP-speakers which permits reconstruction down wh-resumption chains, but only in sentences which do not contain a strong island. From this, it is concluded that resumptive pronouns do not license SI-crossing movement (in BP and Hebrew) — a result which follows immediately from the standard view of strong islandhood, but which is, on the other hand, unexpected, under the alternative view. Additional evidence in support of the standard view comes from SI-crossing wh-gap chains, which are argued to be acceptable only for those speakers of BP and Hebrew for whom wh-gap chains may culminate in a covert resumptive pronoun. Since the reconstruction-data reviewed above indicate that SI-crossing resumption-chains are obligatorily base-generated, it follows that acceptable instances of SI-crossing wh-gap chains, which are analyzed as containing a resumptive pronoun, are also obligatorily base-generated, once again supporting the conclusion that resumptive pronouns do not license SI-crossing movement.

Keywords: strong islands, reconstruction, resumption, island repair

1 Introduction

Under what is arguably the standard view of strong islands (SIs), SIs constitute absolute barriers to movement: whenever movement takes place across an SI, ungrammaticality ensues. This view of SIs contrasts with an alternative view, under which movement can indeed take place across SIs, albeit only under specific conditions. For instance, a number of authors have argued that movement can cross SIs, provided the island is subsequently elided (Ross, 1969; Chomsky, 1972; Lasnik, 2001; Merchant, 2008). Similarly, various authors studying wh-in-situ languages have proposed that movement can take place across SIs, provided this movement takes place covertly (Huang, 1982; Hagstrom, 1998). Finally, in recent work, Boeckx (2003), building on earlier work by Demirdache (1991) and Ross (1967), proposed that movement can cross SIs, provided the moved expression leaves behind a resumptive pronoun (RP). In short, then, the two views of strong islandhood differ in that, under the standard view, the barrierhood of SIs is absolute, ruling out all instances of extraction, whereas under the alternative view, the barrierhood can be circumvented, but only under certain conditions.

The two views of strong islandhood can be evaluated by examining areas of grammar in which the two views produce contrasting predictions. One such area concerns the distribution of SI-crossing A'-reconstruction. Under traditional conceptions of A'-reconstruction, reconstruction is an exclusive property of movement-derived chains: movement-derived chains

* My thanks to Klaus Abels for much valuable discussion, to Zohar Ben Moshe, Lucila Esteves, and Paulo Esteves for preparing the Hebrew-language and Portuguese-language versions of the survey, to Juanito Avelar, Sonia Cyrino, and Elaine Grolla for grammaticality judgements, and to the many individuals who completed the survey. I gratefully acknowledge the financial support of the UCL Graduate Research Scholarship and the UCL Overseas Research Scholarship.
exhibit reconstruction; base-generated chains do not. The standard view of SIs, under which SI-crossing movement is impossible, therefore predicts that SI-crossing reconstruction should be impossible. By contrast, the alternative view, under which SI-crossing movement is permitted, predicts that SI-crossing reconstruction should be possible, provided the conditions enabling SI-crossing movement are met.

Recent studies of A’-reconstruction suggest that the traditional picture needs revision (Rouveret, 2008; Guilliot & Malkawi, 2009, 2012; Moulton, 2013). The authors of these studies argue that base-generated chains do indeed permit reconstruction, though the reconstruction witnessed here differs in certain respects from the sort of reconstruction associated with movement-derived chains. Since the present study utilizes reconstruction as a means of evaluating the two views of strong islandhood, it is necessary to first establish what predictions each view makes regarding the distribution of SI-crossing A’-reconstruction. The following section will be devoted to this task, as well as to a discussion of previous studies of SI-crossing reconstruction.

Section 3 presents the results of an online survey whose purpose was to examine whether Brazilian Portuguese (BP) and Hebrew permit SI-crossing reconstruction down wh-RP chains. As will be discussed further, below, there exist two classes of BP and Hebrew speakers: those who never allow reconstruction down wh-RP chains, and those who do, but only when the sentence does not contain an SI. These results, and in particular, those of the latter group, provide support for the standard view of SIs and against the alternative view.

The survey also revealed that some BP and Hebrew speakers accept SI-crossing wh-gap dependencies. The results of a chi-squared test reveal that speakers of these two languages accept SI-crossing wh-gap dependencies if and only if they accept SI-crossing wh-RP dependencies. On the basis of this result, I propose that the gap-position does not contain a trace, but rather a covert RP, and that this RP is what underlies the acceptability of SI-crossing wh-gap dependencies. Moreover, since the results from the reconstruction-data reviewed above indicate that SI-crossing wh-RP dependencies are obligatorily base-generated, it can be concluded that the dependency between the wh-phrase and the covert RP is obligatorily base-generated, as well — as expected, under the standard view of strong islandhood.

Section 4 reports the results of small-scale informant work on BP. Here, I again test for SI-crossing reconstruction, but this time with wh-gap chains, rather than with wh-RP chains. The results indicate that SI-crossing reconstruction is allowed to a limited extent, but in a manner consistent with the predictions of the standard view, and inconsistent with those of the alternative view. Section 5 summarizes and closes.

2 Reconstruction and Strong Islandhood

Recent studies of A’-reconstruction have concluded that reconstruction is not an exclusive property of movement-derived A’-chains: in some languages, reconstruction is a property of base-generated chains, too.1 These studies have also concluded that base-generated reconstruction differs in certain respects from movement-based reconstruction, meaning that the two types of A’-chains can be distinguished on the basis of reconstruction data. Section 2.1 presents evidence that base-generated reconstruction is possible, and Section 2.2 illustrates what predictions

---

1 I will use the term “base-generated reconstruction” to refer to the sort of reconstruction which occurs with base-generated chains, and “movement-based reconstruction” for the sort of reconstruction taking place down movement-derived chains.
the two views of SIs make, once base-generated reconstruction is considered possible. Section 2.3 discusses the results of previous studies which examine the (un)availability of SI-crossing reconstruction.

2.1 Two Classes of Reconstruction

Moulton (2013), Rouveret (2008), and Guilliot and Malkawi (2009, 2012) argue that base-generated reconstruction is possible, at least in some languages; however, base-generated reconstruction differs from movement-based reconstruction in that “reconstruction conflicts” occur only with movement-based reconstruction.

The term “reconstruction conflicts” refers to contexts in which the reconstructing XP is subject to two, conflicting requirements.\(^2\) The following examples serve as an illustration.

(1) a. Which paper that he\(_1\) gave to Bresnan\(_2\) did every student\(_1\) think \(t’\) that she\(_2\) would like \(t’\)?
   b. *Which paper that he\(_1\) gave to Bresnan\(_2\) did she\(_2\) think \(t’\) that every student\(_1\) would like \(t’\)?

In the sentences above, we are interested in knowing whether the quantifier can bind the co-indexed pronoun, and whether Bresnan and she can corefer — that is, whether the sentences admit a reading in which bound variable anaphora (BVA) and coreference are both present. In order to generate the bound variable reading, the wh-phrase must reconstruct under the quantifier. On the other hand, the wh-phrase must not reconstruct below Bresnan, if coreference is to be possible (given Condition C). In (1-b), there is no single position to which the wh-phrase could reconstruct which would satisfy both requirements (i.e., the two requirements are in conflict). Accordingly, the sentence does not admit a reading in which BVA and coreference both obtain. By comparison, (1-a) allows this reading, as it contains a position which simultaneously satisfies both requirements.

The preceding examples illustrate that movement-derived chains give rise to A’-reconstruction and to reconstruction conflicts. Turning to base-generated chains, Moulton (2013) argues that these chains also give rise to reconstruction, but that they do not exhibit reconstruction conflicts. Moulton bases his arguments on sentences containing a sentential topic, which he argues is base-generated in its surface position. Evidence in support of a base-generation analysis comes from two sources. First, citing Williams (1981), Grimshaw (1982), and Postal (1986), Moulton notes that sentential topics must bind DP-gaps, not CP-gaps. (Following Moulton, I will refer to this as the “DP-Requirement”.) This restriction can be illustrated by the contrast between (2-a) and (3-a). In (2-a), the sentential topic binds a CP-gap, as can be inferred from the fact that boasted selects CP-complements, not DP-complements. In (3-a), on the other hand, the sentential topic is able to bind a DP-gap, given that expected optionally selects DP-complements.

(2) a. *That he could lift 100 pounds, John boasted \([CP\) that he could lift 100 pounds].
   b. John boasted \([CP\) that he could lift 100 pounds].
   c. *John boasted \([DP\) that].

\(^2\) The term is due to Moulton (2013), I believe.
Since movement leaves behind a trace whose category is identical to that of the moved expression, the data above, which illustrate that the categorial membership of the topic and the gap are distinct, indicate that the topic is base-generated in its surface position.\(^3\) As to how the topic is connected to the gap-position, Moulton proposes that a null pro-form is generated in the gap-position and is subsequently raised to a position immediately below the topic, creating an operator-variable chain.

\[(4) \quad [CP \ [CP \text{sentential topic}] \ [CP \text{OP} \ldots \text{tOP}]]\]

An apparent exception to the DP-Requirement comes from examples in which the topic is related to a gap in post-nominal or post-adjectival position. Here, sentential topics are permitted, even though they seem to be binding a non-DP gap, as can be inferred from the fact that nouns and adjectives do not select DP-complements.

\[(5)\]

a. I knew that they would try to repair the damages. But that they would offer to replace the whole project, I had no idea.

b. I knew that Rita didn’t report all her income. But that she was stealing from the company, I was not aware. (Moulton, 2013)

However, post-nominal and post-adjectival gaps are permitted only when the noun or adjective licenses null complement anaphora (NCA) — that is, when the noun or adjective licenses a null DP pro-form which stands in for a missing CP. The noun and adjective in (5) license NCA, as (6) illustrates, hence the acceptability of the sentential topics in (5).

\[(6)\]

a. They are going to replace the whole product? I had no idea.

b. Rita was stealing from the company? Gosh, I was not aware. (Moulton, 2013)

By contrast, the noun ‘belief’ does not license NCA, hence the unacceptability of the sentential topic in (7-a).

\[(7)\]

a. *John did not know that he was being followed. But that his phone was being tapped, he had a belief.

b. *John’s phone was being tapped? Yeah, I had a belief. (Moulton, 2013)

The acceptability of the sentences in (5) thus falls under the generalization that sentential topics must bind DP-gaps — a generalization which motivates a base-generation analysis of sentential topics.

Moulton’s (2013) second argument for a base-generation analysis is based on the absence of reconstruction conflicts. Note, first, that pronouns contained within sentential topics may be bound by a quantifier contained within the main clause, suggesting that the topic has reconstructed below the quantifier.

\[(8)\]

It was clear that something bad was going to happen …

a. … but that he\(_1\) was in real danger, no banker\(_1\) had any clue.

b. … but that he\(_1\) was in real danger, every SEC member\(_1\) was unaware.

c. … but that her\(_1\) company was in real danger, many CEOs\(_1\) had no idea.

(Moulton, 2013)

\(^3\) The requirement of a DP-gap can be made compatible with a movement-based treatment of sentential topics by positing a DP-shell for the sentential topic; i.e., \([DP \ [CP \ldots \]]\). See Moulton (2013, pp. 255-258) for arguments against such an approach.
However, sentential topics do not give rise to reconstruction conflicts. Both sentences, below, permit a reading in which coreference and BVA obtain simultaneously, contrary to what occurs with dislocated DPs.

(9) a. … But that he$_1$ might be too old for Ms. Brown$_2$, I don’t think any man$_1$ would want her$_2$ to believe.
   b. … But that he$_1$ might be too old for Ms. Brown$_2$, I don’t think she$_2$ would want any man$_1$ to believe. (Moulton, 2013)

The absence of reconstruction conflicts supports the conclusion that sentential topics are base-generated, and for the following reason: movement gives rise to reconstruction conflicts, presumably because of its successive-cyclic nature, which produces a reconstruction-site capable of bleeding Condition C in (a), but not in (b).

(10) a. $[\text{XP} \ldots \text{pronoun}_1 \ldots \text{r-expression}_2] \ldots \text{QP}_1 \ldots \text{XP} \ldots \text{pronoun}_2 \ldots \text{*XP} \ldots$
   b. $[\text{XP} \ldots \text{pronoun}_1 \ldots \text{r-expression}_2] \ldots \text{pronoun}_2 \ldots \text{*XP} \ldots \text{QP}_1 \ldots \text{*XP} \ldots$
   (Diagram based on Fox (1999, ex. 38))

If sentential topics were moved to their surface position, the representation of (9-a) and (9-b) would look like (10-a) and (10-b), respectively, incorrectly predicting a reconstruction conflict in (9-b).

In short, the DP-Requirement and the absence of reconstruction conflicts support a base-generation analysis of sentential topics. What remains to be explained under such an analysis is why sentential topics exhibit reconstruction effects (i.e., why the quantifier in (8) and (9) is able to bind the pronoun). Moulton (2013) develops an analysis which succeeds in generating the reconstruction effects, and, crucially, does so without requiring the topic to reconstruct under the quantifier, thereby accounting for the absence of Condition C effects in (9-b). Sentential topics thus provide evidence that base-generated chains permit reconstruction, and, therefore, that reconstruction is not an exclusive property of movement-chains.

Rouveret (2008) and Guiliot and Malkawi (2009, 2012) provide additional evidence that base-generated chains permit reconstruction. In French and Welsh, resumption-chains (i.e., chains containing an RP) exhibit reconstruction, as the following data indicate.

(11) ?Quelle photo de lui$_1$ est-ce que tu te demandes si chaque homme$_1$ l-a déchirée? ‘Which picture of his$_1$ do you wonder whether each man$_1$ has torn it?’ (Guiliot & Malkawi, 2012)

(12) Mae gan Siôn farn ar ei$_1$ lyfr y mae pob awdur$_1$ yn ei pharchu. ‘Siôn has an opinion about his$_1$ book that each author$_1$ respects it.’ (Rouveret, 2008)

However, the resumption-chains do not give rise to reconstruction conflicts.

---

4 I refer the reader to Moulton (2013) for the details of his analysis.
In French, the reading in which BVA and coreference simultaneously obtain is possible, independent of the relative positioning of the quantifier and the obviating pronoun; in Welsh, this reading is impossible, independently of how the quantifier and pronoun are positioned. Both sets of judgements depart from what we would expect to find if the resumption chains in the preceding examples were movement-derived, indicating that these chains are in fact base-generated. French and Welsh thus provide additional evidence in support of the conclusion that base-generated reconstruction is possible.  

2.2 Two Views on Strong Islandhood

The preceding discussion suggests the following understanding of A’-reconstruction: movement-derived chains and base-generated chains exhibit reconstruction; however, only movement-derived chains exhibit reconstruction conflicts. Given this understanding of reconstruction, one can conclude that a given chain is movement-derived if that chain exhibits reconstruction conflicts. On the other hand, if a given chain does not exhibit reconstruction conflicts, one cannot immediately conclude that the chain was base-generated; there may be independent reasons for why the chain lacks reconstruction conflicts.  


6 For instance, information structural factors may prevent a given constituent from reconstructing — hence, from exhibiting reconstruction conflicts (see Erteschik-Shir’s (1997) treatment of continuing topics).
absence of SI-crossing reconstruction conflicts, or one can maintain that the SI-crossing chain is movement-derived and propose that the absence of reconstruction conflicts is due to some property of the SI, itself. Evidently, the latter conclusion is motivated only to the extent that the proposal upon which it is based is itself motivated.

As to the two views of SIs and what they predict, let us consider a language in which some class of A′-chains (e.g., wh-RP chains, topic-gap chains, etc.) exhibits reconstruction conflicts. In particular, suppose we know that this class of A′-chains exhibits reconstruction conflicts in sentences which do not contain an SI, and that we wish to establish what happens when an SI is inserted. If the standard view of SIs is correct, one of the following outcomes will obtain: (1) the sentences will be ungrammatical; this will occur in languages in which the class of A′-chains under examination is obligatorily generated under movement; (2) the sentences will be grammatical, but they will not exhibit reconstruction conflicts; this will occur in languages in which the class of A′-chains has the option of being base-generated. By contrast, the alternative view of SIs predicts that such sentences will exhibit reconstruction conflicts, provided the class of A′-chains in the language under examination satisfies the conditions enabling SI-crossing movement.

Under what conditions is SI-crossing movement possible? Limiting our attention to proposals which link the availability of SI-crossing movement to the presence of an RP (as opposed to theories in which SI-crossing movement is sanctioned by ellipsis or by the covertness of the movement operation — see the references at the beginning of the article), I am aware of three proposals: Ross (1967), Perlmutter (1972), and Boeckx (2003). For Ross and Perlmutter, SI-crossing movement is always possible, so long as the moved expression leaves behind an overt RP. Such theories predict that SI-crossing reconstruction conflicts will occur whenever the moved expression binds an overt RP — an incorrect prediction, as the data presented below will indicate. Boeckx proposes that SI-crossing movement requires the moved expression to leave behind a resumptive pronoun (which may be overt or covert; see Boeckx (2003, pp.167-168, fn. 7)). As to the conditions under which RP-stranding movement may cross SIs, here, it is not necessary to elaborate on the details of Boeckx’s proposal, and for the following reason. In Boeckx’s system, all resumption-chains containing non-intrusive RPs are generated under movement. In languages in which resumption is non-intrusive, the following conclusion can thus be drawn: if a given SI-crossing resumption-chain is grammatical, it follows that the conditions enabling SI-crossing movement have been met, and we therefore expect to observe reconstruction conflicts. The BP and Hebrew data presented below demonstrate that this expectation is not fulfilled.

The three proposals just reviewed are similar in that they each predict BP and Hebrew to exhibit SI-crossing reconstruction. As already noted, the present study tests these predictions, concluding that they are not supported. However, the present study is not meant as an assessment of these three proposals alone, but as a broader assessment of the view that SI-crossing movement is allowed, under certain circumstances. This view, however elaborated, makes the following prediction: there exist languages in which SI-crossing chains exhibit reconstruction conflicts. The standard view of SIs, by contrast, makes the following prediction: there do not exist languages in which SI-crossing chains exhibit reconstruction conflicts. Evidently, the nature of these predictions implies a research program in which a variety of languages are examined.

---

7 The sentence may, however, exhibit reconstruction (though not reconstruction conflicts), if the language permits base-generated reconstruction.

8 By contrast, chains containing intrusive RPs may be base-generated, where intrusive RPs are those “instances of ‘resumption’ [which are] restricted to island contexts” (Boeckx, 2003, p. 149).
The present study contributes to this larger program.

### 2.3 Literature Review

In this section, I have presented evidence indicating that base-generated reconstruction is sometimes possible, and I have detailed what predictions each view of SIs make, given the conclusion that base-generated reconstruction is possible. With this in place, I will now review the key data emerging from previous studies of SI-crossing reconstruction.

In a series of studies, Aoun and colleagues examine the properties of resumption-chains in Lebanese Arabic, illustrating that these chains exhibit reconstruction, but not across SIs (Aoun & Benmamoun, 1998; Aoun, 2000; Aoun, Choueiri, & Hornstein, 2001). The examples in (15) demonstrate that resumption-chains exhibit reconstruction when an SI is not present; in each sentence, the pronoun contained within the dislocated expression can be bound by the co-indexed quantifier.

\begin{align*}
(15)\quad &\text{a. } [\text{Təlmiiz-a}_1 \ [\text{ʃʃitaan}] \ btaʕrfo \ ?ənno \ kəll \ mʕallme}_1 \ ?aaʃṣ-o. \\
&\text{[student-her the-naughty]M know.2pl that every teacher.F punished-him. } \\
&\text{‘[Her}_1 \text{naughty student], you know that every teacher}_1 \text{punished him.’} \\
&\text{(Aoun & Benmamoun, 1998)}
\\
&\text{b. ‘eft }[\text{SSuura \ tabaʕ \ ?əbn-a}_1] \ yalli \ ?əlto \ ?ənno \ kəll \ mwazzafe}_1 \ badda \ saw.1SG \ [\text{the-picture of \ son-her}] \ that \ said.2PL \ that \ every \ employee.F \ want} \\
&\text{ṭalləʔ-a \ bi-maktab-a.} \\
&\text{hang-it \ in-office-her.} \\
&\text{‘I saw [the picture of her}_1 \text{son] that you said that every employee}_1 \text{wants to hang it in her office.’} \\
&\text{(Aoun, 2000)}
\\
&\text{c. ‘eft }[\text{SSuura \ tabaʕ \ ?əbn-a}_1] \ yalli \ ‘triito \ l-kadr \ yalli \ kəll \ saw.1SG \ [\text{the-picture of \ son-her}] \ that \ bought.2PL \ the-frame \ that} \\
&\text{every \ mwazzafe}_1 \ fiTTʕat-a \ fi-i. \text{employee.F put-it \ in-it.} \\
&\text{‘I saw [the picture of her}_1 \text{son] that you bought the frame that every employee}_1 \text{put it in.’} \\
&\text{(Aoun, 2000)}
\end{align*}

However, when an SI is inserted, reconstruction becomes impossible. (Note that these sentences are grammatical when the pronoun is not construed as bound by the quantifier.)

\begin{align*}
(16)\quad &\text{a. } *[\text{Təlmiiz-a}_1 \ [\text{ʃʃitaan}] \ fallayto \ ?ablma \ kəll \ mʕallme}_1 \ t?aaʃṣ-o. \\
&\text{[student-her the-naughty]M left.2pl before every teacher.F punished-him. } \\
&\text{‘[Her}_1 \text{naughty student], you left before every teacher}_1 \text{punished him.’} \\
&\text{(Aoun & Benmamoun, 1998)}
\\
&\text{b. ‘eft }[\text{SSuura \ tabaʕ \ ?əbn-a}_1] \ yalli \ zʕəlto \ la?anno \ kəll \ mwazzafe}_1 \ saw.1SG \ [\text{the-picture of \ son-her}] \ that \ upset.2PL \ because \ everyone.F \ want} \\
&\text{ṭalləʔ-a \ bi-l-maktab.} \\
&\text{hang-it \ in-the-office.} \\
&\text{‘I saw [the picture of her}_1 \text{son] that you were upset because every employee}_1 \text{wants to hang it in the office.’} \\
&\text{(Aoun, 2000)}
\\
&\text{c. ‘eft }[\text{SSuura \ tabaʕ \ ?əbn-a}_1] \ yalli \ ‘triito \ l-kadr \ yalli \ kəll \ saw.1SG \ [\text{the-picture of \ son-her}] \ that \ bought.2PL \ the-frame \ that} \\
&\text{every \ mwazzafe}_1 \ fiTTʕat-a \ fi-i. \text{employee.F put-it \ in-it.} \\
&\text{‘I saw [the picture of her}_1 \text{son] that you bought the frame that every employee}_1 \text{put it in.’} \\
&\text{(Aoun, 2000)}
\end{align*}

When (15) is considered by itself, it is not possible to determine whether the resumption-chains in (15) are movement-derived or base-generated (recall that both types of A’-chains exhibit reconstruction — at least in principle). However, the fact that Lebanese Arabic does
not permit SI-crossing reconstruction indicates that Lebanese Arabic does not permit base-generated reconstruction; if it did, the availability of reconstruction would be insensitive to the presence of SIs. This, in turn, suggests one of two conclusions: (1) In Lebanese Arabic, resumption-chains can be movement-derived or base-generated; in sentences which do not contain an SI, movement is possible, hence the availability of reconstruction, but in sentences which do contain an SI, movement is no longer possible, hence the unavailability of reconstruction; (2) resumption-chains in Lebanese Arabic are always movement-derived; the fact that reconstruction becomes impossible upon the insertion of an SI is due to some property of SIs. As already pointed out, the latter conclusion is ad hoc, unless one can explain why SIs prevent movement-derived chains from reconstructing. I will therefore set this conclusion aside, discussing it further only in the final section. Accepting conclusion #1, then, we can take the pattern of judgements exhibited in (15) and (16) as direct support for the standard view of SIs.

Agüero-Bautista (2001) demonstrates that a similar pattern is found in Spanish. Agüero-Bautista observes that sentences such as (17), in which a wh-phrase binds a resumptive pronominal clitic, are ambiguous. (17) can be understood as a question which asks for the identity of a single individual — the individual whom all of the witnesses wanted to hit (e.g., Juan). Alternatively, it can be understood as a question which asks for a list of pairs, where the first member of each pair is a witness and the second member is the person whom that witness wanted to hit; for example: Maria said that the first witness wanted to hit Pablo, that the second witness wanted to hit Miguel, and that the third witness wanted to hit Pedro. By comparison, sentences such as (18), in which a resumption-chain crosses an SI, are unambiguous: the single-individual reading is possible, but not the pair-list reading. (The example in (19) shows that the bracketed clause in (18) is a strong island.)

(17) (Single-Indvidual Reading, Pair-List Reading)
A quién dijo María que cada testigo le quería pegar?
DOM whom said Maria that each witness 3SG.DAT wanted to hit?
‘Who did Maria say that each witness wanted to hit him?’

(Agüero-Bautista, 2001)

(18) (Single-Indvidual Reading, *Pair-List Reading)
A cual coche piensa Pedro que [de cada mecánico reparar-le algo],
DOM which car thinks Pedro that [of each mechanic fix-3SG.DAT something],
iremos a NY?
will.go.1PL to NY?
‘Which car does Pedro think that [if each mechanic fixes something on it], we will go to NY?’

(Agüero-Bautista, 2001)

(19) *A cual dictador piensas que [de la corte enjuiciar ___] saldría en primera plana?
DOM which dictator think.2SG that [if the court prosecute ___] come.out on first page?
‘Which dictator do you think that [if the court prosecutes ___], it will make the front page?’

(Agüero-Bautista, 2001)

In order to generate the pair-list reading, the wh-phrase must be interpreted within the

---

scope of the quantifier; that is, reconstruction must take place. The preceding examples thus illustrate that Spanish allows reconstruction down resumption-chains, but only when an SI does not intervene. This result is what is expected under the standard view of SIs, but unexpected, under the alternative view.

French and Jordanian Arabic differ from Lebanese Arabic and Spanish in allowing SI-crossing reconstruction. Examples (20) and (21) illustrate that reconstruction takes place down resumption-chains in sentences which do not contain an SI, and examples (22) and (23) demonstrate that resumption-chains permit SI-crossing reconstruction.

(20) a. La photo de sa classe, chaque prof l-a déchirée. 
    the picture of his class, each teacher it-has torn.
    ‘The picture of his class, each teacher has torn it.’

   b. ?Quelle photo de lui est-ce que tu te la demandes si chaque homme, l’a déchirée?
    which picture of his that you REFL ask if each man it-has torn?
    ‘Which picture of his do you wonder whether each man has torn it?’
    (Guilliot & Malkawi, 2012)

(21) a. Talib-ha l-kassoul ma baddna nxabbir wala mçallmih l-ʔinnu-uh zaçbar
    student-her the-bad NEG want.1PL tell.1PL no teacher that-he cheated
    b-l-faḥis.
    in-the-exam.
    ‘Her bad student, we don’t want to tell any teacher that he cheated on the exam.’

   b. ʔaya Surrah l-abin-ha kul marah, mazaçat-ha?
    which picture of-son-her every woman tore-it?
    ‘Which picture of her son did every woman tear it?’
    (Guilliot & Malkawi, 2012)

(22) La photo de sa classe, tu es fâché parce que chaque prof l-a déchirée.
    the picture of his class, you are furious because each teacher it-has torn.
    ‘The picture of his class, you are furious because each teacher tore it.’
    (Guilliot & Malkawi, 2012)

(23) a. Talib-ha l-kassoul ma ziçlat wala mçallhüh l-ʔinnu l-mudirah
    student-her the-bad NEG upset no teacher because the-principal
    kahfât-uh mn l-madrase.
    expelled-him from-the-school.
    ‘Her bad student, no teacher was upset because the principal expelled him from school.’

   b. ʔaya Surrah l-abin-ha Karim ziçil l-ʔinnu kul marah, mazaçat-ha?
    which picture of-son-her Karim upset because every woman tore-it?
    ‘Which picture of her son was Karim upset because every woman tore it?’
    (Guilliot & Malkawi, 2012)

The availability of SI-crossing reconstruction might indicate that these languages allow SI-crossing movement, or it might indicate that these languages allows base-generated reconstruction. In order to test these two possibilities, it is necessary to look at sentences containing potential reconstruction conflicts. Guilliot and Malkawi (2012) do not do this for Jordanian Arabic. As for French, as observed above, reconstruction conflicts are absent in sentences which
do not contain an SI.\textsuperscript{10} As concluded above, the absence of reconstruction conflicts in sentences in which movement should be (relatively) acceptable indicates that resumption-chains in French are obligatorily base-generated, even when an SI does not intervene. French resumption-chains cannot therefore be used to investigate the barrierhood of SIs.

(24) a. Quel résumé qu’il\textsubscript{1} a donné à Hamida\textsubscript{2} est-ce que chaque étudiant\textsubscript{1} se which abstract that he has given to Hamida\textsubscript{2} that each student REFL demande si elle\textsubscript{2} va le corriger? asks if she goes it amend? ‘Which abstract that he\textsubscript{1} gave to Hamida\textsubscript{2} does each student\textsubscript{1} wonder if she\textsubscript{2} will amend it?’

b. Quel article qu-Hamida\textsubscript{2} lui\textsubscript{1} a donné est-ce qu-elle\textsubscript{2} se demande si which article that-Hamida to him has given that-she REFL asks if chaque étudiant\textsubscript{1} va le réviser? each student goes it revise? ‘Which article that Hamida\textsubscript{2} gave to him\textsubscript{1} does she\textsubscript{2} wonder if each student\textsubscript{1} will revise it?’ (Guilliot & Malkawi, 2012)

Summarizing, the reconstruction profile of the four languages reviewed above either supports the standard view of SIs or is uninformative/incomplete.

3 Reconstruction and Island-Crossing Resumption-Chains

The present section presents the results of an online survey whose purpose was to establish whether BP and Hebrew allow SI-crossing reconstruction down resumption-chains. I will begin by discussing the survey’s design and then proceed to the survey’s results.

3.1 Survey Design

Two versions of the survey were constructed: one, written entirely in Hebrew, and the other, written entirely in BP. Since the two versions are otherwise identical, I will use the term, “the survey”, in what follows.

The survey was divided into two sections. The first section contained the following three wh-questions. These wh-questions are potentially ambiguous between a single-individual reading and a pair-list reading. Under the single-individual reading, the questions ask for a single poem/novel such that all of the professors will talk about that poem/novel. Under the pair-list reading, the questions ask for a list of pairs, such that the first member of each pair is a professor and the second member is the poem/novel which that professor will talk about. For instance, under its pair-list reading, (25) can be answered as follows: The organizer said that Professor Jones will talk about “The Sun”, that Professor Smith will talk about “The Moon”, and that Professor Williams will talk about “The Stars”.

\textsuperscript{10} It should be noted, though, that the sentences do contain a weak island. Still, since weak islands in French otherwise allow reconstruction (see (20-b)), it does not seem likely that the absence of reconstruction conflicts can be attributed to some property of weak islands.
(25) Reconstruction; No island
   a. Qual poema que o organizador disse que cada um dos professores vai falar sobre ele?
      ‘Which poem did the organizer say that each one of the professors will talk about it?’
   b. eize roman ha-me’argen amar fe-kol exad me-ha-profesorim yedaber which novel the-organizer said that-each one from-the-professors will talk al-av?
      ‘Which novel did the organizer say that each one of the professors will talk about it?’

(26) Reconstruction; Adjunct Island
   a. Qual poema que você vai sair antes que cada um dos professores fale sobre ele?
      ‘Which poem will you leave (the lecture) before each of the professors talks about it?’
   b. eize roman ha-me’argen amar fe-kol exad me-ha-profesorim yedaber which novel the-organizer said that-each one from-the-professors will talk al-av?
      ‘Which novel will you leave (the lecture) before each of the professors talks about it?’

(27) Reconstruction; Relative Clause Island
   a. Qual poema que a reitora vai repreender os alunos que apostaram que cada um dos professores vai falar sobre ele?
      ‘Which poem will the dean (fem.) reprimand the students who bet that each one of the professors will talk about it?’
   b. eize roman ha-diknit tinzof ba-studentim fe-hit’arvu fe-kol which novel the-dean will reprimand in.the-students that-bet.PST that-each exad me-ha-profesorim yedaber al-av?
      ‘Which novel will the dean (fem.) reprimand the students who bet that each of the professors will talk about it?’

The wh-questions in (25) were used to establish whether the participants permit reconstruction down resumption-chains in sentences which do not contain an SI. The sentences in (26) and (27) established whether the participants permit reconstruction down resumption-chains in sentences which do contain an SI.

The following sentences were included as a control. In these sentences, reconstruction would not place the wh-phrase within the quantifier’s scope, meaning that the pair-list reading should not be possible.
(28)  a. Qual professor t_{wh} que disse que vai falar sobre cada um dos poemas? which professor t_{wh} COMP said that will speak about each one of the poems? ‘Which professor said that he will speak about each of the poems?’

b. eize profesor t_{wh} amar fe-hu yedaber al kol exad me-ha-romanim? which professor t_{wh} said that-he will speak about each one of-the-novels? ‘Which professor said that he will speak about each of the novels?’

The questions in (25) through (28) were each embedded within a short vignette. Each of these vignettes ended with one of the vignette’s protagonists wishing to gain information about an upcoming lecture in which three professors would each be speaking about a different poem/novel. In particular, the protagonist wishes to know something about the professor-poem/novel pairings, and, to this end, asks one of the wh-questions, above. The survey’s participants are then asked to indicate whether the question would succeed in eliciting the information which the protagonist is seeking, where the question would succeed in doing so only if it permitted a pair-list reading. The participants were also asked to explain their answers, making it possible to verify that they were basing their responses on the (un)availability of pair-list readings, rather than on any other considerations.

In short, the purpose of the vignettes was to facilitate the elicitation of pair-list readings from individuals who, in some cases, had little-to-no background in formal syntactic theory. Moreover, the vignettes served to render the pair-list readings salient.

The survey’s instructions contained a sample vignette with two alternative endings. In one ending, the protagonist’s wh-question does not admit a pair-list reading; in the other ending, it does. The participant is told that the first question would not succeed in eliciting the desired information, as it implies that each piano student would play the same piano sonata. The participant is then told that the second question would indeed succeed in eliciting the desired information because this time around, it is clear that each student will play a different sonata. The purpose of these two wh-questions was to tacitly encourage the participants to judge the ensuing wh-questions on the basis of whether they permitted a pair-list reading. Indeed, this strategy seemed to work, as a number of the participants fashioned their responses after the responses given in the sample vignette (e.g., “This question wouldn’t work because it implies that all of the professors will talk about the same poem.”).

The second part of the survey consisted of six wh-questions. The purpose of these questions was threefold: (1) to establish, for each participant, whether s/he accepts adjunct-crossing and relative clause-crossing resumption chains; (2) to establish, for each participant, whether s/he accepts resumption-chains in sentences which do not contain an SI; (3) to establish, for each participant, whether s/he accepts adjunct-crossing and relative clause-crossing wh-gap dependencies.

Regarding the first point, if a given participant does not accept adjunct-crossing resumption-chains, it does not make sense to ask whether that participant accepts adjunct-crossing reconstruction down resumption-chains. Similarly, it does not make sense to ask whether reconstruction takes place down relative clause-crossing resumption-chains for individuals who do not accept such chains. For this reason, it is necessary to ascertain whether the participants accept adjunct- and relative clause-crossing resumption.

As to the second point, suppose some participants accept resumption-chains, but only in sentences containing an SI. Instances of resumption which are limited to island-contexts are, under Boeckx’s (2003) system, base-generated, and are therefore not expected to exhibit reconstruction (assuming that Hebrew and BP do not permit base-generated reconstruction, 11 The sample vignette paired piano students with sonatas, rather than professors with poems/novels.
that is). By contrast, the resumption-chains of the participants who accept resumption in all environments are, under Boeckx’s system, movement-derived, and are therefore expected to admit reconstruction. In interpreting the results of the survey, it will be useful to distinguish these two classes of speakers.

As to the third point, in order to investigate SI-crossing reconstruction, it is necessary to establish that adjuncts and relative clauses are indeed strong islands for the survey’s participants.

Altogether, the three points just elaborated upon comprise five distinct conditions. Along with a baseline judgement, the structure of the second part of the survey is as follows:

(29) Structure of the second part of the survey
   a. Baseline Judgement: Wh-gap chain; No island
   b. Condition #1: Wh-RP chain; Adjunct Island
   c. Condition #2: Wh-RP chain; Relative Clause Island
   d. Condition #3: Wh-RP chain; No island
   e. Condition #4: Wh-gap chain; Adjunct Island
   f. Condition #5: Wh-gap chain; Relative Clause Island

Each condition was instantiated by one wh-question, totaling five wh-questions. These five wh-questions and the baseline judgement are listed below:

(30) Baseline Judgement: Wh-gap chain; No island
   a. Qual poema que o cara que grava as palestras te disse que o Professor Silva vai analisar __? Silva will analyze __?
      ‘Which poem did the guy who records the lectures tell you that Professor Silva will analyze __?'
   b. eize roman ha-baxur fe-masrit et ha-harca’ot amar le-xa fe-profesor araži yenateax __?
      Arazi will analyze __?
      ‘Which novel did the guy who records the lectures tell you that Professor Arazi will analyze __?’

(31) Condition #1: Wh-RP chain; Adjunct Island
   a. Qual poema que você vai sair antes que o Professor Silva fale sobre ele?
      ‘Which poem will you leave (the lecture) before Professor Silva talks about it?’
   b. eize roman ata tece lifnei fe-profesor araži yedaber al-av?
      ‘Which novel will you leave (the lecture) before Professor Arazi talks about it?’

(32) Condition #2: Wh-RP chain; Relative Clause Island
   a. Qual poema que ela vai repreender os alunos que apostaram que o Professor Silva vai falar sobre ele?
      ‘Which poem will she (=the dean) reprimand the students who bet that Professor
Silva will talk about it?’

b. eize roman ha-diknit tinzof ba-studentim je-hit’arvu je-profesor
which novel the-dean will.reprimand in.the-students that-bet.PST that-Professor
arazi yedaber al-av?
Arazi will.talk about-it?
‘Which novel will the dean (fem.) reprimand the students who bet that Professor
Arazi will talk about it?’

(33) Condition #3: Wh-RP chain; No island
a. Qual poema que você acha que o Professor Silva vai falar sobre ele?
which poem comp you think that the Professor Silva will speak about it?
‘Which poem do you think Professor Silva will speak about it?’

b. eize roman at xoʃevet je-profesor arazi yedaber al-av?
which novel you think that-Professor Arazi will speak about-it?
‘Which novel do you think Professor Arazi will speak about it?’

(34) Condition #4: Wh-gap chain; Adjunct Island
a. Qual poema que você vai sair antes que o Professor Silva analise
which poem comp you will leave before that the Professor Silva analyzes.
‘Which poem will you leave (the lecture) before Professor Silva analyzes __?’

b. eize roman at a tece lifnei je-profesor arazi yenateax __?
which novel you will leave before that-Professor Arazi will analyze __?
‘Which novel will you leave (the lecture) before Professor Arazi analyzes __?’

(35) Condition #5: Wh-gap chain; Relative Clause Island
a. Qual poema que ela vai repreender os alunos que apostaram que o
which poem comp she will reprimand the students that bet.PST that the
Professor Silva vai analisar __?
Professor Silva will analyze __?
‘Which poem will she (= the dean) reprimand the students who bet that Professor
Silva will analyze __?’

b. eize roman hi tinzof ba-studentim je-hit’arvu je-profesor
which novel she will.reprimand in.the-students that-bet.PST that-Professor
arazi yenateax __?
Arazi will.analyze __?
‘Which novel will she (= the dean) reprimand the students who bet that Professor
Arazi will analyze __?’

Each of the wh-questions was embedded within a short vignette whose purpose was to
customize the wh-questions. The participants rated the wh-questions on a 5-point scale (‘5’ =
‘completely natural’, ‘1’ = ‘completely unnatural’). For each participant, the grammaticality of
a given condition C (e.g., the grammaticality of adjunct-crossing resumption) was established by
subtracting his/her judgement on C from his/her judgement on the baseline B; if the difference
was two points or less, C was considered grammatical; if the difference was greater than two,
C was considered ungrammatical.

Summarizing, the survey consisted of ten wh-questions: four, examining reconstruction
(i.e., the questions in the first section of the survey), and six, examining the acceptability of the
conditions listed in (29) (i.e., the questions in the second section). Four versions of the BP-
survey were constructed: in two of the versions, the first section preceded the second section, and in two of the versions, the second section preceded the first section. Internal to each section, the order in which the wh-questions were presented differed from version to version. As for the Hebrew-survey, three versions were constructed: one, opening with the first section, and two, with the second section. Again, the section-internal ordering of the wh-questions differed from version to version.

3.2 Survey Results

I will begin by presenting the data pertaining to reconstruction into Adjunct Islands and then turn to the data pertaining to reconstruction into Relative Clause Islands.

As the following data illustrate, BP and Hebrew speakers fall into two classes with respect to the availability of adjunct-crossing reconstruction. For some speakers, neither (36) nor (37) admits a pair-list reading. For these speakers, resumption-chains are obligatorily base-generated, independent of whether the chain crosses an island. By contrast, other speakers permit a pair-list reading in (36), but not in (37). This pattern of judgements replicates the pattern found in Spanish and Lebanese Arabic: resumption-chains permit reconstruction, but only in sentences which do not contain an SI. For these speakers, then, resumption-chains can be movement-derived when an island is not present, but they must be base-generated upon the insertion of an island. This pattern of judgements is precisely what the standard view of SIs leads us to expect.

(36) Reconstruction; No island

a. Qual poema que o organizador disse que cada um dos professores vai which poem COMP the organizer said that each one of the professors will falar sobre ele?
talk about it?
‘Which poem did the organizer say that each of the professors will talk about it?’

b. eize roman ha-me’argen amar fe-kol exad me-ha-profesorim yedaber which novel the-organizer said that-each one from-the-professors will.talk al-av?
about-it?
‘Which novel did the organizer say that each of the professors will talk about it?’

(37) Reconstruction; Adjunct Island

a. Qual poema que você vai sair antes que cada um dos professores which poem COMP you will leave before that each one of the professors fale sobre ele?
talks.SBJV about it?
‘Which poem will you leave (the lecture) before each of the professors talks about it?’

b. eize roman ata tece lifhei fe-kol exad me-ha-profesorim yedaber which novel you will.leave before that.each one of.the-professors will.talk al-av?
about-it?
‘Which novel will you leave (the lecture) before each of the professors talks about it?’
(38) Brazilian Portuguese: Adjunct Island

a. 2 speakers —
RECONSTRUCTION IN (36-a): YES
RECONSTRUCTION IN (37-a): YES

b. 13 speakers —
RECONSTRUCTION IN (36-a): YES
RECONSTRUCTION IN (37-a): NO

c. 2 speakers —
RECONSTRUCTION IN (36-a): NO
RECONSTRUCTION IN (37-a): YES

d. 20 speakers —
RECONSTRUCTION IN (36-a): NO
RECONSTRUCTION IN (37-a): NO

(39) Hebrew: Adjunct Island

a. 1 speaker —
RECONSTRUCTION IN (36-b): YES
RECONSTRUCTION IN (37-b): YES

b. 5 speakers —
RECONSTRUCTION IN (36-b): YES
RECONSTRUCTION IN (37-b): NO

c. 1 speaker —
RECONSTRUCTION IN (36-b): NO
RECONSTRUCTION IN (37-b): YES

d. 6 speakers —
RECONSTRUCTION IN (36-b): NO
RECONSTRUCTION IN (37-b): NO

Note that the data, above, do not include the judgements of those participants who rejected adjunct-crossing resumption. A total of twelve (out of 74) BP participants and sixteen (out of 34) Hebrew participants were thus excluded. Moreover, an additional seventeen BP participants and three Hebrew participants were excluded from the data, above — either because their responses to the reconstruction-testing questions were unclear or because their responses suggested that the participants did not understand what they were being asked to do. Finally, eight BP participants and two Hebrew participants were excluded because they accepted a pair-list reading in (28), repeated below as (40), suggesting that these speakers have at their disposal some mechanism, possibly in addition to reconstruction, for generating the pair-list reading.12

(40) a. Qual professor t_wh que disse que vai falar sobre cada um dos poems?
which professor t_wh COMP said that will speak about each one of the poems?
‘Which professor said that he will speak about each of the poems?’

b. eize profesor t_wh amar fe-hu yedaber al kol exad me-ha-romanim?
which professor t_wh said that he will speak about each one of the novels?
‘Which professor said that he will speak about each of the novels?’

As noted above, all of the participants included in (38) and (39) accept adjunct-crossing

12 Note that both of these Hebrew participants and all but one of these eight BP participants rejected adjunct-crossing reconstruction; some of these participants also rejected reconstruction in (36). The exclusion of these participants’ data does not, therefore, meaningfully alter the results reported in the text.
resumption. However, some of these individuals rejected (41), indicating that they do not accept wh-resumption in sentences which do not contain an island.

(41)  Condition #3: Wh-RP chain; No island
   a.  Qual poema você acha que o Professor Silva vai falar sobre ele?  
       which poem COMP you think that the Professor Silva will speak about it?  
       ‘Which poem do you think Professor Silva will speak about it?’
   b.  eize roman at xoʃevet fe-profesor araži yedaber al-av?  
       which novel you think that-Professor Araz will speak about-it?’
       ‘Which novel do you think Professor Araz will speak about it?’

Recall, now, that Boeckx (2003) proposes that resumption-chains which occur only in island-contexts are base-generated. Under Boeckx’s proposal, then, the speakers who rejected (41) base-generate adjunct-crossing resumption-chains, and more generally, SI-crossing resumption-chains. The fact that such speakers do not accept SI-crossing reconstruction is therefore expected under Boeckx’s proposal — that is, once it is observed that BP and Hebrew do not permit base-generated reconstruction, as the data above indicate. It is therefore appropriate to reconsider the results reported above, with the participants who rejected (41) removed. As the data below make clear, even with these participants excluded, the majority of the speakers continue to fall into the same two classes: one group of speakers rejects reconstruction in (36) and (37), while the other group accepts reconstruction in (36), only. As noted above, this distribution of judgements — and, in particular, the judgements of the latter group — lends support to the standard view of strong islandhood.

(42)  Brazilian Portuguese: Adjunct Island
   a.  2 speakers —
       RECONSTRUCTION IN (36-a): YES
       RECONSTRUCTION IN (37-a): YES
   b.  10 speakers —
       RECONSTRUCTION IN (36-a): YES
       RECONSTRUCTION IN (37-a): NO
   c.  2 speakers —
       RECONSTRUCTION IN (36-a): NO
       RECONSTRUCTION IN (37-a): YES
   d.  13 speakers —
       RECONSTRUCTION IN (36-a): NO
       RECONSTRUCTION IN (37-a): NO
(43) Hebrew: Adjunct Island
   a. 1 speaker —
       RECONSTRUCTION IN (36-b): YES
       RECONSTRUCTION IN (37-b): YES
   b. 5 speakers —
       RECONSTRUCTION IN (36-b): YES
       RECONSTRUCTION IN (37-b): NO
   c. 1 speaker —
       RECONSTRUCTION IN (36-b): NO
       RECONSTRUCTION IN (37-b): YES
   d. 5 speakers —
       RECONSTRUCTION IN (36-b): NO
       RECONSTRUCTION IN (37-b): NO

A similar pattern is found with Relative Clause Islands. Some participants reject reconstruction in both (44) and (45); others accept reconstruction in (44), only. The tables in (46) and (47) include speakers who reject resumption in (41); the tables in (48) and (49) exclude these speakers.

(44) Reconstruction; No island
   a. Qual poema que o organizador disse que cada um dos professores vai which poem COMP the organizer said that each one of the professors will falar sobre ele?
talk about it?
‘Which poem did the organizer say that each of the professors will talk about it?’
   b. eize roman ha-me’argen amar fe-kol exad me-ha-profesorim yedaber which novel the-organizer said that-each one from-the-professors will talk al-av?
about-it?
‘Which novel did the organizer say that each of the professors will talk about it?’

(45) Reconstruction; Relative Clause Island
   a. Qual poema que a reitora vai repreender os alunos que apostaram que which poem COMP the dean will reprimand the students that bet.PST that cada um dos professores vai falar sobre ele?
each one of the professors will talk about it?
‘Which poem will the dean (fem.) reprimand the students who bet that each of the professors will talk about it?’
   b. eize roman ha-diknit tinzof ba-studentim fe-hit’arvu fe-kol which novel the-dean will.reprimand in.the-students that-bet.PST that-each exad me-ha-profesorim yedaber al-av?
one of the-professors will talk about-it?
‘Which novel will the dean (fem.) reprimand the students who bet that each of the professors will talk about it?’

13 Note that both sets of tables exclude the participants who do not accept relative clause-crossing resumption (38 participants for BP; 24, for Hebrew); participants who did not seem to understand the task and participants whose responses were such that it was not possible to determine whether they accepted reconstruction (11, for BP; 2, for Hebrew), and participants who accepted a pair-list reading for (28) (4, for BP; 0, for Hebrew).
(46) Brazilian Portuguese: Relative Clause Island
   a. 1 speaker —
       RECONSTRUCTION IN (44-a): YES
       RECONSTRUCTION IN (45-a): YES
   b. 9 speakers —
       RECONSTRUCTION IN (44-a): YES
       RECONSTRUCTION IN (45-a): NO
   c. 0 speakers —
       RECONSTRUCTION IN (44-a): NO
       RECONSTRUCTION IN (45-a): YES
   d. 11 speakers —
       RECONSTRUCTION IN (44-a): NO
       RECONSTRUCTION IN (45-a): NO

(47) Hebrew: Relative Clause Island
   a. 0 speakers —
       RECONSTRUCTION IN (44-b): YES
       RECONSTRUCTION IN (45-b): YES
   b. 6 speakers —
       RECONSTRUCTION IN (44-b): YES
       RECONSTRUCTION IN (45-b): NO
   c. 0 speakers —
       RECONSTRUCTION IN (44-b): NO
       RECONSTRUCTION IN (45-b): YES
   d. 4 speakers —
       RECONSTRUCTION IN (44-b): NO
       RECONSTRUCTION IN (45-b): NO

(48) Brazilian Portuguese: Relative Clause Islands
   a. 1 speaker —
       RECONSTRUCTION IN (44-a): YES
       RECONSTRUCTION IN (45-a): YES
   b. 8 speakers —
       RECONSTRUCTION IN (44-a): YES
       RECONSTRUCTION IN (45-a): NO
   c. 0 speakers —
       RECONSTRUCTION IN (44-a): NO
       RECONSTRUCTION IN (45-a): YES
   d. 8 speakers —
       RECONSTRUCTION IN (44-a): NO
       RECONSTRUCTION IN (45-a): NO
Taking a step back, the data presented thus far show quite clearly that speakers of BP and Hebrew do not accept reconstruction into adjuncts and relative clauses. These data — and, in particular, the judgements of the speakers who accepted reconstruction in sentences which do not contain an SI — were taken as supporting evidence for the standard view of SIs. There is, however, an assumption, implicit in this understanding of the data: namely, that adjuncts and relative clauses are strong islands for the speakers whose reconstruction data were reported above. If adjuncts and relative clauses are not strong islands for these speakers, then their judgements do not tell us anything about the possibility (or lack thereof) of SI-crossing movement.

Interestingly, most of the speakers whose reconstruction judgements are reported above accept adjunct-crossing wh-gap dependencies (see (50)); similarly, most of these speakers accept relative clause-crossing wh-gap dependencies (see (51)). If these individuals indeed accept extraction from adjuncts and relative clauses, then it would seem that these two structures are not strong islands for them; alternatively, these structures are strong islands for them, and their judgements indicate that SI-crossing movement is possible.

(49) Hebrew: Relative Clause Islands

<table>
<thead>
<tr>
<th>SIs</th>
<th>RECONSTRUCTION IN (44-b):</th>
<th>RECONSTRUCTION IN (45-b):</th>
</tr>
</thead>
<tbody>
<tr>
<td>0 speakers —</td>
<td>YES</td>
<td>YES</td>
</tr>
<tr>
<td>6 speakers —</td>
<td>YES</td>
<td>NO</td>
</tr>
<tr>
<td>0 speakers —</td>
<td>NO</td>
<td>YES</td>
</tr>
<tr>
<td>4 speakers —</td>
<td>NO</td>
<td>NO</td>
</tr>
</tbody>
</table>

(50) Condition #4: Wh-gap chain; Adjunct Island

<table>
<thead>
<tr>
<th>Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Qual poema que você vai sair antes que o Professor Silva analise</td>
</tr>
<tr>
<td>which poem COMP you will leave before that the Professor Silva analyzes.</td>
</tr>
<tr>
<td>SBIV __?</td>
</tr>
<tr>
<td>__?</td>
</tr>
<tr>
<td>‘Which poem will you leave (the lecture) before Professor Silva analyzes __?’</td>
</tr>
<tr>
<td>b. eize roman ata tece lifinei fe-profesor arazi yenateax __?</td>
</tr>
<tr>
<td>which novel you will leave before that-Professor Arazi will analyze __?</td>
</tr>
<tr>
<td>‘Which novel will you leave (the lecture) before Professor Arazi analyzes __?’</td>
</tr>
</tbody>
</table>

(51) Condition #5: Wh-gap chain; Relative Clause Island

<table>
<thead>
<tr>
<th>Sentence</th>
</tr>
</thead>
<tbody>
<tr>
<td>a. Qual poema que ela vai repreender os alunos que apostaram que o</td>
</tr>
<tr>
<td>which poem COMP she will reprimand the students that bet.PST that the</td>
</tr>
<tr>
<td>Professor Silva vai analisar __?</td>
</tr>
<tr>
<td>Professor Silva will analyze __?</td>
</tr>
<tr>
<td>‘Which poem will she (= the dean) reprimand the students who bet that Professor Silva will analyze __?’</td>
</tr>
</tbody>
</table>
There is, however, strong evidence that adjuncts and relative clauses are indeed strong islands, and that SI-crossing movement is never possible. The argument proceeds in two steps. First, I will present further data from the survey, demonstrating that the (un)acceptability of island-crossing wh-gap dependencies correlates with the (un)acceptability of island-crossing resumption-chains. I will then return to the reconstruction data, presented above.

Recall that the reconstruction-data reported above come from the speakers who accept SI-crossing resumption. In addition to accepting SI-crossing resumption, these speakers overwhelmingly accept SI-crossing wh-gap dependencies, as noted above. When we consider the judgements of those speakers who were excluded, a different picture emerges: speakers of BP and Hebrew accept SI-crossing wh-gap dependencies if and only if they accept SI-crossing resumption-chains. Put differently: the (un)acceptability of SI-crossing resumption and the (un)acceptability of SI-crossing wh-gap dependencies are inter-dependent variables.

(52) Chi-Squared Test, verifying the dependence of the following two variables:

ISLAND-CROSSING OVERT RESUMPTION: \{acceptable, unacceptable\};
ISLAND-CROSSING WH-GAP DEPENDENCY: \{acceptable, unacceptable\}

a. Brazilian Portuguese, Adjunct Islands: $\chi^2 = 19.1947$ (p < 0.01)
b. Hebrew, Adjunct Islands: $\chi^2 = 21.9608$ (p < 0.01)
c. Brazilian Portuguese, Relative Clause Islands: $\chi^2 = 12.1978$ (p < 0.01)
d. Hebrew, Relative Clause Islands: $\chi^2 = 28.0615$ (p < 0.01)

The inter-dependency of these two variables suggests that SI-crossing wh-gap dependencies may be generated with a covert RP in the position of the gap. Speakers who permit SI-crossing resumption-chains will therefore accept both types of SI-crossing chains: those which contain an overt RP and those which contain a gap. By contrast, speakers who do not permit SI-crossing resumption-chains will reject both types of chains.\(^{14}\) Clearly, this state of affairs would be unexpected if adjuncts and relative clauses were not SIs.

Theories which link the availability of SI-crossing movement to resumption (e.g., Boeckx, 2003) are better equipped to account for the correlation noted in (52). Nonetheless, such theories incorrectly predict that speakers who permit SI-crossing movement will permit SI-crossing reconstruction. As argued above, this prediction is not fulfilled. The standard view of SIs, on the other hand, predicts the correlation noted in (52), since, according to this view, SI-crossing chains must be base-generated and must therefore culminate in an RP. Speakers who accept SI-crossing resumption, will therefore accept both types of sentences: those in which the SI-crossing chain contains an overt RP and those in which the chain contains a gap (= a covert RP). By contrast, speakers who do not accept SI-crossing resumption will not accept either type of sentence. Moreover, the standard view of SIs predicts the absence of SI-crossing reconstruction.

Summarizing, the present section has argued, on the basis of reconstruction-data, that SI-crossing resumption-chains in BP and Hebrew are obligatorily base-generated, as expected.

\(^{14}\) Note that nothing forces the presence of the RP. However, when it is not present, the wh-phrase will have to undergo SI-crossing movement, resulting in ungrammaticality.
under the standard view of SIs. The section has also argued that SI-crossing wh-gap chains contain a covert RP and that the dependency between the wh-phrase and this RP is obligatorily base-generated. The following section further explores the latter conclusion.

4 Reconstruction and Island-Crossing Gap-Chains

The previous section examined one class of SI-crossing wh-gap chains: namely, those in which a wh-DP binds a direct object gap. On the basis of the data presented in (52), it was proposed that these chains contain a covert RP, which enables the wh-gap dependency to be base-generated, thus accounting for the acceptability of these chains. At this point, it is important to seek corroborating evidence in support of this conclusion; the present section presents such evidence, in the form of reconstruction data from BP.

Consider, first, the following data, which illustrate that the complex pronominal *si mesmo* must take a local, c-commanding DP as its antecedent.15

(53) a. [O pai do João2]1 vendeu a foto de si1,*2 mesmo.
   [the father of the João] sold the picture of *si EMPH.
   ‘[The father of João]2 sold the picture of himself1,*2.’

   b. [O homem que falou com João2]1 vendeu a foto de si1,*2 mesmo.
   [the man that spoke with João] sold the picture of *si EMPH.
   ‘[The man who spoke with João]2 sold the picture of himself1,*2.’

(54) */?A campanha do João1 exige que as fotos de si1 mesmo sejam colocadas
   the campaign of the João requires that the pictures of *si EMPH be placed
   por toda a cidade.
   about all the town.
   ‘João1’s campaign requires that pictures of himself1 be placed all over town.’

(55) */?A foto de si1 mesmo na primeira página do Estado fez as reclamações
   the picture of *si EMPH on the first page of the Estado made the complaints
   do João1 parecerem meio ridiculas.
   of the João1 seem rather ridiculous.
   ‘The picture of himself1 on the front page of the Estado made João1’s complaints seem
   rather ridiculous.’

(56) */?O João1 estava furioso. A foto de si1 mesmo tinha sido destruída.
   the João was furious. the picture of *si EMPH had been destroyed.
   ‘João1 was furious. The picture of himself1 had been destroyed.’

(57) a. *O João1 falou que o Pedro publicou uma foto de si1 mesmo.
   the João said that the Pedro published a picture of *si EMPH.
   ‘João1 said that Pedro published a picture of himself1.’

   b. *O João1 falou que o Estado publicou uma foto de si1 mesmo.
   the João said that the Estado published a picture of *si EMPH.
   ‘João1 said that the Estado published a picture of himself1.’

The data in (54)-(57) are particularly important, as they contrast with the following data, which

15 The judgements on the sentences containing *si mesmo* were provided by two speakers. Their respective judgements on (54)-(56) differed, one assigning the sentences a ‘?’, the other, a ‘*’. The remaining judgements were identical.
Pollard and Sag (1992) use to argue that Picture-NP anaphors do not need to take a local, c-commanding antecedent. Since *si mesmo* consistently requires a local, c-commanding antecedent, even in contexts which seem conducive to the licensing of non-local, non-c-commanding antecedents, I conclude that *si mesmo* must always take a local, c-commanding antecedent.

(58) John’s campaign requires that pictures of himself be placed all over town.

(Pollard & Sag, 1992, citing Lebeaux, 1984)

(59) The picture of herself on the front page of the *Times* made Mary’s claim seem somewhat ridiculous.

(Pollard & Sag, 1992)

(60) John was furious. The picture of himself in the museum had been mutilated.

(Pollard & Sag, 1992)

(61)  

a. *Bill remembered that Tom saw a picture of himself in the post office.

b. ?Bill remembered that the *Times* had printed a picture of himself in the Sunday edition.

(Pollard & Sag, 1992)

Consider, now, the examples in (62) and (63). The contrast between (62) and (63) illustrates that *si mesmo*’s c-command requirement can be licensed at LF, after the wh-phrase undergoes reconstruction, and that reconstruction is possible only when an SI does not intervene. ((64) illustrates that SI-crossing wh-gap chains are possible when reconstruction is not forced.)

(62) a. *Qual/que foto de si mesmo (que) o João vendeu __ pra agência?

Which/what picture of *si EMPH (COMP)* the João sold __ to the agency?

‘Which picture of himself did João sell __ to the agency?’

b. *Qual/que foto de si mesmo (que) você acha que o João vendeu __

which/what picture of *si EMPH (COMP)* you think that the João sold __ to the agency?

‘Which picture of himself do you think that João sold __ to the agency?’

(63) a. *Qual/que foto de si mesmo (que) você vai sair antes que o João vende __ pra agência?

which/what picture of *si EMPH (COMP)* you will leave before that the João sell __ to the agency?

‘Which picture of himself will you leave before João sells __ to the agency?’

b. *Qual/que foto de si mesmo (que) você ficou bravo com o

which/what picture of *si EMPH (COMP)* you became mad with the

empresário que queria que o João vendesse __ pra agência?

boss that wanted that the João sell __ to the agency?

‘Which picture of himself did you get mad at the boss who wanted João to sell

\[16\] For reasons that are not clear to me, one of the two speakers whose judgements are reported above rejected (i). For this speaker, it would seem that reconstruction must target the base of the chain, a conclusion that merits further investigation.

(i) *Qual/que foto de si mesmo (que) o João acha que você vendeu __ pra agência?

which/what picture of *si EMPH (COMP)* the João thinks that you sold __ to the agency?

‘Which picture of himself does João think that you sold __ to the agency?’
to the agency?'

(64)  a. Qual/que foto do João mesmo (que) você vai sair antes que ele venda __ pra agência?

b. Qual/que foto de João mesmo (que) você ficou bravo com o empresário que queria que ele vendesse __ pra agência?

Which picture of João will you leave before he sells __ to the agency?

Which picture of João did you get mad at the boss who wanted him to sell __ to the agency?

These data reproduce what was observed in the previous section; as with wh-chains containing an overt RP, wh-chains containing a gap permit reconstruction, but not into SIs. These data thus lend further support to the conclusion that SI-crossing wh-gap chains are obligatorily base-generated.

Further support for this conclusion comes from pair-list readings. Consider the following pattern of judgements. The sentences in (65) and (66) do not contain an SI; as expected, reconstruction can apply, yielding a pair-list reading. The sentences in (67), on the other hand, do contain an SI; given the data reported above, it is expected that these sentences will be grammatical, but not admit a pair-list reading. However, the sentences are ungrammatical. Evidently, the ungrammaticality of these sentences cannot be attributed to the presence of the island-crossing wh-chain; the sentences in (68) provide direct evidence against such a conclusion. Rather, it seems that the quantifier cada um dos professores, ‘each of the professors’, forces reconstruction, for some reason or another, and that when reconstruction cannot apply, ungrammaticality results. The judgements below thus provide a further example of the now-familiar pattern: wh-gap/RP chains permit reconstruction, but only when an SI does not intervene.

---

17 One of the two speakers did not fully accept (64-b), noting that it sounded better than (63-b) (which was totally unacceptable), but that it was still rather marginal.

18 These judgements are due to one of the two speakers whose judgements were reported, above. The second speaker does not permit a pair-list reading in sentences such as (66), meaning that his/her rejection of the pair-list reading in sentences containing an SI is uninformative.

19 Negrão (2002) argues that the quantifier cada NP, ‘each NP’, obligatorily pairs the members of the set denoted by the restrictor NP with the members of some other set, contained within the quantifier’s scope. To the extent that the quantifiers cada um dos NP and cada NP behave alike, we can extend Negrão’s conclusion to cada um dos professores and propose that the quantifier in the above examples must pair members of the set of professors with members of the set of poems. This pairing will be possible only when the wh-phrase can reconstruct, hence the ungrammaticality of (63). As to the generation of the single-individual reading, this reading will be generated in those instances in which the wh-phrase’s restriction denotes a singleton (e.g., a set consisting of one poem, only); thus, the single-individual and the pair-list reading both involve reconstruction, and the difference between the two readings stems from the cardinality of the set denoted by wh-phrase’s restriction. The proposal just sketched, whatever its merits, incorrectly predicts that (37-a) and (45-a) should be ungrammatical for all speakers of BP. However, some speakers accept these sentences, albeit under a single-individual reading, only. It is thus not clear to me, at present, why the impossibility of reconstruction in (63) yields ungrammaticality.
(65) (Single-Individual Reading, Pair-List Reading)

\[
\text{Qual poema que cada um dos professores vai analisar?}
\]

\[
\text{Which poem will each of the professors analyze?}
\]

\[
\text{‘Which poem will each of the professors analyze?'}
\]

(66) (Single-Individual Reading, Pair-List Reading)

a. \[
\text{Qual poema que a Maria disse que cada um dos professores vai analisar which poem the Maria said that each one of the professors will analyze?}
\]

\[
\text{‘Which poem did Maria say that each of the professors will analyze?'}
\]

b. \[
\text{Qual poema que cada um dos professores disse que a Maria vai analisar which poem each one of the professors said that the Maria will analyze?}
\]

\[
\text{‘Which poem did each of the professors say that Maria will analyze?'}
\]

(67) a. \[
\text{*Qual poema que você vai sair antes que cada um dos professores which poem you will leave before each one of the professors analise?}
\]

\[
\text{analyze.SBJV?}
\]

\[
\text{‘Which poem will you leave before each of the professors analyzes?'}
\]

b. \[
\text{*Qual poema que você vai sair antes de cada um dos professores which poem you will leave before each one of the professors analisar?}
\]

\[
\text{analyze.INF?}
\]

\[
\text{‘Which poem will you leave before each of the professors analyzes?'}
\]

(68) a. \[
\text{Qual poema que você vai sair antes que a professora analise?}
\]

\[
\text{which poem you will leave before that the professor analyze?}
\]

\[
\text{‘Which poem will you leave before the professor analyzes?'}
\]

b. \[
\text{Qual poema que você vai sair antes da professora analisar?}
\]

\[
\text{which poem you will leave before of the professor analyze?}
\]

\[
\text{‘Which poem will you leave before the professor analyzes?'}
\]

I now wish to report the results of a third speaker, for whom (67) is acceptable and, moreover, admits a pair-list reading. The availability of the pair-list reading indicates that it is necessary to test for reconstruction conflicts. Unfortunately, reconstruction conflicts do not arise for this speaker, even in sentences which do not contain an SI; hence, the absence of reconstruction conflicts in sentences which do contain an SI cannot be attributed to the presence of the SI. For this speaker, then, reconstruction conflicts cannot be used to determine whether SI-crossing chains are base-generated or movement-derived.

(All of the following sentences admit an interpretation in which coreference and the pair-list reading simultaneously obtain.)

(69) \[
\text{[Qual dos idiomas que a professora sabe falar] que cada um dos [which of the languages that the professor knows to speak] COMP each one of the alunos pediu que ela ensinasse no semestre que vem? students requested that she teach in the semester that comes?}
\]

\[
\text{‘[Which of the languages that the professor knows how to speak] did each of the}
students ask that she$_1$ teach ___ next semester?’

(70) [Qual dos idiomas que a professora$_1$ sabe falar] que ela$_1$ pediu que [which of the languages that the professor$_1$ knows to speak] COMP she requested that cada um dos alunos estudasse __ no semestre que vem?

each of the students study __ in the semester that comes?

‘[Which of the languages that the professor$_1$ knows how to speak] did she$_1$ ask that each of the students study ___ next semester?’

(71) [Qual dos idiomas que a professora$_1$ sabe falar] que você ficou bravo [after that each one of the students requested that she$_1$ teach ___ in the semestre que vem]?

‘[Which of the languages that the professor$_1$ knows how to speak] did you get mad [after each of the students asked that she$_1$ teach ___ next semester]?’

(72) [Qual dos idiomas que a professora$_1$ sabe falar] que você ficou bravo [after that each one of the students requested that she$_1$ teach ___ in the semestre que vem]?

‘[Which of the languages that the professor$_1$ knows how to speak] did you get mad [after she$_1$ requested that each of the students study ___ next semester]?’

The absence of reconstruction conflicts in sentences which do not contain an island may suggest that CP-crossing wh-gap chains are always base-generated for this speaker — a rather surprising conclusion, but one which would not be without precedent. Alternatively, the absence of reconstruction conflicts may be due to some independent property of the sentences above (i.e., there is a confound). Finally, it may be the case that some languages/dialects simply do not exhibit reconstruction conflicts. I will leave these questions to further research.

Summarizing, the reconstruction data presented here, where conclusive, support the conclusion that SI-crossing wh-gap chains (in BP) are obligatorily base-generated, hence, that they contain covert RPs.

Before concluding, I would like to present one further argument in support of the conclusion reached above — i.e., that the grammaticality of SI-crossing wh-gap dependencies depends upon the grammaticality of SI-crossing covert resumption. If this position is correct, then SI-crossing wh-gap dependencies will be impossible in those contexts in which SI-crossing covert resumption is, itself, impossible. Evidence in support of this conclusion was already presented in the previous section, where it was argued (on the basis of the correlation noted in (52)), that speakers who do not permit SI-crossing resumption (and hence, do not permit SI-crossing covert resumption) do not permit SI-crossing wh-gap dependencies. Additional evidence comes in the form of the following judgements. The judgements in (73) indicate that resumption-chains in BP are not permitted with non-D-linked wh-phrases, and that, as expected, non-D-linked

---

20 See Schneider-Zioga (2009), who argues that movement in Kinande is clause-bounded.

21 Unfortunately, I could not produce supporting evidence from Hebrew, as the three speakers I consulted rejected SI-crossing wh-gap chains.
wh-phrases cannot head SI-crossing wh-chains.\textsuperscript{22}

\begin{enumerate}
\item O que você quer que a professora analyse.\textsuperscript{SBIV} (*ele)?
\begin{itemize}
\item the what COMP you want that the professor analyse.\textsuperscript{SBIV} (*it)?
\end{itemize}
\begin{itemize}
\item ‘What do you want the professor to analyze */it?’
\end{itemize}
\item *O que os alunos vão embora antes que a professora analyse.
\begin{itemize}
\item the what COMP the students will go out after that the professor analyse.\textsuperscript{SBIV} (ele)?
\end{itemize}
\begin{itemize}
\item (it)?
\end{itemize}
\begin{itemize}
\item ‘What will the students leave after the professor analyzes */it?’
\end{itemize}
\end{enumerate}

By contrast, D-linked wh-phrases may head resumption-chains, and, as already noted, may also head SI-crossing wh-chains.

\begin{enumerate}
\item Qual filme chato que os alunos vão embora antes que a professora analyse.
\begin{itemize}
\item which film annoying COMP the students will go out before that the professor analyse.\textsuperscript{SBIV} (ele)?
\end{itemize}
\begin{itemize}
\item analyzes.\textsuperscript{SBIV} (it)?
\end{itemize}
\begin{itemize}
\item ‘Which annoying film will the students leave before the professor analyzes */it?’
\end{itemize}
\end{enumerate}

These judgements further corroborate the conclusion that covert resumption underlies the acceptability of SI-crossing wh-gap chains. Indeed, this conclusion follows from the standard view of SIs, in which all SI-crossing chains must be base-generated, hence, must contain a (possibly covert) resumptive pronoun.\textsuperscript{23}

\section{Conclusion}

Under the standard view of SIs, licit instances of SI-crossing A′-chains are base-generated and will, therefore, never exhibit properties uniquely associated with movement-derived dependencies. Under the alternative view of SIs, SI-crossing A′-chains are sometimes movement-derived and, when so derived, will exhibit the unique properties of movement, all else being equal. The present study has argued that reconstruction conflicts are a unique property of movement-derived chains, and that, for BP and Hebrew, ‘simple’ (i.e., non-conflict generating) reconstruction constitutes a unique property of movement-chains, as well. The latter conclusion was based on the results of a survey, as well as on small-scale informant work, which indicated that BP and Hebrew permit reconstruction down resumption-chains, but only when an SI does not intervene. The island-insensitivity of base-generated chains, coupled with the observed island-sensitivity of reconstruction, jointly suggest that these two languages do not permit base-generated reconstruction — or, in other words, that reconstruction is, in these two languages, a unique property of movement-chains. This conclusion accepted, the island-sensitivity of reconstruction now emerges as evidence in support of the standard view of strong islandhood, under which the

\textsuperscript{22} The following judgements were provided by two speakers.

\textsuperscript{23} The conclusion that BP permits covert resumption is not original to the present study. Ferreira (2000), Modesto (2000), and Grolla (2005) argue that BP permits covert resumptive pronouns, furthermore noting that the availability of covert resumption is sensitive to the properties of the A′-binder (e.g., whether it is D-linked), as well as to the RP’s position (covert RPs are acceptable in object-position, but not in subject-position). These studies do not, however, ask whether SI-crossing covert resumption permits reconstruction. The present study thus provides supporting evidence for these authors’ conclusion, in the form of reconstruction data.
island-sensitivity of reconstruction is predicted, and against the alternative view, under which the island-sensitivity comes as a surprise.

The logic of the alternative view suggests two counter-arguments. First: SI-crossing movement is possible only under specific conditions; SI-crossing resumption-chains in BP and Hebrew do not satisfy these conditions; hence, SI-crossing movement, and with this, SI-crossing reconstruction, is impossible. Second: SI-crossing resumption-chains in BP and Hebrew satisfy the conditions enabling SI-crossing movement; accordingly, these chains are indeed movement-derived; however, there is an independent explanation for why reconstruction is blocked.

In connection to the first counter-argument, I have already discussed the proposals of Ross (1967), Perlmutter (1972), and Boeckx (2003), noting that the present study’s results argue against these authors’ proposals.24 As to the second counter-argument, Boeckx and Hornstein (2008), discussing the impossibility of island-crossing reconstruction in Lebanese Arabic, sketch two alternative accounts of why island-crossing reconstruction is not possible. The accounts cannot be maintained in their current form, though, as they rule out all instances of island-crossing reconstruction — an inappropriate result, given the availability of SI-crossing reconstruction in French and Jordanian Arabic (Guilliot & Malkawi, 2009, 2012). By contrast, the standard view of strong islandhood, coupled with the conclusion that base-generated chains allow reconstruction in some languages but not in others, accounts for the distribution of SI-crossing reconstruction observed in the current study.

Needless to say, a number of issues have been left unresolved — indeed, unaddressed. For instance, under what conditions is covert resumption licensed? The better these conditions are understood, the better we will be able to distinguish apparent cases of SI-crossing movement from true cases (if there are any). Why do languages differ with respect to the availability of base-generated reconstruction? And, of course, if the standard view of strong islandhood is correct, why are strong islands absolute barriers to movement?

References


24 Of particular relevance to the assessment of Boeckx’s (2003) proposal are the data of speakers for whom resumption is non-intrusive.


Negrão, E. V. (2002). Distributividade e genericidade nos sintagmas introduzidos por cada e todo (Distributivity and genericity in phrases introduced by ‘cada’ and ‘todo’). *Revista do Gel*, (especial), 185–205.


On control and envy*

Matthew Reeve

Abstract

Subjects of clausal gerunds in English typically show obviation effects, in that binding by a matrix argument typically requires a PRO subject and disallows an anaphor or pronoun. Contexts in which the gerund subject is focused, however, permit an anaphor or pronoun in this position, depending on the structural position of the clausal gerund: single-object gerunds require an anaphor, while second-object gerunds either allow or require a pronoun. I show that this pattern can be accounted for if the various anaphoric forms compete to represent bound readings (e.g., Safir, 2004), and if obligatorily-controlled PRO also enters this competition, being preferred where possible. Furthermore, I adopt Reinhart and Reuland’s (1993) view that a SELF-anaphor is a ‘reflexiviser’ applying to a predicate that Case-licenses the anaphor; this accounts for the fact that anaphors are blocked as the subject of certain second-object gerunds, as in these cases the matrix predicate is unable to Case-license the gerund subject. The gerund subject pattern as a whole is problematic for attempts within the movement theory of control to reduce obviation to a preference for Move over Merge (e.g., Hornstein & San Martin, 2001).

Keywords: obligatory control, binding theory, Case

1 Introduction

Since the work of Reinhart (1983) and others, Condition B and C effects have often been taken to result from competition among semantic representations or DP forms (e.g., Burzio, 1991; Reuland, 1991, 2011; Grodzinsky & Reinhart, 1993; Safir 2004a,b). Under this view, for example, the pronoun in (1a) is ruled out because an anaphor, which requires a local c-commanding binder, is available. Where an anaphor cannot take a particular antecedent, the pronoun becomes available to express the relevant meaning, as in (1b):

(1) a. Mary likes herself/*her.
   b. Mary said that Bill likes her/*herself.

The preference for null subjects over overt subjects in certain constructions has been treated along similar lines. Thus, Chomsky’s (1981) approach to examples such as (2), in which null subjects alternate with overt subjects, but not with overt pronouns bound by the same antecedent, is to propose an economy principle (the Avoid Pronoun Principle) favouring null subjects where possible:

(2) Mary$_1$ preferred/hated [PRO$_1$/Bill/*her$_1$ leaving early].

Recently, Hornstein and San Martin (2001) have argued that the obviation effect in (2) results from mechanisms similar to those used to derive the Condition B effect in (1a). They adopt Hornstein’s (1999, 2000a) proposal that both anaphoric reflexives and obligatorily-controlled PRO are actually A-traces of their antecedents, the single difference being that anaphors are Case-marked while ‘PRO’ is not. They then adapt Hornstein’s (2000a) proposal that

---

* Thanks to Annabel Cormack, Patrick Elliott, Alison Hall, Vikki Janke, Nathan Klinedinst, Michelle Sheehan, Neil Smith and Gary Thoms for judgements, and to my ‘Current Issues in Syntax’ class at UCL for having been subjected to a certain amount of discussion of binding and control.
Condition B effects result from a preference for Move over Merge to obviation effects. That is, both anaphors and ‘PRO’, which are the result of Move, are preferred over pronouns, which are introduced by Merge.

Authors proposing or assuming non-movement approaches to control, on the other hand, have generally resisted the idea that PRO competes directly with overt DPs for particular positions. This is presumably because it is still widely assumed that PRO is inherently in complementary distribution with overt DPs (as ensured by the PRO Theorem of Chomsky (1981) or the Null Case proposal of Chomsky and Lasnik (1993), for example), and that competition would therefore be superfluous. Thus, Safir (2004a,b) proposes a competitive mechanism for choosing DP forms representing dependent interpretations, but explicitly rules out including PRO in this competition, instead assuming that PRO is restricted to occurring in Null Case positions. However, his reasons for excluding PRO from the competition are largely theory-internal, having to do with the definition of ‘dependence’ he uses to construct the scale on which competition operates.

In this article, I will argue that Hornstein and San Martin (2001) are right to account for obviation facts such as (2) in the same terms as Condition B effects such as (1a); that is, there is competition between obligatory control structures and structures with pronominal (or anaphoric) subjects. I will differ from them, however, in arguing that obviation in gerunds results from competition between DP forms. Thus, I assume the more traditional view of PRO as a base-generated formative, but I also follow Landau (2000) in taking its distribution to be determined not by Case, but by the T(ense) and Agr(eement) features of the potential host IP. Unlike the PRO Theorem and Null Case proposals, this proposal allows for positions that could in principle host PRO or overt DPs. I will argue that the subject of clausal gerunds and want-type to-infinitives is such a position, and that the choice between PRO, an anaphor or a pronoun is determined by a modified version of Safir’s (2004a,b) Form to Interpretation Principle (FTIP), defined in terms of ‘antecedent domains’ rather than ‘dependence’.

In section 2, I review the basic facts concerning obviation in clausal gerunds and want-type infinitives, concluding that an Avoid Pronoun approach to obviation would leave the parallel with Condition B and C effects unexpressed. I argue instead that obligatorily-controlled PRO competes directly with anaphors and pronouns, proposing a modified version of Safir’s FTIP that is constructed according to the size of a DP’s ‘antecedent domain’ rather than how ‘dependent’ it is. I show that PRO arguably has the smallest antecedent domain, and thus is preferred over anaphors and pronouns where possible. In section 3, I adopt Landau’s (2000) proposal that the distribution of PRO is determined by the T/Agr specification of the host IP. I argue that the alternation between null and overt subjects of gerunds and want-type infinitives results from the fact that their I node is underspecified for Agr, as in Landau’s analysis of ECM clauses. For Landau, believe-type ECM clauses do not permit PRO because the ECM Agree relation with matrix v blocks the Agree relation that PRO must establish with matrix I in order to find an antecedent. I argue that gerunds and want-infinitives differ in that they do not involve an Agree relation with matrix v, as they may be Case-licensed by the gerund/infinival I itself. I then argue that the occurrence of SELF-anaphors, and the non-occurrence of interpretatively identical pronouns, as subjects of gerunds and want-infinitives, should be accounted for in terms of Reinhart and Reuland’s (1993) Condition A plus the revised FTIP. In section 4, I show that the analysis proposed in sections 2 and 3 can account for a novel set of observations regarding gerund complements of verbs such as envy and show, and that these data are problematic for attempts to account for obviation in terms of the movement theory of control. First, I show that envy-gerunds permit the same null/overt subject alternation as prefer-gerunds; on the other hand, while prefer-gerunds permit an anaphor as subject (if narrowly focused), and disallow a pronoun with the same antecedent, envy-gerunds disallow an anaphor and allow a bound pronoun. I account for
this in terms of Reinhart and Reuland’s Condition A: the subject of prefer-gerunds may be Case-licensed by a matrix element and hence may ‘reflexive-mark’ the matrix predicate; by contrast, the subject of envy-gerunds must be Case-licensed gerund-internally, and hence may not ‘reflexive-mark’ the matrix predicate, leaving only a pronoun available to express the required interpretation. Show-gerunds differ in that they do not permit PRO (which I take to be a semantic fact) and, like prefer-gerunds, favour an anaphor over a bound pronoun. In fact, though, I show that show-gerunds involve a structural ambiguity, in that what appears to be the gerund subject may also be a matrix object controlling into an ‘adjunct’ gerund. A closer examination of the properties of show-gerunds reveals that the gerund subject position is exempt from Condition A, and that reflexives in this position have the properties of logophors. Thus, if and only if syntactic binding (in terms of Condition A and the revised FTIP) fails, a logophoric interpretation is permitted, provided the intended antecedent is a suitable logophoric antecedent. In both envy- and show-gerunds, anaphoric binding fails, but only in the case of show is the indirect object a suitable logophoric antecedent. Section 5 is the conclusion.

2 Obviation and Competition
2.1 (Non-)complementary Distribution between PRO and Overt DPs

As is well-known, obligatorily-controlled PRO is largely in complementary distribution with overt DPs in English. Thus, for the most part, thematically independent null subjects of non-finite clauses do not alternate with overt subjects, and other thematically independent arguments may not normally be null:

(3)  a. Mary tried [PRO/*Bill to leave early].  
     b. Mary persuaded John [PRO/*Bill to leave early].  
     c. Mary said [that Bill/*PRO should leave early].  
     d. Mary told John [that Bill/*PRO should leave early].

Subjects of clausal gerunds and infinitival complements of verbs such as want constitute an exception to this generalisation, as they may be either null or overt:

(4)  a. Mary preferred/hated [PRO/Bill leaving early].  
     b. Mary wanted/hated [PRO/Bill to leave early].

In the case of (4b), the alternation has often been taken to reflect a structural ambiguity, which allows complementary distribution to be maintained. For example, the PRO Theorem of Chomsky (1981) requires PRO to be ungoverned, while the Case Filter requires an overt DP to be governed in order to receive Case. Thus, Chomsky argued that the embedded clause in (4b) is a CP if the subject is PRO, and an IP otherwise, with the CP blocking government by the matrix verb in the former case. In (4b), the idea that the embedded clause at least may be a CP is supported by the fact that it may be introduced by the prepositional complementiser for when the subject is overt, something which is not possible with raising and ECM complements (e.g., Landau, 2007). In the case of (4a), however, there appears to be no evidence for structural ambiguity besides the null/overt alternation itself, and there may even be evidence that gerunds are always IPs (e.g., Pires, 2006).\(^1\) Furthermore, in both cases there is reason to think that PRO may compete with overt DPs to represent a particular

\(^1\) In section 3, however, I will question this conclusion, proposing instead that clausal gerunds are always CPs.
interpretation. Under the standard assumption that, for two derivations to be in competition, they must involve the same numeration or structure, aside from the competing elements or operations themselves (e.g., Hornstein, Nunes, & Grohmann, 2005; Reinhart, 2006), this suggests that the null-subject and overt-subject versions must be identical in structure and numeration aside from the choice between PRO and an overt DP, thus casting doubt on the structural ambiguity view of (4). Consider the fact that, in an all-new context, neither want-type complements nor clausal gerunds permit an alternation between PRO and an anaphor or pronoun bound by the same antecedent:

(5) Context: What’s wrong with Mary?
   a. Mary₁ hated [PRO₁/*herself₁/*her₁ leaving early].
   b. Mary₁ hated [PRO₁/?*herself₁/*her₁ to leave early].

This suggests that PRO blocks an overt DP if and only if using PRO would result in the same interpretation as the overt DP. Next consider the fact that, in a context that forces the embedded subject to be narrowly focused, an anaphor becomes possible in this position, and is in fact the only possibility:

(6) Context: Mary hated Bill leaving early, didn’t she?
   a. No, Mary₁ hated [*PRO₁/HERSELF₁/*HER₁ leaving early].
   b. No, Mary₁ hated [*PRO₁/HERSELF₁/*HER₁ to leave early].

The generalisation behind (5) and (6) is thus that PRO must be used where possible; otherwise an anaphor may be used. This is reminiscent of the idea that Condition B effects should be accounted for in terms of competition between anaphors and pronouns, in that anaphors block pronouns where the former are available (i.e., where the anaphor has a local binder), while in positions where anaphors are unavailable, pronouns are free to appear (e.g., Reuland 2001, 2011; Safir, 2004a,b). One of the key motivations for this idea is that Condition B effects disappear where using the pronoun would result in an interpretation that is impossible for the anaphor, as in the following example (Heim, 1998; see also Evans, 1980; Grodzinsky & Reinhart, 1993):

(7) You know what Mary, Sue and John have in common? Mary admires John, Sue admires him, and John admires him too.

Again, this parallels the (5)/(6) contrast in that an element A blocks an element B unless using B would lead to a distinct interpretation: in (6) this is the focused interpretation of the embedded subject, and in (7) it is the coreferential (as opposed to bound) reading of the pronoun.

In spite of this parallel, competition-based theories usually stop short of accounting for obviation and Condition B effects in the same way. For example, Safir (2004b) argues that the choice between anaphors and bound pronouns with a particular antecedent is determined by his Form to Interpretation Principle in (8), together with the ‘most dependent’ scale in (9):

(8) Form to Interpretation Principle (FTIP) (simplified): If x c-commands y and z is not the most dependent form available in position y with respect to x, then y cannot be directly dependent on x.

(9) SELF-anaphor > SE-anaphor > pronoun > R-expression
Safir notes explicitly, however, that his proposal excludes PRO from participating in the FTIP competition, because of the way in which he defines ‘dependent’ for the purposes of constructing the scale in (9). Furthermore, he assumes that PRO is in complementary distribution with overt DPs for independent reasons, namely that PRO may only occur in Null Case positions, which do not permit overt DPs (Chomsky & Lasnik, 1993; Martin, 2001). This of course entails that the examples in (4) are indeed structurally ambiguous, which raises the question of how to account for the apparent competition in (5)/(6). The only real possibility seems to be to adopt a principle favouring a null DP where possible, such as Chomsky’s (1981) Avoid Pronoun Principle (APP), in addition to the FTIP. This is problematic for at least two reasons, however. First, the intuition behind the APP seems to be that a null DP is more economical than an overt DP, hence must be used where possible. Yet this ‘functionalist’ account might lead us to expect the preference for null elements to be quite general, such that where a null syntactic element is permitted, overt realisation of this element should be prevented, all else being equal. Yet there are numerous cases where this does not hold. For example, complementisers are often optional, as in (10a,b), as are gapping, as in (10c), and null indefinite objects with certain verbs, as in (10d). The overt realisation of these elements does not, however, seem to be subject to any licensing conditions of the type needed to license the reflexive in (6); rather, from the point of view of the grammar at least, we seem to have genuine optionality here:

(10) a. Mary said (that) John should leave.
    b. I would hate (for) John to have to leave.
    c. Mary ate peaches, and John (ate) lemons.
    d. Bill ate (something).

The second problem with adopting an APP account for obviation plus the FTIP for the binding theory proper is that the parallels between the obviation effect in (5) and Condition B/C effects, as well as contexts in which they are suspended (as in (6) and (7)), is missed. I would therefore like to pursue the obvious alternative to such an account: that PRO and overt DPs may occur in the same structural environments (e.g., Landau, 2000), and that PRO enters into the FTIP competition as overt DPs, being preferred over them where possible. In order to make this feasible, I will redefine the scale on which the FTIP operates in terms of the size of a DP’s ‘antecedent domain’, rather than by its degree of ‘dependence’.

2.2 Competition and Antecedent Domains

The proposal I will put forward in this section is that all types of DP potentially compete for a particular structural position to represent a particular semantic interpretation. In particular, I will argue that the ‘anaphoric scale’ on which competition operates contains at least the following ordering:

(11) obligatorily-controlled PRO > SELF-anaphor > SE-anaphor > pronoun

---

2 Safir also claims that the distinction between de se and non-de se readings is a further reason not to put PRO into competition with overt forms, but I do not follow this argument. It is well-known that both SELF-anaphors and pronouns permit either de se or de re readings, while PRO only permits de se readings, but this does not imply that PRO may not compete with SELF-anaphors and pronouns to represent the de se reading. Furthermore, as Reuland and Winter (2009) note, the SE-anaphor zich only permits de se readings in the relevant contexts, yet Safir clearly intends SE-anaphors to participate in competition with other anaphoric forms.
This scale differs from that proposed by Safir (2004a,b) only in that obligatorily-controlled PRO belongs to the scale, and is preferred over all other DPs where available, all else being equal. Furthermore, whereas Safir constructs the scale on the basis of the degree of inherent ‘dependence’ of the various DPs (which in turn is defined in terms of their degree of referential specification, for anaphors, and deictic potential, for pronouns), I would like to propose that a DP’s position on the scale is determined by the size of its ‘antecedent domain’ in the following sense:

\[(12) \textbf{Antecedent domain:} \text{The antecedent domain of DP A occupying position B is the smallest maximal projection dominating all of A’s potential antecedents.}\]

The scale in (11) is then constructed on the basis of the relative size of antecedent domains in the following way: if there is some position in which a DP of type A has a larger potential antecedent domain than a DP of type B, then type A is lower on the anaphoric scale than type B. For the last three DP types in (11), this has the same effect as Safir’s proposal, given a reformulation of the FTIP as in (13):

\[(13) \textbf{Form to Interpretation Principle (revised):} \text{If } x \text{ c-commands } y \text{ and there is a DP form } z \text{ higher than } y \text{ on the scale in (11) that could occur in the position occupied by } y \text{ and be dependent on } x, \text{ then } y \text{ cannot be directly dependent on } x \text{ if using } z \text{ would lead to an indistinguishable interpretation.}\]

The antecedent of a SELF-anaphor must generally occur within the smallest clause containing the anaphor and a distinct syntactic subject (e.g., Chomsky, 1981; Reinhart & Reuland, 1993); such a clause then corresponds to the anaphor’s antecedent domain. On the other hand, SE-anaphors such as Dutch \textit{zich} have a larger potential antecedent domain, the smallest finite clause containing the anaphor. Indeed, where the SELF-anaphor \textit{zichzelf} may appear, \textit{zich} generally may not. As for the competition between anaphors and pronouns, it is clear that the antecedent domains of both types of anaphor are always smaller than that of bound pronouns, which always corresponds to the entire sentence. Thus, the account of Condition B effects based on the blocking of bound pronouns by anaphors (e.g., Reuland, 2001, 2011; Safir, 2004a) is preserved.

Now consider the question of how the antecedent domain of PRO relates to those of other DPs. There is a long tradition in the literature of defining PRO’s antecedent domain in terms of minimality: PRO may only take the closest c-commanding DP as its antecedent (e.g., Rosenbaum, 1967; Larson, 1991; Martin, 1996; Hornstein, 1999; Manzini & Roussou, 2000). Thus, while a SELF-anaphor in a particular position may have more than one potential

---

3 As I will not discuss non-obligatory control in this paper, it can be assumed henceforth that ‘PRO’ refers to obligatorily-controlled PRO.

4 Although I have called this the revised FTIP, it clearly borrows from Grodzinsky and Reinhart’s (1993) Rule I in its mention of ‘indistinguishable interpretations’. The problem with adapting Safir’s FTIP more faithfully in the present context is that it does not permit, say, an anaphor to be dependent on an antecedent X if PRO is possible in that position. Rather, Safir’s FTIP is designed to prevent a pronoun from depending on antecedent A where an anaphor in the same position could also be dependent on A, while still allowing (via a separate principle of Pragmatic Obviation) for a pronoun to be merely coreferential with A. Since both PRO and SELF-anaphors are necessarily dependent, however, any competition between them must refer to ‘indistinguishable interpretations’ in order to allow for SELF-anaphors to express readings not possible with PRO; otherwise, SELF-anaphors could never occupy positions that could be occupied by PRO.
antecedent, as in (14a). PRO in a particular position generally only has one potential antecedent, as in (14b):

(14) a. Mary₁ told Bill₂ [that Tom₃ showed Eric₄ himself₁/₂/₃/₄ in the mirror].
    b. Mary₁ told Bill₂ [that Tom₃ told Eric₄ [PRO₁/₂/₃/₄ to leave]].

As is well-known, however, there are exceptions to this generalisation. Verbs such as promise and threaten require subject control even in the presence of an intervening object, and other verbs, such as ask, allow either subject or object control, depending on semantic or pragmatic factors (e.g., Landau, 2000):

(15) a. Mary₁ promised Bill₂ [PRO₁/₂ to leave].
    b. Mary asked Bill to leave [PRO₁/₂/₃ to leave].
    c. Mary asked Bill to be allowed to leave [PRO₁/₂/₃ to leave].

Landau (2000) and Culicover and Jackendoff (2001) take facts such as these to be fatal to the idea that PRO is subject to a syntactic locality restriction. However, given recent work on the structure of the English VP by Janke and Neeleman (2009), the possibility that PRO has a syntactically defined antecedent domain can be reconsidered. Janke and Neeleman argue that, in principle, VPs containing two internal arguments of the verb may either have a VP-shell structure, as in (16a), or an ‘ascending’ structure, as in (16b):

(16) a. 

The choice between the two structures is not completely free, however. The verb-movement involved in creating the VP-shell is subject to an economy requirement: it may only take place to satisfy the requirement in English for Case-licensed DPs to be immediately preceded by their Case-licenser or its trace (Case Adjacency). As a result, ambiguity between the two structures in (16) is only found where (i) the first argument of the verb is a DP (thus licensing V-movement to satisfy Case Adjacency) and (ii) the second argument of the verb is not a DP (and thus is not subject to Case Adjacency, hence permitting the ascending structure). These conditions are met in the case of transitive control structures, and so we might expect the structural ambiguity in (16) to be found in these cases too. Thus, all the examples in (15)

---

5 This property of OC was originally captured by the Minimal Distance Principle of Rosenbaum (1967).
could have either a VP-shell or an ascending structure. Notice that, if we assume that PRO must choose the closest c-commanding DP as its controller, this means that a given VP structure will now be unambiguous as to its controller: that is, the VP-shell structure will force object control, and the ascending structure will force subject control:

(17) a. 

\[
\text{EMFTREE_SIGGG0101|71|VP(V(ask)[name:A],VP(DP(h Mary),V'(t<target:A>,CP(h PRO to leave)|VP V ask VP DP Mary V' CP PRO to leave)}
\]

b. 

\[
\text{EMFTREE_SIGGG0101|57|VP(V'(V(ask),DP(h Mary)),CP(h PRO to be allowed to leave)|VP V' V ask DP Mary CP PRO to be allowed to leave)}
\]

Do we have any evidence that the two control readings correspond to different structures? While Janke and Neeleman’s tests for these structures do not give clear results in the case of OC, there is one test that does support the structural ambiguity view. Janke and Neeleman show that object-oriented floating quantifiers, which require c-command by their antecedents, force the construction of a VP-shell. The structural ambiguity view of OC thus predicts that a floating quantifier related to an object DP will be compatible with object control, but not with subject control. This is because the floating quantifier will force the structure in (17a), in which only Mary can be the antecedent of PRO according to the Minimal Distance Principle. Indeed, there is a clear contrast between (18a), in which both can modify the object controller the students, and (18b), in which both cannot easily modify the managers in the presence of control by the subject I. Furthermore, use of both with the verb strongly favours the object control reading of ask, as shown by the contrast between (18c) and (18d):

(i) a. ?I said I would ask the students to do something, and ask them I did to leave.

b. ?I said I would ask the managers to be allowed to do something, and ask them I did to be allowed to leave.

The fact that both are equally possible may simply be because the control clause could have moved out of the VP prior to VP-fronting, and hence these examples do not tell us anything about whether the VP is ascending or descending.

---

6 Larson (1991), who also argues that OC is restricted by minimality, accounts for promise-type verbs by proposing that they only permit the ascending structure in (17b). As Landau notes, though, even promise permits object control under some circumstances, and hence structural ambiguity seems to be more empirically adequate.

7 The apparent equivocality of some of the other tests – in particular, the VP-fronting test – may be due to the possibility that control clauses can independently ‘shift’ out of the VP, in contrast to ‘light’ DPs, for example. Thus, to my ear, both of the following are awkward, but there is no appreciable contrast in acceptability:

(i) a. ?I said I would ask the students to do something, and ask them I did to leave.

b. ?I said I would ask the managers to be allowed to do something, and ask them I did to be allowed to leave.
(18)  a. I ordered the students both to do my work.
b. *I promised the managers both to do my work.
c. I asked the students both to leave.
d. *I asked the managers both to be allowed to leave.

This seems to me to be quite strong evidence that object control examples such as (18a,c) may have a VP-shell structure, while subject control examples such as (18b,d) must involve the ascending structure. This can then be accounted for in terms of syntactic locality: PRO must take the closest c-commanding DP as controller. In other words, we can characterise PRO as having an antecedent domain delimited by the closest c-commanding DP. This gives us the required asymmetry in antecedent domains between PRO and SELF-anaphors: there are structures in which a SELF-anaphor’s domain is larger than PRO’s, but no structures in which the opposite holds. Therefore, the combination of (11)-(13) predicts that in a given position, PRO will block a SELF-anaphor with an indistinguishable interpretation.

2.3 Summary

I have proposed in this section that PRO competes directly with overt DPs to represent a given interpretation. The choice of DP form is determined by the revised FTIP, which operates on a DP-scale constructed in terms of the size of the DPs’ antecedent domains. In the next section, I go on to show how this system can be applied to the null/overt subject alternation in clausal gerunds and want-type infinitives.

3 Controlling and Binding Gerund Subjects

3.1 Controlling Gerund Subjects

Having shown that PRO can compete with anaphors and pronouns given a reformulation of Safir’s (2004a,b) FTIP based on antecedent domains, I now return to the main empirical focus of this paper: the alternation between null and overt subjects of clausal gerunds. Recall that this alternation parallels that in the infinitival complement of want-type verbs:

(19)  a. Mary₁ preferred/hated [PRO₁/Bill leaving early].
b. Mary₁ wanted/hated [PRO₁/Bill to leave early].

In this case, the FTIP does not rule out an overt subject unless the intended interpretation of that subject could also have been provided by PRO. In this situation, PRO blocks an overt DP unless the overt DP is narrowly focused, in which case an anaphor must be used. Of course, as PRO always wins any FTIP competition under the present proposal, there must be other conditions on its distribution that distinguish it from overt DPs, as otherwise PRO would be able to appear in all the positions that overt DPs can, and anaphors and pronouns would never be possible. For concreteness, I will assume that Landau (2000 et seq.) is correct in proposing that PRO’s restricted distribution follows from two differences between PRO and (most) overt DPs: (i) PRO bears a [-R(eferential)] feature in the sense of Reinhart and Reuland (1993), whereas most overt DPs bear [+R]; (ii) PRO bears unvalued (‘anaphoric’) φ-features, whereas most overt DPs have a full φ-feature specification. Landau further proposes that clausal heads (in particular, I) may bear uninterpretable R-features, and that the distribution of these features is determined by a set of ‘R-assignment rules’ on the basis of the T(ense)
and Agr(eement) specifications of I. Specifically, an I-node specified positively for T(ense) and Agr(eement) is assigned [+R], an I-node specified negatively for at least one of these features is assigned [-R], and an I-node underspecified for either T or Agr is assigned no R-feature at all. If uninterpretable [+R] features on I must be checked off by a corresponding interpretable feature, this has the effect that overt DPs, being [+R], are restricted to [+T,+Agr] IPs, while PRO, being [-R], is restricted to [-T,-Agr], [+T,-Agr] and [-T,+Agr] IPs (corresponding to exhaustive control infinitives, partial control infinitives and a subclass of Balkan subjunctives respectively).

ECM infinitives of the believe class differ in that their subject must enter an Agree relation with matrix v in order to check Case and φ-features (Agr). Landau (2004) analyses the I node of such infinitives as [+T], with no Agr specification. As a result, the R-assignment rules assign no R-feature to the I-node, and so in principle either PRO or an overt DP may appear in SpecIP. In order to rule out PRO as the subject of a believe-infinitive, Landau invokes the anaphoric nature of PRO’s φ-features, which must enter into an Agree relation with an I or v node bearing valued φ-features. These feature values in turn arise from a further Agree relation between I/v and a matrix DP, which comes to be interpreted as PRO’s antecedent. Landau argues that, because the subject of an ECM clause must also enter an Agree relation with matrix v (to value v’s φ-features and check Case on v and PRO), this Agree relation blocks the PRO-specific Agree relation with T, and PRO’s φ-features remain unvalued. As a result, PRO fails to be associated with an antecedent, and fails to be interpreted at LF. This accounts for the ungrammaticality of the control version of (20):

(20) Mary believed [Bill/*PRO to have left].

What, then, permits the alternation between null and overt subjects in (19)? It seems reasonable to assume that the I of gerunds and want-infinitives is [+T], but how is the subject Case-licensed? There are essentially three possible Case-licensers for the embedded subject: matrix v, embedded C and embedded I. Given the discussion of (20), matrix v cannot Case-license PRO, although it could feasibly Case-license overt embedded subjects, which do not need to enter a further Agree relation with matrix I. Nevertheless, given the considerable evidence that PRO may be assigned the same range of cases as overt DPs (e.g., Comrie, 1973; Sigurðsson, 1991, 2008, and many others), it would seem to be simpler to assume that whatever Case-licenses PRO in (19) may also license an overt subject. Furthermore, Sigurðsson (2008) argues convincingly that nominative case is active in Icelandic infinitives in much the same way as in finite clauses, and Landau (2008) provides evidence that PRO in Russian is assigned structural (i.e., non-default) dative case of the kind that is also be assigned to overt subjects of matrix infinitives. I will thus assume that the embedded I of clausal gerunds and want-type infinitives assigns structural Case to its specifier. Clause-internal Case-licensing seems to be justified in the case of gerunds, which can have overt subjects even when no clause-external Case-marker is available, as in (21a). In the case of

---

8 Landau (2004) follows Pesetsky (1991) in diagnosing the T specification of I by the potential for independent temporal modification; thus, [+T] denotes purely semantic tense, with no need for accompanying tense morphology. As for Agr, Landau assumes that this is a bundle of φ-features, and purely morphological. Thus, [+Agr] is present if and only if there is agreement morphology. [-Agr] on the other hand is ‘abstract Agr’, which may involve valued φ-features but no morphology.

9 Landau (2004, p. 862) mentions three ways in which this result could be achieved. First, the blocking might have to do with Case, a DP with a checked Case feature being inaccessible to further checking in the same phase. Second, it may result from a feature clash: I and v bear conflicting Case features, but both must Agree with PRO. Finally, the Agree relation with v does not satisfy PRO’s [-R] feature, so Agree with I may block Agree with v on economy grounds.
want-infinitival, however, this idea comes up against the problem of accounting for examples such as (21b), which seem to suggest that the prepositional complementiser for assigns Case:

(21) a. [Bill leaving early] was a real embarrassment.
    b. [* (For) Bill to have left early] was a real embarrassment.

It is quite possible, however, that the requirement for for in (21b) has nothing to do with Case. Rather, as McFadden (2004) argues convincingly, it is plausibly due to the requirement for null complementisers to be in an adjacency relation with a lexical verb (Bošković & Lasnik, 2003). For example, the alternation between for and a null complementiser closely parallels the alternation between that and a null complementiser: a null complementiser is possible when the clause is the complement of a verb, as in (22a-b), impossible when the clause is a subject, as in (22c-d), and obligatory immediately preceding a subject trace, as in (22e-f) (examples from McFadden, 2004, pp. 289-290):

(22) a. I would like (for) him to buy the book.
    b. I believe (that) he bought the book.
    c. [* (For) him to buy the book] would be preferable.
    d. [* (That) he bought the book] was unexpected.
    e. Who₁ do you think (*that) t₁ bought the book?
    f. Who₁ would you like (*for) t₁ to buy the book?

As it is not generally assumed that the pattern involving that has anything to do with Case, nothing would be gained by assuming that the identical pattern involving for is Case-based.

Suppose, then, that C is never a Case-licenser, and that the choice is between Case-licensing by matrix v or by the I of the gerund or infinitival.¹⁰ Suppose furthermore that I is only a Case-licenser if its extended projection also contains CP, and that both gerunds and want-type infinitivals are CPs, while ECM clauses are IPs.¹¹ While the literature contains a wide range of views about the categorial status of these clause types, the treatment of control and gerund clauses as CPs and ECM and raising clauses as IPs has a fair amount of evidence in its favour (e.g., Reuland, 1983; Landau, 2003, 2007).¹² One immediate result of this distinction, given the widely assumed ban on improper movement, is that it accounts for the fact that A-movement of ECM subjects is possible, but A-movement of gerund and want-infinitival subjects is impossible:

(23) a. Bill₁ was believed/proved [IP t₁ to have left early].
    b. * Bill₁ was preferred/hated [CP [IP t₁ leaving early]].
    c. * Bill₁ was wanted/hated [CP [IP t₁ to leave early]].

---

¹⁰ I assume that the Phase Impenetrability Condition (Chomsky, 2000) does not constrain Agree; see Bošković (2007) and references cited there.
¹¹ In order to account for the contrast in (21), I must therefore assume that clausal gerunds do not have a null complementiser, and that -ing is a C element that ‘lowers’ onto the verb. It is not yet clear to me whether this assumption, which seems counterintuitive for various reasons, is independently justified.
¹² The following is just a selection of alternative positions that have been argued for in the literature: all infinitives (in fact, all clauses) are CPs (Pesetsky, 1991); all infinitives without overt complementisers are IPs (Bošković, 1997); ECM clauses can be CPs (Tanaka, 2002); some, but not all, control clauses are smaller than CP, involving ‘restructuring’ (Landau 2000; Wurmbrand, 2001); clausal gerunds are TPs (Pires, 2006, 2007).
A-movement of Bill in (23a) is possible because the embedded I is unable to Case-license it, given the assumption that only IP surmounted by CP can license Case. On the other hand, A-movement of Bill in (23b-c) is prevented both by the fact that embedded C assigns Case, thus making the DP inactive for Agree with matrix I, and by the intervention of a CP phase, which would force A’-movement prior to A-movement, an instance of improper movement. The assumptions above are also consistent with the fact that A’-movement of the embedded subject is possible in all three cases, as this would not involve improper movement or movement from Case-position to Case-position:

(24) a. Who₁ did you believe/prove [IP t₁ to have left early]?
   b. Who₁ would you prefer?hate [CP [IP t₁ leaving early]]?
   c. Who₁ would you want/hate [CP [IP t₁ to leave early]]?

Second, if ECM IPs are not Case-licensers, the requirement for matrix ν to Case-license the embedded subject in (20) follows from the absence of any alternative, rather than from a property of matrix ν itself, thus avoiding the complication of distinguishing between vs that optionally assign Case and those that obligatorily assign Case; rather, ν is always an optional Case-licenser. Finally, we can also preserve the Case-based explanation for the impossibility of ECM clauses in double-object constructions, recently defended by Rezac (2013):

(25) a. *We showed the reader [the propositions to be consistent].
   b. *[The reader]₁ was shown t₁ [the propositions to be consistent].

As Rezac shows, the problem with (25a) is not a requirement for the ECM subject to be adjacent to the matrix verb, otherwise (25b) would be expected to be grammatical, as nominative Case is not subject to Case Adjacency. Rather, the problem seems to be that the propositions cannot be Case-licensed by matrix ν because of the intervening indirect object the reader (or its trace). If the embedded I could Case-license its subject, however, this problem would not be expected to arise in either example. Yet the embedded clause is

\[\text{\textsuperscript{13}}\text{This raises the question of why the subjects in (23b-c) cannot simply remain in situ, with matrix SpecIP being filled by an expletive:}\]

(i) a. *It was preferred/hated [CP [IP Bill leaving early]].
   b. *It was wanted/hated [CP (for) [IP Bill to leave early]].

Notice that (ia) cannot be taken as evidence for embedded I in these examples to be a non-Case-licenser, and for to be a Case-licenser; (ib) is still ill-formed with for. Furthermore, Pires’s (2006) argument that (ia) is ungrammatical because the gerund itself must occupy a Case position is undermined by the fact that want-type infinitives, which Pires does not analyse in this way, show the same ungrammaticality. Furthermore, moving the gerund or infinitive to SpecIP (a Case position) does not lead to improvement:

(ii) a. *[CP [IP Bill leaving early]] was preferred/hated t₁.
   b. *[CP (For) [IP Bill to leave early]] was wanted/hated t₁.

McFadden (2004) argues that expletive it can only associate with a clause that is ‘nominal’ in a particular sense, one test of which is whether the clause can itself function as a subject. While it is not completely clear what makes the clauses in (i-ii) ‘non-nominal’ in the relevant sense, as opposed to the clause in (iii), for example, (i-ii) do at least conform to McFadden’s generalisation.

(iii) a. It would be unfortunate [for John to be sick].
   b. [For John to be sick] would be unfortunate.
arguably an IP, and hence unable to license Case, as shown by the possibility of A-moving the embedded subject in single-object cases:

(26) [The propositions] were shown/believed \([t_1 \text{ to be consistent}].\)

To summarise this section, then, I have argued that the alternation between null and overt subjects in gerunds and *want*-type infinitives is due to the fact that both are \([+T]\) with no Agr specification, and thus partially fall together with ECM and raising clauses in Landau’s (2000) featural typology. Gerunds and *want*-type infinitives are distinguished from ECM and raising clauses, however, in that the former are CPs and the latter are IPs. If the only non-finite IPs that may license Case are those surmounted by CP, then the contrast between gerunds/*want*-infinitives and ECM infinitives with respect to the availability of a PRO subject follows if PRO requires a clause-internal Case-licenser, as external Case-licensing would block the Agree relation with matrix I that PRO must establish in order to find an antecedent. As for overt subjects, these may in principle be Case-licensed by embedded I (in gerunds/*want*-infinitives only) or by matrix \(v\) (in all three cases). The possibility of clause-external Case-licensing can now be used to constrain the binding of anaphoric subjects of gerunds and infinitival clauses, as discussed in the next section.

3.2 Binding Gerund Subjects

One of the central problems for binding theory over the past few decades has been how to formulate an appropriate notion of locality for the binding of anaphors. While the antecedent domain of a SELF-anaphor corresponds roughly to the minimal clause or NP containing it, this famously cannot be enough given that ECM subjects can be bound from the next-highest clause, as in (27a). On the other hand, as shown in (27b), subjects of finite clauses cannot be bound in this way:  

(27) a. John\(_1\) believes [himself\(_1\)/*him\(_1\) to like Bill].
   b. John\(_1\) believes [that *himself\(_1\)/he\(_1\) like Bill].

Within Government and Binding theory, this distinction was captured by referring to the governor of the anaphor in the definition of antecedent domain: an anaphor’s governing category is the minimal clause or NP containing the anaphor, its governor and an ‘accessible subject’. As an ECM subject is governed by the ECM verb, the anaphor’s governing category in (27a) is the entire sentence. On the other hand, *himself in (27b) is governed by embedded I, and hence (given the stipulation in Chomsky (1981) that Agr counts as an accessible subject for SpecIP) the anaphor’s governing category is the embedded IP.

As overt DPs must be Case-marked by their governors to satisfy the Case Filter, the GB binding theory entails that an anaphor’s antecedent domain is defined in terms of its Case-marker. This aspect of GB binding theory was retained in the otherwise very different

\[14\] There is another explanation for the ungrammaticality of (27b): the ‘anaphor agreement effect’ (Rizzi, 1990; Woolford, 1999). However, I am not aware of any examples of reflexives that may occur in finite subject position, but reflexivise the closest c-commanding predicate. Such reflexives could then only be bound by an argument of this predicate, but not by an argument of any other predicate. Rather, reflexives that occur in this position (e.g., Mandarin *ziji*, Japanese *zibun*) are typically simplex long-distance or logophoric reflexives (see, e.g., Reinhart & Reuland, 1991; Huang, Li, & Li, 2009).
binding theory of Reinhart and Reuland (1993). Their new definitions of Conditions A and B, plus the relevant auxiliary definitions, are given in (28):

(28) a. **Condition A**: A reflexive-marked syntactic predicate is reflexive.

b. **Condition B**: A reflexive semantic predicate is reflexive-marked.

c. The syntactic predicate formed of (a head) P is P, all its syntactic arguments, and an external argument of P (subject).

d. The syntactic arguments of P are the projections assigned 0-role or Case by P.

Reinhart and Reuland’s binding conditions account for the contrast between (27a,b) in a very similar way to Chomsky’s (1981), aside from the lack of a stipulation that Agr acts as an ‘accessible subject’ in (27b). In (27a), *himself* is Case-marked by *believe*, and hence counts as a syntactic argument of the syntactic predicate headed by *believe*, by (28c,d). If a syntactic predicate is ‘reflexive-marked’ if one of its syntactic arguments bears the SELF morpheme, then (27a) satisfies Condition A (R&R), as *believe* is reflexive-marked by its syntactic argument *himself*. In (27b), on the other hand, *himself* is not Case- or 0-marked by *believe*, and hence does not count as a syntactic argument of *believe*. *Himself* therefore cannot reflexive-mark this predicate. Why, though, can *himself* not reflexive-mark the syntactic predicate of which it is a syntactic argument: that headed by *like*? To rule this possibility out, as well as the pronominal option in (27a), Reinhart and Reuland appeal to a reformulation of the Chain Condition (Chomsky, 1986):

(29) **Chain Condition**: A maximal A-chain ($\alpha_1, ..., \alpha_n$) contains exactly one link – $\alpha_i$ – that is both [+R] and Case-marked. (Reinhart & Reuland, 1993, p. 696)

As noted in section 2, Reinhart and Reuland classify R-expressions and pronouns as [+R], as these have the property of (syntactically) independent reference, while both SELF- and SE-anaphors are [-R]. Thus, if two DPs in A-positions are coindexed and not separated by a ‘barrier’ (in the sense of, e.g., Chomsky, 1986), they form an A-chain that must respect (29). In (27a) this has the effect of ruling out *him* from ECM subject position, as this would result in an A-chain of which *him* (a [+R] and Case-marked element) is not the highest member. In (27b), on the other hand, the Chain Condition prevents *himself* (a [-R] element) from forming an A-chain with *Bill*, which would otherwise be expected to be possible given Condition A (R&R) in (28a).

Given this formulation of the binding theory, the fact that an anaphor, but not a pronoun, can be the subject of a gerund or an infinitival in a narrow focus context, as discussed in section 2, can be accounted for if this subject can be Case-marked by matrix v:

15 I will henceforth refer to the conditions in (28a,b) as Condition A (R&R) and Condition B (R&R) to distinguish them from the better-known Conditions A and B of Chomsky (1981, 1986), as well as from the more theory-neutral use of the terms ‘Condition A’ and ‘Condition B’ prevalent in the literature.

16 Furthermore, given McFadden’s (2004) proposal that prepositional complementiser *for* is not a Case-licenser, examples such as (i), noted by Canac-Marquis (2005) as a problem for Reinhart and Reuland’s binding theory, cease to be problematic, provided that matrix v can still Case-license the embedded subject (contra McFadden):

(i) John, hopes [for himself,/*him, to be knighted].

17 This runs contrary to the analyses of clausal gerunds in Reuland (1983) and Pires (2006, 2007), according to which gerund subjects are never Case-licensed under ECM. Instead, the gerund itself is Case-licensed in the matrix clause, and either ‘transmits’ Case to its specifier (Reuland) or assigns its own Case to its specifier (Pires). The main motivation for this analysis seems to be the apparent requirement for the gerund itself to appear in a Case position, but the ungrammatical examples that Pires claims to be due to this restriction can be
(30)  **Context:** Mary hated Bill leaving early, didn’t she?
   a. No, Mary₁ hated [*PRO₁/HERSELF₁/*HER₁ leaving early].
   b. No, Mary₁ hated [*PRO₁/HERSELF₁/*HER₁ to leave early].

On the other hand, the impossibility of a pronoun in embedded subject position would only follow from the Chain Condition if this subject can form an A-chain with the matrix subject. This, however, is doubtful, given that A-movement from these subject positions is consistently ruled out (e.g., Brody, 1999; Landau, 2003).\(^{18}\)

(31)  a. *Mary₁ was preferred/hated [t₁ leaving early].
   b. *Mary₁ was wanted/hated [t₁ to leave early].

The impossibility of the pronoun in (30) does follow, however, if the distribution of pronouns is entirely determined by the revised FTIP in (13), as opposed to the combination of Condition B (R&R) and the Chain Condition. That is, if we take some version of Condition A (R&R) to regulate the distribution of anaphors, herself is licensed in (30) provided that PRO is independently excluded, as it is in this context.\(^{19}\) Thus, the impossibility of the pronoun simply follows from the fact that an anaphor is possible in this position with the same interpretation. Dispensing with Condition B (R&R) and the Chain Condition while retaining Condition A (R&R) has some value beyond this. Unlike the theory of Safir (2004a,b), because of the distinction between syntactic and semantic predicates in (28a,b), Reinhart and Reuland’s (1993) binding theory only results in complementary distribution between dependent DP types (SELF-anaphors, SE-anaphors and pronouns) if the DP is a semantic co-argument of its antecedent. Perhaps the most significant empirical consequence of this is that it accounts for the apparent non-complementarity between SELF-anaphors and SE-anaphors in certain positions, as in the Dutch ECM example in (32),

(32)  Max hoorde zichzelf zingen.
      Max heard ZICH(ZELF) sing.
      ‘Max heard himself sing.’

On the other hand, the fact that complementary distribution between SELF-anaphors and pronouns is seen in the English equivalent is not ruled out by Conditions A and B, but by the

---

\(^{18}\) Brody and Landau raise this as a serious problem for the movement theory of control. Hornstein (2000b) proposes a way of resolving this problem, but this proposal is criticised, justifiably in my view, by Landau.

\(^{19}\) In order to avoid an appeal to the Chain Condition to rule out reflexive-marking of the lower predicate in (30), a version of Condition A is needed that also builds in a c-command condition on the antecedent. Neeleman and van de Koot’s (2002) proposal that SELF encodes a selectional function that percolates upwards in the tree until it comes to immediately dominate a predicate containing an unsatisfied 0-role seems to come closest to what is required here. Furthermore, in selecting the appropriate DP form from the anaphoric scale, the FTIP must be able to ignore the identity of the DP’s Case-licenser. This is because, given the proposal here that the subject of a gerund or want-type infinitival can be Case-licenced either by matrix v or by embedded I, a pronoun should be possible in (30) if it is Case-licenced by embedded I and if the FTIP only compares other DP forms Case-licenced by embedded I, as an anaphor would be ruled out in that case. Although ideally the derivations compared by the FTIP would only be minimally different from one another, I do not see a way of avoiding this while capturing all the data discussed in this paper in an otherwise economical way.
Chain Condition, as *him* is [+R]. As Truswell (2014) notes, however, this results in an inelegant binding theory: “[t]he ratio of nominal classes to regulatory principles in R&H’s theory is 1:1.” Furthermore, it is not clear that (32) is truly a case of non-complementary distribution. As Safir (2004a) discusses in detail, (33) (originally noted by Reinhart and Reuland (1993) themselves) has different interpretations according to whether *zich* or *zichzelf* is chosen:

(33) Münchhausen trok [ *zich(zelf)* uit het moeras ].
    Münchhausen pulled [ *ZICH(ZELF)* out.of the swamp ].
    ‘Münchhausen pulled himself out of the swamp.’

Using *zichzelf* results in the meaning intended in the story, whereby Münchhausen has pulled himself out by his own hair, as if he is acting on a ‘proxy’ version of himself. On the other hand, using *zich* results in a meaning not intended in the story, whereby Münchhausen simply got out of the swamp. That is, despite appearances, *zichzelf* and *zich* are competing for the subject position, and *zich* only wins out if it represents a meaning that is not representable by *zichzelf*.

More importantly for our purposes, adopting Reinhart and Reuland’s (1993) binding theory wholesale is inconsistent with the main proposal made here: that nominal elements are in direct competition to represent a given interpretation in a particular position. If SELF-anaphors block SE-anaphors and pronouns, then this removes the rationale for Reinhart and Reuland’s binding theory, which is designed to ensure non-complementarity in cases such as (32) and (33). On the other hand, if Condition A (R&R) is assumed on its own, and ‘Condition B’ effects result from the revised FTIP, this does not result in any conflict or redundancy. Any theory of binding, whether competitive or not, must ultimately specify conditions on the binding of anaphors independently of the competitive principle, which merely comes into operation when those conditions are met, blocking alternatives. Furthermore, as we will see in section 4, the full range of facts concerning obviation in gerund subjects can only be accounted for if the distribution and interpretation of SELF-anaphors is dependent on the identity of their Case-licensers.

---

20 Safir (2004a) argues that in Dutch (as opposed to English), SELF-anaphors are not available to represent obligatorily ‘thematically indistinct’ interpretations. English *himself* permits both ‘thematically distinct’ readings, as in (ia), where John is acting on himself as ‘other’, and ‘thematically indistinct’ readings, as in the ‘inherent reflexive’ in (ib):

(i) a. John hit himself.
    b. John perjured himself.

Where a thematically indistinct reading is required in Dutch, the impossibility of a SELF-anaphor in Dutch makes the SE-anaphor available, and obligatory, even though the SELF-anaphor would normally outcompete it under the FTIP.

21 In addition to the novel observations in section 4, which are problematic for alternative approaches based on the movement theory of control, Condition A (R&R) accounts for the fact that focused reflexives and pronouns seem equally acceptable (though not perfect) in the subject position of subject and adjunct gerunds, as these positions cannot be externally Case-licensed:

(i) a. Context: Bill leaving early caused difficulties for Mary, didn’t it?
    No, she said that [?HERSELF1/?HER1 leaving early] caused difficulties for her1.
    b. Context: Mary had difficulties as a result of Bill leaving early, didn’t she?
    No, she said that she1 had difficulties as a result of [?HERSELF1/?HER1 leaving early].
3.3 Summary

I have argued in this section that clausal gerunds allow an alternation between overt and null subjects because they are [+T] but unspecified for Agr, as in Landau’s (2000 et seq.) characterisation of ECM infinitives. I argued that the difference between believe-infinitives (‘true’ ECM complements) and gerund/want-infinitival complements with null or overt subjects is that believe-infinitives are IPs that cannot Case-license their subjects, while subjects of gerunds/want-infinitives are CPs whose subject can either be Case-licensed by embedded I or by matrix v. The clause-internal Case-marking option accounts for the availability of PRO in gerunds/want-infinitives, in contrast to the subject of believe-infinitives. The clause-external Case-marking option accounts for the possible binding of an anaphor in gerund/infinitival subject position, given Condition A (R&R), and the impossibility of binding a pronoun in this position, given the revised FTIP. In section 4, I show that this analysis of control and binding of gerund subjects can account for the obviation pattern seen in ‘second-object’ gerunds of verbs such as envy, and that this pattern is problematic for movement approaches to control in particular.

4 Control and Binding into Second-object Gerunds

4.1 Introduction

In this section, I will show that gerunds occurring in second-object position show a different obviation pattern from those occurring in single-object position (i.e., gerund complements of prefer, hate, etc.). This pattern can be accounted for by the present analysis in terms of the revised FTIP and Condition A (R&R), but are problematic for the alternative approach of Hornstein and San Martin (2001) based on the movement theory of control. There are two classes of verbs that apparently take clausal gerunds as their second object: let us take show as representative of the first class and envy as representative of the second:22

(34) a. I showed Bill [his mother being fired].
    b. I envied Bill [his mother being a genius].

There are several differences between these two cases, perhaps the most obvious of which is that envy-gerunds may have a null subject, while show-gerunds may not:

(35) a. *I showed Bill [PRO being fired].
    b. I envied Bill [PRO being a genius].

If DPs not c-commanded by a co-argument (in either the semantic or the syntactic sense) are exempt from Condition A (e.g., Pollard & Sag, 1992; Janke & Neeleman; 2012), then this accounts for the alternation between reflexive and pronoun, a characteristic of exempt positions. There is an interesting difference between the two cases: the embedded subject position in (ia) is also a position of non-obligatory control, while that in (ib) is a position of obligatory control. Under a movement-theory approach, the exemptness of the embedded subject position could thus be explained if this is a position that cannot be moved from, accounting for both the impossibility of obligatory PRO and the impossibility of a true (i.e., locally-bound) anaphor. However, (ib) is then problematic, as the embedded subject position must be able to be moved from to account for obligatory control (via ‘sideward movement’ as in Hornstein (1999)), but must block movement in order to account for the lack of obviation.

22 Not all speakers seem to accept the double-object version of envy; my broad impression is that British speakers are more likely to accept it than North American speakers, though this question deserves further investigation. The judgements I present here are based on those of speakers (including myself) who do accept double-object envy.
The two constructions also differ in a number of other crucial respects, as I will show below. I will first argue, in 4.2, that envy-gerunds really do involve an alternation between a PRO subject and an overt subject. Then, in 4.3., I will go on to show that the obviation pattern seen in these gerunds is distinct from that of single-object gerunds, in that a focused pronoun, but not a focused anaphor, is possible as the gerund subject. In 4.4, I will show that show-gerunds show a different pattern again, obscured by a structural ambiguity. The structure in which what looks like the gerund subject really is the subject of the gerund turns out to provide further support for the present analysis over the movement-theory analysis.

4.2 The Anatomy of envy

The complementation possibilities for envy are given in (36). Envy may either take a single object, as in (36a-c), or two objects, as in (36d-f): 23

(36) a. I envy Bill.
   b. I envy [Bill’s genius].
   c. I envy [Bill being a genius].
   d. I envy Bill [his genius].
   e. I envy Bill [Mary loving him so much].
   f. I envy Bill [PRO being a genius].

While the subject of envy is thematically an Experiencer, an object of envy can be interpreted as either the Target of Emotion (ToE) or the Subject Matter of Emotion (SMoE), in Pesetsky’s (1995) terms. If envy takes a single object, this may either be interpreted as ToE or as SMoE, as in (36a,b/c) respectively; if it takes two objects, the first must be the ToE and the second the SMoE, as in (36d-f).

There is also reason to think that the objects of envy enter into the same VP-shell structure as is generally assumed for other double-object constructions (Larson, 1988). For example, the objects of envy show the same ‘scope freezing’ effect seen in other double object constructions, in contrast to prepositional datives such as (37b), in which the scope of the two post-verbal arguments is ambiguous:

(37) a. I gave a (*different) student every book. (*every > some)
   b. I gave every book to a (different) student. (every > some)
   c. I envied a (*different) student every essay. (*every > some)

Scope freezing has been accounted for in various ways, but most explanations in the literature exploit the fact that, under a VP-shell structure, the first object c-commands the second. This has been argued either to block QR of the second object over the higher one (e.g., Bruening, 2001) or to be mapped directly onto an asymmetric scope relation at LF (e.g., Janke & Neeleman, 2012).

A crucial contrast for the purposes of this paper is that between the acc-ing gerund in (36e) and what I have treated as a control gerund in (36f), repeated below:

(38) a. I envy Bill [Mary loving him so much].
   b. I envy Bill [PRO being a genius].

23 I have only found one other verb that behaves like envy: begrudge.
Given that *envy* can be either a double-object or a single-object verb, as shown in (36), there is an alternative analysis that must be considered for (38b), in which *Bill being a genius* is a single acc-*ing* gerund object of *envy*. In fact, though, there are some facts suggesting that object control is the only possibility for this sentence. First, the gerund can occur separately from its subject in ‘specifying coordination’, as in (39a). This is generally possible with both control and acc-*ing* gerunds, as in (39b). On the other hand, (39c), in which the specifying ‘conjunct’ also includes *Bill*, is impossible.24

(39)  
\begin{enumerate}
  \item I envy Bill something in particular – being a genius.
  \item I prefer/hate something in particular – (Bill) looking after the cat.
  \item *I envy something in particular – Bill being a genius.
\end{enumerate}

Second, *Bill* in (38b) apparently must be interpreted as the ToE argument of the matrix verb, which is unexpected if an ECM structure is available. Consider (40), for example, in which the context question can be answered with a double-object construction where the first object is ToE and the second object (the gerund) is SMoE, namely (40a). Yet even though *envy* normally permits a single object interpreted as SMoE (cf. (36b)), it does not seem to be possible to interpret the bracketed string in (40b) as SMoE. Rather, *Mary* must be interpreted as the ToE of *envy*; this, however, is infelicitous in the given context, which requires *Bill* to be the ToE:

(40)  
\begin{enumerate}
  \item \textbf{Context:} What do you envy Bill for?
    \begin{enumerate}
      \item I envy Bill [Mary loving him so much].
      \item ?#I envy [Mary loving him so much].
    \end{enumerate}
\end{enumerate}

Thus, there is clear evidence for the possibility of OC into *envy*-gerunds.

\section*{4.3 The Obviation Pattern of *envy*-gerunds}

Having established that the subject of *envy*-gerunds can either be overt or controlled, we can now turn to the obviation facts. Recall that, if the subject of a single-object gerund is to be interpreted as coreferential with the matrix subject, the former must normally be realised as PRO rather than as an anaphor or pronoun. On the other hand, in a context where the gerund subject is interpreted as the focus of the utterance, an anaphor becomes possible, while a pronoun remains impossible. The possibility of an anaphor in this case is accounted for if matrix $v$ may Case-mark the gerund subject, assuming Condition A (R&R) as the relevant

24 The possibility of adverbial intervention in (ia), paralleling the genuine control gerund example in (ib), and contrasting with the clear non-control examples in (ii), might appear to favour a control analysis of (ia):

\begin{enumerate}
  \item I envy Bill very much being a genius.
  \item Mary caught Bill red-handed feeding the cat poison.
\end{enumerate}

(iia)  
\begin{enumerate}
  \item ?* Mary prefers Bill very much looking after the cat.
  \item ?* Mary hates Bill very much looking after the cat.
\end{enumerate}

Yet gerund complements of aspecual and perception verbs seem to allow adverbial intervention; it may be that such gerunds are ambiguous between control and acc-*ing* structures:

\begin{enumerate}
  \item I stopped Bill abruptly ?(from) looking after the cat.
  \item I saw Bill very clearly feeding the cat.
\end{enumerate}
condition on anaphors. Now consider what the present proposal predicts about \textit{envy}-gerunds, given the structure in (41):

(41) \[ \text{IP} [\text{DP} \text{I}] [\text{vP} [\text{v envy}] [\text{vP} [\text{DP Bill}] [\text{v} \text{tV} [\text{CP} \text{X being a genius}]]]]]] \]

A common assumption in the literature concerning Case-marking in double-object constructions is that the first object receives structural Accusative Case from \textit{v} and the second object receives inherent Accusative Case from the lexical verb (e.g., Larson, 1988; Rezac, 2013). Thus, in (41) \textit{Bill} should be Case-licensed by \textit{v}, and the question arises of how the DP indicated as \textit{X} can be Case-licensed. Presumably, if a single functional head can only Case-license a single DP, as seems uncontroversial, then \textit{X} cannot be assigned Case by a matrix element: \textit{v} has already assigned its Case, and \textit{X} is not an argument of \textit{V} and hence cannot be assigned inherent Case by it. Thus, there is only one option remaining: Case-licensing by embedded \textit{I}. Thus, the proposal in section 2 correctly ensures that \textit{envy}-gerunds may have overt subjects. In addition, it predicts that \textit{envy}-gerunds will show a distinct obviation pattern from single-object gerunds. That is, while \textit{envy}-gerunds should permit PRO in all-focus contexts, they should not permit an anaphor bound by the matrix indirect object, as this would require the anaphor to be Case-licensed by the matrix syntactic predicate. Thus, given the revised FTIP, a pronoun becomes the only option: remaining impossible, and a pronoun becomes the only option.\textcircled{26\text{,}27}

(42) \textit{Context:} What’s new? 
I envy Bill \[ [\text{PRO}/*\text{himself}/*\text{him} being a genius] \].

On the other hand, in a context where the gerund subject is narrowly focused, an anaphor remains impossible, and a pronoun becomes the only option.\textcircled{26\text{,}27}

(43) \textit{Context:} You envy Bill his mother being a genius, don’t you? 
No, I envy Bill \[ [*\text{PRO}/*\text{HIMSELF}/\text{HIM} being a genius] \].

Thus, the restriction to clause-internal Case-licensing essentially restricts the gerund subject’s antecedent domain to the embedded clause itself, ruling out the anaphor.

These observations support the present analysis over potential alternatives. As has already been discussed, the idea that PRO competes directly with anaphors and pronouns (contra Safir, 2004a) fulfills the important task of ensuring that, although overt DPs are normally possible as subjects of gerunds, anaphors and pronouns bound by a matrix argument are not possible except with narrow focus. In this respect, \textit{envy}-gerunds are just like the single-object gerunds discussed in section 3. Furthermore, the \textit{envy}-gerund facts are also

\textcircled{25} That obviation holds in this case is somewhat surprising, given that obviation is generally thought to hold with subject antecedents only (Avrutin & Babynyshev, 1997; Landau, 2004). At present I have no explanation for why \textit{envy}-gerunds should differ in this regard.

\textcircled{26} The string \textit{I envy Bill himself being a genius} is grammatical under a distinct (and irrelevant) interpretation, in which \textit{himself} is an intensifier modifying \textit{Bill}.

\textcircled{27} Note that the impossibility of an anaphor here cannot be attributed to the fact that the intended antecedent is an object rather than a subject, as anaphors in English are not subject-oriented. For example, the second object of \textit{show} may be an anaphor bound by the first object:

(i) I showed John, himself.
problematic for the ‘accidental complementarity’ theory of Reinhart and Reuland (1993). Recall that the problem this theory faces in accounting for obviation in single-object gerunds is that it does not seem to exclude the possibility of a matrix-bound pronoun in gerund subject position, given that it should not be possible to form an A-chain between this pronoun and a matrix argument, and hence this pronoun would not violate the Chain Condition. The fact that a pronoun does become possible in envy-gerunds, precisely where an anaphor is impossible, makes the problem even more acute. Any attempt to account for the impossibility of a pronoun in single-object gerund subjects – for example by ensuring that the Chain Condition applies to them – should automatically extend to envy-gerund subjects, ruling out a pronoun here too. Under an FTIP-based binding theory, on the other hand, the account is simple: a pronoun is ruled out where an anaphor is possible, and ruled in where an anaphor is impossible.

The gerund facts also support the present complementarity-based analysis over another complementarity-based alternative: the Move over Merge account of Hornstein and San Martin (2001), which is based on Hornstein’s (1999, 2000a) proposals that both obligatory control and anaphoric binding involve A-movement, the only difference being that anaphors check Case. Hornstein and San Martin argue that the obviation of a bound pronominal subject by a null subject in gerunds follows from a preference for Move over Merge; thus, in (44), the Merged pronoun her is disfavoured because Mary can be Merged in this position and subsequently A-move to matrix subject position via the external θ-position of prefer: 28

(44) Mary1 preferred/hated [Mary1/*her1 leaving early].

While Hornstein and San Martin do not discuss the obviation of anaphors in all-focus contexts, they could potentially invoke a preference for Case not to be checked if it need not be. Then the Case-checking anaphor trace would be dispreferred in favour of the non-Case-checking simple A-trace. The fact that an anaphor, but not a pronoun, becomes possible in a narrow-focus context could then be accounted for in a similar way to that suggested above: only overt elements can be focused, hence this makes possible the otherwise dispreferred Case-checked anaphor trace while still preventing the merely Merged pronoun.

Now consider what Hornstein and San Martin’s (2001) analysis would have to say about envy-gerunds. First, note that because of the possibility of OC into the gerund, A-movement from gerund subject to matrix object position must be possible under their analysis, as in (45a). This would then correctly lead us to expect that, in wide-focus contexts, both the anaphor and pronoun are impossible: the anaphor under the assumption Case-checking is dispreferred, and the pronoun because of the Move over Merge preference:

(45) a. I envied Bill [Bill loving Mary so much].
   b. *I envied Bill [Bill>himself loving Mary so much].
   c. *I envied Bill1 [him1 loving Mary so much].

In the narrow-focus context, however, Hornstein and San Martin’s analysis incorrectly predicts that an anaphor should become possible and a pronoun should remain impossible, just as in (44). Note that the crucial difference between their analysis and the present one is that, while both acknowledge the importance of Case-licensing to the possibility or otherwise of an anaphor, the identity of the Case-licenser matters in the present analysis, but not in

---

28 Of course, the idea that A-movement is possible out of gerund subject position is independently problematic, as discussed in detail by Landau (2003, 2007). I focus here on the specific empirical problem arising from the obviation facts.
Hornstein and San Martin’s. That is, for them it should be enough that the gerund subject can be Case-licensed for an anaphor to be possible, as long as control is independently ruled out (e.g., by the narrow-focus context). Under the present analysis, what blocks an anaphor is that the subject of envy-gerunds cannot be Case-licensed by the matrix predicate. This in turn makes a pronoun available with the same reading.29

4.4 The Structural Ambiguity of show-gerunds

In this section, I will show that the properties of the other type of second-object gerund, that found with show, provides further evidence for the present analysis over the movement theory of control. Recall that the difference between envy-gerunds and show-gerunds is that the latter only allow an overt gerund subject:

(46) a. I showed Bill₁ [Mary/*PRO₁ being fired].
   b. I envied Bill₁ [his₁ mother/PRO₁ being a genius].

Although I do not currently have a precise account for this difference, note that this is a general fact about perception verbs, and so is plausibly due to a semantic fact about such verbs:30

(47) *John₁ saw/heard/perceived [PRO₁ being fired].

Suppose that in all other respects, show-gerunds are like other gerunds (CPs with I specified as [+T]).

Now consider the fact that, in contrast to envy-gerunds, show-gerunds seem to require an anaphor and disallow a bound pronoun:

(48) I showed Bill₁ [himself₁/*him₁ being fired].

This appears to be problematic for the present analysis. If the indirect object Bill blocks Case-licensing of the gerund subject by matrix v, then himself should not be able to reflexive-mark show, by Condition A (R&R), and only a bound pronoun should be possible in gerund subject position. On closer consideration, however, the situation with show is more interesting, in that there is evidence for structural ambiguity in examples such as (46a) and (48). In one of these structures, the pattern in (48) holds; in the other, both reflexive and pronoun are

29 The findings in this section may also be problematic for Pires’ (2006, 2007) claim that gerunds require Case-licensing themselves as a prerequisite for Case-licensing of the gerund subject by the T/I of the gerund. Given that the gerund subject itself is Case-licensed by T/I rather than by the matrix predicate, this would not permit it to be an anaphor at all, by Condition A (R&R). Relaxing this condition to allow reflexivisation of the Case-licenser of the Case-licenser of the anaphor would resolve this problem, but at the cost of overgeneration. For example, subject gerunds would also be predicted to allow an anaphoric subject and disallow a pronoun with the same antecedent (see footnote 21).

30 My intuition is that it may have something to do with the obligatory de se reading of PRO, which may conflict with the prototypical situation denoted by perception verbs, in which the Experiencer or Goal argument of the verb perceives the Theme as ‘other’. The impossibility of control into perception verb complements would then have the same explanation as the impossibility of logophoric pronouns in perception verb complements (e.g., Sells, 1987), given that logophoric pronouns must be read de se (e.g., Adesola, 2005). One apparent exception to the ban on control into perception verb complements is become aware of (John; became aware of PRO; having been fired), but this may be derivative of the fact that the adjective aware allows control (John; was aware of PRO; having been fired).
available. I will argue that the ambiguity is as in (49): in (49a), the apparent gerund subject really is a gerund subject, while in (49b) it is actually a matrix object controlling into a ‘low adjunct’ PRO-gerund:

(49) a. \([_{vP} [_{vP} V Bill [_{vP} V [CP C [IP Mary being fired ] ] ] ] ]\)

For convenience, I will refer to (49a) as the Subj-structure, and to (49b) as the Obj-structure. If sentences with show are ambiguous in this way, then we might expect at least two sorts of evidence to be able to disambiguate them. With respect to constituency, given the general possibility of extraposing CP to VP or vP, we might expect constituency tests traditionally used to diagnose VP to target different strings in the two cases: show Bill in the Subj-structure and show Bill Mary in the Obj-structure. Furthermore, Mary being fired forms a CP constituent in the Subj-structure but not in the Obj-structure. The structures should also behave differently with respect to binding. In the Subj-structure, Mary should be able to be replaced by a pronoun bound by Bill, but not by an anaphor. In the Obj-structure, the reverse should be true. This is because Mary in the Subj-structure must be Case-licensed internally to the gerund, and so could not reflexive-mark the matrix predicate, by Condition A (R&R). As a result, the FTIP should permit a bound pronoun. In the Obj-structure, on the other hand, Mary is 0-marked by show, and hence should be assigned inherent Case by it, given the assumptions about double-object constructions made here. Thus, an anaphor in this position should be able to reflexive-mark the matrix predicate, by Condition A (R&R). 31

If the proposal of structural ambiguity is correct, then we should expect constituency and binding to pattern together. Indeed, when the Subj-structure VP is fronted, as in (50a), a pronoun bound by Bill becomes possible in the relevant position; on the other hand, when the Obj-structure VP is fronted, as in (50b), only an anaphor is possible:

(50) a. I said I would show Bill something amusing, and \([_{vP} show Bill_{I} ] I did t_{vP} himself_{I}/him_{I} slipping on a banana skin.\)
b. I said I would show Bill, himself_{I} doing something amusing, and \([_{vP} show Bill_{I} himself_{I}/*him_{I} ] I did t_{vP} slipping on a banana skin.\)

31 Another test that should disambiguate the structures is extraction. In both structures, A’-movement of the ‘gerund subject’ might be expected to be possible, as subjects of prefer-type gerunds, which were shown above to be unambiguously subjects, can be A’-extracted:

(i) a. Who; did you show (him) \(t_{I}\) slipping on a banana skin?
b. Who; would you prefer \(t_{I}\) being there?

On the other hand, the ‘gerund subject’ would only be expected to be able to undergo A-movement in the Obj-structure, as A-movement out of CPs is blocked. Thus, (ii) could only have the Obj-structure (A-movement in the double-object version would independently be prevented by Relativised Minimality):

(ii) John_{I} was shown \(t_{I}\) slipping on a banana skin.

Although constituency tests will not be helpful in corroborating the disambiguation here, we might expect that A-movement will be impossible where the ‘gerund subject’ cannot be construed as an argument of the matrix verb, as this would require the Subj-structure. This seems to be correct; for example, A-movement of idiomatic ‘gerund subjects’ seems to be ill-formed:

(iii) a. I showed John [the shit hitting the fan].
b. ??[The shit], was shown \(t_{I}\) hitting the fan.
A further constituency test that can be used is pseudoclefting. Once again, the two possibilities pattern as expected: taking the Subj-structure CP as the pseudocleft focus makes a bound pronoun possible, while taking the Obj-structure CP as the pseudocleft focus precludes this option:

(51) a. What I showed Bill\textsubscript{1} was \[ \text{CP} \text{himself}_{\text{i}}/\text{him}_{\text{i}} \text{ slipping on a banana skin}. \]
   b. What I showed Bill\textsubscript{1} himself\textsubscript{i}/*him\textsubscript{i} doing was \[ \text{CP} \text{PRO}_{\text{i}} \text{ slipping on a banana skin}. \]

Finally, insertion of a matrix adverbial differentiates the binding possibilities in exactly the way expected:

(52) a. I showed Bill\textsubscript{1} eagerly \[ \text{CP} \text{himself}_{\text{i}}/\text{him}_{\text{i}} \text{ being fired}. \]
   b. I showed Bill\textsubscript{1} himself\textsubscript{i}/*him\textsubscript{i} eagerly \[ \text{CP} \text{PRO being fired}. \]

The main question that (50-52) raise is why a bound pronoun is possible in the (a) examples, as opposed to (48). Given the non-complementarity between reflexive and pronoun in these examples, the obvious answer is that the gerund subject position here is exempt from the binding conditions – here, Condition A (R&R) and the revised FTIP – and thus that a reflexive in this position may be interpreted logophorically. A fairly commonly assumed generalisation in the literature is that a reflexive not c-commanded by a co-argument is exempt from Condition A (R&R) (e.g., Pollard & Sag, 1992; Safir, 2004a; Janke & Neeleman, 2012). In that case, because a Condition-A-satisfying anaphor is not available, the revised FTIP should not rule out a pronoun. Even assuming this generalisation, however, the impossibility of a pronoun in (48) is still problematic. The gerund subject in (49a) is not c-commanded by a co-argument, even in the syntactic sense of ‘argument’. If the choice between the structures in (49a-b) is free, as seems reasonable given their degree of structural divergence, then why is it not possible to select structure (49a) with a bound pronominal subject? In fact, it is not quite clear to me that a pronoun is impossible in (48), as long as coreference is somehow made ‘unsurprising’ by the context. For example:

(53) I said I would show Bill something unpleasant for him. And I did: I showed Bill\textsubscript{1} [himself\textsubscript{i}/?him\textsubscript{i} being fired].

Furthermore, a pronoun seems to be more easily available if coreferential with the matrix subject rather than the indirect object, even though a reflexive remains possible:

(54) John\textsubscript{1} showed Mary [himself\textsubscript{i}/?him\textsubscript{i} being fired].

These facts suggest to me that the unacceptability of (48) with a pronoun is not due to purely grammatical factors, although I do not have any more light to shed on the matter here. The point is that both Subj- and Obj-structures seem to be available with show. When the Obj-structure is forced, as in the (b) examples of (50-52), then only the reflexive is available, because of Condition A (R&R) and the revised FTIP. When the Subj-structure is available or forced, as in the (a) examples of (50-52), either a reflexive or a pronoun is available in principle, because the subject position of gerunds is exempt from Condition A (R&R).

It is worth noting that Hornstein and San Martin’s (2001) analysis does not predict the same interactions between constituency and binding expected under the present analysis. Recall that they must allow A-movement out of gerund subject position in order to account for obligatory control into gerunds. Thus, they might account for the constituency facts above.
by proposing that the gerund subject can undergo optional 'object shift' into the matrix clause. Thus, suppose the movement-theory analogue of the Obj-structure is as in (55b):

(55) a. $[vP [\text{vp Bill [v'v [CP C [IP Mary being fired]]]]]]$
b. $[vP [\text{vp Bill [v'v [VP Mary1 [v'v [CP C [IP Mary1 being fired]]]]]]]]$

Yet, under Hornstein’s (1999, 2000a) proposal that both PRO and anaphoric reflexives are in fact A-traces, the difference being that anaphors are Case-marked, this analysis would not make distinct predictions about the binding possibilities in the two cases. Thus, since Mary must be able to be Case-marked in situ in (55a), Mary should be able to be replaced with a reflexive bound by Bill. In that case, object shift in (55b) will make no difference: Mary will either be Case-marked in SpecIP or matrix SpecVP, and should hence be able to be an anaphor. Furthermore, there is no reason under this analysis why, for example, adverbial intervention should make a difference to the binding possibilities, as in (52) above. One might imagine that in (52a) the gerund subject is prevented from A-moving into the matrix clause, which turns this position into an exempt position. This is roughly equivalent to Hornstein’s (1999) analysis of non-obligatory control: if a Caseless subject cannot A-move, the null pronominal pro is inserted as a ‘last resort’ to save the derivation. But if adverbial intervention is incompatible with A-movement of infinitival subjects, this would also incorrectly rule out obligatory control where a matrix adverbial precedes the control clause:

(56) Mary persuaded John, skilfully [PRO1/*2 to leave early].

I conclude that the properties of show-gerunds, despite appearing problematic for the analysis of envy-gerunds in the preceding sections, are in fact much more problematic for the movement-theory approach.

4.5 On envy Again

This brings us back to the obviation facts with envy-gerunds. I argued above that the pattern in (42-43) emerges because of a combination of Condition A (R&R) and the revised FTIP. If gerund subjects are positions exempt from Condition A (R&R), though, why is the binding theory even relevant? In other words, why do we not find an alternation between a reflexive and a pronoun in the subject position of envy-gerunds? I think that it is important here to emphasise that positions that can host exempt reflexives (exempt positions) may also be positions that can host bound reflexives (bindable positions). For example, we saw in section 3 that there is good reason to treat the gerund complements of verbs such as prefer and hate as CPs, with no raising of the gerund subject:

(57) Bill preferred/hated [CP [IP Mary leaving early]].

By the generalisation governing exempt positions, the position of Mary in (57) is exempt, as it is not c-commanded by a co-argument (in any sense). Yet this position may not host a pronoun coreferential with Bill:

(58) Bill1 preferred/hated [CP [IP himself1/*him1 leaving early]].

32 Landau (2007) argues that non-obligatorily-controlled PRO is a null logophor, and Hornstein (1999) at least seems to admit this possibility, which would make the suggested straw-man analysis here much closer to Hornstein’s analysis of NOC.
As there is arguably no structural ambiguity here – that is, no structure in which *himself* is a matrix direct object – this fact seems to argue against the simple statement of the generalisation governing exempt positions. On the other hand, if the possibility of a bound reflexive is governed by Condition A (R&R), then we can account for (58) if matrix *v* may Case-license *himself*, with the revised FTIP thus blocking a pronoun, provided that the generalisation governing exempt positions only applies if binding fails. That is, binding succeeds in *prefer*-gerunds, and hence the gerund subject is not exempt. On the other hand, binding fails in second-object *envy*- and *show*-gerunds because of the intervening indirect object, and hence the gerund subject position may be considered exempt. This predicts that perception verbs which do not take an indirect object will also not show the free alternation between reflexive and pronoun seen with *show*. This is because in this case, the gerund subject could be externally Case-licensed by matrix *v*, and hence anaphoric binding may apply, and a bound pronoun is blocked by the FTIP. This prediction is correct, crucially in cases such as (59b) where the Subj-structure is forced:

(59) a. Bill1 saw/heard/perceived himself1/*him1 being fired.
   b. What Bill1 saw/heard/perceived was himself1/*him1 being fired.

In that case, why does *show* display an alternation between reflexive and pronoun, while *envy* does not? This must simply be because exempt reflexives must typically be interpreted as logophoric. While the meaning of this term is often not defined precisely in the syntactic literature, it is clear from more explicit proposals such as Sells (1987) that the indirect object of *show* could be considered a potential logophoric antecedent in a way that the indirect object of *envy* cannot. Sells distinguishes three ‘discourse roles’ that characterise potential logophoric antecedents: SOURCE, SELF and PIVOT. Of these, the Goal argument of *show* can plausibly be described as a potential PIVOT (“the one from whose point of view the report is made”, Sells (1987, p. 455)). Sells characterises the PIVOT as the “center of deixis” (Sells, 1987, p. 456), and cites the contrast in (60) as resulting from a conflict between the use of *own* (which forces he to be interpreted as PIVOT) and the use of *went* (which suggests that he is not the spatio-temporal centre of the report):

(60) a. He1 was happy when his1 own mother came to visit him1 in the hospital.
   b. ??He1 was happy when his1 own mother went to visit him1 in the hospital.

If *own* is indeed a diagnostic of PIVOT-hood, and hence of logophoricity, then the following sharp contrast suggests that the indirect object of *show* may be PIVOT but that of *envy* may not be:33

(61) a. Mary showed Bill his own mother being fired.
   b. *Mary envied Bill his own mother being a genius.

Given this characterisation of the difference between *show* and *envy*, we expect that tests that make the free alternation between reflexive and pronoun more clearly available with *show* will not facilitate this alternation with *envy*. Indeed, this is correct: VP-fronting and pseudoclefting do not make the reflexive available, as shown in (62a-b):

---

33 For completeness, it is worth noting that the indirect object of *envy* is not a potential SOURCE (“the one who makes the report”) or SELF (“the one whose ‘mind’ is being reported”) either.
(62) a. I said I envied Bill something, and \[_{3P \text{envy Bill}}\] I did \[t_{3P \text{him/*himself being a genius}}\].

b. What I envied was \[_{CP \text{him/*himself being a genius}}\].

Thus, both binding and logophoric interpretation fail for the reflexive subject of an envy-gerund, and only the pronoun remains available.

5 Conclusion

I have argued that obviation patterns in English clausal gerunds should be accounted for by revising Safir’s (2004a, b) FTIP to include PRO in the competition. This is feasible provided that the scale on which the FTIP operates is defined in terms of the antecedent domains of the various DP types, rather than their degree of ‘dependence’. In that case, PRO will always win any FTIP competition. In order to restrict PRO’s distribution, I assumed Landau’s (2000, 2004) R-assignment system, which effectively restricts PRO to occurring in the subject of non-[-T, +Agr] clauses. The fact that gerunds and want-type infinitives show an alternation between PRO and overt subjects can be accounted for if these are CPs that can Case-license their subjects internally. The possibility of Case-licensing gerund/infinitival subjects externally accounts for the possibility of anaphors in these positions. I showed that this system can account for the obviation properties of envy-gerunds: an anaphoric subject is ruled out because of a failure of external Case-licensing (due to intervention), and the FTIP thus permits a bound pronominal subject. Despite first appearances, show-gerunds (in one guise) are identical to envy-gerunds in banning anaphoric binding, and the alternation between reflexive and pronoun that they display in certain cases is due to the possibility of a logophoric interpretation of the reflexive, absent in the case of envy. The findings as a whole are problematic for the movement-theory approach to obviation in gerunds, as this predicts the wrong obviation pattern in the case of envy-gerunds and fails to predict the reflexive/pronoun alternation in the case of show-gerunds.

References


Processing metaphor: The role of conventionality, familiarity and dominance

Giulio Dulcinati¹, Diana Mazzarella¹, Nausicaa Pouscoulous¹ and Jennifer Rodd²

Abstract:

According to the ‘career of metaphor’ hypothesis (Bowdle & Gentner, 2005) metaphor interpretation shifts from a comparison process to a categorization process when the metaphor vehicle becomes conventional, and little importance is given to the conventionality of the topic-vehicle pairing (i.e., metaphor familiarity). In this study, we used a form-preference paradigm to investigate whether highly familiar and conventional metaphors are preferred in the categorization form. We manipulated conventionality and familiarity and we controlled for aptness. Results did not show clear effects of conventionality or familiarity while they confirmed previous findings that aptness is an important predictor of form preference. An additional post-hoc analysis on the role of dominance (i.e., relative frequency) of metaphorical versus literal uses of the vehicle in the form-preference task suggests that this factor plays a key role on this task.

Keywords: metaphor, language processing, conventionality, familiarity, metaphor dominance

1 Introduction
1.1 Comparison or Categorization?

The question of the cognitive underpinnings of metaphor understanding has been lively debated in the recent psycholinguistics literature (for a review see Glucksberg (2001, 2003)). Most accounts ascribe to one of the following views: (i) metaphors are comprehended as categorizations, (ii) metaphors are comprehended as comparisons.

Let us consider the following nominal metaphor³:

(1) My lawyer is a shark.

Categorization models maintain that metaphors are understood by attributing the topic of the metaphor (i.e., lawyer) to the category denoted by the vehicle (i.e., shark). Metaphor interpretation involves the construction of a ‘metaphorical category’ for the vehicle term that differs from its lexically encoded concept. This metaphorical category denotes elements which share some relevant features with (a subset of) items that fall under the concept lexically encoded by the vehicle. For example the metaphorical category SHARK*⁴ may include things that are predatory and vicious (e.g., some sharks but also some lawyers). The class-inclusion account (Glucksberg & Keysar, 1990; Glucksberg & Haught, 2006) and the

¹ Research Department of Linguistics, UCL, 2 Wakefield Street, London WC1N 1PF
² Research Department of Experimental Psychology, UCL, 26 Bedford Way, London, WC1H 0AP, UK
³ Nominal metaphors are metaphors of the form ‘X is a Y’ where X is the topic and Y is the vehicle. There is no theoretically significant reason to distinguish nominal metaphors from other forms. In this paper we will only discuss this form of metaphor because the experiment described here and most of the other relevant studies discussed focus on this form.
⁴ We will follow the practise of representing metaphorical categories as starred concepts.
relevance-theoretic account (Wilson & Carston, 2007; Sperber & Wilson, 2008) can be considered representative for the categorization view of metaphor.

Comparison models maintain that metaphors are ‘implicit similes’ and they are understood by comparing the concepts encoded by the topic and the vehicle. The metaphor expressed by (1) is understood by comparing the lexically encoded concepts MY LAWYER and SHARK. An example of the comparison view is the structure alignment model proposed by Gentner and colleagues (Gentner & Clement, 1988; Gentner & Wolff, 1997), which is an application of the structure-mapping theory of analogy (Gentner, 1983). This model claims that metaphors (and similes) are understood by means of alignment and inference projection. First, the properties and the structural relations of the concepts of topic and vehicle are aligned. The structural alignment means that non-identical properties can be aligned if they play parallel roles in the two concepts (e.g., sharks and lawyers are predatory in different ways). Then, all the properties of the vehicle that are connected to the aligned structure are projected to the topic.

1.2 Comparison and Categorization

Bowdle and Gentner (2005) proposed a hybrid account of metaphor comprehension that combines the categorization and the comparison views: the career of metaphor hypothesis. This account claims that when a metaphor is novel it is understood as a comparison, when it becomes conventional it is understood as a categorization. The comparison-based process is carried out between the representation at the same level of abstraction (e.g., LAWYER and SHARK). The categorization-based process maps representations at different levels of abstraction (e.g., LAWYER and SHARK*, where the metaphorical category SHARK* is more abstract than LAWYER). Thus, conventionalisation is thought of resulting in a shift in mode of processing from comparison to categorisation.

Crucially, according to this account, whether a metaphor is novel or conventional is determined solely by the vehicle of the metaphor. A conventional metaphor is a metaphor with a conventional vehicle and, conversely, a novel metaphor is a metaphor with a novel vehicle. For example, “That lawyer is a shark” is as conventional as “That employer is a shark”, as long as the vehicle maintains the same metaphorical interpretation.

According to Bowdle and Gentner’s (2005) definition, a novel vehicle is a vehicle that does not evoke a metaphorical category in isolation and that might give way to various interpretations. For instance, consider example (2):

(2) His sister is a megaphone

The term ‘megaphone’ does not evoke a metaphorical category in isolation. Therefore, in order to understand the metaphor we need to compare (i.e., horizontally align) the two lexically encoded concepts, HIS SISTER and MEGAPHONE, and figure out in what way ‘his sister’ could be like a ‘megaphone’. Maybe she has a very loud voice or maybe she cannot keep secrets.

When a vehicle has been used many times with the same metaphorical interpretation, the vehicle becomes conventional. The metaphorical sense of a conventional vehicle is stable to the point that the word becomes ‘polysemous’, with the literal and metaphorical meanings being lexically associated to it. That is, both meanings are lexicalized and can be accessed in isolation. For example, consider the metaphor expressed by (1). Even in isolation the vehicle ‘shark’ elicits the metaphoric category of aggressive merciless creatures. While understanding sentence (1), the interpreter directly accesses the metaphoric category SHARK* and attributes the topic to this category. The interpreter vertically aligns the
concept LAWYER with the metaphorical category SHARK*, and all the properties of SHARK* are projected to the topic.

The shift in the mode of processing suggested by the career of metaphor hypothesis does not entail that a metaphor with a conventional vehicle can only be interpreted as a categorization. Indeed while Bowdle and Gentner (2005) claim that while comparison (i.e., horizontal alignment) is the only mode of interpretation available for novel metaphors, they suggest that upon encountering a conventional metaphor, the processes of comparison and categorization start simultaneously. There are several factors (e.g., context, salience) that may favour one process over the other. However, all things being equal, the categorization process is faster because of its smaller computational cost. Therefore, the competition between different modes of processing allows vehicles that are often used in their ‘conventional’ interpretation to be ‘reinterpreted’ as novel when the comparison-based process is initiallyfavoured. This may happen in cases in which the conventional sense of the vehicle is not suitable for the context in which the metaphor is uttered. For example, a metaphor like “Your cat is a shark” may suggest consideration of similarities between the cat and a literal shark (e.g., biting).

1.3 The Form Preference Task

Bowdle and Gentner (2005) empirically investigated the effect of conventionality on metaphor processing through the form preference task. In the form preference task participants are presented with a list of figurative statements. Each statement is presented both as a nominal metaphor (categorical form) and as a simile (comparison form). For each statement they are asked to indicate the degree to which they prefer one form over the other. For example, participants were shown both the sentences “Faith is like an anchor” and “Faith is an anchor” and they were asked to indicate their preference for one or the other on a ten-point scale.

Bowdle and Gentner (2005) proposed that the form preference task could be used to investigate the processing of metaphor on the assumption that “form reflects function in figurative language” (Bowdle & Gentner, 2005, p. 200). On this assumption, preference for the comparison form should reflect that the figurative statement is processed as a comparison. Conversely, preference for the categorization form suggests that the statement is processed as a categorization.

Bowdle and Gentner (2005) pre-rated the conventionality of a set of stimuli with norming studies and then they measured the rate of preference for the categorical form for each figurative statement. They found that conventional metaphors were preferred in the categorical form (e.g., This government is a parasite) significantly more than novel metaphors (e.g., Her generosity is a light). These results seem to support the career of metaphor hypothesis.

The significance of their results has been undermined by one particular piece of criticism. Jones and Estes (2006) pointed out that their experiment manipulated conventionality without controlling for other factors that have been found to have an effect on metaphor processing. Jones and Estes argued that conventionality should not be manipulated without controlling for aptness (or vice versa) as these two variables are frequently correlated.

Aptness is a property of metaphor that has been defined in many different ways. The most widely accepted definition was given by Chiappe, Kennedy and Smykowski (2003, p. 97): “the extent to which the statement captures important features of the topic”. Aptness has been widely used in empirical research, especially in support of categorization models of metaphor, and it has also been found to predict categorical form preference in the form
preference task. Jones and Estes (2006) constructed a set of apt and a set of non-apt metaphors, each of these was equally divided between conventional and novel metaphors. They used this set of stimuli in a form preference task and they found that there is a significant difference in the degree of categorical form preference between apt and less apt metaphor. They used their results to argue that the effect of conventionality observed by Bowdle and Gentner (2005) in their experiment was probably due to the confounding effect of aptness. While this opens up a very interesting possibility, it is worth noting that, as Bowdle and Gentner (2008) have suggested, aptness is a ‘vague’ notion that tends to be correlated with several characteristics of metaphors and that, for this reason, it is arguably of little theoretical interest.

2 Metaphor Conventionality and Familiarity

2.1 Metaphor Familiarity

As we noted above, the technical definition of conventionality proposed by Bowdle and Gentner (2005) has a salient characteristic in that the conventionality of a metaphor depends only on the vehicle and not on the whole sentence. In fact, Bowdle and Gentner draw a distinction between conventionality and familiarity, which is a property of the whole sentence (the topic-vehicle pair). They claim that these two properties are distinct and that “conventional figurative expressions can be either familiar or unfamiliar, depending on [the topic]” (Bowdle & Gentner, 2005, p. 204). For example, “His anger is a fire” and “His panic is a fire” are equally conventional metaphors because they share the same vehicle, but while the former sounds familiar the latter sounds quite unfamiliar. The notion of familiarity, intuitive as it may be, has not received a precise and univocal definition in the literature and, as a consequence, its effect on metaphor processing has received relatively little attention. In what follows, we aim at investigating the role of familiarity in metaphor comprehension.

To begin with, let us discuss some theoretical considerations which point to an effect of familiarity in metaphor comprehension. From a theoretical point of view, although the career of metaphor hypothesis stresses the importance of the vehicle in determining whether the processing will be through comparison or categorization, it is possible to postulate a role for the topic-vehicle pair as well. According to Bowdle and Gentner (2005), novel metaphors are processed as comparison through a process of horizontal alignment. This is true for every novel metaphor, independently of the topic-vehicle pairing. However, it is possible to hypothesise that the repeated encounters of a novel vehicle with the same topic results in an alignment that is stable (i.e., ‘abstractable’) enough to allow a categorization processing. In other terms, the repeated activation of the same cluster of aligned properties could result in the creation of associative shortcuts. They would allow a particular metaphorical category to be immediately available in association with a specific topic-vehicle pair. This, however, would only be accessed for that particular topic-vehicle pairing and would not be ‘conventionalised’ or stored as an additional lexical meaning. In other words, a novel vehicle that appears in a familiar metaphor may activate an abstract category specific for that topic. This would allow processing the familiar-novel metaphor as a categorization. For example, the familiar (and novel) metaphor “Her faith is an anchor” may activate a metaphoric category for ‘anchor’ that is specific to the ‘faith-anchor’ pairing. This metaphoric category may not be available for unfamiliar metaphors which have ‘anchor’ as a vehicle (e.g., Her pension is an anchor).

The empirical investigation of the notion of familiarity requires it to be operationalized in a tractable way. The limited psycholinguistics literature on the effect of familiarity on metaphor comprehension has offered the following operational definitions.
Blasko and Connine (1993) adopted a subjective measure of familiarity, which they defined as “the perceived experience with the metaphor” (Blansko & Connine, 1993, p. 305). Familiarity is said to reflect direct experience with the metaphor (topic-vehicle pair). They found that figurative interpretations for familiar metaphors were as accessible as literal interpretations. Conversely they found that figurative interpretations of unfamiliar metaphors were less accessible than literal interpretations. It is worth questioning whether this familiarity measure really targets the topic-vehicle relation at issue. As Blasko and Connine suggest, the perceived experience with a particular metaphor may also be affected by previous experiences with a set of related metaphors (e.g., from the same conceptual domains).

Following a more promising route, Thibodeau and Durgin (2011) have suggested an alternative objective measure of metaphor familiarity. They found that subjective ratings of familiarity (obtained by asking participants to give ratings for a set of metaphors used in previous research (Jones & Estes, 2006)) were highly correlated to metaphor frequency (obtained using Google as a corpus). Because of this, they propose to regard metaphor frequency as an objective measure of familiarity. Interestingly, while they found that familiarity and aptness were significantly correlated, they did not find any significant correlation between conventionality and familiarity.

2.2 Our Study

Previous studies investigating the effect of conventionality on metaphor processing have found conflicting results (e.g., Bowdle & Gentner, 2005; Jones & Estes, 2006). These studies did not take into account all the relevant variables (e.g., conventionality and aptness) at the same time. This is an obvious problem as many of these variables seem to be correlated. Furthermore, apart from very few cases (Thibodeau & Durgin, 2011), empirical research on conventionality has largely ignored familiarity. The question, therefore, remains of how the effects of these conventionality and familiarity on metaphor processing stand with respect to each other. The present study aims at filling this gap in the literature.

We will focus on two distinct ways of operationalizing personal experience with a metaphor: experience with the vehicle across all its different topics (i.e., conventionality as proposed by Bowdle and Gentner (2005)) and experience with the specific topic-vehicle pairing (i.e., familiarity). In order to have a clearer understanding of how personal experience influences how metaphors are processed, these two variables (familiarity and conventionality) should be pitted against each other. Therefore, in this study we compare the effects of familiarity and conventionality in a form preference paradigm employed by Bowdle and Gentner in order to address some open questions: Is conventionality the sole factor determining whether a metaphor is processed as categorization rather than comparison? Or does familiarity also have an effect?

In our study we investigated three variables: (i) familiarity (ii) conventionality and (iii) aptness. We actively manipulated familiarity and conventionality in a set of stimuli. We also measured aptness in the stimuli and introduced it in the analysis in order to control for the potential confounding effect of this variable, which has been found to be correlated with both conventionality and familiarity (Jones & Estes, 2006; Thibodeau & Durgin, 2011). We measured conventionality and aptness with three rating studies in which we followed the procedures used by Jones and Estes (2006) and Glucksberg and Haught (2006). For familiarity we used metaphor frequency (i.e., objective familiarity) instead of subjective familiarity as a measure. We used Google search as a corpus to construct the familiarity score as there are several reasons to consider Google equivalent to traditional linguistic corpora.
(Kilgarriff & Grefenstette, 2003). We used the scores of the three variables to divide the stimuli into four groups which we then used in the main experiment (form-preference task).

We predict that that familiarity will have an effect on the form preference task, consistently with the role of the topic-vehicle pairing proposed above. Familiar metaphors, whether conventional or novel, should favour a categorization-based process of interpretation. In addition, we expect both aptness and conventionality to have an effect. We expect conventionality to predict categorization-form preference, consistently with the results of Bowdle and Gentner (2005). Although we are not actively manipulating aptness, we expect apt metaphors to be preferred in the categorical form, consistently with the results of Jones and Estes (2006).

2.3 Methods

The process of constructing the stimuli involved an initial stimulus selection and three rating studies. Each phase is described below.

2.3.1 Initial Stimulus Selection. A list of 83 pairs of nominal metaphors was constructed. Each pair contained one familiar metaphor and one unfamiliar metaphor. The metaphors in each pair had the same vehicle but different topics (e.g., Her beauty is a light - Her generosity is a light). Operational definitions of familiar and unfamiliar metaphors (a, b) in conjunction with Google engine in the verbatim search mode were used to classify the metaphors.

a. A familiar metaphor is a metaphor that produces at least 100 results when searched verbatim and without a determiner for the topic (e.g., “company is a family” for the metaphor This company is a family) on the Google engine and at least 10 results when searched verbatim, without a determiner for the topic and followed by the conjunction ‘and’ (e.g., “company is a family and”).

b. An unfamiliar metaphor is a metaphor that when searched verbatim on the Google engine with no determiner for the topic (e.g., librarian is a doll) produces a maximum of five results in which it is used metaphorically. Results in which the metaphor is used literally as part of a larger expression (e.g., That librarian is a doll collector) are not included in the count.

One third of the metaphors had the topic preceded by the demonstrative ‘this’ or ‘that’ (e.g., That child is a sponge), one third by the possessive pronoun ‘my’, ‘his’ or ‘her’ (e.g., Her faith is an anchor) and in the last third the topic was not preceded by anything (e.g., Alcohol

---

5 All the experiments described here were approved by the appropriate ethics committee at University College London. The participants of all the experiments gave their consent to take part in this research after they were informed about the experimental procedure and given contact details of the researcher.

6 The number of occurrences of the figurative statements in the comparison form (e.g., “company is like a family”) was not considered in the operational definitions. However, there was no unfamiliar metaphor with more than 12 occurrences in the comparison form, and no familiar metaphor with 0 occurrences in the comparison form.

7 The requirement for familiar metaphors to produce at least 10 results when followed by the conjunction ‘and’ is motivated by the concern that some vehicles are very common as modifiers in nominal compounds (e.g., “company is a family run business”) and failing to ascertain that a metaphor appears in isolation could have led to a fallacious assessment of the metaphor conventionality.
is a crutch). The metaphor vehicles were always preceded by the indefinite article ‘a/an’ or by nothing (e.g., *Her beauty is a light, Her caress is honey*).

2.3.2 First Rating Study: Generation of Interpretations. This rating study was conducted in order to generate interpretations for the vehicle of each metaphor. These interpretations are needed in order to rate metaphors’ conventionality (second rating study). Eleven adult, monolingual English speakers were recruited as participants via personal contacts and they were sent the experiment as a Microsoft Word document via email. Participants did not receive any compensation for taking part in the experiment. Participants were instructed to read a list of 83 pairs of metaphors and to “write a single word that best captures the metaphorical meaning conveyed by both sentences in the pair” in the appropriate blank space and they were given four examples (*Sentence 1*: A ferry is a bridge. *Sentence 2*: A telephone is a bridge. *Interpretation*: Connecting). Metaphors in each pair shared the same vehicle. The metaphors in the list were in a random order\(^8\). After completing the task, participants were asked to email the filled document to the researcher as an email attachment. For each metaphor vehicle there were 11 interpretations, one for each participants. The most frequent interpretation for each vehicle was selected as the preferred interpretation for that particular vehicle. Similar interpretations (i.e., words) were grouped together when they were listed as synonyms in the Collins Thesaurus of English. For example, the modal interpretation of the vehicle ‘family’ was ‘welcoming’. These interpretations were used in the second rating study.

2.3.3 Second Rating Study: Conventionality. This rating study was conducted in order to measure the conventionality of metaphor. Forty-nine adult, monolingual English speakers not involved in the previous study were recruited via personal contacts and they were sent the experiment as a web link (Qualtrics website). Ten participants failed to complete the task. The analysis was carried out on the data from thirty-nine participants. Participants were instructed to read a list of 87 statements in the form “X is a family” and assess on a scale ranging from one to seven (1=novel, 7=conventional) how conventional it was to use each vehicle to convey its most frequent interpretation (e.g., “How conventional is it to use the concept FAMILY to convey the meaning WELCOMING?”\(^9\)). The metaphors in the list were presented in a random order. The scores obtained in the experiment were used to calculate the average conventionality score of each metaphor.

2.3.4 Third Rating Study: Aptness. This rating study was conducted in order to measure the aptness of each metaphor. Sixty-six adult, monolingual English speakers not involved in the previous rating studies were recruited via personal contacts and they were sent the experiment as a web link. Participants were all native speakers of English. Six participants failed to complete the task (Qualtrics website). The analysis was carried out on data from sixty participants. Each participant was randomly assigned to one of two groups; they were instructed to read a list of metaphors and rate the aptness of each metaphor or “how well each statement communicates what the speaker intended to communicate” (following the wording of Glucksberg & Haught, 2006, p. 369) on a scale ranging from one to seven (1=not apt at all, 7=very apt). Each group of participants was shown only one of two lists of metaphors. Each list contained 83 metaphors in a random order and no metaphors with the same vehicle.

---

\(^8\) In this study and in the following experiments the random order of the stimuli was the same for all the participants (in each version).

\(^9\) The wording of the instructions was modelled on the procedure employed by Jones and Estes (2006).
The ratings of familiarity, conventionality and aptness obtained for each of the 166 metaphors were used to select the 80 stimuli for the main experiment. All metaphors with an average aptness rating below 3 were discarded to avoid risks of incomprehensibility. From the remaining metaphors a group of novel metaphors (average conventionality score between 3 and 5.20) and a group of highly-conventional metaphors (average conventionality score above 6.10) were selected. Each of these two groups was then divided into categories of familiar and unfamiliar metaphors according to the google-based familiarity score. Thus four experimental conditions of 20 metaphors each were obtained. There were significant differences in aptness across the four conditions ($F(3,76)= 9.08 \ p<0.001$). Means and standard deviations of aptness and conventionality for the stimuli in each experimental condition, alongside with an example from each category, can be observed in Table 1. Finally, the 80 metaphors were divided across two lists to avoid presenting metaphors with the same vehicle to the same participant (some but not all of the vehicles were present in two metaphors: one familiar and one unfamiliar). Thus there were two versions of the experiment each containing 10 metaphors from each condition (i.e., a total of 40) and no repeated vehicles.

Table 1

<table>
<thead>
<tr>
<th>Experimental conditions</th>
<th>Examples</th>
<th>Conventionality</th>
<th>Aptness</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td>$M$</td>
<td>$SD$</td>
</tr>
<tr>
<td>Unfamiliar-novel</td>
<td><em>Her generosity is a light</em></td>
<td>4.38</td>
<td>0.83</td>
</tr>
<tr>
<td>Familiar-novel</td>
<td><em>Her beauty is a light</em></td>
<td>4.44</td>
<td>1.05</td>
</tr>
<tr>
<td>Unfamiliar-conventional</td>
<td><em>Ice cream is a crutch</em></td>
<td>6.37</td>
<td>0.19</td>
</tr>
<tr>
<td>Familiar-conventional</td>
<td><em>Alcohol is a crutch</em></td>
<td>6.36</td>
<td>0.18</td>
</tr>
<tr>
<td>Total</td>
<td></td>
<td>5.37</td>
<td>1.17</td>
</tr>
</tbody>
</table>

2.3.5 Participants One hundred and forty-five participants, who did not take part in any of the rating studies, were recruited via personal contacts and social media (Facebook) and they were directed to the online experiment with a web link. Participants were screened with initial questions and only adult monolingual native speakers of English initiated the task. Fifty-four participants were excluded because they did not complete or initiate (i.e., initial screening) the task. Nine participants were excluded because they did not follow the instructions correctly. This left 43 participants in one version and 39 participants in the other version of the experiment.

2.3.6 Procedure Participants were randomly assigned to one of the two versions of the experiment, which were hosted online (Qualtrics website). Each version contained 40 metaphor-simile pairs (e.g., *This company is a family, This company is like a family*) separated by a seven-point scale. The metaphors in each version were in a random order which was the same for all participants, and for half of the items (the same half for all participants) the order of the two forms on the scale (comparison, categorization) was inverted. Participants were instructed to indicate whether each metaphor sounded “more
natural” in one form or the other by marking their answer on the scale closer to the preferred form (wording adapted from Bowdle & Gentner, 2005, p. 201).

2.4 Results

The scores were converted to indicate categorical form preference. The score was on a seven-point scale in which ‘1’ indicated preference for the comparison form and ‘7’ indicated preference for the categorical form. One experimental item was excluded from the analysis because we realized that it had a literal interpretation also in its categorical form (Age is a number).

The means of the conditions were calculated by items and by subjects. For the analysis by items, a mean categorical form preference score was constructed for each metaphor and the data was analysed with a 2x2x2 ANOVA with categorical form preference as the dependent variable and Conventionality, Familiarity and Version as between factors. For the analysis by subjects the mean scores for each subject in each condition were calculated (Figure 1) and analysed with a 2x2x2 repeated measures ANOVA with Conventionality and Familiarity as within-subjects factors and Version as a between-subjects factor. Aptness was not included in this initial analysis.

The overall model of the ANOVA by items was not significant (F1(7,71)=1.17, p=.33, partial \(\eta^2=0.10\)) and there was no significant effect of conventionality (p=.06), familiarity (p=.39), version (p=.68), or any of their interactions (all ps>.05). The repeated measures ANOVA by subjects showed a significant effect of conventionality (F2(1,80)=47.34, \(p<.001\), partial \(\eta^2=0.37\)), a significant effect of familiarity (F2(1,80)=30.92, \(p<.001\), partial \(\eta^2=0.28\)) and no significant effect of version (F2(1,80)=0.17, \(p=.90\)). The analysis also revealed significant effects of three interactions: conventionality*familiarity (F2(1,80)=75.24, \(p<.001\), partial \(\eta^2=0.48\)), conventionality*version (F2(1,80)=5.18, \(p=.03\), partial \(\eta^2=0.61\)) and the three-way conventionality*familiarity*version interaction (F2(1,80)=21.65, \(p<.001\), partial \(\eta^2=0.21\)). The remaining interactions were non-significant (\(p>.1\)). While the variances in each group in the items analysis were very large, the variances in the analysis by subjects were much smaller, which made the analysis more powerful. This resulted in the variables having an effect in the analysis by subjects but not in the analysis by items. This suggests that the effects of the variables may not be reliable across items. Both the effect of familiarity and the effect of conventionality were in the expected direction. Familiar metaphors and Conventional metaphors were preferred in the categorical form significantly more than unfamiliar and novel metaphors respectively. However, it is evident from the chart (Figure 1) that one condition in particular is driving these effects: the condition of Conventional-Familiar metaphors. This also explains the relatively large effect size of the interaction between Conventionality and Familiarity.
Figure 1
Mean subject scores for the four conditions from the Repeated Measure ANOVA by subjects (error bars: SE). Higher scores correspond to preference for the categorization form.

The data was analyzed with an ANCOVA (by items only) to take into account the effect of Aptness. The 2x2x2 ANCOVA had Conventionality, Familiarity and Version as factors and Aptness as a covariate. The overall model was significant (F(2,8,70)=6.15, p<.001, partial $\eta^2=0.41$). Aptness did have a significant effect (F(2,1,7)=36.84, p<.001, partial $\eta^2=0.34$) in the direction we expected (more apt metaphors were preferred in the categorical form). As with the main ANOVA there were no significant effects of Familiarity (F(2,1,77)=3.82, p=.055), Conventionality (F(2,1,77)=0.76, p=.38), Version or any of the interaction (all ps>.1). The estimated marginal means (displayed in Table 2) clearly show that when we factor out the effect of aptness, the effect of familiarity changes direction and unfamiliar metaphors are preferred in the categorical form more than familiar metaphors.
Table 2

Estimated marginal means for the four conditions

<table>
<thead>
<tr>
<th>Variables</th>
<th>Categorical preference</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>$M$</td>
</tr>
<tr>
<td>Familiar</td>
<td></td>
</tr>
<tr>
<td>Conventional</td>
<td>4.62</td>
</tr>
<tr>
<td>Novel</td>
<td>4.10</td>
</tr>
<tr>
<td>Unfamiliar</td>
<td></td>
</tr>
<tr>
<td>Conventional</td>
<td>4.76</td>
</tr>
<tr>
<td>Novel</td>
<td>4.90</td>
</tr>
<tr>
<td>Grand Mean</td>
<td>4.60</td>
</tr>
</tbody>
</table>

3 Post-hoc Analysis on Metaphor Dominance

The results we found in our planned analyses were inconclusive. Interestingly, though, the variance of Categorical form preference across subjects was quite small: the standard deviation of scores given to each item was 1.65 scale points. This means that the majority of participants gave each item a score that was at most one point above or below the average score for that item. That is, our participants tended to agree on how to rate each item. However this apparent consistency was not explained by either of the two experimental variables.

While these variables pertain to the metaphorical use of the word, none of them take into account the use of its literal meaning. Interestingly, this might affect the processability of the metaphor itself. To explore this possibility, we investigated Metaphor Dominance (of the vehicle), that is, the proportion of metaphorical uses of each vehicle relative to its literal uses. This variable can also be described as the dominance of the metaphorical sense over the literal sense. We collected two new continuous variables for our data and we used them in a post-hoc analysis: Metaphor Dominance and Vehicle Frequency. The latter, which is a measure of word-frequency independent from considerations of word-use (metaphorical or literal), was introduced in order to assess whether Metaphor Dominance had an effect over and above the overall frequency. Recent studies have collected metaphor dominance scores in the following ways. Sardinha (2008) first annotated 432 metaphor vehicles from a Portuguese corpus of conference calls and then constructed a metaphor dominance score for each of this by counting how many out of 100 uses of these vehicles (in a different corpus) were metaphorical. Lai, Curran, and Menn (2007) collected metaphor dominance scores for nine verbs by inspecting 50 occurrences of each word in a corpus (BNC, 2007) and recording it as metaphorical or literal. Bethard, Lai, and Martin (2009) then used these metaphor dominance ratings in the development of a metaphor dominance estimator. They also advocated that psycholinguistic experiments on metaphor processing should control for metaphor dominance (in addition to word frequency).

Vehicle Frequency was collected by simply recording the frequency of each metaphor vehicle in the British National Corpus (BNC). We collected Metaphor Dominance by randomly sampling fifty uses of each vehicle in context in the BNC, recording the number of
these instances that used the metaphorical sense and then converting this number to a proportion. Homonyms with an unrelated sense were not related in the count of literal uses. Therefore, each of our stimuli was associated with a proportion that could range from zero (literal uses of the vehicle are much more frequent than its metaphorical uses) to 1 (metaphorical uses of the vehicle are much more frequent than its literal uses).

As shown by the correlation matrix below (Table 3), Metaphor Dominance is significantly correlated with categorical form preference, such that metaphors with higher metaphor dominance of the vehicle were preferred in the categorical form. Vehicle Frequency is significantly and negatively correlated with categorical preference and with Conventionality score (in this post-hoc analysis we use the original conventionality scores as a continuous variable instead of the binary variable we constructed from them for the main analysis), such that metaphors with a high frequency vehicle are novel and preferred in the simile form.

**Table 3**

<table>
<thead>
<tr>
<th>Measure</th>
<th>1</th>
<th>2</th>
<th>3</th>
<th>4</th>
<th>5</th>
<th>6</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Categorical preference</td>
<td>--</td>
<td>.10</td>
<td>.26*</td>
<td>.58**</td>
<td>-.33**</td>
<td>.49**</td>
</tr>
<tr>
<td>2. Familiarity</td>
<td></td>
<td>--</td>
<td>.09</td>
<td>.41**</td>
<td>-.47</td>
<td>-.02</td>
</tr>
<tr>
<td>3. Conventionality score</td>
<td></td>
<td></td>
<td>--</td>
<td>.25*</td>
<td>-.31**</td>
<td>.19</td>
</tr>
<tr>
<td>4. Aptness</td>
<td></td>
<td></td>
<td></td>
<td>--</td>
<td>-.18</td>
<td>.27*</td>
</tr>
<tr>
<td>5. Frequency</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--</td>
<td>-.17</td>
</tr>
<tr>
<td>6. Metaphor Dominance</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>--</td>
</tr>
</tbody>
</table>

* . p < .05. ** . p < .01

In order to test whether Metaphor Dominance can do some explanatory work as a predictor of categorical preference once the other variables are taken into account we constructed two regression models. In Model 1 we regressed categorical preference on Aptness, Familiarity, Conventionality score and Vehicle Frequency. In Model 2 we regressed categorical preference on Aptness, Familiarity, Conventionality score, Vehicle Frequency and Metaphor Dominance. The predictors were entered hierarchically in our regression model in the order just mentioned\(^{10}\). Therefore, in Model 2 the effect of Metaphor Dominance was measured after the effect of the other predictors was taken into account. In Table 4 we show these two models. We see only Aptness and Metaphor Dominance have a significant effect on Categorical form preference and that the proportion of variance explained (R\(^2\)) increases when we include Metaphor Dominance in the model. We also compared the two models with an F-ratio test and found that Model 2 is significantly better than Model 1 (F(1,73)= 13.65, p<.001).

\(^{10}\) The rationale for this ordering is the following: we first entered the variable used in the previous literature, Conventionality, then our original variable of interest, Familiarity, then our control variable, Aptness, then Vehicle Frequency, and lastly Metaphor Dominance because we want to measure its effect over an above any effect of word frequency.
Table 4

Hierarchical regression on categorical form preference

<table>
<thead>
<tr>
<th></th>
<th>R²</th>
<th>Coefficient</th>
<th>SE</th>
<th>t</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>Model 1</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>constant</td>
<td>0.40</td>
<td>0.82</td>
<td>0.76</td>
<td>1.07</td>
<td>.23</td>
</tr>
<tr>
<td>conventionality score</td>
<td>0.08</td>
<td>0.10</td>
<td>0.86</td>
<td>.39</td>
<td></td>
</tr>
<tr>
<td>familiarity</td>
<td>-0.45</td>
<td>0.24</td>
<td>-1.87</td>
<td>.07</td>
<td></td>
</tr>
<tr>
<td>Aptness</td>
<td>0.78</td>
<td>0.14</td>
<td>5.65</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>vehicle frequency</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>-1.41</td>
<td>.16</td>
<td></td>
</tr>
<tr>
<td>Model 2</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>constant</td>
<td>0.50</td>
<td>1.08</td>
<td>0.71</td>
<td>1.53</td>
<td>.13</td>
</tr>
<tr>
<td>conventionality score</td>
<td>0.06</td>
<td>0.01</td>
<td>0.66</td>
<td>.51</td>
<td></td>
</tr>
<tr>
<td>familiarity</td>
<td>-0.32</td>
<td>0.22</td>
<td>-1.46</td>
<td>.15</td>
<td></td>
</tr>
<tr>
<td>aptness</td>
<td>0.65</td>
<td>0.13</td>
<td>4.97</td>
<td>&lt;.001</td>
<td></td>
</tr>
<tr>
<td>vehicle frequency</td>
<td>&lt;0.001</td>
<td>&lt;0.001</td>
<td>-1.24</td>
<td>.21</td>
<td></td>
</tr>
<tr>
<td>metaphor dominance</td>
<td>0.04</td>
<td>0.009</td>
<td>3.69</td>
<td>.001</td>
<td></td>
</tr>
</tbody>
</table>

4 Discussion

In our main analysis we did not find evidence that Categorical form preference (how much a figurative statement is preferred as a metaphor rather than as a simile) is determined by Conventionality or Familiarity. Instead, we found that Aptness is a significant predictor of categorical form preference.

In the post-hoc analysis we found that categorical form preference is significantly and negatively correlated with Vehicle Frequency (i.e., metaphors with frequent words as vehicles are preferred as similes) and significantly and positively correlated with Metaphor Dominance (metaphors with vehicles that are frequently used in a metaphorical sense are preferred in the categorical form). Furthermore, we found that once the variables from the main analysis are taken into account (Conventionality, Familiarity and Aptness), Vehicle Frequency does not have a significant effect whereas Metaphor Dominance is still a significant predictor of categorical form preference.

Our prediction that conventionality would have an effect was not confirmed. This is in contrast with Bowdle and Gentner (2005) as they found that conventional metaphors were preferred in the categorical form significantly more than novel metaphors. Similarly to Jones and Estes (2006) and Chiappe, Kennedy, and Smykowski (2003), who all observed an effect of aptness but not an effect of conventionality on form preference, we failed to replicate the results of Bowdle and Gentner.
We believe that the cause of such different results might be in the stimuli used. The most prominent difference is that the conventionality ratings for their group of novel metaphors (M=2.32) are lower than both the ratings of our novel metaphors (M=4.41) and those used by Jones and Estes (2006) (M=3.42). This suggests two explanations for the difference in results. One explanation is that our novel metaphors were too conventional to show an effect of conventionality. The other, more speculative, explanation is that comprehensibility is playing a role in the experiment of Bowdle and Gentner (2005) but not in ours. In the phase of stimuli construction we eliminated many metaphors with very low conventionality because they were hard to comprehend. In fact, it has been argued that novel metaphors are also harder to comprehend (Giora, 1997). If low comprehensibility favours preference for the simile form, the effect of conventionality observed by Bowdle and Gentner could have been confounded with comprehensibility. While these explanations are speculative, we think that it is possible that we would have found an effect of conventionality with a different set of items.

Our prediction that familiarity would have an effect was also not confirmed. Again, this may depend on the set of stimuli we used. The construct of familiarity we were interested in was the subjective experience with a topic-vehicle pairing that Blasko and Connine (1993) describe. However, we choose to use an objective corpus-based proximate measure inspired by Thibodeau and Durgin (2011) as a proximate measure of this construct. We gave operational definitions of familiar and unfamiliar metaphors that were corpus based. These operational definitions may not accurately reflect the relevant theoretical construct, despite the correlation between subjective and objective measures of familiarity reported by Thibodeau and Durgin. It is an open issue whether a set of stimuli based on a different measure of familiarity could reveal an effect of this variable.

Our prediction that aptness would have an effect in the form preference task was confirmed. This result is not surprising as the effect of aptness on metaphor processing has been observed several times and in different paradigms (Chiappe et al., 2003; Jones & Estes, 2006). As previously discussed, aptness is a very vague and composite theoretical notion that is correlated with several other properties of metaphor (e.g., comprehensibility, relationality, etc.). For this reason, Gentner and Bowdle (2008) argue that in order for aptness to become a useful and explanatory variable for metaphor processing research it should be defined more strictly or broken down into its components.

As they stand, the results do not support the career of metaphor hypothesis and its claim that conventionality determines a shift in the processing mode of metaphorical utterances (from comparison to categorization). The mode of processing metaphorical utterances does not seem to depend on whether the metaphor vehicle has a metaphorical category associated to it (conventional metaphor) or it is frequently paired with a specific topic in a metaphorical statement (familiar metaphor).

Possibly the most surprising aspect of our results is that our analyses by items and by subjects yielded very different results. More specifically, there were patterns in the data that were significant in the subject analysis but not in the items analysis. This is because while there was agreement among subjects as to how to rate the stimuli, there was a lot of variation across the items that was not explained by the predictor variables included in our model.

In the post-hoc analysis we found that the more a word is used to convey a metaphorical rather than its literal meaning, the more the figurative statements where they are used as a vehicle are preferred in their categorical form. To draw an example from our data:

---

11 All scores have been converted to a scale from 1 to 7 for an easier comparison with our ratings.
(3)  
   a. That talk show is like a war.
   b. Renovation is a struggle.

The term *war* is used metaphorically relatively rarely (Metaphor Dominance = 0.06) and the sentence in (3a) is preferred in the comparison form. The term *struggle* is used metaphorically relatively often (Metaphor Dominance = 0.88) and sentence in (3b) is preferred in the categorical form. That is, low metaphor dominance predicts preference for the comparison form, whereas high metaphor dominance predicts preference for the categorical form.

The fact that the dominance of the metaphorical sense of the vehicle, as opposed to the literal one, has an effect on this task suggests that this characteristic also affects metaphor processing. Whatever feature is associated to the metaphorical vehicle (degree of conventionality) and to the metaphorical topic-vehicle pair (degree of familiarity), the relation between the metaphorical and the literal use plays a key role in the processing of the figurative statement. This very interesting conclusion is not totally unexpected when considering the psycholinguistics literature on ambiguity.

The dominance of the metaphorical uses of a word indicates how frequently the word at issue is used metaphorically. This is also a proxy measure of how often we (and our participants) have processed the same word metaphorically, that is, either by retrieving a metaphorical category associated to it (conventional metaphor) or by constructing such a metaphorical category on the fly (non-conventional metaphor). Be there a conventionally associated metaphorical category or not, it is plausible to assume that the more a word is interpreted metaphorically (in proportion to its literal uses), the more its metaphorical interpretative route is facilitated. In other terms, a metaphorical category is more easily retrieved or constructed. We could thus explain our results along the following line: the easier the selection/construction of a metaphorical category, the stronger the preference for the categorical form. Conversely, when the metaphorical use is less frequent, that is, when the word is typically interpreted as conveying its literal meaning, the interpretation of the figurative statement might more heavily rely on such a meaning. For instance, the figurative statement might be interpreted via a process of comparison between the target and the vehicle. This would explain why low Metaphor Dominance is associated with prediction for the comparison form.

This finding is not totally unexpected when considering the psycholinguistics literature on lexical ambiguity, which has consistently shown that the dominance of a word’s different (literal) interpretations plays a key role in how word meanings are represented and accessed during comprehension (see Rodd, Lopez Cutrin, Kirsch, Millar, and Davis, 2013). For example the word “pen” has a high-frequency literal meaning (a writing implement) and a low-frequency literal meaning (enclosure for animals). Numerous experiments have shown that when an ambiguous word occurs in a context in which both meanings are plausible (e.g., “The man thought that the pen…”), readers are biased to retrieve the more frequent meaning (e.g., Rayner & Duffy, 1986). More relevant to the current study are the strong effects of dominance that have been shown for sentences where the ambiguous word is presented in a constraining context (e.g., “The man enclosed the livestock with the pen”). Numerous studies have shown that even when the sentence context is only consistent with one interpretation, readers are relatively slow to retrieve the less frequent meaning compared to either the more frequent meaning or to an unambiguous baseline (e.g., Duffy, Morris, & Rayner, 1988), presumably because the reader must first access and reject the alternative dominant interpretation. It is therefore perhaps not surprising that direct access to a categorical meaning representation may be particularly challenging for metaphorical meanings that must compete with higher-frequency literal meanings (e.g., “war”).
The results of the post-hoc analysis open up a very interesting direction for future research, introducing a new variable in the lively debated literature on metaphor understanding. The role of Metaphor Dominance in metaphor understanding has not only been underestimated in the psycholinguistics literature (Bethard et al., 2009) but it has been arguably neglected in theoretical linguistics. Our investigation call for experimental investigation on whether its effect extends beyond the form preference task and theoretical inquiry on how it may affect metaphor comprehension.

References


Evans’s Challenge to Temporalism*

Jonny McIntosh

Abstract

This paper concerns a challenge raised by Gareth Evans in his article ‘Does Tense Logic Rest on a Mistake?’ to temporalism, the view that propositions, the objects of speech acts like assertion, can vary in truth value over time. I set out the challenge, arguing that it is best understood in terms of a distinction Michael Dummett draws between what he calls the assertoric content of a sentence, i.e., the proposition expressed, and its ingredient sense, i.e., the sentence’s contribution to the propositions expressed by more complex sentences of which that sentence is a constituent part.

Keywords: temporalism, relativism, Gareth Evans, assertoric content, ingredient sense

1 Introduction

This paper concerns a challenge raised by Gareth Evans in his article ‘Does Tense Logic Rest on a Mistake?’ to temporalism, the view that propositions, the objects of speech acts like assertion, can vary in truth value over time. Temporalism is a prominent species of relativism, the view that propositions can vary in truth value over some or other parameter—standard of taste, moral sensibility, etc. Though recent debate over relativism has been intense, Evans’s challenge to temporalism has been largely neglected.¹ Reasons for this are not hard to find. For one thing, it is not immediately clear that Evans intends to present a challenge to temporalism. The main aim of his paper is to argue that the notion of truth relative to a time, employed in the semantics of tense logic, cannot be understood by analogy with the more familiar notion of truth relative to a possible world, employed in the semantics of modal logic developed by Saul Kripke and others in the 1950s and 60s. The argument, however, is not that the notion of truth relative to a time is incoherent. On the contrary, Evans argues that, though it cannot be understood by analogy with the notion of truth relative to a possible world, the notion of truth relative to a time can nevertheless be understood. At best, this raises a puzzle about the nature of any challenge to temporalism Evans might be taken to pose: it cannot simply be that the notion of truth relativised to a time is incoherent. But then, what exactly is the challenge? Worse, it might be thought to show that, far from presenting a challenge to it, Evans is in fact presenting a defence of temporalism, however limited in scope, by showing that it is possible to make sense of its central notion.

Addressing these concerns, I argue that Evans’s challenge is best understood in terms of a distinction Michael Dummett has drawn between the assertoric content of a sentence, i.e., the proposition expressed, and its ingredient sense, the contribution that the sentence makes to the propositions expressed by more complex sentences of which that sentence is a constituent part. Put briefly, in arguing that the notion of truth relative to a time can be understood, Evans argues that it may be that the ingredient sense of a sentence can vary in truth value over times; attention to the details of the argument seems to reveal that the same cannot be said of its assertoric

¹ I would like to thank audiences in London and Oxford, Melissa Fusco, Matthew Gotham, Rory Madden, Alexandru Marcoci, and especially Mark Eli Kalderon, Mike Martin, and an anonymous referee for comments and suggestions. I gratefully acknowledge financial support from the AHRC for the research that led to the paper.

¹ For a recent collection of papers on the topic, see Garcia-Carpintero and Kölbel (2008).
content, however: even if the notion of truth relative to a time can be understood, propositions are true, if at all, relative to all times. Evans’s argument thus seems to show that, even if its central notion can be understood, temporalism itself must be rejected.

2 The core argument: some preliminaries

Evans’s core argument concerns the relationship between tense logic, founded and developed by Arthur Prior, and modal logic. At least superficially, tense logic and modal logic are quite similar. The distinctive feature of tense logic is its treatment of tenses and temporal adverbs as operators, achieved via semantic clauses like (1) and (2) which assign sentences truth-values relative to times. Structurally, this parallels the treatment in modal logic of expressions of modality like ‘possibly’ and ‘necessarily’ as operators via semantic clauses like (3) and (4) assigning sentences truth-values relative to possible worlds.

(1) (∀𝑡) (‘It is raining’ is true) ≡ it is raining at 𝑡.

(2) (∀𝑡) (∀𝑆)(⌜PAST(𝑆)⌝ is true) ≡ (∃𝑡′) (𝑡′ < 𝑡 & 𝑆 is true).

(3) (∀𝑤) (‘Snow is green’ is true) ≡ snow is green in 𝑤.

(4) (∀𝑤) (∀𝑆)(⌜POSSIBLY(𝑆)⌝ is true) ≡ (∃𝑤′) (𝑆 is true).

In the first instance, Evans’s argument is designed to show that these structural similarities in fact disguise important differences—differences which undermine any attempt to understand tense logic by analogy with modal logic.

The argument proceeds by examining different ways in which the truth relative to a time or possible world of sentences might connect up with the correctness of utterances. In the background here is a certain conception of semantic theorising. This can be understood to arise from two thoughts. The first thought is that it is a requirement on any adequate semantic theory for a language that it be capable of serving as a theory of sense, i.e., that it articulate principles knowledge of which would enable a speaker to use and understand the language. The second thought is that it is a conceptual truth about assertion that any particular act of assertion can be assessed as correct or incorrect depending on whether or not the proposition that is thereby expressed—what is thereby asserted or said—is true. Since a central component of the ability

---

2 For Prior’s work on tense logic, see Prior (1957, 1967, 1968).

3 The notation ‘true’, which is Evans’ own, raises some issues which deserve mention. The subscript ‘𝑡’ is not to be understood as syncategorematic, but as occurring in a position of quantification. This being so, why not use the notation ‘true(𝑡)?’ A further issue concerns his use of the notation ‘Correct-at-𝑡(𝑢)’ in (5) below. Again, ‘𝑡’ here is to be understood not as syncategorematic, but as occurring in a position of quantification. So why not use the notation ‘Correct(𝑡, 𝑢)?’ Or, consistent with the notation ‘true’, ‘Correct(𝑢)?’ While I am not entirely sure, it may be that Evans wanted to leave open whether the relevant notions of truth and correctness are to be understood as relations between sentences or utterances and times or rather as properties of sentences or utterances, subject to temporal modification. The different notations reflect the fact that times may be playing different roles in each case. Thanks to Mark Eli Kalderon for pressing me on this.

4 An anonymous referee put it to me that, however appropriate it may be in arguing that tense logic cannot be understood by analogy with modal logic, the claim that an assertion can be assessed as correct or incorrect depending on whether or not the proposition expressed is true begs the question against temporalism, as the temporalist denies that propositions have truth values simpliciter. But the temporalist does not deny that propositions have truth values simpliciter. According to the temporalist, propositions can vary in truth value over time, and pending
to use and understand a language is the ability to use, and to understand the use of, certain sentences of the language to perform assertions, the idea is that knowledge of a semantic theory for a language therefore ought to enable a speaker “to determine that certain utterances are correct or incorrect” (Evans, 1985, p. 346).

I will look at this conception of semantic theorising in more detail later, but it is worth stressing right at the outset that the idea is not that knowledge of a semantic theory should suffice for determining whether or not certain utterances are correct or incorrect, but that it should be an enabling condition, i.e., that knowledge of the theory together with appropriate worldly knowledge—about the time of utterance and the state of the weather at that time, for example—should jointly suffice for determining whether or not certain utterances are correct.

In order to determine whether the semantic theories of tense logic can meet this requirement, we need to know how the tense logician’s notion of truth relative to or at a time, expressed by means of the predicate ‘true’, is supposed to connect up with the relevant assessment of utterances as correct or incorrect. To this end, Evans considers three interpretations of ‘true,’—which he takes to exhaust the available options—together with the three semantic theories, $T_1$, $T_2$, and $T_3$, that result when (1) and (2) are interpreted in each of these ways. In each case, Evans argues, tense and modal logic turn out to be crucially dis-analogous with another.

The argument is presented over the next two sections. §3 discusses the first interpretation and §4 discusses the second and third. Evans argues that, while its modal analogue is unproblematic, the first interpretation of ‘true,’ is untenable. In the case of the second and third interpretations, by contrast, the situation is reversed: while the modal analogues are untenable, the interpretations of ‘true,’ are unproblematic. It is this that raises the interpretive puzzle mentioned in the introduction: if Evans is arguing that there are interpretations on which the notion of truth relative to a time is unproblematic, what exactly is the challenge to temporalism supposed to be? I take up this question in §5, arguing that it is best understood in terms of Dummett’s distinction between assertoric content and ingredient sense. §6 concludes, briefly touching on the question of whether Evans’s challenge to temporalism can be met.

3 The first interpretation

On the first, “revolutionary” interpretation of ‘true,’, specified by (5), an utterance is correct at a time just in case the sentence uttered is true at that time.

(5) $(\forall t)(\forall S)(\forall u) \left[ \text{Of}(S, u) \supset (\text{Correct-at-}t(u) \equiv \text{True}_t(S)) \right]$

According to Evans, $T_1$, i.e., the semantic theory that results when (1) and (2) are interpreted this way, implies that the correctness of an utterance may vary over time. If it was raining yesterday but is not raining today, for example, $T_1$ seems to entail that an utterance of ‘It is raining’, made yesterday, will be correct yesterday but incorrect today. “Such a conception of assertion is not coherent”, Evans claims (1985, p. 349), pressing the following two objections:

---

5 This is a point on which Evans himself seems to have been unclear. For although the argument to be spelt out below relies only on this weaker, enabling claim, at points in ‘Does Tense Logic Rest on a Mistake?’ Evans does in fact invoke the stronger, sufficiency claim in the course of an argument to the effect that the third interpretation of ‘true,’, discussed below, “involves the recognition of a hitherto unknown form of embedding” (1985, p. 362).
In the first place, I do not understand the use of our ordinary word ‘correct’ to apply to one and the same historical act at some times and not at others, according to the state of the weather. Just as we use the terms ‘good’ and ‘bad’, ‘obligatory’ and ‘permitted’ to make an assessment, once and for all, of non-linguistic actions, so we use the term ‘correct’ to make a once-and-for-all assessment of speech acts. Secondly, even if we strain to understand the notion ‘correct-at-\( t \)’, it is clear that a theory of meaning which states the semantic values of particular utterances solely by the use of it cannot serve as a theory of sense. If a theory of meaning permits a subject to deduce merely that a particular utterance is now correct, but will later be incorrect, it cannot assist the subject in deciding what to say, nor in interpreting the remarks of others.

(Evans, 1985, p. 349)

The first objection is that the ordinary notion of correctness, unlike the one that \( T_1 \) seems to employ, is one on which the correctness of an utterance cannot vary over time. We can understand this in terms of a line of thought stressed by Philip Percival (1994): to say an utterance is correct is to say that, in performing it, the speaker successfully pursues a certain aim. On this line of thought, the reason the correctness of an utterance cannot vary over time is that whether or not one successfully pursues a given aim by performing an action is something that cannot vary over time. Suppose that I press the button on the remote control in order to turn on the TV. Whatever else happens, I successfully pursue this aim just in case, in pressing the button, I turn on the TV. If I fail to turn on the TV, nothing that subsequently happens will change this fact. I might go on to turn on the TV by doing something else—by changing the batteries and pressing the button again, perhaps—but that will be to successfully pursue the relevant aim by performing a different action; it does nothing to change the fact that, in pressing the button first time around, I failed to achieve the aim.

Though Evans does not spell it out, notice that this first objection marks a clear contrast between the first interpretation of ‘true\(_t\)’ and the corresponding interpretation of the predicate ‘true\(_w\)’, on which an utterance is correct at a possible world just in case the sentence uttered is true at that world: while the correctness of an utterance cannot vary over time, it can vary over possible worlds. Equivalently, while the correctness of an utterance cannot change, it can be contingent. This is consonant with the conception of correctness just sketched, as marking success. While whether or not, in performing an action, one successfully pursues a given aim is not something that can vary over time, it is something that can vary over possible worlds. Consider again the example of my pressing the button on the remote control. Had the batteries been working, I would have succeeded to turn on the TV, even though I actually failed.

Evans’s second objection is that, even if we can make sense of a notion of changeable correctness, a theory, such as \( T_1 \), that states the semantic values of utterances solely in such terms cannot serve as a theory of sense. The thought here is that knowledge of a theory enables a speaker to use and understand a language only if it enables her to determine whether or not an utterance is correct \( simpliciter \), but knowledge of a theory like \( T_1 \) does not do this. Again, it is worth stressing that the complaint is not that knowledge of the theory is insufficient on its own for determining whether or not an utterance is correct, but that knowledge of the theory is not even an enabling condition. Even together with omniscience as to the state of the weather at every moment, knowledge of a theory like \( T_1 \) would not suffice for determining whether or not an utterance is correct; it would only suffice for determining whether or not it is correct at such and such times.

For Evans, this also marks a contrast between the temporal case and the modal case, since a theory that states the semantic values of utterances solely in terms of a notion of correctness
that can vary across possible worlds can serve as a theory of sense. As Evans explains it, the thought here is that an utterance is correct simpliciter just in case the sentence uttered is true at a certain privileged possible world, the actual world:

the ascription to thoughts of truth-in-\(w\) (truth that varies with worlds) is consistent with the ascription to them of simple truth, and hence is consistent with the ascription of correctness or incorrectness to utterances. Indeed, given the fundamental principle that there is a world (‘the actual world’) such that all and only truths are true with respect to that world, we may derive the absolute truth conditions of sentences (and utterances) from these ‘truth-in-\(w\)’ conditions

(Evans, 1985, p. 351)

So the modal logician can consistently respond to the second objection by insisting that a speaker who knows the theory can determine whether or not an utterance is correct simpliciter by determining whether or not the sentence uttered is true at the actual world.

This raises the question of why the tense logician cannot offer a similar response. Indeed, one might wonder whether Prior himself wouldn’t have offered such a response. Prior, who was both an actualist and a presentist, would have agreed that an utterance is correct simpliciter just in case the sentence uttered is true at the actual world, but insisted on what might seem an analogous claim in the temporal case: that an utterance is correct simpliciter just in case the sentence uttered is true at a privileged time, the present moment.\(^6\)

An initial point to note is that the claim that an utterance is correct simpliciter just in case the sentence uttered is true at the present moment can be understood in either of two ways, depending on whether we take “the present moment” to designate the time at which the utterance is assessed, i.e., now, the time at which you are reading this, or the time of utterance, i.e., the time at which the utterance is made. Assuming that there are utterances made at times other than now, it is clear that only the second of these claims can be correct. An utterance of ‘It is raining’, made some time in 1967, is correct just in case the sentence ‘It is raining’ is true then, at the time of utterance, not now, at the time of assessment.

Of itself, this marks a difference with the modal case, for the corresponding understanding of the claim that an utterance is correct simpliciter just in case the sentence uttered is true at the actual world is unproblematic. Even if, as possibilists contend, there are utterances made in possible worlds other than this world, it is unproblematic to say that such an utterance is correct—as opposed to would be correct, were the circumstances of utterance to obtain—just in case the sentence uttered is true at this world, the world of assessment. So while the claim that an utterance is correct simpliciter just in case the sentence uttered is true at the actual world can be unproblematically understood as the claim that an utterance is correct just in case the sentence uttered is true at the world of assessment, the putatively analogous claim that an utterance is correct simpliciter just in case the sentence uttered is true at the present moment can be unproblematically understood only as the claim that an utterance is correct just in case the sentence uttered is true at the time of utterance.

Worse, however, while the claim that an utterance is correct just in case the sentence uttered is true at the time of utterance is plausible, perhaps even obvious, it serves only to reinstate a stable assessment of utterances as correct or incorrect, once and for all: a sentence is true at the time of utterance if and only if it is always true at the time of utterance. In short, insofar as it is plausible, the claim that an utterance is correct simpliciter just in case the sentence uttered is true at the present moment seems to amount to an abandonment of (5), and the first

\(^6\) For a concise statement of Prior’s presentism, see Prior (1970).
interpretation of ‘true’, for an alternative interpretation specified by (6):

\[(6) \ (\forall t)(\forall S)(\forall u) [(Of(S, u) & At(t, u)) \supset (Correct(u) \equiv True(S))]\]

4 The second and third interpretations

On the second and third interpretations of ‘true,’ that Evans considers, the connection between the notion of truth at a time and the correctness of utterances is as specified by (6): an utterance is correct just in case the sentence uttered is true at the time of utterance. (For our purposes, the differences between the two interpretations are unimportant.) As Evans would have it, the situation in either case is the reverse of that of the first interpretation: while the interpretation of ‘true,’ is at least coherent, the corresponding interpretation of ‘true, w,’ on which an utterance is correct just in case the sentence uttered is true at the world of utterance, is problematic.

As Evans presents it, the argument against the modal version of (6) trades on a distinction between what he calls world-indexed and world-neutral propositions—those, like the proposition that snow is green in the actual world, expressed by statements which contain a reference to the world of utterance and those expressed by statements which do not. According to Evans, the modal version of the (6) has the consequence that the proposition expressed any utterance whatsoever is world-indexed. This, he argues, seems to lead to an “unacceptable form of modal realism”, conflicting with the conception “of the actual world as the world in which all and only true propositions are true” that forms the basis of a “sane view of possible worlds” (1985, p. 363).

Evans’s reasoning, and the distinction between world-indexed and world-neutral propositions on which it is based, is less than clear, but fortunately for our purposes, the underlying problem can be made out without invoking the notions of world-indexed and world-neutral propositions. The heart of it is the fact that, according to the modal version of (6), the correctness of an utterance depends only on the world of utterance. Thus, it implies that the utterance of a contingently false sentence, i.e., a sentence, like ‘snow is green’, which is true relative to some worlds but false relative to the actual world, made in a world in which that sentence is true, is correct, and remains correct regardless of how things are in the actual world. More generally, the correctness of an utterance, according to the modal version of (6), is independent of the world of assessment, and so is correct, if at all, relative to every possible world. But now, since an utterance is correct in the relevant sense just in case the proposition expressed by that utterance is true, it follows that the truth value of the proposition expressed by an utterance is independent of the world of assessment. The modal version of (6) thus implies that the propositions expressed by utterances have their truth values necessarily: that they have the same truth values relative to one possible world as they have relative to every other possible world.

There are at least two problems with this. Perhaps the most obvious problem—though not one that Evans himself points out—is that it rules out the possibility of propositions having their truth values contingently. Though sentences may have truth values relative to other possible worlds which differ from the truth values they have relative to the actual world, propositions—at least those expressed by utterances—do not. Secondly, as Evans does point out, it conflicts with the conception of the actual world required for what Evans calls a “sane” view of possible worlds. For if every proposition is true, if at all, relative to every possible world then the actual world is not uniquely that world at which all and only true propositions are true. More generally, for each set of propositions, there will no unique possible world at which those propositions are true: insofar as they are true at one world, they are true at every possible world.
This is obviously a problem for those, such as Prior, who hold that possible worlds can be individuated by sets of propositions—and not vice-versa. But it is even a problem for modal realists like David Lewis (1986) who do not think that worlds are to be individuated by propositions, but who may still want to allow that, at least for certain purposes, they can nevertheless be represented by propositions. If, for each set of propositions, there is no unique world at which those propositions are true, then this cannot be the case: insofar as one can use a given set of propositions to represent one world, one can use it to represent every world. It is for this reason that Evans takes the modal version of (6) to lead to an unacceptable form of modal realism: it seems to require a conception of possible worlds as problematically antecedent to, or at least independent of, what would have been the case were they to have been actual.

The modal version of (6), then, has a consequence, namely that the propositions expressed by utterances have their truth values necessarily, which is doubly problematic: it precludes us from allowing propositions to have their truth values contingently, and also, it seems, from individuating or representing possible worlds as sets of propositions. By contrast, however, there does not seem to be any corresponding problem in the temporal case, i.e., with (6) itself. To be sure, by parity of reasoning, (6) must have the corresponding consequence that the propositions expression by utterances of sentences have their truth values eternally: that they have the same truth value relative to one time as they relative to every other time. This, in turn, rules out the possibility of propositions having their truth values temporarily, i.e., of their having truth values relative to other times which differ from the truth values they have now, as well as of individuating or representing times as sets of propositions. Accordingly, it seems to lead to a form of temporal realism which parallels that to which the modal version of (6) seems to lead, i.e., a conception of times as antecedent to or independent of what was, is, or will be the case when those times are present. But while this is a position that many would be loath to endorse in the modal case, most will be quite happy to endorse it here, in the temporal case.

5 Evans’s challenge to temporalism

Evans’s core argument is the argument just sketched. If it is sound, modal logic can only be understood on the first interpretation of ‘true’, while tense logic can only be understood on the second or third. This raises the puzzle, mentioned in the introduction, about the nature of any challenge to relativism—and in particular temporalism—that Evans is supposed to be raising. The challenge is presumably to explain how the correctness of an utterance connects with the truth relative to a time of the proposition that is thereby expressed. Evans’s objections to the first interpretation of ‘true,’ seem to show that the temporalist cannot maintain that an utterance is correct at a time if and only if the proposition expressed is true at that time, but why can she not instead maintain that an utterance is correct if and only if the proposition expressed is true at the time of utterance? After all, we have just seen that it is possible to maintain that an utterance is correct if and only if the sentence uttered is true at the time of utterance. Why should matters

7 There is perhaps some scope for the proponent of the modal version of (6) to resist the objection here by insisting that it merely implies that the propositions expressed by utterances are true, if at all, relative to every possible world, and not that propositions more generally are true, if at all, relative to every possible world. This would enable her to hold on to the view that possible worlds can be both individuated and represented by sets of propositions that are true at those worlds, but at the cost of having to concede that none of the individuating propositions can be expressed. It is hard to see independent motivation for this response, and I will set it aside.

8 Prior himself, who sometimes suggests times can be regarded as sets of propositions (see, e.g., Prior 1968, pp. 122–126), is a noteworthy exception, suggesting he would resist the second and third interpretations of “true,”.
be any different in the case of the proposition expressed by an utterance?

The answer should be clear from the details of Evans’s argument: it is possible to maintain that an utterance is correct if and only if the proposition expressed is true at the time of utterance, but to do so is to preclude oneself from also maintaining the view that propositions—at least those expressed by utterances—can be true at some times and others, i.e., temporalism. To see this, notice that the argument against the modal version of (6), and so against the modal analogues of the second and third interpretations of ‘true,’ has two parts. In the first, it is argued that the propositions expressed by utterances have their truth values necessarily, that they are true, if at all, relative to every possible world. In the second, it is argued that this is problematic, leading to an unacceptable form of modal realism. It is because the second part of this argument does not go through in the temporal case that Evans thinks the second and third interpretations of ‘true,’ are at least coherent. Crucially, however, the first part of the argument does go through. Since the correctness of an utterance, on (6), depends only on the time of utterance, it has the consequence that an utterance is correct, if at all, relative to every time. Given that an utterance is correct in the relevant sense just in case the proposition thereby expressed is true, it follows that the proposition expressed by an utterance is true, if at all, relative to every time—that propositions expressed by utterances have their truth values eternally.

There may nevertheless be a residual worry. If (6) comes at such a price, isn’t the coherence of ‘true,’ something of a Pyrrhic victory? The worry is that it is hard to reconcile the idea that Evans is offering a defence of the notion of truth relativised to time, however limited, with the idea that he is arguing against temporalism, its most obvious application. What purpose can a notion of truth relativised to time serve if its coherence is incompatible with temporalism?

The worry can be addressed by invoking a distinction Michael Dummett has drawn between what he calls the assertoric content of a sentence, the proposition expressed by that sentence, and its ingredient sense, what it contributes to the assertoric contents of more complex sentences of which that sentence is a constituent part. Dummett observes that the two need not coincide. Consider a sentence \(\phi\) containing an empty name, for example, and \(Tr(\phi)\), the result of embedding that sentence under the operator ‘It is true that …’. Taking the proposition expressed by a sentence to be given by its truth conditions, i.e., the conditions under which the sentence is determined as true by competent speakers of the language to which it belongs, \(\phi\) and \(Tr(\phi)\) express the same proposition: each is true in precisely the same conditions as the other. The results of embedding each sentence under negation, however, express different propositions. For although \(\neg Tr(\phi)\), the sentence that results when \(Tr(\phi)\) is embedded under negation, is true, \(\neg \phi\), the sentence that results when \(\phi\) is embedded under negation, is not. \(\phi\) and \(Tr(\phi)\) thus seem to differ in ingredient sense, making different contributions to the propositions expressed by more complex sentences of sentences of which they are constituent parts.

How does this help to address the worry? One way to capture the difference in ingredient sense between \(\phi\) and \(Tr(\phi)\) is to distinguish two ways in which a sentence may fail to be true. In order to accommodate the intuition that negation only maps false sentences onto true sentences, for example, we can say that \(Tr(\phi)\) is false and that \(\phi\) is neither true nor false. Importantly, the notion of truth value that we employ to capture the difference—that on which a sentence’s truth value consists in its being true, false, or neither, say—can play this role even if it is not required to characterise any differences in assertoric content, i.e., in the propositions expressed by any sentences, since all we need to do is the notion of a sentence’s being true or not being true. The suggestion, then, is that Evans’s argument shows the notion of truth relativised to time may play a similar role, characterising differences in ingredient sense between sentences even though it is not required to characterise any difference in propositions sentences express.
The point here emerges as a consequence of the so-called “double-indexing” considerations advanced by Hans Kamp in his paper ‘Formal Properties of “now”’ (1971). Consider:

(7) (a) It is raining in London.
    (b) It is raining in London now.

(8) (a) It will always be raining in London.
    (b) It will always be raining in London now.

Taking the proposition expressed by a sentence, relative to a context, to be given by its truth conditions, relative to that context, there is no difference in proposition expressed between (7a) and (7b): both are true, relative to a context, just in case it is raining at the time of utterance. The propositions expressed by (8a) and (8b), however, do differ. (8a) is true, relative to a context, just in case it is raining in London at the time of utterance \textit{and at all subsequent times}. (8b) is true, relative to a context, just in case it is raining in London at the time of utterance. One way to explain this is to treat (7a) and (7b) as differing in ingredient sense, and characterise the relevant difference in terms of a notion of truth relativised to times. On this approach, (8a) and (8b) are constructed by embedding (7a) and (7b), respectively, under an operator, ‘It will always be the case that …’, whose output, relative to a context, is true relative to a time \(t\) just in case the embedded sentence, relative to that context, is true relative to \(t\) and all subsequent times. We can then say that (7a), relative to a context, is true relative to a time \(t\) just in case it is raining in London at \(t\) and that (7b), relative to a context, is true relative to a time \(t\) just in case it is raining in London at \(t_c\), the time of utterance. Given the connection between the notions of truth relative to a time and truth \textit{simpliciter} specified by (6), taken in conjunction with the principle that an utterance is correct just in case the proposition thereby expressed is true, we will have a difference in ingredient sense between (7a) and (7b), manifested by the difference in the conditions under which each, taken relative to a context, is true relative to a time, without a corresponding difference in the propositions they themselves express, relative to any context.

6 Conclusion

I have argued that, even though it constitutes a defence of the notion of truth relativised to time, the core argument in Evans’s (1985) article raises a challenge to temporalism, the view that propositions can vary in truth value over time. I have argued that this challenge is best understood in terms of the distinction between \textit{assertoric content} and \textit{ingredient sense}: though the notion of truth relativised to time is not required for characterising any differences between the propositions expressed by sentences, their assertoric contents, it may nevertheless have a role to play in characterising differences in what sentences contribute to the propositions expressed by more complex sentences of which they are constituent parts, their ingredient sense. I have not considered whether Evans’s challenge can be met, however. Two avenues of inquiry suggest themselves. First, one might try to argue that Evans’s three interpretations of ‘true’ do not exhaust all the available options—that there are interesting alternatives to (5) and (6) to consider. Second, one might try to reject the background conception of semantic theorising on which Evans’s challenge rests. I have no space to explore either of these avenues of inquiry in any detail, but I would like to close with some brief comments on the second.

\footnote{I discuss both in detail in forthcoming work. See McIntosh (forthcoming).}
As we saw in §2, Evans holds that it is a requirement on an adequate semantic theory for a language that knowledge of the theory enable one to determine whether or not utterances of sentences of the language are correct. I distinguished this from the stronger requirement that knowledge of the theory suffice for determining whether or not utterances of sentences of the language are correct. The requirement is merely that it be an enabling condition, i.e., that knowledge of the theory together with appropriate worldly knowledge—about the time of utterance and the state of the weather at that time, for example—should jointly suffice for determining whether or not utterances of sentences of the language are correct. But is there perhaps some scope for the temporalist to reject even this comparatively weak requirement?

An initial point to note is that the requirement only figures twice in the core argument as I reconstructed it: in the second objection to the first interpretation of ‘true,’—that a theory that implies that the correctness of an utterance may vary over time cannot serve as a theory of sense—and in motivating the idea that the notion of truth at a time needs to connect somehow with the relevant notion of correctness in the first place. The second objection is inessential to the overall argument: even if we drop it, there is still the first objection—that the correctness of an utterance cannot vary. But the idea that the notion of truth at a time needs to connect somehow with the relevant notion of correctness is crucial, since it is this that prompts the various interpretations of ‘true,’. The important question is therefore more whether we can reject this idea than whether we can reject the requirement that Evans uses to motivate it.

The idea that the notion of truth at a time needs to connect somehow with the relevant notion of correctness is usefully understood to have two parts. The first part, articulating the relevant notion of correctness, is the picture of assertions as always assessable as correct or incorrect, depending on whether the proposition expressed is true or false. The second part forges the connection to the notion of truth at a time; it is the thought that the notion of truth at a time ought to have implications for the truth of propositions. I take it that it would be self-defeating for the relativist to deny this, at least insofar as he wants to motivate relativism by appeal to tense logic. So we can narrow our focus further, to the question of whether we can reject the picture of assertion as always assessable as correct or incorrect, depending on whether the proposition expressed is true or false. Of course, this picture of assertion also plays a crucial role in the discussion of the second and third interpretations of ‘true,’, warranting the move from the observation that (6) implies that the correctness of an utterance is independent of the time of assessment, and so is correct, if at all, relative to every time, to the conclusion that the propositions expressed by utterances are true, if at all, relative to every time.

Can the picture be rejected? I won’t try to settle the question here, but I do want to stress that it is a quite minimal picture of assertion, perhaps more so than at first appears. The picture is not one on which the truth of the proposition expressed is the only dimension along which an assertion can be assessed for correctness. Clearly, an assertion can be assessed for correctness along a variety of dimensions: whether or not the speaker knows, or can adequately defend the proposition expressed, whether or not it is an appropriately polite thing to say in the circumstances, whether or not the speaker delivers the assertion at an appropriate volume, and so on. But one can allow all this and still insist that one of the ways in which an assertion can be assessed for correctness is according as the proposition expressed is true or false. Similarly, the picture is not one on which the truth of the proposition expressed is in any interesting sense a fundamental or constitutive dimension of assessment. Some philosophers have argued that truth is a constitutive norm or rule of assertion. Others have argued that it is the aim of assertion, i.e., that, in performing an assertion, a sincere speaker intends to express a true proposition. But while these views arguably entail the picture of assertion on offer here, none of them are entailed by it. Perhaps there are no constitutive norms or rules of assertion, and there is nothing
in particular that a sincere speaker need be intending to do in performing an assertion.\(^\text{10}\) It is consistent with all this that an assertion nevertheless can be assessed as correct or incorrect, depending on whether the proposition expressed is true or false, just as it is consistent with all this that it can be assessed as correct or incorrect, depending on whether or not it was delivered at an appropriate volume. Again, I am not trying to settle the question of whether we can reject this picture of assertion.\(^\text{11}\) But I hope it is clear that it is a very minimal picture, one that may appeal to a wide range of theorists, and specifically not just those who think that truth is in some sense a constitutive norm or rule of assertion, or the aim of assertion.

References


McIntosh, J. (forthcoming). *Does Relativism Rest on a Mistake?*


\(^{10}\) For a useful survey of these debates, and further references, see MacFarlane (2011).

\(^{11}\) While it can be interpreted in various ways, on one interpretation of John MacFarlane’s discussion of Evans in his paper ‘Future Contingents and Relative Truth’ (2003) he is rejecting this picture, preferring in its stead one on which, in performing an assertion, the speaker undertakes a commitment to defend the truth of the proposition expressed relative to any time at which she is legitimately challenged to do so. This is not to reject the idea that assertions cannot be assessed as correct or incorrect; they can—depending on whether or not the speaker is always able to give the requisite defence, for example. It is rather to reject the idea that assertions can be assessed as correct or incorrect depending on whether the proposition expressed is true or false. I discuss this position and offer a defence of the idea that assertions can be assessed as correct or incorrect, relating it to Dummett’s distinction between assertoric content and ingredient sense, in (McIntosh, forthcoming).
Early association of prosodic focus with *alleen* ‘only’: evidence from eye movements in the visual-world paradigm*

Iris Mulders and Kriszta Szendrői

Abstract

In three visual-world eye tracking studies, we investigated the processing of sentences containing different prosodic focus, such as the Dutch *Ik heb alleen SELDERIJ aan de brandweerman gegeven* ‘I only gave CELERY to the fireman.’ versus *Ik heb alleen seld**erij aan de BRANDWEERMAN gegeven*. ‘I only gave celery to the FIREMAN.’. Dutch focal stress is like English focal stress. Unlike previous studies (Gennari, Meroni, & Crain, 2005; Paterson et al., 2007), we report eye gaze patterns as they unfold during the utterance with early or late stress. We conclude that focus processing is fast and incremental: eye-gaze patterns start to diverge across the two conditions already as the indirect object is being heard. Our data also indicate that participants anticipate the continuation of the utterance (Altmann & Kamide, 1999; Kamide, Altmann, & Heywood, 2005; Ito & Speer, 2008), providing further evidence for early focus processing, and that focus evaluation is proposition-based.

*Keywords*: semantics, focus, marked stress, incremental language processing, eye tracking, visual world paradigm, anticipatory eye movement

1 Introduction

1.1 Syntax and semantics of ‘only’

Focus is an important information-structuring device. It occurs in every utterance, and it signals to the hearer the most prominent part of the utterance: what is new, or what is contrasted or highlighted. In many languages including English and Dutch, it is marked by prosodic prominence, specifically, with a pitch accent. Focus processing is thus crucial for fast comprehension of utterance meanings in context.

Utterances like (1) are at the heart of the present study. Such sentences involve the operator *only*.

(1)  
I only gave some tea to the woman.

Presented in writing, (1) is ambiguous; its meaning depends on its accentuation pattern. Thus, in (2a), with pitch accent on the indirect object, *only* associates with the stress-bearing indirect object, *the woman*, while in (2b), with stress on *tea*, *only* associates with the direct object, *some*.

---

* We thank Ignace Hooge for help with designing the visual stimuli. We thank Tom Fritzschke, Judit Gervain and Pim Mak for many useful comments about the content of our paper, and Laura Boeschoten for advice on the statistical analysis. We thank the students who helped create the stimuli and run the experiments: Stavroula Alexandropoulou, Desirée Capel, Jan Willem Chevalking, Moreno Coco, Anja Goldschmidt, Alexia Guerra Rivera, Loes Koring, Sophia Manika, Yueru Ni, Andry Panayiotou, Myrto Pantazi, Will Schuerman and Elli Tourtouri. The second author wishes to acknowledge financial help from the Dutch Science Foundation (NWO) [VENI grant number 275-70-011].

1 For ease of exposition, we illustrate the characteristics of focal stress and *only* with English examples. Everything we claim here holds for Dutch in the same way.
tea. Brackets indicate syntactic constituency. Stress (and corresponding pitch accent) is indicated throughout by small capitals.

(2) a. I only [gave some tea to the woman].
   = The only person I gave some tea to was the woman.

   b. I only [gave some tea to the woman].
   = The only thing I gave to the woman was some tea.

Linguistic theories agree that the different interpretations in (2a) and (2b) are an indirect result of the two stress patterns; they arise because the operator only is focus-sensitive, meaning that it associates in its interpretation with the focus of the utterance (Rooth, 1992). Focus in turn is determined by main stress and corresponding pitch accent in English (Chomsky, 1971).  

In this study, we are interested in utterances involving a verb-phrase-level only and indirect object stress (see 3a) or direct object stress (see 4a). Utterances with only can be decomposed into two conjoined propositions (Horn, 1969; Krifka, 1992; Rooth, 1992). The first conjunct, (3b) and (4b) respectively, correspond to the meaning of the proposition without only. This is called the ‘presupposition’ or the ‘nonfocal meaning component’. This part of the meaning is shared by the two utterances with indirect object and direct object stress (3b & 4b). The second conjunct is entailed by the original only-sentence. It expresses the intuition that the presence of only has the effect that the proposition does not hold for any other relevant alternatives. This part of the meaning is called the ‘assertion’ or the ‘focal meaning component’ (3c & 4c).

(3) a. I only gave some tea to the woman.  Indirect Object Stress
   b. I gave some tea to the woman AND
   c. For all x [x ≠ the woman], I did not give some tea to x.

(4) a. I only gave some tea to the woman.  Direct Object Stress
   b. I gave some tea to the woman AND
   c. For all y [y ≠ some tea], I did not give y to the woman.

---

2 Note that (2a) with indirect object stress is in fact ambiguous in itself between the readings indicated in (i) and (ii). This is not important for the present study for two reasons. First, adults strongly prefer the reading in (i), which is the one targeted in this study (Crain & Steedman, 1985). Second, the experiments involve phonetically marked accent on the indirect object, which again makes the reading in (i) to be the preferred one.

(i) The only person I gave some tea to was the woman. = indirect object focus reading

(ii) The only thing I did was give some tea to the woman. = verb phrase focus reading

3 Only cannot associate with just any focus-bearing element; the focus-bearing element must be in its scope syntactically. Utterances like (1) are syntactically distinct from utterances like (i) in the sense that only in (1) is a verb-phrase-level adverb, while it directly modifies the subject noun phrase in (i).

(i) Only [the WOMAN] gave a banana to the monkey.

The kind of ambiguity that was present in (1) with only modifying the verb phrase, disappears in (i), because the operator only takes scope over its c-command domain, which is the verb phrase in (1) and the subject noun phrase in (i). Therefore, (i) can only have the reading exemplified in (iia).

(ii) a. The only person that gave a banana to the monkey was the woman.
    b. *The only event that took place was the woman giving a banana to the monkey.
The focal meaning component is a set of conjoined propositions. In the case of (3c), we can spell it out as in (5a), while (5b) corresponds to the focal meaning component of the direct object stress utterance, (4c).

(5)  a.  \{I didn’t give any tea to the man AND I didn’t give any tea to the boy AND I didn’t give any tea to …\}
   
   b.  \{I didn’t give any coffee to the woman AND I didn’t give any biscuits to the woman AND I didn’t give any … to the woman\}

The exact number of alternatives in each assertion set is determined by the actual context of the utterance. So, for instance, in (5a) we used a context where a man and a boy are present in addition to the woman, while in (5b) we used a context where some coffee and biscuits were available alongside the tea.

This paper investigates how only-sentences are processed on-line. Is there an early association between only and the prosodically marked focal constituent? What is the earliest point that we can find evidence that prosodic focus information is integrated? Previous work suggests that focus is interpreted in an incremental fashion (Crain, Ni, & Conway, 1994; Gennari, Meroni & Crain, 2005; Paterson et al., 2007). However, none of these studies reported the time course of looks accompanying the comprehension of only-sentences involving different prosody. We carried out three visual-world paradigm experiments to investigate these issues, measuring response times and eye movements.

1.2 Previous psycholinguistic work on ‘only’ and prosodic focus

Eberhard, Spivey-Knowlton, Sedivy and Tanenhaus (1995) report an experiment involving a reference resolution task in a real world setting. The instructions involved either contrastive or neutral stress and there were two different visual contexts. The results showed that in the contrastive stress condition, the latency of eye movements to the target referent was significantly shorter in the setting where contrastive stress was informative than in the uninformative setting. The eye movement latency was also shorter in the contrastive stress condition compared to the unstressed condition. So, contrastive stress facilitated reference resolution (but cf. Arnold, 2008). Note that in this task, reference resolution can also take place without contrastive stress. This is different in our only-sentences, where the correct semantics cannot be determined without accentual information.

Another important contribution is the self-paced reading experiment by Crain et al. (1994), extended by Sedivy (2002) (cf. Clifton Jr., Bock, & Radó, 2000; Filik, Paterson, & Liversedge, 2005; Liversedge, Paterson, & Clayes, 2002; Paterson, Liversedge, & Underwood, 1999). This study investigated variants involving only of established garden-path sentences:

(6)  a.  Businessmen loaned money at low interest were told to record their expenses.
   
   b.  Only businessmen loaned money at low interest were told to record their expenses.

The results indicated that the presence of only facilitated a reduced relative reading of loaned money and thus helped avert the usual garden path effect. Crain et al. (1994) explain this in terms of their referential theory of parsing: the presence of only generates a set of alternatives; the domain of the variable can either be given in context, or it needs to be accommodated. The reduced relative clause provides a partitioning of the set of businessmen (i.e., those that loaned money at low interest versus those that did not) that provides an appropriate domain for the only-operator. Sedivy (2002) complemented this result by testing the same sentences in
contexts that provide explicitly the domain on which only applies (e.g., by previously introducing businessmen and accountants). As expected, this renders the partitioning of the set of businessmen unwarranted, and the garden-path effect reappears. These results indicate that the contrast set of only in sentences like (6b) is created incrementally and that context is taken into account on-line. But in sentences like (6b) only always associates with the subject noun phrase in English (see Footnote 3). Thus, although only-resolution was incremental in this case, it is still an open question whether it would be incremental in sentences where only adjoins to the verb phrase and prosodic stress disambiguates which element the operator associates with.

Paterson et al. (2007) compared reading times for dative sentences (and also double object constructions) where the position of the focus particle varied between a pre-direct object position (e.g., Jane passed only the salt to her mother) and a pre-indirect-object position (e.g., Jane passed the salt to only her mother). Assuming that participants would associate only with the immediately adjacent noun phrase, they used congruous vs. incongruous replacives as continuations to the utterances (such as but not the pepper / but not her father) to determine whether participants are sensitive to the placement of the focus particle when creating contrasts. They found that the position of only evoked the expected focus effect on-line (see also Filik, Paterson, & Liversedge, 2009). This, however, manifested itself in longer reading times for the postreplacive region, rather than the replacive region itself. Paterson et al. suggested that ‘the delay was attributable to the operation of inferential processes to evaluate the congruency of the supplied contrast with the focus structure of the utterance’ (Paterson et al., 2007, p. 1440). Although these results clearly point towards relatively early integration of focus information in sentences with only, there are two aspects of this study that necessitate further investigations. First, by its nature, a reading study cannot reveal participants’ sensitivities to the disambiguating potential of stress placement. Second, the focus effect is measured by participants’ sensitivity to the (in)congruity of the replacive (in actual fact, only in the post-replacive region), and not where it occurs (i.e., at the point of the respective only-phrases).

Gennari et al.’s (2005) study gives a more refined picture of the incremental processing of focus in only-sentences. They measured response times and overall fixation patterns in the context of a visual setup involving three people: for instance, a woman, a man and a boy. In the picture, the boy had a glass of milk in front of him, the man had a glass of milk and a cup of coffee. The woman, standing in the background, was holding a tray with a milk carton and a teapot. Participants heard utterances either with neutral stress on the indirect object (like 7a) or with marked stress on the direct object (7b) in a picture verification task.

(7)  
a. The mother only gave some milk to the boy. Neutral stress FALSE  
b. The mother only gave some milk to the boy. Marked stress TRUE

Gennari et al. (2005, p. 250) claimed that “marked stress is used immediately by the parser to decide which noun phrase bears the semantic focus and, therefore, which contrast set should be invoked for sentence interpretation”. They reached this conclusion based on their findings that in the Neutral Stress condition, there were fewer correct responses than in the Marked Stress condition (MS: proportion of correct responses 0.84, SD 0.18; NS: 0.70, SD 0.19) and that the response time in the Neutral Stress condition was numerically higher, although this was not statistically significant (MS: 2178ms, SD 859ms; NS: 2465ms, SD 1170ms; Gennari et al., 2005, p. 254). Note, however, that the expected responses diverged in the two conditions (MS: TRUE, NS: FALSE). It is possible that this influenced response times. There was also a qualitative difference between the phonetic salience of neutral and marked stress, which may have boosted participants’ performance in the Marked Stress condition. Gennari et al. only report the overall proportion of looks on the various entities. They found that the ‘boy’s milk’ draws a significantly higher proportion of looks when it bears
contrastive stress (i.e., MS) compared to when it does not (i.e., NS). They further report that significantly more looks target what they labelled ‘contrast entities’, namely “the man’s coffee (as well as on the set of contrasting elements such as the teapot taken as a whole)” (Gennari et al., 2005, p. 256), in MS than in NS. This is unexpected in the light of the semantics outlined above (see examples 3-5), since neither the man’s coffee nor the woman’s teapot play any role in either the nonfocal or the focal meaning component in the Marked Stress condition. For establishing the truth value of the sentence The mother only gave some milk to the boy, only the boy’s possessions are relevant. Unfortunately, Gennari et al. do not report looks to ‘the man’s milk’, which is a crucial object for determining the truth value of the sentence The mother only gave some milk to the boy. To sum up, Gennari et al. found that the number of correct responses was higher in the Marked Stress condition. They also found that entities bearing contrastive focus and so-called ‘contrast entities’ are targeted more by eye gaze. However, to fully determine how focal computation in utterances with different stress patterns proceeds in real time, it is crucial to know not only the overall fixation patterns, but also how the eye movements progress as the sentence unfolds.

In this paper we report on three picture verification studies involving alleen ‘only’ and early or late stress. In Experiment 1 the divergent expected responses (Early Stress: YES; Late Stress: NO) corresponded to the Gennari et al. study to maximise chances of comparison. We report the first experiment in section 2. In Experiment 2, reported in section 3, the visual stimulus was adapted in such a way that the expected response was YES in both conditions. In Experiment 3, in section 4, the visual stimuli were changed to trigger NO responses in both conditions. Section 5 concludes the paper.

2 Experiment 1
2.1 Methods

2.1.1 Participants. 20 adult participants were recruited from the UiL OTS participant pool, which is largely made up of undergraduate students from Utrecht University. All participants were non-dyslectic native speakers of Dutch. Participants were unaware of the purpose of the experiment, and were paid 5 euros for their participation. The mean age of the participants was 22;8 years (range: 19 – 29); 18 participants were females; 17 were right-handed.

2.1.2 Materials. Sixteen items were constructed in two conditions. Figure 1 shows an example scene for both conditions. There are three persons in the picture, a diver, a doctor and a fireman. They all hold large plates on their left and right side. Some of the plates are empty and some contain a celery or a corn cob. In particular, the diver has a plate with a celery and one with a corn cob, while the fireman has a plate with a celery and an empty plate. The corresponding audio stimuli are in (8). The full items list is in Table 3 in the Appendix.
Figure 1. Example of visual stimulus for Experiment 1.

(8) a. Late Stress condition (LS):  \textit{Expected answer: NO}
Ik heb alleen selderij aan de brandweerman gegeven
\textit{I have only celery to the fireman given}
‘I only gave celery to the fireman.’

b. Early Stress condition (ES):  \textit{Expected answer: YES}
Ik heb alleen selderij aan de brandweerman gegeven
\textit{I have only celery to the fireman given}
‘I only gave celery to the fireman.’

The visual scenes were designed differently from the more realistic scenes found in the Gennari et al. study. In our 3 x 3 grid design, the distance between any two objects would be identical and would be sufficiently large to be well-suited for eye-tracking evaluation. The pairs of objects in the pictures – ‘corn’ and ‘celery’ in Figure 1 - were chosen to match in size, shape and grey value, to make sure participants shift their gaze to them and not identify them parafoveally while looking at the person in the middle.

For practical reasons, the experiment was performed in Dutch. Dutch prosody is sufficiently similar to English prosody to allow comparison with previous work in English. Both languages mark contrastive focal accent by enhanced duration and H*L pitch accent. Stress placement within an utterance is free to match the focus within the syntactic scope of the semantic operator.

Verbal stimuli were pre-recorded by a female native speaker of Dutch. They were checked for the placement of pitch accents using PRAAT (Boersma & Weenink, 2006). The names of target objects and people that were used in the sentences were matched in length.
They were all at least three syllables long. There were no significant differences between conditions in the overall lengths of the audio stimuli (t(16) = 0.95, p = .925).

Although the utterances as a whole do not differ in length in the two conditions, there are slight differences in length between conditions in certain auditory segments: the direct object segment was slightly longer when it was stressed (in the Early Stress condition), as was the indirect object segment in the Late Stress condition. These differences cancelled each other out overall, since each condition contains exactly one segment with marked stress.

98 filler items were constructed including various quantifiers (e.g., niet iedereen ‘not everybody’). The fillers were balanced for YES/NO expected responses. To match our test items, the fillers either involved early marked stress on the direct object or late marked stress on the indirect object. The fillers included a set of 32 control items involving alleen, 16 with early and 16 with late stress, where the expected response was different from the expected response of the corresponding test condition. This would discourage people from developing a strategy relating the position of the accent to the expected response in the test items (i.e., Early Stress=YES; Late Stress=NO). Finally, half of these control items referred to the ‘doctor’ (i.e., to the person in the middle in the visual stimulus), so that participants do not disregard the middle person in the picture in general. A list of the type of fillers used is in Table 1 in the Appendix.

Furthermore, we controlled for potential confounds caused by the spatial location of objects in the picture by varying their positions on the top-down and the left-right axes. The falsifying entity for the Early Stress condition (the ‘diver’s celery’ in Figure 1) appeared in four different positions: in four items it was located in the top left-hand corner of the picture (as in Figure 1); four times it appeared in the top right; four times in the bottom right; and four times in the bottom left.

2.1.3 Procedure. The participants were tested individually in a sound-treated booth. Prior to the experiment, they read an instruction sheet, which included the setting of the experiment. This provided a context in which both utterances with Early stress and utterances with Late stress would be pragmatically felicitous. The participants’ task was to indicate whether the sentence matched the visual scene by pressing a button on a button box.

The experiment was programmed in FEP (Veenker, 2005). Eye movements of the participants’ right eye were recorded with an EyeLink 1000 eye tracker in remote mode using a target sticker to track head movements, at a 500Hz sampling rate. Participants were seated at a distance of 600-650mm from the screen where the visual image was presented; the height of the participants’ chair was adjusted to get an optimal image of the eye.

After the experimenter had ensured a clear image of the pupil, corneal reflection, and target sticker, the experimenter left the participant booth and a 13-point calibration and validation procedure was initiated from the control room. These were repeated until the experimenter was satisfied that they were successful. Every stimulus was preceded by a fixation target in the middle of a blank screen. An automatic drift check was applied as the participant fixated this fixation target and a recalibration initiated if the drift check indicated a drift of more than 20 pixels. Participants were allowed 1000ms to explore the visual scene before the utterance was presented. The whole procedure, including instruction and calibration, took about 20 minutes for each participant.

After successful calibration, the participants were exposed to a practise block of 12 practise items (fillers, 2 of those resembling experimental items), to familiarize them with the task. The practise block was followed by a small pause in which the participants could ask questions about the task (if necessary). After this, the experiment would start. The remaining
118 trials (32 test items, 32 controls, 54 fillers) were presented in two blocks; each block was preceded by a calibration.

All the names of the persons and objects involved in the experimental items were mentioned in the first 16 filler trials (including the practice block), to ensure that the participants had seen them and knew what they were called.

All participants saw all the test items in both conditions. The items and fillers were presented to the participants in a pseudo-randomized order where an experimental item never directly followed another experimental item in any condition; of the (experimental or filler) items involving alleen ‘only’, the trials with late stress never followed a trial with early stress or vice versa; and experimental items never followed a filler involving alleen ‘only’ with any stress pattern. No more than three trials with the same stress pattern occurred successively.

2.2 Predictions

Applying Rooth’s (1992) semantics to the specific example from our experiment we obtain the following meaning components:

(9) **Early Stress condition:**
   a. Example in English: I only gave celery to the fireman
   b. Non-focal meaning: I gave celery to the fireman
   c. Focal meaning: I did not give anything else to the fireman

(10) **Late Stress condition:**
   a. Example in English: I only gave celery to the fireman
   b. Non-focal meaning: I gave celery to the fireman
   c. Focal meaning: I did not give celery to anyone else

Given the basic linking hypothesis that auditory input guides visual attention, one would expect looks to target the entities mentioned in the utterances, i.e., the fireman and any celery when these words are heard. Looks to these entities could also reflect verification of the non-focal meaning component, which directly corresponds to the utterance without only.4

As far as looks required for verifying the focal components are concerned, let us take the Early Stress condition first. In order to verify I didn’t give anything else to the fireman, looks need not shift away from the fireman and his plates. In contrast, in the Late Stress condition, the focal meaning component is I didn’t give celery to anyone else. Verification of this proposition requires looking at the doctor and the diver and their plates. Since in our specific example the doctor’s plates are empty, we may hypothesise that looks would target the diver and his possessions, i.e., the diver, the diver’s celery and the diver’s corn. Since the presence of the diver’s celery in the picture is the reason why the utterance does not match the picture, i.e., this is the falsifying entity, we may expect looks to concentrate on this entity. We may also expect participants to look at the diver’s corn. While the diver’s corn is irrelevant for the focal meaning component, participants may need to look at it to verify that it is not celery.

Concerning the time course of the expected looks as the sentence unfolds, the following predictions hold. The earliest point at which the focal meaning components can be verified is at the point that the indirect object is heard. This is because the sentence final verb gegeven

---

4 We remain agnostic as to whether participants would actually verify the truth of the non-focal meaning component. Kim (2008) found that presuppositional meaning is sometimes verified, and sometimes not depending on the task and the saliency of the entities and the grammatical encoding of the elements. Note that if the focal meaning is verified, the verification can only take place after the indirect object has been heard.
'given' is predictable in our experiment. In the Early Stress condition, marked stress and thus focus can be identified earlier: at the point when the direct object is heard. But note that the focal meaning components cannot yet be computed at this point. When the participant hears *I only gave CELERY to the...* the sentence could end in two different ways. Either the indirect object turns out to be the *fireman*, as in our actual example, in which case the utterance matches the picture, or the indirect object could turn out to be the *diver*, in which case the utterance would not match the picture. (In principle, the utterance could also end with the indirect object the *doctor*, but this would constitute an in felicitous utterance. Since the doctor has no celery in the picture, the non-focal meaning component would not be true.)

To sum up, our hypothesis is that looks will target the fireman and any celeries at the moment they are mentioned, as the audio stimulus guides visual attention. Once participants proceed to verify the focal component, we expect that looks will diverge across the two conditions. In particular, we predict that in the Early Stress condition looks will stay on the fireman and the fireman’s celery, while in the Late Stress condition, looks will shift to the diver, the diver’s celery and to a lesser extent to the diver’s corn. This should take place during the sentence final verb *gegeven* and after the utterance offset. If looks diverge in the predicted way, we would take that to be evidence for early, incremental integration of prosodic focus information.

2.3 Results

For the response data, two experimental trials belonging to the same participant were removed because the answer had already been given before onset of the indirect object. In addition, one filler trial was removed because the answer had been given before sentence onset.

2.3.1 Number of correct responses. The percentage of correct responses for the Late Stress condition was 98%, for the Early Stress condition 99%. The difference was not significant (\(F_1(1,19)=2.923, \ p=.104, \ \eta_p^2=.133; \ F_2(1,15)=1.364, \ p=.261, \ \eta_p^2=.083; \ \text{minF}'(1,28)=.93, \ p=.34\)). The overall correct response rate for the experiment was 98%.

2.3.2 Response time. The overall mean response time from utterance onset for the Late Stress condition was 3034ms, while it was 3048ms for the Early Stress condition. The difference is not significant (\(F_1(1,19)=.027 \ p=.871; \ F_2(1,15)=.045; \ p=.835; \ \text{minF}'(1,33)=.017, \ p=.90\)). So, we did not find a significant effect in response time or accuracy across the conditions.

2.3.3 Eye gaze patterns. The coding and analysis was performed as follows. Each picture was divided into 9 Areas of Interest, using the 3 x 3 grid format. See Figure 1. Fixations were assigned to the AoI they occurred on. For ease of reference, we refer to the AoIs with the content of the example stimulus in Figure 1; the data and plots that we give are calculated over all items and participants, so when for instance we say ‘fireman’, we mean ‘the person in the picture who is part of the non-focal proposition in all the items’.

For the fine-grained analysis of eye movements over time, we divided the utterances into relevant audio segments, and determined the onset of each segment using PRAAT. The sentence segments are: *ik heb ‘I have’; alleen ‘only’; selderij/ selderij ‘celery/ celery’; aan de ‘to the’; brandweerman/ brandweerman ‘fireman/ fireman’; gegeven ‘given’*. For each segment, we analysed the fixation samples falling between 200ms after segment onset, and 200ms after the offset of that auditory segment, to take into account that it takes 200ms to launch a saccade driven by linguistic input (cf. Altmann & Kamide, 2004). The final three segments comprise the interval starting at 200ms after the onset of the verb *gegeven ‘given’* and ending 1500ms later. This was divided into three segments of identical length. For ease of
reference we call these the auditory segment *gegeven* ‘given’, the ‘first 500ms interval after offset’ and the ‘second 500ms interval after offset’. The auditory segments and their average onsets are in Table 2 in the Appendix.

For each experimental trial, we computed the proportion of time the participant spent fixating each area of interest in each auditory segment. We averaged these proportions over participants and over items, and analysed the differences between conditions using SPSS repeated-measures GLM$^5$. For all the eye movement data, we only discuss effects that are significant by participants ($F_1$) and by items ($F_2$). We also provide minF’ values (Clark, 1973; Raaijmakers, Schrijnemakers, & Gremmen, 1999). We report mean proportion of fixation time per AoI for the auditory segments and statistical analyses for the factor Condition in tables.

Figure 2 gives the time course of the mean fixation time proportions for the items in the visual stimulus for Experiment 1. The figure contains 8 plots corresponding to the 9 AoIs in our visual scene (the ‘doctor’s empty plates’ are plotted together). In each plot we give the mean proportion of time spent looking at that AoI (e.g., the ‘fireman’ etc.) during each auditory segment in the two conditions (Early Stress vs. Late Stress). The error bars indicate +/- 2 standard error. Significant differences between conditions are indicated with stars.

---

$^5$ We tested the data for each of the AoI-auditory segment combination for normality, and found that the data was not normally distributed in the AoI-auditory segment combinations that attract only very few fixations (such as the empty plates, and after utterance offset). We attempted to normalize the data by performing an arcsine transformation on the proportion measures, but since this did not normalize the distributions, we performed the analyses on the proportion data as they are. Non-parametric Wilcoxon signed-rank test were performed post hoc, which gave the same significant results as we report here.
Figure 2. Time course of the mean fixation proportions for the items in the visual stimulus for Experiment 1.
Table 1 gives the mean proportion of time spent fixating each AoI for the auditory segments and analyses of variance between the conditions for Experiment 1 where the differences were statistically significant.

Table 1

Proportions of time spent fixating each of the relevant people and objects in Early Stress (ES) and Late Stress (LS) condition for each auditory segment, and analysis of variance between proportions for Experiment 1

<table>
<thead>
<tr>
<th>Auditory segment</th>
<th>Person/Object</th>
<th>prop time looking ES</th>
<th>prop time looking LS</th>
<th>F(1,19)</th>
<th>p</th>
<th>( \eta^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO</td>
<td>Diver's celery</td>
<td>0.22</td>
<td>0.17</td>
<td>6.366</td>
<td>.021</td>
<td>.251</td>
</tr>
<tr>
<td></td>
<td>Doctor's empty plates</td>
<td>0.00</td>
<td>0.01</td>
<td>7.134</td>
<td>.015</td>
<td>.273</td>
</tr>
<tr>
<td>IO</td>
<td>Diver's celery</td>
<td>0.04</td>
<td>0.10</td>
<td>15.540</td>
<td>.001</td>
<td>.450</td>
</tr>
<tr>
<td></td>
<td>Fireman</td>
<td>0.42</td>
<td>0.33</td>
<td>14.756</td>
<td>.001</td>
<td>.437</td>
</tr>
<tr>
<td>given</td>
<td>Diver</td>
<td>0.05</td>
<td>0.14</td>
<td>29.426</td>
<td>.000</td>
<td>.608</td>
</tr>
<tr>
<td></td>
<td>Diver's celery</td>
<td>0.04</td>
<td>0.12</td>
<td>13.907</td>
<td>.001</td>
<td>.423</td>
</tr>
<tr>
<td></td>
<td>Doctor</td>
<td>0.06</td>
<td>0.10</td>
<td>5.105</td>
<td>.036</td>
<td>.212</td>
</tr>
<tr>
<td></td>
<td>Fireman</td>
<td>0.42</td>
<td>0.24</td>
<td>83.212</td>
<td>.000</td>
<td>.814</td>
</tr>
<tr>
<td></td>
<td>Fireman's celery</td>
<td>0.19</td>
<td>0.12</td>
<td>9.824</td>
<td>.005</td>
<td>.341</td>
</tr>
<tr>
<td>0-500ms after offset</td>
<td>Diver</td>
<td>0.04</td>
<td>0.10</td>
<td>14.356</td>
<td>.001</td>
<td>.430</td>
</tr>
<tr>
<td></td>
<td>Diver's celery</td>
<td>0.02</td>
<td>0.08</td>
<td>25.298</td>
<td>.000</td>
<td>.571</td>
</tr>
<tr>
<td></td>
<td>Diver's corn</td>
<td>0.01</td>
<td>0.04</td>
<td>8.803</td>
<td>.008</td>
<td>.317</td>
</tr>
<tr>
<td></td>
<td>Fireman</td>
<td>0.29</td>
<td>0.13</td>
<td>20.688</td>
<td>.000</td>
<td>.521</td>
</tr>
<tr>
<td></td>
<td>Fireman's celery</td>
<td>0.13</td>
<td>0.08</td>
<td>6.946</td>
<td>.016</td>
<td>.268</td>
</tr>
<tr>
<td>501-1000ms after offset</td>
<td>Diver's celery</td>
<td>0.01</td>
<td>0.03</td>
<td>6.136</td>
<td>.023</td>
<td>.244</td>
</tr>
<tr>
<td></td>
<td>Fireman</td>
<td>0.11</td>
<td>0.07</td>
<td>4.680</td>
<td>.043</td>
<td>.198</td>
</tr>
</tbody>
</table>
Table 1 Continued.

<table>
<thead>
<tr>
<th>Auditory segment</th>
<th>Person/ Object</th>
<th>F2(1,15)</th>
<th>p</th>
<th>( \eta^2_p )</th>
<th>df2</th>
<th>minF’(1,df2)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>DO</td>
<td>Diver’s celery</td>
<td>6.190</td>
<td>.025</td>
<td>.292</td>
<td>33</td>
<td>3.138</td>
<td>.086</td>
</tr>
<tr>
<td></td>
<td>Doctor's empty plates</td>
<td>8.735</td>
<td>.010</td>
<td>.368</td>
<td>34</td>
<td>3.927</td>
<td>.056</td>
</tr>
<tr>
<td>IO</td>
<td>Diver’s celery</td>
<td>24.143</td>
<td>.000</td>
<td>.617</td>
<td>34</td>
<td>9.454</td>
<td>.004</td>
</tr>
<tr>
<td></td>
<td>Fireman</td>
<td>12.524</td>
<td>.003</td>
<td>.455</td>
<td>33</td>
<td>6.774</td>
<td>.014</td>
</tr>
<tr>
<td></td>
<td>given</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>Diver</td>
<td>48.663</td>
<td>.000</td>
<td>.764</td>
<td>33</td>
<td>18.338</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Diver’s celery</td>
<td>43.559</td>
<td>.000</td>
<td>.744</td>
<td>29</td>
<td>10.541</td>
<td>.003</td>
</tr>
<tr>
<td></td>
<td>Doctor</td>
<td>5.703</td>
<td>.031</td>
<td>.275</td>
<td>34</td>
<td>2.694</td>
<td>.110</td>
</tr>
<tr>
<td></td>
<td>Fireman</td>
<td>51.522</td>
<td>.000</td>
<td>.775</td>
<td>30</td>
<td>31.820</td>
<td>.000</td>
</tr>
<tr>
<td></td>
<td>Fireman’s celery</td>
<td>17.345</td>
<td>.001</td>
<td>.536</td>
<td>33</td>
<td>6.272</td>
<td>.017</td>
</tr>
<tr>
<td>0-500ms after offset</td>
<td>Diver</td>
<td>21.019</td>
<td>.000</td>
<td>.584</td>
<td>34</td>
<td>8.530</td>
<td>.006</td>
</tr>
<tr>
<td></td>
<td>Diver’s celery</td>
<td>25.221</td>
<td>.000</td>
<td>.627</td>
<td>34</td>
<td>12.630</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>Diver’s corn</td>
<td>9.183</td>
<td>.008</td>
<td>.380</td>
<td>34</td>
<td>4.494</td>
<td>.041</td>
</tr>
<tr>
<td></td>
<td>Fireman</td>
<td>51.106</td>
<td>.000</td>
<td>.773</td>
<td>31</td>
<td>14.727</td>
<td>.001</td>
</tr>
<tr>
<td></td>
<td>Fireman’s celery</td>
<td>7.561</td>
<td>.015</td>
<td>.335</td>
<td>34</td>
<td>3.620</td>
<td>.066</td>
</tr>
<tr>
<td>501-1000ms after offset</td>
<td>Diver’s celery</td>
<td>14.487</td>
<td>.002</td>
<td>.491</td>
<td>31</td>
<td>4.310</td>
<td>.046</td>
</tr>
<tr>
<td></td>
<td>Fireman</td>
<td>10.507</td>
<td>.005</td>
<td>.412</td>
<td>32</td>
<td>3.238</td>
<td>.081</td>
</tr>
</tbody>
</table>

The targeted AoIs during each auditory segment were as follows. Comparing the two conditions, looking patterns start to systematically diverge during the indirect object. At this audio segment, participants spent a significantly higher proportion of time looking at the ‘diver’s celery’ in the Late Stress condition than in the Early Stress condition, and they also spent a significantly higher proportion of time looking at the ‘fireman’ in the Early Stress condition than in the Late Stress condition. During the sentence final verb *gegeven* ‘given’, more time was spent looking at the ‘diver’, the ‘diver’s celery’ and the ‘doctor’ in the Late Stress condition than in the Early Stress condition, while more time was spent on looking at the ‘fireman’ and the ‘fireman’s celery’ in the Early Stress condition compared to the Late Stress condition. Essentially the same pattern of looks continued during the first and second 500ms intervals after the sentence offset. During the first of these segments, there were also significantly more looks to the ‘diver’s corn’ in the Late Stress condition than in the Early Stress condition.
Earlier on in the sentence, a higher proportion of time was spent looking at the ‘diver’s celery’ during the direct object audio segment in the Early Stress condition. During the same audio segment, more time was spent looking at the ‘doctor’s empty plates’ in the Late Stress condition.

2.4 Discussion

2.4.1 Behavioural measures. We found a high number of correct responses in both conditions and no significant difference in the number of correct judgments between the conditions. We speculate that the reason why we got a higher number of correct responses than Gennari et al. (2005) may have been because their experiment involved a more realistic and more complex visual scene, while ours was a stylised 3-by-3 design, and because we provided an overall context story, while participants in the Gennari et al. study heard items without context. Finally, in our experiment there was no phonetic difference between Early and Late Stress, thus no corresponding facilitation effect was expected for Early Stress.

Like Gennari et al., we did not find any significant differences in response times between the conditions. Importantly, this result may have been influenced by the difference in expected responses (ES: YES, LS: NO), as in the original Gennari et al. study. It is possible that it takes longer (or shorter) to find a falsifying entity in a picture than it takes to scan the picture and verify that there is no falsifying entity present. It could also be the case that a negative judgment takes longer (or shorter) than a positive one. In order to control for these factors, we performed Experiment 2, where the expected response in both conditions was YES. In Experiment 3, the expected response was NO in both conditions.

2.4.2 Eye gaze patterns. The most important finding from Experiment 1 is that looks diverged across conditions in the predicted way at the indirect object, at the sentence-final verb gegeven ‘given’ and after the utterance offset: participants’ looks target the ‘fireman’ and the ‘fireman’s celery’ more in the Early Stress condition, while looks target the ‘diver’, the ‘diver’s celery’, the ‘doctor’, and somewhat later also the ‘diver’s corn’ in the Late Stress condition. First of all, this provides evidence that participants have computed the focal meaning component by this stage. This is because the observed divergent looks correspond to the participants’ attempt at verifying the focal meaning component of the utterance, which is different in the two conditions (see (9c) and (10c) above).

Second, this finding also constitutes evidence that the verification process corresponds to the semantics associated with the utterance (see Rooth, 1992 and discussion above). In principle, one may imagine that instead of looks corresponding directly to the focal meaning component participants could engage in heuristic strategies. For argument’s sake, one may hypothesise for instance that in order to verify an utterance involving only it would be enough to look for the falsifying entity. So, in I only gave celery to the fireman looks could target any celery in the picture that does not belong to the fireman. The participant could legitimately reject the utterance without having verified that this offending celery in fact belongs to the ‘diver’. In other words, looks to the falsifying entity are logically necessary for falsification, but looks to the possessor of that falsifying entity are not. The fact that we do find looks targeting the ‘diver’ supports the expectation that sentence verification follows the proposition-based semantics associated with only-sentences. Participants do not simply look for an offending object, they seem to verify the relevant proposition of the focal meaning component, I didn’t give celery to anyone else, falsified by the proposition I gave celery to the diver.

Our expectation that looks follow the logic of the semantically determined focal meaning component is further supported by the relative absence of looks to irrelevant entities. While
participants do look at the (potentially) falsifying entities (the ‘fireman’s celery’ in the Early Stress condition; the ‘diver’s celery’ in the Late Stress condition), they do not target Gennari et al.’s (2005) ‘contrast entities’ (the ‘diver’s corn’) in the Early Stress condition in our experiment. At no auditory segment are looking proportions to this entity higher in the Early Stress condition than in the Late Stress condition.

In addition, there was a brief, but significant difference in looks targeting the ‘diver’s celery’ during the direct object segment (i.e., ES>LS). We take this to be a direct effect of marked stress on the word *selderij* ‘celery’ in the same way as was found by Eberhard et al. (1995). This is a referential look: participants target the image corresponding to the entity just heard. They do so more, if the word bears marked stress. This effect is brief. Note that there is in fact another celery in the visual scene, but there is no statistically significant difference in looks targeting that celery. The significantly smaller proportion of time spent looking at the ‘doctor’s empty plates’ in the Early Stress condition was unexpected. Note though that the looking time proportion was just over 1% in the Late Stress condition, and under 1% in the Early Stress condition.

Overall, we believe that our findings are consistent with early and incremental focus identification and association with only, consolidating earlier results by Paterson et al. (2007) and Gennari et al. (2005). No facilitation was found for response times. However, this may have been due to the fact that the two conditions had divergent expected responses in Experiment 1. We investigate this issue further in Experiment 2.

As noted, there is a predicted difference between time spent on the ‘fireman’ in the Early and the Late Stress conditions, which is significant from the indirect object segment onwards. We were surprised to see that this effect actually reaches significance in the participant analysis already one auditory segment before, during *aan de* ‘to the’, i.e., before participants have actually heard *de brandweerman* ‘the fireman’ (F\(_1\)(1,19)= 6.006, p=.024, \(\eta^2_p=.240\); F\(_2\)(1,15)=3.609, p=.077, \(\eta^2_p=.194\); minF’(1,30)=2.254, p=.144). We interpret the earliness of the effect as the participants’ anticipating the continuation of the utterance to be *de brandweerman* ‘the fireman’ at the point when they have heard *Ik heb alleen SELDERIJ aan de*… ‘I only (gave) CELERY to the…’. We tested this hypothesis in Experiment 3.

3 Experiment 2
3.1 Method

3.1.1 Participants. 20 non-dyslexic native Dutch speakers were recruited from the UiL OTS participant pool. Participants were unaware of the purpose of the experiment, and were paid 5 euros for their participation. The mean age of the participants was 24;3 years (range: 19–46); 19 females and 1 male; 17 participants were right-handed.
3.1.2 Materials. Like in Experiment 1, sixteen items were constructed in two conditions. The auditory stimuli were identical to the ones used in Experiment 1. The visual stimuli of Experiment 1 were changed in such a way that the expected responses were YES in both conditions. In particular, the ‘diver’ had a plate with a ‘corn cob’ and an empty plate, while the ‘fireman’ had a plate with a ‘celery’ and an empty plate. See Figure 3 for an example.

![Figure 3. Example of visual stimulus for Experiment 2stimulus.](image)

The 64 unrelated fillers from Experiment 1 were included alongside the test items. In addition 32 controls involving *alleen* ‘only’ were created, 16 with early stress, 16 with late stress, with half of the items referring to the ‘doctor’. The expected response for the controls was NO, to counterbalance the YES bias introduced by the test items.

3.1.3 Procedure. The procedure was identical to that of Experiment 1.

3.1.4 Predictions. We were interested to see if there was a facilitatory effect of early stress resulting in shorter response times in the Early Stress condition compared to the Late Stress condition. Regarding eye movement patterns, our predictions were the same as in Experiment 1 except that since both conditions are true in the pictures, there is no falsifying entity in the picture.

3.2 Results

From the response data, two trials from different experimental participants were removed because they responded before the indirect object segment.
3.2.1 **Number of correct responses.** The percentage of correct responses for the Late Stress condition was 100%, for the Early Stress condition 99%. The difference was not significant ($F_1(1,19)=.322$, $p=.577$, $\eta^2_{p}=.017$; $F_2(1,15)=.190$, $p=.669$, $\eta^2_{p}=.012$; min$F'(1,30)=.119$, $p=.73$). The overall correct response rate for the experiment as a whole was 98%.

3.2.2 **Response time.** The overall mean response time from utterance onset for the Late Stress condition was 2843ms, while it was 2868ms for the Early Stress condition. The difference is not significant ($F_1(1,19)=.147$, $p=.706$, $\eta^2_{p}=.008$; $F_2(1,15)=.225$, $p=.642$, $\eta^2_{p}=.015$; min$F'(1,34)=.089$, $p=.77$).

3.3.3 **Eye gaze patterns.** Coding and analysis was identical to that in Experiment 1. Figure 4 gives the mean proportion of looking time for the items in the visual stimulus for each auditory segment.

![Figure 4](image-url)  
*Figure 4.* Time course of the mean fixation proportions for the items in the visual stimulus for Experiment 2.
Table 2 gives the mean proportion of time spent looking at each AoI for the auditory segments and analyses of variance between the conditions.

<table>
<thead>
<tr>
<th>Auditory segment</th>
<th>Person/ Object</th>
<th>prop time looking ES</th>
<th>p</th>
<th>prop time looking LS</th>
<th>F1 (1,19)</th>
<th>p</th>
<th>ηp²</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO</td>
<td>Diver</td>
<td>0.04</td>
<td></td>
<td>0.06</td>
<td>5.878</td>
<td>.025</td>
<td>.236</td>
</tr>
<tr>
<td></td>
<td>Diver’s corn</td>
<td>0.05</td>
<td></td>
<td>0.09</td>
<td>6.777</td>
<td>.017</td>
<td>.263</td>
</tr>
<tr>
<td></td>
<td>Fireman</td>
<td>0.44</td>
<td></td>
<td>0.37</td>
<td>8.070</td>
<td>.010</td>
<td>.298</td>
</tr>
<tr>
<td>Given</td>
<td>Diver’s corn</td>
<td>0.05</td>
<td></td>
<td>0.13</td>
<td>17.702</td>
<td>.000</td>
<td>.482</td>
</tr>
<tr>
<td></td>
<td>Doctor</td>
<td>0.09</td>
<td></td>
<td>0.13</td>
<td>4.852</td>
<td>.040</td>
<td>.203</td>
</tr>
<tr>
<td></td>
<td>Fireman's celery</td>
<td>0.20</td>
<td></td>
<td>0.12</td>
<td>22.323</td>
<td>.000</td>
<td>.540</td>
</tr>
<tr>
<td>0-500ms after offset</td>
<td>Diver's corn</td>
<td>0.04</td>
<td></td>
<td>0.08</td>
<td>9.169</td>
<td>.007</td>
<td>.326</td>
</tr>
</tbody>
</table>

Table 2 Continued

<table>
<thead>
<tr>
<th>Auditory segment</th>
<th>Person/ Object</th>
<th>F2 (1,15)</th>
<th>p</th>
<th>ηp²</th>
<th>df2</th>
<th>minF’ (1,df2)</th>
<th>p</th>
</tr>
</thead>
<tbody>
<tr>
<td>IO</td>
<td>Diver</td>
<td>6.796</td>
<td>.020</td>
<td>.312</td>
<td>34</td>
<td>3.152</td>
<td>.085</td>
</tr>
<tr>
<td></td>
<td>Diver’s corn</td>
<td>6.084</td>
<td>.026</td>
<td>.289</td>
<td>33</td>
<td>3.206</td>
<td>.083</td>
</tr>
<tr>
<td></td>
<td>Fireman</td>
<td>6.181</td>
<td>.025</td>
<td>.292</td>
<td>32</td>
<td>3.500</td>
<td>.071</td>
</tr>
<tr>
<td>Given</td>
<td>Diver’s corn</td>
<td>16.129</td>
<td>.001</td>
<td>.518</td>
<td>33</td>
<td>8.439</td>
<td>.007</td>
</tr>
<tr>
<td></td>
<td>Doctor</td>
<td>5.233</td>
<td>.037</td>
<td>.259</td>
<td>34</td>
<td>2.518</td>
<td>.122</td>
</tr>
<tr>
<td></td>
<td>Fireman's celery</td>
<td>36.090</td>
<td>.000</td>
<td>.706</td>
<td>34</td>
<td>13.792</td>
<td>.001</td>
</tr>
<tr>
<td>0-500ms after offset</td>
<td>Diver’s corn</td>
<td>10.071</td>
<td>.006</td>
<td>.402</td>
<td>34</td>
<td>4.799</td>
<td>.035</td>
</tr>
</tbody>
</table>

Looks started systematically diverging across conditions during the indirect object auditory segment, where more time was spent looking at the ‘diver’ and the ‘diver’s corn’ in the Late Stress condition, and more time was spent looking at the ‘fireman’ in the Early Stress condition. On the ‘diver’s corn’ the effect continued during the auditory segments corresponding to the verb, and the first 500ms intervals after utterance offset. During the utterance final verb gegeven ‘given’, there was also significantly more time spent targeting the ‘doctor’ in the Late Stress condition and the ‘fireman’s celery’ in the Early Stress condition.

3.3 Discussion

3.3.1 Behavioural measures. We found a high rate of correct responses for both test conditions. We did not find that Early Stress facilitated verification, as response times did not differ across conditions. See General discussion below for more on this.
3.3.2 Eye gaze patterns. The eye gaze patterns were similar to Experiment 1. The looking patterns diverged in the expected way: more looks on the ‘fireman’ and the ‘fireman’s celery’ in the Early Stress condition and on the ‘diver’, the ‘diver’s corn’ and the ‘doctor’ in the Late Stress condition. Perhaps due to the more simple nature of the visual stimulus, the effects are not as sustained over time as they are in Experiment 1.

Let us now turn to our final experiment where the expected responses were NO in both conditions.

4 Experiment 3
4.1 Motivation and predictions

Recall that in Experiment 1, we found that the difference between conditions in the looks targeting the ‘fireman’ was already significant in the participant analysis before the indirect object was heard. Although we did expect more looks targeting the ‘fireman’ in the Early Stress condition, we did not expect this to happen until after the indirect object de brandweerman ‘the fireman’ was actually heard. We believe that this (numerical) increase in looks targeting the ‘fireman’ is anticipatory. Our hypothesis is that in a picture verification task, participants employ an unconscious strategy when performing the task: they start out with the assumption that the utterance would match the picture.

Let us explain this in more detail using our actual example. Take the moment when participants hear the first half of the utterance Ik heb alleen SELDERIJ … ‘I have only CELERY …’ in a setting where the fireman is the only person that has only celery, as in Figure 1 from Experiment 1. At this point, there is only one continuation of this utterance that would make the sentence true in the picture, namely the actual continuation (i.e., … de brandweerman gegeven. ‘…the fireman given.’). Any alternative continuation (e.g., referring to the ‘diver’) would make the sentence false. Given that there is only one way a sentence can be true in a picture and there are many ways it could be false, it would make sense for the listener to adopt a cognitive strategy that assumes that the sentence is true until proven wrong (see also Spelke 1979). In contrast, in the Late Stress condition, when participants hear Ik heb alleen selderij … ‘I have only celery …’ in a context of a picture where both the fireman and the diver has celery, as in Figure 1, there is no continuation of the utterance that can make the sentence true. So, there is no anticipatory advantage in this condition. This has the effect that participants’ eye gaze already targets the ‘fireman’ in Figure 1 numerically more in the Early Stress condition even before they have heard it (during the aan de ‘to the’ auditory segment) compared to the Late Stress condition.6 In short, we speculate that in a bi-modal verification task, participants anticipate the continuation of the sentence to be such that it makes the utterance true in the picture.

This is in line with findings of Altmann and Kamide (1999) and Kamide et al. (2005) (see also Ito & Speer, 2008). These authors found that while listening to utterances presented to them in the visual-world paradigm, participants can sometimes anticipate certain semantic properties of forthcoming lexical items based on the lexical items they have already heard. In particular, they tested utterances like The boy will eat the cake presented in a visual setting with a boy, a cake, a toy car, a toy train and a ball. They found that participants’ eye movements

6 Note that in Experiment 2, the continuation of the sentence with ‘fireman’ matches the picture in both the Early and the Late Stress condition, so our hypothesis predicts the same anticipatory looks targeting the ‘fireman’ in both conditions, with no significant difference between conditions. As can be seen in Figure 4, this expectation seems to be met.
targeted the cake already before the object noun phrase, so when they only heard *The boy will eat*... Altmann and Kamide showed that this was because the verb *eat* places a semantic restriction on the object noun phrase and the cake was the only edible object in the picture.

The goal of Experiment 3 was to investigate our anticipatory look hypothesis.

4.2 Methods

4.2.1 Participants. 23 non-dyslexic native speakers of Dutch were recruited from the UiL OTS participant pool. Data of 3 participants were discarded prior to analysis; one participant did not receive adequate instruction prior to the experiment and reread the instruction sheet repeatedly during the experiment; one experimental run suffered from an unresponsive button box; and one participant was intimately familiar with linguistic theories on stress shift. The remaining participants were unaware of the purpose of the experiment, and were paid 5 euros for their participation. The mean age of the 20 remaining participants was 22.8 years, ranging from 17-27 years; 14 females and 6 males; 18 participants were right-handed.

4.2.2 Materials. Like in Experiments 1 and 2, sixteen items were constructed in two conditions. The auditory stimuli were identical to the ones used in Experiments 1 and 2. The visual stimuli were changed in such a way that the expected responses were NO in both conditions. In particular, the ‘fireman’ had a ‘celery’ and a ‘corn cob’, while the ‘diver’ had a ‘celery’. See Figure 5 for an example.

![Figure 5. Example of visual stimulus for Experiment 3.](image-url)

The 64 unrelated fillers from Experiments 1 and 2 were included alongside the test items. In addition 32 controls were created, 16 with early stress, 16 with late stress; half of the items
mentioning the ‘doctor’. The expected response for the controls was YES, to counterbalance the test items.

4.2.3 Procedure. The procedure was identical to that of Experiments 1 and 2.

4.2.4 Predictions. The experiment was designed to test our hypothesis that the early numerical increase in looks targeting the ‘fireman’ in Experiment 1 was anticipatory in the following sense. Participants hear *Ik heb alleen SELDERIJ…* ‘I have only CELERY…’ and anticipate that the utterance will continue in such a way that it matches the picture. In Experiment 3 the visual stimulus was changed in such a way that the only person that has only celery is ‘the diver’. See Figure 5 above. The audio stimuli were identical to that of Experiment 1. Thus, our anticipation hypothesis predicts that participants will look more at ‘the diver’ during the *aan de* ‘to the’ auditory segment in the Early Stress condition. This is because the ‘diver’ has only celery. But once they hear the indirect object *de brandweerman* ‘the fireman’, their looks are expected to shift to the ‘fireman’. So, it is expected that in Experiment 3 the anticipatory strategy ‘tricks’ participants.

In addition, we expected that the predictions of Experiment 1 (and 2) about divergent looks between the two conditions would be replicated, except potentially, due to the potential hindering effect of the anticipatory looks, somewhat delayed.

4.3 Results

11 trials (6 experimental) were removed from analysis of the response data because the response had already been given before the onset of the indirect object (6 experimental and 4 filler items) or utterance onset (1 filler).

4.3.1 Number of correct responses. The percentage of correct responses for the Late Stress condition was 97.2%, for the Early Stress condition 98.4%. The difference was not significant ($F_{1}(1,19)=1.353$, $p=.259$, $\eta_p^2=.066$; $F_{2}(1,15)=1.184$, $p=.294$, $\eta_p^2=.073$; $\text{min}F'(1,33)=.631$, $p=.433$). The overall correct response rate for Experiment 3 was 97.1%.

4.3.2 Response time. The overall mean response time from utterance onset for the Late Stress condition was 2875ms, while it was 2909ms for the Early Stress condition. The difference is not significant ($F_{1}(1,19)=.418$, $p=.526$, $\eta_p^2=.022$; $F_{2}(1,15)=.244$, $p=.628$, $\eta_p^2=.016$; $\text{min}F'(1,30)=.154$, $p=.697$).

4.3.3 Eye gaze patterns. Coding and analysis was identical to that in Experiments 1 and 2. Figure 6 gives the mean proportion of looks for the items in the visual stimulus for each auditory segment.
Figure 6. Time course of the mean fixation proportions for the items in the visual stimulus for Experiment 3.
Table 3 gives the mean proportion of looking time on each AoI for the auditory segments and analyses of variance between the conditions.

**Table 3**

*Proportions of time spent fixating each of the relevant people and objects in Early Stress (ES) and Late Stress (LS) condition for each auditory segment, and analysis of variance between proportions for Experiment 3.*

<table>
<thead>
<tr>
<th>Auditory segment</th>
<th>Person/ Object</th>
<th>prop time looking ES</th>
<th>prop time looking LS</th>
<th>F1 (1,19)</th>
<th>p</th>
<th>( \eta^2 )</th>
</tr>
</thead>
<tbody>
<tr>
<td>To the Diver</td>
<td>Diver</td>
<td>0.27</td>
<td>0.18</td>
<td>7.518</td>
<td>.013</td>
<td>.284</td>
</tr>
<tr>
<td>IO</td>
<td>Fireman’s celery</td>
<td>0.07</td>
<td>0.11</td>
<td>8.288</td>
<td>.010</td>
<td>.304</td>
</tr>
<tr>
<td>Given</td>
<td>Diver</td>
<td>0.08</td>
<td>0.11</td>
<td>6.576</td>
<td>.019</td>
<td>.257</td>
</tr>
<tr>
<td></td>
<td>Diver’s celery</td>
<td>0.04</td>
<td>0.11</td>
<td>15.733</td>
<td>.001</td>
<td>.453</td>
</tr>
<tr>
<td></td>
<td>Fireman</td>
<td>0.33</td>
<td>0.20</td>
<td>28.690</td>
<td>.000</td>
<td>.602</td>
</tr>
<tr>
<td></td>
<td>Fireman’s corn</td>
<td>0.18</td>
<td>0.09</td>
<td>21.543</td>
<td>.000</td>
<td>.531</td>
</tr>
<tr>
<td>0-500ms after offset</td>
<td>Diver’s celery</td>
<td>0.02</td>
<td>0.07</td>
<td>19.961</td>
<td>.000</td>
<td>.512</td>
</tr>
<tr>
<td></td>
<td>Fireman</td>
<td>0.15</td>
<td>0.07</td>
<td>13.266</td>
<td>.002</td>
<td>.411</td>
</tr>
<tr>
<td></td>
<td>Fireman’s corn</td>
<td>0.13</td>
<td>0.06</td>
<td>16.140</td>
<td>.001</td>
<td>.459</td>
</tr>
<tr>
<td>501-1000ms after offset</td>
<td>Diver’s celery</td>
<td>0.01</td>
<td>0.04</td>
<td>14.628</td>
<td>.001</td>
<td>.435</td>
</tr>
<tr>
<td></td>
<td>Fireman</td>
<td>0.07</td>
<td>0.03</td>
<td>5.289</td>
<td>.033</td>
<td>.218</td>
</tr>
<tr>
<td></td>
<td>Fireman’s corn</td>
<td>0.05</td>
<td>0.03</td>
<td>5.300</td>
<td>.021</td>
<td>.249</td>
</tr>
</tbody>
</table>
Looking at differences between the conditions, we found that a significantly higher proportion of time was spent looking at the ‘diver’ in the Early Stress condition during *aan de* ‘to the’. A significantly higher proportion of time was spent looking at the ‘fireman’ and the ‘fireman’s corn’ during *gegeven* ‘given’ and the two subsequent 500ms intervals after offset in the Early Stress condition. There was also a significantly higher proportion of time spent looking at the ‘fireman’s celery’ in the Late Stress condition during the indirect object auditory segment. In addition, significantly more time was spent looking at the ‘diver’ and the ‘diver’s celery’ in the Late Stress condition during the verb *gegeven* ‘given’. For the ‘diver’s celery’, this effect persisted during the two 500ms intervals after utterance offset.

### 4.4 Discussion of Experiment 3 and general discussion

#### 4.4.1 Behavioural measures

Overall, in none of the experiments was there any facilitatory effect of early stress in terms of shorter response times or a higher accuracy rate for the Early Stress condition. We think that this is because even though participants may use early stress to anticipate the continuation of the utterance, they still have to wait until the sentence is actually finished until they can establish the meaning components based on the actual continuation. So, overall, even if accentual information is presented earlier in the Early Stress condition, leading to early identification of focus, this cannot facilitate computation of the meaning components associated with *only* overall, due to the propositional nature of these meaning components. The verification task is complex and involves several inferential steps. By the time participants perform this, the potential advantage of early stress disappears.
4.4.2 Eye tracking patterns. The visual stimulus in Experiment 3 was designed to test our hypothesis that participants anticipate the continuation of the utterance when they hear *Ik heb alleen SELDERIJ ... ‘I have only CELERY ...’* in the Early Stress condition. If the sentence would continue with *de duiker‘the diver’*, it would match the picture; and in the Early Stress condition we do indeed find more time is being spent looking at the ‘diver’ than in the Late Stress condition, right before the indirect object is heard. So, we can confirm our anticipation hypothesis.

But, the actual continuation of the utterance turns out to be *de brandweerman‘the fireman’*. So, the utterance ends up being false. As predicted (and already found in Experiments 1 and 2), once the indirect object has been heard, looks shift to the ‘fireman’ and his possessions in the Early Stress condition and to the ‘diver’ and his celery in the Late Stress condition. The effects are somewhat delayed compared to Experiment 1, presumably due to the hindering effect of the anticipation strategy. In particular, during the sentence final verb, there are more looks targeting the ‘fireman’ and the ‘fireman’s corn’ in the Early Stress condition and more looks targeting the ‘diver’ and the ‘diver’s celery’ in the Late Stress condition. On the ‘fireman’, the ‘fireman’s celery’ and the ‘diver’s celery’, these effects continue throughout the first and second 500ms intervals after utterance offset.

In the Late Stress condition, we did not expect to find any particular anticipatory looks, since there is no possible continuation that would make *Ik heb alleen selderij ... ‘I have only celery ...’*, without marked stress on the direct object, true in the picture. One indication that anticipatory looks may be going on in the Late Stress condition, though, may be that during the indirect object auditory segment, we find more looks on the ‘fireman’s celery’, which would be the falsifying object if the sentence would continue with ‘diver’. The ‘fireman’s celery’ is of course also part of the non-focal meaning of the sentence, so it is difficult to interpret this effect.

Overall, we found that sentence verification starts early. In fact, perhaps unexpectedly, it starts already before the whole utterance is heard. Participants anticipate the continuation of the utterance assuming that the utterance will turn out to match the picture. Crucially, prosodic focus on the direct object was found to be relevant for guiding anticipatory looks already at the next sound segment, during aan de ‘to the’ (see Experiment 3). This gives evidence of incremental prosodic focus processing.

In all three experiments, we found that utterance verification proceeds according to the semantics of *only*-sentences (Rooth, 1992). Participants’ looks diverge already during the sentence final verb *gegeven ‘given’* in the two conditions, as they verify the different focal meaning components associated with Early and Late Stress. So, we found evidence that participants’ looks not only target the falsifying entity in the picture, but rather the falsifying proposition was established. This provides support for the psychological reality of proposition-based semantics for prosodic focus association with *only*.

5 Conclusion

Our results show incremental focus processing and thus fall in line with earlier results (Gennari et al., 2005; Paterson et al., 2007). Investigating the time course of looks accompanying the computation of *only*-sentences allowed us to tap into how participants process focal differences marked prosodically. We found that people process prosodic focus incrementally: there is evidence of participants verifying the focal meaning component already during the indirect object. We also found that participants make anticipatory looks in this picture verification task taking into account the prosodic focus of the utterance, providing further indirect evidence of
incremental focus computation at the earliest possible point, at the point where the direct object
with or without prosodic focus is heard.

References

Altmann, G. T., & Kamide, Y. (1999). Incremental interpretation at verbs: restricting the domain of subsequent

Altmann, G. T. M., & Kamide, Y. (2004). Now you see it, now you don’t: Mediating the mapping between
language and the visual world. In J. M. Henderson & F. Ferreira (Eds.), *The interface of language, vision


Steinberg (Eds.), *Semantics: an interdisciplinary reader in philosophy, linguistics and psychology* (pp. 183–
216). Cambridge [u.a.]: Univ Press.

research. *Journal of Verbal Learning and Verbal Behavior*, 12(4), 335 – 359. doi:10.1016/S0022-
5371(73)80014-3

on Comprehension of Reduced Relative Clauses. In Alan Kennedy, Ralph Radach, R. R. Dieter Heller and
Joël PynteA2 - Alan Kennedy, & Joël Pynte (Eds.), *Reading as a Perceptual Process* (pp. 591–619). Oxford:

Crain, S., & Steedman, M. (1985). On not being led up the garden path: the use of context by the psychological
syntax processor. In D. R. Dowty, L. Karttunen, & A. M. Zwicky (Eds.), *Natural Language Parsing:
Psychological, Computational, and Theoretical Perspectives* (pp. 320–358). Cambridge University Press.

(Eds.), *Perspectives on sentence processing* (pp. 443–467). Hillsdale, N.J: L. Erlbaum Associates.

Eberhard, K., Spivey-Knowlton, M., Sedivy, J., & Tanenhaus, M. (1995). Eye movements as a window into real-
time spoken language comprehension in natural contexts. *Journal of Psycholinguistic Research*, 24(6), 409–
436. doi:10.1007/BF02143160

during the processing of relative clause ambiguities. *Journal of Memory and Language*, 53(4), 473 – 495.

M. K. Tanenhaus (Eds.), *Approaches to studying world-situated language use: bridging the language-as-


*Journal of Memory and Language*, 58(2), 541 – 573. doi:10.1016/j.jml.2007.06.013

processing in visual contexts: anticipatory eye movements in English and Japanese. In J. C. Trueswell & M.
K. Tanenhaus (Eds.), *Approaches to studying world-situated language use: bridging the language-as-


doi:10.1080/0272498014300253

Processing of Short Relative Clause Sentences. *The Quarterly Journal of Experimental Psychology Section
A*, 52(3), 717–737. doi:10.1080/713755827


### Appendix

#### Table 1: Test items, fillers and expected answers

<table>
<thead>
<tr>
<th>Conditions</th>
<th>Example</th>
<th>Number of items and expected response</th>
</tr>
</thead>
<tbody>
<tr>
<td>Late Stress</td>
<td>Ik heb alleen worteltjes aan de Eskimo gegeven. I have only carrots to the Eskimo given ‘I only gave carrots to the Eskimo.’</td>
<td>16 items; Experiment 1: NO, Experiment 2: YES, Experiment 3: NO</td>
</tr>
<tr>
<td>Early Stress</td>
<td>Ik heb alleen worteltjes aan de Eskimo gegeven. I have only carrots to the Eskimo given ‘I only gave carrots to the Eskimo.’</td>
<td>16 items; Experiment 1: YES, Experiment 2: YES, Experiment 3: NO</td>
</tr>
<tr>
<td>Control with Early Stress 1</td>
<td>Ik heb alleen komkommer aan de dokter gegeven. I have only cucumber to the doctor given ‘I only gave cucumber to the doctor.’</td>
<td>8 items; Experiment 1: NO, Experiment 2: NO, Experiment 3: YES</td>
</tr>
<tr>
<td>Control with Early Stress 2</td>
<td>Ik heb alleen aardbeien aan de politieman gegeven. I have only strawberries to the police officer given ‘I only gave strawberries to the police officer.’</td>
<td>8 items; Experiment 1: NO, Experiment 2: NO, Experiment 3: YES</td>
</tr>
<tr>
<td>Control with Late Stress 1</td>
<td>Ik heb alleen sla aan de indiaan gegeven. I have only lettuce to the Indian given ‘I only gave lettuce to the Indian.’</td>
<td>8 items; Experiment 1: YES, Experiment 2: NO, Experiment 3: YES</td>
</tr>
<tr>
<td>Control with Late Stress 2</td>
<td>Ik heb alleen champagne aan de koningin gegeven. I have only champagne to the queen given ‘I only gave champagne to the queen.’</td>
<td>8 items; Experiment 1: YES, Experiment 2: NO, Experiment 3: YES</td>
</tr>
<tr>
<td>ENDE_filler</td>
<td>De matroos en de astronaut hebben aardappels. ‘The sailor and the astronaut have potatoes.’</td>
<td>16 items; 8 ‘YES’, 8 ‘NO’</td>
</tr>
<tr>
<td>GEEN_filler</td>
<td>Ik heb geen sla aan de clown gegeven. I have no lettuce to the clown given ‘I didn’t give any lettuce to the clown.’</td>
<td>16 items; 8 ‘YES’, 8 ‘NO’</td>
</tr>
<tr>
<td>NIED_filler</td>
<td>Ik heb niet aan iedereen broccoli gegeven. I have not to everyone broccoli given</td>
<td>16 items; 8 ‘YES’, 8 ‘NO’</td>
</tr>
</tbody>
</table>
‘I didn’t give broccoli to everyone.’

| NIEM_filler | Niemand heeft groene kool gekregen. No one has green cabbage got ‘No one got green cabbage.’ | 16 items; 8 ‘YES’, 8 ‘NO’ |

Table 2: Durations of auditory segments in milliseconds

<table>
<thead>
<tr>
<th>Segment</th>
<th>Average Duration</th>
<th>Longest Duration</th>
<th>Shortest Duration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ik heb</td>
<td>268</td>
<td>307</td>
<td>168</td>
</tr>
<tr>
<td>Alleen</td>
<td>279</td>
<td>318</td>
<td>226</td>
</tr>
<tr>
<td>aan de</td>
<td>257</td>
<td>319</td>
<td>173</td>
</tr>
<tr>
<td>Indirect Object (IO)</td>
<td>548</td>
<td>677</td>
<td>354</td>
</tr>
<tr>
<td>Gegeven</td>
<td>608</td>
<td>693</td>
<td>544</td>
</tr>
</tbody>
</table>

Table 3: Item list

Late stress condition:

1. Ik heb alleen worteltjes aan de ESKIMO gegeven. 
   I only gave carrots to the Eskimo.
2. Ik heb alleen groene kool aan de ESKIMO gegeven. 
   I only gave green cabbage to the Eskimo.
3. Ik heb alleen broccoli aan de AFRISTAAN gegeven. 
   I only gave broccoli to the African guy.
4. Ik heb alleen appeltaart aan de BRANDWEERMAN gegeven. 
   I only gave apple pie to the fireman.
5. Ik heb alleen paprika aan het JONGETJE gegeven. 
   I only gave peppers to the little boy.
6. Ik heb alleen champignons aan het JONGETJE gegeven. 
   I only gave mushrooms to the little boy.
7. Ik heb alleen selderij aan de BRANDWEERMAN gegeven. 
   I only gave celery to the fireman.
8. Ik heb alleen radiator aan de ASTRONAUT gegeven. 
   I only gave raddishes to the astronaut.
9. Ik heb alleen perziken aan de KONINGIN gegeven. 
   I only gave peaches to the queen.
10. Ik heb alleen champagne aan de KONINGIN gegeven. 
    I only gave champagne to the queen.
11. Ik heb alleen bananen aan de ASTRONAUT gegeven. 
    I only gave bananas to the astronaut.
12. Ik heb alleen limonade aan de BRANDWEERMAN gegeven. 
    I only gave lemonade to the fireman.
13. Ik heb alleen aardbeien aan de POLITIEMAN gegeven. 
    I only gave strawberries to the policeman.
I only gave pineapple to the policeman.
I only gave oranges to the African guy.
I only gave a cappuccino to the astronaut.

Early stress condition:
I only gave carrots to the Eskimo.
I only gave green cabbage to the Eskimo.
I only gave broccoli to the African guy.
I only gave apple pie to the fireman.
I only gave peppers to the little boy.
I only gave mushrooms to the little boy.
I only gave celery to the fireman.
I only gave raddishes to the astronaut.
I only gave peaches to the queen.
I only gave champagne to the queen.
I only gave bananas to the astronaut.
I only gave lemonade to the fireman.
I only gave strawberries to the policeman.
I only gave pineapple to the policeman.
I only gave oranges to the African guy.
I only gave a cappuccino to the astronaut.
Abstract

This paper outlines the main assumptions of relevance theory (while attempting to clear up some common objections and misconceptions) and points out some new directions for research. After discussing the nature of relevance and its role in communication and cognition, it assesses two alternative ways of drawing the explicit–implicit distinction, compares relevance theory’s approach to lexical pragmatics with those of Grice and neo-Griceans, and discusses the rationale for relevance theory’s conceptual–procedural distinction, reassessing the notion of procedural meaning in the light of recent research. It ends by looking briefly at the relation between the capacity to understand a communicator’s meaning, on the one hand, and the capacity to assess her reliability and the reliability of the communicated content, on the other, and considers how these two capacities might interact.

Keywords: relevance, communication, explicatures, lexical pragmatics, procedural meaning

1 Introduction

One of the most original features of Grice’s approach to communication was his view that meaning is primarily a psychological phenomenon and only secondarily a linguistic one: for him, speaker’s meanings are basic and sentence meanings are ultimately analysable in terms of what speakers mean (Grice, 1957, 1967). Despite this reference to psychology, Grice’s goals were mainly philosophical or semantic: his analysis of speaker’s meaning was intended to shed light on traditional semantic notions such as sentence meaning and word meaning, and his accounts of the derivation of implicatures were rational reconstructions of how a speaker’s meaning might be inferred, rather than empirical hypotheses about what actually goes on in hearers’ minds. Relevance theorists have been trying to develop Grice’s insights in a different direction, by incorporating them into a psychologically plausible, empirically testable theory of overt (‘ostensive’) communication.

Relevance theory, like other broadly Gricean approaches to pragmatics, takes as its starting point three of Grice’s assumptions about verbal communication. The first is that a sentence meaning is a vehicle for conveying a speaker’s meaning, where a speaker’s meaning is an overtly expressed intention that is fulfilled by being recognised. The second is that a speaker’s meaning cannot be simply perceived or decoded, but has to be inferred from her behaviour, together with contextual information. The third is that in inferring a speaker’s meaning, the hearer is guided by the expectation that communicative behaviour should meet certain standards: for Grice, a co-operative principle and conversational maxims, and for relevance theorists, a presumption of optimal relevance. However, relevance theory also differs from Grice’s framework in several important respects.

One important difference has to do with the scope of pragmatics. Grice’s theoretical definition of speaker’s meaning\(^1\) (‘meaning\(_{NN}\)’) was designed to apply to certain cases of

---

\* A version of this paper will appear in the *Oxford handbook of pragmatics*, edited by Yan Huang. Many thanks to Robyn Carston and Dan Sperber for valuable comments on an earlier draft.

\(^1\)*Grice’s term was ‘utterer’s meaning’, where an ‘utterance’ is an overtly intentional attempt – whether verbal or non-verbal – to produce a certain cognitive or behavioural response in an audience.
non-verbal communication but exclude others. For instance, when Mary shows Peter her bandaged leg in response to his invitation to play squash, Grice (1967/1989, p. 109) notes that although she overtly intended to make Peter believe both that her leg was bandaged and that she couldn’t play squash, it seems appropriate to describe her as meaning that she couldn’t play squash, but not as meaning that her leg was bandaged. He therefore added a third clause to his definition of meaning, designed to exclude this second type of case. While Sperber and Wilson (1986/1995, pp. 53-4) share Grice’s intuition that use of the ordinary-language term ‘meaning’ is inappropriate in certain cases, they argue that the resulting definition of meaning does not pick out a natural class of phenomena, since the cases Grice wants to exclude fall under exactly the same generalisations as those he wants to include. They therefore propose a broader definition of ostensive communication which covers both ‘showing’ and ‘telling’, and which subsumes prototypical Gricean speaker’s meanings as a special case. This difference matters not only for non-verbal communication but for many verbal cases where ‘telling’ and ‘showing’ combine, or where the intended effect is not easily rendered as a single proposition that the speaker can be said to have meant (as with stylistic or poetic effects). These fall squarely within the scope of a theory of ostensive communication, while in Grice’s framework they receive only partial treatment at best.²

A second difference has to do with the role of pragmatic principles or maxims in utterance comprehension. Grice was mainly concerned with pragmatic factors affecting the identification of implicatures, whereas relevance theorists (and a growing number of other broadly Gricean approaches) are equally concerned with pragmatic factors affecting the identification of explicit truth-conditional content.³ In Grice’s framework, moreover, communicators can blatantly violate a maxim in order to trigger the search for an implicature, whereas blatant violation of pragmatic principles or maxims has no comparable role in relevance theory. In particular, relevance theorists question the need for Grice’s first Quality maxim (‘Do not say what you believe to be false’) – which seems to have no other function in Grice’s framework than to be violated in figurative utterances – on two main grounds. First, there are alternative accounts of figurative utterances which involve no blatant maxim violation and fit better with current processing models.⁴ Second, for Grice’s account to work, the speaker must blatantly violate the first Quality maxim by saying something literally false; yet for Grice, saying involves speaker commitment, and in figurative utterances, the speaker precisely does not commit herself to the truth of the proposition literally expressed. Indeed, Grice generally describes the speaker of a figurative utterance as merely ‘making as if to say’ something, and in that case, it is hard to see how his first Quality maxim is violated at all.⁵

A third difference has to do with how far communication is co-operative in Grice’s sense. According to Grice (1967/1989, p. 26), participants in a talk exchange are expected (ceteris paribus) to observe his co-operative principle (‘Make your conversational contribution such as is required, at the stage at which it occurs, by the accepted purpose or direction of the talk exchange in which you are engaged’), and pragmatic inferences –


⁵ Notice that what relevance theorists deny is the claim expressed in Grice’s first Quality maxim, that speakers are expected to say something literally true. It follows from the presumption of relevance that speakers are expected to communicate something true, since an utterance cannot be relevant without achieving some true cognitive effects (Wilson & Sperber, 2002).
including conversational implicatures – are derivable only on the assumption that the co-operative principle is being observed. According to Sperber and Wilson (1986/1995, pp. 161–2), by contrast, the only purpose a genuine communicator and a willing audience have to share is that of achieving uptake, that is, getting the audience to recognise the communicator’s overtly expressed intention to inform them of something. While some communicative exchanges are co-operative in Grice’s sense, the presence of an accepted purpose or direction is seen in relevance theory as just one of many contextual factors that can play a role in comprehension. It may be outweighed by other factors (as when a speaker breaks off to comment on some unexpected event), or it may be entirely absent (as in casual conversation, hostile cross-examination or subtler forms of conversational tug-of-war). This difference has implications for comprehension. In Grice’s framework, a speaker can conversationally implicate that she is unable to provide some required information (since in order to provide it, she would have to violate the Quality maxims) but not that she is unwilling to provide it, since in this case she would be violating the co-operative principle itself. For relevance theorists, inferences about the speaker’s abilities and preferences play an equal and parallel role in comprehension, so a speaker who fails to provide some required information may be just as well understood (in appropriate circumstances) as implicating that she is either unwilling or unable to provide it.

Relevance theory, then, treats utterance comprehension as an inferential process which takes as input the production of an utterance by a speaker, together with contextual information, and yields as output an interpretation of the speaker’s meaning. Utterance comprehension is seen as essentially an exercise in mind-reading, and the challenge for relevance theorists attempting to build a psychologically plausible, empirically testable pragmatic theory is precisely to explain how the closed formal system of language provides effective pieces of evidence which, combined with contextual information, enable successful comprehension to take place. The current version of the theory is a result of many years of collective endeavour by linguists, philosophers and cognitive scientists. Here I will briefly outline some of its main assumptions (while attempting to clear up some common misconceptions), and point out some recent developments and new directions for research.

2 Relevance and Cognition

Relevance theory is grounded in a definition of relevance and two principles of relevance: a cognitive and a communicative principle. The definition of relevance was not intended to capture any of the ordinary-language senses of the word, but to provide a useful theoretical concept which picks out an important psychological property and has enough in common with these ordinary-language senses to justify the name (Sperber & Wilson, 1986/1995, p. 119). Some commentators see the resulting theoretical concept as not having enough in

---

6 Grice (1989, pp. 369-70) describes these as ‘degenerate, derivative’ cases which ‘honor the co-operative principle at least to the extent of aping its application’, and adds that ‘collaboration in achieving exchange of information … may co-exist with a high degree of reserve, hostility, and chicanery and with a high degree of diversity in the motivations underlying quite meagre common objectives’. Given these substantial qualifications, it is not obvious what his insistence on the need for his co-operative principle brings to his account.

7 This difference has implications for the treatment of scalar inferences; see e.g., Sperber and Wilson (1986/1995, pp. 272-278); Carston (1998); Noveck and Sperber (2007).

8 Recent book-length discussions include Blakemore (2002); Carston (2002); Wharton (2009); Wilson and Sperber (2012b); Clark (2013); Ifantidou (2014). Recent encyclopaedia entries include Wilson and Sperber (2004); Sperber and Wilson (2005); Carston and Powell (2006); Carston (2012, in press). I will try to complement, rather than repeat, those earlier discussions where possible.
common with the everyday sense of the word. While this is a largely terminological matter, it does raise a substantive issue about the nature of relevance, and is worth a brief response.

Most linguists attempting a theoretical definition of relevance start from notions such as ‘relevance to a purpose’, ‘relevance to a question’, or ‘relevance to a topic’, where the purpose, question or topic is fixed (or sharply delimited) in advance of the comprehension process rather than identified in the course of comprehension. Sperber and Wilson (1986/1995, chapter 3) start by defining two more general notions: ‘relevance in a context’ and ‘relevance to an individual’. A context comprises mentally represented information of any type – beliefs, doubts, hopes, wishes, plans, goals, intentions, questions, etc. – and is constructed or selected in the course of the comprehension process from a range of potential contexts available to the individual. One reason for treating these more general notions as basic is that considerations of relevance play a fundamental role not only in communication but in cognition. The aim is to define relevance not only for utterances or other communicative acts, but for any external stimulus or internal mental representation which can provide an input to cognitive processes, so that not only utterances but sights, sounds, smells, thoughts, memories or conclusions of inferences may all provide potentially relevant inputs (for an individual, at a time). While it is not implausible that many utterances contribute to an accepted purpose, question or topic which is fixed in advance of the comprehension process, it is quite implausible that the same is generally true of cognition.

Suppose you are watching a tennis match on television. You happen to notice that one of the players repeatedly bounces the ball eight times before serving, while the other bounces it once or twice and serves straight away. Is this information relevant to you? Intuitively, it will be relevant if it interacts with some contextual information you have available to achieve a worthwhile cognitive effect: for instance, by enabling you to draw conclusions about the characters of the players, confirming your suspicion that one of them is more nervous than the other, answering a question about which of them is more likely to win, helping you decide whether to go on watching the match, and so on. According to relevance theory, other things being equal, the greater the cognitive effect achieved, and the smaller the mental effort required, the more relevant this input will be to you at the time (Sperber & Wilson, 1986/1995, pp. 260-66). In this framework, relevance to a purpose, question or topic is a special case of relevance in a context or relevance to an individual. Typically, an input achieves relevance in a context consisting of information of many different types, none of which seems to play a privileged role in the derivation of cognitive effects.

Why did you notice the players’ ball-bouncing techniques, and why did you interpret them in the way you did? At any point in your waking life, a huge variety of potential inputs are competing for your attention, and a fundamental problem for human cognition is how to allocate attention and processing resources among them. According to relevance theory, as a result of constant selection pressures towards increasing cognitive efficiency, the human cognitive system has developed a variety of mental mechanisms or biases (some innate, others acquired) which tend to allocate attention to inputs with the greatest expected relevance, and process them in the most relevance-enhancing way. This claim is expressed in the cognitive principle of relevance (‘Human cognition tends to be geared to the maximisation of relevance’) (Sperber & Wilson, 1986/1995, pp. 260-66). On this approach, you happened to notice the players’ ball-bouncing techniques because, given the organisation of your cognitive system, of all the potential inputs competing for your attention, this one had the greatest expected relevance for you at the time; and you interpreted this input in the

---

9 Levinson (2000, p. 55) describes Sperber and Wilson’s notion of relevance as ‘a very inadequate characterization of what pretheoretically would generally be considered the nature of relevance’, and Bach (2010, p. 135) refers to ‘relevance theorists’ highly idiosyncratic and misleading use of the term’.
context of your knowledge of tennis and tennis players, plans for the afternoon and so on, because given the organisation of your cognitive system, of all the potential contexts available to you, this was expected to enhance its relevance most. More generally, what makes an input relevant to an individual is that it interacts with contextual information he has available to yield worthwhile cognitive effects (e.g., warranted conclusions, warranted strengthenings or revisions of available information), and what makes it maximally relevant to the individual is that it yields greater effects, for less effort, than any alternative input available to him at the time.

A common objection to the Cognitive Principle is that it is too vague and general to be falsifiable. However, it would be straightforwardly falsified by evidence that human attention and processing resources are systematically allocated on some other basis: for instance, to inputs which are expected to be informative without being relevant, to yield many associations but few inferential effects, to be cheap to process regardless of any expected effects, or to have many effects regardless of the processing costs incurred. The cognitive principle also makes a number of testable predictions about human perceptual, memory retrieval and inferential mechanisms. Here, I will consider just one.

It follows from the cognitive principle that human inferential mechanisms tend spontaneously to derive potentially relevant conclusions (i.e., conclusions expected to lead on to further cognitive effects), ignoring others which are logically valid but have few expected effects. This prediction was experimentally tested by Van der Henst, Sperber, and Politzer (2002). Participants were given pairs of premises such as (1a)-(1b) (a ‘determinate relational problem’) or (2a)-(2b) (an ‘indeterminate relational problem’) and simply asked ‘What follows?’

**Determinate relational problem:**
(1)  a. A is taller than B.
    b. B is taller than C.

**Indeterminate relational problem**
(2)  a. A is taller than B.
    b. C is taller than B.

In principle, any set of premises yields an infinite number of logically valid conclusions, and if the goal of human inferential mechanisms were merely to derive valid conclusions, participants should be able to go on listing conclusions indefinitely. In practice, participants typically provide a single conclusion or none at all, because they interpret the question as ‘What of relevance follows?’ Thus, when presented with indeterminate relational problems such as (2), 43% of participants said ‘Nothing follows’ (whereas only 8% said ‘Nothing follows’ when presented with determinate relational problems such as (1), which yield a highly salient and potentially relevant conclusion). These results confirm the prediction that human inferential mechanisms do not simply derive logically valid conclusions regardless of their potential relevance.

Moreover, participants who did draw conclusions from the indeterminate relational problems tended to produce ‘single-subject’ conclusions (e.g., ‘B is shorter than A and C’)

---

10 Of course, there is no way of guaranteeing that the cognitive system will make the right choices on every occasion, and what it expects to be relevant on a given occasion may turn out not to be. Hence the reference in the cognitive principle to a tendency to maximise relevance.

11 For recent discussion, see the papers in Burton-Roberts (2007) and Soria and Romero (2010).
rather than ‘double-subject conclusions’ (e.g., ‘A and C are taller than B’), even when, as in (2a) and (2b), this involved the extra effort of substituting one lexical item for another and altering the syntax of the premises. Van der Henst, Sperber, et al. (2002) argue that the extra effort is justified by the fact that single-subject conclusions have greater expected relevance than double-subject conclusions, since they are more likely to combine with available contextual information to lead on to further conclusions. This surprising result is predictable on the assumption that human inferential mechanisms are relevance-oriented, and hard to explain in other terms.

3 Relevance and Communication

The claim that human cognition is relevance-oriented has immediate implications for pragmatics. For communication to succeed, the speaker needs the addressee’s attention. Since attention tends to go automatically to what is most relevant at the time, a prerequisite to successful communication is that the addressee must take the utterance to be relevant enough to be worth attending to. Then a speaker, by the very act of addressing someone, communicates that the utterance meets this precondition, and this is what the communicative principle of relevance states (Sperber & Wilson, 1986/1995, pp. 266-78):

**Communicative principle of relevance**

Every utterance communicates a presumption of its own optimal relevance

Notice that the presumption mentioned in the communicative principle is one of optimal, not maximal, relevance. Although addressees might want speakers to aim at maximal relevance, and helpful speakers may indeed try to give them what they want, what addressees are entitled to expect within this framework is something rather less.

An utterance is optimally relevant under two conditions:

**Optimal relevance**

a. It is at least relevant enough to be worth the addressee’s processing effort.

b. It is the most relevant one compatible with the speaker’s abilities and preferences.

According to clause (a), the addressee is entitled to presume that the utterance is at least relevant enough to be worth his processing effort; otherwise, he will not attend to it at all.12

According to clause (b), he is also entitled to presume that the speaker will have gone beyond this minimal level of relevance – to the extent that she is both willing and able to – by reducing the processing effort required and increasing the cognitive effects achieved, thus increasing her chances of holding his attention and getting her point across (Wilson & Sperber, 2002).

Given this background, there is a practical heuristic that addressees can use in identifying the speaker’s meaning (i.e., the array of cognitive effects that she overtly intended to achieve):

12 How relevant the utterance has to be to meet this condition depends on what else is going on in the addressee’s cognitive environment at the time: the more relevant the other inputs competing for his attention, the more relevant the utterance has to be to be worth his processing effort.
Relevance-guided comprehension heuristic (Wilson & Sperber, 2002)

a. Follow a path of least effort in constructing an interpretation of the utterance (and in particular in resolving ambiguities and referential indeterminacies, adjusting lexical meaning, supplying contextual assumptions, deriving implicatures, etc.).

b. Stop when your expectations of relevance are satisfied.

The goal is to find an overall interpretation that confirms the presumption of optimal relevance. For this, the addressee must enrich the decoded sentence meaning at the explicit level, and complement it at the implicit level, so as to yield enough cognitive effects to satisfy his expectations of relevance. The relevance-guided comprehension heuristic is an automatic procedure for achieving this goal; it is seen in relevance theory as belonging to a specialised comprehension module, a component of a broader mind-reading module dedicated to attributing mental states in order to explain and predict behaviour.\(^\text{13}\)

What makes it reasonable for the addressee to follow a path of least effort is that the speaker is expected (within the limits of her abilities and preferences) to have made the utterance as easy as possible for him to understand. Since relevance varies inversely with effort, the very fact that an interpretive hypothesis is easily accessible gives it an initial degree of plausibility (an epistemic advantage specific to communicated information). What makes it reasonable for the addressee to stop at the first interpretation which satisfies his expectations of relevance is that a speaker who knowingly produced an utterance with two or more significantly different interpretations, each yielding the expected level of cognitive effect, would put him to the gratuitous extra effort of choosing among them, and the resulting interpretation (if any) would not satisfy clause (b) of the presumption of optimal relevance. Thus, when a hearer following the path of least effort finds an interpretation that is relevant in the expected way, in the absence of contrary evidence, this is the best possible interpretive hypothesis. Since comprehension is a non-demonstrative inference process, this hypothesis may well be false. This can happen when the speaker formulates the utterance in a way which is inconsistent with the expectations raised, so that the normal inferential routines of comprehension fail. Failures in communication are common enough. What is remarkable and calls for explanation is that communication works at all.

A common objection to the communicative principle is that it is too vague and general to be falsifiable. However, this is often based on a misconception. It has been suggested, for instance, that a hearer looking for the most relevant interpretation of an utterance can never be sure of having found it, since by spending a little more effort, it may be possible to achieve substantially greater effects, and hence more relevance (Bach, 2010, p. 136). But, as noted above, the hearer’s goal is not to find the most relevant interpretation: it is to construct an overall interpretation on which the utterance satisfies the presumption of optimal relevance.\(^\text{14}\) Moreover, as shown above, the relevance-guided heuristic has a clear stopping point.

The communicative principle would be straightforwardly falsified by evidence that communicators systematically orient to some other property of utterances than optimal relevance. This could happen, for instance, if speakers systematically aim at literal truthfulness rather than optimal relevance, or produce utterances which are informative without being relevant, or prefer to save their own effort even if the result is not relevant enough to be worth processing. Here, relevance theory comes into direct conflict with Grice’s framework. For Grice, the first Quality maxim was the most important of all the maxims

---


\(^{14}\) Or, in more complex cases, on which the speaker might have thought it would satisfy, or at least seem to satisfy, the presumption of optimal relevance (Sperber, 1994; Wilson, 2000).
(Grice, 1989, pp. 27, 371), and from this it should follow that considerations of literal truthfulness systematically outweigh those of informativeness, relevance or perspicuity. The theoretical consequences of this difference between the two frameworks were discussed in Wilson and Sperber (2002) and experimentally tested by Van der Henst, Carles, and Sperber (2002).

In an initial experiment, Van der Henst, Carles, and Sperber (2002) simply approached strangers in the street and asked ‘Do you have the time, please?’, giving no indication of why the question was being asked. The prediction was that, if the speaker’s watch showed (say) 3.13, in the absence of any indication that some crucial implications would be lost, an answer rounded to the nearest five minutes would be easier for the hearer to process, and hence more likely to be produced by a speaker aiming at optimal relevance. And indeed, 97% of participants with analogue watches gave a rounded answer, while 57% of those with digital watches went to the extra effort of producing a rounded answer rather than simply reading off a strictly accurate (and literally truthful) answer, thus confirming the prediction that speakers systematically aim at optimal relevance rather than literal truthfulness.

In a second experiment, the experimenters asked ‘Do you have the time, please? My watch has stopped’, thus explicitly indicating that a strictly accurate answer would be more relevant than a rounded one. Here, the percentage of rounders fell from 97% to 49% (only results for participants with analogue watches were reported in this experiment), suggesting that speakers tend to provide strictly accurate (i.e., literally truthful) answers when they expect them to be relevant. In a third experiment, the experimenters asked ‘Do you have the time, please? I have an appointment at 4.00’, at different intervals in the half hour leading up to the imaginary appointment. The results showed that speakers tended to give more strictly accurate answers as the time of the imaginary appointment approached (when some crucial implications might be lost by rounding). These results are straightforwardly predictable on the assumptions of relevance theory, and hard to explain in frameworks where a maxim of literal truthfulness is seen as the most important of all the maxims (for further tests of the cognitive and communicative principles, see Van der Henst and Sperber (2004)).

### 4 The Explicit–Implicit Distinction

The term ‘explicature’ was introduced in early work in relevance theory to avoid a potential problem with Grice’s notion of what is said (Wilson & Sperber, 1981; Sperber & Wilson, 1986/1995, p. 182). For Grice, what is said does double duty: it refers to (a) the result of combining sentence meaning with disambiguation and reference resolution (often described as the proposition literally expressed and treated as the output of semantics), and (b) part of speaker’s meaning (e.g., what is asserted rather than implicated). The problem is that (a) and (b) do not necessarily coincide.

Consider Mary’s utterance in (1b):

(3)  
   a. Peter: Let’s ask Billy to see a film with us tonight. 
   b. Mary: He has to finish a paper.

Suppose that the result of combining the meaning of the sentence uttered with disambiguation and reference resolution is the proposition in (4) (where \( PAPER_1 \) denotes academic papers, parliamentary papers, conference papers etc., but not newspaper enterprises):

(4)  
   \( \text{Billy}_i \) has to finish doing something with a \( PAPER_1 \) at some point in the future.
This is what Mary has *said* in sense (a) above. However, if Peter understood Mary as merely asserting (4), her utterance would not satisfy his expectations of relevance, since it does not imply a clear response to his proposal in (3a). He is therefore likely to interpret her as asserting something richer and more pragmatically satisfactory, such as (5):

(5) Billy\textsubscript{i} has to finish writing a PAPER\textsubscript{1} soon.

By combining (5) with the contextual information in (6a), he could derive the implicature in (6b), thus arriving at an overall interpretation that satisfies his expectations of relevance:

(6) a. A good reason for not asking someone out is that they have to finish writing a PAPER\textsubscript{1} soon.
   b. They shouldn’t ask Billy\textsubscript{i} out because he has to finish writing a PAPER\textsubscript{1} soon.

Here, the two notions of *what is said* come apart.

Moreover, it seems clear that disambiguation and reference resolution are also geared to finding a pragmatically satisfactory overall interpretation, and therefore fall within the scope of pragmatics rather than semantics. In (3b), for instance, a hearer using the relevance-guided comprehension heuristic will interpret ‘he’ as referring to Billy\textsubscript{i}, and disambiguate ‘paper’ as PAPER\textsubscript{1}, because these are the most salient hypotheses which lead on to an overall interpretation that satisfies his expectations of relevance. What is left of the linguistic meaning of (3b) once disambiguation and reference resolution are removed is quite fragmentary and incomplete, and falls far short of determining a unique proposition literally expressed; Sperber and Wilson (1986/1995, pp. 72-5) call this fragmentary sentence meaning a logical form. As noted above, the hearer’s goal in developing the logical form of (3b) into a fully propositional form is to find an overall interpretation that satisfies his expectations of relevance. For this, he uses the relevance-guided comprehension heuristic, following a path of least effort in using contextual information to disambiguate the ambiguous word ‘paper’, assign reference to the pronoun ‘he’, enrich his interpretation of what Billy is doing to the paper and when he will do it, in such a way that the result will yield enough contextual implications (and other cognitive effects) to make the utterance relevant as expected.

On this approach, interpreting an utterance is like solving a complex simultaneous equation, and the interpretation process is crucially seen as carried out in parallel rather than in sequence. It is not a matter of *first* identifying the explicit content, *then* supplying contextual assumptions and *then* deriving contextual implications (and other cognitive effects), but of mutually adjusting tentative hypotheses about explicit content, context and cognitive effects, with each other and with the presumption of relevance, and stopping at the first overall interpretation that makes the utterance relevant in the expected way. In interpreting (3b), for instance, Peter will expect it to achieve relevance by implying a response to his proposal in (1a), and this places a strong constraint on the route he will take in developing the encoded logical form into a fully propositional form: it must be such that it combines with easily available contextual assumptions to imply a response of the expected type (on mutual adjustment, see Sperber & Wilson (1998); Wilson & Sperber (2002)).

To avoid proliferating notions of ‘what is said’, Sperber and Wilson (1986/1995, p. 182) introduced the term ‘explicature’, on the analogy of Grice’s ‘implicature’, to refer to what is explicitly communicated. An explicature has two defining features: (a) it is a communicated proposition (i.e., part of the speaker’s meaning), and (b) it is identifiable by a combination of decoding and inference (i.e., by inferentially developing an encoded logical form into a fully propositional form). Everything else communicated is an implicature. On this approach, the explicit–implicit distinction is exhaustive – a communicated proposition must be either an
explicature or an implicature – but explicatures vary in the relative proportions of decoding and inference involved. Compare Mary’s utterance in (3b) with the alternative formulations in (7a)-(7c):

(3)  
   a. He has to finish a paper.
   b. He has to finish a paper.

(7)  
   a. Billy has to finish a paper.
   b. Billy Smith has to finish writing a paper.
   c. Billy Smith has to finish writing an academic paper soon.

Although the explicature is the same in all cases, each of (7a)-(7c) involves more decoding and less inference than its predecessor, and intuitively makes the speaker’s meaning more explicit. Explicitness is therefore definable not only as a yes–no matter but as a matter of degree: the greater the relative contribution of decoding, and the smaller the relative contribution of pragmatic inference, the more explicit the speaker’s meaning will be (Sperber & Wilson, 1986/1995, p. 182).

‘Explicature’ was intended as a theory-neutral term to be used in any framework, and it has been widely (though by no means universally) adopted. Some writers (notably Bach, 1994, 2010) object to it on terminological grounds, and since the objection raises an issue of substance, it is worth a brief mention here. Bach sees use of the term ‘explicature’ as misleading because what is communicated is not made ‘fully explicit’, and proposes the term ‘impliciture’ instead:

What [relevance theorists] regard as explicit is, in general, not fully explicit but partly implicit. Indeed, this is suggested by their term ‘explicature’, which is a cognate of ‘explicate’, not ‘explicit’. To explicate something is to spell it out, and to spell out the explicature of an utterance would be to make fully explicit what has in fact been left partly implicit. That is why I call this partly implicit content an ‘impliciture’ (the term should not suggest that all of an impliciture is implicit).

(Bach, 2010, p. 131)

To which a relevance theorist might reasonably respond: if ‘impliciture’ is an appropriate name for a communicated proposition that is partly explicit and partly implicit, why isn’t ‘explicature’ equally appropriate? How is the substitution of ‘impliciture’ for ‘explicature’ a step forward?

But there is a more substantive issue behind this apparent terminological dispute. For Bach, the only way to express a thought explicitly is to encode it, and the function of linguistic meaning is precisely to enable the encoding of thoughts:

My main reason for thinking that at least some sentences express propositions is very simple. If none did, then none of our thoughts would be explicitly expressible. Indeed, it is arguable that all of our thoughts are explicitly expressible, in which case for every thought there is at least one sentence that would express it explicitly. (Bach, 2010, p. 129)


16 In fact, relevance theory’s explicit–implicit distinction applies only to communicated propositions, and not to their constituents. One might describe the constituents of propositions as being ‘tacitly’ or ‘overtly’ (rather than ‘explicitly’ or ‘implicitly’) expressed.
For Bach, ‘explicit’ is an absolute term, like ‘empty’, and anything less than ‘fully explicit’ is not explicit at all. For relevance theorists, the function of linguistic meaning is not to encode the speaker’s meaning but to provide evidence of it, and the idea that any thought (let alone all of them) can be fully encoded, has been rejected from the outset (see e.g., Sperber \& Wilson (1986/1995, pp. 191-3); Carston (2002, chapter 1.3)). As Wilson and Sperber (2012b, p. ix) put it,

There are always components of a speaker’s meaning which her words do not encode: for instance, the English word ‘he’ does not specifically refer to [e.g., Billy in (3b)]. Indeed, we would argue that the idea that for most, if not all, possible meanings that a speaker might intend to convey, there is a sentence in a natural language which has that exact meaning as its linguistic meaning is quite implausible.

For relevance theorists, ‘explicit’ is both a classificatory and a comparative concept: any communicated proposition with a linguistically encoded conceptual constituent is explicit to some degree, and the greater the proportion of decoding to inference, the more explicit it will be. On this approach, any utterance can be made more explicit, and there is no such thing as ‘full explicitness’ (what would be the ‘fully explicit’ version of Mary’s utterance in (3b)?). Thus, debates about the appropriateness of the term ‘explicature’ have their roots in a deeper disagreement about the role of linguistic meaning in communication. However, since it is generally agreed that ‘explicatures’ and ‘implicitures’ involve both decoding and inference, it is not legitimate to object to ‘explicature’ on the ground that it is partly explicit and partly implicit and defend ‘impliciture’, which is partly implicit and partly explicit too.

5 Lexical Pragmatics and the Literal–Figurative Distinction

Lexical pragmatics explores the application of the semantics–pragmatics distinction at the level of the word or phrase rather than the whole utterance. A central goal is to investigate the processes by which linguistically encoded word meanings are adjusted (or ‘modulated’) in use.\(^\text{17}\) Well-studied examples of such processes include lexical narrowing (e.g., *drink* used to mean ‘drink alcohol’, or ‘drink substantial amounts of alcohol’), approximation (e.g., *square* used to mean ‘squarish’) and metaphorical extension (e.g., *nightmare* used to mean ‘bad experience’). A striking feature of much existing research in this area is that narrowing, approximation and metaphorical extension tend to be seen as distinct processes which lack a common explanation. Relevance theorists have been trying to develop a more unitary account based on two main claims. First, there is no presumption of literalness: linguistically specified word meanings are typically adjusted in the course of pragmatic interpretation, using available contextual information. Second, there is a continuum of cases of broadening, from approximation through to ‘figurative’ uses such as hyperbole and metaphor, which all involve the same interpretive mechanisms and can be explained in the same way. Here I will briefly compare relevance theory’s approach to lexical narrowing and broadening with two alternative accounts.

Lexical narrowing involves the use of a word or phrase to convey a more specific concept (with a narrower denotation) than the linguistically encoded meaning. For instance, *red* is typically narrowed in different directions in common adjective-noun combinations

(e.g., red eyes, red apple, red hair, red stamp, etc.), picking out a different shade, distributed in different ways across the surface of the object, in different combinations. One approach which fits well with the stereotypical nature of much lexical narrowing is to treat it as a variety of default inference. For instance, Levinson (2000, pp. 37-8, pp. 112-34) analyses narrowing as involving a default inference governed by an Informativeness heuristic (‘What is expressed simply is stereotypically exemplified’), itself backed by a more general I-principle instructing the hearer to

Amplify the informational content of the speaker’s utterance, by finding the most specific interpretation, up to what you judge to be the speaker’s intended point (…). (Levinson, 2000, p. 114)

On this approach, hearers are seen as automatically constructing a stereotypical (or otherwise enriched) interpretation and accepting it in the absence of contextual counter-indications. The alternative view, developed in relevance theory, is that lexical narrowing is a far more creative and flexible process, involving the construction of ad hoc, occasion-specific concepts influenced by a much wider range of cognitive and contextual factors than default approaches take into account. Thus, in order to satisfy expectations of relevance, the interpretation of red eyes might be narrowed to different degrees, and in different directions, in different contexts, yielding a range of occasion-specific (‘ad hoc’) concepts, e.g., [RED EYES]*, [RED EYES]**, and so on. How might one choose between these two accounts?

For Levinson (2000), default narrowings are generalised conversational implicatures, to be dealt with in a theory of utterance-type meaning designed to explain how sentences are systematically paired with preferred interpretations regardless of the contexts in which they occur. Levinson contrasts this with a theory of utterance-token meaning, or speaker’s meaning, such as relevance theory, which is designed to take context and speaker’s intentions into account. It should follow that on Levinson’s approach, information about the wider discourse context cannot affect the outcome of lexical narrowing, and the same default interpretation (specifying a certain shade and degree of redness, distributed over certain parts of the eye) must be automatically assigned to every occurrence of red eyes, and accepted in the absence of contextual counterindications.

As Noveck and Sperber (2007) point out, on the assumption that communicative systems tend to favour least-effort principles and to evolve in the direction of increasing efficiency, the value of a default-based approach will depend heavily on the distributional frequencies of interpretations on which the default interpretation proves acceptable and those in which it has to be overridden or cancelled for contextual reasons. To provide some evidence, Kolaiti and Wilson (2014) took the phrase red eyes – which does not seem obviously to favour either a default or a relevance-theoretic approach – and examined its occurrences in the Bank of

---

18 The notion of a default inference has been developed in many different ways; see e.g., Levinson (2000, chapter 1.5); Geurts (2009); Jaszczolt (2014).

19 Notice, though, that the I-Principle does not explain how the hearer identifies the speaker’s intended meaning, but presupposes that he has some independent means of judging what this is. To put it slightly unkindly, the I-Principle says ‘Choose a more specific interpretation if you think this is what the speaker intended.’ But the goal of a pragmatic theory is to explain how hearers decide that a certain meaning was intended, and given that lexical broadening is just as common as lexical narrowing, the I-Principle does not get us any closer to this goal.

20 I will follow the usual practice of representing linguistically encoded meanings (‘lexical concepts’) in small capitals (RED) and occasion-specific meanings (‘ad hoc concepts’) in small capitals followed by one or more asterisks (RED*, RED**…).
English (a 56 million word corpus). They found that Levinson’s (2000) default-based approach would guide the hearer in the right direction – and therefore help with processing costs – in roughly 50% of cases (i.e., those involving crying, fatigue, flu/cold, eye damage, eczema, heat/sand and sore eyes in humans), but would be positively misleading and incur the costs of cancellation in the remaining 50% of cases (i.e., those involving e.g., flash photography, animals, insects, supernatural beings, fictional entities and inconclusive cases with no obvious justification for narrowing at all). A more flexible inferential approach such as relevance theory would involve context-sensitive – and therefore relatively costly – fine tuning of the encoded lexical meaning in the full range of cases, but without the costs of default derivation followed by cancellation and reinterpretation in 50% of the cases. As Kolaiti and Wilson point out, it is far from obvious that the statistical tendencies revealed by their corpus justify a default rather than an inferential account of lexical narrowing on grounds of economy of processing, yet this was the main rationale for the default approach proposed in Levinson (2000, chapter 1.3).

A further claimed advantage of default-based approaches to narrowing is that they explain the ready accessibility of ‘normal’, or ‘stereotypical’, narrowings in the absence of special contextual factors. However, there are other ways of explaining this ready accessibility without appeal to defaults, as in Horn’s approach based on his R principle (‘Say no more than you must’) or relevance theory’s approach, which predicts that ‘normal’ or ‘stereotypical’ interpretations will be less costly to construct in most circumstances, and will therefore be selected by the relevance-guided comprehension heuristic as long as they yield enough implications to satisfy the audience’s expectations of relevance. Moreover, neo-Griceans such as Levinson, Horn and Blutner, who have been primarily concerned with lexical narrowings of a fairly stereotypical sort, have said little or nothing about how they would treat loose, hyperbolic or metaphorical uses of language, which are heavily context dependent and are standardly treated as violating Grice’s first Quality maxim. As noted above, relevance theorists have consistently argued against this maxim and defended the view that there is a continuum between literal, loose and metaphorical uses rather than a set of clearly definable theoretical categories which play distinct roles in communication and comprehension. How might one assess these alternative approaches?

Lexical broadening involves the use of a word or phrase to convey a more general concept (with a broader denotation) than the linguistically encoded meaning. As noted above, a striking feature of much research in this area is that different interpretive procedures have been proposed for a range of phenomena which could all be seen as varieties of broadening. Thus, approximation is often treated as a case of pragmatic vagueness involving different contextually determined standards of precision (Lewis, 1979; Lasersohn, 1999). Metaphor and hyperbole are still widely seen as involving blatant violation of Grice’s first Quality maxim, with the use of metaphor implicating a related simile or comparison and the use of hyperbole implicating a related weaker proposition (Grice, 1967/1989). Typically, these accounts do not generalise: metaphors are not analysable as rough approximations, approximations are not analysable as blatant violations of a maxim of truthfulness, and so on. Relevance theorists have been exploring the hypothesis that there is no clear cut-off point between literal use, approximation, hyperbole and metaphor, but merely a continuum of cases of broadening, which are all understood in the same way, using the same relevance-guided comprehension heuristic.21 On this approach, approximation, metaphor and hyperbole are not natural kinds, which are dealt with by different mechanisms, and there is no fact of the matter

---

about what is ‘really’ a metaphor or hyperbole and what is not. In what follows, I will use these terms as handy descriptive labels rather than theoretical concepts.

It is worth highlighting two important differences between the Gricean and relevance-theoretic approaches to broadening. First, Grice retains a sharp distinction between literal and figurative uses, and like many philosophers of language, he appears to see loose talk and rough approximations as falling on the literal rather than the figurative side (to be analysed as involving contextually determined standards of precision rather than blatant violation of a maxim of literal truthfulness). Second, he sees figurative uses such as metaphor and hyperbole as not contributing to truth-conditional content or ‘what is said’, but merely to what is implicated. By contrast, relevance theorists deny that there is a clear theoretical distinction between literal and figurative uses, and treat the ad hoc concepts derived via lexical-pragmatic processes as contributing to truth-conditional content (explicatures) across the whole ‘literal–figurative’ continuum.

In the light of this, consider the use of _painless_ in (8):

(8) _Dentist to patient_: The injection will be _painless_.

On a relevance-theoretic approach, _painless_ in (8) might be taken to convey either its literal meaning, _PAINLESS_ (‘with no pain’) or an approximation, _PAINLESS*_ (‘with almost no pain’). But the presence of the small amount of pain that would justify classifying _painless_ in (8) as an approximation shades off imperceptibly into the amount of pain that would justify classifying it as a hyperbole, _PAINLESS**_, (‘with less pain than expected or feared’). The Gricean framework predicts that this imperceptible shading off gives rise to a dramatic difference in processing on either side of the approximation/hyperbole divide: on the one side, the speaker is making a genuine assertion, albeit under reduced standards of precision, whereas on the other side, she is merely implicating that the injection won’t hurt too much. As far as I know, there is no experimental evidence whatsoever of such a dramatic processing difference between different degrees of broadening. In the relevance-theoretic framework, by contrast, where both approximation and hyperbole contribute to truth-conditional content or explicatures, this imperceptible shading off between approximation and hyperbole is both predicted and explained.

All this suggests that the goal of an adequate pragmatic theory should be to provide a unitary account of the full range of lexical-pragmatic processes. However, largely as a result of historical accident (perhaps combined with differences in intellectual taste), the only explicit attempts so far at developing such an account have been made by relevance theorists. Neo-Griceans working on lexical narrowing have shown little interest in extending their account to cover metaphor or hyperbole; philosophers and literary scholars working on metaphor and hyperbole have shown no interest in extending their account to approximation or narrowing, and so on, and semanticists and logicians working on approximation have shown little interest in metaphor or hyperbole. This is not, of course, to claim that relevance theory offers the only possible unitary account: the challenge is to propose a better one.

6 The Conceptual–Procedural Distinction

The conceptual–procedural distinction was introduced into relevance theory by Diane Blakemore (1987, 2002) to account for differences between regular ‘content’ words such as _dog_, or _red_, which are standardly seen as encoding concepts that contribute to the truth-conditional (assertive) content of utterances, and discourse connectives such as _so_, or _after all_, which are standardly seen as non-truth-conditional. Blakemore suggested an original rationale for non-truth-conditional meaning, arguing that the function of discourse
connectives is to guide the inferential comprehension process by imposing procedural constraints on the construction of intended contexts and cognitive effects. On this approach, *so* in (9a) does not affect the assertive content of the utterance, but is used to indicate that what follows it is a contextual implication of the fact that it is raining, while *after all* in (9b) is used to indicate that what follows it is intended to strengthen the preceding claim that the grass is wet:

(9)  
- a. It’s raining, *so* the grass is wet.
- b. The grass is wet. *After all*, it’s raining.

This approach has been insightfully applied to a wide range of discourse connectives in many languages.\(^{22}\)

In an initial phase of research, the conceptual–procedural distinction was seen as coinciding with the distinction between truth-conditional and non-truth-conditional meaning. However, it soon became clear that this parallel breaks down in several ways. In the first place, illocutionary adverbials such as *frankly* in (10a), which are standardly seen as non-truth-conditional, have synonymous manner-adverbial counterparts which contribute to truth conditional content in regular ways, as in (10b) (Bach & Harnish, 1979):

(10)  
- a. Frankly, Bill should resign.
- b. John spoke frankly to Anne.

The simplest solution is to treat both uses of *frankly* as encoding the same concept, which contributes to truth-conditional content in (10b), but not in (10a). Wilson and Sperber (1993) analyse illocutionary adverbials as contributing to so-called ‘higher-order explicatures’, which carry information about the speaker’s propositional or affective attitude, or the type of speech act she intends to perform, rather than contributing directly to truth-conditional content; thus, *frankly* in (10a) would be taken to indicate that the speaker is telling Bill frankly that he should resign. On this approach, illocutionary adverbials are both conceptual and non-truth-conditional.

In the second place, the parallel between procedural and non-truth-conditional meaning breaks down for a range of referential expressions such as *I*, *she*, *now* and *then*. These clearly contribute to truth-conditional content rather than implicatures, but are not plausibly seen as encoding full-fledged concepts, since their referents vary from context to context and have to be pragmatically inferred. Wilson and Sperber (1993) analyse them as encoding procedural constraints on reference resolution, so that *she*, for instance, restricts the set of potential referents to those appropriately picked out by use of a feminine pronoun. On this account, *she* is both procedural and truth-conditional.\(^{23}\)

Finally, a variety of non-truth-conditional items such as mood indicators, sentence and discourse particles, interjections and intonation have been analysed as encoding a still further type of procedural constraint, this time on the construction of higher-order explicatures.\(^{24}\) For instance, the addition of an interrogative particle, question intonation or interrogative word

\(^{22}\) For recent discussions, see e.g., Iten (2005); Hall (2007); Unger (2007); Escandell-Vidal, Leonetti, and Ahern (2011).

\(^{23}\) For procedural approaches along these lines, see e.g., Hedley (2007); Powell (2010); Scott (2013a, b); Escandell-Vidal et al. (2011).

\(^{24}\) See e.g., Wilson and Sperber (1993); Fretheim (1998); Wilson (2000, 2011b); Wharton (2003, 2009); Wilson and Wharton (2006); Escandell-Vidal et al. (2011).
order to the utterance in (11) might trigger construction of the higher-order explicature in (12a), and use of the interjection *alas* or certain types of affective intonation in (11) might trigger the higher-order explicature in (12b):

(11)  Bill was at the party.
(12)  a.  The speaker is asking whether Bill was at the party.
     b.  The speaker is expressing regret that Bill was at the party.

Along these lines, the conceptual–procedural distinction might contribute in interesting ways to current debates on the distinction between descriptive and expressive meaning.  

The conceptual–procedural distinction as proposed in relevance theory raises several questions. For instance, given that procedural meaning need not contribute to truth conditions, in what sense is it properly semantic, and what explains the disparate nature of the procedural expressions described above? I will respond briefly to both questions here.

According to Sperber and Wilson (1986/1995, pp. 172-3), a linguistic expression is semantically interpreted by being put into systematic correspondence with other objects: for example, with the formulas of another language, with possible states of the world, or with states of the user of the language. Regular ‘content’ words in natural language are widely seen as semantically interpreted in the first of these ways, by being put into systematic correspondence with constituents of a conceptual representation system or ‘language of thought’; and conceptual representations are standardly seen as semantically interpreted in the second way, by being put into systematic correspondence with states of the world. Wilson (2011b) suggests that procedural expressions might be seen as semantically interpreted in the third way, by being put into systematic correspondence with states of the user of the language. The argument goes as follows.

According to the ‘massive modularity’ hypothesis (Sperber, 2005; Carruthers, 2006), the human cognitive system comprises a large array of domain-specific procedures with distinct developmental trajectories and breakdown patterns, which may be more or less highly activated in different circumstances, and are likely to alter their level of activation in response to different cues. Among the possible states of the user of a language will be those in which a certain cognitive mechanism or procedure is highly activated. Wilson (2011b) suggests that the function of the procedural expressions in a language may be to put the user of the language into a state in which some of these domain-specific cognitive procedures are highly activated (and hence more likely to be selected by a hearer using the relevance-guided comprehension heuristic).

One consequence of this proposal is that we might expect to find clusters of procedural items linked to different domain-specific capacities, with different developmental trajectories and breakdown patterns, and this seems to be just what we find. For instance, most languages have a cluster of procedural items (e.g., affective intonation, interjections, attitudinal particles) associated with mechanisms for emotion reading. The capacity to read emotions from facial and vocal cues is known to be present very early, and its outputs are particularly hard to analyse in conceptual terms (Wharton, 2003, 2009); expressions of this type are therefore particularly suitable for procedural treatment. Most languages also have a cluster of procedural items (e.g., mood indicators, intonation, various types of discourse particle) linked to mindreading mechanisms. A naïve capacity for attributing mental states to others is also thought to be present very early, although its outputs may not be available to introspection or

---

25 See, e.g., Blakemore (2011, in press); Carston (in press).

26 For discussion, see Bezuidenhout (2004); Escandell-Vidal et al. (2011).
general inference until much later. Languages with grammaticalised honorific systems contain a further cluster of procedural expressions which might be seen as linked to the capacity for social cognition. Finally, most languages also have a cluster of procedural items (e.g., punctuation, prosody and various types of discourse particle) whose function is to guide the inferential comprehension process in one direction or another.

As noted above, the standard relevance-theoretic account of procedural meaning treats procedural expressions as guiding the inferential comprehension process by constraining the construction of contexts and/or the derivation of cognitive effects. On the approach just outlined, there is more to be said about them than this. Notice that the capacities for mindreading, emotion reading and social cognition are not intrinsically linked to ostensive communication: for instance, we attribute mental states to others whether or not they are communicating with us. So whereas some procedural expressions (e.g., pronouns) activate mechanisms which are properly pragmatic, others activate mechanisms with a wide range of disparate functions, and this idea might be worth exploring further.

7 Concluding Remarks

A speaker producing an utterance has two distinct goals: to get the addressee to understand her meaning, and to persuade him to believe it. The addressee has two corresponding tasks: to understand the speaker’s meaning, and to decide whether to believe it. The first task involves the pragmatic ability to infer the speaker’s meaning from linguistic and contextual cues, by identifying the overtly intended cognitive effects. In (1b), for instance, Peter will understand Mary’s meaning if he recognises that she intends him to believe they shouldn’t ask Billy out that evening because he has to finish writing a paper soon. However, having understood her, he may not believe her, since he may suspect she is mistaken or lying.

The second task involves what Sperber, Clément, Heintz, Mascaro, Mercier, Origgi, and Wilson (2010) call a capacity for ‘epistemic vigilance’, which helps hearers avoid being accidentally or intentionally misinformed. There is a growing body of evidence suggesting that even at a very early age, children do not treat all communicated information as equally reliable, and that the capacity for epistemic vigilance develops alongside the capacity for inferential communication. Indeed, Sperber et al. suggest that comprehension, the search for relevance and epistemic vigilance may be seen as interconnected aspects of a single overall process whose goal is to make the best of communicated information.

One possible direction for future research would be to investigate points at which the capacities for mindreading, communication and epistemic vigilance might interact. For instance, there are well-known parallels between irony comprehension and the ability to cope with lies and deliberate deception; both correlate with success in standard second-order false-belief tasks, and Grice’s account of irony sheds no light on why this should be so (Mascaro & Sperber, 2009; Wilson, 2009). Relevance theorists have long argued that irony requires a higher order of mindreading ability than ordinary literal or metaphorical utterances; and exploring possible interactions between the mindreading, communicative and epistemic vigilance capacities in irony comprehension might well yield fruitful results.

Moreover, in light of the arguments in section 6, given that the capacity for epistemic vigilance is distinct from those for mindreading and communication, we might expect to find clusters of procedural expressions specifically linked to epistemic vigilance mechanisms. According to Sperber et al. (2010) and Wilson (2011b), logical and discourse connectives, on

---

27 On the current state of the art in irony studies, see Wilson and Sperber (2012a); Wilson (2013, 2014).
the one hand, and grammaticalised indicators of epistemic modality and evidentiality, on the other, might well fall into this category, and this possibility would worth exploring further.

References


