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Scope domains

Toward a Dependency Grammar account of the syntactic distribution of negative polarity items

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Abstract: A widely assumed limitation on the distribution of negative polarity items (NPIs) is that they must be c-commanded by a trigger. Scrutiny of this limitation reveals, however, that c-command by a trigger is neither a necessary nor a sufficient condition on the distribution of NPIs. The failure of c-command to serve as the basis for an account of the syntactic distribution of NPIs is taken here as the impetus to pursue an alternative approach, one in terms of scope and linear order instead of c-command. A particular concept of scope is established that serves as the key notion for characterizing the syntactic relationship between NPIs and their triggers. Scope is defined in a dependency grammar (DG) theory of syntax in terms of **scope domains**. The **catena** unit plays an important role. Given the notions of scope put forward, it is possible to discern two conditions on the syntactic distribution of NPIs.

Keywords: catena; constituent; dependency grammar; negative polarity item; scope; scope domain

1. Problems with a c-command account of polarity licensing

Textbook wisdom states that a **negative polarity item** (NPI) must be c-commanded by its **trigger** (e.g., Radford 1997, 113–114; Fromkin et al. 2000, 223; Poole 2002, 51; Adger 2003, 121; Sobin 2011, 72–73; Carnie 2013, 224: Sportiche et al. 2014, 311–312).[1] The c-command restriction on the distribution of NPIs concerns the configurational relationship between

[1] The sources just cited are linguistics and syntax textbooks. The stance that an NPI must be (c-)commanded by a trigger is also common in detailed polarity investigations (e.g., Klima 1964, 297; Linebarger 1987, 328; Laka 1994, 21; Progovac 1993, 2; van der Wouden 1997, 165; de Swart 1998, 177–8; Lasnik 1999, 12; Giannakidou 2011, 1163).

licensor (trigger) and licensee (NPI).[2] Data like the following appear to motivate the c-command constraint:

(1) a. **No**body said **any**thing.
b. *__Any__body said **no**thing.
c. *__Any__ student had **not** written the manuscript.

(2) a. Frank **never** gets up when **any**body expects him to.
b. *Frank **ever** gets up when **no**body expects him to.
c. *When **no**body expects him to, Frank **ever** gets up.
d. *When **any**body expects him to, Frank **never** gets up.

Given standard assumptions about phrase structure, the negation c-commands the NPI *any* in the acceptable a-sentences, but it fails to c-command the NPI *any* or *ever* in the other sentences. It is therefore understandable how the c-command restriction has become a pillar of the theory of polarity distribution.

In other cases, there is clearly no surface c-command relation between the trigger and the NPI, yet licensing is successful:[3]

(3) Bill spoke with **no**body about **any**thing.

(4) During **no**body's presentation did I say **any**thing.

(5) a. **No** student's parent posed **any** questions.
b. The parent of **no** student posed **any** questions.

(6) She said **no**thing at **any** time.

In (3)–(4), the complement of the preposition does not c-command out of the PP. In (4)–(5), the negation *no(body)* does not c-command out of the encompassing nominal group. In (6), the object *nothing* does not

[2] For easy reference, the main abbreviations and schematic devices are listed here in one spot: c-command = constituent command; DG = dependency grammar; FCI = free choice item; NPI = negative polarity item; PSG = phrase structure grammar; [...] marks the scope of a negation or of some other item in general, and {...} marks the scope of an NPI.

[3] A canonical definition of c-command is as follows (Reinhart 1976, 32):

(i) C-command
A node N_1 c-commands a node N_2 if and only if neither N_1 nor N_2 dominates the other, and the first branching node to dominate N_1 also dominates N_2.

– assuming a traditional left-branching VP structure to accommodate the adjunct *at any time* – c-command *any* in the adjunct.

It has long been known that a surface c-command licensing condition for NPIs cannot be correct (e.g., Linebarger 1980; Uribe-Etxebarria 1994; Giannakidou 1998; de Swart 1998; Hoeksema 2000). What is generally accepted, however, is that an NPI must occur in the scope of its licensor (e.g., Merchant 2000, 147). Authors within the Minimalist tradition generally assume that an item's scope corresponds to its c-command domain at a level of Logical Form (LF) derived from the surface configuration by movement of scope-bearing elements. Thus, in (3), for example, since *nobody* takes scope over the entire sentence, it is assumed to undergo movement (Quantifier Raising or QR; e.g., May 1985; Fox 2000) to a position c-commanding the rest of the sentence at LF, including the NPI *anything*. The LF c-command approach can directly account for successful NPI-licensing in examples such as (3) and (6). On the other hand, the examples in (4)–(5) are more problematic, as movement of the trigger to a position c-commanding the NPI would violate island constraints (some combination of adjunct, subject and/or definite NP islands, depending on one's assumptions about the relevant structures). At the very least, this suggests that neither surface nor LF c-command can be considered a necessary condition on NPI-licensing. Furthermore, examples like (1b) suggest that LF c-command could not be a sufficient condition either: QR should be able to move *nothing* to a position that c-commands the rest of the sentence, including *anybody*, yet the example is unacceptable.[4]

A different type of challenge to the c-command restriction on the distribution of NPIs is posed by data of the following sort:

(7) It was clear that a student with **any** knowledge of syntax had **not** written the manuscript.

(8) That **any**one had actually passed was **not** seriously considered.

(9) ...but **all that** happy, she clearly was **not**.

(10) ...but **at all** satisfied, he obviously was **not**.

[4] It has been suggested that examples such as (1b) can be ruled out through an anti-c-command condition holding of surface syntax (e.g., Heycock & Kroch 2002, 155; Reeve 2012, 44–45), but this will face problems with such cases as **A picture of anybody impressed no one*, which can be handled by the Precedence Condition proposed here (see especially section 5).

The negation *not* now follows the NPI and also appears to the right of the matrix finite auxiliary, a position from which it clearly does not c-command the NPI in surface syntax. These examples show that an alternative account in terms of linear order alone is untenable, but they also raise difficulties for the c-command approach. Once again, one might seek to address data such as these by imposing an LF c-command requirement on NPIs. For example, it is generally assumed in Minimalist syntax (following, e.g., Koopman & Sportiche 1991) that subjects underlyingly occupy a position within the VP (or *v*P, following Chomsky 1995), and are hence c-commanded by sentential negation at this level. Given the further assumption that movement leaves a 'copy' of the subject inside VP (e.g., Chomsky 1995), the c-command constraint on the NPIs in (7)–(8) would be satisfied by this lower copy ('reconstruction'). Yet this approach has no obvious way of distinguishing acceptable examples such as (7)–(10) from unacceptable examples such as (1c), where reconstruction of the subject NP should satisfy the c-command requirement at LF.

The message so far is therefore that c-command (whether on the surface or at LF) is neither a necessary nor a sufficient condition on the distribution of NPIs.[5] Given this state of affairs, an alternative approach is warranted, one that builds on some other aspect of the syntactic configuration. The dependency grammar (DG) approach presented below does this in terms of the **scope domain**, the definition of which is given here now for orientation:

(11) Scope domain

> The minimal constituent containing (part of) a syntactic predicate P (that is not preceded and dominated by any other part of P) and any argument of P that dominates P.

Given this notion, the scope of a given non-predicative item X is defined as follows:

[5] Indeed, even the notion of 'semantic scope' is not a sufficient condition for NPI-licensing, as has been discussed in the literature (e.g., Linebarger 1987):

(i) ?I did**n't** add that there was **any** food in the refrigerator. (*op.cit.*, 376)
(ii) ?She did **not** scream that **any**one should help her.
(iii) *It did **not** upset us that **any** of our pets had destroyed another pair of shoes.

In examples (i)–(iii), the negation c-commands the NPI *any* in the object clause, yet acceptability is degraded significantly. Such data are therefore another source of difficulties for most c-command-based approaches to NPI-licensing.

(12) Scope of X (where X is not predicative)

The scope domain established by the first/lowest predicate to directly or indirectly govern X.

These notions allow one to discern two necessary, but not sufficient, conditions on the distribution of NPIs:

(13) Scope Condition

An NPI must appear within the scope of a trigger.

(14) Precedence Condition

i. An *iota*-type NPI must follow its trigger.

ii. An *any*-type NPI must follow its trigger unless its scope is (contained in) an argument of the predicate that establishes a trigger's scope.[6]

These two conditions combine to serve as the foundation upon which a DG theory of syntactic distribution of NPIs can be constructed. The two conditions are, however, merely necessary – they are not also sufficient. This means that they do not account for the numerous idiosyncrasies associated with the distribution of individual NPIs and individual licensors of NPIs (see Hoeksema 2017 for a recent overview and critical discussion of previous approaches). The Scope Condition expresses the fundamental insight that an NPI must appear in the scope of its trigger. The Precedence Condition is an additional condition that holds of some, but not all, NPIs.

This paper is organized as follows. Section 2 distinguishes between types of NPIs: predicative vs non-predicative and *iota*- vs. *any*-type. Section 3 presents the DG approach to syntax in which our alternative account of the distribution of NPIs is couched. Section 4 presents the scope domain unit and the general understanding of scope based on it. Section 5 establishes the validity of the two conditions just mentioned, the Scope Condition and the Precedence Condition. Section 6 considers additional sources of support demonstrating the potential of the scope domain unit for establishing a greater theory of scope. Section 7 concludes the paper.

[6] More precisely, an *any*-type NPI must follow its trigger unless its scope is **reflexively contained** in an argument of the predicate that establishes a trigger's scope.

2. Classifying NPIs

The aim of this section is to establish a classification of NPIs with a view to delineating the empirical focus of the article. Two criteria are crucial in this classification: linearity, a primary criterion, and clausematiness, a secondary criterion. On the basis of these two criteria, we distinguish between **predicative** and **non-predicative** NPIs, and, within the latter subtype, between *iota*- and *any*-type NPIs. Predicative NPIs are subject to clausematiness but not linearity, while one type of non-predicative NPIs, *iota*-type NPIs, are subject to both clausematiness and linearity. The other type of non-predicative NPIs, *any*-type NPIs, are sometimes subject to clausematiness and/or linearity and sometimes not. Because of their more complicated distribution, *any*-type NPIs pose a particularly difficult challenge for theories of NPI-licensing, and it is therefore this class that we mainly focus on in this article. Section 2 closes with a brief discussion of the free choice item (FCI) *any*, which must be distinguished from NPI *any*.

2.1. The relevance of linear order: predicative vs. non-predicative NPIs

A number of linguists have observed (e.g., de Swart 1998, 179–180; van der Wouden 1997, 172; Hoeksema 2000, 130–131) that there is a class of NPIs that seem to be free of any linearity constraints. De Swart calls them 'non-quantifier' NPIs, and Hoeksema calls them 'verbal' and 'predicative' NPIs. The following examples are taken from Hoeksema (2000, 131):

(15) a. Carla **could stand** it **no** more.
b. Al **could abide none** of it.
c. Frieda **stopped at nothing**.

These examples involve the verbal NPIs modal+*stand*, modal+*abide*, and *stop at*. Since each of these examples has the NPI preceding the negation, it is again difficult to see how such cases can be interpreted in terms of c-command (taking into account the discussion of QR accounts above). Hoeksema (2000) observes in this area that "as long as the clause in which the modal appears is negated, the result is grammatical". He then concludes that c-command is not relevant for the distribution of verbal NPIs.

The following examples illustrate the point further:

(16) a. Fey **cares for none** of these rice cakes.
b. *Fey **cares for** rice cakes.

(17) a. Larry **gave a damn** at **no** point during the process.
b. *Larry **gave a damn** during the process.

(18) a. She **lifted a finger** for **no** one.
b. *She **lifted a finger** for you.

(19) a. You **need not** do that.
b. *You **need** do that.

The b-sentence is included each time to demonstrate that the negation in the a-sentence is indeed licensing the NPI. Since the negation follows the NPI, one can conclude that these NPIs are not sensitive to linear order.

The class of NPIs that behave in this way is quite large. What follows is a list of such NPIs that have been collected from the literature:

(20) Predicative NPIs

bear, budge an inch, modal+*abide*, modal+*fathom*, modal+*help*, modal+*possibly*, modal+*seem*, modal+*stand*, *care for*, *dare*, *do a thing*, *drink a drop*, *faze*, *give a damn*, *give a shit*, *have the foggiest (idea)*, *have/be a snowball's chance in hell*, *hurt a fly*, *last long*, *lift a finger*, *mind*, *my cup of tea*, *need*, *sleep a wink*, modal+*stomach*, *stop at*, *would dream*

This list could certainly be expanded. The key trait that these NPIs all have in common is that each of them represents a predicate. These NPIs are hence called *predicative* because they establish the predicate-argument structures in which they appear. From a syntactic point of view, predicative NPIs are less challenging because their distribution is not sensitive to linear order; they are immune to the constraint on linear order that is illustrated with the next set of examples (22)–(27).

Another class of NPIs are **non-predicative**. A non-predicative NPI does not establish the predicate-argument structure in which it appears; the role it plays in clause structure is secondary. The list of non-predicative NPIs that we have collected from the literature on NPIs is comparatively small, consisting mostly of minimizers:

(21) Non-predicative NPIs

a soul, *all that*, *any*, *at all*, *either*, *even*, *ever*, *in the least*, *in the slightest*, *in X* (time length), *let alone*, *much less*, *one iota*, *too*, *until X* (point in time), *yet*

Despite the fact that the list of non-predicative NPIs is noticeably shorter, the attention that they have received in the literature on polarity is much

greater than for predicative NPIs. Furthermore, the distribution of a certain subclass of non-predicative NPIs (*all that, at all, any, ever*, etc., called *any*-type NPIs here) has generated particular interest and has led to the claim that a c-command restriction holds of the distribution of NPIs in general.

Most non-predicative NPIs are indeed sensitive to linearity in a way that predicative NPIs are not. As illustrated with examples (1)–(2) above, non-predicative NPIs often cannot precede their triggers. Here are some further examples:

(22) a. He did **not** help **one iota**.
b. ***One iota**, he did **not** help.

(23) a. She did **not** protest **in the least**.
b. ***In the least**, she did **not** protest.

(24) a. He could**n't** do it **in three years**.
b. ***In three years**, he could**n't** do it.

(25) a. The adults did **not** like it, **let alone** the children.
b. ***Let alone** the children, the adults did **not** like it.

(26) a. They will **not** arrive **until** tomorrow.
b. ***Until** tomorrow, they will **not** arrive.

(27) a. We have **not ever** considered that.
b. *We have **ever not** considered that.

These examples demonstrate that the non-predicative NPIs *one iota, in the least, in three years, let alone, until X* (time interval), and *ever* cannot precede the negation that would trigger them. While there are important exceptions to this constraint on some non-predicative NPIs – which are examined and discussed below in sections 5.2 and 5.3 – the greater observation is that the linear order of an NPI and its trigger impacts the distribution of many non-predicative NPIs in an important way.[7]

[7] There may be a class of non-predicative NPIs that require the NPI to precede the negation. This seems to be true of *heel* 'whole' in Dutch (Den Dikken 2002; Hoeksema 2017) and *beileibe* 'really' in German (Richter & Soehn 2006, 427).

2.2. The relevance of clausematiness: *iota*- vs. *any*-type NPIs

At times, an NPI and its trigger must be clausemates. Such NPIs are called **strict** (Horn 1975; Collins & Postal 2014; Hoeksema 2017, 38–41). If a given NPI is not strict, then it is called **non-strict**. Many, if not all, of the predicative NPIs listed above are strict, and many of the non-predicative NPIs listed above are also strict. However, the NPIs *any* and *ever*, which have received the most attention in the literature on polarity, are non-strict. Clausematiness, which is the basis for the strict vs. non-strict distinction, serves here as a second criterion for classifying NPIs. Given both linearity and clausematiness, a typology of NPIs is possible that allows key distributional characteristics of diverse NPI types to be captured.

The next examples illustrate the basic distinction between strict and non-strict non-predicative NPIs. Examples (28)–(30) involve strict NPIs:

(28) a. Frank did **not lift a finger**.
b. *They did **not** say that Frank **lifted a finger**.

(29) a. Susan did **not drink a drop**.
b. *We did **not** say that Susan **drank a drop**.

(30) a. Esther did **not** help **one iota**.
b. *He did **not** say that Esther helped **one iota**.

The next examples illustrate non-strict NPIs:

(31) a. Frank did **not** do **any**thing.
b. They did **not** say that Frank did **any**thing.

(32) a. Susan did **not ever** drink alcohol.
b. We did **not** say that Susan **ever** drank alcohol.

(33) a. Esther did **not** help **at all**.
b. He did **not** say that Esther helped **at all**.

Examples (28)–(30) illustrate the fact that the NPIs *lift a finger, drink a drop*, and *one iota* need a clausemate trigger, whereas examples (31–33) demonstrate that the NPIs *any, ever*, and *at all* do not need a clausemate trigger inasmuch as the trigger can be in a superordinate clause. This difference in strictness serves here as the criterion for distinguishing between two subtypes of non-predicative NPIs, called *iota*-type NPIs and *any*-type NPIs here:

(34) a. *Iota*-type NPIs

a soul, either, even, in the least, in the slightest, in X (time length), *let alone, much less, one* ***iota****, too, until X* (point in time)

b. *Any*-type NPIs

all that, ***any****, at all, ever, yet*

The noteworthy aspect about this distinction is that the majority of examples in the literature on polarity (including the textbook accounts cited at the very start of this article) use *any*-type NPIs, mainly *any* and *ever*, to illustrate aspects of polarity distribution. The list of *any*-type NPIs is, however, quite small. Nevertheless, the account of NPI distribution developed here also focuses primarily on the distribution of *any*-type NPIs. The reason for this is that, of the various types of NPIs mentioned, the distribution of *any*-type NPIs is the most challenging to investigate and discern with certainty.

2.3. Neg-raising

The nature of so-called **negative raising (neg-raising)** (Fillmore 1963; Horn 1971; 1975; Collins & Postal 2014; Hoeksema 2017) and the predicates that license it (e.g., *appear, believe, seem, suppose*, etc.) is important for verifying key aspects of the typology just established. Neg-raising predicates allow a negation appearing in the matrix clause to result in a meaning that is almost synonymous with the corresponding sentence in which the negation appears in the embedded clause; for example:

(35) a. John does **not** believe that he passed the exam.

b. John believes that he did **not** pass the exam.

These two sentences are essentially synonymous (though cf. Horn's foreword to Collins & Postal 2014, ix). This is a bit surprising in view of the fact that predicates of speaking and saying, which are similar to *believe* in taking an object clause and which behave as 'bridge' verbs for *wh*-dependencies (e.g., Chomsky 1977), do not allow this; for example:

(36) a. John did **not** say that he passed the exam.

b. John said that he did **not** pass the exam.

These two sentences are now transparently non-synonymous. The meaning of sentence (36a) is consistent with a situation in which John said nothing

at all, whereas sentence (36b) makes it clear that John definitely said something.

In the current context, the relevant aspect of neg-raising predicates (and other non-factive predicates; see Hoeksema 2017) concerns the extent to which strict NPIs (see the immediately preceding section) can appear in an embedded clause when the trigger appears in a superordinate clause; for example:

(37) a. I do**n't** think Sam **gives a shit**.
b. I think Sam does**n't give a shit**.

Despite the fact that the strict NPI *give a shit* appears in the object clause, it can still be licensed by the negation in the matrix clause. In other words, the acceptability of (37a) is surprising insofar as the strict NPI *gives a shit* and the negation are not clausemates. This acceptability stands in contrast to similar examples involving, again, a verb of speaking:

(38) a. *Sam did **not** state that he **gives a shit**.
b. Sam stated that he does**n't give a shit**.

The unacceptability of (38a) is now expected given that the strict NPI *gives a shit* and *not* are not clausemates. Apparently, the nature of neg-raising predicates is such that the object clause they take is relatively transparent for purposes of polarity licensing.[8]

This liberal nature of neg-raising predicates can be accessed to consolidate the distinction established in the previous section between *iota-* and *any*-type NPIs. Even though *iota*-type NPIs are strict, the prediction is that, given a neg-raising predicate in the matrix clause, a matrix negation should nevertheless be able to license an *iota*-type NPI appearing in the object clause (in the same way that it can license the predicative NPI *give a shit* in the object clause). This prediction is borne out, as the a-sentences

[8] The fact that the clausemate condition can be violated with neg-raising predicates has been taken to support a transformational analysis of neg-raising, as originally proposed by Fillmore (1963) (e.g., Lakoff 1969; Collins & Postal 2014). In addition, Collins and Postal (2014) cite the fact that the relation between trigger and NPI is subject to island constraints, which they argue "does not follow from any known pragmatic approach to [neg-raising]" (2014, 4). Hoeksema (2017), however, argues that there are independent explanations for the data that Collins and Postal adduce, and furthermore, he shows that long-distance licensing of strict NPIs is sometimes possible with non-neg-raising non-factive predicates. He concludes that some version of Giannakidou's (1998) non-veridicality requirement would seem to be sufficient to handle the variation in long-distance licensing, a position we find convincing.

in the next examples illustrate. Interestingly, however, the object clause containing the *iota*-type NPI cannot be fronted:

(39) a. Sam does **not** think that they cheated **in the least**.
b. *That they cheated **in the least**, Sam does not think.

(40) a. We do **not** believe that Jane will leave **until tomorrow**.
b. *That Jane will leave **until tomorrow**, we do **not** believe.

(41) a. Sue does **not** think that she solved problem 1, **let alone** problem 2.
b. *That she solved problem 1, **let alone** problem 2, Sue does **not** think.

In contrast, topicalization is possible if an *any*-type NPI is present instead of an *iota*-type NPI:

(42) a. Sam does **not** think that they cheated **at all**.
b. That they cheated **at all**, Sam does **not** think.

(43) a. We do **not** believe that Jane will **ever** leave.
b. That Jane will **ever** leave, we do **not** believe.

(44) a. Sue does **not** think that she solved **any** of the problems.
b. That she solved **any** of the problems, Sue does **not** think.

Hoeksema (2017, exx. (20)–(21)) notes this difference in the potential to topicalize, although he does not use the nomenclature employed here (*iota*- vs. *any*-type NPI). The data consolidate the distinction between *iota*- and *any*-type NPIs. The two NPI types are distinct in their distributions.[9]

To summarize the discussion in this section and the previous two sections, the current account of NPI distribution acknowledges two main types of NPIs, one of which can be further subdivided into two subtypes (Table 1). As noted above, it is *any*-type NPIs that have constituted the focus of most previous work on NPI-licensing. Before concluding this typology of NPIs, a brief discussion of free choice *any* is necessary in order to avoid confusion between the two types of *any*.

[9] A reviewer notes, attributing the observation to A. Giannakidou, that there appears to be a correlation between locality and linearity (or overt c-command under the reviewer's assumptions), which we formulate as follows: for a given NPI type X, if X must be a clausemate of its trigger, then X must follow its trigger. We note that this correlation would follow from our proposal (in particular, the Precedence Condition) if in cases of neg-raising the negation's scope domain were coextensive with that of the embedded trigger, but we leave elaboration of this idea for future work.

Table 1: Typology of NPIs assumed in this article

NPIs		
Predicative	Non-predicative	
	Iota-type	Any-type

2.4. Free choice *any*

A source of confusion when discussing the NPI *any* in English is the fact that it is homophonous with FCI *any*. We know, however, that NPI *any* and FCI *any* are distinct, because in many other languages such words are not homophonous, as established in the works of Giannakidou in particular (e.g., Giannakidou 1998; 2001; Giannakidou & Cheng 2006). In fact, their distributions are distinct even in English: NPI *any* is often licensed by a negation, whereas FCI *any* is typically licensed by a modal verb, generic present tense, or a post-modifier (as in the phenomenon that LeGrand 1975 calls 'subtrigging'). Interestingly, the two types of *any* are generally in complementary distribution; for example:

(45) a. Spicer has **not** insulted **any**one. – NPI any
b. *Spicer has **not** insulted almost **any**one.
c. *...but **any**one, Spicer has **not** insulted.

(46) a. Spicer **would** insult **any**one. – FCI *any*
b. Spicer **would** insult almost **any**one.
c. ?...but almost **any**one Spicer **would** insult.

As shown in the b-sentences, when *almost* can modify *any-, any-* is an FCI (Carlson 1981). The c-sentences illustrate further that if topicalization of *any-* alone is (at least marginally) possible, *any-* is again an FCI.

The most important aspect of FCI *any* in the current context is that, like the predicative NPIs listed above, it is insensitive to linear order. That this is so is most evident in simple examples like the following:

(47) a. **Any**one **would** insult Spicer.
b. Almost **any**one **would** insult Spicer.

The acceptance of modification by *almost* in (47b) identifies *any-* in (47a) as FCI *any*. The modal verb *would* must be responsible for licensing *any-* in (47a), since the simple past indicative would be unacceptable: **Anyone*

insulted Spicer. What this means in the current context is that FCI *any* is like predicative NPIs inasmuch as it is not sensitive to the linearity constraints that restrict the distribution of non-predicative NPIs.

Since predicative NPIs and FCI *any* are not sensitive to linear order in the same way as non-predicative NPIs, accounting for their distribution is less challenging. (In our terms, FCIs must satisfy the Scope Condition, but need not satisfy the Precedence Condition). The exploration of polarity items below focuses primarily on non-predicative NPIs. To avoid potential confounds with FCI *any*, episodic simple past is used in most of the examples, as FCI *any* is generally incompatible with episodic simple past tense; e.g., **Anyone insulted Spicer*. This ensures that the occurrence of *any* in the acceptable examples below must be construed as NPI *any*.

3. Dependency Grammar (DG)

The following sections establish central aspects of the dependency grammar (DG) theory of syntax in which our account of polarity distribution is couched.

3.1. Principles of dependency syntax

The account of polarity distribution developed here is couched in a dependency grammar (DG) approach to syntax. Like most DGs, the DG here assumes that the units of syntax are organized in accordance with the following three principles:

Three principles of syntactic organization

1. One-to-one mapping,
2. Strict headedness, and
3. Hierarchical organization in terms of trees

The first principle posits a strict correspondence between atomic units of syntax (e.g., words) and nodes in the hierarchical structure. Each atomic unit corresponds to a single node, and vice versa (see Mel'čuk 1979, 96; Mel'čuk et al. 1987, 48, 57–58; Kahane 1996, 45; Schubert 1987, 78–86, 129; Engel 1994, 25, 28; Bröker 2003, 297; Hudson 2003, 520; Hudson 2007, 183; Carnie 2010, 177). The second principle excludes the possibility of complex syntactic units that are headless. In other words, all units of syntax are endocentric. The third principle guarantees that cycles do not occur in the

hierarchy of structure. Each word necessarily has one and only one parent – barring the root node, which has no parent at all.[10]

A fourth principle is also assumed here:

Fourth principle of syntactic organization

4. Monostratal syntax such that dominance and precedence are both primitive.

Some DGs do not adhere to this fourth principle. For instance, Tesnière (1959, 11–13) assumed that the units of syntax are first organized in terms of government (≈ dominance) in the mind of a speaker, and that precedence relations are then derived from the government relations by the speaker. Further, Mel'čuk's (1988; 2003) Meaning-Text Theory (MTT) assumes two levels of syntax, a deep level and a surface level, and linear order is absent from both – it first appears at the morphological level(s) of organization. Other DGs, in contrast, do not separate linear order from hierarchical order, such as Hudson's Word Grammar (Hudson 1984; 1990; 2007; 2010) and Starosta's Lexicase Grammar (Starosta 1988; 2003). In this article, however, we assume a monostratal DG without further comment, as this would take us too far afield.

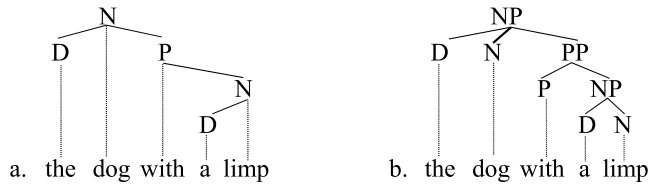
The four principles of syntactic organization just listed result in hierarchical analyses of phrases and clauses such as the following a-structures. The corresponding phrase structure analyses are given as the b-examples; they are included as a point of comparison:

(48)

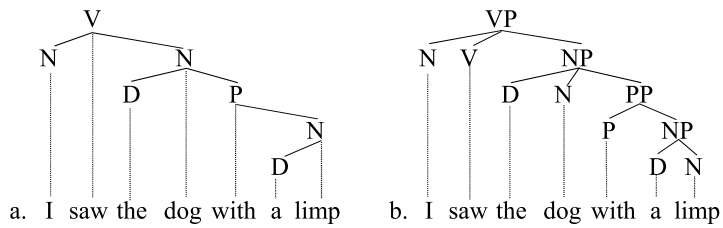
(49)

[10] Richard Hudson's Word Grammar (Hudson 1984; 1990; 2007; 2010) is a prominent DG that does not adhere to hierarchical organization in terms of trees. A given word in Word Grammar analyses often has multiple parents. Word Grammar is unlike most other DGs in this regard.

(50)



(51)



The dependency analyses given in the a-structures can be translated directly into the corresponding phrase structure analyses given with the b-structures, and vice versa. This translation back and forth is possible due to the assumption of entirely endocentric, relatively flat phrase structures, as shown with the b-trees. For instance, the sentence is taken to be a big VP in (51b) and this VP is divided into three constituents, instead of just two.

3.2. Rising

Since some of the data presented in the introduction and explored further below involve displacement, the approach to discontinuities assumed here will now be sketched; that is, the discussion will consider the means by which common discontinuities – also known as long-distance dependencies – associated with extraposition, scrambling, topicalization, and *wh*-fronting are addressed. A fuller account of the theory of discontinuities we pursue is presented in Osborne et al. (2012) and especially Groß & Osborne (2009).

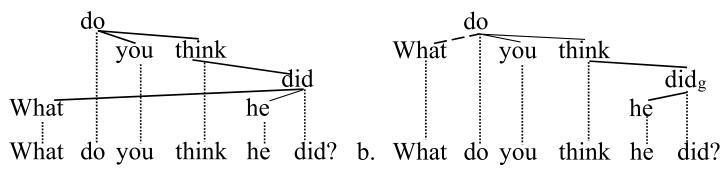
A number of DGs address, or suggest addressing, discontinuities in terms of a flattening of structure (Schubert 1987, 190; Lobin 1993, 31–35; Heringer 1996, 261; Bröker 1999, 55–59; 2003, 294; Eroms & Heringer 2003, 260; Starosta 2003, 276–279; Groß & Osborne 2009). A displaced constituent takes on a word as its head that is not its governor.[11] This

[11] The current theory draws a major distinction between **heads** and **governors**. The head of a given word is the one word that immediately dominates it, whereas the governor of a given word is the one word that licenses its appearance. In continuous

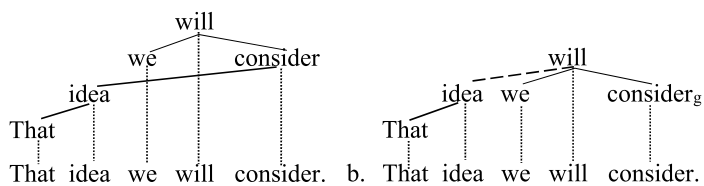
phenomenon is called **rising** here, a notion to be understood metaphorically. When a constituent is separated from its governor by material that dominates its governor, crossing lines can obtain in the dependency tree. The crossing lines identify a **projectivity violation**. By assuming rising, the crossing lines are no longer present and the projectivity violation disappears. The result is an entirely projective DG.

The rising analysis of an instance of *wh*-fronting, an instance of topicalization, an instance of scrambling from German, and an instance of extraposition are now presented. The a-trees illustrate the crossing lines (projectivity violations) of discontinuities, and the b-trees show how these crossing lines are 'remedied':

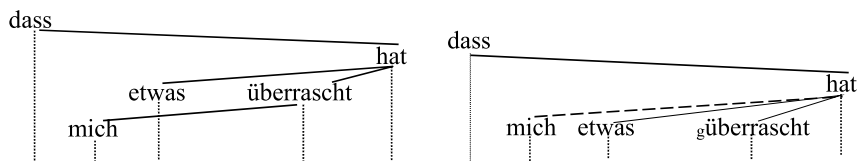
(52)



(53)

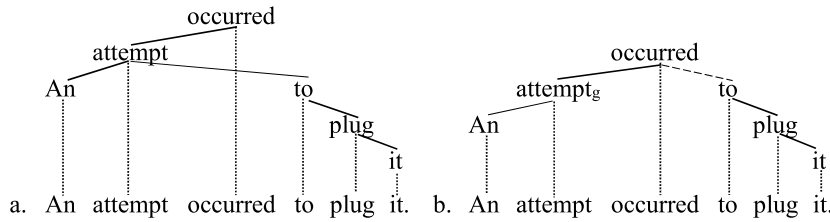


(54)



structures (i.e., where there are no discontinuities), the head and the governor of a given word are always the same one word. When a discontinuity is present, however, the head and the governor of the displaced unit are distinct.

(55)



In (52a) the crossing lines are those of a *wh*-fronting discontinuity, in (53a) those of a topicalization discontinuity, in (54a) those of a scrambling discontinuity, and in (55a) those of an extraposition discontinuity.

The crossing lines are absent in the b-trees, where the displaced constituent has taken on a word as its head that is not its governor. The displaced constituent is said to have **risen**, although the notion is, as stated above, merely a convenient metaphor. The risen constituent is identified using a dashed dependency edge. The g-subscript marks the governor of the risen constituent.

3.3. Catenae

The minimal structures of DG allow one to acknowledge certain word combinations as concrete units of syntax that are less visible in grammars that assume phrase structure. These word combinations are called *catenae* (Latin for 'chains'; singular *catena*). The ability to acknowledge catenae is due in part to the vivid representation of hierarchical order that dependency enables, since dependency links the words of sentences directly to each other in hierarchies – in contrast, phrase structure syntax uses additional nodes, the purely phrasal nodes, which mediate in the hierarchy between the words. Osborne et al. (2012) argue that the catena unit is the fundamental unit of syntactic analysis, not the constituent. The constituent is of course also important, but it is a less inclusive unit than the catena.

The catena unit is defined here together with the string and constituent units. The three are given together in order to increase understanding through comparison.

(56) String

A word or a combination of words that is continuous with respect to precedence.

(57) Catena

A word or a combination of words that is continuous with respect to dominance.[12]

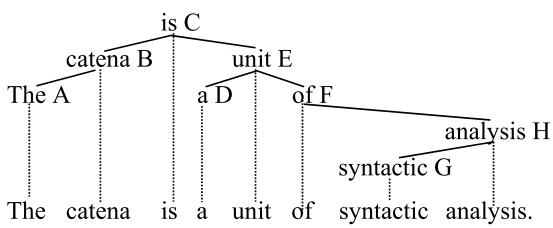
(58) Constituent

A word or a combination of words that form a complete subtree.

This definition of the constituent here is consistent with its definition in phrase structure grammars (PSGs) when defined over phrase structure trees; a constituent is **a node plus all the nodes that that node dominates** (for similar definitions, see for instance Kroeger 2005, 40; Tallerman 2005, 136; Carnie 2010, 37; Sportiche et al. 2014, 47). Some DGs have also offered such a definition of the constituent unit, but over dependency structures (e.g., Hudson 1984, 92; Starosta 1988, 105; Hellwig 2003, 603; Anderson 2011, 92).

The following dependency tree is used to illustrate the three units:

(59)



The capital letters abbreviate the words. All the distinct strings, catenae, and constituents in (59) are listed next:

(60) 36 distinct strings in (59)

A, B, C, D, E, F, G, H, AB, BC, CD, DE, EF, FG, FH, ABC, BCD, CDE, DEF, EFG, FGH, ABCD, BCDE, CDEF, DEFG, EFGH, ABCDE, BCDEF, CDEFG, DEFGH, ABCDEF, BCDEFG, CDEFGH, ABCDEFG, BCDEFGH, and *ABCDEFGH*.

[12] Note that we give a non-formal definition of the catena unit here in order to aid the comparison/contrast with the string unit. A set-theoretic definition of the catena is as follows:

(i) Catena (set-theoretic definition)
Given a dependency tree T, a catena is a set of nodes N in T such that exactly one node in N is not immediately dominated by another node in N.

(61) 45 distinct catenae in (59)
A, B, C, D, E, F, G, H, AB, BC, CE, DE, EF, FH, GH, ABC, BCE, CDE, CEF, DEF, EFH, FGH, ABCE, BCDE, BCEF, CDEF, CEFH, DEFH, EFGH, ABCDE, ABCEF, BCDEF, BCEFH, CDEFH, CEFGH, DEFGH, ABCDEF, ABCEFH, BCDEFH, BCEFGH, CDEFGH, ABCDEFH, ABCEFGH, BCDEFGH, and *ABCDEFGH.*

(62) 8 distinct constituents in (59)
A, D, G, AB, GH, FGH, DEFGH, and ABCDEFGH.

Note that some strings are not catenae (e.g., *CD, BCD, DEFG,* etc.) and that some catenae are not strings (e.g., *CE, FH, CEF,* etc.). The number of DG constituents listed, just eight, is approximately half as many as the corresponding phrase structure tree would contain. Hence the number of catenae in (59) is more than double the number of phrase structure constituents that one might assume for the structure (16 vs. 45). In this regard, the catena is a much more inclusive and flexible unit of syntax than the constituent. Furthermore, every constituent listed is of course also a catena. This observation is true of phrase structure constituents as well: every phrase structure constituent is a catena. Hence the constituent, be it a DG or PSG constituent, is a subtype of catena.

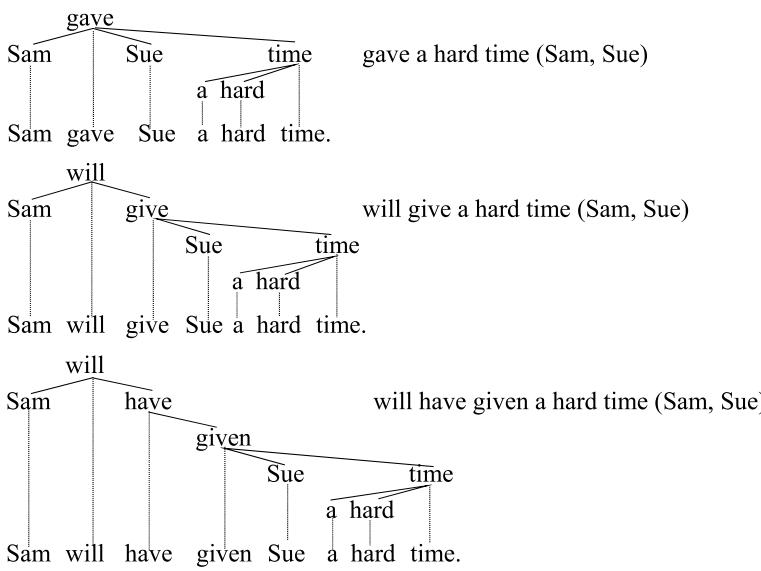
3.4. Predicates and arguments

The understanding of predicates and arguments assumed here overlaps to an extent with that of Napoli (1989), and it is largely consistent with Ackerman and Webelhuth's (1998) lengthy exploration of predicates. It is also consistent with the understanding of predicates that one encounters in the grammar tradition of the German language (e.g., Tarvainen 1981, 36–40; Helbig & Buscha 1998, 536–543). This tradition views the main predicate of a clause as consisting of a content verb and any pure auxiliary verbs that are also present, or of a copular verb and a predicative expression. Note that such an understanding of predicates is contrary to the understanding of predicates that is dominant in the modern tradition of the English language, where a predicate is deemed to be everything in a clause except the subject. These two competing views of predicates correspond to the DG vs. PSG distinction. Most PSGs begin with a binary division of the clause into a subject and a predicate, whereas DGs reject this division, positioning the verb as the clause root instead.

A DG approach that acknowledges catenae can also acknowledge the presence of predicates and arguments in sentence structure in a concrete way, in a way that is less straightforward for PSGs. Most of the time, the words that constitute a predicate form a catena in sentence structure, and the argument(s) of that predicate are also catenae. This state of affairs will now be illustrated using various examples. Simplified predicate-calculus representations that cling to the surface forms of words are employed to identify predicates and their arguments.

The matrix predicate of a clause usually includes one or more verbs; for example:

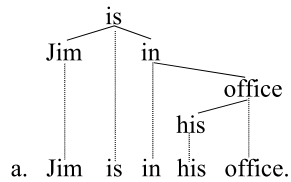
(63)



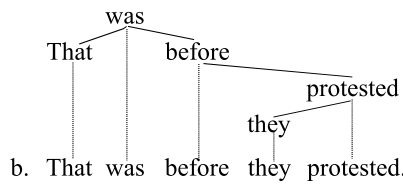
These examples illustrate the manner in which the verbs of the main clause predicate form a catena, and in the case of (63b–c), we see that the idiomatic expression *give a hard time* forms a catena with any auxiliary verbs that are present, despite the fact that *gave/give/given* and *a hard time* do not form a string each time due to the intervening object argument *Sue*.

The flexibility of the catena unit allows the approach to acknowledge word combinations as predicates that clearly would not qualify as constituents in a PSG; for example:

(64)



is in (Jim, his office)

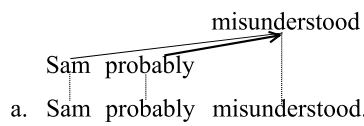


was before (that, they protested)

The copula *is* forms a catena with the following preposition *in* (64a), and the copula *was* forms a catena with the following subordinator *before* in (64b). This state of affairs allows the account to acknowledge *is in* as the matrix predicate in (64a) and *was before* as the matrix predicate in (64b).

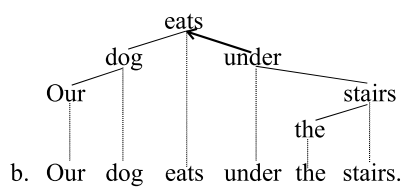
The current analysis of predicates and their arguments can account directly for the manner in which many adjuncts are predications over the entire rest of the clause; for example:

(65)



misunderstood (Sam)

probably (Sam misunderstood)



eats (our dog)

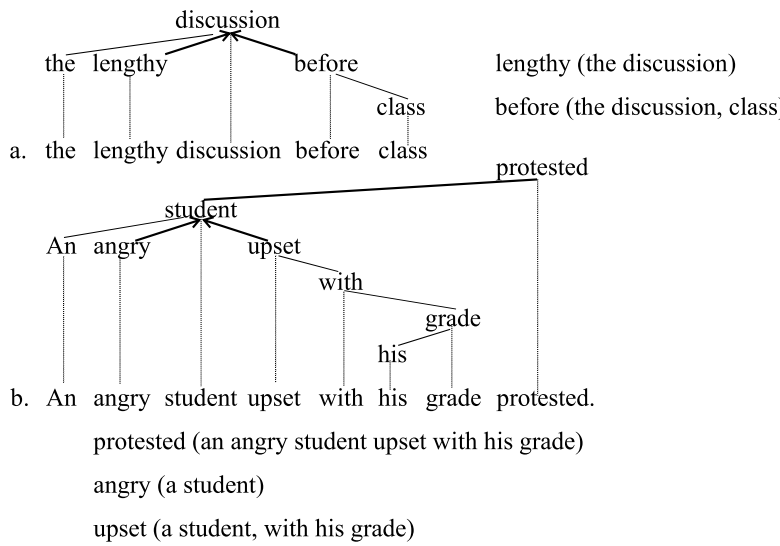
under (our dog eats, the stairs)

Following a number of DGs (e.g., Tesnière 1959, 36; Baum 1976, 79; Tarvainen 1981, 61; Engel 1994, 44; Jung 1995, 111–116; Eroms 2000, 85–86; Mel'čuk 2003, 193; Uzonyi 2003, 237), adjuncts are identified in dependency trees using a special visual device. While the particular convention for this varies among DGs, the current DG positions an arrow dependency edge pointing away from the adjunct towards the adjunct's governor. The arrow indicates that semantic selection is operating in the opposite direction to normal; the adjunct semantically selects its governor rather than vice versa.

The modal adverb *probably* predicates over the entire sentence, so its argument is the rest of the sentence. Similarly, the locational preposition *under* is a predicate that establishes a relationship between *our dog eats* and *the stairs*. These examples illustrate well the fact that while the argument of a given predicate is often not a constituent, it is nevertheless a catena. Each of the predicates and arguments shown in the examples throughout this section is a catena.

The current approach also acknowledges predicates used attributively inside NPs; for example:

(66)



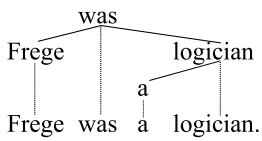
The predicates *lengthy, angry*, and *upset* are being used attributively. Despite this fact, they appear as catenae in the structure, and their arguments also appear as catenae.

There are of course many aspects of predicates and their arguments that are not addressed here. The message at present is merely that by acknowledging the catena unit, an approach to predicate-argument structures has become available that is not possible for theories of syntax that take the constituent to be the fundamental unit of syntax. Predicates and their arguments are now manifest in sentence structure in a concrete way.

3.5. Syntactic vs. semantic predicates

The examples just considered demonstrate that verbs, adjectives, certain prepositions, and certain subordinators are or can be predicates. The extent to which nouns can be predicates has yet to be established. Certainly, when nouns are used predicatively, they are (part of) a predicate; for example:

(67)



was a logician (Frege)

The interesting and noteworthy aspect of this analysis of nouns concerns those nouns functioning as arguments – i.e., non-predicatively. Non-predicative nouns cannot be construed as predicates in syntax, since they do not take arguments in the manner of predicatively used nouns.

The simple argument nouns in the following sentences cannot be construed as syntactic predicates:

(68) a. The dog chased the cat.
b. The cat ran up the tree.
c. Birds flew out of the tree.

The argument nouns *dog, cat, tree*, and *birds* can be construed as semantic predicates insofar as they are properties predicated of entities in the situational context, but they cannot be construed as syntactic predicates because they are not predicated of linguistic material in the sentence.[13] However, when such nouns appear in apposition, they become predicates; for example:

(69) Caesar, the dog, chased Nero, the cat.

The NPs *the dog* and *the cat* are now given as properties which are predicated of *Caesar* and *Nero*, respectively; they have become syntactic predicates.

[13] Cf. Higginbotham's (1985) argument, within a Chomskyan framework, that the determiner saturates the relevant argument slot of the noun through 'theta-binding', a mechanism distinct from the 'theta-marking' relation that holds between a predicate and its syntactic argument(s).

The importance of the current distinction between semantic and syntactic predicates is most visible with relational nouns that appear with their semantic arguments; for example:

(70) Caesar's invasions of Britain occurred in 55–54 BCE.

While it is clear that that the noun *invasions* is a semantic predicate with the semantic arguments *Caesar* and *Britain*, it is not a syntactic predicate under the present understanding of predicates. A noun occurring with its argument(s) can become a syntactic predicate, however, as soon as it is used predicatively:

(71) These are Caesar's best soldiers.

The noun phrase *Caesar's best soldiers* is now being predicated of the subject *these*. The consequence of this observation is that it is not possible to view *invasions* as a syntactic predicate in (70), because it is not being predicated of another part of the sentence.

The following claim about nouns summarizes the observations and reasoning just produced:

(72) Claim about nouns

Non-predicative nouns are not syntactic predicates.

This aspect of nouns distinguishes them from other word categories. A given verb or adjective is always (part of) a predicate, and many prepositions and subordinators can also be used predicatively. This issue is important for defining the domain that is relevant for the analysis of polarity-sensitivity. A non-predicative noun does not establish a scope domain.[14]

[14] Gerunds, which have both noun- and verb-like qualities, are, interestingly, more verb-like than noun-like according to the central data being explored in this article; for example:

(i) a. *Reading **none** of those papers is **ever** necessary.
b. Reading **any** of those papers is **never** necessary.

This acceptability pattern suggests that *reading none/any of those papers* is a separate scope domain that is embedded in the greater scope domain. The gerund *reading* is hence a syntactic predicate.

4. Scope

The next two subsections define and illustrate the concept of scope as understood based on the *scope domain*, a type of constituent.

4.1. Scope domains

The syntactic constituent that is relevant for capturing aspects of polarity-sensitivity is called the **scope domain**:

(73) Scope domain (preliminary version)

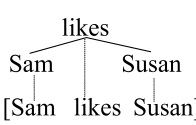
> The minimal constituent containing a syntactic predicate P and any argument of P that dominates P.

The innovation here is in the formulation "...any argument of P that dominates P". By defining the scope domain in this manner – i.e., in terms of predicates and arguments that dominate them – a unique type of constituent is posited. A predicate that is dominated by one of its arguments forms a scope domain with that argument.

As one examines the constituents that qualify as scope domains according to this definition, one sees that the scope domain overlaps to an extent with the clause, since a given clause is usually a scope domain. There are, however, many scope domains that most grammars would not construe as clauses. Hence the clause is a subtype of scope domain. The discussion that now follows illustrates this state of affairs by examining a series of examples. Square brackets are used in this section to delimit scope domains. Each predicate establishes a scope domain, and this scope domain is enclosed in square brackets.

Since argument nouns are not syntactic predicates (as established in section 3.5), they do not establish scope domains. A simple sentence containing a subject noun, a verbal predicate, and an object noun is therefore just a single scope domain; for example:

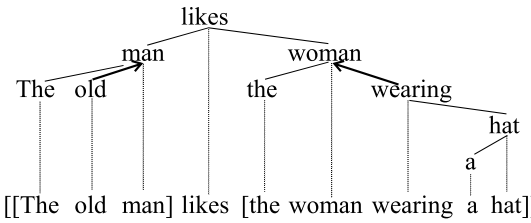
(74)



a. likes (Sam, Susan)

As soon as a noun is modified by a predicate, however, the entire NP becomes a separate scope domain; for example:

(75)



a. likes (the old man, the woman wearing a hat)

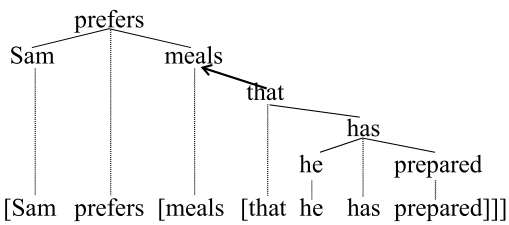
b. old (the man)

c. wearing (the woman, a hat)

The attributive adjective *old* and the present participle *wearing* are predicates, so they establish scope domains. Since they are dominated by their 'subject' nouns, the scope domains that they establish include these nouns.

Example (75) contains the reduced relative clause *wearing a hat*. The relative clause in the following example is not, in contrast, reduced:

(76)



a. prefers (Sam, meals that he has prepared)

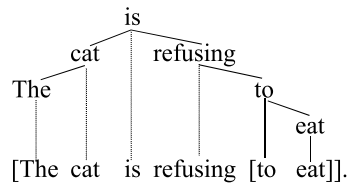
b. that he has prepared (meals)

c. has prepared (he)

The relative clause *that he has prepared* is as a whole a predication over *meals*, as indicated in (76b). Within this relative clause, the predicate *has prepared* takes the argument *he* (as well as a second argument that is absent but that corresponds to the object gap), as indicated in (76c). This example therefore illustrates that one scope domain as a whole can function as a predication.

Non-finite verbs are often separate predicates. Thus, when a control verb subcategorizes for another infinitive, participle, or gerund, each establishes its own scope domain; for example:

(77)



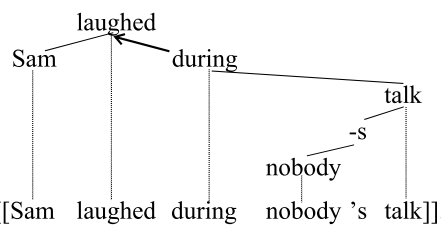
a. is refusing (the cat, to eat)

b. to eat (the cat)

The auxiliary *is* and the present participle *refusing* together form the matrix predicate, thus establishing the matrix scope domain. The participle takes a *to*-infinitive valent, which is itself a separate predicate, establishing its own scope domain. Since the argument of *to eat* – i.e., *the cat* – does not dominate *to eat*, it is not included in the scope domain established by *to eat*. Note that we can know that *is refusing* and *to eat* are separate predicates from the fact that each can be negated; e.g., *The cat is not refusing to eat* vs. *The cat is refusing not to eat*.

Event-oriented adjuncts take the entire matrix clause as their first argument, so the scope domains that they establish encompass the entire matrix clause; for example:

(78)



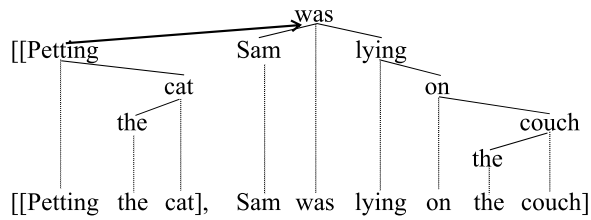
a. laughed (Sam)

b. during (Sam laughed, nobody's talk)

The minimal constituent containing the matrix predicate *laughed* is the entire sentence, and since (part of) the first argument of the adjunct preposition *during*, which is a separate predicate, dominates *during*, the scope domain established by *during* also encompasses the entire sentence. This results in a situation in which two coextensive scope domains are present – in other words, the two completely overlap.

The scope domains established by participant-oriented adjuncts are quite different. A participant-oriented adjunct is a predication over one of the matrix arguments, often over the subject. This state of affairs results in scope domains that are not coextensive:

(79)



a. was lying (Sam, on the couch)

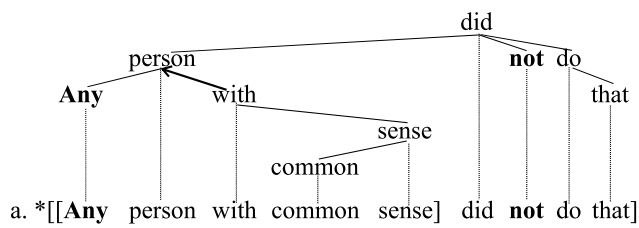
b. petting (Sam, the cat)

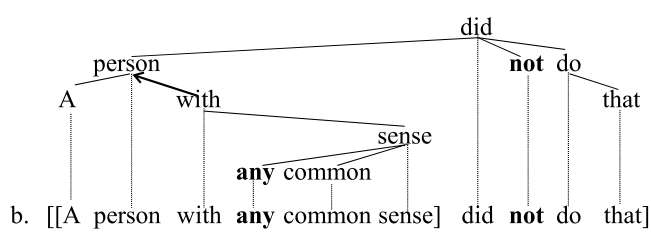
While the matrix subject *Sam* is also the first argument of the participle predicate *petting*, it does not dominate *petting*. This means that the scope domain of *petting* does not extend upward to include the matrix clause; it is, rather, limited to just the fronted adjunct *petting the cat*.

4.2. Scope of *X*

NPIs and their triggers relate to the scope domains that contain them in an important way. The minimal scope domain containing a given item does not necessarily delimit the scope of that item. The following examples illustrate the issue:

(80)





In both of these sentences, the NPI *any* is contained within the embedded scope domain established by the adjunct predicate *with*. This observation might suggest, incorrectly, that there should be no acceptability contrast across the two sentences.

A closer examination of the two sentences reveals the relevant difference. The NPI *any* in (80b) is dominated by the prepositional adjunct predicate *with*, whereas *any* in (80a) is not dominated by *with*. This insight indicates how NPIs are sensitive to the scope domains that contain them. The formulation **scope of *X*** is used henceforth to express how the scope of an item is understood. The following definition holds:

(81) Scope of X (where X is not predicative)

The scope domain established by the first/lowest predicate to directly or indirectly govern X.

The notion of government appealed to here is that put forth by Tesnière (1959, ch. 2, 5–7), early in the development of dependency syntax. A given word directly governs another word if it appears directly above it in the dependency hierarchy. Most of the time, the head of a given word directly governs that word. Only when a discontinuity is present are the head and the governor of a given word distinct – see section 3.2; in particular, footnote 11. In (80a), the scope of *any* is the entire sentence because the first/lowest predicate to govern *any* is *did do*, which is the matrix predicate. In (80b), in contrast, the scope of *any* is the embedded scope domain because the first/lowest predicate to govern *any* is the prepositional predicate *with*.

With this important use of terminology established, the account can now proceed to demonstrating how the concept of scope just established serves as the central notion for discerning the syntactic distribution of NPIs.

5. Analyses in terms of scope

The next two subsections establish the two main restrictions on the distribution of predicative, *iota*-type, and *any*-type NPIs in relation to their triggers. These restrictions have to do with containment within the scope of a trigger and with linearity (as expressed in terms of precedence).

5.1. The Scope Condition

The obvious and most important aspect of scope that helps account for the distribution of NPIs concerns containment ('appearance within'):

(82) Scope Condition

An NPI must appear within the scope of a trigger.

The Scope Condition expresses the basic insight that an NPI must be in the scope of a trigger.[15] This requirement is apparent when considering that a negation in an embedded clause cannot license an NPI in the matrix clause (see Jackendoff 1972, 349; Kayne 1994, 24; Lasnik 1999, 40–41, 185; Hoeksema 2000, 123; Lasnik & Uriagereka 2005, 148; O'Grady 2005, 18–19; Uriagereka 2012, 131). In the following examples and henceforth, the negation's scope is enclosed in square brackets [ ] – further below, wavy

[15] That is, we are assuming that ultimately it is scope in the semantic sense that licenses NPIs, but that semantic scope is determined on the basis of a syntactic domain as in (81). The idea that 'scope of X' in the sense of (81) – call it **syntactic scope** – always maps directly onto semantic scope is of course an oversimplification. Such simple examples as *He didn't eat at least two dishes that were given to him* demonstrate that scope in the sense of (81) does not always fully determine semantic scope, as this example is scopally ambiguous. We simply assume that, where the syntactic scopes of two items X and Y are coextensive, then potentially either may semantically scope over the other. (This is relevant in our brief discussion of FCIs in section 2.4.) This could also handle the fact, raised by a reviewer of this paper, that in Greek, subjunctive relative clauses may host NPIs that precede their licensors, while indicative relative clauses may not.

(i) a. Enas giatros pou na iksere **tipota** gia velonismo **dhen**
a doctor that SUBJ knew anything about acupuncture not
itan diathesimos.
was available
'A doctor that knew anything about acupuncture was not available.'

b. *Enas giatros pou iksere **tipota** gia velonismo **dhen**
a doctor that knew anything about acupuncture not
itan diathesimos.
was available

Given that the NPI in both cases is within the trigger's syntactic scope (Scope Condition) and that the NPI's syntactic scope is in an argument of the predicate establishing the trigger's scope (Precedence Condition), we may expect both examples to be acceptable. We simply assume that, since indicative relatives are unable to occur in the semantic scope of negation, the subject NP containing the relative in (ib) must take semantic scope over negation, as it can given that the subject NP's syntactic scope is coextensive with the trigger's syntactic scope. However, this means that the NPI fails to be licensed, as NPIs must occur in the semantic scope of their trigger.

brackets { } are used to delimit the NPI's scope. The Scope Condition hence necessitates that the NPI appears within the square brackets:

(83) a. *When [**no**thing bad happened] **any**one was dissatisfied.
b. [**No** one was dissatisfied when **any**thing bad happened].

(84) a. *The DA proved that [**none** of the defendants were guilty] during **any** of the trials.[16]
b. [The DA proved during **none** of the trials that **any** of the defendants was guilty].

(85) a. *Because [**no** one said they were hungry], **any**body brought food.
b. [**No**body brought food because **any**one said they were hungry].

From its position in the embedded clause, the negation in the a-sentences cannot scope out of the embedded clause over the matrix clause. When the relationship is reversed so that the negation is in the matrix clause and the NPI is in the embedded clause, as in the b-sentences, the result is fine. Note that the word order differs across each a- and b-sentence. This is necessary to satisfy the constraint on the linear ordering of *any*-type NPIs in relation to their triggers; this constraint is discussed below.

The Scope Condition helps distinguish between complements and adjuncts in NPs; for example:

(86) a. *[The fans wearing **no** clothes] made **any** noise.
b. [The fans of **no** team made **any** noise].

(87) a. *The author [known to **none** of us] **ever** wants to go unread.
b. ?[The author of **no** linguistics article **ever** wants it to go unread]. (Kayne 1994, 25)

(88) a. *[The key in **no**body's pocket] can **ever** open this door.
b. ?[The key to **none** of these problems has **ever** been obvious].
(Hoeksema 2000, 141–142)

The acceptability contrast across these examples is a function of the post-noun dependent – i.e., whether it has complement or adjunct status. The post-noun PP dependents in the a-sentences can easily be rendered as relative clauses (e.g., *the fans who were wearing no clothes, the author who is known to none of us, the key that is in nobody's pocket*), which is a mark of adjuncts. In contrast, the post-noun PPs in the b-sentences cannot be rendered as such; e.g., **the fans who are of no team,* **the author who is*

[16] Example (84a) is taken from Lasnik & Saito (1991, 12) (see also Lasnik & Uriagereka 2005, 148).

*of no linguistics article, *the key that is to none of these problems.* The post-noun PPs in the a-sentences are hence adjuncts containing separate scope-domain-establishing predicates.

The Scope Condition is a necessary condition, but not a sufficient one. This is apparent in simple cases such as *[***Any****one has* ***not*** *done that*], where the NPI *anyone* appears within the scope of a potential trigger but is not licensed, because it precedes that potential trigger instead of following it – see the next section. Even in cases where both criteria are met – i.e., the NPI appears within a potential trigger's scope and follows that trigger – triggering can fail. This occurs, for instance, with psychological predicates (see the examples in footnote 5):[17]

(89) a. *[It did **not** upset Jill that **any**one had divulged her secret].
b. *[It did **not** affect John that **any**one had stretched the truth].

There are many other types and aspects of polarity items that demonstrate further that the Scope Condition is a necessary but not a sufficient condition. These matters are not pursued further here, however (see, e.g., Collins & Postal 2014 and Hoeksema 2017 for useful recent discussion).

5.2. The Precedence Condition

The notion of scope established above also serves as the basis for discerning when an *any*-type NPI can precede its trigger. To show this, however, it is first necessary to extend the notion of scope beyond how scope is normally understood. We now stipulate that in addition to triggers, all lexical items have scope. Hence a given NPI also takes scope, and its scope is consistent with the definition of **scope of *X*** given above in Section 4.2: the scope of a given NPI is hence **the scope domain established by the first/lowest predicate to govern that NPI**. The manner in which the scope of an NPI and that of its trigger relate to each other can now be explored.

There are three basic constellations to acknowledge when examining how an *any*-type NPI's scope and its trigger's scope relate to each other:

[17] Following Linebarger (1987), one can perhaps explain the badness of examples like (89a–b) by acknowledging a negative implicatum evoked by the NPI *any* in the embedded clauses. The matrix predicates seem to presuppose the truth of their argument clauses, a fact that contradicts the negative implicatum evoked by *any*.

Three scope constellations

A. The scope of the NPI and that of its trigger are coextensive (i.e., they completely overlap),
B. The two scopes are not coextensive and the NPI's scope is (contained in) an argument of the predicate that establishes the trigger's scope, or
C. The two scopes are not coextensive and the NPI's scope is NOT (contained in) an argument of the predicate that establishes the trigger's scope.

These three constellations are represented schematically as follows. The trigger's scope is indicated with square brackets [ ], and the NPI's scope with wavy brackets { }:

(90) Scopes are coextensive (with *any*-type NPI)

a. [{ Trigger NPI }]

b. *[{ NPI Trigger }]

(91) Scopes are not coextensive (*any*-type NPI in an argument)

a. [Trigger $\{_{\text{Arg}}$ NPI }]

b. [$\{_{\text{Arg}}$ NPI } Trigger]

(92) Scopes are not coextensive (*any*-type NPI in an adjunct)

a. [Trigger $\{_{\text{Adj}}$ NPI }]

b. *[{Adj NPI} Trigger]

All three constellations are summarized and unified as one condition (in two parts) on the distribution of non-predicative NPIs (i.e., *iota*- and *any*-type NPIs):

(93) Precedence Condition

i. An *iota*-type NPI must follow its trigger.

ii. An *any*-type NPI must follow its trigger unless its scope is (contained in) an argument of the predicate that establishes a trigger's scope.

The Precedence Condition captures an aspect of the distribution of non-predicative NPIs that was noticed early on in investigations of the distribution of NPIs. Jackendoff (1972, 349–350) posited the 'left-to-right condition', and Ladusaw (1980, 206–207) the 'left-right order restriction' – see also Ladusaw (1996, 333). More recently, O'Grady (2005, 18–21) has

argued against c-command in favor of an account in terms of left-to-right linear order.

The following sets of examples give the basic cases that the Precedence Condition captures:

(94) Scopes are coextensive (with *any*-type NPI)

a. [{**No**body said **any**thing to **any**one}].

b. [{He said **no**thing to **any**one}].

c. *[{**Any**body said **no**thing to **any**body}].

d. *[{**Any**body said **any**thing to **no**body}].

Scopes are not coextensive (with *any*-type NPI in an argument)

(95) a. I'm sure that [a student had **not** written the explanation {who knew **any**thing about syntax}].

b. I'm sure that [a student {who knew **any**thing about syntax} had **not** written the explanation].

(96) a. [It was **un**expected that {**any**one had actually solved the problem}].

b. [{That **any**one had actually solved the problem} was **un**expected].

Scopes are not coextensive (with *any*-type NPI in an adjunct)

(97) a. [She did **not** stay because {**any**one asked her to}].

b. *[Because {**any**one asked her to}, she did **not** stay].

(98) a. [He did **not** slow down so that {**any**one could understand}].

b. *[So that {**any**one could understand}, he did **not** slow down].

Example (95b) and (96b) are the most noteworthy ones here. In those examples, the NPI precedes its trigger, yet the sentences are fine. That *any*-type NPIs can at times precede their triggers is acknowledged in many places (e.g., Ross 1967, 282; Ladusaw 1980, 205; Linebarger 1980, 13–14; Laka 1994, 121; Uribe-Etxebarria 1996; de Swart 1998; Hoeksema 2000, 135–137).

Note that the Precedence Condition has no difficulty with some of the examples from the introduction that were problematic for the c-command account. Examples (5a–b) are repeated here as (99a–b), with brackets added to mark the relevant scopes:

(99) a. [{**No** student's parent posed **any** questions}].
b. [{The parent of **no** student posed **any** questions}].

In each sentence, the scope of the NPI is coextensive with that of its trigger, and since the negation precedes the NPI, the sentences are predictably fine. Examples (4) and (6), which contain event-oriented adjuncts, are repeated here as (100a) and (101a):

(100) a. [{During **no**body's presentation did I say **any**thing}].
b. *[{I said **any**thing during **no**body's presentation}].

(101) a. [{She said **no**thing at **any** time}].
b. *[{At **any** time, she said **no**thing}].

The adjunct predicates *during* and *at* establish scope domains, and these scope domains are in addition to the scope domains established by the matrix predicates *say* and *said*. Since these adjuncts are event-oriented, the matrix clause is the adjunct predicate's first argument. This extends the scope domain established by the adjunct predicate over the entire sentence, resulting in coextensive scopes, which correctly predicts that the *any*-type NPI must follow its trigger, for the scope of the one overlaps completely with the scope of the other.

Like the Scope Condition, the Precedence Condition is a necessary limitation on the distribution of non-predicative NPIs, but it is not a sufficient one. In other words, there are cases in which the Precedence Condition is obeyed, yet the appearance of a non-predicative NPI is disallowed.[18]

[18] Further examples that support the idea that the Precedence Condition restricts non-predicative NPIs include the following ((ia/b) from Heycock & Kroch 2002, 154):

(i) a. *Any firemen weren't available.
b. What wasn't/weren't available was/were any firemen.
c. *Any firemen was/were what wasn't/weren't available.

Here it seems clear that the reason why the NPI is licensed in the pseudocleft (ib) but not in (ia,c) is that it is preceded by its trigger in (ib) but not in (ia). What remains to be explained about (ib) is why the NPI is licensed despite apparently being outside the scope of its trigger (the *wh*-subject). Even under an ellipsis analysis of pseudoclefts (e.g. Ross 1972; Den Dikken et al. 2000), we do not expect licensing to succeed here, given the ungrammaticality of **Any fireman weren't available*. We leave this as a topic for future research.

5.3. Fronted predicates

An examination of data involving topicalized non-finite predicates, as seen in examples (9)–(10) in the introduction, has been postponed until now. The reason for this postponement is that fronted non-finite predicates unexpectedly behave as though they are separate scope domains. Examples (9)–(10) are repeated here as (102a–b):

(102) a. ...but **all that** happy, she clearly was **not**.
b. ...but **at all** satisfied, he obviously was **not**.

Given the analyses of predicative elements above, *happy* and *was* in (102a) and *satisfied* and *was* in (102b) should form a single predicate each time. This means that they should establish a single scope domain, which predicts, in turn, that the *any*-type NPIs *all that* and *at all* should, in accordance with the Precedence Condition, not be able to precede the negation. This prediction is wrong, since (102a–b) are acceptable. What actually seems to have occurred is that fronting of the adjective phrase has resulted in that phrase becoming an embedded scope domain with argument status.[19]

The problem is illustrated further with the following data:

(103) a. I definitely did **not** drink **any** beer.
b. *...but **any** beer, I definitely did **not** drink.
c. ...but drink **any** beer, I definitely did **not**.[20]

As the account stands, the Precedence Condition correctly predicts that the non-predicative NPI *any* cannot precede the trigger *not* in (103b). However, the Precedence Condition incorrectly predicts (103c) to also be bad because the matrix predicate *did drink/drink...did* has not changed,

[19] This resembles Adger's (2013) proposal, in a different empirical context, that the verb and auxiliary in VP-fronting constructions head two distinct 'extended projections' (in the sense of Grimshaw 1991).

[20] Our judgment for sentence (103c) stands in contrast to Laka's (1994, 124) judgments for such cases. Laka takes the following examples to be unacceptable:

(i) a. *Buy any records she hasn't.
b. *Buy any records is what she refused to do.

We think that the acceptability of (ia) increases markedly if the negation is emphasized and the participial form of the verb is used (*...but bought any records, she definitely has* ***not***), and, concerning (ib), we simply disagree with Laka's acceptability judgment: for us, (ib) is fine.

the same words being present. What seems to have occurred is that the fronting of the non-finite VP *drink any beer* has resulted in that VP gaining the status of an embedded argument scope domain.

Assuming that this is correct – i.e., that the fronted non-finite AP/VP has gained the status of an embedded argument scope domain – examples (102a–b) receive the following analyses:

(104) a. ...but [{**all that** happy}, she clearly was **not**].
b. ...but [{**at all** satisfied}, he obviously was **not**].

(105) a. [{I definitely did **not** drink **any** beer}].
b. *...but [{**any** beer, I definitely did **not** drink}].
c. ...but [{drink **any** beer}, I definitely did **not**].

While these analyses seem to be on the right track inasmuch as the scope domains shown are now congruent with what the Precedence Condition predicts, no independent evidence has been produced that motivates the presence of the embedded scope domains indicated. In other words, there is no obvious reason why such fronted non-finite predicates should constitute embedded scope domains, nor why they should have argument status.

Putting aside the question of independent evidence for the moment, note that there are further data supporting the stipulation that the fronted non-finite APs and VPs have the status of embedded argument scope domains:

(106) a. [I would definitely drink **no** beer].
b. ...but [**no** beer would I drink]
c. *...but [drink **no** beer] would I definitely.
d. [{I would definitely **not** drink **any** beer}].
e. *...but [drink **no** beer], I would definitely.

The fronted expression *no beer* elicits negative inversion in (106b), which is congruent with the presence of the single scope domain indicated. In (106c), in contrast, the fronted non-finite VP fails to elicit negative inversion, which is consistent with the analysis shown because the fronted non-finite VP is an embedded scope domain that the negation's scope does not reach out of. Sentence (106d) is truth-conditionally equivalent to sentence (106a), which is consistent with the single scope domain or coextensive scope domains analyses shown in those two examples.

The badness of (106e) is unexpected, since there is no apparent reason why the non-finite VP containing *no* should not be frontable. Observe,

however, that if *drink no beer* is an embedded scope domain as shown, then there is no expectation that (106e) would be truth-conditionally equivalent to (106d), due to the mismatching scope domains – one scope domain in (106d), but potentially two in (106e). It seems likely in this regard that the grammar simply has no means of assigning (106e) an interpretation, due to the fact that the presence of the embedded scope domain ensures that *no beer* cannot be equivalent in meaning to *not…any beer* in (106d).

With these further considerations in mind, the best analysis of fronted non-finite predicative phrases is that they do indeed qualify as embedded argument scope domains. To accommodate this aspect of the data, the current account emphasizes the monostratal nature of the greater approach to syntax assumed – see the fourth principle in section 3.1. A monostratal syntax that takes hierarchical and linear organization to both be primitive can appeal to, and build on, the production and processing of syntactic structures in time. Scope domains are produced and processed in time as they are spoken or heard (or read: from left to right in languages that are written from left to right and from right to left in languages that are written from right to left; see Osborne et al. 2011 and Osborne 2012). Once a word appears that potentially establishes a scope domain, the grammar indeed creates a space for that predicate word as a scope domain. Fronted non-finite predicative adjectives and verbs therefore establish separate scope domains.

An addendum is now added to the definition of the scope domain to accommodate the data and points discussed in this section:

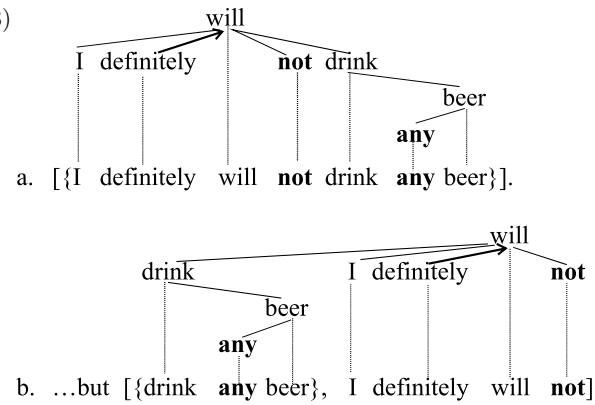
(107) Scope domain (final version)

> The minimal constituent containing (part of) a syntactic predicate P (that is not preceded and dominated by any other part of P) and any argument of P that dominates P.

With the addenda in parentheses – i.e., *(part of)* and *(that is not preceded and dominated by any other part of P)* – the definition now identifies fronted non-finite APs and VPs as embedded scope domains. A further stipulation is also necessary, namely that these embedded scope domains have argument status in relation to the encompassing scope domain established by the following auxiliary verb.

The next trees illustrate how this expanded definition of the scope domain is understood:

(108)



The relevant difference across these two structures is that the non-finite verb *drink* in (108a) is preceded and dominated by *will*, the two words together forming one predicate. According to the definition, this means that *drink* alone does not establish a separate, embedded scope domain. In (108b), in contrast, *drink* is not preceded and dominated by *will*, so it does establish a separate scope domain. As soon as *drink* is uttered in (108b), *drink* alone acquires scope-domain-establishing status because no other word has yet been uttered that could be construed as forming a predicate with it. The greater observation, then, is that scope domains are being established in real time in an online manner as (part of) a predicate is produced or perceived.

6. Additional issues

The following subsections consider additional sources of support for the account above in terms of scope domains and the definition of scope more generally.

6.1. Negative inversion

The scope domain unit helps predict when negative inversion does and does not occur. When a negation precedes the subject and finite verb in a clause and the scopes of the negation and the subject are coextensive, negative inversion must occur. If the two scopes involved are not coextensive, however, negative inversion does not occur. This state of affairs is demonstrated here first using event-oriented adjuncts:

(109) a. [Sam dances under **no** circumstances].
b. [Under **no** circumstances does Sam dance].
c. *[Under **no** circumstances, Sam dances].

(110) a. [Bill drinks alcohol before **no** social events].
b. [Before **no** social events does Bill drink alcohol].
c. *[Before **no** social events, Bill drinks alcohol].

Since the negation in these examples is in a phrasal event-oriented adjunct, its scope encompasses the entire sentence. This necessitates that subject-auxiliary inversion occur.

When the negation is embedded in a clausal event-oriented adjunct, in contrast, the scope of the negation does not extend out of the embedded clause over the matrix clause:

(111) a. Sam never dances because [he has **no** self-confidence].
b. *Because [he has **no** self-confidence] does Sam never dance.
c. Because [he has **no** self-confidence], Sam never dances.

(112) a. Bill avoids pubs when [he has **no** money].
b. *When [he has **no** money] does Bill avoid pubs.
c. When [he has **no** money], Bill avoids pubs.

The scope of the negation in these examples is limited to the adjunct clause. The scope of the negation therefore does not reach over the matrix subject and finite verb, so negative inversion in the matrix clause does not occur.

The first acceptability pattern (examples (109)–(110)) occurs again when the negation is (part of) an argument of the matrix predicate (but not contained within an adjunct in that argument); for example:

(113) a. [Jill has understood **none** of the explanations].
b. [**None** of the explanations has Jill understood].
c. *[**None** of the explanations, Jill has understood].

(114) a. [I would send my dog to **no** dog school].
b. [To **no** dog school would I send my dog].
c. *[To **no** dog school, I would send my dog].

A single predicate, the matrix predicate, is present in each of these examples – the preposition *to* introduces an argument of the matrix predicate,

as opposed to an adjunct, which means that it is not a separate predicate. This situation sees the scope of the negation encompassing the entire sentence.

The next examples involve phrasal participant-oriented adjuncts:

(115) a. ?Susan was actually quite happy, [in love with **no** one].
b. *[In love with **no** one] was Susan actually quite happy.
c. [In love with **no** one], Susan was actually quite happy.

(116) a. James has finally given up, [tired of getting **no** support].
b. *[Tired of getting **no** support] has James finally given up.
c. [Tired of getting **no** support], James has finally given up.

The adjuncts in these cases cannot be viewed as clausal, in part because they lack a finite verb. Despite this fact, the negations do not scope out of the adjuncts over the matrix clauses. They do not do so because, as participant-oriented adjuncts, they are predications over a participant, in these cases over the subject, and their scopes are therefore limited to the adjuncts.

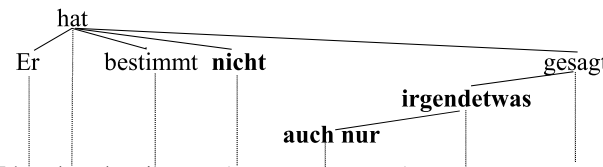
6.2. German

The account of NPI distribution above can be extended to other languages. In this section, some data from German is considered, data of the sort discussed by Hinterhölzl (2006) and Richter & Soehn (2006). Despite the freer word order associated with scrambling in German, the Scope Condition and Precedence Condition hold in the same manner that they do in English. The data examined next involve VP-fronting in matrix clauses, clause-fronting, and scrambling in subordinate clauses. The same distribution of non-predicative NPIs seen above in English repeats itself in German.

The V2 principle of German (and other Germanic languages) is such that the position immediately preceding the finite verb in matrix declarative clauses can be occupied by most any phrasal constituent. An object phrase, for instance, can easily precede the finite verb, causing the subject phrase to follow the finite verb; e.g., *Er hat bestimmt **alles** gesagt* 'He certainly said everything' → ***Alles** hat er bestimmt gesagt* 'He certainly said everything'. It is even possible for a nonfinite verb together with its object to occupy the first position; e.g., ***Alles gesagt** hat er bestimmt* 'He certainly said everything'. This fundamental aspect of word order in German allows one to test the Precedence Condition well.

The following data set tests the Precedence Condition using the *any*-type NPI *auch nur irgendetwas* 'anything'. The predictions the Precedence Condition makes are borne out:

(117)



a. [{Er hat bestimmt **nicht** **auch nur** **irgendetwas** gesagt.}]
he has certainly not even only anything said
'He certainly did not say anything.'

b. *[{Er hat bestimmt **auch nur irgendetwas nicht** gesagt}].

Sentences (117a–c) illustrate the standard pattern: the NPI should follow the negation. Sentence (117d), in contrast, demonstrates that the NPI can precede the negation if the participle is fronted together with it, as the NPI and participle together make up a separate scope domain. This is, assuming that the NPI is a dependent of the participle as shown in (117a), exactly as the Precedence Condition predicts.

The prediction concerning a non-predicative NPI in a subordinate clause is that it should be able to precede a negation in the main clause. This prediction is also borne out:

(118) a. *[{**Auch nur** **irgendetwas** wurde **nicht** gestohlen}].
even only anything was not stolen
'*Anything was not stolen.

b. [Dass {er **auch** nur **irgendetwas** gestohlen hat},
that he even only anything stolen has
wurde **nie** bewiesen].
was never proved
'That he had stolen anything was never proved.'

Sentence (118a) illustrates again the inability of a non-predicative NPI to be fronted on its own. When it appears in an argument clause as in (118b), though, the argument clause can be fronted. The brackets continue to indicate how these cases are interpreted. The acceptable (118b) has the NPI's scope properly contained inside the negation's scope.

The account predicts that in the middle field (Ger. *Mittelfeld*) in subordinate clauses, the NPI should *not* be able to precede the negation. This

is indeed the case, as the following examples taken from Richter & Soehn (2006, 425) demonstrate:

(119) a. weil [{er **nicht auch nur irgendetwas** gesagt hat}]
because he not even only anything said has
'because he has not said anything'

b. *weil [{er **auch nur irgendetwas nicht** gesagt hat}]

Scrambling in the middle field in these cases does not involve an embedded argument scope domain, hence the NPI cannot precede the negation. If the scope of the NPI is (or is contained in) an embedded argument, however, the NPI can precede the negation; for example:

(120) weil [er einen Autor {der **auch nur irgendetwas** schreibt}
because he an author who even only anything writes
nicht kennt]
not knows
'because he doesn't know an author who is writing anything'

In this case, the relative clause modifies an argument noun, which means that the relative clause is a scope domain that is in an argument of the matrix predicate.

In light of the examples from German examined in this section, the current account of NPI distribution can claim validity beyond English. The value of the German data lies in particular in the freer word order of German. Despite this freer word order, the Precedence Condition remains valid and helps predict when an *any*-type NPI can precede its trigger.

7. Conclusion

This paper has endeavored to clarify the syntactic relationship between NPIs and their triggers. The discussion began with demonstrations of the inability of c-command to capture this relationship. C-command (either on the surface or at LF) is neither a necessary nor a sufficient condition on the distribution of NPIs. In place of the c-command restriction, a DG account has been presented that examines **scope domains** in order to identify the factors that determine the syntactic relationship between NPIs and their triggers.

The DG catena plays an important role, since by acknowledging catenae, one can discern the presence of predicates and their arguments in

syntactic structures in a concrete way. This, in turn, is what has made it possible to identify scope domains. Equipped with the scope domain, two conditions on the distribution of NPIs have been identified. The highlights of the account are repeated here again to provide a concluding overview:

(121) Scope domain

The minimal constituent containing (part of) a syntactic predicate P (that is not preceded and dominated by any other part of P) and any argument of P that dominates P.

(122) Scope Condition

An NPI must appear within a trigger's scope.

(123) Precedence Condition

i. An *iota*-type NPI must follow its trigger.

ii. An *any*-type NPI must follow its trigger unless its scope is (contained in) an argument of the predicate that establishes a trigger's scope.

The two conditions on the distribution of NPIs are necessary, but not sufficient. Indeed, there are numerous aspects of polarity licensing (e.g., intervention effects; see, e.g., Guerzoni 2006) and idiosyncrasies of various licensors and licensees that have been ignored in this contribution. However, we are aware of no clear exceptions to our claim that the two conditions are necessary.

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