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Special Session
Fieldwork Methodology

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Foreword

This monograph contains a number of the talks given at the 41st Annual Meeting of the Berkeley Linguistics Society, held in Berkeley, California, February 7-8, 2015. The conference included a General Session and the Special Session *Fieldwork Methodology*. The 41st Annual Meeting was planned and run by the second-year graduate students of the Department of Linguistics at the University of California, Berkeley: Kenny Baclawski, Anna Jurgensen, Spencer Lamoureux, Hannah Sande, and Alison Zerbe.

The original submissions of the papers in this volume were reviewed for style by Anna Jurgensen and Hannah Sande. Resubmitted papers were edited as necessary by Anna Jurgensen and Kenny Baclawski, and then compiled into the final monograph by Anna Jurgensen. The final monograph was reviewed by Spencer Lamoureux. The endeavor was supported by Alison Zerbe's management of the Berkeley Linguistic Society's funds for publications.

The BLS 41 Executive Committee
July 2015

The ‘Whole’ Story of Partitive Quantification

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1 Introduction

This paper defends a new theory of the Logical Form (LF) of quantity-denoting expressions that appear in and define the structure of the determiner phrase in English (henceforth, DP quantifiers). This class of expressions includes, but is not limited to, those in (1), which are the DP quantifiers on which I focus my attention in this paper.

(1) DP Quantifiers

*every, each, both, many, few, some, several, a (one), two/three/etc., no (none), all, most*¹

As is well known, these expressions have three distinct surface structures, appearing alternately with (a) a nominal complement (Q+NP), (b) a nominal complement embedded in a partitive PP (Q+PP), or (c) no apparent nominal complement at all (the so-called ‘bare’ uses) as shown in (2).

- (2) a. Q+NP: {Every/Each/Both/Many/Few/Some/Several/A/Two/No/All/Most} {man/men} walked to the store.
b. Q+PP: {Every one/Each (one)/Both/Many/Few/Some/Several/One/Two/None/All/Most} of the men walked to the store.
c. Bare: {Every one/Each (one)/Many/Few/Some/Several/One/Two/None/All/Most} walked to the store.

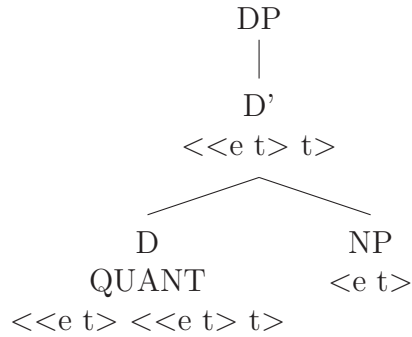
Since early work in Generalized Quantifier Theory (GQT), the traditional approach to DP quantifiers has assumed that their LF mirrors the Q+NP surface structure (cf., among many others, Barwise and Cooper 1981 and Keenan and Stavi 1986). Under this approach, quantifiers behave syntactically as determiners taking NP complements and semantically as relations between sets, as shown in Figure 1 on the following page.

Recent literature suggests instead that the LF of DP quantifiers mirrors the Q+PP surface structure such that these expressions c-command an NP embedded in a partitive PP. After briefly reviewing this existing work, the present paper advances two novel arguments in support of this partitive structure. Importantly, where previous proposals limit (to varying degrees) the scope of the partitive structure to only a subset of the expressions in (1), the evidence I contribute suggests that *all* of these expressions are necessarily partitive at LF. I then advance a novel analysis of the syntax and semantics of the partitive structure, one that

*My sincere thanks to Patrick Farrell, Robert May, Adam Sennet, and William Ladusaw for talking at length with me about the material presented here. I am also grateful to audiences at the 41st Annual Meeting of the Berkeley Linguistics Society and the 7th Meeting of California Universities Semantics and Pragmatics for their helpful comments and observations.

¹I assume unproblematically that *one* and *none* are variants of *a* and *no*, respectively, that appear when these quantifiers take overt partitive PP complements or when they appear bare at surface structure.

Figure 1: DP Quantifiers under GQT



takes into consideration the fact that not all DP quantifiers combine with the partitive PP in the same way at surface structure. Finally, I review some of the independent benefits of the analysis, noting in particular how it accounts for the behavior of quantifiers with group- and individual-denoting predicates.

2 Arguments for the partitive structure

This section surveys the reasons for stipulating an underlying partitive structure for DP quantifiers, reviewing existing work before advancing two novel arguments.

2.1 Existing arguments

2.1.1 Crosslinguistic evidence (Matthewson 2001)

Matthewson (2001) makes a case for the partitive structure of quantification on the basis of crosslinguistic evidence from St'át'imcets (Lillooet Salish). In St'át'imcets, quantifiers necessarily take DP, and not NP, complements at surface structure, as the data in (3) show (from Matthewson 2001:150-1, her examples 7 and 8).

- (3) a. léxlex tákem i smelhmúlhats-a.
 intelligent all DET.PL woman.PL-DET
 ‘All (of the) women are intelligent.’
- b. *léxlex tákem smelhmúlhats.
 intelligent all woman.PL
 ‘All women are intelligent.’
- c. cw7it i smelhmúlhats-a léxlex.
 many DET.PL woman.PL-DET intelligent
 ‘Many (of the) women are intelligent.’
- d. *cw7it smelhmúlhats léxlex.
 many woman.PL intelligent
 ‘Many women are intelligent.’

Matthewson observes that English quantifiers also indirectly take DP complements when they combine with a partitive PP: given the Partitive Constraint (cf., among others, Jackendoff 1977, Selkirk 1977, Ladusaw 1982, and Barker 1998), the complement of the partitive PP is a definite DP. She therefore concludes that the best proposal for the universal structure of DP quantifiers stipulates that their complement at LF is not a bare NP but a partitive PP. She further argues that the head of the partitive PP, *of*, is semantically vacuous, which in turn explains the surface facts of Q+DP structures in St’át’incets and Q+NP structures in English.

2.1.2 Evidence from anaphora (Gagnon 2013)

Gagnon (2013) also argues for a partitive quantifier structure on the basis of evidence from anaphora in English. He argues that bare uses of quantifiers cannot be analyzed as cases of nominal ellipsis (as the Q+NP structure obliges) and must instead be analyzed as cases of partitive ellipsis, offering the scenario in (4) as an example (2013:317, his example 4).

- (4) I arrived at class ten minutes before the start. There were boyscouts (X) and girlscouts (Y) standing at their desks. Then, ten young boys (Z) walked in whistling. Many sat down.

Many in the final sentence of (4) may refer to the set of boys who just walked in (Z) or to the entire set of students in the class ($X \cup Y \cup Z$) but not to the total set of boys ($X \cup Z$). Gagnon notes that this is at odds with what we would expect if the elided constituent were just the noun *boys* and instead mimics an elided partitive pronominal.

- (5) Many sat down. ($Z; X \cup Z$)
 a. \neq Many boys sat down. ($X \cup Y \cup Z$)
 b. = Many of them sat down. ($Z; X \cup Z$).

While Gagnon is on the right track with this argument, I will argue that scenarios such as these are more complicated than they need to be to prove the general point that anaphoric uses of DP quantifiers often, if not always, require DP antecedents; more on this in §2.2.1.

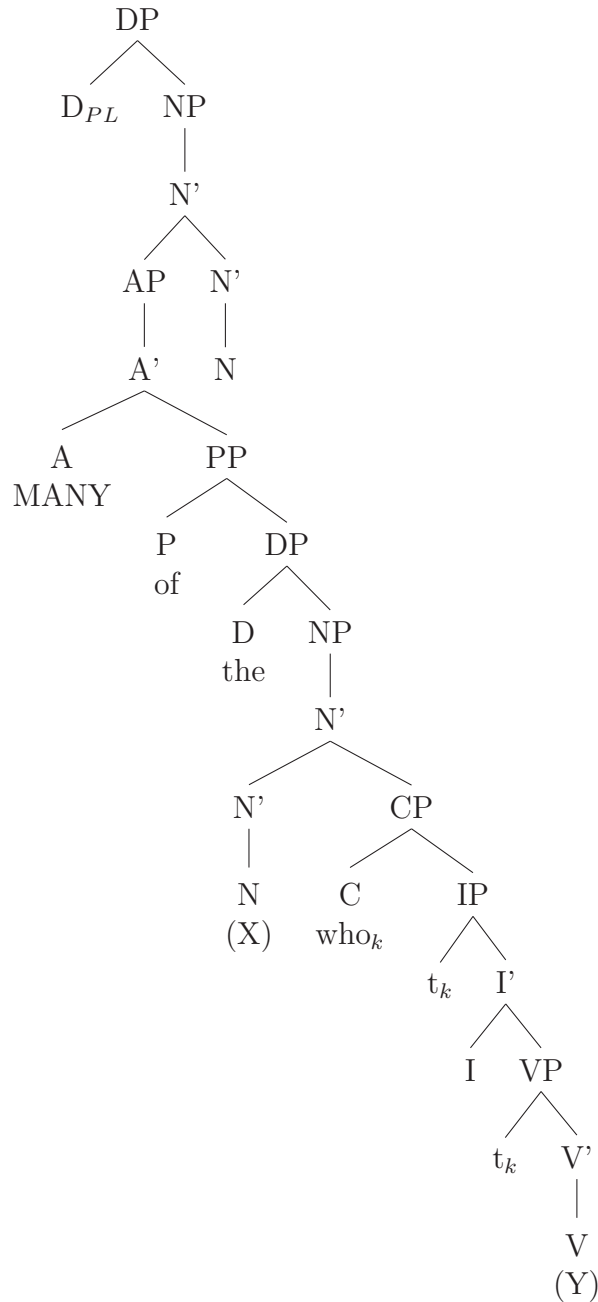
2.1.3 Quantifier ambiguity (Greer 2014b)

My account of the ambiguity of *many* and *few* in Greer (2014b) also indirectly supports a partitive structure for DP quantifiers. As Westerståhl (1985) originally noted, *many* and *few* allow an interpretation wherein the semantic arguments ‘reverse’ the ordering of the sentential predicates: where the set denoted by the noun normally represents the restrictor of the quantifier and that denoted by the verb its scope (the proportional reading), the set denoted by the verb represents the restrictor and that denoted by the noun the scope in the so-called ‘reverse’ reading. The possibility of this latter reading is especially evident in Westerståhl’s original example, given in (6).

- (6) Many Scandinavians have won the Nobel Prize.
 a. Proportional: Many *of the Scandinavians* have won the Nobel Prize.
 b. Reverse: Many *of the people who have won the Nobel Prize* are Scandinavian.

In Greer (2014b), I attribute this ambiguity to a variable, contextually-determined domain (represented as a variable at LF per arguments for Hidden Indexicality in, e.g., Stanley 2000 and Stanley and Szabó 2000). If we assume, as is standard, that the syntactic complement of the quantifier maps into its first semantic argument (the syntax-semantics mapping hypothesis advocated in, e.g., Diesing 1992), then a Q+NP LF is too rigid to accommodate the variable domain of quantifiers like *many* and *few*. Instead, I argue that this position is occupied by a PP dominating variable, contextually-resolved content. This PP then effec-

Figure 2: The structure of *many* and *few*



tively displaces the overt N from the c-command domain of the quantifier at LF, obliging the quantifier to combine with this noun as an adjunct. This structure is sketched in Figure 2 on the previous page (from Greer 2014b:333; D’, C’, and P’ levels have been omitted for reasons of space).

2.2 Further arguments

Extant arguments for the partitive structure of DP quantifiers are, in one way or another, limited in their scope. Matthewson is in favor of adopting the partitive structure for all DP quantification in all natural languages, but she admits that her analysis of the structure of the PP encounters difficulty with *every* (more on this below). Gagnon, on the other hand, argues that only some quantifiers (those that may appear bare) have a partitive structure, and then only some of the time, hence advocating a kind of structural ambiguity (cf. Gagnon 2013:326), and Greer (2014b) makes a case only for the partitive structure of *many* and *few*.

In what follows I present arguments in support of the much stronger claim that *all* the DP quantifiers of (1), including the problematic *every*, have a Q+PP structure at LF *all the time*. These arguments are of two types: the first is fundamentally syntactic, citing evidence from Wh-questions and anaphora, and the second is pragmatic, citing evidence from quantifier presuppositions.

2.2.1 A syntactic argument: Evidence from Wh-questions and anaphora

Facts from Wh-extraction suggest that all DP quantifiers are necessarily associated with *of* at some level of structure. It is impossible to extract out of a quantified object, even one with an antecedent Q+NP structure, without a residual *of* in the extraction site, as the examples in (7) show (the ⁺ annotations on the indices signal a caveat that I explain immediately below).

- (7) a. I sold {every/each} [_{NP} book]_k⁺.
 What_k did you sell {every/each} *(one of) t_k?
- b. I sold {both/many/few/some/several/a (one)/two/no/all/most} [_{NP} book(s)]_k⁺.
 What_k did you sell {both/many/few/some/several/one/two/none/all/most}
 *(of) t_k?

If we assign quantifiers the traditional Q+NP LF, it is unclear how we should handle *of* in the examples in (7), but if we instead assign them a Q+PP structure, this *of* is simply an overt manifestation of this underlying structure that, while optional in declaratives, is obligatory in Wh-extraction contexts.

One might suggest that we can retain the underlying Q+NP structure and posit a rule of *of*-insertion to account for the data in (7). This will not do, however, as this preposition is not the only curious feature of the questions in (7). The simple NP *book(s)* does not suffice as an appropriate response to these questions, hence the annotations on the indices in the declaratives of (7). Instead, appropriate responses to these questions would be full DPs like *the books*, *those books*, *my books*, or *the books that I was trying to sell*. If we assume that the declarative on which these questions are based contains a Q+NP structure, the origin of these DP responses is entirely mysterious. Given a Q+PP structure, however, a full DP such as this *does* form part of the underlying structure of the declarative, as shown in (8).

- (8) I sold {every one/each (one)/both/many/few/some/several/one/two/none/all/most} [_{PP} of [_{DP} the [_{NP} books (that I was trying to sell)]]]_k].

Because it can account for both the appearance of the preposition and the structure of the anticipated response, an account of the Wh-question data in terms of syntactic ellipsis is preferable to an alternative, *of*-insertion account of the kind that must inevitably accompany the Q+NP structure.

In fact, when we consider the Wh-question data in combination with the bare quantifier data of Gagnon (2013), what emerges is that anaphoric uses of quantifiers *in general* require DP antecedents. As I mentioned in the discussion of Gagnon’s data, it is not actually necessary to set up scenarios wherein there are multiple possible sets that an anaphoric quantifier could refer to to prove this point. Even in scenarios with only one salient antecedent set, an anaphoric quantifier is most naturally reconstructed with a definite DP of some kind. In (9), for instance, reconstructing the sentence with a bare NP sounds odd with the desired interpretation that the sets sold were the ones the speaker owned.

- (9) I used to own all of the Star Wars Lego sets. I played with them all the time.
- a. But, {many/most} got sold last year at our garage sale.
 - b. {Many/Most} {?Star Wars Lego sets/of them/of the sets I owned} got sold last year.
 - c. But, {every (single) one/each one} got sold last year at our garage sale.
 - d. {Every (single)/Each} {?Star Wars lego set/one of them/one of the sets I owned} got sold last year.

That anaphoric uses of quantifiers should ever require DP antecedents is a desirable result as it shows that DP quantification in English operates just like what Matthewson has observed for St’át’imcets.² Independently of Matthewson’s crosslinguistic argument, then, evidence from anaphoric quantifiers in English shows that the Q+PP structure is the best representation of the underlying form of these expressions.

2.2.2 A pragmatic argument: Evidence from quantifier presuppositions

A different kind of argument for the Q+PP structure of DP quantifiers follows from their pragmatic structure. In Greer (2014b), I propose that context has two distinct truth-conditional effects on the interpretation of DP quantifiers: one is in determining the domain of quantification (given that some quantifiers are ambiguous between nominal- and verbal-domain readings, as reviewed in §2.1.3 above), and the other is in restricting that domain to a relevant subset of the universe. I conclude that these two effects must be represented as variables at LF given Stanley’s claim that “all truth-conditional effects of extra-linguistic context can be traced to LF” (Stanley 2000:391; cf. also Stanley and Szabó 2000:229). I further argue that the contents of these variables correspond to the contents of existential presuppositions that are salient in the context. In essence, this means that the contextual variables correspond to sets whose existence is presupposed in the discourse (or simply ‘presupposed sets’): the content of the domain variable corresponds to the set denoted by either

²It is important to notice that this discussion has shown that *every*, too, obliges DP antecedents, and this is in contrast to Matthewson’s suggestion that *every* may never operate over DPs (cf. Matthewson 2001:176).

the nominal or the verbal predicate, and that of the domain restriction variable corresponds to a superset of the non-domain predicate (cf. Greer 2014b:323-8 for details). Importantly, this amounts to the claim that DP quantifiers presuppose the existence of two sets: one representing the domain and one representing the domain restriction.³

The definite article *the* can also be understood as presupposing two sets. Under the Strawsonian view (cf. Strawson 1950), *the* presupposes the existence and uniqueness of the denotation of its complement noun.⁴ To accomplish this latter presupposition, we need a domain that the noun can be unique *in*, and this is often not reflected in the overt syntactic structure. For instance, if we utter,

(10) The door is open.

we do not presuppose (or, much less, assert) that there is only one (=unique) door in the entire universe but rather that there is only one door in *some salient domain*. This is often referred to as the problem of “incomplete description”: the description of the intended referent in (10) is lacking information to specify it uniquely. One promising solution to this problem is to propose that there is a variable that associates with the nominal complement of the definite article as a modifier (syntactic adjunct) such that the structure of (10), for instance, is actually something like that in (11).

(11) [_{DP} [_D The] [_{NP} [_{N'} [_{N'} [_N door]]] [_{CP} X]]] is open.

As with the variables in the structure of DP quantifiers, the value of this variable corresponds to the content of a salient existential presupposition of the discourse. This content represents a presupposed set that, intersected with the nominal, provides a limited domain in which the noun can be unique, thus satisfying the presupposition of uniqueness.⁵

Viewed in this way, the definite article bears presuppositions that are almost exact parallels of the presuppositions of DP quantifiers: the existence presupposition corresponds to the presupposition of the existence of the domain of DP quantifiers, and the uniqueness

³Of course, certain DP quantifiers may bear cardinal (or ‘weak’) interpretations that are fundamentally *non*-presuppositional. These interpretations can be derived from the basic DP quantifier structure I am proposing. Under it, a quantifier’s first semantic argument represents material that is presupposed, so if nothing is presupposed, there is simply no material in this first argument. This provides a principled explanation for the derivation of the unary quantifier structure from its fundamentally binary structure. Further discussion of the cardinal reading can be found in Greer (2014a), which updates features of the discussion in Greer (2014b:345).

⁴Typically, these presuppositions are ascribed to the singular variant of the definite article, but I see no problem in stipulating that these apply straightforwardly to the plural definite article. Instead of presupposing the existence and uniqueness of an *individual* entity, the plural definite article makes these presuppositions of a plural entity, which I generally assume means a set of entities. There are, of course, other theories about what plural entities might be (i.e., sum entities, as in Link (1983) and much subsequent work). For the sake of space, I avoid a detailed discussion of what an adequate representation of plurals must be and generally take the liberty of referring only to sets.

⁵In the example in (10), for instance, if the speaker is standing in a room, there is a salient extra-linguistic presupposition that there are things in that room, $\exists x[in\text{-}this\text{-}room'(x)]$. The property of being in the room may then be assigned to the domain restriction, and the meaning paraphrased below will result.

(1) The door (*that is*) *in this room* is open.

presupposition corresponds to the domain restriction of DP quantifiers. If DP quantifiers *c-command* a partitive PP, they will always *c-command* a definite determiner (per the Partitive Constraint), and if this is the case, we can stipulate that the presuppositions of the quantifier are simply projections of the presuppositions of the embedded definite determiner. The partitive structure of quantification thus provides a structural account of the *source* of the presuppositions of quantification, something which previous theories have been unable to explain (cf. the admonition in Szabolcsi 2010: 75-6).⁶

The above has shown that what we accomplish by assuming a partitive structure is (a) an explanation of crosslinguistic data, (b) a principled account of the DP antecedents of anaphoric quantifiers, and (c) a structural account of the presuppositions of quantification. And conveniently, we accomplish all of this without proposing any obscure syntactic entities that may not themselves appear in the overt syntax of DP quantifiers.

3 The structure of the partitive PP

With the presence of the partitive PP in the LF of DP quantifiers justified, I turn now to a theory of its formal structure. The syntactic structure I propose is relatively uncontroversial, so I describe this first. The semantics that this syntax supports is far more complicated; in pursuit of this, I review the analyses advanced by Matthewson (2001) and Ladusaw (1982), pointing out the empirical and theoretical challenges facing each. I then propose that, by blending key features from these two accounts, we arrive at an alternative analysis that avoids these challenges while providing some additional explanatory benefits.

3.1 Syntax

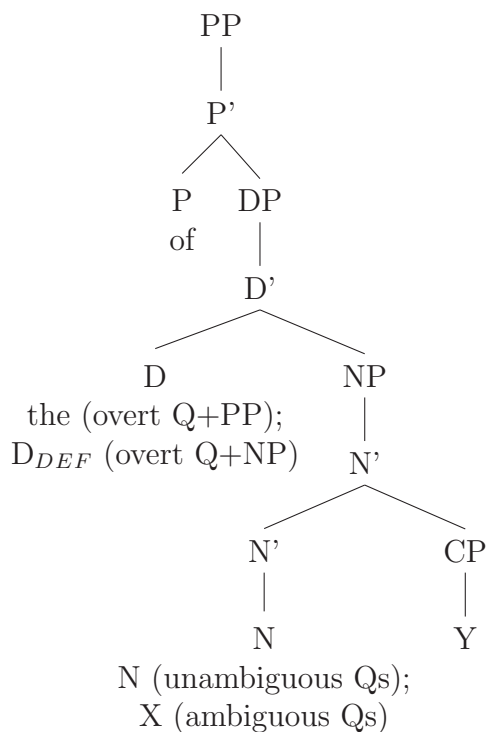
The syntax I propose for the partitive PP is fairly straightforward. It is projected by the preposition *of*, which takes a definite DP as its complement per the Partitive Constraint. The head of this DP may be either the overt definite article *the* or a null variant of this article, D_{DEF} , with the choice between these correlating with whether the PP is overt or not (more on this in §5). The complement of the definite determiner is an NP, the head N of which represents the domain of the quantifier. This domain may either be the set denoted by the nominal predicate from the overt syntax (for unambiguous quantifiers that bear only proportional readings), N, or, as Greer (2014b) argues, it may vary between the sets denoted by the nominal and verbal predicates (for ambiguous quantifiers that bear proportional, reverse, focus-affected, or cardinal readings), in which case it must be represented as a variable (X in Figure 3 below). Regardless of the content of the domain, a restrictive clause modifier, represented as a tensed CP, adjoins to the head of the NP.⁷ This CP contains the

⁶Matthewson (2001) also alludes to the ability to derive the domain restriction of quantification from the function of the definite article in the partitive PP (pp. 159-60).

⁷The restrictive clause modifier may in some cases be a reduced relative PP or AP, which are best analyzed as DPs along the lines presented in Farrell (2005). However, because it is possible to reconstruct these reduced relatives as CPs with covert content, I refer to this modifier uniformly as a CP. In fact, the entire CP is often covert (though it need not be), so we are not proposing any *additional* unpronounced structure when we analyze these reduced relatives as CPs.

domain restriction variable, Y , the content of which is also resolved pragmatically. This syntactic structure is schematized in Figure 3 below.

Figure 3: The syntax of the partitive PP



Ultimately, the quantifier c-commands this PP in one of two ways: if it is ambiguous, it c-commands this phrase directly, but if it is unambiguous, it does so indirectly by way of an intervening *one*-NP. More on this immediately below.

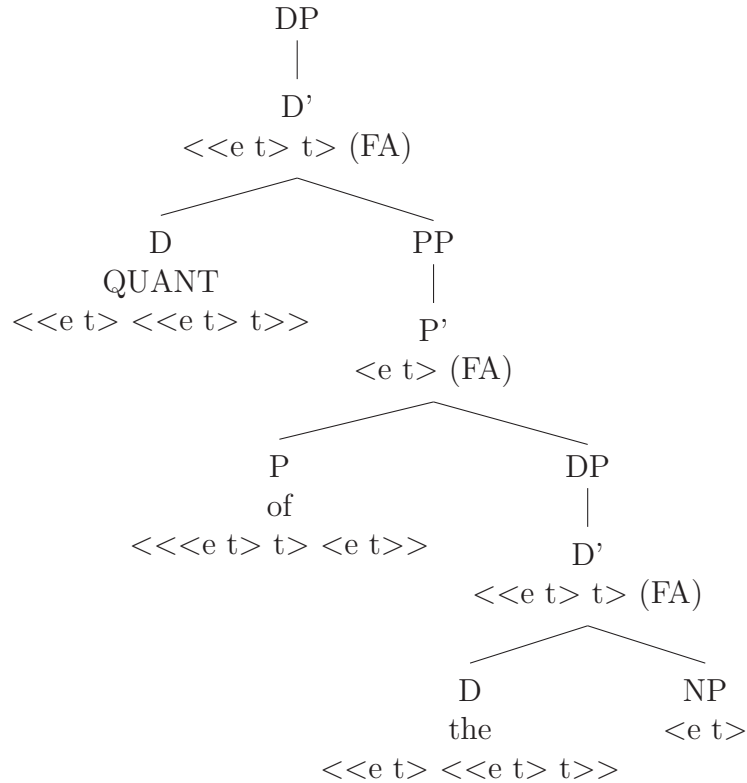
3.2 Semantics

The partitive PP poses a significant challenge to the semantics of DP quantifiers. Under GQT, DP quantifiers are determiners denoting relations between sets (type $\langle\langle e, t \rangle, \langle\langle e, t \rangle, t \rangle\rangle$). The partitive PP, however, dominates a definite DP that is itself a set of sets (a GQ of type $\langle\langle e, t \rangle, t \rangle$). It is therefore unclear how the quantifier should be adjusted to take a GQ, and not a set, as its first semantic argument.

There have been two systematic attempts to resolve this type incompatibility. In the first, Ladusaw (1982) suggests that the head of the partitive PP, *of*, is a ‘down-stepping’ function of type $\langle\langle e, t \rangle, t \rangle, \langle e, t \rangle\rangle$ that type-shifts the embedded GQ. Being definite, the embedded GQ is itself a principal filter (a set of sets containing a common core set), and the down-stepping function returns the generator (the common core) of this principal filter. The result of this process is a semantic object that is of the same type as the denotation of the common noun embedded in the partitive, but instead of denoting all the members of this set, it is restricted to a contextually salient domain. This down-stepping analysis of the

partitive PP appears in Figure 4.⁸

Figure 4: Ladusaw’s (1982) analysis of the semantics of the partitive PP



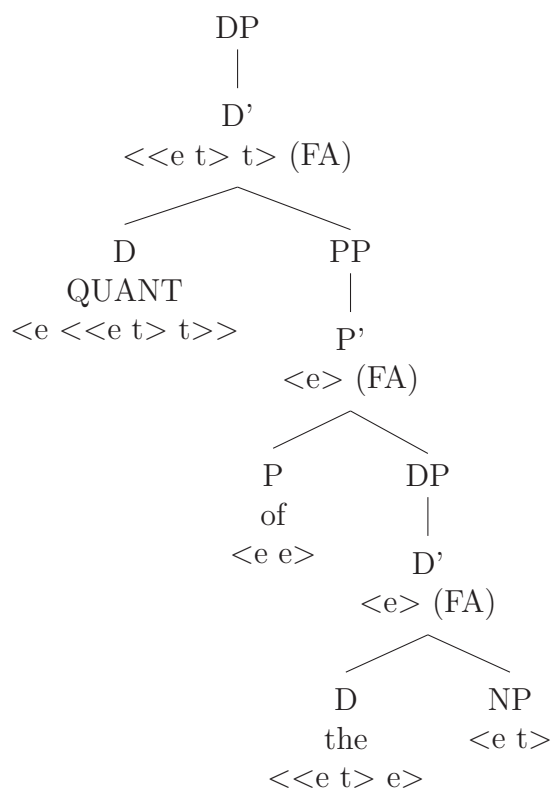
Matthewson (2001) takes a different tack, suggesting that certain determiners (specifically, quantifiers) form GQs by operating not on sets but on individuals, being thus of type $\langle e, \langle e, t \rangle, t \rangle$. The definite article embedded in the partitive PP represents a choice function that selects one (singular or plural) individual from the set denoted by its complement NP. She further assumes that the preposition *of* is semantically vacuous, so the individual denoted by the embedded DP is passed on as the first argument of the higher quantifier, which then quantifies over atomic parts of the individual (Matthewson 2001: 151-5), as shown in Figure 5 on the following page.

These analyses face theoretical and empirical challenges. In the case of Ladusaw’s proposal, the down-stepping function somehow restricts the generator of its input GQ to a contextually relevant subset. But since this function doesn’t contribute any new semantic

⁸The abbreviations FA and PM in this and all subsequent figures refer to the compositional semantic operations Function Application and Predicate Modification, which have the standard definitions given below.

- (1) a. **Function Application (FA):** If f is an expression of type $\langle \alpha, \beta \rangle$ and a is an expression of type $\langle \alpha \rangle$, then the concatenation of f and a , $f(a)$, is an expression of type $\langle \beta \rangle$.
- b. **Predicate modification (PM):** If f is an expression of type $\langle \alpha, \beta \rangle$ and g is an expression of the same type, then the concatenation of f and g is an expression of type $\langle \alpha, \beta \rangle$.

Figure 5: Matthewson’s (2001) analysis of the semantics of the partitive PP



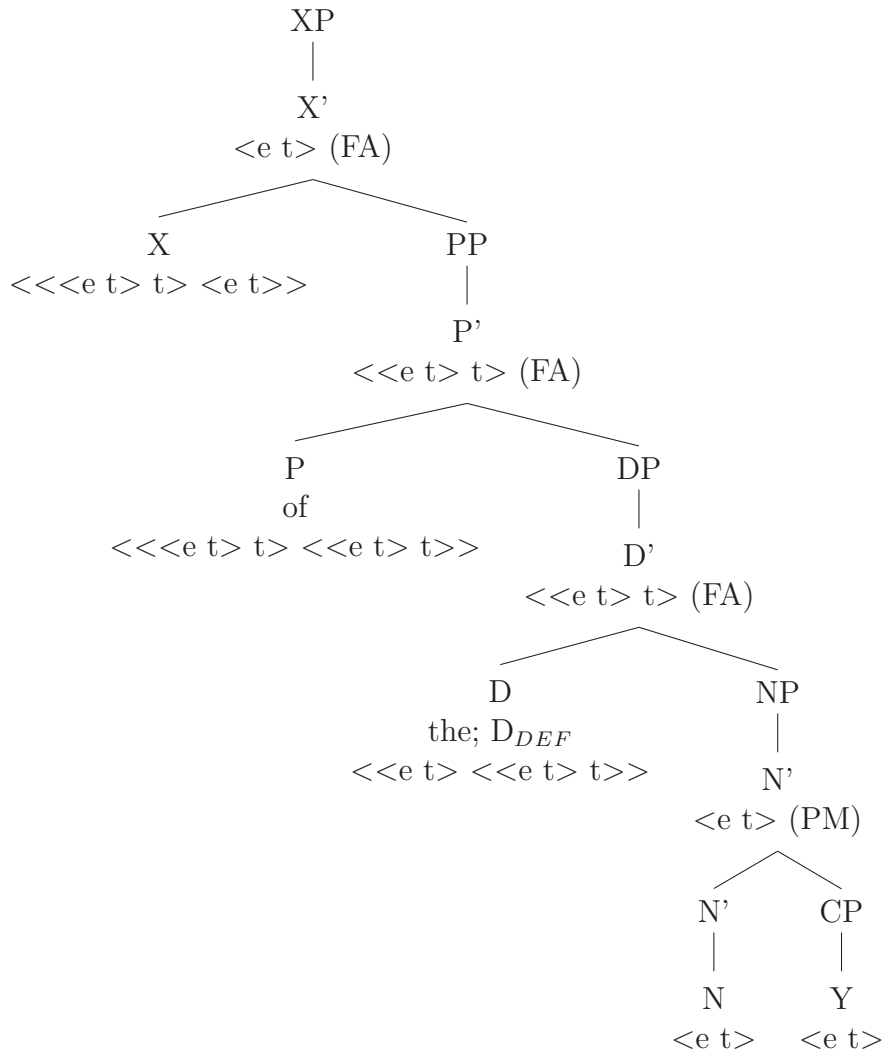
material to the generator NP, it is unclear how this restriction is accomplished. Under the present account, the burden of the restriction is shifted to the relative clause modifier of the domain, so the down-stepping function need only be a type-shifter, reducing the GQ to a set. In Matthewson’s analysis, the claim that quantifying determiners take individuals as their first argument amounts to abandoning the GQT claim that determiners are relations between *sets*. While QNPs still ultimately denote GQs under her analysis, these GQs aren’t sets of sets but sets of atomic parts of individuals. What is especially concerning about this is that it rests on treating DPs as having different semantic types: DPs headed by the definite article denote individuals while those headed by quantifiers denote GQs.⁹

Beyond these theoretical issues, both analyses confront a significant empirical challenge in the quantifier *every*: neither can explain why *every* requires (and *each* allows) an NP headed by *one* when it appears with an overt partitive PP. I propose that the best treatment of *every* takes its surface structure at face value: if *every* requires an intervening *one* at surface structure, *one* must likewise be present in its LF. Assuming this, we can arrive at an appropriate semantics for the partitive PP by blending features of Ladusaw (1982) and Matthewson (2001). First, I want to retain the GQT insight that determiners are relations between sets (and not relations between individuals and their atomic parts as in Matthewson

⁹Matthewson’s discussion suggests that quantifiers are members of a distinct lexical category Q and as such project QPs instead of DPs. And while this sidesteps the worry mentioned here, it is nevertheless undesirable to propose an additional lexical category when it is possible to reconcile quantifiers to existing categories (namely, determiners and adjectives) in a way that accommodates all of the empirical facts.

2001), so I follow Ladusaw in stipulating a down-stepping function over the partitive PP. But instead of attributing this function to *of* (which, following Matthewson, I assume is semantically vacuous), I attribute it to the head of the phrase immediately dominating the PP. And given that some quantifiers combine directly with the partitive PP at surface structure while others require an intervening *one*-NP (cf. the data in (2)), there are two possibilities for the phrase immediately dominating the PP at LF: the quantifier itself or the N *one*. This semantic structure is schematized in Figure 6 below (where X represents a variable over the lexical categories represented by the two possible down-stepping functions).

Figure 6: A revised analysis of the semantics of the partitive PP



3.3 Two types of DP quantifiers

The above discussion of the formal structure of the partitive PP has alluded to the fact that there are two fundamentally distinct structures for the DP quantifiers in (1). I review these two structures in more detail in this section.

3.3.1 Direct partitive quantifiers: Quantifying adjectives

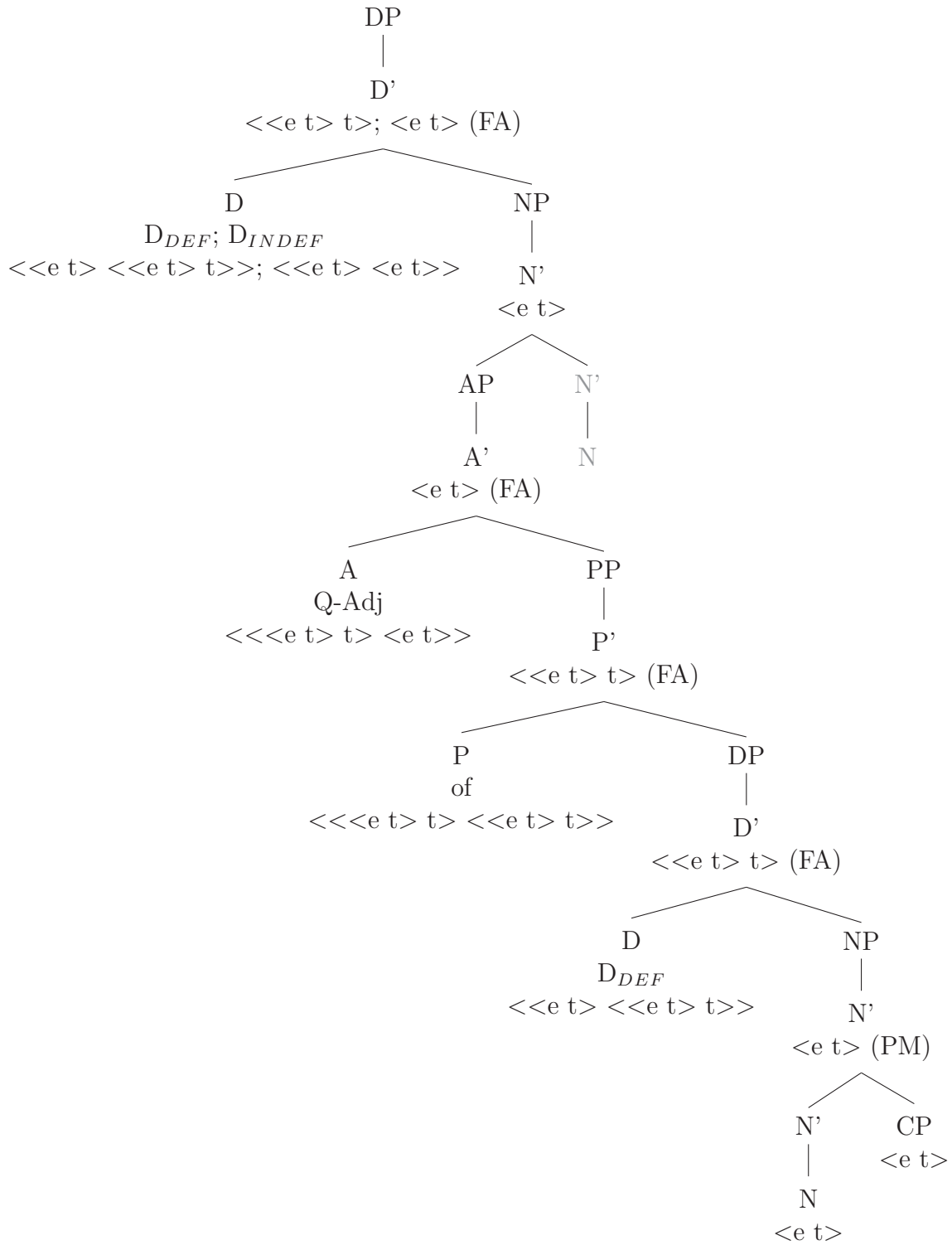
Quantifiers that combine directly with the PP at surface structure take this phrase as their immediate syntactic complement at LF, having as their semantic value the down-stepping function discussed above. Given that their complement position is filled by the PP, these quantifiers combine with the noun from the overt syntax as modifiers, for which reason I refer to them as quantifying adjectives (Q-Adjs). The syntactico-semantic structure of these direct partitive Q-Adjs is schematized in Figure 7 on the following page (note that this figure ignores the contribution of the nominal modificand, which appears grayed-out, for reasons of space; for details, see Greer 2014a).

Being adjectives, Q-Adjs do not c-command the noun from the overt syntax at LF. As a result, they allow variable domain interpretations as discussed in Greer (2014b) (cf. the summary in §2.1.3 above). Quantifiers that combine directly with the partitive PP therefore coincide with those that are ambiguous between various presuppositional interpretations (proportional, reverse, and focus-affected). This is not immediately obvious, as the data in (2) indicate that quantifiers like *some*, *no*, and, even more problematically, *all* and *most* combine directly with the partitive PP and as such must be ambiguous. In Greer (2014a), however, I argue that this is the right result: quantifiers like *some*, *several*, *a (one)*, *two/three/etc.*, and *no (none)* are *non-essentially* ambiguous, having logically equivalent presuppositional interpretations, while the more contentious quantifiers *all* and *most* are surface variants of ambiguous quantifier lexemes ALL and MOST that bear proportional (*all* and *most*) and reverse (*only* and *mostly*) allolexes.

Because the quantifier itself is not a determiner, QNPs containing Q-Adjs must be headed by a null determiner. This determiner bears definite or indefinite semantics according to what is presupposed: if the set denoted by the nominal predicate is presupposed (as in a proportional interpretation, where the set denoted by the noun values the domain variable), this determiner is definite, and if the set denoted by the verbal predicate is presupposed (as in a reverse interpretation, where the set denoted by the verb values the domain variable), this determiner is indefinite. When indefinite, the DP must be bound by a higher operator or by a default operation of existential closure over the VP (cf. Heim 1982; Diesing 1992). For its part, the nominal modificand is also interpreted differently according to whether the DP is definite or indefinite (for details, see Greer, 2014a:63-8; 72-6).

Finally, notice that, in effect, Q-Adjs function like two-step GQ modifiers on their definite (= proportional) interpretations, operating first on a GQ and then combining with a determiner whose output is a GQ. By function composition (which states that if one function, f , is of type $\langle a, b \rangle$ and another, g , is of type $\langle b, c \rangle$, they may combine to form a syllogistic function, $f \circ g$, of type $\langle a, c \rangle$), the effect of a definite Q-Adj is essentially $\langle \langle \langle e, t \rangle, t \rangle, \langle \langle e, t \rangle, t \rangle \rangle$, which is exactly the kind of semantic operation we would expect from an adjective.

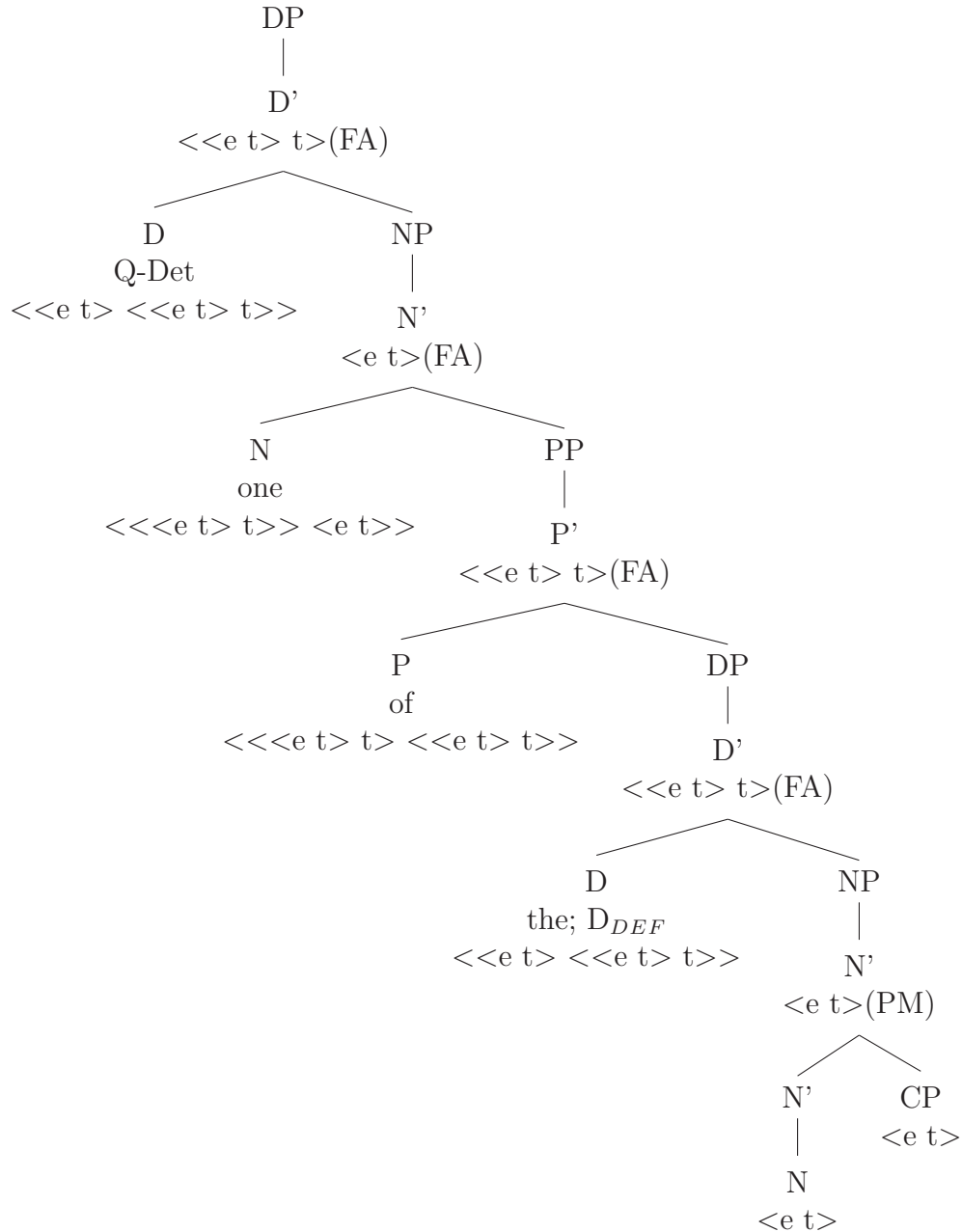
Figure 7: The structure of Q-Adjs



3.3.2 Indirect partitive quantifiers: Quantifying determiners

Quantifiers that combine indirectly with the partitive PP at surface structure take this phrase as their indirect complement at LF. Mediating the combination of the quantifier with the PP is an NP headed by *one*, the denotation of which is the down-stepping function. Because they take a traditional NP complement, these indirect partitive quantifiers occupy the standard determiner position defended in GQT, as shown in Figure 8.

Figure 8: The structure of Q-Dets



As Figure 8 shows, the noun from the overt syntax appears embedded in the partitive PP

such that these quantifying determiners (Q-Dets) *c*-command the noun from the overt syntax at LF. As a result, Q-Dets do not allow variable domain interpretations (given the standard syntax-semantics mapping hypothesis). Quantifiers that appear with *one* in overt Q+PP structures therefore correspond almost exactly to quantifiers that bear only proportional (nominal-domain) interpretations (*every* and *each*). I say “almost exactly” because there is one errant quantifier, *both*, that never appears with *one* at surface structure (cf. the data in 2) but which is nevertheless unambiguous and which must, therefore, *c*-command the noun at LF as a Q-Det. I provide further evidence to corroborate the Q-Det analysis of *both* in §4.2.

4 Further advantages of the partitive structure

Having defended a theory of the structure of partitive quantification, I now consider some of the benefits that emerge from this analysis. These include solutions to some puzzling cases of partitive PPs and an explanation of why certain DP quantifiers prohibit group-denoting predicates.

4.1 Puzzles in the analysis of partitivity

The present analysis of the partitive PP sheds new light on some puzzling variants of this structure. First, because it is not the *of* itself that does the obligatory down-stepping, the fact that the definite determiners *the* and *every* in (12) are incompatible on top of an overt partitive PP follows from the fact that there is no intervening down-stepping phrase.

- (12) a. *The of the men came to the party.
b. *Every of the men came to the party.

The vacuity of *of* also neatly explains its optional appearance in certain QNPs with embedded DPs, as Matthewson likewise observes (2001:162).

- (13) a. All (of) the men came to the party.
b. Both (of) the men came to the party.

Under the present proposal, the QNPs in (13) represent cases where the underlying partitive structure is overt, but the head of the partitive PP, being semantically vacuous, is elided (though why it is only these quantifiers that exploit the vacuity of *of* in this way is still an open question).

Second, my account provides some insight into apparent exceptions to the Partitive Constraint, which stipulates that a partitive PP requires a definite DP complement. These exceptions include both definite quantifiers that are ungrammatical as the head of the embedded DP (14a) and ostensibly indefinite quantifiers that are acceptable in this position (14b)-(14d).

- (14) a. *Three of* {**every/*each*} man went to the party. (from Ladusaw 1982:234)
b. Oregon [is] *one of many* states seeking tougher vaccine laws.¹⁰

¹⁰Authentic example from a headline on StatesmanJournal.com.

- c. The prisoner swap (was) *one of several* tough moments for Obama in recent weeks.¹¹
- d. The room was in *one of some* separate buildings behind the public house.¹²

For all of these examples, my account associates the embedded quantifier with a partitive PP of its own.¹³ The ungrammaticality of the definite quantifiers in (14a) can then be attributed to a semantic redundancy. The partitive PP that the definite DP immediately dominates provides the domain for the higher quantifier *three*. Given the lexical semantics of *every* and *each*, this embedded DP does nothing to limit this original domain to a subset of some specific size: having universal quantificational force, all these quantifiers do is say that the *whole* domain is the domain of the higher quantifier *three*. As a result, they make no new semantic contribution to the sentence; the examples in (14a) don’t say anything beyond what the comparable sentence in (15) says.

(15) *Three of the men* went to the party.

More formally, the problem with these definite quantifiers is that they denote improper subsets of the domain.¹⁴

As for the embedded indefinites in (14), my account treats these quantifiers as appearing beneath a null determiner that may be either indefinite *or* definite. As they appear in (14), then, these quantifiers must combine with the definite determiner, in which case they do not represent exceptions to the Partitive Constraint after all.

4.2 Individual- and group-denoting predicates

Positing the N *one* in the underlying structure of some (but importantly not all) quantifiers allows a principled explanation of why certain quantifiers prohibit group-denoting predicates. Beyond the down-stepping function, *one* makes an additional semantic contribution to the QNP: it specifies that supersets formed on the output of the down-step must be individual-denoting. This predicts that those quantifiers that have *one* at LF will reject group-denoting

¹¹Authentic example from a headline on npr.com.

¹²Authentic example from a user review on TripAdvisor.com.

¹³This results in paraphrases like the following.

- (1) a. *Three of every one of the men went to the party.
*Three of each (one) of the men went to the party.
- b. Oregon is one of many of the states seeking tougher vaccine laws.
- c. Prisoner swap is one of several of the tough moments for Obama in recent weeks.
- d. The room was in one of some of the separate buildings behind the public house.

While this partitive PP need not be overt (my account only suggests that it exists at LF), it is interesting that making this structure transparent for the indefinite quantifiers in (14) renders the sentences slightly odd. When they appear embedded under other quantifiers, these quantifiers seem to prefer an overt Q+NP structure.

¹⁴Denoting an improper subset of the domain is also what prevents *all* (which is not obligatorily definite under the present analysis because I treat it as a Q-Adj) from appearing as the downstairs quantifier in overt partitive constructions such as these (i.e., **Three of all (of the) men went to the party*).

predicates like *surround* or *be similar* (an individual cannot non-figuratively surround something and can only be similar to another, syntactically overt argument); this is illustrated in (16) for the Q-Dets *every* and *each*.

- (16) a. *{Every one/Each (one)} of the men is similar.
 b. *{Every one/Each (one)} of the men surrounded the building.
 c. *{Every/Each} man is similar.
 d. *{Every/Each} man surrounded the building.

The data in (16c) and (16d) show furthermore that the individualizing effect of *one* is evident even when this noun is covert. In these Q+NP structures, the nominal complement must bear singular morphology. We can account for this by proposing that, because of its additional, individualizing semantic contribution, the morphological features of *one* survive at surface structure independently of its phonological features. Because extraneous morphological features would cause the derivation to crash, these features combine with the semantic features of the embedded nominal, resulting in the singular nominal in Q+NP surface structures.

Finally, I suggested earlier (§3.3.2) that *both* also appears at LF with *one* despite never co-occurring with this noun at surface structure. Evidence from group-denoting predicates corroborates this analysis: like *every* and *each*, *both* rejects these predicates.

- (17) a. *Both (of the) men are similar.
 b. *Both (of the) men surrounded the building.

Both must appear with *one* at LF if this morpheme is what causes a quantifier to be individual-denoting. It just so happens that, in agreement with the morphology of *both*, *one* appears as the dual *ones* (not to be confused with the homophonous plural *ones*) with this quantifier. This idiosyncratic morphology is perhaps what ultimately prevents *ones* from appearing with *both* at surface structure.

As a final point, note that this analysis correctly predicts the distribution of quantifiers with respect to the constraint against group-denoting predicates: all and only those quantifiers that appear with *one(s)* at LF (the Q-Dets) are subject to this constraint; the rest of the DP quantifiers listed in (1) are perfectly felicitous with group-denoting predicates, as shown in (18).¹⁵

- (18) a. {Many/Few/Some/Several/Two/No/All/Most} men are similar.
 b. {Many/Few/Some/Several/Two/No/All/Most} men surrounded the building.

5 Resurfacing: Deriving quantifier surface structure from the partitive LF

What remains now is to show how the partitive quantifier structure can derive the three distinct surface structures shown in (2) (Q+NP, Q+PP, and bare). For Q-Dets, this is straightforward. In Q+PP structures with Q-Dets, the functional material in the PP (the

¹⁵One important exception to this is, of course, the Q-Adj *a* (*one*). This quantifier rejects group-denoting predicates because of its lexical semantics and so differs from Q-Dets, which reject such predicates for *compositional* reasons (specifically, the presence of the N *one* at LF).

head P *of* and the definite determiner) is overt, and the noun *one* may or may not be overt (for *every*, it must be overt; for *each*, it may be overt; and for *both*, it cannot be overt). In Q+NP structures, the head P is covert (recall that *of* is semantically vacuous, anyway), the embedded DP is headed by a null variant of the definite determiner, D_{DEF} , and the morphological features of *one* combine with the semantic features of the embedded nominal (producing a singular nominal for *every* and *each* but a plural—or more likely, dual—nominal for *both*). And in bare uses, the entire PP and, depending on the quantifier, the N *one(s)* are elided (for *every*, *one* cannot be elided; for *each*, it may be elided; and for *both*, it must be elided).

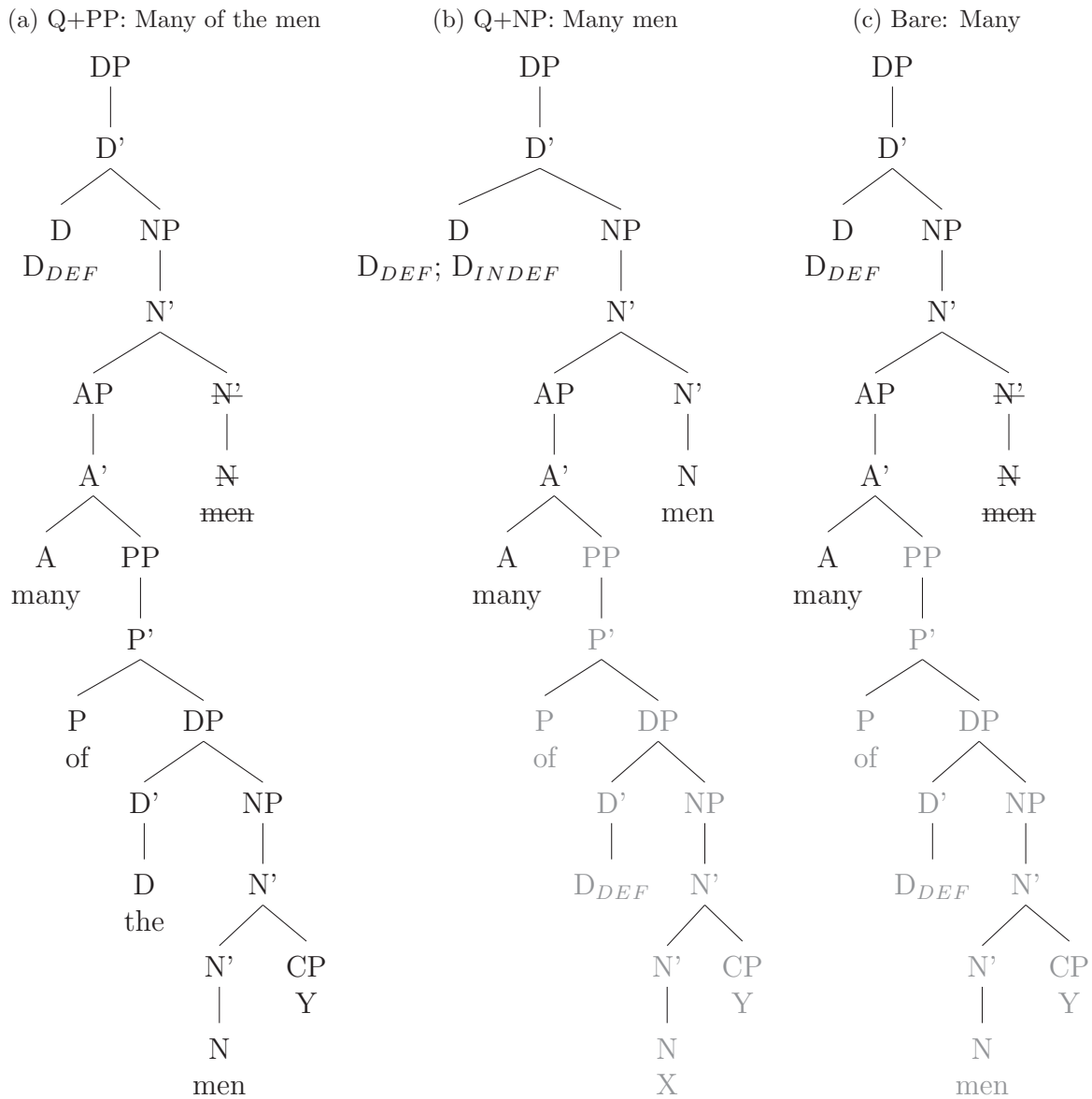
QNP containing Q-Adjs are slightly more complicated, involving syntactic ellipsis, covert pragmatic material, or a combination thereof. In Q+PP structures, the head noun of the QNP is elided under identity with overt pragmatic material in the PP (a pragmatic copy of the nominal predicate appears in the domain variable position of the PP). In Q+NP structures, the partitive PP is unpronounced. This means that the null variant of the definite determiner appears in place of *the*, the preposition *of* is simply not pronounced, and the contents of the domain and domain restriction variables are also covert; being pragmatically determined, these contents need not be made explicit because they can be recovered from context. In bare uses of the quantifier, the partitive PP is unpronounced and the head noun is syntactically elided. In fact, my account explains why it is that only the proportional interpretation is available in these bare structures: *many* in (19), for instance, can only mean that a large proportion of the men at the conference had a good time. The reverse interpretation, where the existence of people who had a good time is presupposed, would be incoherent.

- (19) There were 30 men at the conference. Many had a good time.
- a. Proportional: Many *of the men who were at the conference* had a good time.
 - b. Reverse: *Many *of the people who had a good time* had a good time.

Under the present account, ellipsis of the nominal in the surface structure of *Many had a good time* is licensed by the presence of identical content in the partitive PP at LF. Bare quantifiers can therefore only be interpreted with a nominal domain, resulting in the obligatory proportional interpretation.

The Q+PP, Q+NP, and bare surface structures of Q-Adjs are schematized in Figure 9 on the following page (where gray-out corresponds to unpronounced pragmatic material and strike-through indicates syntactic ellipsis).

Figure 9: Deriving the surface structures of Q-Adjs



6 Concluding remarks: The overall picture

The present paper has advanced novel arguments in support of treating DP quantifiers as fundamentally partitive. What distinguishes these arguments from extant arguments for this structure is that they show that *all* DP quantifiers in English, even the tricky *every*, are partitive at LF *all the time*: all DP quantifiers require a partitive PP to accommodate (a) their anaphoric behavior (anaphoric quantifiers generally take DP, and not NP, antecedents) and (b) their presuppositions (strong uses of quantifiers bear presuppositions identical to those of the definite article). Once we accept this, we are driven to stipulate two basic structures of DP quantifiers given that, at surface structure, not all DP quantifiers combine

with the obligatory PP in the same way: some take the PP as their immediate syntactic complement at LF, while others embed this PP in an NP complement headed by *one(s)*. This structural difference then corresponds to the semantic distinction between group- and individual-denoting quantifiers. The overall proposal for quantifier partitivity presented here therefore presents compelling evidence for stipulating two fundamentally distinct kinds of quantification in the English DP.

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