A Compositional Analysis for *Subset Comparatives*[*]

Helena APARICIO TERRASA–*University of Chicago*

Abstract. Subset comparatives (Grant 2013) are amount comparatives in which there exists a set membership relation between the target and the standard of comparison. This paper argues that subset comparatives should be treated as regular phrasal comparatives with an added presuppositional component. More specifically, subset comparatives presuppose that: a) the standard has the property denoted by the target; and b) the standard has the property denoted by the matrix predicate. In the account developed below, the presuppositions of subset comparatives result from the compositional principles independently required to interpret those phrasal comparatives in which the standard is syntactically contained inside the target. Presuppositions are usually taken to be licensed by certain lexical items (presupposition triggers). However, subset comparatives show that presuppositions can also arise as a result of semantic composition. This finding suggests that the grammar possesses more than one way of licensing these inferences. Further research will have to determine how productive this latter strategy is in natural languages.

Keywords: Subset comparatives, presuppositions, amount comparatives, degrees.

1. Introduction

Amount comparatives are usually discussed with respect to their *degree* or *amount* interpretation. This reading is exemplified in the comparative in (1), where the elements being compared are the cardinalities corresponding to the sets of books read by John and Mary respectively:

(1) John read more books than Mary.
$|\{x : \textit{books}(x) \wedge \textit{John read } x\}| \succ |\{y : \textit{books}(y) \wedge \textit{Mary read } y\}|$

In this paper, I discuss *subset comparatives* (Grant (to appear); Grant (2013)), a much less studied type of amount comparative illustrated in the Spanish[1] example in (2):[2]

(2) Juan ha leído más *libros* que *El Quijote*.
Juan has read more books than *El Quijote*
$\{y : y \textit{ is El Quijote}\} \subset \{x : \textit{books}(x) \wedge \textit{Juan read } x\}$

[*]Special thanks to Chris Kennedy and Karlos Arregi for all the feedback and encouragement they have given me throughout every stage of this project. I would also like to thank Itamar Francez, Jason Merchant, Anastasia Giannakidou, Rajesh Bhatt, Julian Grove, Meg Grant and the audiences of the student session at ESSLLI 2013 and *Sinn und Bedeutung* 18 for useful discussion on different aspects of the data and the analysis.

[1]Unless noted otherwise, it should be assumed that all non-English examples belong to Spanish.

[2]In Spanish, the phrase '*El Quijote*' can be used to refer to both the name of the character and the title of the book. Throughout this paper, I will use '*El Quijote*' to refer to the name of the book.

The term *subset comparative* refers to amount comparatives like (2) in which the target ('*books*') and the standard of comparison ('*El Quijote*') are in a set membership relation. This contrasts with non-subset amount comparatives like (1), where there does not exist any such relation between standard ('*Mary*') and target ('*John*'). Subset comparatives also differ from other amount comparatives in that they are presuppositional. More specifically, subset comparatives presuppose that 1) the matrix predicate is true of the complement of '*than*'; and 2) the standard is in the extension of the target.

Subset comparatives have not been extensively discussed in the literature. To my knowledge, Grant (2013) is the only existing analysis of this construction. In a nutshell, Grant derives the meaning of subset comparatives by assuming a new lexical entry for '*more*' that establishes a proper subset relation between two sets of individuals. The presupposition that the matrix predicate is true of the standard is encoded as part of the lexical semantics of this new meaning for '*more*' (see §3 for a more detailed explanation of this account). In this paper I argue that it is possible to provide a semantics for subset comparatives without multiplying the repertoire of meanings for the degree head '*more*'. I show that the presuppositional status of subset comparatives is straightforwardly accounted for under a phrasal analysis. In this system, the presuppositions arise as a result of the compositional principles required for the interpretation of phrasal comparatives such as (2), in which the standard is syntactically contained in the target. The analysis has the advantage of predicting for which configurations we should expect subset readings to be available.

The paper proceeds as follows. In §2, I show that subset comparatives are presuppositional. In §3, I present Grant's (2013) proposal. In §4, I develop my own analysis. Finally, in §5 I conclude.

2. Characterizing the meaning of subset comparatives

Subset comparatives have the same cardinality entailment as any amount comparative (see (1)). The meaning differences between subset and non-subset amount comparatives can be reduced to the fact that the former carry two presuppositions that are absent in the latter. In particular, subset comparatives presuppose that: a) the standard of comparison has the property denoted by the target; and b) the standard of comparison is in the extension of the matrix predicate. Thus, sentence (2), repeated below, licenses the inferences in (3a-b).

(3) Juan ha leído más libros que *El Quijote*.
Juan has read more books than *El Quijote*
'Juan has read more books than *El Quijote*.'
⇒ a) *El Quijote* is a book ∧ Juan read it. **Presuppositions**
⇒ b) Juan read more than one book. **Assertion**

The assertion in (3b) consists of a statement about cardinalities. Sentence (3) entails that the cardinality of the books read by Juan is greater than one (the cardinality of '*El Quijote*'). This is

supported by the fact that the continuation in (4) results in a contradiction only in (4a), where the entailment is that Juan read more than one book. In (4b), on the other hand, the entailment is that Juan did not read more than one book. Therefore, the continuation is expected to be well-formed.

(4) a. Juan ha leído más libros que *El Quijote*. #Sólo leyó *El Quijote*.
Juan has read more books than *El Quijote*. Only read *El Quijote*
'Juan has read more books than *El Quijote*. #He only read *El Quijote*.'

b. Juan no ha leído más libros que *El Quijote*. Sólo leyó *El Quijote*.
Juan not has read more books than *El Quijote*. Only read *El Quijote*
'Juan has not read more books than *El Quijote*. He only read *El Quijote*.'

Example (3) triggers two more inferences that seem to be specific to subset comparatives. The first one is that '*El Quijote*' is in the extension of the NP indefinite '*libros*' ('books'). The second one is that Juan read '*El Quijote*'. Evidence in favor of the presuppositional status of these inferences comes from their projection behavior. Examples (5)-(7) show that these inferences behave as presuppositions, since they project up through well known presupposition holes such as the antecedent of conditionals (5), questions (6) and negation (7):

(5) Si Juan lee más libros que *El Quijote*, no terminará su ensayo a tiempo.
If Juan reads more books than *El Quijote*, not finish.fut his essay in time
'If Juan reads more books than *El Quijote*, he won't finish his essay in time.'
⇒ a) *El Quijote* is a book ∧ Juan read it. **Presuppositions**

(6) Al final, Juan ha leído más libros que *El Quijote*?
To-the end Juan has read more books than *El Quijote*
'All in all, did Juan read more books than *El Quijote*?'
⇒ a) *El Quijote* is a book ∧ Juan read it. **Presuppositions**

(7) Juan no ha leído más libros que *El Quijote*.
Juan not has read more books than *El Quijote*
≈Juan only read *El Quijote*.
⇒ a) *El Quijote* is a book ∧ Juan read it. **Presuppositions**
⇒ b) It is not the case that Juan read more than one book. **Assertion**

This division of labor between asserted and presupposed meaning accounts for the *only*-reading of the negated subset comparative in (7). Sentence (7) presupposes that Juan read '*El Quijote*' and asserts that he did not read more than one book. Therefore, it follows that Juan must have only

read '*El Quijote*'. This characterization of the meaning of subset comparatives also explains why subset comparatives are available with *more*-comparatives but ill-formed in *less*-comparatives:

(8) # Juan ha leído menos libros que *El Quijote* y *La Celestina*.
Juan has read less books than *El Quijote* and *La Celestina*
⇒ a) *El Quijote* and *La Celestina* are books ∧ Juan read them. **Presuppositions**
⇒ b) Juan read less than two books. **Assertion**

The semantic oddness of (8) results from the contradictory relation between the assertion and one of the presuppositions. Example (8) presupposes that Juan read '*El Quijote*' and '*La Celestina*', but asserts that he read less than two books. These two propositions are not consistent and therefore the sentence is semantically ill-formed.

Taken together, the facts discussed in this section suggest that subset comparatives should be treated as amount comparatives that carry some extra presuppositions. The question that remains to be addressed is: what feature of subset comparatives makes them presuppositional? A satisfactory analysis of subset comparatives should be able to explain how the presuppositions of this construction come about, while also accounting for the restricted distribution of these inferences. In the following section, I present Grant's (2013) account and discuss how well her proposal fares with respect to these issues.

3. Previous account

Examples of subset comparatives can be found in the literature (see Fults and Phillips (2004)). However, Grant (2013) is the only existing attempt at providing a fully fledged account of the syntax/semantics of this type of amount comparatives. Grant discusses English examples like (9).

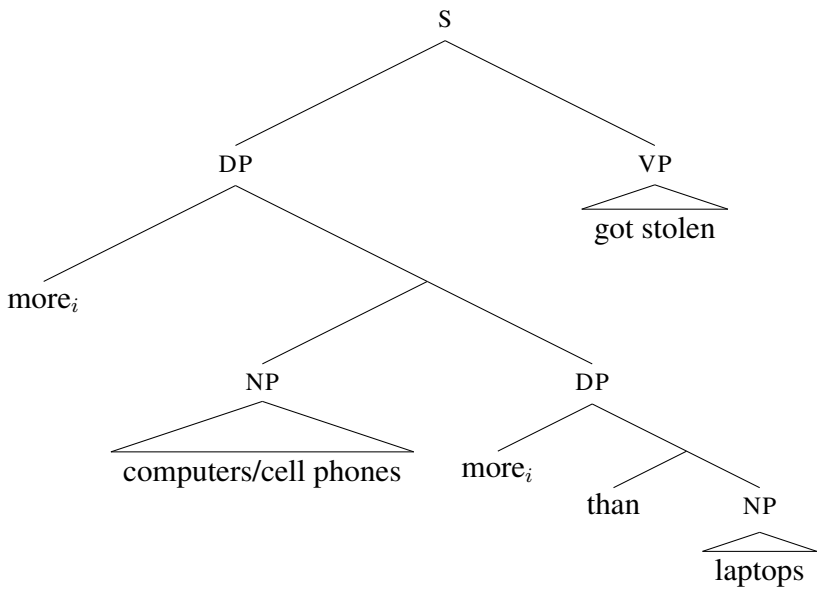
(9) More computers than laptops got stolen.

Grant pursues the line of thought that the syntax of subset comparatives is essentially the same as that of DP-internal subcomparatives, illustrated in (10), which can only receive an amount interpretation.

(10) More cell phones than laptops got stolen.

In order to implement this idea, Grant adopts Izvorski's (1995) DP-shell analysis of comparatives. Izvorski's proposal is to treat '*more*' as a two-place determiner that projects a DP-shell structure. The determiner moves out of the most embedded DP, where it selects for the standard, to a higher DP, where it selects for the target NP as its complement.

(11)



My goal in this section is to focus on the semantic aspects of Grant's analysis, so I will abstract away from the syntactic motivations that lead her to adopt the structure in (11) for sentences like (9) and (10). The core of Grant's proposal is that the subset and the amount readings in (9) and (10) involve two different lexical entries for '*more*'.

(12) a. $[\![More_{deg}\ Q_1\ than\ Q_2\ P]\!] = \{d : Q_2(d) \cap P\} \subset \{d : Q_1(d) \cap P\}$
b. $[\![More_{sub}\ Q_1\ than\ Q_2\ P]\!] = [(Q_2 \cap P)\ \subset\ (Q_1 \cap P)]$, where $Q_2 \cap P \neq \emptyset$

'*More*$_{deg}$' derives the amount interpretation by establishing a proper subset relationship between two sets of *degrees* (12a). On the other hand, '*more*$_{sub}$' establishes a proper subset relationship between two sets of *individuals* (12b). This second lexical entry is responsible for the subset interpretation. In this account, the presupposition that the matrix predicate is true of the standard is encoded as a definedness condition in the lexical entry of '*more*$_{sub}$'. Grant encodes this presupposition as an existential statement by ensuring that the intersection of the VP and the standard is non-empty.

Since '*more*$_{sub}$' takes three properties of individuals as arguments, it cannot be used to interpret subset comparatives in which the standard is an individual-denoting DP like '*El Quijote*' (see (3)). In order to overcome this issue, Grant assumes a type-shifting operation (Partee (1987)) that raises the type of the DP from e to an $\langle e, t\rangle$ predicate. This is not a trivial assumption, since subset comparatives always present standards that denote individuals: aside from proper names, as in (3), the standard of a subset comparative can also consist of a demonstrative, or a complex DP containing an individual-denoting relative clause, as in (13) and (14), respectively.

(13) Juan ha leído más libros que esos.
Juan has read more books than those
'Juan has read more books than those.'

(14) Juan ha leído más libros que los que escribió Pedro.
Juan has read more books than the.m.p that wrote Pedro
'Juan has read more books than the ones Pedro wrote.'

Sentence (9), repeated below, might at first sight seem a counterexample to the claim that the standards of subset comparatives always denote individuals.

(15) More computers than laptops got stolen.

Grant's proposal can very straightforwardly account for cases like (15), which superficially seem to contain an NP standard. However, if '*laptops*' in (15) denotes a property of individuals, the contrast in (16) remains unexplained.

(16) a. ?? More computers than computers that I borrowed from the campus tech center got stolen.
b. More computers than the computers that I borrowed from the campus tech center got stolen.

In (16a), the standard denotes a property indefinite, whereas in (16b) the standard is definite and therefore denotes an individual. Note that the degraded status of (16a) cannot be due to the property indefinite being interpreted as the subject, as shown by the the grammaticality of (17).

(17) Computers that I borrowed from the campus tech center got stolen.

Under Grant's account, the fact that there exists an asymmetry in acceptability between (16a-b) is unexpected. I take the contrast in (16) to further support the claim that the standard of a subset comparative must denote an individual, not a set. However, the question remains as to how to account for (15). In fact, (15) stops being problematic once we take into consideration that in this example the standard can only receive a kind interpretation (Carlson (1977)), in which case it would also be of type e.[3] Sentence (15) could be paraphrased as 'more *types* of computers, aside from laptops, were stolen.' Based on the evidence in (13)-(16), and provided that subset comparatives with set-denoting standards are unattested, the use of type shifting seems unmotivated.

[3]Grant also mentions that the standards of some subset comparatives can receive a kind interpretation.

A second problem for this analysis is that the subset presupposition is not guaranteed to project under negation.[4] In (12b), the set membership relation between standard and target follows from the proper subset relation. In fact, in Grant's account, this inference is not modeled as a presupposition, but rather as part of the assertion. However, this system ends up deriving truth-conditions for negated subset comparatives that are too weak.

(18) a. John didn't see more students than Olivia.
b. $[\![18a]\!]$= $\neg[(\{\textit{Olivia}\} \cap \{y : \textit{John saw}\, y\}) \subset (\{x : x \textit{ is a student}\} \cap \{y : \textit{John saw}\, y\})]$, where $\{\textit{Olivia}\} \cap \{y : \textit{John saw}\, y\} \neq \emptyset$

The subset inference does not follow from the meaning in (18b). No presupposition failure is predicted if Olivia is not a member of the set of students. By the same logic, the *only*-reading of negated subset comparatives (cf. (7)) is not guaranteed to be derived, unless the two sets of individuals being related by the proper subset relation are extensionally identical. Consider, for instance, a scenario in which John saw both Olivia and Max, where only Max is a student. In this situation, the meaning in (18b) incorrectly predicts both that all the presuppositions of (18a) should be satisfied and also that the sentence is true.

A third problem with Grant's proposal is that an unconstrained application of the lexical entries in (12) over-generates readings. Grant notices that in her account nothing prevents sets of individuals in a proper subset relationship to be compared by '$\textit{more}_{deg}$'. This is an undesired result, since '$\textit{more}_{deg}$' cannot derive the presuppositions observed in subset comparatives. Grant rules out this possibility by invoking a new pragmatic principle that states that if the subset part of the meaning of '$\textit{more}_{deg}$' follows from world knowledge, then '$\textit{more}_{sub}$' must be deployed. This type of solution is not unreasonable. After all, the subset reading is stronger than the amount reading, since the former always entails the latter. Thus, the principle of using '$\textit{more}_{sub}$' whenever possible could be motivated in terms of the Gricean Maxim of Quantity. However, it is unclear whether world knowledge is the driving force that determines when '$\textit{more}_{sub}$' should be deployed. When the standard consists of a demonstrative, as in (13), repeated below, the sentence only has a subset interpretation, even when uttered out of the blue.

(19) Juan ha leído más libros que esos.
Juan has read more books than those
'Juan has read more books than those.'

Whatever principle ensures that (19) is interpreted with '$\textit{more}_{sub}$', it is clear that it could not be the result of conceptual relationships or world knowledge. Rather, it seems that subset readings arise as a result of the grammatical properties of this construction. This is the idea I pursue in the

[4] I thank Julian Grove for pointing this out to me.

next section, where I present the proposal. I argue that it is possible to account for the semantic properties of subset comparatives without resorting to lexical ambiguity and without encoding the presuppositions as part of the meaning of any of the lexical items involved in the construction.

4. Proposal

4.1. Subset comparatives are phrasal

From a descriptive point of view, phrasal comparatives are comparatives where the complement of the standard marker ('*than*' in English) is a DP (20a). In clausal comparatives like (20b), on the other hand, the complement of the standard marker is a CP that has undergone some reduction operation via ellipsis.

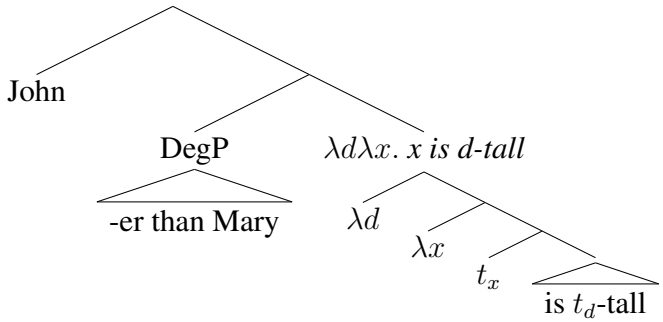
(20) a. John is taller than Mary.
b. Johns is taller than Mary is.

Whereas it is clear that comparatives like (20b) can only receive a clausal analysis, cases like (20a) present at least two possible analytical options. The first one would be to assimilate (20a) to (20b) by assuming extra structure that has been elided (Bresnan (1973); Lechner (2001), among many others). Under this view, (20a) is a *reduced* clausal comparative that can be interpreted as its overt counterpart in (20b). The second option would be to not assume any unpronounced material. This approach is referred to as the Direct Analysis (DA). In the DA, the degree head combines with an individual (21a), instead of a property of degrees (21b), as is commonly assumed in the (reduced) clausal analysis (Hankamer (1973); Heim (1985); Kennedy (2007); Bhatt and Takahashi (2011)).

(21) a. $[\![more_{phrasal}]\!] = \lambda y_e \lambda g_{\langle d,\langle e,t\rangle\rangle} \lambda x_e .\, max\{d\text{: } g(d)(x)\} \succ max\{d'\text{: } g(d')(y)\}$
b. $[\![more_{clausal}]\!] = \lambda D_{\langle d,t\rangle} \lambda D'_{\langle d,t\rangle} .\, max(D) \succ max(D')$

The degree relation $\langle d, \langle e, t\rangle\rangle$ that '$more_{phrasal}$' takes as its second argument is created by a series of LF movements.

(22)



In (22), the target moves, creating a predicate of individuals. Next, the degree head and the standard, which are assumed to form a logical constituent (i.e. the DegP), scope out targeting the $\langle e, t\rangle$-predicate created by movement of the target. This latter movement is an instance of parasitic scope (Barker (2007)), since it is contingent upon the movement of the target. Once the degree relation has been created, the meaning derived by phrasal '*more*' ends up being equivalent to the meaning obtained through the clausal analysis, as seen in (23).

(23) a. $[\![more]\!]$(Mary)($\lambda d \lambda x$. *x is d-tall*)(John)
b. $max\{d$: John is *d*-tall$\} \succ max\{d'$: Mary is *d'*-tall$\}$

In languages like English, it is hard to determine whether comparatives like (20a) are phrasal or reduced clausal comparatives. Spanish '*que*' is just like English '*than*' in not marking the phrasal/clausal distinction morphologically. However, there are languages that distinguish (reduced) clausal and phrasal comparatives by means of different standard markers. Merchant (2009) shows that Greek is such a language. In Greek, clausal comparatives present the marker '*apo'ti*', whereas phrasal comparatives always contain the marker '*apo*'.

The prediction is that if subset comparatives are phrasal, they should only be available with the phrasal standard marker '*apo*', and unavailable with the clausal standard marker '*apo'ti*'. As seen in (24), this prediction is borne out.

(24) I Ariadne diavase parapano vivlia apo/*apo'ti tin *Odysseia*.
the Ariadne read further books from/that the.acc. *Odysseia*.acc
'Ariadne read more books than the *Odyssey*.'

Phrasal comparatives also differ from (reduced) clausal comparatives in that only the latter allow multiple remnants. Example (25) shows that subset comparatives parallel phrasal comparatives.

(25) * Juan ha leído más libros en clase que [*El Quijote*] [en casa].
Juan has read more books in class than *El Quijote* in home

Finally, just as in phrasal comparatives, the standard of a subset comparative must always denote an individual. When the complement of the standard marker is an adverbial, as in (26), the subset interpretation is unavailable.[5]

[5] I have marked the unavailable reading with the symbol $\otimes$.

(26) Hoy he visto a más amigos que ayer.
Today have.1sg seen to more friends than yesterday
Amount: 'I saw a greater number of friends today than I saw yesterday.'
⊗Subset: 'Yesterday I saw some friends. Today I saw those friends and at least one more.'

There exists, however, a piece of data that is problematic for the view that subset comparatives are phrasal. The standard of a phrasal comparative is usually assumed to be a DP. Nevertheless, subset comparatives can present PP-standards.

(27) Juan se ha deshecho de más libros que *(d)el Quijote*
Juan SE has gotten-rid of more books than of-the *Quijote*
'Juan has gotten rid of more books than *El Quijote*.'

Based on well established assumptions regarding the syntax of phrasal comparatives, examples such as (27) cannot be easily accounted for. Unlike the clausal analysis, the phrasal analysis does not have much to say about how the preposition in the standard of (27) is selected. At the moment, I do not have a worked out solution to this problem. However, I should point out that in examples like (27) the preposition is optional. The sentence is grammatical, and has a subset interpretation, regardless of whether the preposition is present.

As long as the PP standard denotes an individual, examples like (27) become unproblematic for the analysis presented in §4.2. To the extend that prepositional standards are licensed in subset comparatives, the proposal developed below predicts that it should be possible to analyze them as individual denoting. Thus, if the phrasal analysis for subset comparatives is on the right track, the solution to the worry posed by (27) should be syntactic in nature. Specifically, it should involve a more complex theory of the constraints imposed on the selectional requirements of the standards in phrasal comparatives.

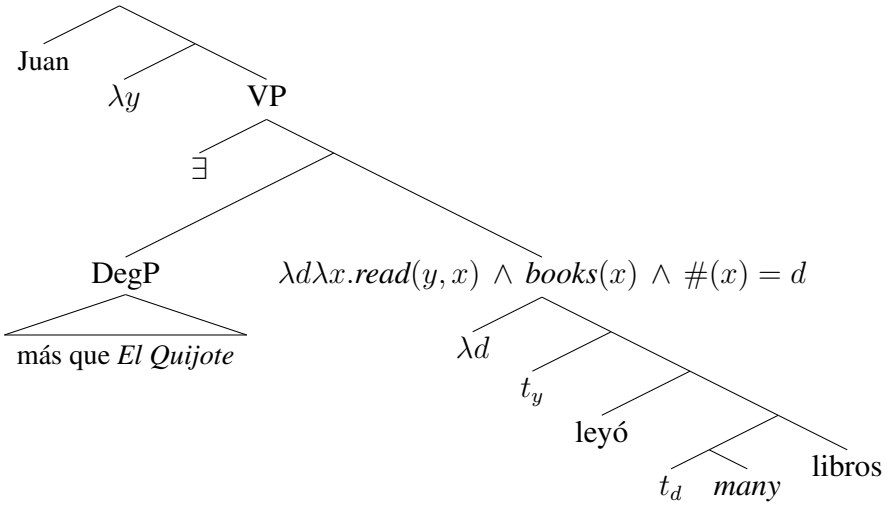
Even though not all the issues discussed above are fully understood, the syntactic evidence in (24)-(26) seems to provide support for a phrasal analysis of subset comparatives. In the following subsection, I show that the semantic properties of subset comparatives can be straightforwardly accounted for if subset comparatives are treated as phrasal comparatives.

4.2. Analysis

The LF in (28) contains the proposed analysis for the subset comparative in (3). As discussed in §4.1, in the Direct Analysis the degree head and the standard clause form a logical constituent that undergoes movement to create a constituent of the appropriate type $\langle d, \langle e, t\rangle\rangle$ for the second argument of '*más*' (Heim (1985); Barker (2007); Kennedy (2007); Bhatt and Takahashi (2011)). The

silent '*many*' is a degree function (equivalent to the gradable adjective in an adjectival comparative) that maps an individual into its cardinality.[6]

(28)



I assume that indefinites in object position ('*libros*' in (28)) denote properties that work as predicate modifiers. Property indefinites compose with the verb by the mode of composition *Restrict* (Chung and Ladusaw (2004)). This operation narrows down the domain of the predicate function (i.e. the verb) to a subdomain consisting of individuals in the extension of the property-indefinite. The output of this operation is a predicate of the same semantic type as the input. The remaining unsaturated argument is $\exists$-closed at the VP level later in the derivation.

In (28), the DegP moves to the edge of the VP below the $\exists$-quantifier. The scope of the DegP does not need to be stipulated. If the DegP moved right above $\exists$-closure, the derivation would crash, since the second argument of '*más*' would not be of type $\langle d, \langle e, t\rangle\rangle$, but rather $\langle d, t\rangle$. On the other hand, the fixed scope of the indefinite predicts that it should always have narrow scope with respect to other propositional operators such as negation, as in (29), or universal modals, as in (30). Examples (29)-(30) show that this prediction is borne out.[7]

(29) Juan no ha leído más libros que *El Quijote*.
Juan not has read more books than *El Quijote*
'It is not the case that Juan read more books than *El Quijote*.'
$\neg >> \exists$ / $^{\otimes}\exists >> \neg$

[6] In the metalanguage, this degree function is represented with the # sign.
[7] The same holds for other propositional operators such as universal quantifiers and intensional verbs.

(30) Juan está obligado a leer más libros que *El Quijote*.
Juan is required to read more books than *El Quijote*
'Juan is required to read more books than *El Quijote*.'
$\Box >> \exists$ / $^{\otimes}\exists >> \Box$

In the following subsection, I go over how the analysis derives the presuppositions observed in subset comparatives. Finally, in §4.4, I show that the proposal has the advantage of predicting when the presuppositions should be licensed.

4.3. Deriving the presuppositions

Presuppositions are usually taken to be inferences that are triggered by the presence of certain lexical items (i.e. the presupposition triggers). For instance, in Grant's analysis the presupposition trigger is '$more_{sub}$'. In what follows, I argue for a different view, namely that the presuppositions of subset comparatives follow from the semantic interpretation of LF's like (28). In (31), I present a slightly simplified interpretation of (28):

(31) a. $[\![\textit{más}]\!](EQ)(\lambda d \lambda x.\textit{read}(y,x) \wedge \textit{books}(x) \wedge \#(x) = d)$
b. $\exists x[max\{d\text{: }\textit{read}(y,x) \wedge \textit{books}(x) \wedge \#(x) = d\} \succ$ by ∃-Closure
$max\{d'\text{: }\textit{read}(y,EQ) \wedge \textit{books}(EQ) \wedge \#(EQ) = d'\}]$
c. $[\lambda y.\exists x[max\{d\text{: }\textit{read}(y,x) \wedge \textit{books}(x) \wedge \#(x) = d\} \succ$
$max\{d'\text{: }\textit{read}(y,EQ) \wedge \textit{books}(EQ) \wedge \#(EQ) = d'\}]](\textit{Juan})$
d. $\exists x[max\{d\text{: }\textit{read}(j,x) \wedge \textit{books}(x) \wedge \#(x) = d\} \succ$
$max\{d'\text{: }\textit{read}(j,EQ) \wedge \textit{books}(EQ) \wedge \#(EQ) = d'\}]$

In prose, (31d) states that there is an individual x such that x is a plurality of books read by Juan, and the cardinality of x is greater than the cardinality of '*El Quijote*', which is also a book read by Juan. In order to derive the presuppositions of (3), I make the following assumption regarding the maximality function built in the meaning of phrasal '*more*'.

(32) max is undefined when the set of degrees it takes as an argument is empty.

(32) is the only new element needed in order to derive the meaning of (3). Once (32) is assumed, it follows that in order for (31d) to be defined, it must be the case that Juan read '*El Quijote*' and that '*El Quijote*' is a book. In a scenario in which Juan did not read '*El Quijote*' or '*El Quijote*' is not a book, the set of degrees to the right of the $\succ$ relation would be empty (since at least one

of the conjuncts would not be satisfied), triggering the expected presupposition failure when max applies to the empty set.

The proposal also makes the correct predictions for negated subset comparatives like (7), repeated below. (34) contains the interpretation of (33):

(33) Juan no ha leído más libros que *El Quijote*.
Juan not has read more books than *El Quijote*
≈Juan only read *El Quijote*.

(34) $\neg\exists x[max\{d\text{: }\textit{read}(j,x) \wedge \textit{books}(x) \wedge \#(x) = d\} \succ$
$max\{d'\text{: }\textit{read}(j,EQ) \wedge \textit{books}(EQ) \wedge \#(EQ) = d'\}]$

(34) states that there is no plurality of books x such that Juan read x, whose cardinality is greater than the cardinality of '*El Quijote*', a book read by Juan. The *only*-interpretation follows from (34). We have already seen that in order for (34) to be defined, it must be the case that Juan read '*El Quijote*' and that '*El Quijote*' is a book. Given this, and provided that (34) asserts that Juan did not read more than one book, it follows that Juan must have only read '*El Quijote*'. Notice that in (34), negation can uniquely target the meaning corresponding to the assertion (the set of degrees to the left of $\succ$), never the meaning corresponding to the presuppositions. This is exactly what we would expect given the projection behavior of these inferences.

Adopting (32) entails that any comparative construction whose semantics makes use of max is presuppositional. This claim seems uncontroversial when it comes to subset comparatives or adjectival comparatives. In order for the adjectival comparative in (35a) to be felicitous, it must be the case that Mary has some degree of height. The question is whether the claim accurately describes amount comparatives like (35b).

(35) a. John is taller than Mary.
b. John read more books than Mary.

Sentence (35b) carries the inference that Mary read at least one book.[8] This inference is certainly weaker than that of subset or adjectival comparatives, but is nevertheless present. The source of

[8]Example (1) might appear as a counterexample to the claim that all amount comparatives are presuppositional.

(1) John read more books than Mary: he read two, and she didn't read any.

Some speakers do not think that (1) is a good way to report the actual facts (i.e. that Mary did not read any book). This could be taken as an indication that, in uttering the second sentence, the speaker of (1) is playing with the presupposition failure.

the variability in the strength of the presuppositions associated with the different types of comparatives is a poorly understood issue that deserves careful examination. Unfortunately, an exhaustive exploration of this question is beyond the scope of this paper.

In the proposal developed in this section, the presuppositions of subset comparatives are not lexically triggered (*contra* Grant (2013)). Rather, the presuppositions are the byproduct of the compositional principles independently needed to interpret phrasal comparatives. The only new assumption required by the analysis is that the maximality function be undefined for the empty set. Under this view, the fact that presuppositional comparatives like subset comparatives exist is not surprising, given that natural languages make use of phrasal syntax as one of the strategies to express comparison. This raises the interesting question of how many ways natural languages go about licensing presuppositions. On the one hand, presuppositions can be lexically triggered; on the other, subset comparatives suggest that presuppositions can also be the result of semantic composition. Future research will need to determine how pervasive this latter strategy is in natural languages.

4.4. Predicting the presuppositions

Subset comparatives present a distinctive syntactic configuration that sets them apart from other amount comparatives. More specifically, in subset comparatives the standard is syntactically contained in the target in the position where both are base-generated. This contrasts with non-subset amount comparatives in which this containment relation is not present. This observation can be stated in the following generalization.

(36) In subset comparatives, the standard and the target are base-generated as part of the same syntactic argument.

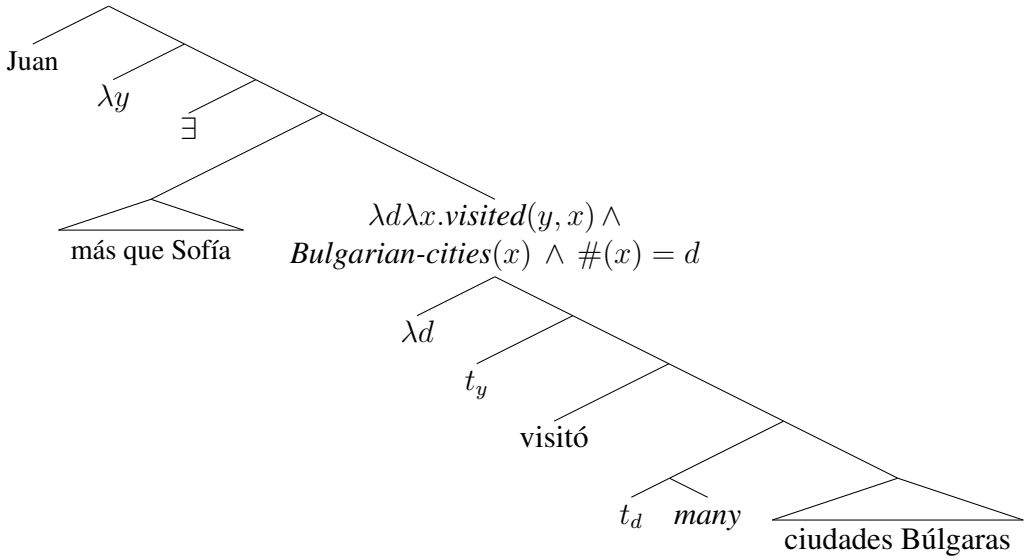
To see how the generalization in (36) helps explain the distribution of the presuppositions, consider the following example.

(37) Juan visitó más ciudades búlgaras que Sofía.
Juan visited more cities Bulgarian than Sofia
Amount: 'Juan has visited a greater number of Bulgarian cities than Sofía has.'
Subset: 'Juan has visited more Bulgarian cities than Sofía (the capital).'

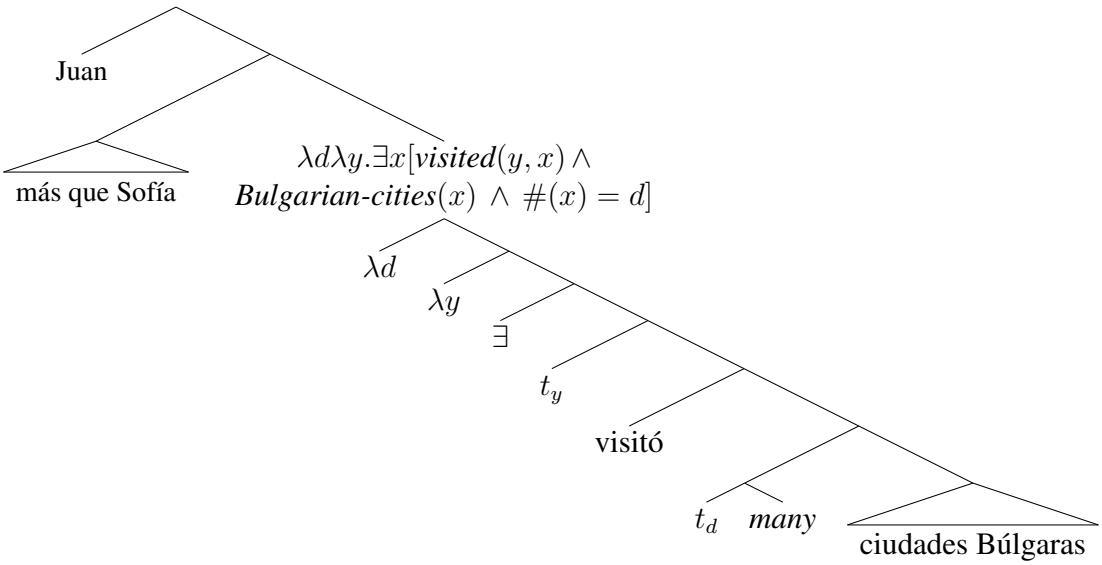
(37) is ambiguous between a subset and an amount interpretation. The subset reading arises when '*ciudades búlgaras*' is interpreted as the target, in which case '*Sofía*' is interpreted as the name of the capital. If, on the other hand, '*Juan*' is interpreted as the target, '*Sofía*' can only be construed as the subject and be interpreted as a female name. In the latter syntactic configuration there is

no containment relation between the target and the standard. Thus, the subset interpretation is not licensed and the amount reading is the only one available. The LF's corresponding to the subset and the amount reading are given in (38) and (39) respectively.

(38)



(39)



The interpretations of (38)-(39) are given in (40)-(41). As seen in (40)-(41), the different scope of the degree clause determines whether the standard will be interpreted as the object (subset reading), or the subject (amount reading).[9]

[9]A third possibility would be to interpret the DegP *in situ*. As far as semantic composition goes, nothing rules out this possibility. However, this LF derives an unattested amount interpretation of (37). This reading can be paraphrased

(40) a. $[\![\textit{más}]\!](\textit{Sofía})(\lambda d\lambda x.\, \textit{visited}(y,x) \wedge \textit{Bulgarian-cities}(x) \wedge \#(x) = d)$

b. $\exists x[max\{d\text{: }\textit{visited}(y,x) \wedge \textit{Bulgarian-cities}(x) \wedge \#(x) = d\} \succ$ by $\exists$-Closure
$max\{d'\text{: }\textit{visited}(y,s) \wedge \textit{Bulgarian-cities}(s) \wedge \#(s) = d'\}]$

c. $[\lambda y.\exists x[max\{d\text{: }\textit{visited}(y,x) \wedge \textit{Bulgarian-cities}(x) \wedge \#(x) = d\} \succ$
$max\{d'\text{: }\textit{visited}(y,s) \wedge \textit{Bulgarian-cities}(s) \wedge \#(s) = d'\}]](\textit{Juan})$

d. $\exists x[max\{d\text{: }\textit{visited}(j,x) \wedge \textit{Bulgarian-cities}(x) \wedge \#(x) = d\} \succ$
$max\{d'\text{: }\textit{visited}(j,s) \wedge \textit{Bulgarian-cities}(s) \wedge \#(s) = d'\}]$

(41) a. $[\![\textit{más}]\!](\textit{Sofía})(\lambda d\lambda y.\exists x[\textit{visited}(y,x) \wedge \textit{Bulgarian-cities}(x) \wedge \#(x) = d])(\textit{Juan})$

b. $max\{d\text{: }\exists x[\textit{visited}(j,x) \wedge \textit{Bulgarian-cities}(x) \wedge \#(x) = d]\} \succ$
$max\{d'\text{: }\exists x[\textit{visited}(s,x) \wedge \textit{Bulgarian-cities}(x) \wedge \#(x) = d']\}$

The analysis correctly predicts that the presuppositions should only be licensed in those cases in which both standard and target are interpreted as part of the same argument. In order to derive the correct truth-conditions, the degree phrase must scope below the $\exists$-quantifier. If it scopes above it (see (39)), only the subject reading of the standard can be derived, in which case none of the presuppositions are present. This is a welcome result, since it explains the generalization in (36) and accounts for the fact that the presuppositions are only licensed when the syntactic configuration described in (36) is met.

5. Conclusion

I have provided a compositional analysis for subset comparatives. I proposed that subset comparatives share entailments with amount comparatives, but present additional presuppositions. Specifically, subset comparatives presuppose that 1) the standard is in the extension of the denotation of the target; and 2) the standard of comparison has the property denoted by the matrix predicate. In the analysis presented above, the presuppositions associated with subset comparatives are not lexically triggered. Rather, they emerge as a result of the compositional principles required to interpret phrasal comparatives in which the standard is base-generated as part of the same syntactic argument as the target.

as 'Juan visited more than one Bulgarian city.' Based on the unavailability of such reading, it seems plausible to conclude that the DegP must obligatorily scope out of its base position. At the moment I do not have a principled way of ruling out the *in situ* interpretation of the DegP. However, I will suggest two possible approaches to this problem that eventually might lead to a solution. The first type of solution would be configurational. It is possible that there exists an independent parallelism requirement on the relation between target and standard that cannot be satisfied when the latter is contained in the former, thus forcing the DegP to scope out. The second type of solution would rely on a pragmatically motivated blocking mechanism. In the reading derived by the *in situ* scope, the use of the referential DP '*Sofía*' seems unnecessary. The same exact truth-conditions would be achieved with any other standard that denoted a singular referential term or by just saying '*more than one*'. It is therefore possible that, under some generalized version of the Maxim of Manner, the referentially more complex DegP '*more than Sofía*' blocks the parse in which the DegP stays *in situ*.

The proposal has several advantages with respect to Grant's (2013) lexical-ambiguity based analysis. First, it is more economical, since it does not involve multiplying the lexical entries for the degree head. The analysis developed above only makes use of machinery that has been shown to be needed in order to compositionally interpret phrasal comparatives (Heim (1985); Kennedy (2007); Bhatt and Takahashi (2011)). The only new assumption required by the analysis is that the maximality function be undefined for the empty set. Second, the analysis straightforwardly accounts for the otherwise puzzling fact that the presuppositions are not licensed across the board. Subset comparatives all present the same syntactic configuration in which the standard and the target are part of the same syntactic argument. The scopal configuration that derives the object reading of the standard also derives the two presuppositions that characterize subset comparatives. On the other hand, when the DegP scopes above the VP, only the subject reading of the standard is derived. In this configuration, none of the presuppositions observed in subset comparatives are licensed.

The broader theoretical implications of this study have to do with the grammatical mechanisms of presupposition licensing. Presuppositions are usually thought of as inferences that are attached to certain lexical items, or presupposition triggers. Subset comparatives reveal that presuppositions can also emerge as a consequence of semantic composition. To the extent that the claims defended in this paper are headed in the right direction, we would expect to find other constructions in natural languages that carry these compositionally generated presuppositions.

References

Barker, C. (2007). Parasitic scope. *Linguistics and Philosophy 30*(4), 407–444.

Bhatt, R. and S. Takahashi (2011). Reduced and unreduced phrasal comparatives. *Natural Language and Linguistic Theory 29*, 581–620.

Bresnan, J. (1973). The syntax of the comparative clause construction in english. *Linguistic Inquiry 4*, 275–343.

Carlson, G. N. (1977). A unified analysis of the English bare plural. *Linguistics and Philosophy 1*, 413–457.

Chung, S. and W. Ladusaw (2004). *Restriction and Saturation*, Volume 42 of *Linguistic Inquiry Monograph*. MIT Press.

Fults, S. and C. Phillips (2004). The source of syntactic illusions. Poster presented at the 17th CUNY Conference on Human Sentence Processing, University of Maryland.

Grant, M. (2013). *The Parsing and Interpretation of Comparatives: More than Meets the Eye*. Ph. D. thesis, University of Massachusetts Amherst.

Grant, M. (to appear). Subset comparatives: A psycholinguistic investigation. In M. Y. Erlewine and Y. Sudo (Eds.), *Proceedings of the MIT Workshop on Comparatives*.

Hankamer, J. (1973). Why there are two *than*'s in English. In C. Corum, T. C. Smith-Stark, and A. Weiser (Eds.), *Proceedings of the 9th Annual Meeting of the Chicago Linguistic Society*, pp. 179–191.

Heim, I. (1985). Notes on comparatives and related matters. University of Texas, Austin.

Izvorski, R. (1995). A DP-shell for comparatives. In *CONSOLE III Proceedings*, pp. 99–121.

Kennedy, C. (2007). Modes of comparison. In M. Elliott, O. Sawada, E. Staraki, J. Kirby, and S. Yoon (Eds.), *Proceedings of the 43rd Annual Meeting of the Chicago Linguistic Society*, pp. 141–165.

Lechner, W. (2001). Reduced and unreduced phrasal comparatives. *Natural Language and Linguistic Theory 19*(4), 683–735.

Merchant, J. (2009). Phrasal and clausal comparatives in Greek and the abstractness of syntax. *Journal of Greek Linguistics 9*, 134–164.

Partee, B. H. (1987). Noun Phrase interpretation and type-shifting principles. In J. Groenendijk, D. de Jongh, and M. Stokhof (Eds.), *Studies in Discourse Representation Theory and the Theory of Generalized Quantifiers*. Dordrecht: Foris.