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EXCEPTIVE CONSTRUCTIONS

The compositional description of complex quantifier structures is an important research goal within the theory of quantification. In this article, I will investigate ways to formulate the semantics of quantified sentences containing exceptive constructions, which typically serve to reduce the force of universal quantifications by diminishing the domain quantified over. Among the large variety of exceptive constructions and their relatives, I will concentrate fairly narrowly on the two types illustrated in (1), the highly grammaticized English *but*-phrase in (1a), and the 'free exceptive' with *except for* in (1b).[1]

(1) a. Every student but John attended the meeting.
    b. Except for John, every student attended the meeting.

Although exceptive constructions and some of their core properties have been known since the times of the medieval semanticists, their proper analysis in a formal theory has proven very elusive.[2] The first and more substantial part of this article (Section 1) is therefore devoted to a compositional analysis of the semantics of *but*-phrases, something that has not been achieved before. Various ways of connecting the semantics to the syntax are discussed. I will argue for an NP-internal syntax of *but*-phrases and discuss two possible constituencies which correspond to different 'curryings' of the semantics.

The second part of the article (Section 2) is devoted to the analysis of free exceptives. Some surprising differences between *but*-phrases and free exceptives will be explained by assigning to the latter a semantics that is crucially weaker than the one for *but*-phrases.

This contribution then aims to provide a firm semantic foundation for the further study of exceptives, which could provide important clues to larger issues in the theory of quantification and in the theory of the interaction between syntax and semantics. Some possible lines of further research, descriptive and theoretic, will be sketched at the end (Section 3).

1. A SEMANTICS FOR *BUT*-PHRASES

The problem addressed here is how to derive the correct truth conditions for quantified sentences with *but*-phrases as in (2).

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(2) a. Every student but John attended the meeting.
b. No student but John attended the meeting.

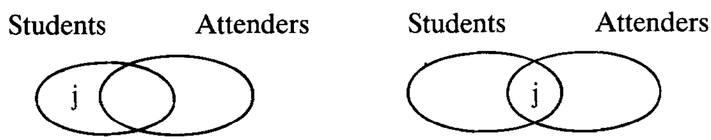
As it turns out it is not easy to do this compositionally. We would especially like to be able to give *but* a unified meaning that combines successfully with both the positive determiner *every* and the negative one *no*. I show that such a unified semantics is indeed possible, and that it turns out to have the added advantage of offering a handle on the co-occurrence restrictions of *but*-phrases. An interesting side effect of the solution is that a previously unknown formal property is singled out that universal determiners (*every* and *no* and their synonyms) share, to the exclusion of all other basic determiners.

The semantic framework assumed here is essentially the theory of generalized quantifiers,[3] although there will be additional notions borrowed from other traditions. The syntactic discussion will stay fairly theory neutral.

1.1. *What Do* But*-Phrases Mean?*

If we want to develop a precise derivation of the truth conditions of exceptive statements we have to agree on what those truth conditions are. In their brief mention of exceptives, Keenan and Stavi (1986) treat (2a) as saying that John is the only student who did not attend the meetings; (2b) is said to be true if and only if John is the only student who did attend the meeting. The sentences, if true, would correspond to the diagrams in (3):

(3) Every student but John attended the meeting: No student but John attended the meeting:



This strong construal of the truth condition of *but*-sentences, namely that a sentence like (2a) in fact implies (i) that John is a student and (ii) that he did not attend the meeting, may seem too strong. Hoeksema (1990) suggests that the second entailment at least should be taken as a Gricean implicature instead and presents (4) as evidence.

(4) Well, except for Dr. Samuels everybody has an alibi, inspector. Let's go see Dr. Samuels to find out if he's got one too.

For free exceptives like the one in (4), Hoeksema's suggestion does appear to be correct; to accommodate this, the analysis of free exceptives to be proposed in Section 2 will have a Gricean component. A *but*-phrase in the same context, however, seems to be far less felicitous, as (5) shows:

(5) Well, everybody but Dr. Samuels has an alibi, inspector.
??Let's go see Dr. Samuels to find out if he's got one too.
#In fact, he has one too.

Karttunen and Peters (1979) show that implicatures and entailments are distinguishable by their behavior under embedding. Consider (6):

(6) I just noticed that even Bill likes Mary.

They write: "[Sentence (6)] says that the speaker has just noticed that Bill likes Mary. It does not mean that he has just noticed that other people like Mary or just noticed that Bill is the least likely person to do so" (p. 13). The latter two propositions of course are the conventional implicatures triggered by *even*. Let's test *but*-phrases in the same environment.

(7) I just noticed that every student but John attended the meeting.

What (7) says is that the speaker has just noticed that every student other than John attended the meeting and that John didn't attend it. Both propositions then seem to be entailments. At the same time, however, the speaker is not saying that she just noticed the fact that John is a student, another entailment under the Keenan-Stavi semantics. This then might be a mere implicature.

While these issues obviously merit more careful scrutiny, I will make the simplifying step of following Keenan and Stavi in not designating any part of the meaning of *but* as less than an entailment.[4,5] The goal then is to find a denotation for *but* that, together with the standard determiner meanings for *every* and *no* in (8),[6] yields the meanings given in (9) for the whole NP.

(8) $[\![\text{every}]\!]([\![\text{student}]\!]) = \{P \subseteq E \mid \overline{P} \cap [\![\text{student}]\!] = \emptyset\}$
$[\![\text{no}]\!]([\![\text{student}]\!]) = \{P \subseteq E \mid P \cap [\![\text{student}]\!] = \emptyset\}$

(9) $[\![\text{every student but John}]\!] = \{P \subseteq E \mid \overline{P} \cap [\![\text{student}]\!] = \{[\![\text{John}]\!]\}\}$
$[\![\text{no student but John}]\!] = \{P \subseteq E \mid P \cap [\![\text{student}]\!] = \{[\![\text{John}]\!]\}\}$

The meanings in (9) are what we want because they are equivalent to the intuitive meaning given for (2) above. What does $[\![\text{but}]\!]$ have to be, to get us the results in (9)? Specifically, we want to have a unified meaning for *but* that can combine with both *every* and *no* without need for a disjunctive stipulation.

1.2. *The Company* But *Keeps*

Apart from the truth-conditional import of *but*, there are other aspects of its semantics that need explanation. We would expect an adequate analysis to account for the fact that *but*-phrases occur felicitously only with universal quantifiers (positive quantifiers like *every* or negative ones like *no*), as illustrated in (10), from Horn (1989, 346):

(10) Everyone but Mary — Nobody but John
Anyone but Carter — *Somebody but Kim
Anywhere but here — *Somewhere but here
{All/*Most/*Mary/*Three/*Some/None} of my friends but Chris
Everything but the kitchen sink
None but the brave deserves the fair. (Dryden)
No man but a blockhead ever wrote except for money. (Dr. Johnson)

Ideally, we would want the truth conditional analysis of *but* to have some obvious connection to these co-occurrence restrictions. The treatment that I will now develop through three successively stronger incarnations will eventually allow such a connection to be made.

1.3. But *as a Minus Sign: Domain Subtraction*

The intuition which I will found my treatment of exceptives on is that they subtract entities from the domain of a quantifier. In a first approximation then, we could treat *but* as creating a noun modifier with a semantics as in (11). Some discussion of such an analysis can be found in Hoeksema (1987).

(11) $[\![\text{students but John}]\!] = [\![\text{students}]\!] - \{[\![\text{John}]\!]\}$

Our test sentence (2a) would then be true iff everyone who is a student but who isn't John attended the meeting. While I do think that domain subtraction as in (11) is the central part of the meaning of any exceptive construction, as a semantics for *but* it cannot be the whole story.

First, as Hoeksema (1987) points out, it fails to capture the co-occurrence restrictions of *but*-phrases. If *but* is a mere minus sign, the resulting set will be just like any other set without any distinguishing properties. The set of students minus John is a maximally dull set as far as set theory is concerned. There would then be no reason why *some* or *most* shouldn't combine with it to form a well-formed noun phrase. But, **some students but John* and **most students but John* are of course ill-formed.

Second, analyzing *but* as a minus sign allows some inferences to go through that are plainly illicit. The reason for this is that the universal determiners *every* and *no* are left downward monotone on their first argument as defined in (12):

(12) *Left Downward Monotonicity* ($\downarrow$ *mon*)[7]
$P \in D(A)$ and $B \subseteq A \Rightarrow P \in D(B)$.

This property of universal determiners licenses the inferences in (13):

(13) Every human being is mortal.
$\Rightarrow$ Every male human being is mortal.

No human being is mortal.
$\Rightarrow$ No male human being is mortal.

If we put the left downward monotonicity of the universal determiners together with the view that *but* is a mere minus sign we now predict the inferences in (14) to be valid without further assumptions. The reason is that the set of students minus John and Jill is of course a subset of the set of students just minus John. Hence we should be able to infer down from the latter to the former:

(14) Every student but John attended the meeting.
?$\Rightarrow$? Every student but John and Jill attended the meeting.

No student but John attended the meeting.
?$\Rightarrow$? No student but John and Jill attended the meeting.

But the inferences in (14) are blatantly incorrect.[8] The conclusions imply that Jill is a student who did, or did not, attend the meeting. But that is something which we cannot validly infer from the premise. A satisfactory treatment of *but* then has to block the downward monotonicity of the universal determiners in some way, in order to prevent the inferences in (14) from falsely going through.

These problems notwithstanding, I would like to maintain the initial intuition as far as possible. Let us assume that the central part of the meaning of *but* is indeed set subtraction and that the entailment in (15) holds.

(15) $D\,A\,[\![\text{but}]\!]\,C\,P = \text{True} \Rightarrow P \in D(A - C)$

Key for (15): $D = [\![\text{every}]\!], [\![\text{no}]\!]$
$A = [\![\text{student}]\!]$
$C = \{[\![\text{John}]\!]\}$
$P = [\![\text{attended the meeting}]\!]$

For the semantics developed here to work, the NP complement of *but* has to denote a set that can be subtracted from the set denoted by the head noun. This is arguably a healthy consequence because, as (16) demonstrates, only NPs that can be taken to denote sets can be the complement of *but*, as first noticed by Hoeksema (1987):

(16) *all the students but each foreigner

For an explicit implementation of this analysis, we could supplement the framework of Generalized Quantifier Theory with the type-shifting mechanisms of Partee (1987), in particular the type-shift rule that lowers a generalized quantifier to a set. For the purposes of this article, I will ignore these details and just assume that somehow the complement of *but* can be made to denote a set.

1.4. *Domain Subtraction and Restrictiveness*

The question now is: what more needs to be added to the right of the implication arrow in (15) for a complete semantics of *but*? The logical next step is to require that the *but*-phrase be necessary to rescue the quantificational statement: without the exception the sentence would be false. This 'restrictiveness' requirement is formalized in (17). It is very plausible that we get restrictiveness for free by appealing to Gricean principles: there must be a point to using an exceptive after all.

(17) $\mathrm{D\,A}\,[\![\mathrm{but}]\!]\,\mathrm{C\,P} = \mathrm{True} \Rightarrow \mathrm{P} \in \mathrm{D}(\mathrm{A}-\mathrm{C})\ \&\ \underline{\mathrm{P} \notin \mathrm{D}(\mathrm{A})}$

Our test sentence (2a) is now true iff it is the case that everyone who is a student and who is not John attended the meeting (domain subtraction) and it is furthermore the case that not everyone who is a student at all attended the meeting (restrictiveness). That sounds promising.

A desirable consequence of imposing (17) is that left upward monotone determiners,[9] as defined in (18), would immediately falsify any exceptive sentence under the meaning formalized in (17).

(18) *Left Upward Monotonicity* ($\uparrow$*mon*)
$\mathrm{P} \in \mathrm{D}(\mathrm{A})$ and $\mathrm{A} \subseteq \mathrm{B} \Rightarrow \mathrm{P} \in \mathrm{D}(\mathrm{B})$.

These determiners license the inference from sets to their supersets in their left argument as illustrated by the licit inference in (19):

(19) Some female human being is an athlete.
$\Rightarrow$ Some human being is an athlete.

If such a determiner is used with *but* we get immediate falsity. For, assuming that $P \in D(A - C)$, we can then make the inference from $A - C$ to its superset A, and so $P \in D(A)$, which contradicts restrictiveness. In (17) at least this part of the co-occurrence restrictions of *but* is captured. Determiners like *some*, *at least three*, and *many*,[10] can be naturally excluded.

Unfortunately, a semantics for exceptives along the lines of (17) can be shown to be insufficiently strong. One problem is that while left upward monotone determiners are excluded there are still some determiners that we let in but shouldn't: *most*, for example, is not left upward monotone but cannot appear with *but*. We would then have to stipulate the distribution of *but*-phrases (as Hoeksema 1987, who proposes a semantics very much like (17), actually does),[11] which should only be a last resort.

There is also the serious descriptive problem that the illicit inferences licensed by the left downward monotonicity of universal quantifiers still go through. Consider (14) again, repeated here:

(14) Every student but John attended the meeting.
?⇒? Every student but John and Jill attended the meeting.

No student but John attended the meeting.
?⇒? No student but John and Jill attended the meeting.

It is easy to see that, under the analysis considered here, the consequent will indeed follow from the premise. Recall that (17) predicts the premise of the first inference in (14) to be true iff it is the case that everyone who is a student and who is not John attended the meeting and it is also the case that not everyone who is a student at all attended the meeting. But then it will also be the case that everyone who is a student and who is neither John nor Jill attended the meeting and it will still hold that not every student attended. The semantics in (17) is not enough then; something has to be added. We have to derive that John is in fact the only student who did not attend.

1.5. *The Uniqueness Condition*

We have to strengthen the conditions even further. What does it mean to be the set of exceptions to a quantified statement? Consider this:

(20) The set of exceptions to a quantified sentence D (A) P is the smallest set C such that D (A − C) P is true.

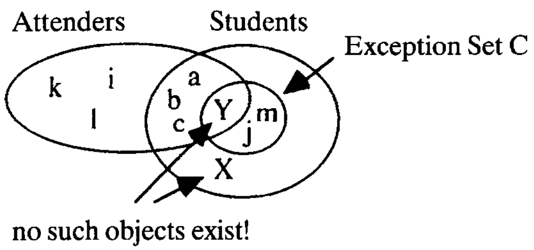
The exception set C has to be the smallest set such that if it is subtracted from the quantifier domain the quantification comes out true. This can be factored out into two conditions, one of which is the Domain Subtraction clause we already know; the other is essentially a condition of uniqueness. In (21) three equivalent ways of conceiving of the uniqueness condition are given. As the reader can verify, the Uniqueness Condition subsumes the earlier condition of restrictiveness.

(21) $D\ A\ [\![\text{but}]\!]\ C\ P = \text{True}$

$$\Leftrightarrow P \in D(A - C) \ \& \ \forall S\,(P \in D(A - S) \Rightarrow C \subseteq S).$$
$$\Leftrightarrow P \in D(A - C) \ \& \ \forall B\,(B \subseteq A \ \& \ P \in D(B) \Rightarrow C \cap B = \emptyset)$$
$$\Leftrightarrow \underbrace{P \in D(A - C)}_{\text{Domain Subtraction}} \ \& \ \underbrace{\bigcap \{S \mid P \in D(A - S)\} = C}_{\text{Uniqueness Condition}}$$

The picture in (22) gives an idea of how to visualize the truth conditions for a sample sentence:

(22) Every student but John and Mary attended the meeting.



The two clauses in (21) work together to ensure that C contains all and only the exceptions to the quantificational assertion. The Domain Subtraction clause says that C contains *all* the exceptions, while the Uniqueness Condition says that C contains *only* exceptions. In sum, a *but*-phrase names the set responsible for the falsehood of a quantified statement.

It should be obvious that the uniqueness condition is pragmatically natural. It ensures maximal relevance of the *but*-phrase: the exceptive is not only necessary to save the quantification, it also is the most economical way of doing that. The lexical meaning of *but* then has, I claim, internalized this pragmatically natural condition.

After these appeals to intuitive plausibility let me demonstrate that with the semantics for *but* in (21), the resulting truth conditions for exceptive sentences are exactly the ones that we set out to obtain. The steps of calculation in (23) are justified by the application of the assumed standard definitions of $[\![\text{every}]\!]$ and $[\![\text{no}]\!]$ and by fairly elementary set-theoretic equivalences.[12]

(23) $[\![\text{every}]\!]\ A\ [\![\text{but}]\!]\ C\ P = \text{True}$
$\Leftrightarrow\ P \in [\![\text{every}]\!]\ (A - C)\ \&\ \forall Y\ (P \in [\![\text{every}]\!]\ (A - Y) \Rightarrow C \subseteq Y)$
$\Leftrightarrow\ (A - C) \subseteq P\ \&\ \forall Y\ ((A - Y) \subseteq P \Rightarrow C \subseteq Y)$
$\Leftrightarrow\ \overline{P} \cap A \subseteq C\ \&\ \forall Y\ (\overline{P} \cap A \subseteq Y \Rightarrow C \subseteq Y)$
$\Leftrightarrow\ \overline{P} \cap A \subseteq C\ \&\ C \subseteq \overline{P} \cap A$
$\Leftrightarrow\ \overline{P} \cap A = C$

$[\![\text{no}]\!]\ A\ [\![\text{but}]\!]\ C\ P = \text{True}$
$\Leftrightarrow\ P \in [\![\text{no}]\!]\ (A - C)\ \&\ \forall Y\ (P \in [\![\text{no}]\!]\ (A - Y) \Rightarrow C \subseteq Y)$
$\Leftrightarrow\ P \cap (A - C) = \emptyset\ \&\ \forall Y\ (P \cap (A - Y) = \emptyset \Rightarrow C \subseteq Y)$
$\Leftrightarrow\ P \cap A \subseteq C\ \&\ \forall Y\ (P \cap A \subseteq Y \Rightarrow C \subseteq Y)$
$\Leftrightarrow\ P \cap A \subseteq C\ \&\ C \subseteq P \cap A$
$\Leftrightarrow\ P \cap A = C$
Q.E.D.

It is a nice side-effect of (21) that the unwanted inferences discussed earlier do not go through anymore.

(24) a. Every student but John attended the meeting.
b. Every student but John and Jill attended the meeting.

Assuming that (24a) is true, the semantics in (21) predicts that (24b) cannot be true at the same time. (24a) asserts that the singleton set of John is the smallest set that needs to be subtracted from the set of students to make the quantification true. Obviously, (24b) contradicts that in asserting that the set containing both John and Jill is the smallest such set.

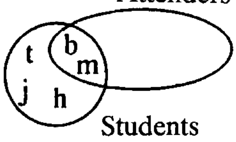
1.6. *The Co-Occurrence Restrictions Motivated*

Not only does (21) yield the correct truth conditions for sentences with *but*, it also provides immediate explanations for other aspects of the meaning of exceptive *but*. First and foremost, the uniqueness condition offers a handle on the co-occurrence restrictions of *but*-phrases. The crucial observation is that among simple natural determiners, only the universal ones, e.g., *all* (and its synonyms) and *no* (and its synonyms), guarantee the existence of a unique exception set, if there is any at all.

To see that universal determiners in fact guarantee a unique exception, if there is one at all, consider this. Assume that $P \notin D\ (A)$. If D is *no*, then $P \cap A$ is the culprit; it should have been empty but wasn't; it is the unique exception we are looking for. If D is *all*, then $\overline{P} \cap A$ is the offender since it should have been empty; it is thus the unique exception.

As an example of a determiner that is not universal and does not give rise to unique exceptions let us examine *most*. Consider the situation illustrated in (25) where (25a) is false because there are three students (Tom, John, and Harry) who did not attend the meeting while only two students (Bill and Mary) attended:

(25) Attenders



Students

a. Most students attended the meeting.
b. *Most students but Tom and John attended the meeting.

We could try to make the *most*-quantification true by excluding a sufficient number of nonattending students from the set we are quantifying over. So we attempt (25b), excluding Tom and John, thus creating a situation where still only two students attended (Bill and Mary) but only one nonattender (Harry) remains. So now a majority of the students under consideration did attend the meeting. But note that since the *most*-claim is not a universal one we did not have to exclude all nonattending students. Hence we had a choice of which students to exclude. We could equally well have excluded Tom and Harry, or John and Harry. There is obviously no unique set of students that we have to exclude. The uniqueness condition encoded in (21) brands (25b) as false, since Tom and John are not the unique exception set to the quantification in (25a). Parallel thought experiments can be carried out for all determiners that stand a chance of having exceptions (recall that the upward monotone ones are excluded by even more elementary considerations).

It could be noticed that there are limiting cases where even a *most*-quantification has a unique exception. If there were only two students, John and Harry, and only one of them, Harry, attended the meeting, we can make the statement *Most students attended the meeting* true by excepting the unique student who did not attend the meeting: John. The existence of such exotic situations is obviously not enough for *but* to be able to occur with *most*. The analysis of the co-occurrence restrictions of *but* that I propose then is that they are a grammaticization of the semantic fact that only universal determiners guarantee the existence of a unique exception set, while non-universal determiners (almost) guarantee its absence.[13, 14]

The last paragraph may appear to be little more than fancy footwork. Can the co-occurrence restrictions of *but*, the ungrammaticality of, say, **most students but John*, really be *explained* by showing that the "bad" sentences come out as automatically false?

There is a well-known similar attempt in the literature on existential constructions and the Definiteness Effect: Barwise and Cooper (1981).[15] They point out that strong quantifiers as defined by them would always yield either tautologies or contradictions in existential sentences and offer this observation as an explanation for the Definiteness Effect. The conceptual problem with this is that, in general, tautologies or contradictions are not ungrammatical. Keenan (1987) also points out a descriptive problem: some formally strong quantifiers as in (26) are acceptable in *there*-contexts!

(26) Your argument is ingenious, Mr. Jones. It proves among other things that there are fewer than zero perfect numbers.

What about the attempt to reduce the co-occurrence restrictions of *but* to the fact that the semantics in (21) reliably yields contradictions with nonuniversal determiners? Are all such accounts destined to be off the mark? Not necessarily. What is missing, admittedly, is an explicit theory of grammaticization. But surely the semantic facts uncovered by Barwise and Cooper (the clash between the presuppositions of strong determiners and the existentiality of *there*-contexts) and in this article (the connection between universal determiners and unique exception sets) will have to be at the heart of any satisfactory account. While the final word has not been said, there is nothing better on the market at this time.

1.7. *Other Benefits of the Analysis*

Horn and Bayer (1984, cf. also Horn 1989, 346) note that *but*-phrases induce an exclusively rhetorical reading on *wh*-questions as in (27a), turning them into what Sadock (1971) called '*wh*-queclaratives'. In contexts as in (27b), where a rhetorical reading is dispreferred (for whatever reasons), ungrammaticality ensues:

(27) a. Who but a total idiot would have said a thing like that?
b. ?*Who but Leslie is coming to a party?

The semantics in (21) now allows an explanation for this behavior. Since *but*-phrases are only felicitous with universal determiners, the only possible answers to (27a) will be *nobody* or *everybody*. Such restricted choice of logically possible answers presumably promotes a rhetorical interpretation of the question. Rhetorical questions generally have negative import, which means that (27a) will be interpreted as conveying that nobody but a total idiot would have said a thing like that.[16]

One last observation. Geis (1973) pointed out that exceptives cannot be conjoined. Consider (28):

(28) a. *Everybody but John and but Mary attended the meeting.
b. Everybody but John and Mary attended the meeting.

Again, we can account for this fact using the meaning for *but* given in (21). The complement of *but* is supposed to be the unique exception to the modified quantificational assertion. If there are two *but*-phrases modifying the same quantifier, their uniqueness demands will clash. John cannot be the only exception at the same time that Mary is the only exception. What can be said is that John and Mary together form the unique set of exceptions.

This concludes the demonstration that (21) is an adequate specification of the meaning of exceptive *but*. The correct truth conditions are predicted, unwarranted inferences induced by the monotonicity of universal determiners are blocked, the co-occurrence restrictions of *but* become less mysterious, and some puzzling facts about rhetorical questions and conjoinability are explained.

1.8. *What Does* But *Operate On?*

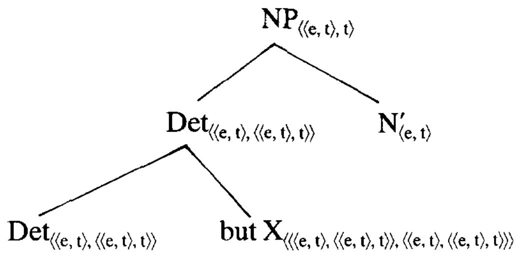
So far I have been careful not to commit myself to a position on how exactly the elements in a quantificational noun phrase like *every student but John* combine semantically and how this is linked to a particular syntactic structure. A close look at the semantics in (21), repeated in (29), reveals that the *but*-phrase must have access to both the determiner D and its domain A. D applies more than once in (29), to different sets, and A is subtracted from at various points.

(29) $$\mathrm{D\,A}\,[\![\mathrm{but}]\!]\,\mathrm{C\,P} = \mathrm{True} \Leftrightarrow \mathrm{P} \in \mathrm{D(A - C)}\ \& \\ \forall \mathrm{S}\,(\mathrm{P} \in \mathrm{D\,(A - S)} \Rightarrow \mathrm{C} \subseteq \mathrm{S}).$$

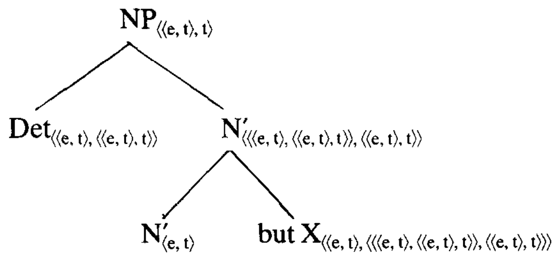
The necessity of "simultaneous access" excludes two initially attractive implementations. It is not possible to have the exceptive operate solely on the domain A, which would have made it possible to treat it as a fairly ordinary noun modifier. It is also not possible to compute the noun-phrase denotation D(A) first and have the exceptive then take the result as its argument, which would have corresponded to an analysis of *but*-phrases as NP modifiers.[17, 18] The semantics in (29) forces more exotic analyses.

Assuming binary branching in both syntax and semantics, we have to decide whether the *but*-phrase applies first to the determiner and then to the common noun or the other way round. That is, we have to decide between two different 'curryings'[19] of the function denoted by the *but*-phrase, given in (30) and described below.

(30) a.



b.



The first possibility (30a) is to treat the *but*-phrase as a determiner modifier, which makes it the same type as adverbs like *almost* in *almost all* (namely, functions from determiner denotations to determiner denotations). This is actually implicit in the proposal by Keenan and Stavi (1986) who, however, do not give any compositional derivation but treat *every* . . . *but* . . . and *no* . . . *but* . . . as complex lexical items instead. Syntactically this would force us to accept either a discontinuous constituency or a local movement around the head noun.[20] Treating *but*-phrases as modifiers of determiners may provide a natural connection to constructions like *all but at most five students* where we find a complex determiner phrase built with *but* to the left of the head noun.

The second and semantically more adventurous option (30b) has the *but*-phrase combine with the common noun first to give a higher type common noun, which then takes the determiner as its argument, in a reversal of the usual function–argument structure. This high type for common nouns is not very common in semantic analyses and we would like independent evidence for it.[21]

It seems difficult to decide between these options. At the moment, I am inclined to treat *but*-phrases as operators on determiners because there is already a well-established class of such operators, notably the semantically similar adverb *almost*. The syntactic repercussions having to do with the local movement to the right of the common noun will of course have to be investigated.

What the reader should keep in mind is that *but*-phrases, because of the built-in uniqueness condition, have to have a rather high logical type. In the next section, I will suggest that it is their semantic type that distinguished *but*-phrases from the weaker free exceptives.

2. FREE EXCEPTIVES

2.1 *Except for*

The prototypical cases of free exceptives (the term was introduced by Hoeksema 1987) are phrases marked with *except for*, which can appear not only NP-internally but also in both left- and right-peripheral positions.

(31) a. No one, except for the famous detective, suspected the cook.
b. Except for the famous detective, no one suspected the cook.
c. No one suspected the cook, except for the famous detective.

This positional freedom makes free exceptives crucially different from *but*-phrases. I will assume without much argument that it is not possible to consider sentence-peripheral free exceptives as being related to their associated quantifier by an S-structure movement rule (cf. Baltin 1985, who argues that modifiers cannot be extraposed to the left.) Suppose then that free exceptives are base-generated as sentence adjuncts (whether this would extend to the apparently NP-internal exceptive in (31a) is unclear to me).

There are, I think, three degrees of semantic integration of the free exceptive into the sentence they modify. The loosest connection is found in cases where the exceptive is an afterthought, repair, or self-correction, illustrated by (32):

(32) Everyone loved the new show and no one thought it would be canceled so soon. Except for George, of course.

It seems unlikely that these are amenable to a compositional analysis. I will leave them aside.

An intriguing 'appositive' use is shown in (33):

(33) a. Except for Joan, most cabinet members liked the proposal.
b. Except for John, few employees accepted the pay cut.

Near-universal determiners like *most* or *few* probably lead to the implicature that it was not possible to use a universal determiner. In other words, they implicate the existence of an exception set. The sentences in (33) seem to have as their most prominent reading one where the exceptive gives further information about the exception set. (33a) then would convey that Joan is a notable exception to the generalization that cabinet members liked the proposal. It seems obvious that this appositive reading should only arise with free exceptives. They can, so to speak, "wait" until the implicatures of the sentence are computed.[22]

The third use of free exceptives, which is most similar to *but*-phrases, is the one I want to concentrate on here. In (34) the exceptive is used 'restrictively': only after the exceptive has done its thing will the quantification come out true.

(34) a. Except for Jim, no one really liked the soup.
b. Except for Jane, my relatives are (all) total bores.
c. Except for the assistant professors, most faculty members supported the dean.

Free exceptives are obviously more permissive in their co-occurrence restrictions than *but*-phrases. (34b) illustrates the fact, noticed first by Hoeksema (1987), that free exceptives can modify definite NPs that are not overtly quantified. (34c) shows that free exceptives can occur with nonuniversal determiners like *most.*

With respect to *wh*-questions and conjunction as well, free exceptives behave "more weakly" than *but*-phrases. They give rise to ordinary, informative question interpretation with no flavor of rhetoric as the comparison in (35) shows (again pointed out by Hoeksema 1987). They can also be conjoined, again in contrast to *but*-phrases, as (36) demonstrates:

(35) a. Except for John, who would say a thing like that?
b. Who but John would say a thing like that?

(36) a. Except for John and except for Mary, nobody complained.
b. *Nobody but John and but Mary complained.

2.2. *Could Free Exceptives Be Sentence Modifiers?*

Before we turn to the explicit formulation of the semantics of free exceptives, a red herring needs to be taken care of. If free exceptives are sentence adjuncts syntactically, the simplest possible semantic treatment would of course be to interpret them at the sentence level. Hoeksema (1987) suggests that such a sentential exceptive simply removes the excepted set from the universe of discourse or the evaluation model for the modified sentence. As first shown in von Fintel (1989) and acknowledged by Hoeksema (1990), this proposal is refuted by the well-formedness of (37):[23]

(37) Except for John, everybody likes John.

The modified sentence would obviously be uninterpretable if the exceptive removed John from the universe. The conclusion seems unavoidable that even though free exceptives behave syntactically as sentence adjuncts, semantically they only associate with a quantifier.

2.3. *The Semantics of Free Exceptives*

The attentive reader of Section 2.1 will have realized that none of the arguments brought forth in the first part of this article for the Uniqueness Condition as part of the meaning of *but* seem to apply to free exceptives. Free exceptives are weaker with respect to (i) co-occurrence restrictions, (ii) question interpretation, (iii) conjoinability.

I therefore propose to give free exceptives a weaker semantics than *but*-phrases. Specifically, let us remove the Uniqueness Condition. What will be left is the meaning considered in Section 1.4, consisting of set subtraction plus restrictiveness (the latter plausibly imposed by pragmatic considerations). It was rejected there as too weak for *but*-phrases; but it will suit free exceptives just fine. The proposed semantics is given in (38):

(38) $[\![\text{except for}]\!]\ C, D\ A\ P = \text{True} \Leftrightarrow P \in D\,(A - C)\ \&\ P \notin D(A)$

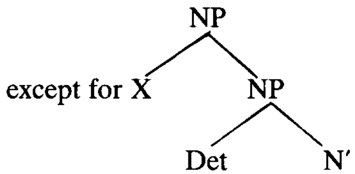
Since it was the Uniqueness Condition that explained the strict co-occurrence restrictions of *but*-phrases, it is no surprise that free exceptives have looser restrictions and can indeed occur with nonuniversal determiners. The Uniqueness Condition also explained the rhetorical reading of *wh*-questions with *but* and the nonconjoinability of *but*-phrases. Again, its absence from the meaning of free exceptives accounts for their more permissive behavior.

The weakness of the lexical meaning of free exceptives does not preclude pragmatic strengthenings of that meaning. With universal determiners, the maximally relevant reading will still be the one where the exception stated is the unique smallest one. The perceived equivalence of universal statements modified by *but*-phrases or free exceptives then merely conceals the different ways these readings come about.

2.4. *Problems of Implementation*

Before we finish up, a few words on how the semantics in (38) can be implemented in a compositional way. One question is how a syntactic sentence adjunct can be interpreted as a modifier of a subsentential phrase. The literature on exceptives contains two proposals. Hoeksema (1990) attempts to treat free exceptives analogously to recent analyses of *only*, namely as items that associate with a focussed constituent via a purely interpretive mechanism (Rooth 1985). Landman and Moerdijk (1979) and more recently Reinhart (1989) proposed that the association between the free exceptive and its target quantifier is established at LF via quantifier raising (QR).[24] This is not the place to discuss these essentially syntactic questions. I will assume that somehow the interpretation mechanism will be provided with the free exceptive and its target quantifier forming a constituent as in (39):

(39)



According to the semantics for free exceptives proposed in the previous section, the exceptive needs access to the common noun set. In (39), however, the exceptive combines with a full noun phrase. How can we give the exceptive access to the meaning of the N′?

Robin Cooper (1975) proposed a way of interpreting correlative clauses (with Hittite as his particular data source) that semantically made them common noun modifiers despite their fairly indisputable sentence adjunct status. Bach and Cooper (1978)[25] showed that this solution could also be used to reconcile an NP-level syntax of English relative clauses with an N′-semantics. The crucial technique is the introduction of a free variable at the N′-level which can then later be filled in by the relative clause. In informal notation, the NP with relative clause in (40a) will be interpreted as in (40b):

(40) a. [[every man] who loves Mary]
b. $\lambda R[[\![\text{every}]\!]([\![\text{man}]\!] \cap R)]([\![\text{loves Mary}]\!])$
$\Leftrightarrow$ $[\![\text{every}]\!]([\![\text{man}]\!] \cap [\![\text{loves Mary}]\!])$

Nontrivial questions about the restrictiveness of the resulting framework then arise.[26] For instance, what is the status of the NP-internal free variable posited here? One way of conceiving of the status of such free variables is that they are something like miraculously base-generated traces of base-generated adjuncts; base generation would have to be less constrained than actual movement traces. For Hindi correlative clauses, Srivastav (1991) presents an alternative where what the correlative clause binds in its associate is not a free variable ex nihilo but is in fact created by the demonstrative determiner of the NP. I favor a third possibility which was actually briefly put forward by Cooper himself (1975, 258f). When the free variable inside the noun phrase is not bound off by a relative clause, he suggests, it may represent the contextual restriction of the NP-interpretation to a specific restricted set of entities.[27] The need for such restrictions has been discussed in some recent work on generalized quantifiers (Westerståhl 1985, Johnsen 1987) and can be traced all the way back to early contributions to logical theory by Wallis, Boole, and de Morgan.

The idea then is that free exceptives have access to the Cooper variable. A free variable R of type $\langle e, t\rangle$ is introduced into the translation which is conjoined with the denotation of the common noun. The free exceptive gets quantified into the free variable R inside the quantifier. The semantic effect is that of set subtraction, as specified in the semantics in (38). For a structure in (41a) we then get the interpretation in (41b).[28]

(41) a. $[_{NP}$ [except for John] $[_{NP}$ [Det every] $[_{N'}$ student]]]

b. $[\![\text{except for John}]\!]\ \lambda R([\![\text{every}]\!]([\![\text{student}]\!] \cap R))$

$\Leftrightarrow [\![\text{every}]\!]([\![\text{student}]\!] \cap \overline{\{j\}})$

$\approx$ 'every student who is not John'

3. Conclusion And Speculations

This paper will end with a flurry of rather speculative activity — but before that a summary of the main results. I showed for the first time that it is possible to give a uniform compositional derivation of the meaning of both *every student but Kim* and *no student but Kim*. The semantics of exceptives is primarily one of subtraction from the domain of a quantifier. The crucial semantic difference between *but*-phrases and free exceptives is that the former have the uniqueness condition as part of their lexical meaning whereas the latter are mere set subtractors. Several empirical differences between the two types of exceptives were shown to follow from this basic lexical difference. Beyond the specific analyses proposed, I have aimed to show that the study of exceptives and, in general, domain restrictors on quantifiers can serve as a probe into quantificational structures.

One part of what remains to be done is to extend the empirical coverage by exploring related constructions. Various other types of exceptives (English *besides*, German *außer*, Dutch *behalve*) seem to present slight semantic variations on the theme struck by *but*: (42) shows that *besides* can co-occur with numeral quantifiers (what *is* the relation between counting and quantifying?). An idea sketched in von Fintel (1989) is that instead of the Uniqueness Condition the *besides*-exceptives impose mere minimality.

(42) Besides John, five other students attended the meeting.

We will also have to explore the syntax and semantics of the adjectives *other* and *else*. As a desirable side-effect the behavior of *else* may provide insights into the syntactic structure of quantified noun phrases, since it only occurs with compound quantifiers like *everyone, somewhere*, etc. (cf. **every student else*). Another interesting question concerns the relation between exceptives and the adverb *almost*, which may also be analyzed as marking the existence of exceptions to a generalization. Then we will have to explore the connection between my analysis of exceptives and the idea proposed by Nirit Kadmon and Fred Landman (1990) that the semantics of *any* can be seen as marking a generalization as exceptionless. Lastly, exceptives seem to be related to the exclusive particle *only* in a sense that needs to be clarified. Of special interest are languages like French (*ne ... que*), Arabic, and Irish that employ the collocation of negation and exceptive to express 'only'.

The other big outstanding issue concerns the detailed interface between the semantic notions explored here and the syntax of quantification. Several specific problems in this respect have already been mentioned in passing above. A fascinating question is whether there is any connection between the lexical difference in meaning between *but*-phrases and free exceptives (presence vs. absence of the Uniqueness Condition) and their different syntactic status. Could it be that it is precisely their semantic weakness that allows free exceptives to be syntactically "free," i.e. to be sentence adjuncts, although they take a quantifier as their semantic argument?

Again, this is not the place to develop this in any detail. But let me suggest that there may indeed be such a connection. Chierchia (1984, 74–90) has some thoughts about the status of the hierarchy of logical types.[29] There are, Chierchia says, basically three levels of natural language meanings: entities, properties, and functors. The third layer, the level of functors, is the exotic one. He proposes that there can be no variables of a functor type:[30]

(43) *The "No Functor Anaphora Constraint" (Chierchia 1984)*
Functors do not enter anaphoric processes in natural languages.

Among the consequences of this constraint are the absence of *wh*-questions for determiners and for nonpredicative adverbs like *almost*, and other previously mysterious properties of natural language. Considering that the mechanism of allowing modifiers access to the Cooper variable is essentially an anaphoric process, we might assume that for such a variable the constraint will ensure that it can only be a set variable of type $\langle e, t\rangle$. Remember that the Uniqueness Condition grammaticized in the lexical meaning of *but* forces us to give the *but*-phrase a functor type considerably higher than $\langle e, t\rangle$. We could say that an exceptive could only be enforcing the Uniqueness Condition if it directly takes a determiner as its argument, and that only exceptives that do nothing more than domain subtraction could make do with the Cooper variable. Then, indeed, it would be their semantic weakness that allows free exceptives their freedom.

This is admittedly only the bare beginning of an account. There needs to be much more careful scrutiny of the syntactic behavior of *but*-phrases and free exceptives (e.g., why can *but*-phrases appear in right-extraposed position if they need to take a determiner as their direct argument?). The exciting prospect, however, is that this investigation may open up the possibility of reconstructing at least part of the notion of grammaticization in a formal framework.

NOTES

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[1] This distinction between connected and free exceptives was first clearly stated by Hoeksema (1987).

[2] For an initial overview of the medieval literature see Kretzmann (1982). I hope to be

able to discuss the medieval treatments elsewhere soon. Modern references include: Keenan and Stavi (1986), Hoeksema (1987, 1990), von Fintel (1989, 1991a), Landman and Moerdijk (1979), Reinhart (1989).

[3] The principal references on generalized quantifiers are Barwise and Cooper (1981), Keenan and Stavi (1986), and Westerståhl (1989). Throughout this paper, I will employ the notational framework of Barwise and Cooper instead of Keenan's Boolean semantics or the lambda-expressions of Montague semantics. Everything here should be straightforwardly translatable into the other frameworks.

[4] There do seem to be speakers with a very "weak" semantics for *but*:

(i) I don't usually feel so good about myself after I've made it with someone but Harvey. (Robert B. Parker, *Promised Land* [Dell, 1976], p. 166)

Here I will describe the "strong" dialect only, for which the Keenan-Stavi semantics seems to be a justifiable idealization.

[5] Another twist in the initially straightforward meaning of exceptive sentences may come from an expression very familiar from the idiolect of logicians.

(i) *a* coincides with *b* everywhere except possibly at *c*.

The adverb *possibly* in (i) has a very strange effect. The closest paraphrase may be disjunctive as in (ii).

(ii) *a* coincides with *b* everywhere or *a* coincides with *b* everywhere except at *b*.

Something similar would have to be said about (iii a):

(iii) a. John and possibly Mary will be here.
b. John or (John and Mary) will be here.

In this paper, I will ignore this issue.

[6] ⟦every⟧ is defined in (8) in a way different from but equivalent to the standard formulation (⟦student⟧ $\subseteq$ P); the definition given here has the advantage of making the fundamental similarity between *every* and *no* more obvious.

[7] Barwise and Cooper (1981) use the term 'anti-persistent'.

[8] Again, this only holds for the strong *but*-dialect. Speakers of the weak dialect apparently find the inference in (14) good.

[9] The 'persistent' ones in Barwise and Cooper's terminology.

[10] Under at least one reading. There are arguably other uses of *many* where it would not be monotone; cf. Partee (1988).

[11] The particular way of stipulating the co-occurrence restrictions of *but* that Hoeksema proposes is that *but* only gives a defined result if the determiner is both left-downward monotone and left-additive (these are the so-called 'idealizing' determiners). He refers to a result by van Benthem (1984, 458), who had shown that under some general constraints on quantifiers (Conservativity, Quantity, Variety), the following theorem holds: "On the nonempty sets, the only idealizing determiners are *all* and *no*." An anonymous reviewer points out that Variety is such a strong restriction that its empirical usefulness is doubtful.

[12] The set-theoretic tautologies employed are:

(i) $X - Y \subseteq Z \Leftrightarrow X \cap \bar{Z} \subseteq Y$

(ii) $\forall Y (X \subseteq Y \Rightarrow Z \subseteq Y) \Leftrightarrow Z \subseteq X$

(iii) $X \subseteq Y \,\&\, Y \subseteq X \Leftrightarrow X = Y$

[13] Some worrisome cases remain. English possesses some partial universal determiners (*both*, *neither*), which resist collocation with *but* although they presumably give rise to unique exception sets. An anonymous reviewer points out, however, that while (ia) is clearly ungrammatical, (ib) sounds more like a joke (similar to # *all but one of my two*

students passed as opposed to *all but one of my ten students passed*); note also the childhood riddle in (ic) pointed out to me by Barbara Partee:

(i) a. *I know most linguists but John.
b. # I know both linguists but John.
c. Q: How are Lincoln and Washington alike?
A: # They both have beards except Washington.

Another problem (discussed briefly by Hoeksema 1990) concerns the behavior of the nonuniversal mass quantifier *little*, which does co-occur with *but* as (ii) shows:

(ii) We had little choice but to comply.

Let me just note here that this construction seems fairly idiomatic and does not appear productive: *? *I had little furniture but two chairs and a futon.*

[14] An interesting topic for further research will be to explore the implications of the notion of exception for the theory of natural language determiners in general. What is the connection between the conception of universal determiners as those with unique exception sets and other possible characterizations?

[15] Two anonymous *NLS* reviewers point out the parallels between my account of the co-occurrence restrictions of *but* and that of Barwise and Cooper.

[16] This account would have to be refined in the light of an explicit theory of rhetorical questions, which as far as I know does not yet exist, and located within a formal semantics of interrogatives, which opens another can of worms. As Barbara Partee (pers. comm.) points out to me, the semantics for exceptives proposed here would seem to preclude an interpretation of *who* in (27a) as an existential quantifier, because otherwise the co-occurrence restrictions of *but* would not be fulfilled. I can only suggest that an approach along the lines of Berman (1990), who treats *wh*-phrases as free variables, might turn out to be compatible with my account.

[17] There is some evidence that would at first glance argue that it is inescapable to give *but*-phrases the syntactic status of NP-modifier. The problem arises with exceptives modifying portmanteau quantifiers like *everybody*. Since it seems ludicrous to analyze the phrase in (ia) as in (ib) by splitting up the word *everybody* into its putative components, the argument goes, the *but*-phrase must be able to modify an NP.

(i) a. everybody but John
b. every (body but John)

The proper analysis of these portmanteau quantifiers or compound pronouns is far from obvious, though, and could be the topic of some fruitful research. I expect some forthcoming analysis to justify the decomposition in (ib) in a principled way. Some initial suggestions may be found in Emonds (1985, 162, 204, 207), Abney (1987, 285ff), McCawley (1989, 130ff).

[18] Another argument for the NP-modifierhood of *but*-phrases (brought forth by Hoeksema 1990) will also have to be defused. This concerns the possibility of sentences like (i) which are parallel to similar cases with relative clauses as in (ii):

(i) Every man and every woman but Adam and Eve were born in sin.

(ii) The boy and the girl who dated each other are friends of mine.

The study of the so-called 'hydras' as in (ii) will hopefully shed light also on (i); cf. for some discussion Link (1984) and Hoeksema (1986).

[19] Or 'schönfinkelizations', as Angelika Kratzer (pers. comm.) reminds me.

[20] Such local wrappings are presumably independently motivated by constructions like *an easy rug to clean* or *the first person we talked to* (Ed Keenan, pers. comm.). For references

on the status of discontinuity in the theory of grammar see the contributions in Huck and Ojeda (1987), Blevins (1990), and most recently Hoeksema (1991). See also Bach (1979, 1981) on the Right Wrap operation, which has been taken up in the HPSG framework.
[21] There is one place in the literature I am aware of where this type is discussed. Partee and Rooth (1983, 374ff) cite a manuscript by Robin Cooper where he proposes to analyze the reading of (i) where it means "most men swim and most women swim" by raising the type of the common noun phrase.

(i) Most men and women swim.

Partee and Rooth discuss some of the issues that arise from admitting such type-raising.
[22] Emmon Bach (pers. comm.) suggests to me that this may be just a variant of the afterthought/repair type. At this point, I do not know how to defend the intuitive distinction I make in the text.
[23] I am indebted to Hotze Rullmann for this point. Roger Higgins (pers. comm.) points out to me that with more clearly sentential exceptives we do get oddness:

(i) *?Ignoring John, everybody likes John.

[24] See also Kempson (1991).
[25] That article was an elaboration of Appendix A of Cooper's dissertation (Cooper 1975).
[26] Some discussion can be found in Janssen (1983) and Partee (1984). Variations of the Cooper-variable approach are proposed in McCloskey (1978) and Jacobson (1983, 1984). At this point an explicit fragment would of course be helpful; but that is an enterprise I will have to leave to a future occasion.
[27] Cooper refers to a similar suggestion made by Vendler (1967) who used an unexpressed relative clause to introduce the implicit restrictions on definites. Another early reference is Hausser (1974).
[28] A further complication would have to be added for stacking of various modifiers that demand access to the Cooper variable (Bach and Cooper already discuss the possibility of stacking relative clauses). The obvious solution is to have every modifier that binds the variable R introduce a new one in turn. Looking at various ways of stacking R-binders, it seems that there are two combinations that are not so good. Free exceptives and *but*-phrases don't co-occur easily, which may be because pragmatically they compete for the same meaning. It may also be that *but*-phrases and extraposed relatives do not go together well (although the judgments are unclear), which may be because of some stylistic condition on extraposition. Thus consider the examples in (i) (most of these are due to Angelika Kratzer, pers. comm.).

(i)
a. Except for Joan, all students attended, unless they had been told to stay away.
b. Except for Joan, there were no students left who still remembered the furlough.
c. Except for this one, we will return all letters if they don't have sufficient postage.
d. *?Except for Joan, all students but Jill attended.
e. No student but Joan who was in good standing left the program.
f. All the letters but this one that don't have sufficient postage have to be returned.
g. ?No student but Joan left the program who was in good standing.

[29] Chierchia's ideas are inspired by Jespersen's hierarchy of primaries, secondaries, and tertiaries (Jespersen 1924, Ch. 7). I am very grateful to Paul Portner (pers. comm.) for reminding me of Chierchia's discussion.
[30] The use of a free variable to stand in for the choice between a number of sentential

connective meanings (*because*, *in spite of*, ...) by Stump (1981, 1985) in his treatment of the interpretation of free absolutes and adjuncts might be a counterexample. I suspect, though, that his use of a free variable is rather different from the one discussed here. His variable is not subject to *wh*-movement, anaphora, or binding. Still, this whole area needs further attention. For some critical comments on Stump's analysis see Partee (1984). Angelika Kratzer (pers. comm.) points out two further potential problems with it: *only* seems to be able to associate with focused determiners or focused bound variable pronouns, and functional questions seem to *wh*-move functors.

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ABSTRACT

For the first time a uniform compositional derivation is given for quantified sentences containing exceptive constructions. The semantics of exceptives is primarily one of subtraction from the domain of a quantifier. The crucial semantic difference between the highly grammaticized *but*-phrases and free exceptives is that the former have the Uniqueness Condition as part of their lexical meaning whereas the latter are mere set subtractors. Several empirical differences between the two types of exceptives are shown to follow from this basic lexical difference.

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