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PRESUPPOSITION INCORPORATION IN ADVERBIAL QUANTIFIER DOMAINS *

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Abstract

This paper proposes a novel solution to the problem of determining the domain of an adverbial quantifier. We observe that adverbial and nominal quantification differ with respect to their ability to incorporate presuppositions into their domain restrictions, and we use that observation to motivate an account of qadverbs as quantifiers over polar alternatives. Along the way to explaining incorporation, we also provide an analysis of presupposing achievement verbs that clarifies the connection between presupposed and asserted situations.

1 Introduction

At first glance, adverbial and nominal quantification appear to differ in their interaction with presupposition. Presuppositions in the scope of a QNP cannot further restrict the domain of the quantifier, whereas some presuppositions in the scope of a qadverb obligatorily restrict the domain. We present an account of adverbial quantification that resolves this apparent difference.

2 Motivating data

Schubert and Pelletier (1987) and Berman (1991) point out that certain presuppositions triggered in the scope of a qadverb seem to be incorporated into the restrictor of the qadverb. Consider the sentences in (1).

(1) a. Canada Post sometimes loses letters. (Schubert and Pelletier 1987, (234))
b. John usually beats Marvin at ping pong. (Schubert and Pelletier 1987, (235))
c. John usually manages to see a film by Fellini. (Berman 1991, (56))
d. John usually finishes reading an article by Chomsky. (Berman 1991, (55))

Sentences (1a), (1b), and (1c) are all examples of what Schubert and Pelletier call presuppositional verbs. In each case, the verb gives rise to a presupposition which provides the restrictor material for the qadverb. Thus, the presupposition of sentence (1a) is that the Canada Post has some letters to begin with; the presupposition of sentence (1b) is that

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John plays ping pong with Marvin sometimes; and the presupposition (1c) is that John sometimes tries to see a film by Fellini. Sentence (1d) contains an aspectual verb, *finish*, which triggers the presupposition that the event it modifies has started. Thus, in this example, it is situations in which John starts reading an article by Chomsky that form the domain of quantification for *usually*.

These examples seem to demonstrate that presuppositions can easily be incorporated into qadverb domains. The same cannot be said of qdeterminer domains. Sentence (2), adapted from Beaver (1994), demonstrates the unavailability of presupposition incorporation in QNPs.

(2) a. Few team members have cars,
b. #but every team member came in her car.

If incorporation of the presupposition triggered by *her car* were available, we would expect that this sentence should have a reading roughly equivalent to (3).

(3) Few team members have cars, but every team member who has a car came in her car.

Clearly, though, sentences (2) and (3) are not equivalent.

As it turns out, the situation is not entirely straightforward with qadverbs. With an explicit restrictor for the qadverb (i.e., a restrictive *when*-clause), we see a similar failure of incorporation.

(4) a. When John and Marvin meet, they rarely play badminton.
b. #When they meet, though, John always beats Marvin at badminton.

If the presupposition triggered by *beat* could be incorporated in the restrictor of (4b), we would expect that it would be roughly equivalent to sentence (5).

(5) When they meet and they do play badminton, John always beats Marvin.

In fact, though, as in (2), such incorporation is not available in (4b).

When we compare examples of qdeterminers and qadverbs without explicit restrictors, we see divergent behavior.

(6) a. Few team members can drive,
b. #but each will arrive in her car.

(7) a. When John and Marvin meet, they rarely play a game of badminton.
b. John always beats Marvin at badminton, though.

In sentence (6), we see that the presupposition triggered by *her car* cannot be incorporated into the restriction of *each*. In sentence (7b), however, the domain of *always* is taken to be those situations in which John and Marvin do play badminton: thus, the presupposition triggered by *beat* is incorporated into the restrictor.

We see further that this phenomenon of presupposition incorporation can force the domain set itself to bridge to a subset of an existing set.

(8) a. When John and Marvin meet, they play various games.
b. John always beats Marvin at badminton.

Sentence (8a) makes available two sets of situations for subsequent reference: those situations of John and Marvin meeting and those situations of John and Marvin playing games (each member of this second set is a sub-situation of some member of the first). The domain of (8b), however, is not resolved directly to either of these sets. Instead, the domain bridges to a subset of the set of situations of John and Marvin playing games—those situations in which they play badminton. This fact plays a role in our evaluation of other analyses of this phenomenon in section 3.

3 Previous approaches

In this section, we review several approaches to the problem of presupposition incorporation in quantifier domains (section 3.1) and point out several shortcomings of these analyses (section 3.2). We also briefly discuss another theory of adverbial quantification that does not directly address presupposition incorporation but that is related to the analysis we present in this paper (section 3.3).

3.1 The empty-restrictor hypothesis

According to the binding theory of presupposition (van der Sandt 1992), together with the standard assumption that the restrictor of a quantifier is accessible to the nuclear scope, presupposition incorporation can be seen simply as the accommodation by the restrictor of presuppositions triggered in the nuclear scope. Proceeding from this observation, several accounts of adverbial quantification have been given in which the restrictor of a qadverb is simply an empty DRS that may accommodate scopal presuppositions, thus incorporating them into the domain restriction (Kuhn 1996, Ahn 2001).[1] We refer to this basic analysis in which qadverb restrictors are initially completely unspecified as the *empty-restrictor* hypothesis.

In light of evidence that incorporation is not possible for qdeterminers (e.g., sentence (2) above), Geurts and van der Sandt (1999) present a revised account of the binding theory in which left-to-right resolution order is enforced and the restrictor of a quantifier is itself a presupposition that must be resolved to an accessible domain. On this account, the accommodation of nuclear scope presuppositions by the restrictor actually results in the accommodation of such presuppositions by the antecedent domain set to which the restrictor has been resolved. Such accommodation, then, may be blocked because of inconsistency with the antecedent set. For example, in (2), the restrictor of *every* is first bound to the set of team members introduced in the first half. The presupposition triggered by *her car* must then be resolved. Accommodation by the restrictor is not an option, because, while

[1] von Fintel (1995) can also be seen as a variant of this view, although not couched in the framework of the binding theory.

the presupposition of car ownership is compatible with the restrictor material alone, it is inconsistent with the set to which the restrictor has been resolved.

While this account seems right for QNPs, Geurts *et al.* simply adopt an empty-restrictor representation for qadverbs, which results in incorrect predictions. According to their account, the restrictor of *always* in (8b) would first be resolved to the various games John and Marvin play. The presupposition that John and Marvin play badminton would then be accommodated by the restrictor, resulting in a reading on which all of the various games are badminton. As we have noted, though, on the reading that is actually preferred, however, the presupposition incorporated into the restrictor guides the resolution of the restrictor, so that the domain of *always* bridges to the antecedent set through the subset relation.

3.2 Shortcomings of the empty-restrictor hypothesis

According to the variations on the empty-restrictor hypothesis reviewed above, a qadverb does not have a meaningful restrictor until it has accommodated some of its nuclear scope presuppositions. While these theories do provide some explanation of how qadverb domains are determined, they also suffer from a variety of problems, some of which we have already mentioned.

First of all, the empty-restrictor hypothesis is subject to the problem that, as laid out in section 2, qadverbs and qdeterminers appear to behave differently with respect to accommodation of nuclear scope presuppositions. The standard binding theory account (Kuhn 1996, Ahn 2001) stipulates that qadverb and qdeterminer logical forms, which are otherwise identical, must be somehow distinguished for the purposes of presupposition resolution. The revised account (Geurts and van der Sandt 1999) does not distinguish qadverbs and qdeterminers and, as a result, makes incorrect predictions about the binding of qadverb domain set presuppositions.

The empty-restrictor hypothesis is also subject to the problem that although intermediate accommodation is supposed to be dispreferred to global accommodation (van der Sandt 1992), it appears to be necessary to explain presupposition incorporation. Neither variant of the hypothesis makes any attempt to explain why this preference should be violated.

Finally, both variants of the hypothesis distinguish between what is traditionally considered to be nuclear scope material and the actual nuclear scope of a qadverb's logical form. In particular, they take the nuclear scope set of a qadverb to be composed of those situations characterized by the restrictor that can somehow be extended to satisfy the nuclear scope material.

For example, consider the sentence (9).

(9) When a farmer beats donkey, he always receives a citation.

On the traditional view of adverbial quantification, in which the qadverb quantifies over free variables introduced by indefinites in the restrictor (Lewis 1975), the restrictor material consists of the *when*-clause, *when a farmer beats a donkey*, while the nuclear scope material consists of the main clause, *he always receives a citation*.

According to the variants of the empty-restrictor hypothesis (as well as any other situation-

based accounts of adverbial quantification, such as Heim (1990) and von Fintel (1995)), though, the restrictor material has to be included, along with the nuclear scope material, in the actual nuclear scope of the logical form representation. If it were not, the qadverb would be rather hopelessly comparing two completely disjoint sets of situations—situations of a farmer beating a donkey and situatons of someone receiving a citation.

The idea of requiring restrictor material to be in both the restrictor and the nuclear scope is not a new one. Both in order to preserve conservativity for qadverbs and in order to get binding facts right, the restrictor material is often assumed to be carried over into the nuclear scope (Schubert and Pelletier 1989). In the empty-restrictor hypothesis, the mechanism by which the restrictor material ends up in both places is novel (i.e., by starting out there to begin with), but the end result is the same.

Given the kind of situation theories in which these versions of the empty-restrictor hypothesis are couched (Kratzer 1989, Schubert 2000), the notion that a nuclear scope situation is simply a restrictor situation that can be extended to a situation that satisfies the nuclear scope material is problematic. In these situation theories, the set of situations is closed under arbitrary mereological joins, though, so *any* situation can be extended to *any* other situation, without any additional stipulations.[2] Thus, matching each restrictor situation to the "right" nuclear scope situation is a challenge.

Sharing arguments through dynamic binding does help cut down on the possible extensions, but it is possible for a qadverb restrictor and nuclear scope not to share any variables at all. Consider sentence (10).

(10) When Sue leaves, John always sighs.

The two clauses of this sentence do not even have to share a temporal parameter, making an account that simply relies on extending restrictor situations into nuclear scope situations untenable (in this sentence, for example, even if there are many situations of Sue leaving and only one of John sighing, without any further stipulations, each situation of Sue leaving could be extended to one that includes the same situation of John sighing, thus (incorrectly) satisfying the quantification).

The empty-restrictor hypothesis also suffers from a more conceptual problem: in order for an adverbially quantified sentence to obtain any meaningful semantic interpretation, a pragmatic repair operation—accommodation—is required. Prior to accommodation, the representation of an adverbially quantified sentence involves a completely trivial restrictor.

3.3 Focus and alternatives

The analysis of adverbial quantifiers we give in section 4 is based on the idea that qadverbs, rather than starting out life with a trivial empty restrictor that is filled in through accommodation, quantify directly over a set of alternatives. As Rooth observes, qadverbs are focus-sensitive—their domains depend partly on the focus structure of their scope. On his view of focus, it principal purpose is to evoke alternatives (Rooth 1985, Rooth 1992).

[2] As von Fintel (1995) puts it, "there is a situation that contains all and only my left earlobe, the square root of 2, and Brutus stabbing Caesar."

Thus, in Rooth (1995), he gives an account of qadverbs as quantifiers over these alternatives. He takes the restrictor of a qadverb to be a free variable, much as in the empty-restrictor hypotheses. This free variable, though, is subject to restriction by the focus semantic value of the scope of the qadverb. Since the principal function of focus is to evoke alternatives, the focus semantic value of a sentence is the set of alternative propositions generated by substituting for the focused constituent. A qadverb, then, quantifies over this set of alternative propositions.

For example, consider sentences (11a) and (11b), which differ only in their stress placement (marked by the brackets and subscript F).

(11) a. In St. Petersburg, an officer always escorts [a ballerina.]$_{\mathrm{F}}$
b. In St. Petersburg, [an officer]$_{\mathrm{F}}$ always escorts a ballerina.

In (11a), the focal stress on the *a ballerina* evokes a set of (contextually dependent) alternatives to a ballerina; the qadverb *always*, then, quantifies over (potential) situations of an officer escorting any of these alternatives. Similarly, sentence (11b) quantifies over situations of ballerinas being escorted by alternatives to officers.

This focus-based theory of adverbial quantification does not directly address the problem of incorporating verbal presuppositions, but it does suggest another way of looking at the problem of incorporation, which we explore in the rest of this paper. We come back to the question of focus—in particular, its interaction with presupposition incorporation—in section 5.

4 Polar alternatives

Instead of thinking of presupposition incorporation in adverbial quantification as unmotivated intermediate accommodation, as in the empty-restrictor hypothesis, we propose a novel account on which the restrictor of a qadverb quantifies directly over alternatives of the nuclear scope. Thus, the presuppositions triggered by the nuclear scope are also triggered *within the restrictor*. Incorporation, then, is dependent on the interaction of the trapping constraint on presuppositions (van der Sandt 1992) and the pluarlity condition on quantifier domains (de Swart 1991).

On our account of adverbial quantification, restrictors do not start out life empty. Instead, we take as our starting point Rooth's idea that qadverb domains are sets of alternatives. What we propose here is that a qadverb domain *description* (i.e., a qadverb restrictor) consists of the disjunction of a minimal set of alternative propositions—what we call the *polar alternatives* of the scope. In particular, these alternatives are expressed by the scope of the quantifier and its negation. Thus, in gross outline, the semantic representation of *always S* would be the formula (12), where '::' represents a situation description operator.

(12) $\forall(x, x :: (\llbracket S \rrbracket \vee \neg\llbracket S \rrbracket), x :: \llbracket S \rrbracket)$

Note that our account is embedded in a situation theory in which the description relation between situations and sentences—*characterization*—is partial (Schubert 2000, Ahn and Schubert 2003), so that the disjunction in the restrictor is non-trivial. In fact, such a disjunction must minimally satisfy the presuppositions of positive disjunct. Thus, the

restrictor always shares the presuppositions of the nuclear scope. (See Ahn (2004) for more details on extending DRT with this situation theory.)

Note that these polar alternatives can be determined semantically, without recourse to pragmatics or world knowledge, which means that a meaningful logical form for adverbial quantification can be obtained without requiring pragmatic operations. This is not to say, though, that pragmatics and world knowledge play no role in adverbial quantification; in fact, they are crucial in determining the actual domain set. On our analysis, though, it will be clearer what exactly their role is.

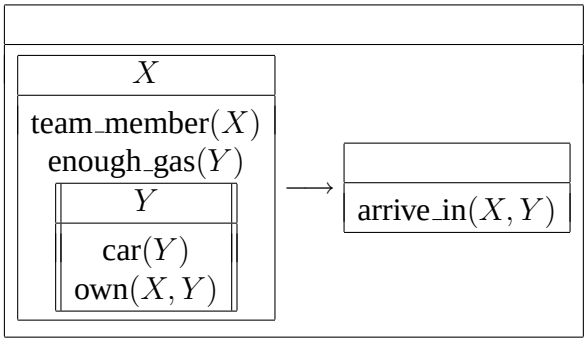
Given this initial representation, our explanation of incorporation depends on three factors: trapping, a pluarlity condition on quantifier domains, and the structure of the presuppositions triggered by presuppositional verbs. We discuss each of these factors in turn.

The trapping constraint is part of the standard binding theory (van der Sandt 1992) and states simply that presupposition resolution cannot create free discourse referents. To see how trapping works in QNPs, consider sentence (13).

(13) Few team members have cars, but every team member who has enough gas in her car will arrive in her car.

This sentence does not have the incoherence of (2). The presupposition triggered by the occurrence of *her car* (the DRS with double lines in (14)) in the restrictive NP *every team member who has enough gas in her car* contains X, the discourse referent introduced by the quantifier, and thus it is trapped in the restrictor and obligatorily restricts the quantification to those team members who own cars.

(14)



The plurality condition on quantifier domains is due to de Swart (1991). It states simply that a quantifier cannot felicitously quantify over a set if it is known that the set's cardinality is less than two. In order to support this condition, de Swart adduces examples such as (15), for nominal quantification, and (16), for adverbial quantification.

(15) a. #Every mother of Mary got a present.
b. Every mother of a linguist got a present.

(16) a. #When Mary knows French, she always knows it well.
b. When Mary speaks French, she always speaks it well.
c. #When Anne made "Dangerous liaisons," she always recommended it to her friends.

The sentences in (15) demonstrate the condition clearly: Mary can be generally assumed to have only one mother, thus, the domain of *every* in (15a) is known to be a singleton set, and hence the use of the quantifier is infelicitous. Similarly, in (16), we see that adverbial quantification is infelicitous for restrictors that describe "once-only" predicates (regardles of whether they are stage- or individual-level).

The final piece in our presupposition incorporation puzzle is the content of the presuppositions that actually get incorporated. Note that all the presupposition triggers in (1)—*lose*, *beat*, *manage*, *finish*—have something in common: they are all achievement verbs, and what they are normally taken to presuppose is the state of activity leading up to the achievement. Thus, *lose* presupposes a state of possession, *beat* presupposes an activity of game playing, and so on. We take the position that there is an additional component to the presupposition besides the mere existence of an appropriate eventuality—a culmination relation holding between the *presupposed* eventuality and the eventuality described by the trigger (what we will call the *asserted event*).

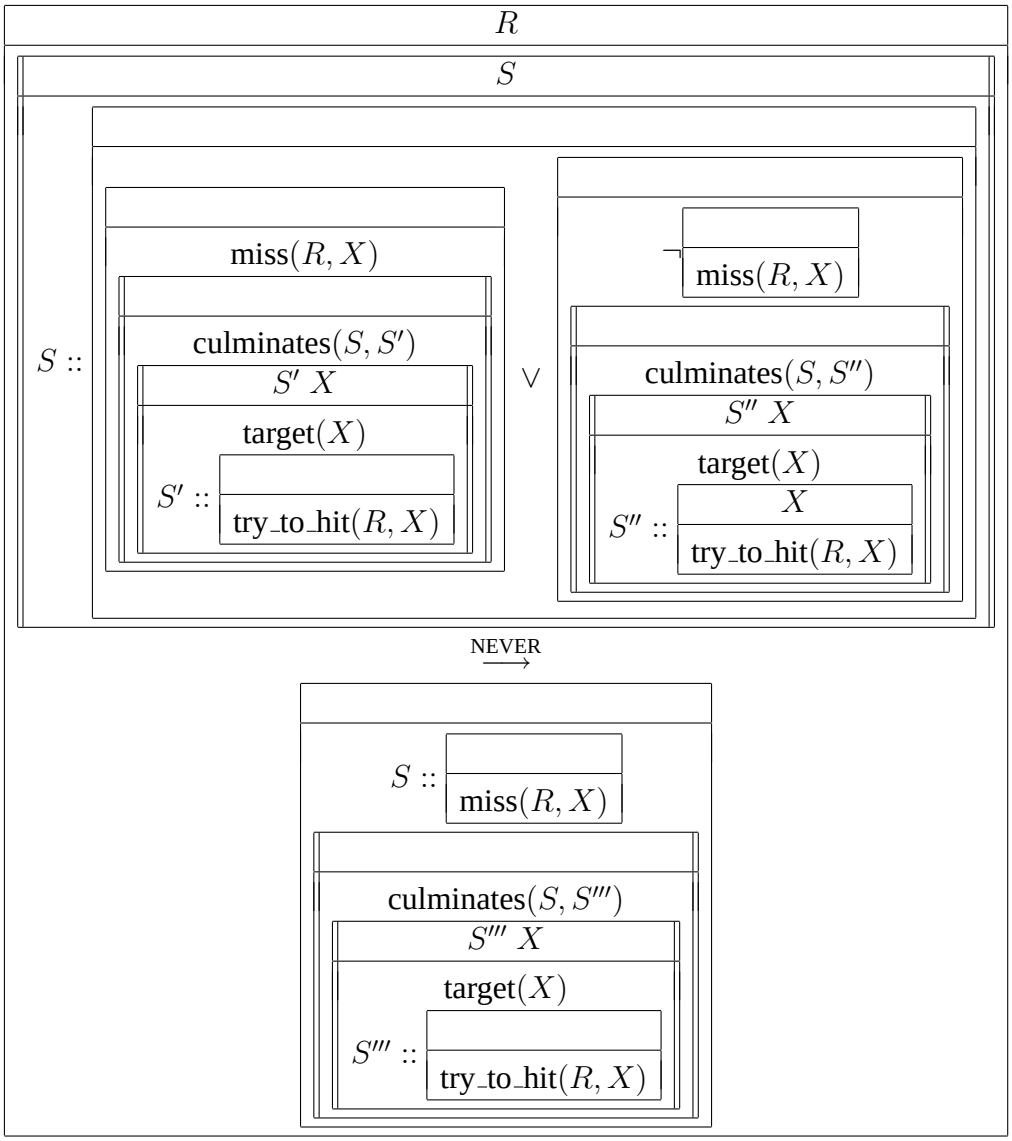
One important charateristic of this culmination relation is that it is, in a sense, functional. In other words, for any given eventuality, there is at most one culminating event. For example, a game of John and Marvin playing ping pong has at most one culmination—an event of John winning, an event of Marvin winning, or an event of the game ending in a tie. Similarly, while a state of the Canada Post possessing a particular letter may never culminate (i.e., the state may persist forever), but if it does, it does so only once. Once the possession has ended (in a losing event, for instance), and re-possession of the same letter is a distinct state.

So, how do our three elements combine to force incorporation? Consider a simple adverbially quantified sentence, such as (17).

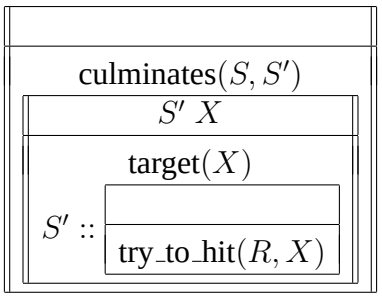
(17) Robin Hood never misses.

The preliminary DRS for this sentence is given as (18).

(18)



(19)

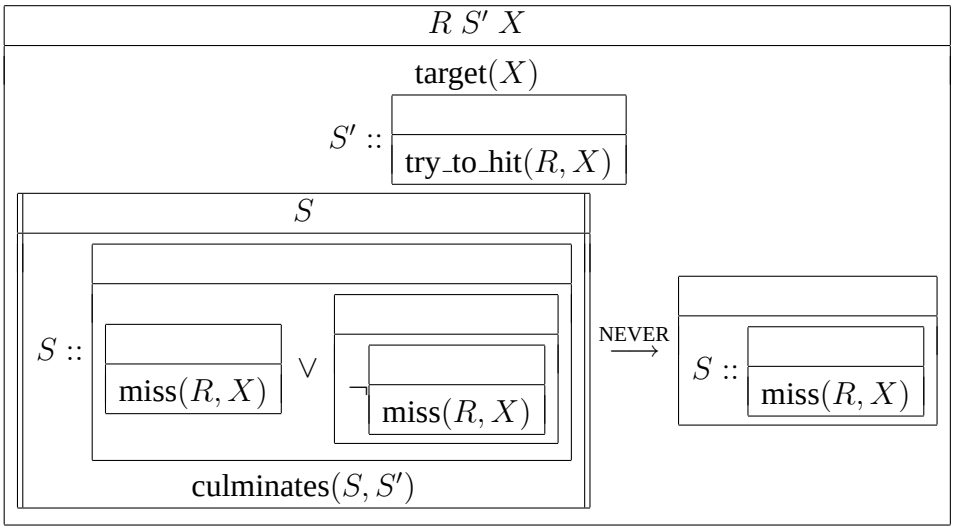


Now, first of all, note that the same presuppositional DRS triggered by *misses* (repeated as (19)) occurs three times: twice in the restrictor and once in the nuclear scope (with distinct presupposed referents). Further, note that the culminating event argument of the presupposed culmination relation is S, the variable of quantification introduced by the quantifier. Thus, at least the culmination relation must be trapped in the restrictor.

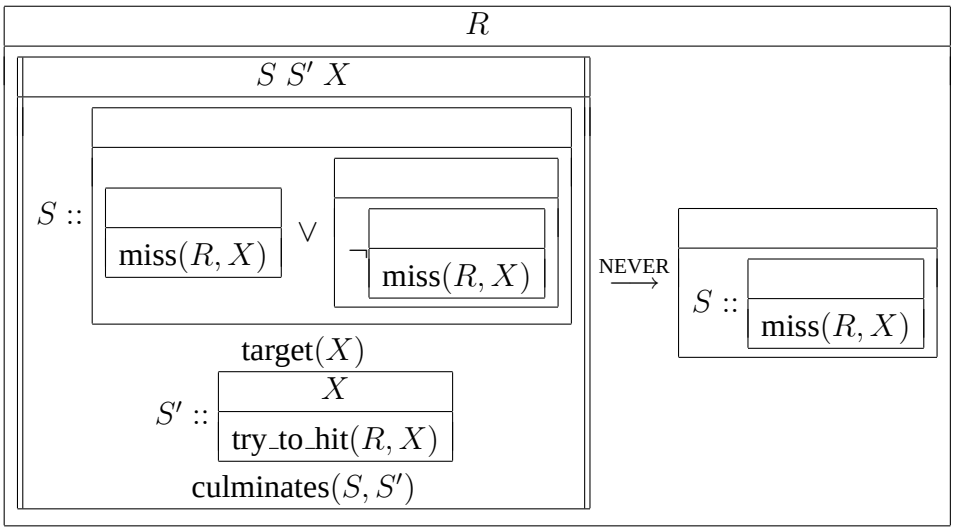
According to the standard binding theory, binding of presuppositions is preferred to accommodation, and, if accommodation is required, global accommodation is preferred to local. Since the three presuppositions triggered by *miss* are identical, resolution options

in which only one of the presuppositions is accommodated and the others are bound to that one are generally preferred. Given that the restrictor of the quantifier is accessible to the nuclear scope and not *vice versa*, the two most highly preferred readings are (20a) and (20b), in that order (note that we are glossing over the resolution of the discourse referent for the target).

(20) a.



b.



Of the two readings, the second most preferred reading, DRS (20b), is actually the reading we would like to obtain. Happily, though, the plurality condition rules out (20a). Consider the interpretation of DRS (20a): there exists a target X and a (single) situation S' such that S' is a situation of Robin Hood trying to hit X. Now, the quantifier NEVER quantifies over the set of situations S, such that S is either a situation of Robin Hood missing the target or of Robin Hood not missing the target and, crucially, S culminates S'. But we know that the culmination relation is functional, so that there is at most one culmination of S'. Since S' only refers to a single situation, then, this reading is infelicitous, and we are left with DRS (20b) as the most preferred reading.

This account of adverbial quantification is compatible with the general picture of the interaction between quantification and presupposition presented in (Geurts and van der Sandt 1999). Note that DRSs (20a) and (20b) are actually only partially resolved. The

restrictor itself is still an unresolved presupposition, which must be bound to a set in context or accommodated. Note, though, that on our account, unlike the empty restrictor account, the restrictor of a qadverb always contains the exactly information necessary to guide resolution, including possible bridging, to an antecedent domain.

5 Interaction with focus

One thing we have not considered so far in our analysis of adverbial quantification is the interaction of presupposition incorporation with focus. Consider the discourse in (21).[3]

(21) a. When John and Marvin meet, John always beats Marvin at some game.
b. He usually beats him [at badminton]$_{F.}$

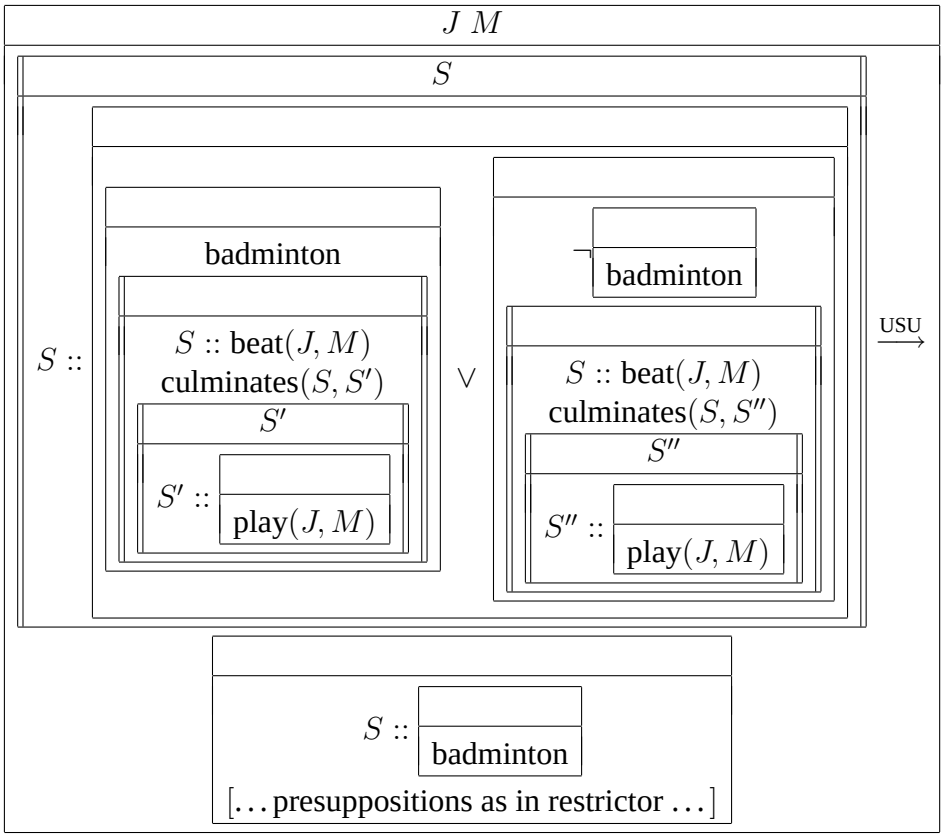
The domain of *usually* is *not* a set of situations of John and Marvin playing badminton, as you might expect from the the analysis presented so far. Instead, it is the set of situations of John beating Marvin at some game, as the association-with-focus account would predict. The question for our polar alternative account, then, is: what happens to the presupposition triggered by *beat*?

The answer we advance here is that focus is presuppositional and thus has a direct effect on the presupposition triggered within a sentence (Geurts and van der Sandt 2004).[4] In particular, we claim that the focus-based division of material into presupposed and asserted content precedes the computation of verbal presuppositions. Thus, in (21b), the focal stress induces a division of the scope into presupposed material (i.e., that John beats Marvin at something) and asserted material (i.e., that that "something" is badminton). Only then is the presupposition triggered by *beat* computed: that John and Marvin play "something" and that this playing situation is culminated by the (also presupposed) situation of John beating Marvin at "something." A rough preliminary representation of (21b) is given in (22).

[3] Adapted from Orin Percus, p.c.

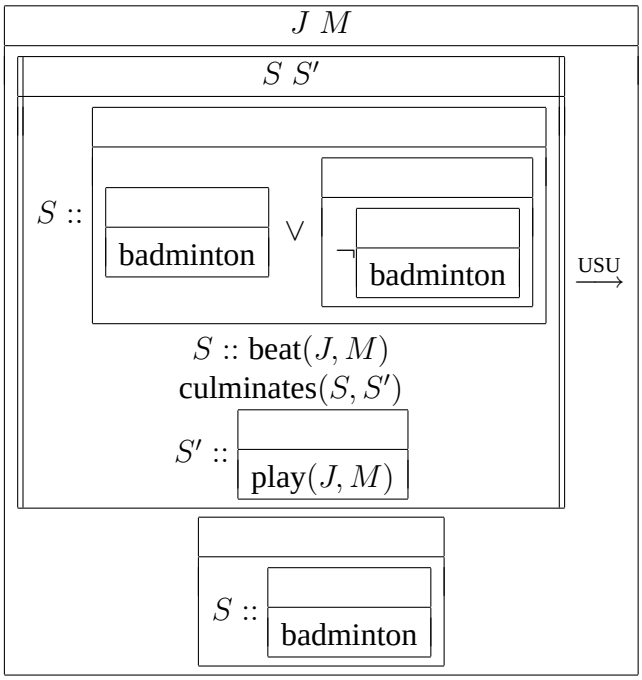
[4] The notion that focus is presuppositional is somewhat controversial, but, in fact, the solution we present here could be reconciled with a non-presuppositional account of focus, as long as negation is still taken to associate with focus and with an adequate account of combining presuppositions of disjunctions (perhaps along the lines of Krahmer (1998)).

(22)



The same considerations apply in resolving (22) as in resolving (18), so the preferred (partially) resolved reading is (23).

(23)



Note that the restrictor in (23) describes exactly the right set of situations—a domain situation S is one which culminates a situation of John and Marvin playing (some game) by John winning and which is either (part of) a badminton game or not (part of) a bad-

minton game. Thus, the presupposition triggered by *beat* does not disappear; rather, the presupposition introduced by the focal stress alters its computation.

6 Conclusion

In this paper, we have presented a novel account of adverbial quantification that takes as its starting point the phenomenon of presupposition incorporation in quantifier domains and that explains the difference with respect to incorporation between nominal and adverbial quantification without resorting to different presupposition resolution strategies. There is still much left unaddressed by this work—the incorporation of presuppositions triggered by something other than achievement verbs, the interaction of presuppositions with explicit restrictors, as well as with definite and indefinite NPs, and the justification of the particulars of our proposed logical form—but in the course of attempting to provide an adequate account of incorporation, we have also provided an analysis of the presuppositions triggered by presuppositional achievement verbs, as well as a claim regarding the relative order of computation for presuppositions triggered by focus and presuppositions triggered by presuppositional verbs, both of which merit further investigation on their own.

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