

Quantification at a distance and event relatedness

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The relation between the sentences in (1) has been the focus of much linguistic research:¹

- (1) a Max a beaucoup vendu de livres.
 Max has a lot sold of books
 b Max a vendu beaucoup de livres.

In both sentences we seem to have a lot of books, but in (1a) we have ‘quantification at a distance’ (QAD): the quantifier is separated from the nominal constituent by the past participle *vendu*. The consensus seems to be that the difference between the two sentences is the following. In (1a) *beaucoup* is an iterative adverb, meaning something like *many times* which licences an object phrase of the type *de N* and in (1b) it is a determiner, modifying the noun phrase.² The evidence given for this difference, which has mainly been brought up by Obenauer (1983, 1984), will be questioned below. According to Obenauer (1983, 1984) the iterative *beaucoup* has a direct syntactic relation with the noun phrase, since it identifies an empty category in the object phrase:

- (2) Max a beaucoup_i vendu [_i de livres]

The quantification of the object is indirectly brought about by iterative quantification over the event, and not directly by interpreting *beaucoup* in the empty position it binds.³ Obenauer calls this the V quantification hypothesis.

In this paper the QAD construction will be studied in the light of Krifka’s (1990) event related reading. As Krifka has shown, the sentence in (3) has two readings that he calls object related (OR) and event related (ER):

- (3) 4000 ships passed through the lock last year.

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² An object can have the form *de N* in the QAD construction and in the context of negation.

³ De Swart (1988) pushes this even further by assuming that no binding takes place.

The OR applies to the following situation: 4000 different ships have passed once or more than once through the lock last year. In the ER we do not need 4000 different ships, but we just have 4000 events of a ship passing through the lock. So in the OR we may have more than 4000 events provided that only 4000 ships are involved and in the ER we may have less than 4000 ships but we have exactly 4000 ship passings. In the ER the cardinal numeral that forms part of the DP does not count nominal entities but events, as does *beaucoup* in the QAD construction.

In this paper I will argue that the ER is in fact similar to the one forced in the QAD construction. It will be shown that the adverb in the QAD construction is not necessarily iterative, and evidence will be given against Obenauer's V quantification hypothesis. In both the ER and the QAD construction iterativity depends on the type of predicate: a 'count' predicate forces iterativity but a 'mass' predicate does not. In the third section I will discuss the similarity between the ER and QAD in the light of some recent proposals made by Honcoop (1992) and Dobrovie-Sorin (1993) who both argue that the ER is derived by covert quantification at a distance at LF.

1. ER, mass nouns and iterativity

It is argued in the literature that in order to have QAD we need an iterative interpretation of the event (cf. Obenauer 1984 and de Swart 1988).⁴ In this section it will be shown that the ER does not imply an iterative event.

In example (3) we discussed above, we could in fact state that in the ER the cardinal determiner *4000* quantifies iteratively over ship pass events. However, it is not necessary in the ER that the numeral quantifies iteratively over the event. To see this we turn back to Krifka. Krifka shows that the ER is not only possible in the case of count nouns, but that mass nouns can have a ER as well:

- (4) 60 tons of radioactive waste were transported through the lock last year.

In this example, *60 tons of radioactive waste* can refer to a quantity of 60 tons of radioactive waste that passed through the lock once or more than once (OR). It is also possible that 60 tons is the sum of all the radioactive waste that passed through the lock, where a portion of waste that passes through the lock twice counts twice. This is an important observation, because it shows that the

⁴ Notice that this is another notion of iterativity than the one Krifka (1990) uses. According to Krifka an event is iterative if there is an object which participates in two different subevents of the event. Following de Swart (1988) I use the term *iterative* for quantification of V in terms of 'X times'.

difference between OR and ER cannot be made by stating that in the OR the numeral gives the number of objects and in the ER it gives the number of events. In the case of count nouns this is possible, because the counting unit (ships) is also the unit that passes in a minimal passing event. This is not the case when we are dealing with mass nouns. The waste in (4) can pass by all at once, in several heaps or even in a continuous stream. In this context (5) is illuminating:

- (5) Het afgelopen uur heeft de fontein 500
 the past hour has the fountain 500
 liter water omhoog gespoten.
 liter water up spouted

The ER is pragmatically the most salient reading of (5). The fountain spouts water in the air, the water falls down in the basin, is spouted in the air again and so on. It would be absurd here to talk about 500 different events where partially the same water is involved. Iterativity is not necessary in the ER.

2. Iterativity of *beaucoup* in QAD?

Now that we have established that the ER does not imply the iterativity of the event, the question arises what happens in QAD. Let us first have a closer look at the arguments that have been given in the literature in favour of the idea that QAD implies iterativity.

Obenauer (1983, 1984) claims that QAD is excluded in contexts that make an iterative interpretation of the adverb impossible. According to his V quantification hypothesis, it is the iterative quantification over the event that licences the QAD construction. French *beaucoup* is ambiguous and can either mean something like *many times* or mark an intensity. In Dutch the first use of *beaucoup* is translated by *veel* and the second use by *erg*. The verb *apprécier* 'to appreciate' is an example of a verb that cannot be combined with an iterative *beaucoup* as we can see in the paradigm below:

- (6) a J'ai beaucoup apprécié Marie. (French)
 I-have a lot appreciated Marie
 b Ik heb Marie erg/*veel gewaardeerd (Dutch)
 I have Marie a lot appreciated

In (6a) the adverb *beaucoup* marks the intensity. The sentence does not mean that there were a lot of occasions at which I appreciated Marie. This is explicit in the Dutch example; we have to use the intensity marking adverb *erg* and not *veel*. The verb *apprécier* does not allow for QAD:

- (7) *J'ai beaucoup apprécié de livres.
 I-have a lot appreciated of books

This is the first piece of evidence Obenauer gives in favour of the necessary iterativity of *beaucoup* in the QAD construction. Verbs such as *apprécier* do not allow for an iterative interpretation which is, according to him, a necessary condition for QAD.

Another argument Obenauer gives in favour of the 'X times' interpretation is that a single event reading is incompatible with QAD:

- (8) a *En soulevant le couvercle il a beaucoup
 lifting the lid he has a lot
 trouvé de pièces d'or.
 found of coins of-gold
 b En soulevant le couvercle il a trouvé
 lifting the lid he has found
 beaucoup de pièces d'or.
 found of coins of-gold

The context *en soulevant le couvercle* forces here a reading in which all golden coins are found at a time, and this results in ungrammaticality of the QAD construction. If we replace *en soulevant le couvercle* by an adjunct that does allow for an iterative interpretation, QAD is possible:

- (9) Dans cette caverne il a beaucoup trouvé de
 in this cave he has a lot found of
 pièces d'or.
 coins of-gold

These arguments seem to be a quite solid foundation for Obenauer's claim that the adverb in QAD must be interpreted as 'X times'. However, this would mean that there is a fundamental difference between the ER and QAD, as we have seen that the ER does not necessarily have an iterative interpretation. But there is a snake in the grass. All contexts Obenauer uses to show that QAD forces an iterative interpretation are contexts in which we cannot use Krifka's criterion to see whether the ER is possible. Obenauer's evidence is based on contexts that force one single event, and on the *apprécier* case discussed in (6) and (7). In these contexts it is impossible that some individual or item is counted twice because it was twice involved in the event. Consider the examples in (10) that mirror the impossible QAD cases in (7) and (8b):

- (10) a John appreciated 20 books.
 b Lifting the lid, he found 200 golden coins.

In these sentences we do not seem to deal with the ER; in (10a) we necessarily have 20 different books and in (10b) we must have 200 different golden coins. This is of course quite suspicious.

Given that the ER is not necessarily iterative, as has been shown in the preceding section, Obenauer's tests do not provide us with waterproof evidence in favour of the iterativity of QAD. In fact it is possible to construe examples that show that iterativity is not necessary in order to have QAD, such as (11):

- (11) a Pendant les dernières dix minutes la fontaine
 during the last ten minutes the fountain
 a beaucoup projeté d'eau.
 has a lot spouted of-water
 b L'oléoduc a beaucoup transporté de pétrole.
 the pipeline has a lot transported of petrol
 c Pendant le voyage de la navette spatiale, ce filtre
 during the voyage of the space shuttle this filter
 a beaucoup nettoyé d'air.
 has a lot cleaned of-air

In the examples in (11) we do not have an iterative event but one continuous event, and still QAD is possible.

The conditions that allow for QAD clearly have to be reformulated. I will do so by adapting an idea developed in de Swart (1988). *Beaucoup* and the other adverbs that allow for the QAD construction (*peu* and *trop*) can quantify over mass nouns and count nouns on the one hand and over mass predicates and count predicates on the other. According to de Swart the QAD construction is possible if *beaucoup* quantifies over count events, but in the case of *apprécier* we have a non-count event. As has been shown in (6), *beaucoup* marks the intensity in the context of verbs like *apprécier*, and this would be the result of quantification over a non-count event. I think it is correct to say that *beaucoup* can be combined with both mass and count predicates and NPs. It is not true however that quantification over a mass event results in the intensity reading. The mass/count distinction is independent of the intensity reading, as the examples in (12) show:

- (12) a Jean a beaucoup dormi.
 Jean has a lot slept
 b Jean a beaucoup vendu ce modèle.
 Jean has a lot sold this model
 c Jean a beaucoup apprécié sa soeur.
 Jean has a lot appreciated his sister

Only in (12c) *beaucoup* has an intensity reading. In (12a) we have quantification over a mass predicate. Subevents of a sleeping event are sleeping events. There are not necessarily many different sleep intervals. The total amount of sleeping is a lot. In (12b) *beaucoup* is iterative, and this corresponds to quantification over a count event. The event denoted by *to sell a model* cannot be divided in subevents that can be characterised as *to sell a model* events. This makes the quantification iterative: in order to have a lot of a count event, you have many events. A lot of a mass event on the contrary gives you 'much event' and does not imply iterativity. The use of *beaucoup* in (12c), where *beaucoup* is an intensifier, should be seen as an independent use of *beaucoup*, and not as quantification over a mass event. The fact that in Germanic languages such as Dutch and German we have the same distinction expressed by the use of different lexical items, reinforces the hypothesis that we are dealing with a different *beaucoup* in case it marks the intensity. I will come back on this issue in the next subsection.

To sum up, QAD is possible if *beaucoup* quantifies over the event. The interpretation 'X times' results from quantification over a count event, but is not implied in the context of a mass predicate. Examples of the two types of QAD are given in (13):

- (13) Count event / iterative interpretation:
 a Il a beaucoup passé de bateaux
 it has a lot passed of ships
 b Il a beaucoup trouvé de pièces d'or
 he has a lot found of coins of-gold
 Mass event / no iterativity:
 c La fontaine a beaucoup projeté d'eau
 the fountain has a lot spouted of-water
 d Il a beaucoup bu de lait
 he has a lot drunk of milk

The example of a mass predicate given in (13c) is very clear. We have one event, and still QAD is possible. The example in (13d) is more surprising, because this type of sentences has been cited in the literature by authors who defended the thesis that QAD is necessarily iterative (Obenauer 1983, 1984, de Swart 1988). I think that iterativity is not implied in this sentence. Let us first look to a simpler example in which a mass predicate is quantified by *beaucoup* and *peu*:

- (14) J'ai beaucoup/peu dormi ce weekend.
 I-have a lot/little slept this weekend

Both *beaucoup* and *peu* can be used in a context with three sleep intervals, provided that they are long with respect to what is considered to be normal if *beaucoup* is used and short if *peu* is used. *Beaucoup* does not imply here that I slept many times, and *peu* does not imply that I slept few times. The same seems to apply to (13d). There are not necessarily many milk drink events, but there is much milk drinking going on. The criterion used to distinguish between the count and the mass classification of the event is the following. If it is possible to define a 'minimal event' the event is count, and if not we have a mass event. Landman (1991) uses the notion of minimal element to distinguish mass and count nouns. Whereas the count domain is represented by join semilattices that are generated by a set of minimal elements, the structure of the mass domain is a non-atomic structure. As there are no minimal elements there are no units to count. In order to count a mass, you have to add a unit to count: kilo, liter, meter etc.

In examples of count events in (13) we can indicate the minimal event: every passing of one ship in (13a) and every finding of one or more golden coins in (13b). In the examples of mass events we cannot define a minimal event. A milk drinking event can always be divided into smaller milk drinking events, and the same is true in the case of water spouting. The count/mass nature of the predicate is of course inextricably linked to aspect but I will not comment on this here.

2.1. Consequences for the V quantification hypothesis. As we have seen in the preceding section the V quantification hypothesis as proposed in Obenauer (1983, 1984) is untenable, because the QAD construction does not imply a multiplicity-of-event requirement. We only have this requirement if *beaucoup* quantifies over a count event. If we quantify over a mass event there is no multiplicity-of-event requirement but QAD is still possible, as the grammaticality of the examples in (11) shows. In this section I will mention some of the problems that are raised by this necessary modification of the V quantification hypothesis.

In the first place Obenauer suggests that the multiplicity-of-events requirement explains why QAD is excluded in the context of verbs such as *apprécier*, in which the adverb marks the intensity and cannot mean something like 'X times'. De Swart (1988) attributes the incompatibility of these verbs and QAD to the incompatibility of mass quantification and QAD. She suggests that mass quantification results in the intensity reading of the adverb. The distinction that has to be made now is much more subtle, because we have seen that mass quantification does not exclude QAD. I will confine myself to showing the complexity of this problem. In the preceding section, I suggested that in QAD we have quantification over the event, while *beaucoup* becomes an intensity marker in the context of verbs such as *apprécier*. This is of course not very insightful,

because nothing has been said about what makes that a verb changes *beaucoup* in an intensity marker. And this is not a very easy question to answer. A first class of verbs that apparently does not combine with QAD is the class of psych verbs. According to Honcoop (1992) we are dealing with individual level predicates here. This is not obvious, because the predicates that do not allow for QAD do allow for modification by *souvent* 'often' or *rarement* 'rarely' and individual level predicates are known for not allowing this:

- (15) a J'ai souvent apprécié cet acteur
 I-have often appreciated this actor
 b Son regard m'a rarement impressionné
 his look me-has rarely impressed

According to Kratzer (1988) individual level predicates lack a davidsonian argument position. Quantificational adverbs such as *souvent* bind either the davidsonian argument position or an indefinite. As we do not have an indefinite argument in either of the sentences in (15) *souvent* should bind the davidsonian argument position which shows that the verbs are not individual level predicates.

Not only psych verbs are incompatible with QAD. Obenauer (1983) also cites the verb *accélérer* 'to hasten':

- (16) *Jean a beaucoup accéléré de procédures
 Jean has a lot hastened of procedures

Other verbs that behave like *accélérer* are *diminuer* 'to reduce' and *retarder* 'slow down'. We seem to deal here with degree accomplishments and these verbs trigger the intensity reading of *beaucoup*. It remains unclear to me why degree accomplishments and most psych verbs trigger necessarily the intensity reading of *beaucoup* and why *beaucoup* having the intensity reading cannot licence QAD.

A second result that Obenauer derives from his multiplicity-of-events requirement, is that he can exclude the use of *un peu* in QAD constructions. As Obenauer observes, just like *peu*, *un peu* can function as a NP modifier (17a) and as an adverbial (17b), but still QAD is excluded (17c):

- (17) a Jean a pris un peu de crème.
 Jean has taken a bit of cream
 b Jean s'est un peu reposé.
 Jean himself(CL)-is a bit rested
 c *Jean a un peu bu d'alcool.
 Jean has a bit drunk of-alcohol

Obenauer attributes the impossibility of using *un peu* in the QAD construction to the multiplicity-of-events requirement: *un peu* can only be combined with a mass

term (**un peu de journaux* ‘a bit of newspapers’) and is therefore incompatible with an ‘X times’ interpretation. However, on the basis of the observations made in this paper it is not predicted anymore that (17c) is ungrammatical. We do expect that *un peu* is incompatible with count predicates but the incompatibility with the mass predicate *boire d'alcool* is not expected.

3. Back to ER

As the preceding sections made clear, the function *beaucoup* has in the QAD construction is similar to the one the determiner has in the ER:

- (18) a The fountain spouted 90 liters of water in the air.
 b John transported 200 tons of waste through the lock.
 c The library lent out 400 books last week.

One could say that the water spouting event in (18a) measures 90 liters, the waste transportation event in (18b) measures 200 tons and the book lending event in (18) has the value 400. In the first two sentences there is quantification over mass events and in the last over a count event. This gives non-iterative events in the first two sentences and an iterative event in the last. In case of a mass event, there is a unit (*liter, ton*) that expresses the extent of event. The sentences in (18b) and (18c) can be compared to the examples in (19):

- (19) a Jan is vijf kilo afgevallen.
 Jan is five kilos lost-weight
 b John ran 2 kilometers.

The size of the events expressed by the mass predicates in (19) is expressed in kilos and kilometers respectively.

Recently Honcoop (1992) and Dobrovie-Sorin (1993) proposed that the ER (which Dobrovie-Sorin calls the ‘amount reading’), is an instance of covert QAD. According to both of them, *beaucoup* in the QAD construction is not an adverb, as for instance Obenauer claims, but a raised determiner. The sentences in (18) have at LF a structure in which the determiners (*90 liters, 200 tons* and *400*) have been adjoined to the VP. An example is given in (20):

- (20) the library [_{VP} 400_i [_{VP} lent out [_{e_i} books]]] last week (‘LF’ of 18c)

This expresses in fact the parallelism between the ER and the QAD construction that has been investigated in this paper. But is this the way to proceed? I will not digress upon the technical syntactic difficulties of the analysis, that are mentioned

and discussed by Dobrovie-Sorin. The two questions I want to raise here are the following.

In the first place, it has been argued in the literature that an object has the function of measuring out the event (Tenny 1987). This is clearly what the object in the ER does; it states in terms of the object N the size of the event. But the object also has this function in sentences such as (21) where the object is a definite NP:

- (21) Jan ate the apple.

So it seems to be a more general property of the object that it measures out the event, and not a property of the ER. But then we seem to miss a generalization if we adopt a mechanism of determiner raising at LF in order to measure out the event.

In the second place it is not well established that the ER is in fact restricted to contexts in which QAD is possible. It is true that Krifka's test cannot be used in contexts that are incompatible with QAD, as we have seen in the preceding section. Does this mean, however, that the ER is impossible? In other words, is Krifka's test waterproof? Let us first look at an example in which we have QAD, but where Krifka's test cannot apply:

- (22) a Ces idiots ont beaucoup abattu d'arbres.
 these idiots have a lot cut-down of-trees
 b These idiots cut down 200 trees.

As soon as a tree is cut down it cannot be cut down another time, so the OR and the ER of (22a) apply to the same situation. Still this is a context in which QAD is possible, so if the ER is covert QAD, we would like to postulate that we do have a distinction between the ER and the OR in (22b), and we have to conclude that Krifka's test is not conclusive.

Things get even more complicated if we take the following into consideration. There seems to be a relation between the ER and *combien* extraction. In French one can extract the *wh*-expression *combien* while leaving the nominal part of the questioned phrase behind:

- (23) Combien as-tu consulté de livres?
 how-many have-you consulted of books

Combien extraction is subject to weak islands as Obenauer has shown and Dobrovie-Sorin assumes that this is so because *combien* extraction implies the amount reading ('ER') and the amount reading brings about the weak island effect. This seems all very plausible, but as the examples below show, contexts

that do not allow for QAD nor for the application of Krifka's test, do allow for *combien* extraction (cf. Obenauer 1983):

- (24) a *Jean a beaucoup apprécié de films
 Jean has a lot appreciated of films
 b John appreciated 10 films.
 (no ER according to Krifka's test)
 c Combien Jean a-t-il apprécié de films?
 how-many Jean has-he appreciated of movies
- (25) a *En soulevant le couvercle il a beaucoup
 lifting the lid he has a lot
 trouvé de pièces d'or
 found of coins of-gold
 b Lifting the lid, he found 200 golden coins.
 (no ER according to Krifka's test)
 c Combien a-t-il trouvé de pièces d'or en soulevant
 how-many has-he found of golden coins lifting
 le couvercle?
 the lid

The paradigms in (24) and (25) give us three possibilities: either QAD corresponds to the ER, but the ER does not correspond to *combien* extraction or the ER does not correspond to QAD but corresponds to *combien* extraction or there are three different phenomena. In this last case, which is of course the least attractive, we might maintain that Krifka's test is waterproof, but in the other two we cannot. So far, I know of no conclusive evidence to choose among these possibilities.

4. Conclusion

In this paper parallelisms between the QAD construction and Krifka's event related reading have been investigated. It has been shown that in both cases the type of event (count or mass) decides whether the result of QAD or the ER is iterative or not. A count event results in an iterative reading and a mass event does not. This goes against the V quantification hypothesis of Obenauer (1983, 1984), who claims that the QAD construction requires a multiplicity of the event. I have shown here however that this is not a necessary condition for QAD as it is not for the ER. The multiplicity of the event is the result of quantification over a count predicate. Quantification over a mass predicate does not force a multiple event reading.

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