

A Unified Semantic Analysis of the Licensing Conditions of ‘Bare’ Nouns in French*

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1. Introduction

This paper presents a unified analysis of the licensing conditions for NPs headed by the particle *de* in argument position in French. Some examples of the sentences that will be examined over the course of the paper are shown in (1) and (2).

- (1) J’ai beaucoup lu **de livres**
I have a lot read **de books**
roughly: ‘I read a lot of books’
- (2) Je (n’)ai pas lu **de livres**
I (neg)have not read **de books**
‘I didn’t read any books’

NPs headed by *de* have often been referred to as the ‘bare nouns’ of French (Heyd (2003); Mathieu (2004)). There are a number of puzzles associated with these phrases. The goal of this paper is to provide an answer to one of them.

1.1. The Puzzles

The first puzzle is syntactic and concerns the distribution of the *de* phrases. In French, the appearance of *de* phrases in argument position is very restricted.¹ For example, they are ungrammatical in subject position (3).

- (3) *D’enfants ont beaucoup lu trois livres
de children were a lot read three books
Intended: ‘A lot of children read three books’

This is the case for both underlying subjects and derived ones. For example, a passive sentence with a *de* phrase subject is ungrammatical (4), even though the phrase presumably started off the derivation in direct object position.

- (4) *De livres ont été beaucoup lus
de books have been a lot read
Intended: ‘A lot of books were read’

Furthermore, *de* phrases are impossible inside any oblique arguments, including the indirect object (5).

- (5) a. *J’ai beaucoup parlé à *de* filles
I have a lot talked to *de* girls
Intended: ‘I talked to a lot of girls’

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¹In this paper, I examine only the occurrences of *de* N in *argument* position, leaving aside examples like *J’en ai lu trois, de livres* ‘I read three of them, books’.

- b. *Personne a parlé à *de* filles
 No one has talked to *de* girls
 Intended: ‘No one talked to girls’

The generalization about the distribution of *de* phrases in argument position is the following:

- (6) Argument **de** phrases are only possible in direct object (DO) position.

Thus, the first puzzle is why (40) holds.

The second puzzle concerns the licensing of the *de* phrases when they appear in DO position. In fact, *de* phrases are only possible in DO position when c-commanded by an appropriate operator.² For example, bare *de* phrases are ungrammatical.

- (7) *J’ai lu **de** livres
 I have read *de* books

Similarly, *de* phrases c-commanded by inappropriate operators, like *souvent* ‘often’, are also ungrammatical.

- (8) *J’ai **souvent** lu *de* livres
 I have **often** read *de* books

The operators that can license *de* phrases in their scope fall into two classes: adverbial *degree quantifiers* (DQs), and *anti-additive* (negative) quantifiers (AAQs). The class of DQs includes elements like *beaucoup* ‘a lot’, *peu* ‘little’, and *tellement* ‘so much’.³ Sentences in which *de* phrases are licensed by DQs are known in the literature as *Quantification at a Distance* (QAD) sentences (cf. Kayne (1975); Obenauer (1983) and Doetjes (1997) *inter alia*).

- (9) J’ai **beaucoup** lu **de** livres
 I have **a lot** read **de** books
 ‘I read a lot of books’ **Quantification at a Distance**

The class of AAQs (to be defined in a formal manner later in the paper) includes elements such as *pas* ‘not’, *personne* ‘no one’, and *jamais* ‘never’. An example of *personne* licensing a *de* phrase is shown in (10).

- (10) **Personne** (n’)a lu **de** livres
No one (neg)has read **de** livres
 ‘No one read any books’

The focus of this paper is the second puzzle. In particular, the question that I will address is the following:

What do degree adverbs and anti-additive quantifiers have in common that allows them to license *de* phrase DOs in their scope?

This is not a trivial question: at first glance, DQs and AAQs are semantically very different. Additionally, DQs and AAQs are syntactically very different. For example, while DQs are all adverbial quantifiers, the class of AAQs contains adverbs like *pas* and *jamais*, DPs like *personne* and *rien* ‘nothing’, and even determiners like *aucun* ‘no’. However, I propose that there is a unifying generalization that allows us to group together degree quantifiers and anti-additive quantifiers in a way that explains their ability to license *de* phrases. Furthermore, I propose that this generalization is semantic:

- (11) **The elements that can license *de* phrases are polyadic operators: quantifiers that can bind more than one variable at a time.**

²In this paper, I leave aside uses of *de* phrases in direct object position with a small number of prenominal adjectives (ex: *J’ai lu de bons livres*) since these belong to a different register than the one that I am studying; however the relation between this construction and the *de* phrases that are licensed by quantifiers is still open.

³Other examples of DQs include *trop...pour* ‘too...for’, *assez...pour* ‘enough for’, *plus...que* ‘more...than’, *moins...que* ‘less...than’, and *pas mal* ‘fairly’.

More specifically, following other authors, I propose that *de* phrases denote bare properties. In particular, they combine with a predicate via an unsaturating operation (such as (Chung & Ladusaw, 2004)'s *Restrict*) to form a complex predicate with an unbound variable. Since both DQs and AAQs are polyadic operators, they can bind this variable in order to create an interpretable structure. I argue that we can see that DQs are polyadic from the interpretations that are assigned to *Quantification at Distance* sentences. I argue that we can see that AAQs are polyadic from their ability to bind multiple *de* phrases and their participation in negative concord sentences, a phenomenon that is often analyzed in the literature as involving polyadic quantification.

1.2. Plan

The paper is organized as follows: In section 2, I present a previous analysis of the semantics of *de* phrases, one that involves the notion of *semantic incorporation*. I argue that there are empirical problems with this analysis, and, in section 3, I present my new analysis of *de* phrases in which they combine with a predicate to form a VP with an unbound variable inside it. For a structure to be interpretable, this variable must be bound from a higher position, and elements that can bind from these positions are polyadic operators. Finally, in section 4, I argue that both DQs and AAQs are such operators.

2. *De* phrases and Semantic Incorporation

In this section, I consider a previous analysis of the semantics of *de* phrases, one that I will call the *incorporation analysis*. This style of analysis is featured prominently in the works of Heyd (2003), Mathieu (2002), Mathieu (2004), and Martin (2006). For these authors, *de* phrases denote bare properties, and they undergo a *semantic incorporation* process similar to the one that accompanies syntactic incorporation in languages like Inuktitut (West-Greenlandic) (12).⁴

- (12) Amajaraq **eqalut** -tur -p -u -q
 Amajaraq.ABS salmon eat IND [-tr] 3SG
 'Amajaraq has eaten a salmon' ((van Geenhoven, 1998); cited in (Mathieu, 2004))

Heyd and Mathieu provide a number of arguments for the claim that *de* phrases are semantically incorporated. Their most important one comes from the inability of *de* phrases to take scope higher than the position in which they appear. For example, *de* phrases may never take scope over negation.

- (13) Je (n')ai pas lu de lives
 I (NEG) have not read de books
 'I did not read any books' **not** 'There were books that I did not read'

Furthermore, the *de* phrase in a QAD sentence must scope underneath an intensional verb like *chercher* 'to look for'. In these constructions, *de* phrases must always be interpreted *de dicto*.

- (14) J'ai beaucoup cherché de livres pour mon travail de syntaxe
 I have a lot sought de books for my paper of syntax
 'I looked for a lot of books for my syntax paper'
- a. ...parce qu'une longue bibliographie donne l'air intelligent
 ...because a long bibliography gives the air intelligent
 '...because a long bibliography makes one look smart'
- b. *...notamment, Kayne (1975), Milner (1978), Rizzi (1990), et de Swart (1993)
 ...notably Kayne (1975), Milner (1978), Rizzi (1990), and de Swart (1993)
 *'...notably Kayne (1975), Milner (1978), Rizzi (1990), and de Swart (1993)'

Heyd proposes that verbs selecting *de* phrase complements are *incorporating* verbs, and, as such, they have the argument structure in (15).

- (15) $\lambda x_e. \lambda P_{\langle e, t \rangle}. \exists y [V(x, y) \& P(y)]$ (Heyd (2003: 199, her (57))

⁴Also Martin (2006) for the *de* phrases in the Oblique Locatum Construction (*Jean a chargé le camion de briques*); however, cf. Hirschbühler & Labelle (2009) for arguments against this.

For Mathieu, the semantic incorporation of *de* phrases is not governed by verbal lexical semantics, but, rather, is a freely occurring process. In his analysis, the determiner *de* is not semantically a determiner; it is “a morphological spell-out of incorporation” (Mathieu, 2004: 7).

In both analyses, however, the denotation of the VP *lire de livres* ‘read *de* books’ is as shown in (16).

$$(16) \quad \llbracket \text{lire de livres} \rrbracket = \lambda y \lambda e. \exists x (\text{Reading}(e, y, x) \ \& \ \text{Book}(x))$$

Correspondingly, the interpretations for sentences where *de* is licensed by a negative quantifier or a degree quantifier are shown in (17) and (18).

$$(17) \quad \llbracket \text{Je (n') ai pas lu de livres} \rrbracket = \neg \exists x (\text{Reading}(e, I, x) \ \& \ \text{Book}(x))$$

$$(18) \quad \llbracket \text{J'ai beaucoup lu de livres} \rrbracket = BCPe (\exists x (\text{Reading}(e, I, x) \ \& \ \text{Book}(x)))$$

Note that, in (18), *beaucoup* is a simple unary event quantifier.

The incorporation analysis accounts nicely for a number of properties of *de* phrases. Firstly, to the extent that we have an independent theory of semantic incorporation, it provides an answer to Puzzle 1, since, as discussed by Mathieu (2004), cross-linguistically, incorporation is very often limited to the direct object position. Secondly, it accounts for the scopal inertia of the *de* phrases: when a *de* phrase is incorporated, the variable in the direct object position is immediately existentially closed, so the scope of the DO is fixed at the level of the predicate. Nevertheless, I argue that there are empirical problems with this analysis.

Firstly, the incorporation analysis leaves Puzzle 2 (the licensing conditions of *de* phrases) unsolved; in fact, it is completely unaddressed. It is not clear why, under this analysis, we cannot say **J'ai lu de livres* or insert a frequency adverb and say **J'ai souvent lu de livres*.

Secondly, as we will see in section 4, Inuktitut-style incorporation, where the incorporated property is existentially closed, predicts the wrong interpretations for some sentences containing *de* phrases. As argued in Burnett (2009a), and to be discussed below, *Quantification at a Distance* sentences require the adverb to bind both the verb's event argument and the direct object. I therefore put forth a new proposal for the semantics of *de* phrases, which is outlined in the next section.

3. A New Proposal

To account for the fact that *de* phrases must be c-commanded by another operator in order to be licit in a structure, I propose that combining the verb and the *de* phrase does not existentially close the direct object. Instead, I propose that *de* phrases in object position are combined with the verb via an unsaturating compositional rule such as Chung & Ladusaw (2004)'s *Restrict*. To account for scopally inert direct objects in incorporation-type contexts, Chung & Ladusaw (2004:5) propose a binary operation that composes a predicate directly with a property to yield a predicate without changing the degree of unsaturation. This mode of composition, called *Restrict*, is illustrated in (19).

$$(19) \quad \text{Restrict}(\lambda y \lambda x [\text{feed}'(y)(x)], \text{dog}') \\ = \lambda y \lambda x [\text{feed}'(y)(x) \wedge \text{dog}'(y)]$$

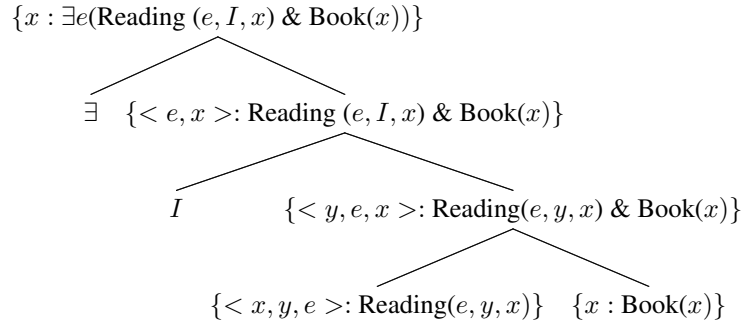
Restrict takes a relation and a property and intersects the direct object co-ordinate with the property. Thus, in my analysis, the VP *lire de livres* ‘read *de* books’ denotes the set of triples shown in (20).

$$(20) \quad \llbracket \text{lire de livres} \rrbracket = \{ \langle y, e, x \rangle : (\text{Reading}(e, y, x) \ \& \ \text{Book}(x)) \}$$

Thus, when a *de* phrase appears bare in a sentence, the variable that it introduces does not get bound, and the denotation of the entire sentence is a property, not a truth value. This is shown in (21).⁵

⁵Additionally, I assume that there is no free existential closure for individuals in French. I take this to be unproblematic, since free existential closure has independently been shown to make the wrong predictions for the semantics of indefinites (cf. Reinhart (1997); Winter (1997); Schwarzschild (2002)). In the tree in (21), there is existential event closure; however, in a more complete representation of the semantics of the sentence, the verb's event argument would be bound by another operator, for example, tense.

- (21) *J'ai lu de livres
I have read *de* books



Thus, the variable in the direct object position needs to be in the scope of a quantifier that can bind it. In the next section, I argue that both degree adverbs and anti-additive quantifiers can bind this variable because they can bind multiple variables at once.

4. Polyadic Quantifiers in French

In this section, I argue that both degree adverbs and anti-additive quantifiers in are polyadic. I argue that this can be seen through the interpretations of *Quantification at a Distance* (QAD) sentences, and *Negative Concord* (NC) sentences in French.

4.1. Degree Quantifiers

4.1.1. The Data

As first noticed by (Obenauer, 1983), QAD sentences can be used in only a subset of the contexts in which canonical quantification sentences (22) are used.

- (22) J'ai lu beaucoup de livres
I have read a lot de books
'I read a lot of books'

In particular, QAD sentences in Standard French involve adverbial quantification by the degree quantifier. For example, a QAD sentence with *beaucoup* is only true if *beaucoup* holds of the set of events denoted by the verb. This generalization is known in the literature as Obenauer's *Multiplicity of Events* requirement.

- (23) ***Multiplicity of Events Requirement: (MER)***
QAD sentences are only true in contexts involving many events

In what follows, I present one test for the presence of the MER in QAD sentences; however, this is a well-established fact in the literature. For more on the MER, see Obenauer (1983), Doetjes (1997), and Burnett (2009b).

One way of testing for adverbial quantification is through the use of point adverbials. We can insert a prepositional phrase, like *dans cette cassette* 'in this box' or *en soulevant le couvercle* 'lifting the lid' into the sentence, and this serves to create a single event context. As shown below, sentences with canonical quantification are compatible with single-event contexts.

- (24) a. Dans cette cassette, il a trouvé beaucoup de pièces d'or
In this cassette, he has found a lot de pieces of gold
'In this cassette, he found a lot of gold pieces'
b. En soulevant le couvercle, il a trouvé beaucoup de pièces d'or
In lifting the lid, he has found a lot de pieces of gold
'Lifting the lid, he found a lot of gold pieces'

(Obenauer (1983: 78, his (42)))

QAD sentences with PPs forcing a single-event reading are ungrammatical.

- (25) a. *Dans cette cassette, il a beaucoup trouvé de pièces d'or
In this cassette, he has a lot found de pieces of gold
b. *En soulevant le couvercle, il a beaucoup trouvé de pièces d'or
In lifting the lid, he has a lot found de pieces of gold
(Obenauer (1983: 78, his (43)))

Note that QAD sentences with PPs suggesting a context where there are many events are fine.

- (26) a. Dans cette caverne, il a beaucoup trouvé de pièces d'or
In this caverne, he has a lot found de pieces of gold
'In this caverne, he found a lot of gold pieces'
b. En cherchant partout, il a beaucoup trouvé de pièces d'or
In searching everywhere, he has a lot found de pieces of gold
'Searching everywhere, he found a lot of gold pieces'
(Obenauer (1983: 78, his (45)))

In summary, we see that for a QAD sentence to be felicitous, *beaucoup* must hold of the verbal event argument.

At this point, we might wonder whether *beaucoup* in a QAD sentence is a simple unary adverbial quantifier, of the type found in (27).

- (27) J'ai beaucoup dormi
I have a lot slept
'I slept a lot'

In other words, perhaps the interpretation assigned to a QAD sentence by the incorporation analysis (repeated below) is the correct one.

- (28) $\llbracket \text{J'ai beaucoup lu de livres} \rrbracket = BCPe (\exists x(\text{Reading}(e, I, x) \ \& \ \text{Book}(x)))$

However, I argue that this is not the case, and that the interpretations assigned to QAD sentences are more complex than (28). In fact, for a QAD sentence to be felicitous, *beaucoup* must hold not only of the predicate's event argument, but also of its direct object. On analogy to the MER, I call this generalization the *Multiplicity of Objects* requirement.

- (29) ***Multiplicity of Objects Requirement: (MOR)***
QAD sentences are only true in contexts involving many objects

QAD sentences involving many events but a single object are judged false. For example, (30) cannot be uttered in a context in which I called only my own mother many times.

- (30) J'ai beaucoup appelé de mères
I have a lot called de mothers

Similarly, contexts with multiple events and few objects are also judged to be false. For example, it is infelicitous to say *J'ai beaucoup lu de livres* if I read my two favourite books many times. The fact that the cardinality of the *de* phrase must be 'a lot' suggests that the MOR is due to quantification of *beaucoup* over the direct object, not the plural marking on the *de* phrase.

Therefore, it seems that in QAD sentences in Standard European French, *beaucoup* quantifies over both the verb's event variable and its direct object variable that is restricted by the *de* phrase.

4.1.2. Analysis

In previous work (Burnett (2009a); Burnett (2009b)), I proposed a semantic analysis of the QAD construction in European French. Specifically, I proposed that the simple unary adverbial event quantifier

beaucoup (i.e. the quantifier that is found in (27)) is extended to deal with binary relations in the following way:

- (31) Let $s, t \in N$ such that $0 < s, t < |E|$,
For all $R \in \mathcal{P}(E \times E)$, $BCP_{s,t}(R) = 1$ iff $|Dom(R)| > s$ & $|Ran(R)| > t$

BCP takes a set of <event, object > pairs and yields true just in case the cardinality of the set of first co-ordinates is a lot (in this case, greater than the contextually given threshold that is required to count as ‘a lot’), and the cardinality of the set of second co-ordinates is also a lot. Thus, in my analysis, the interpretation assigned to a QAD sentence like *J’ai beaucoup lu de livres* is shown in (32). This sentence will be true just in case there are many events of me ‘book-reading’, and many books involved in these events.

- (32) $\llbracket J’ai beaucoup lu de livres \rrbracket = 1$ iff $|\{e : \text{Reading}(e, I, x) \ \& \ \text{Book}(x) \mid > s_e \ \& \ |\{x : \text{Reading}(e, I, x) \ \& \ \text{Book}(x) \mid > t_x$

Thus, I accurately account for both the multiplicity of events requirement and the multiplicity of objects requirement, since these requirements are straightforwardly built into the meaning of the quantifier.

Besides the fact that it gets the interpretations of QAD sentences right, the main argument for a binary quantification approach to QAD is the following fact about *BCP*.

- (33) **Theorem 1 (Burnett, 2009b):**
BCP is unreducible to any iteration of unary quantifiers.

The proof of Theorem 1 is given in (Burnett, 2009b). Thus, a polyadic analysis of degree quantifiers in French is necessary to get the semantics of QAD sentences right.

4.2. Anti-Additive Quantifiers

A short list of the negative quantifiers that can license *de* phrases in their scope is shown in (34).

- (34) *pas* ‘not’, *plus* ‘no more’, *aucun* ‘no’, *jamais* ‘never’, *ni...ni* ‘neither...nor’, *nulle part* ‘nowhere’, *personne* ‘no one’, *rien* ‘nothing’, and *sans* ‘without’.

Some examples of these quantifiers licensing *de* phrases are shown below.⁶

- (35) a. Je lis **pas/plus/jamais** de livres
I read **not/no more/never** of books
‘I don’t/never read books (anymore)’
b. **Aucun enfant/Personne** a lu de livres
No child/no one has read of books
‘No child/one read any books’

This class of negative quantifiers can be identified based on the mathematical properties of the functions that they denote: they are all *anti-additive* functions. The formal definition of anti-additivity is given in (36).

- (36) A function f is *anti-additive* iff $f(X \vee Y) \Leftrightarrow f(X) \wedge f(Y)$

In other words, a quantifier is anti-additive if it gives rise to inferences of the type shown in (37).

- (37) a. Jean a pas [chanté ou dansé] \Leftrightarrow Jean a pas [chanté] et Jean a pas [dansé]
b. Personne a [chanté ou dansé] \Leftrightarrow Personne a [chanté] et personne a [dansé]
etc.

⁶Since the preverbal negative particle *ne* is entirely extinct in Québec French (Sankoff & Vincent (1977)), and very infrequent in spoken European French (Ashby (2001)), I will omit it from all my examples.

While the anti-additive property allows us to characterize the class of negative *de* phrase licensors in a formal manner, I argue that it is not this property in particular that allows them to license *de*; instead, I argue that they can bind the free variable inside the VP because they are also polyadic.

I argue that one piece of evidence for the polyadicity of AAQs in French comes from their binding properties in ECM constructions. As shown in (38), AAQs can bind multiple *de* phrases in ECM constructions, and this results in a pair (or even triple) quantification interpretation.

- (38) a. **Personne** a vu **d'**hommes embrasser **de** femmes
 No one has seen *de* men kiss *de* women
 '*No one saw any men kissing any women/any man-woman kissing pairs*'
 b. Il a **pas** laissé **d'**hommes voir **de** femmes embrasser **d'**enfants
 He has **not** let *de* men see *de* women kiss *de* children
 '*He didn't let any men see any women kissing any children*'

Constructions such as (38) therefore suggest that AAQs in French should also be analyzed as having a polyadic use.

4.2.1. AAQs and Negative Concord

The conclusion drawn in the previous section is not novel. In fact, that French AAQs are polyadic quantifiers has already been proposed to account for the behaviour of these quantifiers in another context: negative concord (NC) sentences. It is well known that French is a NC language. For example, the most salient reading of (39), a sentence with two negative quantifiers, is one with a single negation.

- (39) **Personne** a **rien** fait
 No one has **nothing** done
 Most salient reading: '*No one did anything*'

As observed by Muller (1991) and de Swart & Sag (2002), the quantifiers that participate in negative concord phenomena in French are the anti-additive quantifiers, and there is a rich tradition in the semantic literature of analyzing NC as arising from the creation of a single negative polyadic quantifier that binds all the N-words in its scope.

I propose that such a quantifier, in addition to binding N-words, also binds *de* phrases. An argument for the link between *de* phrase licensing and negative concord comes from the generalization in (40).

- (40) All the negative quantifiers that license *de* phrases also participate in negative concord.

We therefore have the beginning of an explanation for why AAQs can also bind *de* phrases: this is a side-effect of their participation in the negative concord construction.

There is, however, some dialectal and historical variation in the class of quantifiers that participate in negative concord. For example, while (40) holds for (to my knowledge) all Canadian dialects of French (*Québécois*, *Franco-Ontarien*, *Acadien* etc.), a single item, *pas* 'not' in Standard European French, is not a member of the NC class. Thus, while the *Québécois* sentence with *pas* in (41) is NC, it would not be so in Standard French.

- (41) Maxim Bernier oublie **pas plus rien nulle part**
 Maxim Bernier forgets **not no more nothing nowhere**
 '*Maxim Bernier doesn't forget anything anywhere anymore*'
 Line from *Et Dieu créa Laflaque* on Radio Canada, April 26th, 2009

However, I argue that this one dialectal exception does not take away from the polyadic status of AAQs on one hand, and the link between *de* phrase binding and negative concord on the other. In fact, the exclusion of *pas* from the NC system seems to have been a relatively recent phenomenon, since, as shown by Déprez & Martineau (2004), *pas* participated in NC in Classical (17th century) European French. For example, in the quotation from Racine shown below, *pas* and *rien* 'nothing' combine together to form a single semantic negation.

- (42) On ne veut **pas rien** faire ici qui vous déplaît
 We neg want **not nothing** do here that you displease
 ‘We don’t want to do anything here that displeases you’
 (Racine. *Les Plaideurs*. II, 6, v.472. cited in Déprez & Martineau (2004))

So, at least from a historical point of view, NC and *de* phrase licensing have gone together in the grammar of French, and the correlation continues to be exact in many modern dialects of the language.

5. Conclusion

In conclusion, in this paper, I presented a unified analysis of the licensing conditions for French ‘bare’ indefinites in direct object position. I argued that French *de* phrases combine with verbs to form VPs with an unbound variable inside them. This variable must be bound for the sentence to be interpretable. I argued that the quantifiers that can bind the direct object position are those that can bind more than one variable at a time, i.e. are *polyadic*. I argued that we can see that degree quantifiers can bind more than one variable because modeling the interpretation of *Quantification at a Distance* sentences requires a properly polyadic quantifier. Furthermore, I argued that we can see that anti-additive quantifiers are polyadic because they participate in negative concord phenomena and can bind multiple *de* phrases in ECM constructions. I therefore conclude that, despite appearances, the licensing of *de* phrases in argument position in French is a unified semantic phenomenon.

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