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THE DISTRIBUTIVITY OF COORDINATED CONSTITUENTS UNDER NEGATIVE SCOPE

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La distributivité des constituants coordonnés sous la portée négative

Résumé

Dans cette étude, nous postulons que si certains phénomènes présents dans la langue naturelle reflètent fidèlement les principes sémantiques de la langue artificielle, telle que la logique formelle, alors ces principes doivent être universellement reconnus par toute langue humaine. Nous nous concentrons sur un phénomène bien étudié dans la langue anglaise, le fait que l'opérateur disjonctif or puisse donner des interprétations collectives et distributives sous la portée de la négation. Ce phénomène reflète les lois de De Morgan, un théorème de la logique formelle qui décrit l'interaction entre la conjonction, la disjonction, et la négation. Nous proposons que ce même phénomène est également présent dans la langue française, mais qu'il ne se trouve pas dans le contexte de la négation propositionnelle forte. Nous concluons que cette divergence n'est pas due à une différence fondamentale entre les propriétés sémantiques du or anglais et du ou français, mais plutôt qu'elle est à cause du fait que l'opérateur disjonctif ou est un terme de polarité positive, puisque cet opérateur a effectivement la capacité d'exprimer un sens collectif dans certains autres contextes qui sont favorables aux TPPs. Nous comparons cette notion à quelques études antérieures sur le sujet, telles que celle de Szabolcsi (2002) sur la langue hongroise et celle de Goro (2003) sur la langue japonaise, qui ont également conclu que les opérateurs disjonctifs dans leurs langues d'étude respectives peuvent être considérés comme des termes de polarité positive.
The distributivity of coordinated constituents under negative scope

Summary

In this study, we posit that in order for phenomena occurring in natural language to mirror structures of meaning present in artificial language, such as first-order logic, these structures must be universally recognized by all human languages. We focus on a specific phenomenon occurring in the English language in which the disjunctive operator or is able to bear both distributive and collective meanings under negative scope. This semantic principle mirrors De Morgan’s Laws, a theorem in formal logic that describes the interaction between conjunction, disjunction, and negation. We propose that this same phenomenon is present in the French language, though it does not occur in cases of strong clause-mate negation. We conclude that this discrepancy is not due to a fundamental difference in the logical properties of the English or and the French ou, but rather due to the fact that the French disjunctive operator ou is a positive polarity item, as it is able to bear a collective reading in PPI-friendly environments. We compare this finding to some previous studies on the matter such as those of Szabolesci (2002) on Hungarian and Goro (2003) on Japanese, who both also conclude that the disjunctive operators in their respective languages of study may be considered as positive polarity items.
Acknowledgements

First and foremost, I would like to express my deep gratitude toward my advisor, Dr. Manuel Espanol-Echevarria, whose enthusiastic supervision never ceased to inspire and to encourage me throughout this process.

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Introduction

Traditionally, systems of artificial language as studied by logicians and systems of natural language as studied by linguists have stood in theoretical opposition against one another. Many a linguist has balked at the concept of applying the laws of logical language to the study of natural language (cf. Nidditch 1952). The main point of contention between the two domains seems to be the notorious ambiguity of natural language, which ostensibly cannot be adequately illustrated by a clear-cut, “perfect” logical system of grammar, such as those present in artificial languages.

Nonetheless, this theoretical dichotomy has not stopped some semanticists from attempting to incorporate the cognitive reasoning behind symbolic logic to the study of natural language. Famously, Richard Montague proclaimed that he “reject[ed] the contention that an important theoretical difference exists between formal and natural languages” (Montague 1974; 188) and thus attempted to describe a fragment of the English language using his system of grammar, based upon a truth-conditional framework and a model-theoretic viewpoint. One need only consider the enduring popularity of notion of Logical Form (LF) in the study natural language syntax to comprehend the fundamental way in which logical reasoning has marked linguistic analysis (cf. Chomsky 1975, May 1985, Heim & Kratzer 1998).

One can certainly see the appeal of applying the study of logical structure to linguistic research, as oftentimes patterns of meaning in natural language seem to stand parallel to certain principles apparent in logical systems of reasoning. However, when such similarities occur, further linguistic investigation is necessary. The present study focuses on one such natural language phenomenon mirroring logical reasoning; specifically, we will be examining the logical notions of negation, conjunction, and disjunction as they pertain to natural language constructions. Much linguistic investigation has been dedicated to the phenomenon of the possible collective interpretation of the disjunctive operator or under negative scope in the English
language\(^1\). Plainly, this phenomenon shows that constituents coordinated by the English conjunction *or*, when under negative scope, can be ambiguous\(^2\) and bear both a distributive (disjunctive) reading (cf. Reading 1 in (1)) as well as a collective (conjunctive) reading (cf. Reading 2 in (1)). In the words of Huddleston & Pullum (2002), “when a sub-clausal *or*-coordination falls within the scope a negative, it is equivalent to an *and*-coordination of negative clauses” (1299). The following example demonstrates such an occurrence in the English language:

(1) I didn’t like his mother or his father.

Reading 1: [I didn’t like his mother] OR [I didn’t like his father]

\[ \textit{not } A \text{-or-} B \]

Reading 2: [I didn’t like his mother] AND [I didn’t like his father]

\[ \textit{not-} A \text{ and not-} B \]

(from Huddleston & Pullum 2002; 1299)

This possible collective reading in everyday English interestingly mirrors the logical principle of the second of De Morgan’s Laws, a theorem from classical logic that illustrates the interaction between negation, conjunction, and disjunction. The second of De Morgan’s Laws states that the disjunction of two negated arguments is logically equivalent to the conjunction of the same negated arguments:

(2) De Morgan’s Laws

\[ \neg (p \land q) = \neg (p) \lor \neg (q) \]

\[ \neg (p \lor q) = \neg (p) \land \neg (q) \]

If logical language can be used as a tool to illustrate some of the inner workings of natural language, it would seem as though (1) would be a prime example. If we assume that the semantic motivation behind the natural language example (1) can be

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\(^2\) While such a structure is ambiguous, as two possible readings are available, Huddleston & Pullum (2002) observe that “*or* generally falls within the scope of preceding negative, but wide-scope [distributive readings are often possible as less likely interpretations” (1299). It must be noted that while the narrow-scope [collective] interpretation is more salient, the wide-scope [distributive] interpretation is often possible.
illustrated by the cognitive reasoning of De Morgan's Laws, we would then have to assume that this logical principle is universally valid in all human languages.

The goal of the present study is to determine whether the logical principles illustrated by De Morgan's Laws are present in the same type of syntactic structure in other languages than English. This is not a strikingly new research concept; there already exists a good deal of literature examining De Morgan's Laws in a cross-linguistic context (cf. Szabolcsi 2002, Goro 2003). The present study, however, is the first, to our knowledge, to undertake a comparative study of this phenomenon in the context of the French language. Some researchers have found that the disjunctive operator in a given language of study does not yield the same semantic properties as its English counterpart, or. Our findings are parallel to these previous studies, and we will show that the French disjunctive operator ou is not ambiguous and cannot bear a collective reading under negative scope in the same contexts as the English or. We posit that this discrepancy in the interaction between disjunction and negation in the French and English languages is not due to the non-universal cognitive reasoning behind De Morgan's Laws, but rather is tied to a semantic issue linked to the concept of affective polarity licensing conditions. In sum, the fact that the French disjunctive operator ou does not yield the same interpretational ambiguity as its English counterpart in certain contexts, is not due to a fundamental difference in the logical properties of or and ou, but rather due to a specific linguistic constraint in the French language, that of ou being a positive polarity item that has a restricted interpretation under direct negative scope. We will support this argument by showing that in certain PPI-friendly contexts, ou follows De Morgan's Laws and is able to bear a collective reading.

The outline of the present study is the following. In Chapter One, we will lay out some fundamental background information regarding coordination and negation in both logical language and natural language (namely, the English language). In Chapter Two, we will delve deeper into the concept of negation, classifying certain negative expressions in a hierarchy of monotonic expressions. In Chapter Three, we will present some background information on the concept of polarity items, terms that are licensed
depending on the affective context of their surroundings. In Chapter Four, we will present an overview of the finding of two previous attempts to give a cross-linguistic account of De Morgan's Laws, in the Hungarian language (Szabolcsi 2002), and in the Japanese language (Goro 2003). Finally, in Chapter Five, we will give our own analysis of the possible interpretations of the French disjunctive operator ou under negative scope, first, by exploring some semantic and distributional discrepancies between the negative French coordinator ni and the neg-ou construction, and secondly by analyzing the semantic properties of the neg-ou construction in a variety of PPI-friendly contexts in order to make a case for ou being classified as a positive polarity item. We will discuss PPI-licensing, and make some interesting parallels between these conditions and negative polarity item licensing conditions.

The main purpose of the current study is to present an overview of the issues facing the application of certain aspects of logical reasoning to natural language in a cross-linguistic context. Though we will present some possible arguments for the phenomena in the final chapter of the study, we will allow that this subject merits further research. Further study into the matter, including more in-depth corpus research and linguistic testing, could yield more conclusive results. The current study represents a first stab at accounting for the discrepancy between disjunctive constructions under negative scope in the English and French languages.
Chapter One – Coordination and Negation

As De Morgan’s Laws are founded on the interaction between conjunction, disjunction, and negation in logical language, some background theoretical information on coordination and negation is in order before we proceed to any kind of linguistic analysis. The intention of the current chapter is not only to provide necessary theoretical information that will be useful in later analysis, but also to address some controversies surrounding the application of the logical constructions of negation and coordination to the study of natural language syntax and semantics. We will discuss coordination from both the perspective of propositional logic, in which arguments are coordinated by connectives, as well as those logical connectives counterparts in natural language, coordinating conjunctions such as and and or. Finally, we will address negation from a metalinguistic viewpoint, before exploring the semantic role of De Morgan’s Laws in the context of the English language.

1.1 The Logic of Coordination

Ironically, we will be introducing the complex and much-studied concept of coordination with a simple definition of the topic at hand. Quite simply, coordination is the operation, in both natural language and artificial language, of linking together pieces of information (conjuncts) that for the most part, are of equal grammatical value. In a natural language such as English, this task is accomplished with such coordinating conjunctions as and, for, but, or, yet, and so.

(1) a. He took up a sheet of paper and a pencil.
b. I preferred to tell her the truth, for I knew she would not be displeased if she knew it.
c. He wanted to speak, but he could not.
d. He may come today or tomorrow.
e. She was rather bad-tempered, yet I liked her.
f. He never came back, so he was taken for dead.

(from Attal 1987; 849-867)

The natural language coordinating conjunctions and and or have first-order logical counterparts in the domain of propositional calculus; these are represented by logical connectives, the conjunction operator [\( \land \)] and the disjunctive operator [\( \lor \)]. Natural language conjunctions are intimately tied to logical connectives, as they both serve the same fundamental purpose: to link information in their given systems of grammar. However, in the analysis of the validity of arguments in the domain of propositional calculus, connective operators play the substantial role of allowing the veracity of a complex formula to be verified by means of logical analysis. Simply put, a logical connective such as the [\( \lor \)]-operator or the [\( \land \)]-operator allows us to analyze the composite parts of complex formulae in order to determine the overall meaning for the whole. The principle that the meaning of a complex formula is composed of the meaning of the sum of its parts is a wholly Fregean viewpoint, specifically referring to the Principle of Compositionality, which states that “the meaning of composite expression must be built up from the meanings of its composite parts” (Gamut 1991; 5).

As Gamut (1991; 26) points out, natural language is not always “ideally suited to investigations into the validity of arguments” because it “contain[s] ambiguities”. This is not the case for the analysis of complex formulae in the domain of propositional calculus, which allows us to analyze the truth-values by means of the logical implications of the connectives involved. In first-order propositional calculus, these truth-values are illustrated by truth tables, in which arguments are represented by variables \( p, q, r \), and truth-values are represented by the digits 1 (true) and 0 (false). The following truth tables represent the truth-values of the [\( \land \)]-connective (conjunction) and the [\( \lor \)]-connective (disjunction):
# Truth Table for $[\land]$-Connective

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<th>$p$</th>
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# Truth Table for $[\lor]$-Connective

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We must note that in logical terms, the $[\lor]$-operator represents an inclusive kind of disjunction, which explains why the disjunction of two true arguments results in a [1] truth-value. Some logicians (cf. Gamut 1991: 199) consider that there also exists a separate connective representing an exclusive kind of disjunction, in which two arguments cannot be mutually true; this connective is called the $[\oplus]$-operator:

# Truth Table for $[\oplus]$-Connective

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We will discuss the dichotomy of inclusive and exclusive disjunction in greater detail later in this chapter.

As we can ascertain from the preceding truth tables, the truth-value of a complex formula linked by a connective depends upon the truth-values assigned to each linked individual argument. To give a natural language perspective to this concept, let us consider the following example:

(2) \( \text{John is selfish}_p \) and \( \text{Anna is happy}_q \)

In order for the logical structure of this complex sentence to be factual (that is to say, in order for \( (p \land q = 1) \), both arguments \( p \) and \( q \) must have a value of 1 (true). If one of the arguments is false, the whole complex sentence will prove to be false as well:

John is selfish = 1
Anna is happy = 0
John is selfish and Anna is happy = 0

In the domain of propositional calculus, we can combine not only atomic formulas but also composite formulas by using linking operators and bracketing, and derive the value of the increasingly complex formula by means of logical computation. This kind of computation can be done automatically and leaves no room for ambiguity. As we have stated, this is one of the major differences between artificial languages and natural languages, and one of the reasons for which logical languages cannot always adequately account for natural language phenomena. As we will see in the proceeding section, certain semantic nuances reflected in the usage of natural language coordinators such as \textit{and} and \textit{or} cannot be described by logical operators.
1.2 Coordination in Natural Language

In natural language grammar, coordination generally refers to the linking of sequences of words that generally have an equal syntactic value\(^3\); in the domain of syntactic analysis, such groups is known as a constituents. For example, in the following sentence, the NPs *a medium coffee* and *a piece of pie* are constituents coordinated by the conjunction *and*:

(3) John bought *a medium coffee* and *a piece of pie*.

Similarly to the logical connectives of propositional calculus, coordinating conjunctions such as *and* serve the role of linking individual constituents in order to form new, complex argument sentences. Coordinate sentences consist of two or more constituent sentences and a conjunction, with the constituent sentences generally being of equal status; as Downing & Locke (2006) observe, "[constituent sentences] can be conjoined when they share related meanings and fulfil the same function" (285). In terms of the equal status of constituents, Huddleston & Pullum (2002) note that, in general, "the equality of the [constituents] is reflected in the fact that usually either of them could stand alone in place of the whole coordination (which adjustment of the agreement features where necessary)" (1275). For example, the conjuncts for a sentence such as *Kim and Pat*

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\(^3\) We must slightly refine this definition to allow for exceptions to this rule occurring in natural language. There exist numerous examples of coordinated conjuncts that are not of the same syntactic category, per Sag et al. (1985; 117):

(i) a. Pat is either stupid or a liar. [AP or NP]
b. Pat is a Republican and proud of it. [NP and AP]
c. Pat is healthy and of sound mind. [AP and PP]
d. Pat is either asleep or at the office. [AP or PP]
e. That was a rude remark and in very bad taste. [NP and PP]

Both coordinated conjuncts are, generally, of the same category or semantic type, or rather, are suitable for their surrounding environment (cf. the external homogeneity condition of Höhle 1991). The examples in (ia-e) are possible because the predicate *be* has several c-selection options and therefore can accept all conjuncts of semantic type \(<e,t>\). (cf. Cormack & Smith 2005). For example, the conjuncts *stupid* (AP) and *a liar* (NP) in (ia) are compatibly coordinated as they both require a certain type of argument (a predicative VP) to yield an interpretable sentence.
speak excellent French can stand alone: Kim speaks excellent French and Pat speaks excellent French. Though the description and classification of coordinate structures is markedly more complex than these preliminary definitions, we will not delve very much deeper into the theoretical notion of coordination, as it would be beyond the scope of the present study. Our current goal is to compare and contrast the preceding model of the coordination of constituent structures of natural language with the logical concept of atomic sentences.

It is widely known that the atomic sentences linked by connectives in propositional logic cannot fully illustrate the pragmatic meaning of certain instances of the and-conjunction in natural language (cf. Carston 1993). Certainly, they can be considered syntactic counterparts, serving to link composite structures of meaning in their respective domains, as Gamut (1991; 58) states:

(4) From a syntactic point of view, the connectives of propositional logic are coordinating; they combine two formulas in one new formula in which they both have a role to play. And the conjunctions in natural language which correspond to logical conjunction and disjunction, and and or, are coordinating conjunctions too.

Through the syntactic process of gapping, natural language coordinate sentences may be reduced by removing redundant lexical information (cf. McCawley 1998). In this way, a coordinate construction that contains what would be two logical propositional arguments becomes a simpler sentence:

(5) a. [Bob drinks coffee] or [Bob drinks beer]. (p ∨ q)
   b. Bob drinks coffee or beer.

Indeed, the connectives [∧] and [∨] are the logical counterparts of and and or, but, as we have noted, these natural language conjunctions can oftentimes create semantic situations that are inexplicable by means of logical illustration. Gamut (1991; 197) cites the following sentences as an example of a natural language problem that cannot be adequately represented by the truth tables of propositional calculus:
(6)  a. Annie took off her socks and jumped into bed.
    b. Annie jumped into bed and took off her socks.

If we were to translate the preceding examples into propositional logic, we would end up with the same semantic value for both sentences:

\[ p = \text{Annie took off her socks} \]
\[ q = \text{Annie jumped into bed} \]

(6)  a. \((p \land q) = \)
    b. \((q \land p) \)

From a logical viewpoint, the two sentences, i.e. (6a) and (6b), have an equal value. However, any English speaker reading the examples in (6) knows that the two sentences do not have an equal semantic value. Both sentences imply that Annie completed one of the actions before the other (either taking off her socks before jumping into bed, or jumping into bed before taking off her socks). In such a sentence, the conjunction *and* takes on a temporal value. Pragmatically and logically, this nuance of meaning is quite important, as these sentences are not true in the same situations for English speakers. As Downing & Locke (2006) observe, "conjunctions [such as *and*] express the semantic relationship between the units that they connect, reflecting the speaker's view of the connection between states of affairs in the world" (294). In simple propositional calculus, it is quite impossible to derive the temporal significance of the conjunction by

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4 Levinson (1985; 119) discusses this issue in terms of one of major distinguishing properties of pragmatic implicatures, *cancellability*. In the following examples, we see that (i) implicates (ii), as we can *cancel* (ii) as in (iii):

(i) Joe taunted Ralph and Ralph hit him.
(ii) First Joe taunted Ralph and then Ralph hit him.
(iii) Joe taunted Ralph and Ralph hit him, but not necessarily in that order.

There is some discussion, however, per Levinson (1985) that this *cancellability* argument is rather cumbersome and unnecessary, and that (iii) does not *cancel* (ii), per se, but merely serves to disambiguate the dual meaning of (i).
translating the examples with the \( \land \)-operator. Gamut (1991) remarks that one solution to the problem would be to apply a second meaning to the \( \land \)-operator, roughly translating to *and then*; however, this double meaning would certainly create an unnecessary ambiguity.

In natural language, the conjunction *and* can also convey a casual and consequentiality meaning between the two linked conjuncts; again, this kind of semantic relationship cannot be fully represented by the first-order logical operator \( \land \). Let us consider the following examples:

(7)  
\begin{align*}
\text{a. He gave up semantics and felt much happier.} \\
\text{b. He felt much happier and gave up semantics.}
\end{align*}

(from Blakemore & Carston 2005; 570)

The preceding two sentences have markedly different meanings. (7a) implies that the individual gave up semantics, and as consequence, felt much happier, whereas (7b) implies that the subject’s giving up semantics was a consequence of feeling much happier. Again, the translation of such sentences into first-order propositional calculus would yield an identical reading of \( p \land q \).

We can apply the Fregean Principle of Compositionality to the preceding natural language examples by arguing that the meaning of the complex sentence is a function of the meaning of the two constituent sentences and the semantic function of the linking conjunction. For example, the sentence *John was caught stealing and was fired Tuesday* carries a cause-and-effect signification, which is a product of the fusion of the two conjuncts *John was caught stealing* and *[John] was fired Tuesday*. Unlinked, these two premises are certainly acceptable, but only linked do they denote the cause-and-effect relationship between the two events (John was fired Tuesday because he was caught stealing). In other words, the semantic effect of the complex sentence is derived directly from the linking of the conjuncts; however, the conjuncts must function as independent premises by their own right, as Blakemore & Carston (2005; 573) remark:
The conjuncts of an and-utterance may make a rather different sort of contribution to the interpretation of the utterance, in that they may be detached from the conjunctive logical form and function as independent premises in the process of inferring an intended cognitive effect...although they are no longer conjoined, the conjuncts must function collectively in the derivation of the cognitive effect.

As we’ve attempted to show in this section, the cognitive effect derived by a conjunction such as and in natural language does not necessarily translate to simple forms of propositional calculus. We will see in the following sections that this non-translation of cognitive effects is not restricted to the semantic relationship between the conjunction and the [∧]-operator, but also affects other grammatical elements in natural language and their logical counterparts.

### 1.3 Disjunction in Natural Language

Gamut (1991; 199) states that the extent to which the semantic relationship between the connective [∨] in logical language and the natural language conjunction or holds is an even more hotly contested topic than the relationship between and and the [∧]-operator. The controversy surrounding this pairing mostly centres on the supposed distinction between inclusive and exclusive disjunction. As we stated earlier in this chapter, classic propositional logic dictates that the disjunction operator [∨] represents an inclusive kind of disjunction, in which the disjunctive formula is true when both of its disjuncts are (p or q or both), as illustrated on the [∨]-operator truth table:

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Though some logicians remain agnostic to the claim that exclusive disjunction merits its own operator, still others readily use the separate operator, which differs from [v]-operator in that the disjunctive formula is false if both disjuncts are true (p or q but not both):

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Linguists seem to be also divided on the question of which operator most frequently corresponds to the natural language conjunction or. Both Gamut (1991) and Fillenbaum (1974) claim that or in its natural language context is generally exclusive, or at least ambiguous. However, Noveck et al. (2002; 298)'s investigation into the interpretation of disjunction in natural language found that “participants’ natural inclinations concerning or tend towards being inclusive”; the researchers claim that interpretations are initially inclusive before becoming exclusive by way of sentence modification (such as placing the disjuncts in a syntactical construction like either...or).

Pragmatically, certain natural language examples of or seem to cry out for either an exclusive or inclusive interpretation. Noveck et al. (2002) and Gamut (1991) cite the following examples as utterances that clearly force either an inclusive or an exclusive interpretation:
(9)  
   a. An applicant should have a degree in engineering or five years of programming experience.
   b. John has an MD or a PhD.

      (from Noveck et al. 2002; 298)

(10)  
   a. Customers who are teachers or college students are entitled to a special reduction.
   b. We are going on a hike or we are going to the theatre.

      (from Gamut 1991; 200)

(9a) and (10a) seem to veer toward an inclusive interpretation (in which a winning applicant could possess both qualifications, and both teachers and students are entitled to a reduction), whereas (9b) and (10b), according to the researchers, appear to present a choice between two options. We are quite incredulous toward the assertion that (9b) and (10b) present a solely exclusive interpretation, as in any possible world, an individual could possess both an MD and a PhD, and one could go on a hike and go to the theatre in the same day. Gamut (1991; 201) does, however, present two examples in which the two disjuncts are mutually exclusive:

(11)  
   a. It is raining or it is not raining.
   b. John is in London or John is in Paris.

Truly, these two utterances present disjuncts that logically cannot be true at the same time. However, as Gamut points out, these kinds of examples only reinforce the fact that a separate exclusive disjunctive operator is unnecessary. In example (11a), there would be no difference in truth-value whether the or were inclusive or not, as it is logically impossible for it to both rain and not rain. As the two disjuncts in the example can never be true at the same time, the inclusive disjunctive operator would give the same result as the exclusive operator. From this perspective, Gamut (1991; 201) states that “an exclusive or is completely unnecessary for the analysis of disjunctions where the disjuncts rule each other out, logically or in practice”.

15
Regardless of such controversies surrounding disjunction, for the purposes of our study, it is important to differentiate between the possibility of both exclusive and inclusive disjunction. As Noveck et al (2002; 304) note, in the case of de Morgan’s Laws, the logical theorem on which we are basing our study, the sentence *John did not buy ice cream or chips* is logically equivalent to *John did not buy ice cream and he did not buy chips*. Noveck et al. (2002) remark that if we were to consider the *or* in this sentence as inclusive, only one possibility would be pragmatically viable: that he bought neither ice cream nor chips. If we were to consider the *or* as exclusive, the sentence would present the possibility that a) he bought neither or b) he bought both. However, in order for meaning (b) to be available, from a pragmatic standpoint, more information must be available – *John didn’t buy ice cream OR chips – he bought both*. While it is true that such a sentence could have an ambiguous reading from a pragmatic viewpoint, we remain sceptical to the idea that the sentence could entail the possibility of a *both* reading in a conversational context without the addition of the *he bought both* tag. As we are working on the assumption that de Morgan’s Laws entails the “neither” reading (though it also presents the possibility of an “either...or”, meaning that he either didn’t buy ice cream or he didn’t buy chips, as mentioned), we prefer to base our analysis of the disjunction *or* on an inclusive approach. It is for that reason that we will remain agnostic on the possibility of a logical exclusive disjunction applicable to natural language contexts in the type of non-tagged examples that we will present in this study.

1.4 Negation in Logical Language and Natural Language

The relation between negation in logical language and natural language is a much-studied topic, equally fraught with controversy. As Hintikka (2002; 585) notes, “in logic, negation is usually taken to be a simple, unproblematic notion, perhaps a mere reversal of the concepts of truth and falsity(...)in contrast, linguists have found negation in natural language a highly complex subject full of puzzling phenomena”. Propositional calculus uses the $[-]$-operator as a marker to represent negation. The truth-values of the $[-]$-operator can be found in the truth table below:
TRUTH TABLE FOR [¬]-OPERATOR

<table>
<thead>
<tr>
<th>p</th>
<th>¬p</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>0</td>
</tr>
<tr>
<td>0</td>
<td>1</td>
</tr>
</tbody>
</table>

In terms of natural language, Ladusaw (1996; 321) notes that the semantic principle of negation “is rooted in an opposition between two elements which are inconsistent with each other”. Lexically, the English repertoire of “negative elements” can be considered as consisting of lexemes that form binary oppositions with affirmative elements, whether they be prefixed morphemes, adverbial markers, or quantifiers. Examples of these binary oppositions in natural language are numerous:

<table>
<thead>
<tr>
<th>Kind of Negation</th>
<th>Affirmative</th>
<th>Negative</th>
</tr>
</thead>
<tbody>
<tr>
<td>prefixed morpheme</td>
<td>grammatical</td>
<td>ungrammatical</td>
</tr>
<tr>
<td>quantifiers</td>
<td>many students</td>
<td>few students</td>
</tr>
<tr>
<td>adverbial markers</td>
<td>some students</td>
<td>no students</td>
</tr>
<tr>
<td></td>
<td>sometimes</td>
<td>never</td>
</tr>
<tr>
<td></td>
<td>often</td>
<td>rarely</td>
</tr>
</tbody>
</table>

If we were to translate some of the preceding examples into logical formulas, we would clearly grasp the distinction between the truthfulness and falsity represented by the [¬]-operator. As Ladusaw (1996; 322) remarks, “the Boolean relations [of affirmative and negative oppositions in natural language] are preserved in such a way that sentences containing these phrases are correctly predicated to have contradictory truth conditions without formal decompositions which would assimilate each to analysis in terms of propositional negation”. Let us take the example of the prefixed negative morpheme un-. The prefix un- in natural language integrates itself to the morphology of the affirmative sentence, much like the [¬] in propositional calculus, to mark negation:

---

5 We will further discuss ways of understanding negative binary oppositions in section 2.1.
(12) a. The sentence is grammatical. \((p)\)
    b. The sentence is ungrammatical. \(\neg p\)

\([\neg p] = "It \ is \ not \ the \ case \ that \ the \ sentence \ is \ grammatical"

Though Ladusaw argues that the morphological asymmetry between negation and affirmation may be typologically similar to that of formal logic (meaning, that natural language uses negative morphological markers whereas formal logic employs the \([-]\)-operator), this syntactic aspect does not tell the whole story. Plainly put, negative sentences in natural language cannot always be semantically equated to negative formulas in formal logic.

The pragmatic ambiguity of negation in natural language is too far-reaching a concept to be adequately represented by the \([-]\)-operator. Some common uses of negation in everyday language require contextual and conversational information in order to properly process the information being given by the speaker. Horn (1989) discusses this issue, providing the following utterances:

(13) a. \textit{Some} men aren’t chauvinists – \textit{all} men are chauvinists.
    b. Chris didn’t manage to solve \textit{some} of the problems – he managed to solve \textit{all} of the problems.

(from Horn 1989; 370)

(14) a. Around here, we don’t like coffee, we love it.
    b. That wasn’t a bad year, it was horrible.
    c. I’m not happy he’s gone – I’m elated.

(from Horn 1989; 382)

Examples (13a-b) show a certain ambiguity in the first part of the sentence, which is disambiguated in the second part. If we were to state that \textit{some men aren’t chauvinists}, it could either imply that \textit{all men are chauvinists} or \textit{not all men are chauvinists}, and vice-
versa. As Horn (1989; 370) remarks, this kind of conversational implicatum by
definition “are not part of logical form”. Examples (14a-c) demonstrate another kind of
conversational implicature, based upon lexical scalar predicates. In the case of (14a), the
English language speaker immediately comprehends the meaning of the sentence because
he is familiar with the lexical classification of the two negated predicates involved; the
speaker’s appreciation of coffee is greater than that expressed by the predicate to like.
Such a sentence rendered in formal language would be hopelessly contradictory due to its
inability to adequately express the pragmatically-induced value of such scalar
implicatures. Quite simply, morphological markers are not always accurate in expressing
certain negative contexts; as Ladusaw (1996; 323) notes, “the morphology of negation in
natural languages does not generally explicitly differentiate between negation within the
theory of semantic content and oppositions which are created in the pragmatic aspect of
utterance interpretation”.

1.5 De Morgan’s Laws

We’ve spent much of the current chapter discussing some of the difficulties that
arise when applying the principles of logical language to the study of natural language.
We’ve cited several natural language contexts in which the operators of propositional
calculus cannot sufficiently express the semantic value of the utterance. Our goal in
outlining these kinds of difficulties is to demonstrate that while some phenomena in
natural language cannot be properly illustrated by means of logical principle, it often
occurs that the structure of natural language corresponds to logical reasoning. As we
mentioned in our introduction to this study, when such phenomena occurs, they certainly
merit further investigation.

Our study focuses on the relationship between the principle of De Morgan’s
Laws, a theorem from classical logic, and a certain construction in natural language, the
ambiguity of the disjunctive conjunction or under negative scope. De Morgan’s Laws
describe the logical interaction between conjunction, disjunction and negation, asserting
that the negation of two arguments linked by the [\wedge]-operator is logically equivalent to the disjunction of two negatively marked arguments, and vice-versa.

(15) De Morgan’s Laws
    a. \neg (p \wedge q) = \neg (p) \vee \neg (q)
    b. \neg (p \vee q) = \neg (p) \wedge \neg (q)

First let us examine the first of the De Morgan’s Laws (cf. 15a) in a natural language setting. The following example demonstrates the negation of two conjuncts:

(16) *John does not like coffee* \(p\) and *John does not like tea* \(q\).

We will transform the example to a more concise sentence by means of gapping, the syntactic process of removing redundant grammatical information:

(17) John does not like coffee and tea.

Applying the first of De Morgan’s Laws (\(\neg (p \wedge q) = \neg (p) \vee \neg (q)\)) to (14), we see that the example is logically equivalent to the following sentence:

(18) *John does not like coffee* or *John does not like tea*.

If it is the case that either “John likes coffee” or “John likes tea” is false, (17) will prove false as well. We will now examine the second of De Morgan’s Laws. Let us consider the following example:

(19) John does not like coffee or tea.

This coordinate sentence, which mirrors the logical construct (\(\neg (p \vee q)\)) is ambiguous and can have two distinct interpretations.
(20)  a. John does not like coffee or John does not like tea.
       b. John does not like coffee and John does not like tea.

The way in which one chooses to interpret the sentence depends upon whether we give
the negative element a wide-scope reading or narrow-scope reading. In semantic terms,
Giannakidou (1997; 17) defines scope as:

(21)  \textit{Semantic scope}

An expression $a$ is in the semantic scope of an expression $b$ iff the interpretation of
$a$ is affected by the semantic contribution of $b$.

The interpretation of the sentence depends upon the scope of the negative marker \textit{not}. If
we were to interpret the sentence with a narrow-scope reading, \textit{not} would negate each
one of the constituents, resulting in the distributive (disjunctive) meaning ($\neg p \lor \neg q$):

(22)  John does not like tea or coffee.
      John likes [(NOT coffee) \textbf{OR} [(NOT tea)]
      \textbf{OR} > NOT

If we were to interpret the sentence with a wide-scope reading, \textit{not} would negate the
predicate \textit{to like}, and the negated predicate would scope over the disjunctive operator
resulting in the collective (conjunctive) meaning ($\neg p \land \neg q$):

(23)  John does not like coffee or tea.
      John NOT [(likes (coffee or tea)]
      NOT > OR

The ambiguity of the preceding sentence lies in the way in which the reader interprets the
scope of the negation. This is a syntactical and semantic matter, but as we can well see,
the collective interpretation of constituents coordinated by a disjunctive operator under
negative scope is a logical issue, clearly illustrated by De Morgan’s Laws. As we’ve
previously mentioned, logical reasoning is based upon human cognitive faculties, and therefore, the principles of logic should be universally salient by all humans. If the preceding construction, by which we mean the collective interpretation of a disjunctive operator under negative scope, is disallowed in a given language, it is unreasonable to assume that it is due to a case of faulty logic. Later in this study, we will explore some languages in which the disjunctive operator does not bear a collective reading under negative scope, including Hungarian (cf. Szabolcsi 2002) and Japanese (cf. Goro 2003). In the final chapter of this study, we will discuss this kind of construction in the French language, and explore the reason for which the disjunctive operator ou does not seem to be ambiguous and does not bear the collective, wide-scope reading like its English counterpart or under direct negative scope.

1.6 Chapter Summary

In this chapter, we have attempted to define, both logically and as they pertain to natural language, the concepts of coordination and negation in order to give a solid background to some of the issues that will be raised in this study. We have also addressed some of the controversy surrounding the use of artificial languages, such as first-order propositional calculus, to describe or illustrate certain constructions that occur in natural language. Logical languages present the semantics of negative and connective operators to be universally sound; however, due to the ambiguous nature of natural language, it is sometimes difficult to judge the validity of such logical constructs in the context of all conversational utterances. As we have shown, the meanings of certain types of utterances cannot be adequately described or illustrated by means of logical reasoning. We have discussed the incompatibility of certain natural language phenomena involving conjunction and negation, but also addressed the important distinction between exclusive and inclusive disjunction in both logical and natural languages. We have also shown that certain phenomena in natural language seem to mirror the principles of logical reasoning, specifically in the case of De Morgan’s Laws. We have stated that the second of De Morgan’s Laws corresponds to a well-known construction in the English language, which can have two distinct interpretations due to scope ambiguity. Though this
phenomenon appears to be well established in the English language, it may not be semantically universal and occur in all natural languages, which is a matter that merits further discussion and linguistic investigation.
Chapter Two – Monotonicity Phenomena

In the first chapter of our study, we provided a brief overview of the concept of negation as it pertains to both logical and natural language. We have also discussed the complex nature of negation in natural language, showing meaning patterns that represent ambiguities that cannot be adequately described by logical reasoning alone. In this chapter, we will introduce the concept of monotonicity, which is intimately linked to negation as defined by de Morgan’s Laws. In this discussion of monotonic expressions, we will attempt to show that negative contexts in natural language can be classified according to the licensing effect that they have on their surrounding environment.

2.1 Strong and Weak Negation

Not all negative expressions are created equal, a concept to which many previous studies on the matter can attest (cf. Klima 1964, van der Wouden 1997). In exploring the effect of negative contexts on the interpretation of disjunction, we must take varying degrees of negation into account. The terms strong and weak, when describing negation, are ambiguously used in semantics literature, and therefore further clarification is needed in order to show in which way we plan to use these terms. To preface, we will first discuss which kind of distinction between weak and strong negation we will not address. We will not be working within Horn (1989)’s conception of weak and strong negation, based on the semi-classical propositional logic of Von Wright (1959). In this system, a distinction is made between a strong negative operator (¬p) and a weak negative operator (¬ - p). Horn (1989; 132) describes the system as follows:

(1) In this system, strong negation (¬p) is an affirmation and a denial...Like the corresponding term logic predications S is P and S is not-P, p and ¬p may both be
false, namely, when the subject doesn't exist or when it exists but the predicate cannot be naturally applied to it. Weak negation (- p), on the other hand, is a contradictory operator, corresponding to predicate denial, amounting to the proposition that it is not true that p.

This distinction between strong and weak negation has an important consequence for the logic of negation, namely that strong negation follows the first of de Morgan's Laws, whereas weak negation does not. To give some natural language perspective on the dichotomy of weak and strong negation, Horn (1989; 133) provides the following examples:

(2)  a. The number 7 is white.  [p]
    b. The number 7 is not white.  [-p]
    c. The number 7 is not-white.  [¬p]

Whereas the negative operator [¬] represents a strong opposition to an argument, the weaker [-] operator represents a denial. This echoes Aristotle's model of contradictory versus contrary negation (cf. La Palme Reyes et al. 1994, Horn 1989). As La Palme Reyes et al. (1994; 48) note, Aristotle believed that the syntactic difference between these two types of negation (contradictory representing wide-scope predicate negation [- p] and contrary representing narrow scope predicate negation [¬p]) has an important consequence for the semantics of the sentence. This is evident when we reformulate the sentences: it is not a white log does not require the object in question to be a log at all, while if it is a not-white log, the object is necessarily a log. La Palme et al. (1994; 45) examine another example of Aristotelian contradictory versus contrary negation with a discussion of the difference between the terms not honest and dishonest, which they argue correspond to this framework of weak and strong negation:

(3)  a. John is not honest. [- p]
    b. John is dishonest. [¬p]
(3b), the instance of contrary negation, seems stronger than (3a), the instance of contradictory negation: while we must accept that John is either honest or not honest, it would not be contradictory to state that he is neither honest or dishonest.

While discussions of this dichotomous vision of strong versus weak negation are quite interesting, we will be focusing rather on a hierarchical organisation of negation in which negative expressions are organized according to their logical properties for the purposes of this study. In the past, some researchers (cf. Ross 1973) have worked in a framework in which negative expressions can be ranked in a hierarchy based upon assumptions regarding the semantic nature of the element in question; the negative expressions in question are ranked from “weakest” to “strongest”:

\[ \text{few in object} > \text{few in subject} > \text{seldom} > \text{hardly} > \text{nothing in object} > \text{no in subject} > \text{not} \]
(from Ross 1973, cited in van der Wouden 1994)

As van der Wouden (1994) notes, it is difficult to hypothesize on any possible usefulness in comparing expressions in such a vague model, as the semantic properties of the terms are not well defined from a logical standpoint; the hierarchy relies too heavily on the researcher’s own intuitions. Prior to linguistic research on monotonic expressions, such “weaker” negative expressions as \text{few} and \text{rarely}, were ranked lower than “strong” expressions such as \text{nobody} and \text{never} without any logical reasoning to back such assertions up. In our present study, we will be using a framework in which affective negative contexts are ranked in a hierarchy based on de Morgan’s Laws. This model will allow us to examine the interaction between disjunction (or in Boolean logic, a \text{join}), conjunction (in Boolean logic, a \text{meet}), and negation. As a general term, we refer to the classification of such expressions as monotonicity phenomena.
2.2 Monotonicity in Mathematical Language

Monotonicity is a well-known concept in the field of mathematics. Hoeksema (1986; 29) introduces the mathematical notion of monotonicity by the following definition:

(4) A function \( f \) is said to be monotone increasing if \( x > y \) implies that \( f(x) > f(y) \). In more pedantic terms: \( f \) is directly monotone with respect to the greater-than relation. In yet other terms: \( f \) preserves the ordering on its domain. Examples of monotone increasing functions are:

a. \( f(x) = 2x \)

b. \( g(x) = x + 2 \)

c. \( h(x) = x^3 \)

So for each of the above functions, the following inference scheme is valid:

a. \( f(x) > a \)

b. \( y > x \)

\[ \therefore f(y) > a \]

Monotonicity, as it is understood in linguistic terms, can equally be characterized as describing a function that has an effect upon a given term in its immediate environment. As Hoeksema (1986; 30) points out, similarly to the study of the domain of mathematical language, some approaches to natural language (specifically categorial grammar, cf. Adjukiewicz 1935, Steedman 1996) deal with concepts such as the structural implications of operator-operand and function-argument. It is unarguable that certain natural language operators yield a semantic effect upon their surrounding terms. In the following sections of this chapter, we will describe a well-known hierarchy of some natural-language monotonic expressions in terms of their logic implications and the semantic effect that they yield upon their surroundings.
2.3 What is a Negative Context?

The use of the concept of monotonicity to describe negation phenomena in natural language is clearly a response to a certain vagueness surrounding the question of what constitutes a negative context, which we briefly touched upon in 2.1. The overall semantic concept of negation is notoriously controversial. What exactly qualifies as a negative context? In the introduction to his seminal study of English negation, Klima (1964; 249) cites the following examples of negative contexts:

(5) a. The students did not believe that it had happened.
b. The students never believed that it had happened.
c. The students hardly believed that it had happened.
d. The students rarely believed that it had happened.
e. None of the students believed that it had happened.
f. Few of the students believed that it had happened.
g. The students were unable to believe that it had happened.
h. The students were too intelligent to believe that it had happened.
i. The students doubted that it had happened.

Certain terms in the preceding list are unarguably of a “negative” nature, such as classical strong negative terms as not and never. However, what are we to make of such terms as few and hardly, which appear to have an affirmative value, and yet are routinely classified under the negative rubric? Jespersen (1917; 37-42) remarks that these phantom affirmative terms can be considered as instances of “incomplete negation”, which create semantic pairings with a strongly negative counterpart; for example, one such “negative pairing” could be proposed for the determiner few:

(6) Few students went to lunch. = Not many students went to lunch.
The idea that weak negation denotes this kind of semantic pairing with a strong negative item is an interesting proposal, but does not fully explain the relationship between two such terms. For example, we notice that \textit{few} licenses\textsuperscript{6} the same types of terms under its scope as \textit{not many}, terms that cannot be licensed in affirmative contexts, such as \textit{ever} and \textit{any}, as shown in (7) – (8):

(7)  
  a. \textbf{Not many} students \textit{ever} go to lunch.  
  b. \textbf{Few} students \textit{ever} go to lunch.  
  c. * \textbf{Many} students \textit{ever} to lunch.

(8)  
  a. \textbf{Not many} students had \textit{any} cake.  
  b. \textbf{Few} students had \textit{any} cake.  
  c. * \textbf{Many} students had \textit{any} cake.

As we will see later on, it is not a coincidence that these types of negative contexts are able to license these specific terms, while affirmative contexts cannot. However, we will see that the determiner \textit{every} is able to license terms such as \textit{ever} and \textit{any} as well:

(9)  
  a. \textbf{Every} partygoer who had \textit{any} of the potato salad was sick the next day.  
  b. \textbf{Every} student who has \textit{ever} dreamed of being an astronaut should sign up for that course.

\textit{Every} is able to license such special terms as \textit{ever} and \textit{any}, and yet, has no special relationship or semantic pairing with a strongly negative expression like \textit{few} does; this fact does not fit in to Jespersen (1917)'s dichotomous test for “negativity”. Clearly, definitions of what constitutes a negative context as opposed to a strong negative context

\textsuperscript{6} By using the term \textit{licensing}, we intend the following definition, based on Giannakidou (1997):  
\textbf{Licensing}  
(i) An item \textit{a} is said to be “licensed” by a property \textit{b} iff \textit{a}'s proper interpretation in a context \textit{c} requires that \textit{R (a,b)} hold in \textit{c}, for some relation \textit{R}.  
(ii) \textit{b} is the licensing semantic property or the expression carrying this property.  
We will revisit the concept of licensing in more depth in Chapter 3.
need to be refined. The concept of linguistic monotonicity, which we will present in the following sections, and its hierarchical consideration of negative contexts can therefore be seen as a response to the need to clarify this class of expressions. In the hierarchy of monotonic expressions, negative operators are classified according to their logical properties and their relation to the interplay between negative, conjunctive, and disjunctive operators. The following sections will describe the different classes of expressions belonging to this hierarchy.

2.4 Downward Entailing Expressions

The broadest category in the hierarchy of monotonic expressions is occupied by a class of downward entailing expressions, classified as weakly negative terms that share the property of negation with strong negative terms but “do not have the full range of semantic properties that classical negation has” (Ladusaw 1996; 324). This category includes such expressions as few and rarely. Downward entailing (DE) expressions (also referred to as monotone decreasing or downward monotonic expressions) create contexts in which the DE operator licenses an inference from a set to its subsets. Van der Wouden (1997) gives the following logical definition for this class of expressions:

\[(10) \quad \text{Definition of downward entailingness}
\]

Let \( B \) and \( B^* \) be two Boolean algebras. A function \( f \) from \( B \) to \( B^* \) is monotone decreasing iff for arbitrary elements \( X, Y \in B: X < Y \rightarrow f(Y) < f(X) \).

(from van der Wouden 1997; 95)

Some English examples of simple downward entailing expressions include few, seldom, and hardly:

\[(11) \quad \text{a. Few guests came to the party.} \rightarrow \text{Few guests came to the party early.}
\]

\[\text{b. I seldom read books.} \rightarrow \text{I seldom read police novels.}\]

\[\text{c. He hardly ever goes to class.} \rightarrow \text{He hardly ever goes to History class.}\]
The general category of downward-entailing terms\textsuperscript{7} can be further subdivided into three types of expressions in our monotonic hierarchy: antimultiplicative terms, anti-additive terms, and antimorphic terms. In the following sections, we will proceed to present these three categories.

### 2.5 Antimultiplicative and Anti-additive Expressions

Further along on our hierarchy of downward monotonic expressions are the classes of antimultiplicative and anti-additive expressions, which are defined as follows:

(12) \textit{Definition of antimultiplicativity}

Let B and B\textsuperscript{*} be two Boolean algebras. A function f from B to B\textsuperscript{*} is antimultiplicative iff for arbitrary elements X, Y, e B: f (X \cap Y) = f (X) \cup f (Y).

(from van der Wouden 1997 ; 99)

\ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ (from van der Wouden 1997 ; 99)

(13) \textit{Definition of anti-additivity}

Let B and B\textsuperscript{*} be two Boolean algebras. A function f from B to B\textsuperscript{*} is anti-additive iff for arbitrary elements X, Y e B: f (X \cup Y) = f (X) \cap f (Y).

(from van der Wouden 1997 ; 99)

From the preceding definitions, we see that antimultiplicativity has the characteristic of reversing meets, whereas anti-additivity has the characteristic of reversing joins. As the hierarchy dictates, while antimultiplicative and anti-additive terms are classified as

\textsuperscript{7} We will also note, for interest's sake, that inversely, there also exist upward-entailing expressions such as \textit{many} and \textit{all}:

\begin{enumerate}
  \item \textit{Definition of upward entailment}
    \begin{enumerate}
      \item Let B and B\textsuperscript{*} be two Boolean algebras. A function f from B to B\textsuperscript{*} is monotone increasing iff for arbitrary elements X, Y e B: X < Y \rightarrow f(X) < f (Y).
    \end{enumerate}
\end{enumerate}

(from van der Wouden 1997; 95)

Upward entailing expressions, such as \textit{many} and \textit{all} license inferences from a subset to a set:

\begin{enumerate}
  \item \textit{Many} children asked for cake \rightarrow \textit{Many} children asked for dessert.
  \item \textit{All} the students are required to take a French course. \rightarrow \textit{All} the students are required to take a language course.
\end{enumerate}
downward entailing, downward-entailingness does not imply anti-additivity or antimultiplicativity.

A natural language example of an antimultiplicative expression would be *not always*:

(14) John does *not always* brush his teeth and wash his face.

As *not always* is antimultiplicative, it does not join meets, and therefore *John does not always brush his teeth and wash his face* does not imply *John does not always brush his teeth and John does not always wash his face*, but rather:

(15) John does *not always* brush his teeth and wash his face. $\leftrightarrow$

John does *not always* brush his teeth or John does *not always* wash his face.

Natural language examples of anti-additive expressions include the terms *nobody, never, and nothing*. As we can well remark, the join of such expressions is logically equivalent to the meet:

(16) a. *Nobody* called or wrote. $\leftrightarrow$ *Nobody* called and nobody wrote.

b. I have *never* skied or ice-skated. $\leftrightarrow$ I have *never* skied and I have never ice-skated.

c. *Nothing* moved or made a sound. $\leftrightarrow$ *Nothing* moved and nothing made a sound.

We will further refine our categories of monotonicity in the next section by presenting some expressions that are both anti-additive and anti-multiplicative.  

As downward-entailing expressions have contrastive pairing with upward-entailing expressions, so do too anti-multiplicative and anti-additive expressions with multiplicative and additive expressions, which are defined in the following way:

(i) Definition of multiplicativity

Let $B$ and $B^*$ be two Boolean algebras. A function $f$ from $B$ to $B^*$ is multiplicative iff for arbitrary elements $X, Y \in B$: $f(X \cap Y) = f(X) \cap f(Y)$.

(from van der Wouden 1997; 96)
2.6 Antimorphic Expressions

Our final category of downward monotonic expressions is that of antimorphic expressions. Antimorphism combines the logical properties of both antimultiplicative and anti-additive expressions, as the terms belonging to this category have the ability to both reverse joins and reverse meets:

\[ f(X \cap Y) = f(X) \cup f(Y) \]
\[ f(X \cup Y) = f(X) \cap f(Y) \]

(from van der Wouden 1997; 104)

The natural language expression that creates antimorphic environments is not, whether collocated to a verb or noun phrase:9

(ii) Definition of additivity
Let B and B* be two Boolean algebras. A function f from B to B* is additive iff for arbitrary elements X, Y ∈ B:
\[ f(X \cup Y) = f(X) \cup f(Y) \]

(from van der Wouden 1997; 96)

Natural language examples of multiplicative expressions include always, while natural language examples of additive expressions include sometimes.

\[ \text{9 Much like our previous downward monotonic expressions, antimorphism also has an affirmative counterpart, homomorphism:} \]

(i) Definition of homomorphism
Let B and B* be two Boolean algebras. A function f from B to B* is homomorphic iff for arbitrary elements X, Y ∈ B:
\[ f(X \cap Y) = f(X) \cap f(Y) \]
\[ f(X \cup Y) = f(X) \cup f(Y) \]

(from van der Wouden 1997; 103)

Van der Wouden (1997; 97) remarks that several researchers (cf. Zwarts 1986 and Kas 1993) claim that proper names (John) and definite descriptions (the king of France) are the only kinds of expressions that create a homomorphic environment, due to the fact that these two kinds of noun phrases share the semantic
(18)  
   a. He did not talk and walk. \(\leftrightarrow\) He did not talk or he did not walk.  
   b. He did not talk or walk. \(\leftrightarrow\) He did not talk and he did not walk.

Thus concludes the brief introduction of our typology of downward monotonic expressions based on the logical properties of the natural language negative terms in question, detailing the weakest form of negation according to the hierarchy (simple downward-entailing expressions) to the strongest form (antimorphic expressions). What is the importance of this type of hierarchy of negative expressions? As Hoeksema (1986; 34) notes, the concept of monotonicity “is not just an interesting notion in theories of inference”, but also gives us a key to understanding how certain terms are licensed under the scope of such expressions. For example, as we’ve previously discussed (cf. section 2.3), there exist specific terms such as any and ever that are licensed by downward monotonic contexts and are thus dependant upon downward monotonic contexts. To use Hoeksema (1986; 35)’s example of this importance, let us consider the difference in monotonicity between at most three women (which creates a downward-entailing context) and at least three women (which does not create a downward-entailing context). Notice in the following paradigm that only the downward-entailing expression can license the term ever:

(19)  
   a. At most three women have ever loved him.  
   b. ? At least three women have ever loved him.  

(from Hoeksema 1986; 35)

type e (entity) in the Montagovian framework (cf. Montague 1974). Therefore, the veracity of the following natural language examples holds true:

(ii)  
   a. John talked and walked. \(\leftrightarrow\) John talked and John walked.  
   b. John talked or walked. \(\leftrightarrow\) John talked or John walked.
More interesting still is the distribution of certain types of these terms in regards to varying degrees of monotonicity. Van der Wouden (1997; 141) presents the following paradigm:

(20)  a. **Chomsky** wasn’t *a bit* happy about these facts.
     b. **Chomsky** didn’t talk about these facts *yet*.
     c. **Chomsky** didn’t talk about *any* of these facts.

(21)  a. *No one* was *a bit* happy about these facts.
     b. *No one* has talked about these facts *yet*.
     c. *No one* talked about *any* of these facts.

(22)  a. *At most three* linguists were *a bit* happy about these facts.
     b. *At most three* linguists have talked about these facts *yet*.
     c. *At most three* linguists have talked about *any* of these facts.

The distribution of *a bit, yet, and any* depends upon the strength of the downward monotonic operator in question. We see in (20a-c) that all three terms are acceptable under the scope of the antimorphic operator *not*. In (21a-c), only *yet* and *any* are acceptable under the scope of the anti-additive operator *no one; a bit* is restricted. Finally, in (22a-c) only *any* is acceptable under the scope of the downward-entailing operator *at most three; a bit* and *yet* are restricted. These examples illustrate that the distribution of these kinds of context-sensitive terms, hereafter referred to as *polarity items*, depends upon the specific type of monotonic environment that licenses it. We will explore these kinds of terms in some detail in the next chapter.

### 2.7 Chapter Summary

In this chapter, we have shown that the concept of negation in natural language is far more complex than the simple opposition between affirmative and negative contexts. By analyzing negative expressions within a hierarchal monotonic framework, we are able
to classify their strength by means of logical reasoning. We have identified four main classes of downward monotonic expressions in order of their strength (weakest to strongest): simple downward-entailing expressions, antimultiplicative and anti-additive expressions, and antimorphic expressions. As we have mentioned, the concept of monotonicity is more than just an interesting theory semantic of inferences. Monotonicity has a far greater consequence on lexical distribution in natural language, as downward-entailing operators license the distribution of a class of expressions called polarity items. This is an important concept, as the remainder of our study will deal heavily with polarity item licensing and distribution. The licensing and distribution of polarity items will help to explain why French disjunctive operator *ou* may not bear a collective interpretation under negative scope, like the English disjunctive operator *or* has the ability to do. Now that we have identified the typology of monotonic expressions, we must identify in detail how these terms affect other linguistic elements that fall under the scope of their influence.
Chapter Three - The Classification of Polarity Items

In the preceding chapter, we described some of the key properties of monotone-decreasing expressions, notably, that these expressions license semantic inferences from sets to subsets and that downward-entailing operators reverse Boolean joins and meets. As we briefly mentioned, a third characteristic that is crucial to the semantic makeup of monotone-decreasing expressions is their ability to create affective contexts in which negative polarity items (NPIs) such as any and ever are licensed. The ability to license such terms is characteristic of all classes of monotone-decreasing expressions, from simple downward entailing expressions such as few, to stronger antimorphic expressions such as not, as we can observe in the following examples:

(1) a. Few people have ever walked on the moon.
    b. I do not ever go to class.

The affective contexts that license polarity items have been a recurring topic of discussion in much syntactic and semantic research over the years. The concept of polarity is crucial to the present study, as it may help to explain why collective interpretations of constituents coordinated by disjunctive operators may be not semantically possible in all natural languages. In this chapter, we plan to examine the licensing of polarity items in both English and French.

3.1 The Licensing of Polarity Items in English

The study of negative polarity items (NPIs) has been a controversy-provoking topic ever since the first investigation of NPIs in the framework of generative grammar by Klima (1964), though as Hoeksema (2000; 118) notes, some large philological dictionaries such as the Oxford English Dictionary and its Dutch counterpart, the
Woordenboek der Nederlandsche Taal, had already commented upon the distributional properties of such items before they sparked the interest of theoretical linguists such as Klima. The licensing and distribution of polarity items may seem like a fairly instinctive process for the native speakers of a given language. Any native English speaker knows, for example, that while *I don’t have any money* is an acceptable utterance, *I have any money* is wholly ungrammatical. However, it wasn’t until Klima (1964) assessed the licensing contexts of such items that linguists became interested in the syntactic and semantic relationship between polarity items and the affective negative contexts expressions that call for their use. In order to adequately study the semantic value of a negative polarity item, it is essential to examine the licensing relation between the negative context of an utterance and the NPI itself. As Ladusaw (1996; 325) states, “a negative polarity item carries conventionalized requirements that limit its distribution to a proper subset of the grammatical contexts in which it would otherwise be expected to occur”. Simply put, polarity items are finicky terms that do not take very well to being used in a non-licensing context. As the distribution of polarity items is dependant upon a specific context, we must first define what we mean by the concept of semantic dependency:

(2) Semantic dependency

A linguistic expression $A$ is semantically dependant on a property $b$ iff $b$ is a semantic property and $A$ can be properly interpreted only if a certain relation $R$ holds between $A$ and something with the property $b$.

(from Giannakidou 1997; 14)

Working from the preceding definition of semantic dependency, we can state that a linguistic expression $A$ is a polarity item if it is semantically dependent on being licensed by an affective context, such as that provided by a negative expression. The polarity item $A$ can only be properly interpreted if a certain relation $R$ (a licensing relation) holds between $A$ (the polarity item) and something with the property $b$ (the affective context). It is also useful to state Giannakidou (1997)’s definition of polarity item licensing:
(3) **Polarity Item Licensing**

(i) A polarity item \(a\) is said to be "licensed" by a property \(b\) iff \(a\)'s proper interpretation in a context \(c\) requires that \(R(a, b)\) hold in \(c\), for some relation \(R\).

(ii) \(b\) is the licensing semantic property or the expression carrying this property.

In other words, if a polarity item is not properly licensed by a specific affective context, the result will be either (i) an ill-formed sentence due to restricted distribution (of non-licensing) of the item in question, or (ii) a sentence with a restricted interpretation, meaning that the sentence will be grammatical, but will have a particular interpretation, which can be called restricted because it corresponds to only one of the possible interpretations of an item that it contains. These two consequences will depend upon the type of polarity item in question; as we soon will see, some kinds of polarity items have stricter licensing conditions than others.

In the following list we present some examples of some proper licensing contexts for negative polarity items, terms that are licensed by negative contexts and some other downward-entailing expressions, juxtaposed with instances of these terms occurring in non-licensing affirmative contexts. In these specific cases, we see examples of ill-formed sentences due to the restricted distribution of the NPIs in question. In accordance with linguistic tradition, asterisks mark ungrammatical sentences:

(4) a. The dean didn’t sign *any* of the letters before she left.
   b. *The dean signed any of the letters before she left.

(5) a. I don’t *ever* take the train to work.
   b. *I ever take the train to work.

(6) a. They haven’t found a reliable contractor *yet*.
   b. *They have found a reliable contractor yet.

(7) a. Mark didn’t contribute *a red cent* to the relief fund.
   b. *Mark contributed a red cent to the relief fund.
a. I’m not *all that* anxious to visit them.

b. * I’m *all that* anxious to visit them.

(8)  

(from Ladusaw 1996; 325)

While NPIs are licensed by negative contexts, positive polarity items (PPIs) are not strictly licensed by any specific context, but are said to be unlicensed in negative contexts. This second category includes terms such as *some* and *already*. Unlike negative polarity items, however, when positive polarity items occur in a non-licensing context (such as under the scope of direct negation), their presence does not necessarily render a given sentence ungrammatical\(^\text{10}\). Rather, we encounter the second non-licensing consequence, that of the restricted interpretation of the polarity item. Let us compare the preceding examples of unlicensed NPIs ((4) – (8)) with the following list of unlicensed PPIs ((9) – (12)). In accordance with linguistic tradition, questions marks indicate questionable, but not necessarily ungrammatical sentences:

(9)  

a. Mary saw *some* interesting magazines at the newsstand.

b. * Mary didn’t see *some* interesting magazines at the newsstand.

(10)  

a. I have *already* finished my homework.

b. * I haven’t *already* finished my homework.

(11)  

a. I would *rather* go to that restaurant.

b. * I wouldn’t *rather* go to that restaurant.

(12)  

a. John was *somewhat* pleased with the dinner.

b. * John wasn’t *somewhat* pleased with the dinner.

\(^\text{10}\) It is important to note that there are exceptions to this general rule. In the following examples of unlicensed NPIs, the sentences are grammatically acceptable, but with a literal meaning which does not correspond to the meaning of their NPI counterpart:

(i)  

a. John didn’t *budge an inch*.

b. * John *budded an inch*.

(ii)  

a. John didn’t give me *a red cent*.

b. * John gave me *a red cent*.

This effect occurs mainly with a subtype of NPIs known as *minimizers*, expressions denoting some minimal quantity or extent. Other examples of such NPIs include *sleep a wink*, *lift a finger*, and *for all the tea in China* (cf. Israel 2001, Vallduvi 1993)
As we can see in (9-12), a violation caused by the insertion of a PPI in a non-licensing context, in general, differs greatly from that caused by the improper licensing of a NPI (cf. footnote 3). Simply put, it is a question of the dichotomy of restricted distribution versus restricted interpretation. In the case of an unlicensed PPI, the result is that a given sentence will be grammatical, but will have a particular interpretation because it corresponds to only one of the possible meanings that the item in question may contain. Much like the examples of metalinguistic negation that were discussed in section 1.4 (I don't like coffee – I love it!), sentences featuring PPI-disruption sometimes need a little extra contextual information in order to relay the meaning of the utterance:

(13) Mary didn’t see some interesting magazines at the newsstand – she saw several.
(14) Have you already finished your homework?
    I haven’t already finished my homework, so stop asking!

Another consequence of the restricted interpretation of PPIs in non-licensing contexts is the disambiguation of certain terms, specifically some-type PPIs. Let us consider a common example of a some-type PPI in a licensing, affirmative context:

(15) John called someone.

Pragmatically, this sentence can either be interpreted as (a) John calling a specific individual (referred to by the tag someone), or (b) simply to the mere fact that John placed a call to another human being. Let us consider the sentence in a negative context:

(16) John didn’t call someone.

We argue that due to the unlicensed some-type PPI, reading (b) is not possible; in order to obtain reading (b), the NPI anyone is the preferred choice. However, we believe that reading (a), the case in which someone refers a specific individual, still stands. Indeed, in all cases, even in an affirmative context, we can obtain the (a) reading. Furthermore,
with a little more contextual information, (16) could have a denial reading like that in (13):

(17) John didn’t call someone – he called his wife.

While PPIs generally have a restricted interpretation under direct negative scope, there exist certain conditions, enumerated by Szabolcsi (2004), under which this restriction can be lifted. First of all, while PPIs have a restricted interpretation under clause-mate antimorphic and anti-additive negation (John didn’t call someone), they can happily scope below cases of extra-clausal negation and other extra-clausal NPI licensors, as shown in the examples in (18):

(18) a. I don’t think that John called someone.
    b. No one thinks that John called someone.
    c. I regret that John called someone.
    d. Every boy who called someone got help.

(from Szabolcsi 2004; 415)

Secondly, while PPIs have a restricted interpretation within the immediate scope of strongly negative expressions (i.e., antimorphic expressions such as not), they are generally acceptable and have no restricted interpretation within the scope of merely monotone decreasing operators (such as at most five), as shown in the examples in (19):

(19) a. ? John didn’t call someone.
    b. ? No one called someone.
    c. ? John came to the party without someone.
    d. At most five boys called someone.

(from Szabolcsi 2004; 414)
A third condition on restricted interpretation lifting within the scope of a strongly negative context is the presence of some scopal element intervening\textsuperscript{11} between the negative expression and the PPI. In the examples in (20), the intervening elements are underlined:

(20) a. John didn’t offend someone \textit{because he was malicious (but because he was stupid)}.
   b. Not every student said something.
   c. John didn’t say something \textit{at every party}.
   d. John didn’t show every boy something.

(from Szabolcsi 2004; 415)

The fact that certain syntactic and semantic modifications can alter the licensing environments for these terms inevitably leads to the question of how exactly polarity items are licensed in the first place. As we have previously remarked, polarity items are notoriously context sensitive\textsuperscript{12} linguistic elements. The question of how they are licensed is the subject of recurring controversy in the linguistic community. Are polarity items licensed syntactically, semantically, or pragmatically? The camp that believes that these items are semantically licensed point to the fact that NPIs and PPIs are syntactically heterogeneous in nature; the class of polarity-sensitive items range from determiners such as \textit{any} to adverbs like \textit{ever}. This would seem to make a strong case for polar-licensing being based on a semantic or pragmatic level, rather than a syntactic level. Furthermore, the fact that not only strong antimorphic expressions such as \textit{not} as well as weak negative expressions (downward-entailing operators such as \textit{few}) license NPI-ready context seems to indicate that NPIs are not licensed by negative grammatical

\textsuperscript{11} We will discuss this kind of intervention effect, particularly in regards to \textit{because}-clauses like that in (20a), further in Chapter 5.

\textsuperscript{12} It must be noted that there exist certain contexts in which NPIs and PPIs are both acceptable and mix freely. As Ladusaw (1996; 327) notes, \textit{if}-antecedent conditionals as well as polar yes/no questions are such a type of environment that can host both kinds of polarity items:

(i) If anyone /someone noticed anything unusual, it should be reported to campus police.
(ii) Has anyone /someone already figured out the answer?

NPIs and PPIs may also mix freely in embedded clauses under a negative scope clause, a context which we will discuss at length later in this study.
markers *per se*, but rather the negative implicature of a given expression in a communicative context provides an argument for pragmatic licensing. Ladusaw (1996; 329) demonstrates this principle by showing that some non-monotonic quantifiers do, in fact, allow NPIs. This is shown in (21), in which the NPI *budged an inch* is allowed under the non-monotonic quantifier *exactly*:

(21) **Exactly** four people in the whole room *budged an inch* when I asked for help.

The argument that polarity items are solely licensed by semantic or pragmatic contexts does have some flaws, however. As we’ve shown, the fact that PPIs can happily scope under antimorphic expressions when there is an intervening scopal element involved, as shown in (20), seems to be a syntactically motivated phenomenon, which would contradict semantic-strict licensing. Additionally, as Ladusaw (1996; 333) shows, the licensor (the negative element) must always c-command the licensee (the NPI) in surface structure:

(22) a. The teachers didn’t attend *any* of the meetings.
   b. *Any* of the teachers didn’t attend the meeting.

(23) a. He read none of the stories to *any* of the children.
   b. *He read any* of the stories to none of the children.

In our own analysis of the French coordinating conjunction *ou* under negative scope in Chapter Five of this study, we will revisit this debate in order to further discuss some of the syntactical motivations for PPI-licensing.

### 3.2. **Negative Polarity Items in French**

Hoeksema (2000; 117) observes that the polarity phenomenon is semantically universal: “so far all evidence suggests that polarity sensitivity is equally universal...the literature does not mention a single candidate for the status of a natural language with a completely polarity-insensitive vocabulary”. Hoeksema adds that artificial languages,
such as programming languages and first-order logical languages, typically feature negative markers, but there exist no items within the syntax of the language that could be considered as polarity sensitive. Based on this observation, it would seem as though polarity sensitivity is not a strictly logical feature in natural language, but rather a "deeply ingrained feature" (Hoeksema 2000; 117).

Cross-linguistic studies focussing on the inventory of polarity sensitive items in a given language are numerous. While the actual inventory of the kinds of words that are polarity sensitive vary a great deal among natural languages, the underlying feature of polarity phenomena remains universally static: polarity items are sensitive to certain affective licensing conditions. In this section, we will focus on polarity item licensing in the French language. Before discussing negative polarity in the French language, we must first give some brief background information on the system of negation in French.

The system of negation in English usually features a negative-morpheme marker:

(24) a. I am not going to class today.
    b. Nobody likes spinach.
    c. I have never been to that part of town.

In contrast, like most Romance languages, French is a negative concord language, in which two (or more) negative markers may interact to express a single negation within a sentence:

    "I called nobody"
    b. Je n’ai jamais rencontré Jean.
    "I have never met Jean"
    c. Marie n’a rien reçu pour Noël.
    "Marie received nothing for Christmas"
Negative operators such as personne (25a) and rien (25c), which we will refer to henceforth as French n-words, correspond more or less to such English negative quantifying specimens as nobody and nothing. In conjunction with the negative particle ne, they create a sole instance of negation within a sentence. They are not negative polarity items. For the purposes of this study, it is crucial to highlight the differences between French n-words and French NPIs. In this section, we will explain the subtle differences between these two types of terms.

Let us consider the following examples:

(26) a. Je n’ai appelé personne.
    “I called nobody”

b. Je n’ai pas appelé qui que ce soit.
    “I did not call anybody”

(27) a. Je n’ai rien fait.
    “I did nothing”

b. Je n’ai pas fait quoi que ce soit.
    “I did not do anything”

(26a) and (27a) are examples of French n-words personne “nobody” and rien “nothing”, while (26b) and (27b) are examples of French NPIs qui que ce soit “anyone” and quoi que ce soit “anything”. As we can see, the French n-words in (26a) and (27a) stand alone, syntactically, while the NPIs in (26b) and (27b) must be licensed under the scope of a negative marker:

(28) a. Il n’a rien dit.
    “He said nothing”

b. * Il a dit quoi que ce soit.
    “He said anything”

(from de Swart 2001; 119)
Furthermore, such n-words as rien and personne can be used alone in response to affirmative queries, which is not the case for NPIs (cf. Zanuttini 1997, Valduvi 1994, de Swart 2001):

(29) Qu’est-ce que tu fais?
    “What are you doing?”
    a. Rien.
    b. * Quoi que ce soit.

(30) Qui a appelé?
    “Who called?”
    a. Personne.
    b. * Qui que ce soit.

As Mathieu (2001) remarks, as Zanuttini (1991) originally demonstrated, another difference between French n-words and NPIs is that n-words can be modified by certain adverbs such as presque “almost”, pratiquement “practically”, and absolument “absolutely”, whereas NPIs cannot (331):

(31) a. Jean (n’) a presque rien fait.
    “Jean did almost nothing”
    *“Jean did almost anything”

b. Jean (n’) a pratiquement rien fait.
    “Jean has done practically nothing”
    *“Jean has done practically anything.”

c. Jean (n’) a absolument rien fait.
    “Jean has done absolutely nothing”
    *“Jean has done absolutely anything”

(from Mathieu 2001; 331)
The preceding three differences between n-words and NPIs in French mirror some differences between English negative quantifier specimens like nobody and English NPIs like anybody. The final difference between French n-words and NPIs is specific to the French language, as it deals with the question of negative concord. As de Swart (2001; 118) states, it is widely known that the antimorphic operator ne...pas “not” is not considered as part of the negative concord system in French, as it cannot mix freely with French n-words in standard French13 to create a single negation:

(32)  a. Il n’est pas jamais venu.  
     “He didn’t never come”
     b. Il n’a pas appelé personne.  
     “He didn’t call nobody”
     c. Il n’a pas rien reçu.  
     “He didn’t receive nothing”

In (32a-c), the sentences do not express a single negation, but rather double negations, as indicated in the English translations. Il n’est pas jamais venu “he didn’t never come” does not mean that he never came, but in fact implies that he did come. On the other hand, French NPIs can mix freely with ne...pas to create a single negation:

(33)  a. Je n’en ai pas la moindre idée.  
     “I do not have the slightest idea”
     b. Ce n’est pas très catholique.  
     “It is not very orthodox”
     c. Il n’a pas un sou.  
     “He has not a penny”

We recall these subtle yet crucial differences between French n-words and French NPIs in Chapter 5, when we discuss the nature of the negative French conjunction ni. For now, in the next section, we will discuss some characteristics of French PPIs.

13 These kinds of constructions sometimes occur in some dialectal varieties of French, such as Quebecois.
3.3. Positive Polarity Items in French

Up to this point, much less linguistic investigation has been made into the matter of French PPIs. However, the distribution of PPIs in French is a crucial matter in our study. The inventory of PPIs in French generally covers two categories of terms: i) PPIs that have a restricted distribution under negative scope, and ii) PPIs that show a strong preference for outscoping negation, which tend toward a forced or preferred interpretation (cf. Tovena, Déprez & Jayez 2004; 399). We will now discuss the first class of PPIs. In this class, we find terms that have a restricted distribution, which includes terms that are not interpretable in anti-licensing contexts (as in 34), as well as terms that are strictly part of idioms that do not mix with negation (as in 35):

(34) a. Gaston aimerait mieux se reposer
    “Gaston would rather rest”

b. * Gaston n’aimerait pas mieux se reposer.
    “Gaston wouldn’t rather rest”

    “I am delighted”

b. * Je n’en suis pas bien aise.
    “I am not delighted”

(from Tovena, Déprez & Jayez 2004; 400)

To the second class belong PPIs that overscope negation, the result of which is a restricted interpretation of the term. Tovena, Déprez, & Jayez (2004; 400) further subdivide these classes in two types: i) adverbs of temporal perspective, in which the negated item “merely falsifies the sentence”, such as in (36), which mirrors the behaviour of the English already (14) and ii) existential terms that have a forced interpretation, such as in (37), which mirrors the English someone (16):
(36) a. Il est déjà parti.
   "He has already left"
   b. ? Il n’est pas déjà parti (il était même en retard)
   "He has not already left (actually he was late)"

(37) a. Il a vu quelqu’un
   "He saw someone"
   b. ? Il n’a pas vu quelqu’un (une personne en particulier)
   "He did not see someone (a particular person)"

We are most interested by the second kind of PPI, which overscope negation and therefore have a restricted interpretation in the context of clause-mate negation, as we believe this concept may be key to understanding why the French disjunctive operator ou is unable to bear a collective reading under clause-mate negation like its English counterpart; this is an argument to which we will return in the final chapter of our study. It is important to remember that unlike NPIs, PPIs are not licensed by any specific context\(^\text{14}\); however, by the way in which they react under clause-mate negation, one could say that PPIs are “antiLicensed” by negative expressions such as not (Tovena, Déprez & Jayez 2004; 399). The consequence of this “anti-licensing” will be a restriction on the semantic properties of the term itself, and, pragmatically will result in a strict interpretation of the utterance.

### 3. 4. Chapter Summary

In this chapter we have introduced the concept of polarity items, natural language terms that are licensed by a specific affective context. Negative polarity items are licensed by negative contexts and therefore, are unacceptable in affirmative sentences. Positive polarity items are slightly less contextually sensitive than their polar counterpart, as they are not licensed by any specific context. However, PPIs are considered as being

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\(^{14}\) See also footnote 10 for a brief discussion of certain contexts in which NPIs and PPIs mix freely.
“anti-licensed” by clause-mate negation, the result of which is not grammatical acceptability in most cases, but a forced or restricted interpretation. We have also explored the concept of polarity items from a cross-linguistic point of view, by discussing the inventory of polarity items in French. We have discussed the crucial distinction between French n-words such as personne and rien, which create negative contexts, and French NPIs such as quoi que ce soit and qui que ce soit, which are licensed by negative contexts. We have also explored two classes of positive polarity items in French: i) those that have a restricted distribution of non-literal readings under negative scope, and ii) those that show a strong preference for outscoping negation, and therefore have a restricted interpretation in negative contexts. This second class of positive polarity items will be of particular interest to this study in our discussion of the French disjunctive operator ou under negative scope in Chapter Five.
Chapter Four – A Survey of Cross-Linguistic Studies of Disjunction

There have been several studies and general discussions exploring the interpretative properties of disjunctive operators under negative scope in a cross-linguistic context. Among the languages studied and/or discussed, according to Szabolcsi & Haddican (2004; 220), are English and German (in which disjunctive operators bear a collective reading under negative scope), as well as Hungarian, Japanese, Russian, Italian, and Serbian (in which disjunctive operators cannot bear a collective reading under negative scope). The consensus among researchers studying this subject is that in cases in which the or-coordinator in a given language cannot be interpreted collectively under negative scope, we can classify the disjunctive operator as a positive polarity item. As we’ve seen in the previous chapter, PPIs are mostly found in affirmative contexts, but are sometimes acceptable in negative contexts albeit with a restricted interpretation. This would explain the reason for which an or-coordinator under negative scope in a given language cannot bear a collective reading. In this chapter, we will examine the findings of two of these studies.

4.1 The disjunctive operators vagy and ka under clause-mate negation

As we have previously noted, the English disjunctive operator or can be interpreted conjunctively when under the scope of negation:

(1) I do not like cake or pie.

   (i) [I do not like cake] OR [I do not like pie] [(¬p) ∨ (¬q)]
   (ii) [I do not like cake] AND [I do not like pie] [(¬p ∧ q)]
Szabolcsi (2002)’s study of Hungarian disjunction under negative scope reveals that the disjunctive operator *vagy* does not react in the same fashion as English *or* in the context of clause-mate negation. When *vagy* is found within the scope of a negative expression *nem*, it is almost always interpreted disjunctively. Szabolcsi notes that the Hungarian sentence in (2) is therefore not ambiguous in the same way as its English counterpart is:

(2) \textit{Nem cskutuk be az ajtót vagy az ablakot.}

“We didn’t close the door or the window”

(i) [We didn’t close the door] OR [We didn’t close the window] \([\neg p \lor \neg q]\)

(ii) * [We didn’t close the door] AND [We didn’t close the window] \([\neg (p \land q)]\)

(from Szabolcsi 2002; 219)

In his study of the Japanese disjunctive operator *ka* under negative scope, Goro (2003; 3) makes a similar finding; when occurring under clause-mate negation, *ka* “or” cannot be read conjunctively:

(3) \textit{Taro-wa eigo ka nihongo-wo hanasenai.}

“Taro cannot speak English or Japanese”

(i) [Taro cannot speak English] OR [Taro cannot speak Japanese] \([\neg p \lor \neg q]\)

(ii) * [Taro cannot speak English] AND [Taro cannot speak Japanese] \([\neg (p \land q)]\)

(from Goro 2003; 4)

Based on these findings, one would be quick to jump to the conclusion that the disjunctive operators *vagy* and *ka* in these respective languages do not logically correspond to the English operator *or*, which has the ability to express collective readings under clause-mate negation. However, this would be a false assumption based on the exceptions to the examples presented by the authors. This situation seems to indicate that these respective disjunctive operators behave like PPIs; we will discuss these findings in the following sections.
4.2 Vagy and ka under the scope of extra-clausal negation

We will recall from our discussion of positive polarity items (PPIs) (cf. section 3.1) that one key characteristic of PPIs when found in non-licensing environments is their restrictive interpretation. While PPIs aren’t necessarily ungrammatical in non-licensing environments (in cases of negation, for example), they do have a restricted semantic interpretation. This may explain the reason why the Hungarian disjunctive operator vagy can be used grammatically under negative scope, but has a very strict, non-ambiguous distributive reading in comparison to the English operator or. Let us recall that one of the main characteristics of some-type PPIs is their restricted interpretation under direct negative scope; when PPIs are found in the context of extra-clausal negation, no interpretative restriction occurs. Szabolcsi (2002) observes that the following example, in which vagy appears in the embedded clause while the negative expression nem appears in the matrix clause, can indeed be read conjunctively and does bear out the second of de Morgan’s Laws:

(4) Nem hiszem, hogy becsvukt volna az ajtot vagy az ablakot.
   “I don’t think that we closed the door or the window”
   (i) I don’t think that [we closed the door] OR [we closed the window] [(¬p) ∨ (¬q)]
   (ii) I don’t think that [we closed the door] AND [we closed the window] [¬ (p ∧ q)]
   (from Szabolcsi 2002; 223)

However, it is important to address, in regards to the restricted distribution/interpretation debate on the subject of PPIs, Szabolcsi’s discussion of “the division of labour between conjunction and disjunction and the systematic divergence of acceptable versus preferred choices” (2002; 223). For example, Szabolcsi notes that while a collective reading featuring vagy is perfectly acceptable in cases of extra-clausal negation, és “and”, is usually the preferred connective of choice:

(5) Nem hiszem, hogy becsvukt volna az ajtot és az ablakot.
   “I don’t think that we closed the door and the window”
It is important to differentiate between “acceptable” readings and “preferred” readings when compiling data from native language speakers. While certain grammatical constructions can have a preferred reading, this does not exclude the construction from having a second acceptable interpretation. Nonetheless, Szabolcsi (2002) does confirm that *vagy* can bear a collective reading under extra-clausal negation, further supporting this observation by exploring some other extra-clausal negative environments, such as those created by combining the subordinating complementizer *hogy* with negative particles *nem* “not” and *ne* “not-subjunctive”. As predicted, *vagy* happily scopes below the resulting constructions headed by *nemhogy* and *nehogy*, creating a collective reading in the following examples, much like the Hungarian PPI *vala*- “some”:

(6)  *Nemhogy* becsuktad volna az ajtot vagy az ablakot…
     “Let alone closing the door or the window…”

(7)  *Nehogy* becsukjad az ajtot vagy az ablakot!
     “Don’t you close the door or the window!”

(from Szabolcsi 2002; 225)

Goro (2003) makes a parallel observation in terms of the possible conjunctive reading of disjunctive operator *ka* under extra-clausal negation. As Goro (2003) shows, the disjunctive operator *ka* in Japanese cannot be interpreted conjunctively under direct negative scope. One could make the argument that this is a syntactical problem, tied to the position of the object and the NEG-operator in Japanese. As Goro (2003; 2) notes, Japanese is a strict head-final language, whose basic word order is generally thought to be S-O-V. As English is a S-V-O language, a brief explanation of the role of negative scope in Japanese is necessary in order to compare clause-mate versus extra-clausal negation in these two languages. In Japanese, negation appears on clause-final predicates as a bound morpheme. There are no quantificational negative operators like *no*, or

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15 This may be due to pragmatic reasons, since “and” is more informative than “or”, and thus this choice better suits Grice’s Cooperative Principle (cf. Grice 1975).
negative adverbs like *never and negation always appears between the verb root and the tense morpheme:

(8)  
\[ \text{tabe-ta} \quad \text{tabe-nakat-ta} \quad ^*\text{tabe-ta-nai/nakatta} \]
\[ \text{eat-Past} \quad \text{eat-neg-Past} \quad ^*\text{eat-Past-neg} \]

Since in sentences such as (9):

(9)  
\[ \text{Taro-wa eigo ka nihongo-wo hanaseru.} \]
\[ \text{Taro English or Japanese-ACC speak-able-neg-Pres.} \]
\[ "\text{Taro cannot speak English or Japanese"} \]

the direct object precedes the negation, one could argue that *ka’s unwillingness to scope under the negative operator is due to the position of the direct object. This case would be parallel to the case of disjunctive constituents in subject position in English, which also scope over negation and have a distributive interpretation, if we assume that subjects in English raise from a VP-internal position\(^\text{16}\):

(10)  
\[ \text{John or Mary did not come.} \]

In (10), the disjunction cannot be interpreted under the scope of negation. However, it is important to note, the scopal relation between negation and quantified arguments shows subject/object asymmetry (at least with some quantifiers) in Japanese. As Goro shows, while quantified subjects cannot be assigned scope under negation, quantified objects can easily scope under negation:

\(^\text{16}\) According to the VP-Internal Hypothesis, the subject is generated internal to the VP, and due to syntactic movement, raises above negation to its surface Spec, IP position, which is why subject position scopes over negation (cf. Koopman & Sportiche 1991). See, for instance, the interpretation of (10).
(11) Takusan-no gakusha ga Taro-wo hihansinakatta.
Many-gen scientist-top Taro-acc criticize-neg-past
“Many scientists did not criticize Taro”

* \(\rightarrow\) MANY

(12) Taro-wa takusan-no gakusha-wo hihansinakatta.
“Taro did not criticize many scientists”
\(\rightarrow\) MANY
(from Goro 2003; 2)

So while one could make the argument that the reason for which \(ka\) is not interpreted conjunctively under negative scope is due to the fact that the neg-operator cannot scope over the object position, we see, based on examples like (11), that this is not true, as it is possible for quantified objects to be interpreted under the scope of negation. The fact that \(ka\) does not bear a collective reading in negative contexts is not an issue of the inability of Japanese negation to scope over object position, but rather an issue of the restricted interpretation of \(ka\) under clause-mate negation. If it were the case that the exclusively distributive reading in (9) were due to the negation’s inability to c-command object position, we should see the same result in (13). But as Goro shows, this is not the case, and (13), in which \(ka\) is embedded in a relative clause, is still able to bear a collective reading:

(13) Taro-wa [[Rel clause eigo \(ka\) nihongo-wo hanaseru] gakusei]-wo minakatta.
“Taro didn’t see a student who can speak English or Japanese”
\(\rightarrow\) [Taro didn’t see a student who can speak English] AND [Taro didn’t see a student who can speak Japanese] \([\neg(p \land q)]\)
(from Goro 2003; 8)

Goro also shows that when \(ka\) appears in the verbal complement clause, it is interpreted inside the scope of negation and has a conjunctive interpretation:
Taro-wa [pro sono gakkai-de John ka Mary-ni atta]-to iwanakatta

"Taro didn't say that he met John or Mary at the conference"

\[ \rightarrow \text{[Taro didn't say that he met John at the conference] AND [Taro didn't say that he met Mary at the conference]} \quad [\neg (p \wedge q)] \]

(from Goro 2003; 9)

This data seems to indicate that the fact that \textit{vagy} and \textit{ka} do not react in the same fashion as \textit{or} under clause-mate negation is not due to some sort of underlying semantic or logical issue. The fact that these disjunctive operators can happily bear a collective reading under extra-clusual negation would indicate that there is a greater issue at hand, that of polarity sensitivity. In the next section, we will explore some other cases, involving a variety of monotonic-decreasing expressions, in which \textit{vagy} and \textit{ka} can be interpreted collectively.

4.3 \textit{Vagy and ka under the scope of other downward-entailing operators}

Previously in this chapter, we discussed the disjunctive operators \textit{vagy} and \textit{ka}'s inability to scope under clause-mate negation, the result of which is the inability for constituents coordinated with these operators to be interpreted collectively. As these operators seem to be interpreted collectively quite easily under extra-clausual negation, it may be assumed that the collective interpretation relies on the locality of negation. However, this assumption would fail to take into account some other salient findings in Szabolcsi (2002) and Goro (2003)'s studies.

The negative expression explored up to present in our survey of these studies, \textit{not}, has been of an antimorphic nature. We will recall that while PPIs always have either a restricted distribution or interpretation under strong antimorphic, and sometimes anti-additive, operators, they generally are allowed, restriction-free, under simple downward-entailing operators (cf. section 3.1). This also seems to be the case for the disjunctive operators \textit{vagy} and \textit{ka}. Szabolcsi (2002) demonstrates that the locality of the negative
expression no longer becomes an issue in cases in which the negative expression is of a simple downward-entailing nature. We see that \textit{vagy} scopes quite happily under the downward-entailing expression \textit{few}, bearing both a distributive and collective reading:

\begin{enumerate}
\item[(15)] Kevés fiú hivta fel Katit vagy Marit.
   \begin{quote}
   "Few boys called Katy or Mary"
   \end{quote}
   (i) [Few boys called Katy] OR [Few boys called Mary] \[\neg p \lor \neg q\]
   (ii) [Few boys called Katy] AND [Few boys called Mary] \[\neg (p \land q)\]
   (from Szabolcsi 2002; 228)
\end{enumerate}

Goro (2003; 24) also observes that the Japanese disjunctive operator \textit{ka} can also be interpreted collectively in a variety of downward-entailing contexts:

\begin{enumerate}
\item[(16)] Taro-wa John ka Mary-ga haittekuru mae-ni happyou-wo hajimeta.
   \begin{quote}
   "Taro started the presentation BEFORE John or Mary came in"
   \end{quote}
   (i) [Taro started the presentation before John came in] OR [Taro started the presentation before Mary came in] \[\neg p \lor \neg q\]
   (ii) [Taro started the presentation before John came in] AND [Taro started the presentation before Mary came in] \[\neg (p \land q)\]
\end{enumerate}

\begin{enumerate}
\item[(17)] Dono eigo ka nihongo-wo hanaseru gakusei-mo gokaku sita.
   \begin{quote}
   "EVERY student who can speak English or Japanese passed the exam"
   \end{quote}
   (i) [Every student who can speak English passed the exam] OR [Every student who can speak Japanese passed the exam] \[\neg p \lor \neg q\]
   (ii) [Every student who can speak English passed the exam] AND [Every student who can speak Japanese passed the exam] \[\neg (p \land q)\]
\end{enumerate}
(18) Ringo ka mikan-wo taberu koto-wo kinshi-sita.
   "Taro FORBADE you eating apple or orange"
(i) [Taro forbade you eating apple] OR [Taro forbade you eating orange]
   \[ (\neg p) \lor (\neg q) \]
(ii) [Taro forbade you eating apple] AND [Taro forbade you eating orange]
    \[ \neg (p \land q) \]

Based on the parallel findings of Szabolcsi (2002) and Goro (2003) to present, the evidence is quite compelling for the classification of \textit{vagy} and \textit{ka} as positive polarity items. We will explore one more condition of PPI interpretation restriction lifting that applies to both disjunctive operators in the following section.

4.4 Intervention effects in Hungarian and Japanese disjunction

We recall that one final condition of PPI restricted interpretation lifting as discussed by Szabolcsi (2004) (cf. section 3.1). Szabolcsi (2004; 415) notes that when some scopal element intervenes between a negative expression and a positive polarity item, the PPI can quite happily scope under negation, as seen in (19):

(19) John didn’t \textit{always} call someone.

Szabolcsi (2002; 232) observes that this intervention effect is also valid for the Hungarian \textit{vagy}; when some adverbial scopal element intervenes between negative expression \textit{nem} and disjunctive operator \textit{vagy}, the sentence is able to bear a collective reading:

(20) Janos nem hivta fel \textit{mindig} Katit vagy Marit.
   "John didn’t always call Kati or Mari"
(i) [John didn’t always call Kati] OR [John didn’t always call Mari]
    \[ (\neg p) \lor (\neg q) \]
(ii) [John didn’t always call Kati] AND [John didn’t always call Mari]
    \[ \neg (p \land q) \]
Both (20) and (21) behave like the English PPI *someone* in (19), easily scoping under negation when shielded by an intervening scopal element. Goro (2003) makes a parallel observation in the Japanese language, however, with some background syntactic information. As Goro remarks, it is difficult to find exact parallels between the syntactical location of PPIs and negation in English and Japanese due to the difference in word order of these two languages. Taking this into account, Goro cites an example in which the two following conditions for scopal intervention are met: “(i) the intervening qualifier [meaning, an element that limits or qualifies another words, phrase, or clause] should be under the scope of negation, and (ii) the PPI should be under the scope of the intervening qualifier” (2003; 11):

(22) Taro-wa *hitotu-mo* [ringo ka mikan]-wo tabenakatta.
Taro-TOP one-even apple or orange-ACC eat-neg-past
“Taro didn’t eat even one apple or orange”
(i) [Taro didn’t eat even one apple] OR [Taro didn’t eat even one orange]
\[\neg (p \lor \neg q)\]
(ii) [Taro didn’t eat even one apple] AND [Taro didn’t eat even one orange]
\[\neg (p \land q)\]
(from Goro 2003; 11)

The qualifier *hitotu-mo* “one-even” in (22) is NPI-licensed and takes scope under negation; however *hitotu-mo* is also a numeral quantifying the object NP and scoping over the operator *ka*. The operator *ka* is then under the scope of the intervening scopal element, which itself is under the scope of negation. Therefore, in (22), the disjunctive
operator \textit{ka} is technically under the scope of local negation, yet bears a collective reading being shielded by an intervening scopal operator.

4.5 \textit{Chapter Summary}

In this chapter, we have attempted to present the results of two cross-linguistic studies aimed at demonstrating the subject languages' disjunctive operators' inability to bear a collective reading under negative scope, unlike their English counterpart \textit{or}. Though Szabolcsi (2002) and Goro (2003) both show, respectively, that the Hungarian \textit{vagy} and the Japanese \textit{ka} cannot be interpreted collectively under clause-mate negation, this seems not to be due to a radical variation in the semantic properties of the disjunctive operators in question. As both \textit{vagy} and \textit{ka} have the ability to bear a collective reading under many other PPI-friendly environments, the researchers advance the theory that these disjunctive operators can be considered as positive polarity items in their respective languages. We have discussed three conditions in which Szabolcsi (2002) and Goro (2003) find that their respective disjunctive operators may scope under negation: (i) when the disjunctive operator is under the scope of extra-Clausal negation, (ii) when the disjunctive operator is under the scope of a simple downward-entailing expression, and (iii) when some other scopal element intervenes syntactically between the negative expression and the disjunctive operator. These three conditions are characteristic of positive polarity item licensing. As positive polarity items have a restricted interpretation under clause-mate negation, this may explain why \textit{vagy} and \textit{ka} can only bear a distributive reading in this kind of negative context. When placed in a PPI-friendly environment, the restricted interpretation is, predictably, lifted, and a secondary collective interpretation is possible. These studies have provided a useful starting point for our own investigation into the interpretation of the French disjunctive operator \textit{ou} in negative contexts.
Chapter Five – French Disjunction under Negative Scope

As we have argued from the beginning of this study, in order for phenomena from artificial languages to properly mirror systems of meaning in natural language, the given phenomena should be universally valid in all natural languages. Up to this point, we’ve mostly focussed on the semantic properties of disjunctive operators in natural languages. Much like in first-order logic, it would seem as though all disjunctive operators in natural language universally have a dual meaning, meaning that they appear to bear both a distributive and a collective reading, based on context and syntactic structure. In other words, a coordinating conjunction such as or can represent the logical disjunctive operator [$\lor$] as well as the conjunctive operator [$\land$] under negation. However, what is not universal in all natural languages are the contexts in which this dual reading is possible. As we’ve previously observed, while the English coordinating conjunction or welcomes this dual interpretation under direct negative scope, no matter the degree of the negative expression in question, some other languages, such as Hungarian and Japanese, do not feature the same semantic ambiguity in parallel syntactic environments. Researchers studying these languages have concluded that this is not due to semantic cross-linguistic asymmetry in the disjunctive operator, but rather, it is a result of the polarity sensitivity of certain terms in the vocabulary. Both Szabolcsi (2002) and Goro (2003) show that disjunctive operators such as vagy and ka have the ability in certain contexts to bear a conjunctive reading, but that in other contexts, such as under the scope of clause-mate negation, they have a restricted interpretation, meaning that only a distributive reading is possible. Based upon these observations, both researchers have claimed their respective disjunctive operators as positive polarity items, terms that yield a restricted interpretation under direct negative scope.

In this chapter, we will explore this phenomenon from the point of view of the French language. We posit that while the French disjunctive operator ou appears to be a
positive polarity item and have restricted distributive interpretation in certain negative contexts, this restriction can be lifted based on certain syntactic and semantic conditions. Basing our findings on native judgment speaker tests as well as corpus information, we will discuss these conditions and their impact upon French disjunction.

5.1 French coordination: the relationship between ou, et, and ni

Like the English terms and and or, the French et and ou are coordinating conjunctions used to link together conjuncts to form coordinate sentences. The conjunction et corresponds to the logical operator [\(\land\)] in propositional calculus, while the conjunction ou corresponds the [\(\lor\)]-operator.

(1) Ce soir, nous irons au cinéma et au restaurant. \(= (p \land q)\)
    “Tonight we will go to the movies and to a restaurant”

(2) Voudriez-vous du café ou du thé? \(= (p \lor q)\)
    “Would you like some coffee or some tea?”

In French, there also exists ni, a coordinating conjunction used to link two conjuncts in a negative context:

(3) a. Elle n’était ni belle, ni particulièrement laid.
    “She was neither beautiful, nor particularly ugly”

b. Ils ne m’aident pas, ni je ne les aime.
    “They do not like me, nor do I like them”

c. Jean n’a pas envie de danser, ni de manger.
    “Jean does not feel like dancing, nor eating”
Let us recall our discussion of the distinction between French n-words and French NPIs (cf. section 3.2). Based on these criteria, de Swart (2001) argues that *ni is not strictly a French n-word, but also a French NPI. Let us investigate this claim.

First, as we will remember, while French n-words are able to stand alone and create their own negative contexts, French NPIs must be licensed under the scope of a negative marker. As de Swart (2001; 111) remarks, *ni always depends upon another negative element:

(4)  
a. * On savait son nom *ni son histoire.
    “We knew his name nor his story”
b. * Il a écrit *ni téléphoné plusieurs fois.
    “He wrote nor telephoned several times”
c. * Je voyais déjà son père *ni sa mère.
    “I already saw his father nor his mother”

Secondly, as de Swart (2001; 119) observes, like other French NPIs, *ni cannot stand alone as an answer to a question, even a negative query:

(5)   
Tu *n’as pas vu Paul?
    “You didn’t see Paul?”
  *Ni Pierre.
    “Nor Pierre”

Finally, de Swart argues that *ni is a NPI, and not a n-word, as not only can *ni mix freely with ne...*pas “not” (which as we have seen, French n-words cannot do), but it is sometimes licensed under the scope of this antimorphic operator, as in (6). *Ni also mixes freely with n-words such as personne “no one” and jamais “never”, as in (7) and (8):

(6)   
Je *n’ai pas vu Marie *ni Jean.
    “I did not see Marie nor Jean”
(7) *Personne n’a vu Marie ni Jean.
   “Nobody saw Marie nor Jean”

(8) *Je ne suis jamais allé à New York, ni à Los Angeles.
   “I have never been to New York, nor to Los Angeles”

If we are to accept de Swart’s classification of *ni as a French NPI\(^\text{17}\), it is reasonable to assume that either *or or *et could be its polar variant. At this point, it useful to ask ourselves whether *ni logically corresponds to the [*\&]-operator or to the [*\text{v}]-operator. Let us consider the following sentence:

(9) Jean *n’est *pas intelligent, *ni *sympathique.
   “Jean is neither intelligent nor friendly”

In terms of propositional logic, should (9) be rendered as $\neg(p \& q)$ or $\neg(p \text{ v } q)$? According to some researchers, such as Gaatone (1971), *ni should be considered as the polar variant of *et, representing the negation of a conjunctive phrase rather than the negation of a disjunctive phrase. Presumably, this is based on the fact that both *et and *ni denote collectivity. However, de Swart (2001) argues that *ni is not the polar variant of the conjunction *et, but rather of *ou. In comparing nearly identical examples containing both *et and *ni, both conjunctions seem to logically signify conjunction:

(10) a. M. Guitrel *ne parlait *ni ne mangeait.
   “Mr. Guitrel wasn’t talking nor eating”

\(^{17}\) It is necessary to add that we must differentiate between *ni as a NPI and *ni as a term that is part of the complex negative construction *ni...ni as belonging to the system of negative concord in French. For example, the example in (6) would not be possible with the *ni...ni construction:

(i) *Je n’ai pas vu ni Marie ni Jean.

At best, this would be a case of double negation, much like those presented in Chapter 3, in which French n-words like *rien and *personne could not mix freely with *ne...pas in single negation constructions. Therefore, we differentiate between *ni as a n-word (which can not be used by itself outside the construction *ni...ni) and *ni as a NPI.
b. M. Guitrel ne parlait pas et ne mangeait pas.
   “Mr. Guitrel wasn’t talking and wasn’t eating”

(from de Swart 2001; 110)

(10a) and (10b) are unarguably logically equivalent, which seems to make a good case for et being the affirmative equivalent of ou. However, de Swart (2001; 115) notes that in (10a-b), as well as the examples in (11a-b), the use of et requires the repetition of the negative particle pas, whereas the use of ni does not:

(11) a. Elle ne se leva pas ce jour-là, ni ne fit sa toilette.
   “She did not get up that day, nor did she wash herself”

b. Elle ne se leva pas ce jour-là, et ne fit pas sa toilette.
   “She did not get up that day, and she did not wash herself”

This would indicate that ni is within the scope of negation licensed by the negative particle ne, whereas et is not. As we’ve previously seen, de Morgan’s laws posit that the negation of two arguments coordinated by conjunction is equivalent to the negation of two arguments coordinated by disjunction. Bearing this in mind, we remark that (11b) expresses the conjunction of two negated constituents; as (11a) and (11b) are logically equivalent, and the use of ni in (11a) is within the scope of negation, de Swart (2001) hypothesizes that ni expresses the disjunction ou rather than the conjunction et. Further support for this argument can be found in the following examples:

(12) a. Paul est parti sans passeport ni billet.
      Paul est parti sans passeport et Paul est parti sans billet.

b. Il n’a jamais écrit ni téléphoné.
   Il n’a jamais écrit et il n’a jamais téléphoné.

c. Il n’y a là rien d’étonnant ni de rare.
   Il n’y a là rien d’étonnant et il n’y a là rien de rare.

d. Il ne parle à personne de ses affaires ni de ses projets.
Il ne parle à personne de ses affaires et il ne parle à personne de ses projets.

(from de Swart 2001; 116)

De Swart (2001) remarks that in (12a-d), a sentence containing *ni* that negates two constituents is logically equivalent to a sentence containing the construction *neg-et*; however, in the case of the sentences containing *et*, the primary negative operator must be repeated, whereas in the sentences coordinated by *ni*, the coordinating operator is already found within the scope of negation. Furthermore, de Swart (2001) notes that the only possible way to coordinate negated constituents with the *et* conjunction, without repeating the primary negative marker, is to modify the sentence adverbially with a tag such as *en même temps* “at the same time”:

(13) a. Rosa *ne veut pas* lire le journal *et* regarder la télé *en même temps*.

“Rosa does not want to read the newspaper and watch TV at the same time”

(from de Swart 2001; 116)

In example (13), the function of the *et* conjunction under negative scope is to negate the possibility of the two arguments. However, this does not mean that one of the arguments cannot be true, when separated from the other. For instance, (13) is true in a situation in which Rosa wishes to read the newspaper (but not watch TV)\(^\text{18}\), which would not be the case of contexts featuring *ni*:

(14) Rosa *ne veut pas* lire le journal *ni* regarder la télé.

“Rosa does not want to read the newspaper nor watch TV”

(14), as opposed to (13), can never be true in any situation in which Rosa wishes to watch TV. If we are to accept de Swart (2001)’s hypothesis that *ou* is theoretically the polar

\(^{18}\) If we were to consider a hypothetical, not attested, use of such a phrase without the adverbial tag.
variant of ni\(^{19}\), as dictated by de Morgan’s laws, then ou should be able to bear a collective reading similar to that of ni under direct negative scope. If this is the case, then the following example (15) should have the same meaning as (14):

(15) Rosa ne veut pas lire le journal ou regarder la télé.

“Rosa does not want to read the newspaper or watch TV”

While it is certainly the case that a disjunctive operator under negative scope can express collectivity in the English language (cf. section 1.5 and the translation of (15)), we are curious as to whether a comparable construction such as (15) has the same reading in French, as de Swart argues. Furthermore, if (14) and (15) are identical on a semantic level, they should be more or less equal in terms of distribution; that is to say, in contexts in which ni is employed, one should be able to freely substitute the neg-ou construction bearing a collective interpretation. The goal of the following sections of this chapter is to attempt to verify if it is indeed the case that neg-ou is semantically identical to ni, bearing a collective interpretation. Regarding the question of distribution, we will attempt to see if the neg-ou construction can truly occur in the same contexts as ni. If this is the case, then neg-ou constructions should be able to bear a collective interpretation that corresponds to the meaning of constructions that use ni as a coordinator. If this is not the case, then we will have to theorize on the syntactic and semantic motivations for unequal distribution and interpretation.

### 5.2 Ou under negative scope: preliminary notions

In discussing the proper grammatical use of the French coordinating conjunction ou, Grevisse (2003; 1552) states that while in strict normative grammar ou should not be used to coordinate terms in a negative sentence or phrase, it oftentimes can replace the negative ni. Bearing in mind that ou is a polar variant of ni as per de Morgan’s Laws,

\(^{19}\) For a similar argument regarding the Spanish ni as a polarity-sensitive disjunctive operator, see Aranovich (2006), in which it is argued that the form “ni XP ni XP” “neither…nor” is a case of disjunction, and not of conjunction.
one would expect *ou* under clause-mate scope to express collectivity. However, based upon our research, this is not always the case. Grevisse’s statement is not a general truth and needs to be refined. If *ou* is unable to bear a collective reading in a negative context, it is due to the fact, we claim, that the conjunction is behaving like a PPI, scoping over negation and bearing a preferred distributive reading.

Let us consider the following example to show a possible natural language equivalent of de Morgan’s Laws in the French language:

(16) Jean n’aime pas le café ou le thé.
“Jean doesn’t like coffee or tea”

If we took Grevisse’s claim at face value, we could conclude that (16) bears both distributive and collective readings, much like its English counterpart. However, based upon informal native speaker judgment tests, this kind of construction has a distributive rather than a collective interpretation\(^{20}\). Another example of this kind of construction that received the same kind of reaction from our informants can be seen in (17):

(17) Je ne connais pas Jean ou Martin.
“I do not know Jean or Martin”

(i) \((\neg p \lor \neg q)\) (distributive)

(ii) \((\neg (p \land q))\) (collective)

Our informants overwhelmingly reported than upon hearing (17) with no further contextual information, their impression would be that the speaker knew either Jean or Martin, but not “neither”.

This kind of result mirrors Szabolcsi (2002) and Goro (2003)’s findings, in which their respective disjunctive operators had a restricted interpretation under direct negative scope, leading the authors to conclude that these terms where in fact, positive polarity

\(^{20}\) That is, (16) is compatible with a situation in which Jean likes tea.
items. Could *ou* be a positive polarity item in its own right? Possibly, but further investigation to this claim is needed. We will do so much in the style of Szabolcsi (2002) and Goro (2003), by verifying if this restriction on the interpretation of *ou* can be lifted in a variety of PPI-friendly environments.

Let us recall some salient characteristics of *some*-type positive polarity items. As we recall, PPIs generally have either a restricted distribution or a restricted interpretation in negative contexts, due to their refusal to scope under negation. Let us consider the following example:

18)  ? John didn’t call *someone*.

(from Szabolcsi 2004: 414)

While (18) cannot be interpreted as meaning “John didn’t call anybody”, we are hesitant to judge the example as wholly ungrammatical. With further contextual information, we argue that this example is acceptable (cf. Levinson 1983, Horn 1989). For example, if there were an individual in question that John didn’t call, and *someone* were specifically referring to this individual, the example seems to be acceptable. This same restricted interpretation seems to stand for other examples of the *some*-PPI:

(19)  ? No one called *someone*.

(20)  ? John came to the party without *someone*.

(from Szabolcsi 2004: 414)

Let us analyze (20) in the following context. If John were to come to the party without his significant other, and other partygoers took notice of this fact, the utterance *John came to the party without *someone*, referring to the absent significant other, seems to stand the test of acceptability. Let us consider (21) from an existential quantificational viewpoint.
(21) ? John came to the party without someone.

(i) ¬ ∃x [person (x) ∧ went with John to party (x)]

*There is no x, such that x is a person and x went to the party with John.*

(ii) ∃x [person (x) ∧ ¬ (went with John to party (x))]

'There is x, x is a person, it is not the case that x went to the party with John.'

We can see that while (21) cannot be represented by formula (i), it does bear the reading of formula (ii). Therefore, we see that some-type PPIs have a restricted interpretation under negative scope.

5.3 Ou under extra-clausal negation

We will recall that while PPIs have a restricted interpretation under direct clause-mate negation, they can happily scope below extra-clausal and other extra-clausal NPI-licensors while retaining a double interpretation, as seen in examples (22)-(25):

(22) I don’t think that John called someone.
(23) No one thinks that John called someone.
(24) I regret that John called someone.
(25) Every boy who called someone got help.

(from Szabolcsi 2004; 415)

Scoping under extra-clausal negation, the some-type PPI does not have a restricted interpretation and we are able to interpret the utterance following utterance in two different ways:
(26) I don’t think that John called someone.
(i) \( \neg \exists x [\text{person (x)} \land \text{John called (x)}] \)
   ‘There is no x, such that x is a person, and John called x.’
(ii) \( \exists x [\text{person (x)} \land \neg (\text{John called (x)})] \)
   ‘There is x, x is a person, it is not the case that John called x.’

If we are to believe that ou is indeed a PPI, theoretically, problems of restricted interpretation should be countered by positioning the item under extra-clausal negation:

(27) Je ne crois pas que Pierre ait appelé Jean ou Marie.
   “I do not think that Pierre called Jean or Marie”

Indeed, according to our informants, an inclusive interpretation is more plausible in the case of (27), as compared to the construction featuring ou under clause-mate negation in (17):

(28) Je ne crois pas que Pierre ait appelé Jean ou Marie.
   “I do not think that Pierre called Jean or Marie”
(i) \( \neg (p) \lor \neg (p) \) (distributive)
(ii) \( \neg (p \land q) \) (collective)

This mirrors Szabolesi (2002)’s claim that the Hungarian PPI vagy can be interpreted both distributively and collectively under extra-clausal negation:

(29) Nem hiszem, hogy becsuktuk volna az ajtót és az ablakot.
   “I don’t think that we closed the door or the window”
(i) \( \neg (p) \lor \neg (p) \) (distributive)
(ii) \( \neg (p \land q) \) (collective)
According to our informants, when the *ou* operator occurs under the scope of extrACLausal negation rather than clause-mate negation, a collective interpretation is more plausible. As Szabolcsi (2002; 415) notes, this behaviour is characteristic of that of positive polarity items, which further supports an argument for *ou* being classified as a PPI.

### 5.4 Ou under the scope of downward-entailing operators

In his study of Dutch PPIs, van der Wouden (1997; 130) claims that there exist three classes of positive polarity items: strong PPIs (incompatible with all monotone decreasing contexts), medium-strength PPIs (compatible with monotone decreasing contexts but incompatible with anti-additive ones), and weak PPIs (compatible with downward monotonic and anti-additive contexts, but incompatible with antimorphic ones) (cf. Chapter 3). This classification suggests that there is quite a bit of flexibility involved in terms of PPIs appearing in negative contexts, depending on the strength of the negation.

Mirroring van der Wouden’s findings, we will recall that Szabolcsi’s second condition of restricted interpretation lifting on English PPIs occurs in cases in which the PPI is found under the scope of simple downward-entailing (such as *rarely*) expressions rather than antimorphic clause-mate expression (such as *not*):

(30)  *At most five* boys called someone.
(31)  *Few* boys called someone.
(32)  When I’m lonely, I *rarely* call someone.

(30)-(32) do not have the restricted interpretation that they would were they to be found under the scope of a strong antimorphic operator such as *not*. As we can see in the following French example, the *ou* coordinator seems to lose this restricted interpretation under the scope of downward entailing operators as well:
(33) Ce n’est guère par vertu ou par force d’esprit que l’on sort d’une grande affliction.
   “It is rarely by virtue or by the force of one’s spirit that one recovers from a great affliction”
   (from Badiou-Monferran 2000; 297)

(33) seems to bear both a distributive and collective interpretation as it is under the scope of the downward-entailing operator ne...guère. This seems to support Grevisse’s claim that ou sometimes can be used in the place of ni under negative scope, yet also supports our hypothesis that ou is a PPI; while ne...guère can be considered a “negative expression”, it is specifically a downward-entailing expression that is hospitable to positive polarity items. This is further supported by our informants, in the example in 34:

(34) Je ne vais guère à Paris ou à Toulouse.

Our informants found that (34) also could bear a collective reading, much like that in (33).

5.5 *Intervention Effects in French*

Let us consider the final condition of the lifting of restricted interpretation on PPIs under negative scope. As we can recall, some-type PPIs retain their interpretative properties in cases in which some scopal element intervenes between the negative expression and the PPI itself, such as in the following examples:

(35) John didn’t offend *someone* because he was malicious (but because he was stupid).
(36) Not every student said *something*.
(37) John didn’t say *something* at every party.
(38) John doesn’t: always call *someone*.
(39) John didn’t show every boy *something*.

(from Szabolesi 2004; 415)
The intervening scopal element\textsuperscript{21} takes the focus off the PPI, restoring full interpretative properties to the PPI in question. Let us consider a parallel example of an adverbial scopal element intervening in the case of \textit{ou} under direct negative scope:

(40) Quand il part à la chasse, Jean n’ammene pas \textit{toujours} son sac ou son couteau.

“When he goes hunting, John doesn’t always bring his bag or his knife”

According to our French informants, (40) yields a double-interpretation more easily than examples without the intervening scopal element \textit{toujours} “always”. This claim is also supported by numerous examples of this intervening effect that we found both in the literature as well as in the ARTFL-Frantext corpus of written French:

(41) Cette rêverie n’est pas \textit{après tout} si vaine ou si puérile qu’elle ne tend parfois à m’apparaître.

“This reverie is not, after all, as vain or as puerile as it sometimes seems to me”

(from Grevisse 2003; 1552)

(42) Elle ne quitta plus \textit{guère} son fauteuil ou son lit.

“She left not often her chair or her bed anymore”

\textsuperscript{21} The constituents “because he was malicious” and “at every party” from (35) and (37) don’t immediately appear to “intervene” in terms of linear sequence between the negative element and the \textit{some}-type PPI in surface syntactical structure. It should be noted, though, that the VP-adjunct “because he was malicious” in (35) is adjoined below negation as a VP-adjunct, and so it does hierarchically intervene between negation and the PPI in object position, therefore allowing the intervention effect to occur (see also Johnston 1993; 171). A similar reasoning applies to “at every party” in (37).
(43) Il ne s’agit pas ici de défense ou d’attaque, mais de préserver, par l’offensive ou la défensive, le pays…

"It is not a question here of defence or attack, but to preserve, by offensive or defensive measures, the country..."

(from the ARTFL-Frantext corpus)

A given positive polarity item’s restricted interpretation can be accounted for by the term’s refusal to scope under a negative expression. If we are to accept ou as a PPI, it would seem as though having an intervening scopal element prevents the conjunction

22 At first glance, in (43) the intervening element, i.e. ici, does not seem to be associated with the negative operator. Let us consider the cases (i)-(ii) featuring intervention effects:

(i) John doesn’t always call someone.
(ii) John didn’t talk to someone because he was in trouble (but because …).

In both cases, the affirmative counterpart without the intervening element is presupposed. Thus, the implications in (iii) and (iv) are valid:

(iii) John doesn’t always call to someone. →
John calls someone.
(iv) John didn’t talk to someone because he was in trouble →
John talked to someone.

This is not necessarily the case in (43):

(v) Il ne s’agit pas ici de défense ou d’attaque. */->
Il s’agit de défense ou d’attaque.

In spite of the contrast between (iii)-(iv) and (v), we would like to claim that this is still a case of intervention effect, although a more subtle one. We propose that the interpretation of (43) involves in Logical Form (LF) a predicative relation where ici “here” is the subject of the predication and il ne s’agit pas de défense ou d’attaque the predicate:

(vi) [SUBJECT/TOpic ici] [PREDICATE il ne s’agit pas de défense ou d’attaque].

Furthermore, we would like to claim that negation scopes on the predicative relation depicted in (vi). In other words, what is negated in (43) is the relation between ici “here” and what is the case there. This is why (vii) seems indeed to be a valid implication:

(vii) Il ne s’agit pas ici de défense ou d’attaque. →
Il s’agit ici de quelque chose.

Thus, the topical interpretation of ici “here” in (43) involves a predicative relation, such as the one in (vi), and it is this predicative relation that takes the focus of negation and acts as the intervening element in the interpretation of (43).
from overscopying negation, and thus *ou* interacts with the scope of negation and is able to bear a collective reading. This situation is similar to the one underlying the Immediate Scope Constraint (ISC) in NPI licensing, as discussed by Linebarger (1991; 170), (and Johnston (1993; 168)) define this phenomenon as follows:

(44) Immediate Scope Constraint (ISC): A negative polarity item is acceptable in a sentence S if in the LF of S the subformula representing the NPI is in the immediate scope of the negation operator. An element is in the immediate scope of NOT only if (1) it occurs in a proposition that is the entire scope of NOT, and (2) within this proposition there are no logical elements intervening between it and NOT.

This kind of constraint seems to explain the behaviour of negated sentences featuring *because*-clauses, which lose their ambiguity when featuring a NPI in their matrix clause. For example, as Johnston (1993; 163) shows, the following sentence is ambiguous and can be interpreted in two ways:

(45) Marty didn’t sell his bike because the gears are broken.
   (i) Marty didn’t sell his bike and the reason was that the gears were broken.
   (ii) Marty did sell his bike but not because the gears were broken.

In the (45i) reading, it is the matrix clause that is being negated; Marty didn’t sell his bike. In the (45ii) reading, it is the adjunct clause that is being negated; Marty did sell his bike, but did not do so because the gears were broken. However, when a NPI is introduced to the matrix clause, the second reading, cf. (ii), is no longer available:

(46) Marty didn’t *ever* sell his bike because the gears are broken.

In (46), only the negated matrix clause reading is possible because the NPI *ever* is in the scope of the negation operator, as dictated by the Immediate Scope Constraint in (44). Let us consider a similar example in French:
Jeanne n’a pas fini la vaisselle parce que sa mère arrivait.

“Jeanne didn’t finish washing the dishes because her mother was arriving”

(47) can have two possible interpretations: (a) Jeanne didn’t finish washing the dishes, and the reason is that her mother was arriving, or (b) Jeanne did finish washing the dishes, but not because her mother was arriving (but because she didn’t want to leave them for later, perhaps). Much like in the English example (46), in which the NPI ever followed the Immediate Scope Constraint to block one of the interpretations, we see the same effect when inserting the French NPI tout-à-fait “quite” into the matrix clause of (47):

(47) a. Il n’est pas tout à fait quatre heures
   “it is not quite four o’clock”
   b. * Il est tout à fait quatre heures.
   c. Il est tout à fait sympatique
   “He is really nice”
   (from Toven, Déprez, & Jayez 2004; 409)

In our present example (48), tout-à-fait is unacceptable in an affirmative context:

(48) * Jeanne a tout-à-fait fini la vaisselle parce que sa mère arrivait.

While the discussion of whether to accept tout-à-fait as a true NPI is up for debate, we accept the term as a reasonable candidate for the status of a intervening NPI in the current discussion of the Immediate Scope Constraint, due to its inability to appear in many affirmative contexts, including the example in question. We believe that perhaps tout à fait is acceptable in affirmative sentences in which it appears with a modifier, but unacceptable in other affirmative contexts, as we see in the following examples:

(49) a. Je suis tout à fait convaincu.
   “I am quite convinced”
   b. * J’ai tout à fait convaincu Marie.
   “I quite convinced Marie”

(49) La réunion s’est passée tout à fait normalement.
   “The meeting went quite normally”
   a. * La réunion s’est tout à fait passé.
   “The meeting quite went”
(48) Jeanne n’a pas tout-à-fait fini la vaisselle parce que sa mère arrivait.
“Jeanne didn’t quite finish the dishes because her mother was arriving”

The insertion of the NPI tout à fait in to the matrix clause of the sentence in (48) seems to disambiguate the sentence, leaving only one meaning (that Jeanne did not finish washing the dishes) available.

Interestingly, this evidence seems to indicate that intervening scopal operators such as because-clauses have the opposite effect on positive polarity licensing under negative scope as expected; rather than posing interpretive restrictions on a negated sentence featuring a NPI, they lift restrictions on negated sentences featuring a PPI, as in (35).

5.6 Diachronic accounts for the ni/neg-ou dichotomy

In all examples we have considered in which ou was used under negative scope to genuinely express a collective meaning, one of the salient conditions of PPI interpretation restricted lifting was present. The fact that the use of the ou conjunction under negative scope can be fairly reliably predicted by one of afore-mentioned conditions seems to contradict Badiou-Menferran (2002; 299)’s assertion that the use of ou under negative scope is rather due to the decline and near elimination of the negative morpheme in the French language. This would ostensibly mirror such syntactic phenomena as ne-omission in negative concord, the process of systematically dropping the negative marker ne in informal spoken and written French, while preserving the secondary negative marker:

(49) une prof qui faisait rien
“a teacher who did nothing”

(50) celui d’avant il marchait pas
“the one in front wasn’t working”

(51) je faisais celle qui comprenait rien quoi
“I pretended not to understand”
(52) je dis: ‘Madame, les X marchent pas’

“I said, M’am, the X-key doesn’t work”

(examples of ne-omission in spoken French, from Armstrong 2001: 166)

While this is an interesting parallel and mirrors Gaatone (1977; 125)’s observation that ni is “on the decline” and “has a restricted role in spoken language”24, any diachronic explanation to the opposition between ni and ou usage in these terms does not take into account that many of the examples we found that use ou under negative scope vastly predate the preference of ni over ou of our modern French-speaking informants; indeed, the corpus that we used to obtain our examples, the ARTFL-Frantext Corpus, features French documents dating from the 18th century to the 20th century. Therefore, Badiou-Monferran’s parallel is fundamentally flawed and fails to take into account the syntactical and semantic motivation behind this linguistic phenomenon.

We believe that the idea of ou being a positive polarity item can certainly explain why our French informants have an overwhelmingly preference for distributive readings in certain negative contexts, while the same conjunction readily bears a collective reading in other nearly identical constructions. We question the validity of proposals, such as that of Badiou-Monferran (2002), that the presence neg-ou constructions in French can be explained as a result of the “decline” process. However, we do concede that much further research into the matter, including the analysis of accounts of such constructions in spoken French corpora as well as vaster array of examples, could certainly refine our preliminary notion that ou is a positive polarity item.

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24 Gaatone (1977) does not specifically refer to any duality between ni and ou, but rather ni and et, which he considers to be ni's positive counterpart. See our discussion of et and ou under negative scope and their relationship to ni in section 5.1. We have established that while et in a negative context can indeed bear a negated collective reading much like ni, et does not seem to occur directly under the scope of negation, which necessitates the repeating of the negative element (cf. example 10). We maintain that ni is the negative counterpart of ou, and not et.
5.7 Chapter Summary

In this chapter, we have discussed the interaction between coordinating conjunctions *ou* and *et* and negation in the French language. We have explored the question of whether, like in the English language, the French disjunctive operator *ou* is able to bear out a collective reading when under the direct scope of a negative expression. In an attempt to verify de Swart (2001)'s hypothesis that *ou* is the affirmative polar variant of the French NPI *ni*, we wondered whether the 'neg-ou' construction and *ni* have equal semantic value and distribution. By consulting with our francophone informants, as well as by consulting the corpora, we found that this is not necessarily the case, as sentences in which *ou* appears under clause-mate negation have an overwhelmingly preferred distributive reading. We posited that a possible explanation for this interpretative restriction might be that *ou* is a positive polarity item. We supported this claim by showing that French disjunctive constructions bearing collective readings featured the conditions of restrictive interpretation lifting, as described by Szabolcsi (2002). We concluded that indeed *ou* is able to bear a collective reading under negative scope, as long as at least one of these conditions is fulfilled.
Concluding Remarks

In this study, we have attempted to study how certain phenomena in natural language mirrors the principles of artificial language, such as first-order logic. We have argued that the laws of logical language reflect universal cognitive reasoning, and are therefore ostensibly applicable to all human language systems. We have specifically focussed on how a specific phenomenon that is widely accepted as being in the English language: the disjunctive operator or, when occurring under the scope of negation, can bear both a distributive and collective reading. This construction mirrors the logical theorem of de Morgan’s Laws, which dictates that the negation of two arguments coordinated by disjunction is equivalent to the conjunction of two negated arguments. As we have emphasized many times, when natural language constructions seem to mirror logical systems of reasoning, further investigation is needed; it is for this reason that we commenced our study by giving some background information on the principles of conjunction, disjunction, and negation as they pertain to both natural and artificial languages. As we noted, not all natural language constructions can be illustrated by the principles inherent in logical language, due to the presence of ambiguity in human language.

Our specific goal in this study was to verify if this phenomenon that occurs so frequently in the English language is also present in the French language. This has not been the first study of its kind in terms of cross-linguistic investigation into this matter. We have presented the detailed findings of two other studies of this kind that tackle the same question, in the Hungarian and Japanese languages. It was found that the Hungarian and Japanese disjunctive operators vagy and ka, adhere to de Morgan’s Laws, but only in very restricted contexts. Unlike the English disjunctive operator or, vagy and ka cannot bear a collective interpretation under clause-mate negation. As these operators do bear a collective reading in certain other contexts, it was concluded that the reason for
this discrepancy is not due to some sort of different semantic property possessed by or, but rather a question of polarity sensitivity. It was shown that vagy and ka could happily bear collective interpretations in conditions that mirror those that allow for restricted interpretation on positive polarity items to be lifted, such as (i) extra-clusual negation, (ii) when under the scope of a downward-entailing operator, and (iii) when some tertiary scopal element intervenes between the negative expression and the item in question. Thus, Szabolcsi (2002) and Goro (2003) both conclude that their respective disjunctive operators vagy and ka, could be classified as positive polarity items.

We have approached our study of the French language by first examining the relationship between three French conjunctions, et (‘and’), ou (‘or’), and ni (‘nor’). We have explored de Swart (2001)’s notion that the disjunctive operator ou can be considered as the affirmative polar variant of the NPI ni, which expressed negated collectivity in coordinate sentences. Citing de Morgan’s Laws, de Swart (2001) argues that ou under negative scope theoretically is the semantic equivalent of ni. We have attempted to investigate de Swart (2001)’s claim, with the following notions in mind: (i) if a neg-ou construction is the semantic equivalent of ni, the two terms should hypothetically possess an equal semantic value, as well as comparable syntactic distribution, and (ii) if (i) proves to be true, then neg-ou and ni should be able to be understood and found in the same contexts in the French language. Consulting with several native French-speaking informants, we found quickly that this was not necessarily the case. In constructions in which ou appears under clause-mate negation, our informants overwhelmingly judged the examples as bearing a distributive interpretation, rather than a collective interpretation. In fact, when presented with such examples, our informants claimed that ni would be the preferred connective of choice in order for the sentences to bear a collective interpretation. Keeping this in mind, we worked on the hypothesis that ou is a positive polarity item, as PPIs generally have restricted distributions or interpretations under direct negative scope. In order to test our hypothesis, we examined examples in which condition allow for PPI interpretative restriction lifting. Not surprisingly, not only did our informants accept a collective reading for these constructed examples, but we also found examples of ou under negative scope in which these conditions were present in the
ARTFL-Frantext corpus. This seems to support our hypothesis that while *ou* cannot bear a collective reading under clause-mate negation, it is able to bear a collective reading in other negative contexts that are considered as PPI-friendly. In other words, we have concluded that the French language does obey de Morgan’s Laws, just like the English language, however some restrictions on how these laws can be interpreted in the language are present due to the polarity sensitive nature of the *ou* conjunction.

This study represents a first attempt to account for the discrepancy in the semantic interpretation of a certain syntactical structure in the English and French languages. While there have been previous studies that have explored the matter from a cross-linguistic perspective, to our knowledge, this is the first that specifically addresses the problem in the French language. We do not claim to have answered all possible questions regarding this issue, but have opened many doors for further research into the matter. As we have mentioned, further research could include the use of spoken French databases to analyze speaking patterns, or perhaps a wider sample of native French speaking informants analyzing constructed examples.

As have we predicted from the onset of work on this study, logical structures as cognitive reasoning patterns are universally understood by the human mind, no matter the individual’s mother tongue. These patterns are universal in systems of grammar in natural language. However, these cognitive patterns may not be expressed in the same way in a given language as in another language due to lexical restrictions and grammatical constraints.
References


