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# The Semantics of Negation

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## 1 Introduction

Classical logic has only one way of negating a proposition, by means of the negative operator, which has one fixed meaning, i.e. reversing the truth value of the proposition it combines with.<sup>1</sup>

- (1)  $p$   
 $\neg p$

However, morphologically speaking, negation takes many different forms and gets packaged in intricate ways with other operators and/or other functional categories. Moreover, it is not immediately obvious that all of these seemingly negative forms semantically correspond to simple truth value reversers. In this chapter, we shall therefore start out by examining a plethora of forms that negation can take in natural language: standard negators, negative indefinites (including concord items), affixal negators, and squative negative elements (Sect. 2). Next we will test these different forms against a set of diagnostic tests, which on the one hand seem suitable for diagnosing the presence of a semantic/conceptual or logical negation, and on the other hand something which seems to be more syntactic in nature, and that we will refer to by the term ‘negative scope’ (Sect. 3). We will conclude that while some negative morphemes are only semantically negative, others are negative both syntactically and semantically (see also Zeijlstra 2004b, 2008

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for a similar idea). Moreover, if a morpheme is syntactically negative, the level of embedding of the negative feature and the internal morphosyntactic make-up of the negative marker are relevant to its scope in the sentence.

## 2 Negative elements in Natural Language

### 2.1 Standard negators

The most dominant negator across the languages of the world is the standard negator. With the term ‘standard negator’ Miestamo (2005) refers to the negator that is used to produce the simple negation of a declarative sentence, as in the English example (2b) below.

- (2) a. Alissa went to school today.  
 b. Alissa did **not** go to school today.

In English, the standard negator is the negative adverb *not*. All languages have a morpheme or word that can make a sentence negative in this way (Horn 2001b, Dryer 2013), and we will look at the morphology of standard negators in Sect. 2.1.2. Before we do that, we want to briefly discuss the core meaning of standard negators, in particular, the distinction between internal and external negation.

#### 2.1.1 External vs. internal negation

Based on the crucial role of a standard negator in the languages of the world one would assume that it is the obvious counterpart to the negative operator of classical logic. However, this is not straightforwardly true. Looking at (2b), at the surface level it is not immediately clear that the negation has the entire proposition in its scope, as is the case for the negative operator from classical logic (see (1) above). More concretely, in (2b) the subject and the tensed auxiliary do not seem to be included in the surface scope of the negator *not*. This points us to an important difference between the traditional operator from logic and the standard negator across the languages of the world: while the first one is an external negator, representing the meaning ‘It is not the case that *p*’, the regular standard negator is an internal negator, scoping over the tensed or untensed predicate. More importantly, it has been claimed that there are no languages in the world that have a dedicated morpheme for external negation (Horn 2001b). That does not mean of course that there are no means to do external negation: negative clefts or negative preposed DPs, for instance, can give rise to external negation. In fact, it has been proposed that Jewish Babylonian Aramaic is a language

with a dedicated grammaticalised external negator (Bar-Asher Siegal 2015, Bar-Asher Siegal & De Clercq 2019; see also the discussion of Boumaa Fijian in Sect. 2.1.2 below). Moreover, while the standard negator is clearly not a straightforward counterpart of the logical negator, it very often also gives rise to external negation. The meaning of (2b) can, in fact, be paraphrased as in (3).

(3) It is not the case that Alissa went to school today.

However, when a scope bearing element like a quantifier occupies the subject position (or is contained in the subject), as in (4a), the meaning of the sentence with the regular standard negator (4a) does not correspond to the meaning of the sentence with the external negator or negative cleft, illustrated in (4b) (Jackendoff 1972: 326).

- (4) a. Many of the arrows didn't hit the target  
       MANY >  $\neg$   
       b. It is not the case that many of the arrows hit the target.  
        $\neg$  > MANY

The reading of the external negation, i.e. the one in (4b), can also be achieved by adding the negator to the subject, as in (5) (Jackendoff 1972: 326):

(5) Not many of the arrows hit the target.

The difference seems first and foremost to be one of scope, as is indicated in (4). It may be brought out by the continuation 'but many of them did hit the target', as shown in (6).<sup>2</sup> While (4a) could be continued as in (6), (4b) and (5) could not, as illustrated in (7a) and (7b), respectively.

- (6) Many of the arrows didn't hit the target, but many did.  
 (7) a. #Not many of the arrows hit the target, but many did.  
       b. #It is not the case that many of the arrows hit the target, but many did.

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<sup>2</sup> One could view external and internal negation as a consequence of scopal differences for one and the same  $\neg$ , but one could also treat them as instances of two different (semantic) types of negation, with a different lexical semantics. Within systems that adopt a different semantics for internal ( $\neg p$ ) and external ( $\neg p$ ) negators, the main difference is that the external negator is presupposition cancelling, while the internal negator is presupposition preserving (see for instance Ladusaw 1980, Horn 2001b, Schwarz & Bhatt 2006, Bar-Asher Siegal 2015, Bar-Asher Siegal & De Clercq 2019, Siegal forthcoming). Horn (2001b) refers to those who recognize a different external and internal negator as ambiguists, and to those who adopt only one negative operator with one meaning and one scope as monoguists (see among many others Gazdar 1979). We refer the reader to the literature referred to for more discussion of the distinction between external and internal negation.

This discussion shows that while standard negators very often indeed correspond to the external negator from classical logic, they cannot really be equated with it. Standard negators are always internal negators with the capacity to extend their scope to that of an external negator, when there are no intervening operators. This is an important point to keep in mind while we discuss the morphology of standard negators in the next section.

### 2.1.2 A morphological classification

Dryer (2013) gives a typological overview of the different ways in which standard negators can be realised.<sup>3</sup> He discusses five different types of standard negators. The first type is affixal negation, where the standard negator is an affix on the verb, as in Kolyma Yukaghir, spoken in Siberia. An example is given in (8):

- (8) *Kolyma Yukaghir* (Siberia)  
 met numö-ge **el**-jaqa-te-je.  
 1SG house-LOC NEG-achieve-FUT-INTR.1SG  
 ‘I will not reach the house.’

Languages of the second type have what Dryer calls a ‘negative particle’, i.e. a separate word that makes the sentence negative. Musgu is such a language:

- (9) *Musgu* (Chadic, Afro-Asiatic; Cameroon)  
 à sədà cécébè **pây**.  
 3SG.M know jackal NEG  
 ‘He didn’t see the jackal.’

The third type uses a negative auxiliary: this is a negative word that shows properties of a verb, such as showing agreement with the subject. Finnish has such a special negative auxiliary:

- (10) *Finnish* (Finnic; Uralic)  
**e-n** syö-nyt omena-a.  
 NEG-1SG eat-PTCP apple-PART  
 ‘I didn’t eat an apple.’

In Grebo we see something similar to Finnish. In the affirmative sentence (11a) the verb *du*<sup>1</sup> ‘to stamp’ gets a special tense suffix *-da*<sup>2</sup>, which refers to a ‘past before yesterday’. In the negative sentence the same tense suffix appears on the negative word *yi*<sup>21</sup>.

<sup>3</sup> All the examples in this section are taken from Dryer (2013), except where otherwise indicated. Dryer’s overview does not include allomorphs of the standard negator in non-declarative clauses.

- (11) *Grebo* (Kru, Niger-Congo; Liberia)
- a. ne<sup>1</sup> du<sup>1</sup>-da<sup>2</sup> bla<sup>4</sup>.  
1SG.SUBJ pound-PST rice  
'I pounded rice before yesterday.'
- b. ne<sup>1</sup> yi<sup>21</sup>-da<sup>2</sup> bla<sup>4</sup> du<sup>1</sup> mɔle.  
1SG.SUBJ NEG-PST rice pound Monday  
'I did not pound rice on Monday.'

The fourth type is one with a negative morpheme, of which it is not clear *a priori* whether it is a word (second type), or a verb (third type). The reason for this is that there is no agreement morphology in the language in question.

- (12) *Maori* (Tahitic; Austronesian; New Zealand)
- kaahore** taatou e haere ana aapoopoo.  
NEG 1PL.INCL T/A move T/A tomorrow  
'We are not going tomorrow.'

In Boumaa Fijian, although there is no agreement morphology, the standard negator does appear to be more of a verb, with the sentence to be negated a subordinate clause that functions as the subject of the negative verb:

- (13) *Boumaa Fijian* (Oceanic)
- e **sega** [ni la'o o Jone].  
3SG NEG COMP go ART John  
'John is not going.' (literally: 'It is not the case that John is going.')

Dryer calls his last and fifth type 'double negation', to describe a situation where two discontinuous morphemes correspond with one logical negation. In Izi these morphemes are a prefix and a suffix on the verb.

- (14) *Izi* (Igboid, Niger-Congo; Nigeria)
- ó **tó-òmé-đú** ré.  
3SG NEG-do-NEG well  
'He does not do well.'

In Ma one of the negative morphemes is an affix on the verb (*tá*), and the other a free morpheme (*nyɔ̄*).

- (15) *Ma* (Adamawa-Ubangi, Niger-Congo; Democratic Republic of Congo)
- tá**-mù-sùbù-li nɔ̄gbɔ̄ **nyɔ̄**.  
NEG-1SG-eat-PST meat NEG.1SG  
'I did not eat meat.'

However, we will use the term 'bipartite negation' to describe this type, because two morphemes are needed to make the sentence negative, while reserving the term 'double negation' for cases where there are actually two semantic negations.

Double negation arises in a English sentence like the following, with two occurrences of the standard negator:

(16) We **cannot not** talk to them.

Since each of the two negators contributes a logical negation, the combination them yields a double negation, with the two negations cancelling each other out and yielding an affirmation, according to the law of double negation ('*duplex negatio affirmat*').

(17)  $\neg\neg p \leftrightarrow p$

In many languages with bipartite negation, one of the morphemes is optional, and when there is only one negative morpheme, it is usually the free morpheme. This is the case in West Flemish for instance (18) (Haegeman 1995: 120).

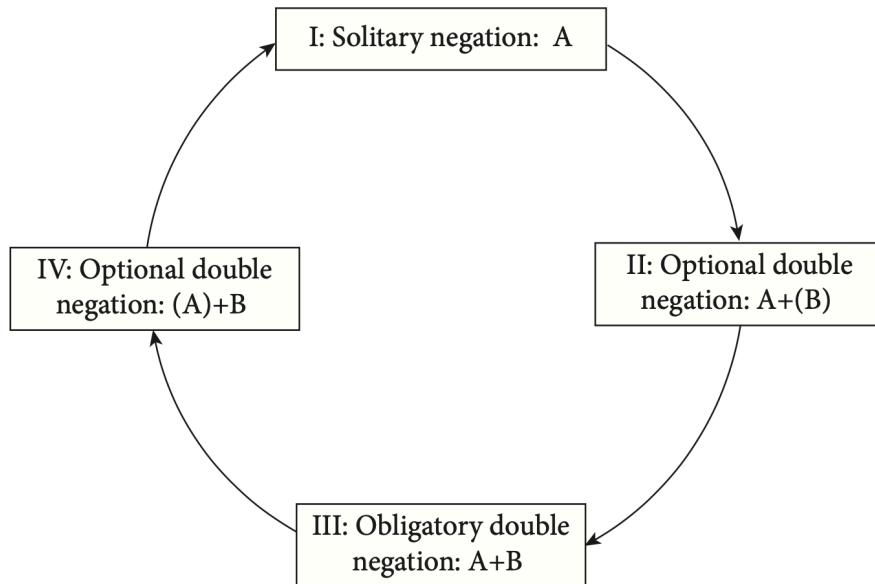
(18) da Valère woarschijnlijk **nie** styf drunke (**en**) = was  
 that Valère probably not very drunk NEG = was  
 'that Valère probably wasn't very drunk.'

Observe that although we gloss *en* as NEG, *en* by itself is not sufficient to make a sentence negative in current varieties of (West) Flemish: it requires the simultaneous presence of *nie*. *En* on the other hand can be easily dropped and has been argued to have become a discourse marker rather than a polarity marker (Breitbarth & Haegeman 2014). This optionality in (18) illustrates one step in a diachronic process for negation that is well-known as Jespersen Cycle (see Jespersen 1924: 335-6, Dahl 1979: 88 for coinage of the term, and Willis et al. 2013 for an overview). This cycle involves an originally negative element being strengthened by a second element, which at first is optional, but becomes compulsory over time, resulting in a bipartite negation. The second element then becomes the bearer of the negative meaning. This weakens the original first element and makes it disappear over time.<sup>4</sup> This pattern of diachronic development is seen in many different languages. A schematic representation of it is given in Figure 1 (from Hoeksema 2009).<sup>5</sup>

<sup>4</sup> There are different proposals in the literature concerning the real trigger for the change. While Jespersen (1917) argued that it is due to the weakening of the original negator that a new element enters the scene, others have argued that it is the introduction of a new emphatic element that weakens the original negator (Meillet 1921, Hansen 2013: 51-53), Kiparsky & Condoravdi (2006).

<sup>5</sup> Note that Hoeksema's diagram exploits the term 'double negation', which we refer to as 'bipartite negation.'





**Figure 1** The Jespersen Cycle

We see the same phenomenon in written French, which reflects an older stage of the language: the proclitic element *ne* on the verb combines with a second negative element *pas* (19). Just like in West Flemish the *ne* can be dropped and is actually mostly dropped in colloquial French.

- (19) Je **ne** = bois    **pas** de bière.  
 I    NEG = drink not of beer  
 'I don't drink beer.'

The crucial point for this chapter is that in the stage when the two elements need to co-occur, there are in essence two different morphemes responsible for the lexicalisation of the single logical negation  $\neg$ . This could suggest that  $\neg$  needs to be decomposed, or that  $\neg$  is underlyingly always associated with another element. As for the first possibility, to our knowledge no one has tried to decompose the operator  $\neg$  in semantic subcomponents that together give rise to the meaning associated with  $\neg$ . Most proposals in the literature take a version of the second approach, which deals with bipartite negation as a temporary morphosyntactic strengthening of the negator. In Kiparsky & Condoravdi's (2006) semantic/pragmatic account this strengthening is a consequence of an expressive need inherent in the rhetorical function of bounded scalar evaluative expressions like negation. Due to this same expressive resource the emphatic (bipartite) construction will be

overused leading to some type of inflation, which will eventually lead to the weakening of the original negator and loss of compositionality (bleaching). Just like Kiparsky & Condoravdi's (2006) semantic/pragmatic account, most morphosyntactic proposals are in essence asymmetric, putting the semantic negativity in one of the two elements, with the other element dependent on it or reinforcing the negator. This is the case for Zeijlstra's (2008) account for French *ne*, which he argues is an NPI, and hence dependent on the presence of *pas*. The same holds for accounts that argue that *ne* in French is basically non-negative, acquiring negativity by means of some type of agree with *pas* (Rizzi & Roberts 1996: 76; Rowlett 1998: 28; Roberts & Roussou 2003: 154-155; Roberts 2007: 64-81). The problem with all of these accounts is that the co-occurrence of the two morphemes in stage III of the cycle goes without explanation. The syntactic accounts of Poletto (2008) and De Clercq (2013, 2020) try to capture this obligatory co-occurrence of French *ne* and *pas* by proposing that the marker responsible for sentence negation or wide scope negation not only needs to lexicalise NEG, but also a fixed set of other tense or scope related features. We refer the reader to the literature mentioned for more details on bipartite negation.

## 2.2 Negative indefinites

The previous section has discussed standard negators. In this section, we turn to a second type of negator, the negative indefinites. These are combinations of a negation and an indefinite article, pronoun, or quantifier (Haspelmath et al. 2005, Penka 2011). We will look at two types of negative indefinites, those that always give rise to negation on their own, the so-called negative quantifiers (Zeijlstra 2020; Sect. 2.2.1), and those that do not always or hardly ever give rise to negation on their own, the so-called negative concord items (Sect. 2.2.2).

### 2.2.1 Negative quantifiers

Negative quantifiers are a subtype of negative indefinites. They derive their name from the fact that, semantically, they contain a negation  $\neg$  and an existential quantifier  $\exists$ , with the negation taking scope over the quantifier and giving rise to a universally negative meaning ( $\neg\exists$ ). Examples are given in (20) (see ? for an argument that this decomposition is also syntactic).

- (20) a. **No-one** knew the answer.  
 b. There was **nothing** left of the delicious dessert.  
 c. He **never** watches football.  
 d. They are welcome **nowhere**.

- e. **No** student knew the answer.

In English, they formally consist of *n-* and a quantificational pronoun, adverb, or *wh-word* like *one*, *ever*, or *where*. As the examples show, the negative quantifiers can lexicalise  $\neg$  on their own.

In addition to  $\neg$ , these negative indefinites also lexicalise an existential quantifier  $\exists$ . This  $\exists$  corresponds to the quantificational pronoun (e.g. *someone*) or adverb (*ever*, *somewhere*) contained in these negative indefinites. In other words, the meaning of these words can be understood as a combination of the logical symbols  $\neg$  and  $\exists$ . This decomposition is shown schematically in (21).

(21)	$\neg$	$\exists$
	no-one = not	someone
	no-thing = not	something
	n-ever = not	ever
	no-where = not	somewhere
	no N = not	a N

Somewhat informally, then, and considering what we said about the scope of  $\neg$  in classical logic, i.e. it being an external negator, we could represent the decomposition of the negative words in the examples of (20) as in (22).

- (22) a.  $\neg$  (**Someone** knew the answer)  
 b.  $\neg$  (There was **something** left of the delicious dessert)  
 c.  $\neg$  (He **sometimes** watches football)  
 d.  $\neg$  (They are **welcome** somewhere)  
 e.  $\neg$  (**A** student knew the answer)

These representations are informal not only in their notation, but also in the fact that they show all these negations as having an external negation. As we shall show when discussing the syntactic effects of negation (Sect. 3.4 below), negative indefinites do not always take this wide scope.

Since negative quantifiers contribute a logical negation by themselves, the combination of a negative quantifier with a standard negator will yield a double negation, as in the English example in (23), with the standard negator and a negative quantifier in object position:

- (23) We **cannot** invite **no-one**.

The resulting reading is an affirmative one, i.e. *not no-one* ( $\neg\neg\exists$ ) means *someone* ( $\exists$ ).<sup>6</sup> The same effect arises in sentences with two negative indefinites, as in the following Dutch example (van der Wouden 2007).

<sup>6</sup> The example in (23) also involves a modal, which is affected if we paraphrase the sentence with *someone*: ‘You must invite someone’. We discuss the interaction of negation with modality in Sect. 3.3.

- (24) Een huwelijk en een promotie op dezelfde dag is **niet niks**.  
 a marriage and a PhD on the same day is not nothing  
 ‘It’s quite something to have a marriage and a PhD defense on the same day.’

Here as well, the negations contained in the negative quantifiers *niet niks* ‘not nothing’ cancel each other out, i.e. *niet niks* is equivalent to *something*.

### 2.2.2 Negative concord items

A second type of negative indefinites looks like the negative quantifiers, but differs from them in that they do not always give rise to negation on their own, but require the additional presence of a negative morpheme, which can be the standard negator, or another negative indefinite. An example from Italian is given in (25).

- (25) **Non** ha visto **niente**.  
 not have.3SG seen nothing  
 ‘He has seen nothing.’

The negative indefinite *niente* ‘nothing’ requires the presence of the sentence negator *non*. In the case of negative quantifiers discussed in the previous section, this combination resulted in a double negation, i.e. an affirmative. In contrast, in the case of (25) there is only one semantic negation. This phenomenon is referred to as negative concord, i.e. two negative morphemes agree with each other to only realise one semantic negation (see Jespersen 1922, Haegeman 1995, Giannakidou 2000, Zeijlstra 2004a, Van der Auwera & Gianollo 2025 and many others). Correspondingly, negative indefinites that display concord properties are referred to as ‘negative concord items’. An alternative term used in the literature is that of *n-word* (Laka 1990, Giannakidou 2006).

Combinations of multiple negative indefinites likewise do not contribute multiple semantic negations, as the following examples from Italian (26a) and Czech (26b) make clear.

- (26) a. **Nessuno** ha visto **niente**.  
 no-one has seen nothing  
 ‘No-one saw anything.’  
 b. **Nikdo nic ne-viděl**.  
 no-one nothing NEG-saw  
 ‘No-one saw anything.’  
 ‘It is not the case that somebody saw something.’

The two negative indefinites in (26a) (marked in bold) together give rise to one single negative meaning. In the Czech example (26b) there are even three negative elements, but only one semantic negation. Of these three

elements two are negative concord items, i.e. *nikdo* and *nic*, while *ne* is the standard negator.

Within negative concord languages, a distinction is made between strict negative concord and non-strict negative concord (Giannakidou 1997, 2000). In the first case, the sentence negator must always appear when a negative concord item is present. In the case of non-strict negative concord, the sentence negator can be omitted under certain circumstances. Czech is a language with strict negative concord. As we saw above, the sentence negator *ne-* appears as a prefix on the verb (27).

- (27) Pavel ženě peníze **ne**-dal.  
 Pavel woman.DAT money.ACC NEG-gave  
 'Pavel didn't give money to the woman.'

In combination with negative concord items the negative prefix *ne-* must always appear on the verb, regardless of the position of the negative concord item.

- (28) a. **Nikdo** ženě peníze **ne**-dal.  
 nobody woman.DAT money.ACC NEG-gave  
 'No-one gave money to the woman.'  
 b. Ženě **ne**-dal **nic**.  
 woman.DAT NEG-gave nothing  
 'He didn't give the woman anything.'

Italian is an example of a language with non-strict negative concord. The sentence negator is *non*, which appears preverbally, (29):

- (29) a. Gianni **non** ha telefonato.  
 Gianni not has called  
 b. **Non** ha telefonato Gianni.  
 not has called Gianni  
 'Gianni hasn't called.'

A relevant fact about Italian is that it can have postverbal subjects, as in (29b). When such a subject is a negative indefinite like *nessuno* 'nobody', we get negative concord, as in (30a). However, this is not the case when the negative indefinite precedes the verb (30b), in which case the clausal negator *non* is omitted (or we get a double negation reading when *non* is present).

- (30) a. **Non** ha telefonato **nessuno**.  
 not has called nobody  
 'Niemand heeft gebeld.'  
 b. **Nessuno** ha telefonato.  
 nobody has called  
 'Niemand heeft gebeld.'

Since the direct object necessarily follows the verb, it always requires negative concord, as we saw above in (25). Because in Italian negative concord items do not systematically require the presence of the sentence negator, Italian is classified as a non-strict negative concord language.

This kind of negative concord also occurs in many substandard varieties of English. In (31), a number of English song titles are given that illustrate the phenomenon.

- (31) a. **Ain't no** sunshine (when she's gone) (Bill Withers, 1971).  
 b. **Ain't no** mountain high enough (Marvin Gaye and Tammi Terrell, 1966).  
 c. (I **can't** get **no**) satisfaction (Rolling Stones, 1965).  
 d. **Don't Nobody** Bring Me **No** Bad News (Mabel King, 1978)  
 e. **Don't** Come Round Here **No** More (Tom Petty and the Heartbreakers, 1985)

Languages can also combine negative concord and bipartite negation. French and West Flemish are examples of bipartite negation languages (as we saw above), and they also feature negative concord. In French, there is no negative concord with *pas*: when there is only one negative indefinite in the sentence, as in (32a), then the addition of *pas* leads to a double negation reading. But with two or more negative indefinites, as in (32b), we do see negative concord, i.e. only one of the negative indefinites is interpreted negatively.<sup>7</sup>

- (32) a. **Personne n'** = est (**pas**) venu  
 no-one NEG = is not come  
 'No-one came' or 'No-one didn't come.'  
 b. **Personne n'** = a **rien** vu.  
 no-one NEG = has nothing seen  
 'No-one saw anything.'  
 'It is not the case that somebody saw something.'

In West Flemish, on the other hand, negative concord already occurs with one negative indefinite, which can occur together with the standard negator *nie* with a negative concord reading (33a) (in addition to the bipartite negation clitic *en*). Negative concord also occurs with two (or more) negative concord items, as in (33b) (Haegeman 1995: 116).

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<sup>7</sup> den Besten (1986) and van der Wouden & Zwarts (1993) use the term 'negative spread' for the co-occurrence of multiple negative indefinites without the presence of an additional standard negator (as in (26a)), and 'negative doubling' when a negative marker co-occurs with a negative indefinite, giving rise to one  $\neg$  (as in (25)). However, all languages with negative spread also have some type of negative doubling (e.g. even though French *pas* cannot take part in negative concord, *ne can*), we believe negative concord is the better term to refer to the phenomenon.

- (33) a. da Valère ier **niemand nie en**-kent.  
 that Valère here no-one not NEG-knows  
 ‘that Valère knows no-one here.’
- b. da Valère woarschijnlijk an **niemand niets nie en** = zegt  
 that Valère probably to nobody nothing not NEG = says  
 ‘that Valère probably doesn’ say anything to anyone.’

Note that the last sentence in (33b) contains four negative elements, which nevertheless are interpreted as a single  $\neg$ .

Negative concord has been discussed extensively in the literature, since it poses serious challenges to the principle of the compositionality of meaning, “which says that the meaning of a complex whole is a function of the meaning of its parts and the way they are put together” (De Swart & Sag 2002: 375). If indeed we were to put the different negative concord items together to compute the meaning of the whole, then we would end up with double negations in all of the above examples. In the remainder of this section, we discuss five different proposals which have been suggested in the literature to deal with this problem.

One solution, proposed by Zanuttini (1991) and Haegeman & Zanuttini (1996) is to assume that all negative concord items are negative quantifiers, and that an operation, called *factorization*, reinterprets a sequence of quantifiers that each contain a negative operator as a new sequence with only one operator. However, according to May (1989), factorization fails to preserve compositionality, because a part of the semantics of each negative concord item is actually erased.

A second type of approach assumes that negative concord items are not quantifiers, but Negative Polarity Items (henceforth NPIs; see Sect. 3.2 for discussion; e.g. Laka 1990, Ladusaw 1992, Giannakidou (2000) and many others). This solution basically tries to do away with the compositionality problem by reducing the negative concord item to an existentially quantified NP. However, De Swart & Sag (2002) point out a problem for this assumption. Negative concord items, like French *rien*, can appear as fragment answers (34b), but NPIs like *quoi que ce soit* ‘anything’ cannot (34c).

- (34) a. Qu’est-ce que tu as vu?  
 What that you have seen  
 ‘What did you see?’
- b. Rien.  
 nothing  
 ‘Nothing.’
- c. \*Quoi que ce soit.  
 what that it is.SBJV  
 ‘Anything’

If negative concord items were NPIs, then this contrast is unexpected. Moreover, De Swart & Sag (2002: 376) observe that a French example like

(35) is in fact ambiguous between a negative concord and a double negation reading (though admittedly the concord reading is definitely the preferred one).

- (35) *Personne (n')a rien fait.*  
 No-one NEG = has nothing done  
 'No one has done nothing.' (DOUBLE NEGATION)  
 'No one has done anything.' (NEGATIVE CONCORD)

This ambiguity is again hard to explain if negative concord items were NPIs.

De Swart & Sag (2002) account for data of this type in terms of a polyadic quantificational approach, based on May (1989) and van Benthem (1989), which can be considered the third approach to negative concord. Double negation arises in their approach due to interpreting a sequence of negative indefinites as the iteration of monadic quantifiers. Concord arises due to interpreting a sequence of negative indefinites via resumption. In other words, De Swart & Sag (2002) allow for two types of quantificational mechanisms. A potential problem with this type of approach is that it predicts that each language should have both readings for sequences of negative indefinites, and that is not the case.

A fourth approach to negative concord deals with negative concord in terms of intrinsic ambiguity, either configurational/contextual (van der Wouden & Zwarts 1993, van der Wouden 1994, 1997) or lexical (Herburger 2001). Herburger (2001) proposes that the lexicon of languages with negative concord, like Spanish, contains two different lexical items for the same negative concord item, one being a negative quantifier (to account for fragment answers), and the other a negative polarity item. Support for her approach comes from the fact that this type of situation could be regarded as the Stage III of the Jespersen Cycle, where there is obligatory bipartite negation (see the discussion in section 2.1.2 above). The problem with this type of approach is that it requires a multiplication of homophonous lexical entries. The approach of De Clercq (2019, accepted), couched in Nanosyntax (Starke 2009), does away with that problem and proposes to capture the ambiguity of negative concord items without creating doublets in the lexicon by treating the identity between the negative quantifier and the concord item as a case of syncretism, which is in turn accounted for in the standard nanosyntactic manner. We refer the reader to this literature for more details.

A fifth approach to negative concord is the syntactic agreement approach, which adopts minimalist technology, in particular the distinction between interpretable and uninterpretable features (Zeijlstra 2004a, 2009, Penka & Zeijlstra 2010). Negative concord items typically appear to be negative, but are not so interpreted. Under this type of approach, this follows from them having an uninterpretable [uNeg] feature. That is, they are syntactically marked for negation, but semantically non-negative. In strict negative concord languages like Czech, the standard negator, like *ne* in (28), is also



endowed with this [uNeg] feature. A silent negative operator with an interpretable [iNeg] feature will license all the negative concord items in its scope, leading to the effect that only one semantic negation is interpreted. For a non-strict negative concord language like Italian or Spanish, Zeijlstra (2004a) argues that the standard negator has [iNeg], allowing it to license [uNeg] items in its scope. However, when a negative indefinite appears in preverbal position it will need to get self-licensed. This self-licensing mechanism is also called for in contexts like fragment answers (34), raising the question whether these so-called semantically non-negative words are not actually semantically negative after all.

### 2.3 Negative correlative conjunctions

In this section we discuss a type of negator which shows a formal similarity with the negative indefinites in being composed of *n-*, followed by *either* (as in *neither*), or by the disjunctive conjunction *or* (as in *nor*). *Neither* and *nor* typically occur together in the negative correlative *neither ... nor*.

(36) **Neither** Alissa, **nor** Marian went to school today.

The meaning of this sentence involves either a conjunction and two negations, or a disjunction and one negation:

(37) a.  $(\neg p \wedge \neg q)$   
 b.  $\neg(p \vee q)$

We return to the equivalence between conjunction and disjunction below, when discussing De Morgan's Law. In line with (37a), its meaning can be paraphrased as in (38):

(38) Alissa didn't go to school today, and Marian didn't go to school today.

Formally, *nor* resembles English negative quantifiers in being a combination of *n-* and a second element (*or*) with existential semantics (compare pairs like *ever-never*, *a-no*, *somebody-nobody*, etc.). The combination *neither ... nor* as in (36) looks very much like a case of negative concord, with only one semantic negation being contributed by two negative morphemes (and assuming a logical representation with a disjunction in the scope of a single negation, as in (37b)).

## 2.4 Other negative words and expressions

In addition to the negative indefinites and correlatives of the previous sections, there are other types of words and complex expressions, which may potentially express logical negation, or have some intuitively negative feel to them. For the most part, they lack overt morphology indicating their negativity (although in some cases, as with the negative adjectives, a negative prefix like *un-* may occur).

As a first instance, this category includes complex negative expressions like in *by no means*, *in no way*, and *anything but*. As the examples show, these may or may not include an overt negator.

- (39) a. It is **by no means** certain that we'll finish the project by June.  
 b. She had **in no way** intended to offend anybody.  
 c. Nasrin is **anything but** kind.

The negator *anything but* typically combines with predicative adjectives and nouns. As we shall see in Sect. 3, these behave very much like the standard negator and negative indefinites with respect to the diagnostics for negation.

A second category includes the adverbs *hardly*, *rarely*, and *seldom*:

- (40) a. Eric can **hardly** remember the accident.  
 b. Anna **rarely** drinks coffee.  
 c. Kangaroo rats **seldom** have access to drinking water.

Their properties resemble those of the vague scalar quantifier *few*, which meaningwise is close to *not many* discussed above.

- (41) a. **Few** arrows have hit the target.  
 b. She's read **few** books.

A third category are the negative adjectives. These may be morphologically derived from positive adjectives by means of a negative prefix (42a), or they may be semantically negative without such a prefix (42b).

- (42) a. My grandfather was unaware of the problem.  
 b. It was difficult for him to stay with her.

The presence of a covert negation in the adjectives of (42b) is suggested by the systematic impossibility of prefixing them with *un-*, as observed by Jespersen (1942: 466) (also Zimmer 1964; Horn 2001b: 275; Horn 2005).

- (43) a. unhappy    b. sad  
       unwise        foolish  
       unclean        dirty  
       unfriendly    hostile  
       unhealthy     sick  
       unkind         rude  
       untrue         false  
       uneasy         difficult

An account of this pattern in terms of a constraint on structurally adjacent negative heads is proposed in De Clercq & Vanden Wyngaerd (2019) (see also Collins 2018).

Another example of this category is the preposition *without*, which is clearly negative, in the sense that its meaning can be paraphrased as *not with* (and various other types of evidence support this conclusion, as we will see in Sect. 3). At the same time, its scope does not include the whole sentence, as can be seen from looking at (44).

- (44) The children left for school **without** their school bags.

Here the event of leaving for school is not denied: the children did leave for school, they just did so not taking their school bags.

As with the negative indefinites of the previous section, the words and expressions discussed in this section can be decomposed into a negation and another element, as illustrated in (45).

(45)	negative word =	X	¬	X
	hardly	= almost	not	
	rarely	=	not	often
	few	=	not	many
	without	=	not	with
	by no means	=	not	by any means
	in no way	= not		in any way
	anything but	=	not	
	un- $A_{POS}$	=	not	$A_{POS}$
	$A_{NEG}$	=	not	$A_{POS}$

Accordingly, the negative sentences in this section can be represented in an informal fashion as in (46).

- (46) a. ¬ (She can remember the accident)  
       b. ¬ (Anna often drinks coffee)  
       c. ¬ (Many arrows have hit the target)  
       d. ¬ (The children have left for school with their schoolbags)  
       e. ¬ (Nasrin is kind)  
       f. ¬ (My grandpa was aware of the problem)

- g.  $\neg$  (It was easy for him to stay with her)

The decomposition is intended to show the presence of a semantic negation in these sentences.

A category for which such a decomposition is not straightforward includes verbs with a negative meaning but with (mostly) no visible negative morphology, like *dissuade*, *doubt*, *refuse*, *deny*, *forget* (see Ladusaw 1980 for discussion).

- (47) a. I **doubt** that he is telling the truth.  
 b. Luke **denied** that the accusations were true.  
 c. Luke **denied** the accusations.  
 d. She **refused** to kiss him.

In (47a), a paraphrase with *not sure* is possible, and *deny that p* seems equivalent with *claim that not p*, but it is unclear how that paraphrase extends to (47c). For (47d), it is unclear what the paraphrase with an overt negation would look like.

As we shall show below, not all of these negations always take sentential scope. Various tests indicate, for example, that the negative prefix *un-* never takes sentential scope and hence that the informal representation in (46f) is not right. Similarly, as we noted above, in a case like (44) with *without*, the negation does not negate the event, but has scope over the adjunct. We come back to this in Sect. 3.4.

## 2.5 Squatitive negation

A final type of negation that we want to have a look at is squatitive negation (Horn 2001a, Postal 2004, De Clercq 2011).<sup>8</sup> This involves a set of words, all derived from taboo-items, that shows the interesting behaviour of being used both in the scope of negation (as an NPI or negative indefinite, see Sect. 3.2 and 2.2), as well as with full negative meaning on their own. The list in (48) is a mixture of American and British English squatitive negation items (based on McCloskey 1993, Postal 2004, De Clercq 2011).

- (48) squat, fuck-all, beans, crap, dick, diddley, diddley-poo, diddley-squat, jack, jack-shit, jack-squat, piss-all, poo, shit, shit-all, sod-all, bugger-all, naff-all, crap-all

<sup>8</sup> See also Sailor (2017) for *fuck*-inversion, which is used in some varieties of the English spoken in the British Isles, and seems to behave quite differently from squatitive negation as discussed in this chapter.

Postal (2004) also refers to them as vulgar minimizers, because they share properties with minimizers, like *a drop*, *a finger*, which, like other NPIs, always need to occur in the context of negation.

The examples in (49) (from Postal 2004: 159) illustrate the use of squative items in the context of negation, yielding a meaning similar to the negative polarity item *anything*. The examples in (50) show that, when negation is absent, the squative items can give rise to a negative meaning on their own (De Clercq 2011; Sarah Haas, p.c.).

- (49) a. Olmstead didn't say **dick** about the new dean.  
 b. Olmstead doesn't understand **squat** about topology.
- (50) a. Claudia saw **squat**.  
 b. **Fuck-all** happened.  
 c. It's 3:15 and I've done **fuck-all** but this thing.

De Clercq (2011: 15) also discusses the use of British English squative elements as determiners, as in (51) with a meaning similar to *no*.<sup>9</sup>

- (51) A: Did Claudia buy everything on the shopping list?  
 B: She got the whiskey and the cigars, but she bought **fuck-all** books or magazines.

Squative negation is definitely not limited to English. In substandard Dutch a definite expression *de ballen* 'the balls' can be used to negate a sentence (52), and like the English squative items, the same noun, but without the definite article, can also be used in the scope of the negator *geen* 'no' as an emphatic element. Note that the definite article and *geen* cannot co-occur, as illustrated in (54).

- (52) Ik heb er **de ballen** verstand van.  
 I have R-pron the balls brains of.  
 'I don't know the first thing about it!'
- (53) Ik heb er **geen ballen** verstand van.  
 I have R.pron no balls brains of  
 'I don't know the first thing about it!'
- (54) \*Ik heb er geen de ballen verstand van.

Whether these squative items also truly contain a semantic negation is a matter that we will take up in the next section, where we will discuss different tests for negation. We will see that the negative morphemes discussed in this section do not all behave alike with respect to these tests.

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<sup>9</sup> Special thanks go to William Harwood for help with the data on British English *squat*.

### 3 Diagnosing negation

In the previous section we discussed different types of morphemes, words, and complex expressions, which are all negative in some way. In this section we will discuss a couple of tests that provide support to them being classified as negative, while at the same time pointing to subtle differences in what it means to be negative.

#### 3.1 De Morgan's first law

##### 3.1.1 Standard negators

The first test that we want to discuss involves De Morgan's First Law, which posits a logical equivalence between the Boolean operators  $\wedge$  and  $\vee$ , when they combine with negation:

$$(55) \quad \text{De Morgan's First Law} \\ (\neg p \wedge \neg q) \Leftrightarrow \neg(p \vee q)$$

Named after the 19th century British mathematician Augustus De Morgan, it forms a pair with his second law in (56).

$$(56) \quad \text{De Morgan's Second Law} \\ (\neg p \vee \neg q) \Leftrightarrow \neg(p \wedge q)$$

The Boolean operators  $\wedge$  and  $\vee$  are said to be each other's dual, i.e. one can always be translated into the other using logical negation, as shown in (57):

$$(57) \quad \begin{array}{l} \text{a. } (p \vee q) \Leftrightarrow \neg(\neg p \wedge \neg q) \\ \text{b. } (p \wedge q) \Leftrightarrow \neg(\neg p \vee \neg q) \end{array}$$

The same relationship of duality holds between the universal and existential quantifiers:

$$(58) \quad \begin{array}{l} \text{a. } \forall x.P(x) \Leftrightarrow \neg\exists x.\neg P(x) \\ \text{b. } \exists x.P(x) \Leftrightarrow \neg\forall x.\neg P(x) \end{array}$$

Finally, as we shall see in Sect. 3.3, a dual relationship also exists between necessity and possibility modals (see Demey & Smessaert 2016 for discussion of more duality phenomena in logic and natural language).

We will be concerned in particular here with De Morgan's First Law. This equivalence between *and* and *or* in the presence of a negation can also be observed in natural language. One way to formulate (55) is that an *and* that has two negations in its scope turns into an *or* when the negation takes scope over the logical connective. We start out by looking at simple sentences with

the standard negator, which we assume to undoubtedly contain a  $\neg$ . In (59) we see two NPs conjoined by the coordinating conjunction *or*.

(59) Nasrin doesn't like [beer **or** wine].

Although (59) contains *or*, its meaning is more like that of *and*, in the sense that the sentence is true if neither of the conjuncts is true, i.e. (59) means that Nasrin does not like beer, and he does not like wine. We also see this *and* appear in (60), which has the same meaning as (59).

(60) [Nasrin doesn't like beer] **and** [Nasrin doesn't like wine].

In (60) we see two negations, one in each conjunct, the two conjuncts being connected with the coordinating conjunction *and*. Formulated in terms of scope, the conjunction *and* (logical  $\wedge$ ) in (60) has scope over the negations, as in the statement that is to the left of the double arrow in (55) above. The sentence (59), with *or*, in contrast, has the disjunctive operator in the scope of the negation (as in the part that is to the right of the double arrow in (55) above). The latter situation always involves some kind of ellipsis, as we can see when comparing (60) and (59).

Having established that the appearance of *or* (logical  $\vee$ ) to mean something that semantically corresponds to *and* in the presence of negation can be understood in terms of the Morgan's First Law, we can also use this property as a diagnostic to detect the presence of a (semantic) negation, or the  $\neg$  from classical logic, in those places where there is no standard negator but some alternative negative word, like a negative indefinite, adverb, or whatever type of intuitively negative element. Whenever *or* has a meaning that can be paraphrased with *and*, this points to the presence of an underlying negation.<sup>10</sup> Let us therefore look at the negative words that we discussed in Sect. 2 through the lens of this diagnostic.

### 3.1.2 Negative indefinites

We start with negative quantifiers in English. The same thing we saw with the standard negator applies to negative indefinites, such as *no-one*. Here too, (61a) has the same meaning as (61b).

- (61) a. **No-one** likes Bach **or** Wagner.  
 b. **No-one** likes Bach **and no-one** likes Wagner.

From this we can conclude that negative indefinites contain a logical negation, and that in (61a) this negation has scope over the conjunction *or*. This is confirmed by the fact that, if we replace the *or* in (61a) with an *and*, as

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<sup>10</sup> This observation is also made in Reiss (to appear).

in (62), then the meaning changes: nobody likes both, i.e. both Bach and Wagner.

(62) **No-one** likes Bach **and** Wagner.

For example, in a family where everyone likes Bach but hates Wagner, (61) is false, but (62) is true.

As is to be expected, a sentence with *or* but without a negative quantifier behaves very differently from one with a negative quantifier: the sentences in (63) do not have the same meaning.

(63) a. **Everyone** likes Bach **or** Wagner.  
b. **Everyone** likes Bach **and** **everyone** likes Wagner.

Consider again our family where everyone likes Bach but hates Wagner: in such a situation, (63a) is true, but (63b) is false. The reason for this is of course that the universal quantifier does not have a hidden negation inside it, and so no change from *or* to *and* or vice versa can occur, because De Morgan's First Law does not apply.

The other negative indefinites of (20) behave like *no-one*, i.e. they give rise to a universally negative meaning when there is an *or* in their scope. This is illustrated in (64):

(64) a. **Nothing** could interest the boys **or** the girls.  
b. He bought **no** books **or** magazines.  
c. I **never** drink beer **or** wine with my dinner.  
d. **Nowhere** in this town can you buy beer **or** wine.  
e. **No** student **or** professor knew the answer.

For example, sentence (64a) means that there was nothing to interest the boys, and there was nothing to interest the girls (i.e. the universally negative meaning), and so do the other sentences in (64). These sentences contrast minimally with those in (65), where the negative indefinite is replaced by a non-negative counterpart:

(65) a. **Many things** could interest the boys **or** the girls.  
b. He bought **some** books **or** magazines.  
c. I **always** drink beer **or** wine with my dinner.  
d. You can buy beer **or** wine **everywhere** in this town.  
e. A student **or** a professor knew the answer.

Here we have a reading in which it is not necessary that there are many things that could interest the boys, and many that could interest the girls. It is sufficient that the sums of their interests can be characterized as 'many things' in some way. This is most clearly the case in (65c), where it is a very natural interpretation that you always drink one or the other (beer or wine) with your meal, but not both.



### 3.1.3 Other negative words and expressions

We next turn to the category of the other negative words and expressions which we discussed in Sect. 2.4 above. These fall into two groups. In a first group, De Morgan's first Law applies in full. However, there is also a group where the logical equivalence between *and* and *or* does not hold, suggesting that they are either nonnegative, or, alternatively, negative in a different manner.

We start off the discussion with the first group, where De Morgan holds in full. A case in point are complex expressions of the type *anything but*, *in no way* and *by no means*. We show this for *anything but* in (66), leaving it to the reader to reproduce it for the other two members of the triplet.

- (66) a. Nasrin is **anything but** kind **or** gentle.  
 b. Nasrin is **anything but** kind **and** Nasrin is **anything but** gentle.

The preposition *without* also shows full De Morgan behaviour, as shown in (67).

- (67) The children went to school **without** a coat **or** bag.  
 ↔ The children went to school **without** a coat, **and** the children went to school **without** a bag.

The same is true for all sorts of negative adjectives, whether prefixed or not, as long as they can be complemented by an infinitival clause. The negation inside the adjective seems to be able to turn the *or* into an *and*, yielding a universally negative meaning.

- (68) It is **impossible** to find beer **or** wine here.  
 ↔ It is **impossible** to find beer here, **and** it is **impossible** to find wine here.
- (69) It is **difficult** to find beer **or** wine here.  
 ↔ It is **difficult** to find beer here, **and** it is difficult to find wine here.

With negative verbs like *refuse* and *deny* De Morgan's First Law also holds:

- (70) Max **refuses** to drink **or** smoke.  
 ↔ Max **refuses** to drink **and** Max **refuses** to smoke.
- (71) The postman **denies** that he smokes or drinks.  
 ↔ The postman **denies** that he smokes **and** the postman **denies** that he drinks.

We now turn to the second group of negative words, which behave differently, in the sense that the sentence with one negation and *or* does not mean the same as the sentence with two negations and *and*. In other words,

De Morgan's equivalence does not always hold. An example of this is the negative quantifier *few*:

- (72) **Few** students smoke **or** drink.  
 $\nleftrightarrow$  **Few** students smoke, **and few** students drink.

If the first sentence is true, then the second is always true, but the reverse does not hold. There are cases in which the second sentence (with *and*) is true, but the one with *or* is not. Suppose we have a group of seven students, two of whom smoke (and do not drink), two others drink (and do not smoke), and the remaining three neither smoke nor drink. A majority of four out of seven therefore smokes or drinks. In such a situation, the sentence with *and* is clearly true (there are few smokers and few drinkers), but the sentence with *or* is not (since there is a majority that either smokes or drinks). It seems that the *or* in the scope of *few* is a real semantic *or*: the sum of smokers and the drinkers has to amount to a number that can be considered 'few' for the first sentence of (72) to be true.<sup>11</sup> In contrast, for the sentence with *and* to be true, the number of smokers has to qualify as 'few', and the number of drinkers has to qualify as 'few' as well, but we do not look at the number of the combined smokers and drinkers. In requiring reference to the sum of the smokers and the drinkers, *few* resembles *many*:

- (73) **Many** students smoke **or** drink.

If the sum of the smokers and the drinkers amounts to four out of seven (as in the situation just sketched), we would be likely to say that (73) is true (whereas (72) with *or* is false). Note finally that (72) with *or* behaves like (74) with respect to De Morgan:

- (74) **Not many** students smoke **or** drink.

The relevance of this observation is that (74) clearly contains an overt negator, yet it fails the De Morgan test, like *few*, which does not contain an overt negator. Rather, it looks like there are different degrees of negativity, which are in part related to the type of negator, and in part to its syntactic position. This conclusion will be further confirmed by our discussion of negative polarity in Sect. 3.2 below.

The adverbs *hardly*, *rarely*, and *seldom* also fit into the category of non-De Morgan compliant negators. We first show this for (75):

- (75) You can **hardly** find beer **or** wine here.

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<sup>11</sup> The quantifiers *few* and *many* are like gradable adjectives in that they refer to an implicit contextual norm or standard or comparison class for their interpretation. In the text, we are operating in a context where a proportion of two out of seven makes the sentence with *few* true, while four out of seven makes it false. Since these proportions are not an absolute property of this quantifier, the truth conditions may vary with the contextual standard.

↔ You can **hardly** find beer here, **and** you can **hardly** find wine here.

Here too, it is true that the truth of the first sentence implies the truth of the second. But the reverse is not so clearly the case: if you can find beer in 2 out of 7 shops in a city, and wine in 2 others, then you can find either beer or wine in 4 out of 7 shops. In that case, the second sentence is true, but the first untrue. Similar contexts can be created for *rarely*:

(76) I **rarely** drink beer **or** wine with my dinner.  
 ↔ I **rarely** drink beer with my dinner **and** I **rarely** drink wine with my dinner.

Here too, there are conceivable circumstances in which the second sentence is true, and the first is false. Sketching such a context requires certain assumptions about where the threshold lies for speaking of ‘rarely’. Suppose that drinking beer (or wine) with your meal three times a month counts as ‘rarely’, but not six times. If someone then drinks beer with his meal three times a month, and also drinks wine three times a month, then the second sentence is true, but the first is not.

In the Sect. 3.2, we will come back to quantifiers like *few*, *hardly* and *seldom*, and how they differ from the ones for which De Morgan’s equivalence does hold. We will call the latter class anti-additive (AA) (Zwarts 1986), and the former downward entailing (DE) (Ladusaw 1980). These two classes also have different properties when it comes to licensing NPIs.

### 3.1.4 Squatitive negation

Last but not least, we need to have a look at the squatitive negators, which we introduced in Sect. 2.5. These elements behave in exactly the same way with respect to the De Morgan test as the standard negator and the negative indefinites, like *no*, *nothing*, *without*, *etc.*

(77) **Fuck-all** students smoke **or** drink.  
 ↔ **Fuck-all** students smoke, **and** **fuck-all** students drink.

(78) Claudia bought **fuck-all** books **or** magazines.  
 ↔ Claudia bought **fuck-all** books **and** Claudia bought **fuck-all** magazines.

That is, the equivalence between the sentences with *and* and with *or* holds in all contexts. We conclude that they are fully negative.

### 3.1.5 Interim summary and outlook

We have found that, for the vast majority of negative expressions, it is the case that *or* gets a universally negative reading. But there is also a small group of negative expressions, which we will refer to as the downward entailing QPs, in which De Morgan's equivalence does not hold true in all situations. In the next section we take a closer look at the phenomenon of Negative Polarity, as this serves as a second diagnostic to detect the presence of a semantic negation. That section will also further develop the concept of negations of different strengths.

### 3.2 NPI-licensing

In our previous discussion, we have already mentioned Negative Polarity Items (NPIs) a number of times. These are expressions that can only occur in certain kinds of environments (see Buyskens 1959, Ladusaw 1980, van der Wouden 1994, Giannakidou 1997, Homer 2021 for discussion). Many of these environments can be characterized as 'negative' in a way that is intuitively obvious. For this reason, these items are called Negative Polarity Items: they require a negative pole in the sentence.<sup>12</sup> In the examples below, the NPIs are italicized, and the negative elements bolded (the examples in this section have been inspired by Ladusaw 1980, van der Wouden 1994, Homer 2021).

- (79) a. Sally didn't eat *any* breakfast yesterday.  
b. \*Sally ate *any* breakfast yesterday.
- (80) a. Joe isn't *all that smart*.  
b. \*Joe is *all that smart*.
- (81) a. I **never** want to talk to him *anymore*.  
b. \*I want to talk to him *anymore*.
- (82) a. The children **cannot** *stand* the schoolmaster.  
b. \*The children *can stand* the schoolmaster.
- (83) a. You **needn't** be afraid.  
b. \*You *need* be afraid.
- (84) a. **No-one** told the secret to *anyone*.  
b. \*Everyone told the secret to *anyone*.
- (85) a. **Nobody** *lifted a finger* to help her.  
b. \*The children *lifted a finger* to help her.

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<sup>12</sup> The NPI also needs to be c-commanded by its licenser in many languages. (see Ladusaw 1980, Homer 2021). We will not discuss this issue further in this paper.

A comparison of the a- and b-sentences shows that the bolded negative word, which is either a standard negator or a negative indefinite, is required for the NPI to be allowed, i.e. the NPI cannot appear when there is no negative word present. NPIs can be expressions like *any*, or collocations such as *can stand* or *lift a finger*. The modal verb *need* (83) is also an NPI when it is used as a modal, i.e. without *do*-support and with a bare infinitive (Iatridou & Zeijlstra 2010).<sup>13</sup> It is the negative counterpart of the obligation or necessity modal *must*, which we formally represent as  $\square$  (see Sect. 3.3 for more discussion). The negation in (83) takes scope over the necessity modal, resulting in a meaning of absence of necessity or obligation.

- (86) Anna needn't worry.  
 $\neg \square W(a)$

The fact that NPIs require a semantic negation to be licensed makes them a useful test to diagnose the presence of  $\neg$ . The application of this test will reveal, however, that not all NPIs behave in the same way. Observe the difference between (87a) and (87b).

- (87) a. **None** of the girls *give a damn* about the way they look.  
 b. \*?**Few** girls *give a damn* about the way they look.

We see that the NPI *give a damn* can occur with a negative indefinite like *none* (87a), but not with *few* (87b). In contrast, an NPI such as *can stand* can occur with both negative indefinites and with *few*, as we see in (82a) and (88b), respectively.

- (88) a. **No one** *can stand* the schoolmaster.  
 b. **Few** children *can stand* the schoolmaster.

The property that sets apart the negative indefinite and a negative quantifier word like *few* is called **anti-additivity** (Zwarts 1986). Standard negators and negative indefinites are anti-additive (AA), whereas quantifiers like *few* are not.<sup>14</sup> The property of anti-additivity is in fact one that we discussed extensively in Sect. 3.1 above on De Morgan's First Law. Anti-additive negators are those for which De Morgan's Law holds, i.e. which trigger a universally negative reading for *or*. These negators can combine with any kind of NPI, while negators that are not anti-additive can only occur with a subset of the NPIs. This property distinguishes weak NPIs (which can occur under any negator) from strong NPIs (which only occur under anti-additive negators). The next question is what both groups of negators have in common. This question is relevant, since affirmative sentences do not allow any NPIs at all,

<sup>13</sup> When followed by a *to*-infinitive, *need* requires *do*-support, and is not negatively polar, e.g. *You (don't) need to visit her soon.*

<sup>14</sup> Actually standard negators like *not* are antimorphic, and they are able to license super-strong NPIs like *a bit*. We abstract away from discussing this subtype of anti-additivity in this paper.

as we saw in the above examples (79)-(85). That implies that all types of negative sentences share a property that they do not share with affirmative sentences.

The property in question is called **downward entailment** (DE), and it is opposed to upward entailment (UE), which is a property of affirmative sentences. As the name suggests, downward and upward entailment have to do with the kind of inference patterns that sentences give rise to. These different types of inference patterns can be illustrated by the sentences in (89).

- (89)  $p$  All children in the class are wearing a woollen sweater.  
 $q$  All children in the class are wearing a sweater.

If the sentence  $p$  is true, then  $q$  must also be true. The converse is not the case: if  $q$  is true, then  $p$  can be either true or false. This is a typical case of logical entailment:  $p \rightarrow q$ .

The interesting fact is now that the direction of entailment is reversed when we replace the universal quantifier *all* by the universally negative *no*.

- (90)  $p$  No child in the class is wearing a woollen sweater.  
 $q$  No child in the class is wearing a sweater.

In this case, we can conclude from the truth of  $q$  that  $p$  is true. In other words, the negative indefinite *no* reverses the direction of inference:  $q \rightarrow p$ .

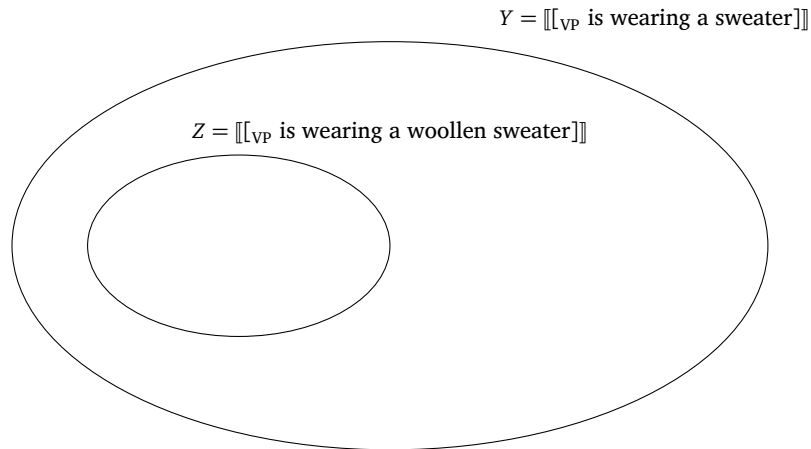
This reversal of the direction of entailment is something that is characteristic of all sorts of negative environments. We can demonstrate this, for example, with *few*, which we saw earlier can license weak NPIs. In (91) we see that the inference pattern is  $q \rightarrow p$ .

- (91)  $p$  Few children in the class are wearing a woollen sweater.  
 $q$  Few children in the class are wearing a sweater.

Negative contexts (and others in which the direction of inference is reversed) are downward entailing, or monotonically decreasing. This means that they give rise to inferences from sets to subsets. They are opposed to contexts that are upward entailing (monotonically increasing), such as the affirmative sentences in (89), where the inferences go from the subset to the set.

To understand this, we need to consider VP denotations. VPs in formal semantics are viewed as sets of individuals, for example the set of the individuals who wear a (woollen) sweater in the above examples. Now the set of individuals who wear a woollen sweater is a subset of the set of individuals who wear a sweater, i.e. the VPs in (90) (and therefore also (91)) stand to each other in a set-subset relation. This is shown in the form of a Venn diagram in Figure 2.

With this in mind, we can better understand the concept of upward and downward entailment: when inferences run from set to subset (i.e. from  $Y$  to  $Z$ ), we are talking about downward entailment. In the case of upward

**Figure 2** Denotations of VPs as sets of individuals

entailment, the reverse is true: inferences run from subset to set (i.e. from  $Z$  to  $Y$ ).

The two sets in Fig. 2 are far from the only ones: within the wearers of a woollen sweater, we can distinguish a smaller subset of the wearers of a green woollen sweater, or of a green woollen sweater with a V-neck, etc. Conversely, the sweater-wearers are a subset of the wearers of a garment. We can list sentences with all these VPs, and we see that indeed for *all* (and universal quantifiers in general) there is upward entailment: if the first sentence (92a) is true, then all other sentences of (92) are also true.

- (92)
- a. All children in the class are wearing a green woollen sweater.
  - b. All children in the class are wearing a woollen sweater.
  - c. All children in the class are wearing a sweater.
  - d. All children in the class are wearing a garment.

As before, if we make (92) negative by replacing *all* with *no*, the direction of entailment is reversed, from (92d) to the other sentences.

Anti-additivity is a special case of downward entailment, in the sense that all anti-additive contexts are downward entailing, but not the other way round: not all downward entailing contexts are also anti-additive.

Returning now to the distribution of NPIs, Table 1 shows how their distribution is on the one hand restricted by the entailment patterns triggered by the licenser (DE vs. UE), and on the other hand by the exact nature of the licenser, i.e. whether the licenser is AA, triggering a universally negative reading for *or*, or just DE.

Formulated as a generalisation, we can formulate the findings of Table 1 as in (93):

**Table 1** Weak and strong NPis

	AA	DE	UE
strong NPI	✓	✗	✗
weak NPI	✓	✓	✗

- (93) a. A weak NPI occurs in a downward entailing environment.  
 b. A strong NPI occurs in an anti-additive environment.

In (94a-b) we give an overview of different types of negative expressions, classified according to the criterion of whether they are anti-additive, simply downward entailing, or upward entailing.

- (94) a. anti-additive (AA)  
*not, no, never, nowhere, neither ... nor, by no means, without, refuse, deny, un-A, iN-A, hard, difficult, ...*  
 b. downward entailing (DE)  
*few, hardly, seldom, rarely, not everyone, not all N*  
 c. upward entailing (UE)  
*some, many, all, everyone, always, often, sometimes*

In (95) we sort NPis according to their strength.

- (95) a. weak NPis  
*any, ever, can stand, all that A, at all, need, yet, anymore, ...*  
 b. strong NPis  
*lift a finger, give a damn, either, until (with activity verb), in months, ...*

We illustrate some of these combinations in the examples below. Consider a strong NPI such as *until*: it needs a negator that is not only upward entailing, but also anti-additive. The negative element *few* is not anti-additive, as we saw earlier (Sect. 3.1), although *few* is downward entailing. For that reason, (96a) is ruled out (or at least less good than (96b) for most speakers). A weak NPI such as *can stand*, on the other hand, can do with a downward entailing environment, as (96c) shows. For the sake of completeness, (96d) shows that a weak NPI is ruled out in an upward entailing environment.

- (96) a. \*?Few guests will arrive *until* Sunday.  
 b. **Nobody** will arrive *until* Sunday.  
 c. **Few** children *can stand* the schoolmaster.  
 d. \*All children *can stand* the schoolmaster.

Similar contrasts can be reproduced for a number of the other combinations of negators and NPis.

- (97) Strong NPI: *lift a finger*



- a. \***Not all** bystanders *lifted a finger* to help the poor man.
  - b. They looked at the scene **without** *lifting a finger* to help the poor man.
  - c. They **refused** to *lift a finger* to help him.
  - d. \*We *lifted a finger* and then resumed our journey.
- (98) Strong NPI: *in months*
- a. \***Not everyone** has spoken to him *in months*.
  - b. **No-one** has spoken to him *in months*.
  - c. **Neither** Alissa **nor** Marian have spoken to him *in months*.
  - d. \***Many** colleagues have spoken to him *in months*.

All these sentences contain a strong NPI. The (a)-sentences contain a licenser or negator that is downward entailing (but not anti-additive); because the NPI is strong, this results in an ungrammatical outcome. The (b-c)-sentences replace the licenser with an anti-additive one, so that the sentence becomes good. The (d)-sentences are upward entailing with an NPI, which is also ungrammatical.

In (99) we have a weak NPI, which combines with all types of downward entailing contexts, whether anti-additive or not (99a-b), but not with upward entailing environments (99c).

- (99) Weak NPI: *ever*
- a. **No-one** has *ever* properly looked at this problem.
  - b. He's **barely** *ever* at home.
  - c. \*I want to *ever* visit Moscow.

Note that negative adjectives without any overt negative morphology, like *hard* or *annoyed*, can also license NPIs, as illustrated in (100) (from Ladusaw 1980: 102), with weak NPIs) and (101) (with strong NPIs). In other words, they behave as predicted given that they are anti-additive elements.

- (100) a. It is **hard** to find *any* squid at Safeway *anymore*.  
 b. He is **annoyed** that *anyone* would be *all that* anxious to leave.
- (101) a. Due to the war, they were **unable** to speak to him *in months*.  
 b. It was **hard** for them to *lift a finger* to help her.

There is one group of negative words, the squative negators, that do not seem to be consistent licensors of NPIs. For Postal (2004: 166), *squat* cannot license weak nor strong NPIs (102), but the British English *fuck-all* can license both weak and strong NPIs, both as a determiner and as a noun, as illustrated in (103) (p.c. William Harwood).

- (102) a. \*Helga gave **squat** to *anyone*.  
 b. \*Helga has said **squat** to me *in years*.  
 c. \*Helga learned **squat** in *any* convent *at all*.

- (103) a. We were all expecting Helga to pass the bottle round but in the end she gave **fuck-all** whiskey to *anyone*.  
 b. Helga has said **fuck-all** to me *in years*.

This suggests that the condition of downward entailment may not be a sufficient condition for NPI-licensing. A possible explanation for the fact that *squat* cannot license NPIs may lie in the fact that *squat* itself also frequently (and possibly even predominantly) appear as NPIs, as we pointed out in Sect. 2.5 above. While more data and research are needed to say anything firm about this, it is likely that *squat* has not fully developed into a real negator yet, while *fuck-all* has. The functional instability of *squat* could be the reason that it cannot license NPIs.

As a final point in this section, we need to point out that the condition of being downward entailing is not a necessary condition for NPIs either. A case in point are polarity questions, which can license weak NPIs (104), though not strong ones (105).

- (104) a. Do you know *anything* about the licensing conditions of NPIs?  
 b. Is she *all that* clever, you think?  
 c. Don't they have *any* shame *at all*?
- (105) a. \*Will he arrive *until* Sunday?  
 b. \*Did she talk to her mother *in weeks*?  
 c. \*Should they come *either*?

Because of facts like these, Giannakidou (1998) referred to this type of NPIs as PIs, i.e. as polarity items, identifying the licensing property as non-veridicality. Since the complexity of the issue goes far beyond the limits of this chapter, we refer the reader to the literature already mentioned, and in particular to Giannakidou (2011), Gajewski (2011), Penka (2020), Homer (2021) for overviews of the existing literature on NPIs and PIs.

Summarising this section, we saw that NPIs may be used to diagnose negative environments. The distribution of NPIs reinforced the need for a distinction between the different types of negations that we also saw on the basis of De Morgan's Law: those which are merely downward entailing, and those which are also anti-additive. In the next section we look at yet another diagnostic for negation: modality.

### 3.3 Interaction with modality

Negation interacts semantically with modality (Lyons 1977, Horn 2001b, De Haan 1997, Cormack & Smith 2002, Butler 2003, Iatridou & Sichel 2011 and many others), and this interaction, when observed, can also provide a diagnostic as to the presence and scope of negation in sentences. We will look at the interaction of negation with possibility and necessity modality,

two central notions in traditional modal logic. Just like conjunction and disjunction are logically related by negation (see the discussion of duality in Sect. 3.1 above), so are necessity and possibility (Lyons 1977: 787). The relevant logical equivalencies are shown in (106) (necessity being indicated with  $\Box$  and possibility with  $\Diamond$ ):

- (106) a.  $\Box p \Leftrightarrow \neg \Diamond \neg p$   
 b.  $\Diamond p \Leftrightarrow \neg \Box \neg p$

These in turn translate into (107):

- (107) a.  $\Box \neg p \Leftrightarrow \neg \Diamond p$   
 b.  $\Diamond \neg p \Leftrightarrow \neg \Box p$

The first of these two equivalencies (107a) represents an impossibility: the necessity that not  $p$ , or, equivalently, the impossibility that  $p$ . The second (107b) represents an absence of necessity: it is not necessary that  $p$ , or it is possible that not  $p$ . Accordingly, both types of meaning can be expressed using either a necessity or a possibility modal, as we shall show below. We will primarily focus on the first of these two equivalencies to diagnose the presence of negation, while noting that the second can serve the same purpose.

Let us move away from the rather abstract depiction in (107), and have a more concrete look at how modal verbs interact with negation in English. Taking the possibility modal *can/could* as an example, we see that it can have a deontic meaning corresponding to permission, or an epistemic reading corresponding to possibility, as illustrated in (108).<sup>15</sup>

- (108)  $\Diamond p$   
 a. Anna can borrow my car.  
 'It is permitted that Anna borrows my car.'  
 b. Anna could be working from home today.  
 'It is possible that Anna is working from home today.'

When a sentence containing *can/could* is combined with negation, as in (109), negation takes semantic scope over the modal, resulting in an impossibility reading.

- (109)  $\neg \Diamond p$  (=  $\Box \neg p$ )  
 a. Anna cannot borrow my car.  
 'It is not permitted that Anna borrows my car.'  
 b. Anna cannot be working from home today.  
 'It is not possible that Anna is working from home today.'

<sup>15</sup> To keep the discussion manageable, we ignore here dynamic modality readings, which refer to an ability, as in *Johnny can swim 100m in less than a minute*. Also note that the present tense modal *can* does not have an epistemic sense in affirmative sentences, but only in questions and negative sentences, i.e. it is an NPI.

The same meaning can be conveyed with a necessity modal, due to the fact that now the negation takes scope under the modal:

- (110)  $\Box\neg p$  ( $= \neg\Diamond p$ )
- a. Anna mustn't borrow my car.  
'Anna is obliged not to borrow my car.'
  - b. That restaurant must not be any good, it's always empty.<sup>16</sup>  
'It is necessarily the case that this restaurant is not any good.'

Observe that the English necessity modals *must*, *should*, and *ought* cannot take scope under negation. To express absence of necessity, the modal *need* is resorted to instead (see Palmer 2001 for discussion).

- (111)  $\neg\Box p$
- a. Anna doesn't need to borrow the car.  
'Anna is not obliged to borrow the car.'
  - b. Anna doesn't need to be working from home today.  
'It is not necessary that Anna works from home today.'

Iatridou & Zeijlstra (2010) argue that *must* is a Positive Polarity Item (PPI), which always needs to escape the scope of negation, and hence cannot give rise to absence of necessity readings.

Also note that the impossibility reading does not always arise when a possibility modal is negated. This is notably the case with *may/might*, which takes scope over negation in its epistemic sense (112b), but below negation when it has a deontic meaning (112a):

- (112) a.  $\neg\Diamond p$  ( $= \Box\neg p$ )  
Anna may not borrow my car.  
'It is not permitted that Anna borrows my car.'
- b.  $\Diamond\neg p$   
Anna may not be working from home today.  
'It is possible that Anna is not working from home today.'

Table 2 gives an overview of the various types of modal meanings, their interaction with negation, and which English modals can express which types of meaning. Cells in the table that show a mix of possibility and necessity modals are bolded.

In what follows we show how the patterns of interaction between modality and standard negation that are summarised in Table 2 are reproduced with the other negative words that we discussed before. We start by zooming in on negative indefinites, and the negative correlative pair *neither ... nor*. Just like with the standard negator, the possibility modal *can/could* typically

<sup>16</sup> According to Swan (2005: 337) (from which the example in (110b) is taken), the epistemic impossibility reading of *must not* is restricted to American English. Even there, the more common way to express epistemic impossibility would be with *cannot*.

**Table 2** Types of modal meaning in interaction with negation

	EPISTEMIC	DEONTIC
$\Box p$	necessity ( <i>must, should, need, have to, ought to</i> )	obligation ( <i>must, should, need, have to, ought to</i> )
$\Diamond p$	possibility ( <i>could, may, might</i> )	permission ( <i>can, could, may</i> )
$\neg\Box p \equiv \Diamond\neg p$	<b>absence of necessity</b> ( <i>don't need to, may not</i> )	absence of obligation ( <i>don't need to, don't have to</i> )
$\neg\Diamond p \equiv \Box\neg p$	<b>impossibility</b> ( <i>cannot, couldn't, must not<sup>AE</sup></i> )	<b>prohibition</b> ( <i>cannot, couldn't, shouldn't, mustn't, may not</i> )

scopes under negation, giving rise to prohibition (deontic) or impossibility (epistemic) readings, as illustrated in (113):

- (113)  $\neg\Diamond p$
- No-one** can leave the building.
  - The journalists could take **nothing** into the briefing.
  - As a child he could **never** watch football.
  - You can park **nowhere** on the campus.
  - No residents** can still be in the building.
  - Neither** Alissa, **nor** Marian can be at school today.

In contrast, the necessity modals like *must*, *should* and *ought to* take scope over negation, giving rise to readings that are logically equivalent to those of (113).

- (114)  $\Box\neg p$
- No-one** must leave the building.
  - The journalists should take **nothing** into the briefing.
  - As a child he must **never** watch football.
  - You ought to park **nowhere** on the campus.
  - No residents** should still be in the building.
  - Neither** Alissa, **nor** Marian should go to school today.

The examples in (113) and (114) contrast semantically with those in (115), which instead of negative indefinites contain other types of quantificational elements, which are not negative, and which give rise to permission or possibility readings:

- (115)
- Everyone** can leave the building.
  - The journalists could take **a few items** into the briefing.
  - As a child he could **always** watch football.
  - You can park **everywhere** on the campus.
  - Most residents** could still be in the building.

For at least some of the negative indefinites in (114) we can create contexts in which a scope ambiguity arises.<sup>17</sup> This is the case with (116a), where the part between brackets disambiguates the sentence in the direction of the permission/possibility reading, i.e. the one where the modal has scope over the negation.

- (116) a. In certain cases a doctor can do **nothing** (and that may even be the recommended course of action).  
 b. Fred could invite **no-one** to his birthday party (and celebrate it all by himself).

A number of the other anti-additive expressions and downward entailing words and expressions that we discussed above also give rise to prohibition or impossibility readings in combination with a possibility modal.

- (117)  $\neg\Diamond p$
- a. We can **in no way** approve the underlying directive.  
 b. This journey can **by no means** be said to have terminated if the Soul has to undergo yet another birth.  
 c. Eric could **hardly** go outside.  
 d. Anna can **rarely** borrow the car.  
 e. The ferry can carry **few** people.  
 f. She is doomed to continue longing **without** being allowed to hope.<sup>18</sup>

At least for some of these, the same impossibility reading can be found with a necessity modal:

- (118)  $\Box\neg p$
- a. We must **in no way** approve the underlying directive.  
 b. This journey should **by no means** be said to have terminated if the Soul has to undergo yet another birth.  
 c. It should **hardly** be surprising that the service economy comes with numerous challenges.  
 d. The question of what is deserved should **rarely**, if ever, be asked.  
 e. The ferry must carry **few** people.

Negatively prefixed adjectives (like *impractical*) and negative adjectives like *hard* behave differently, in that the semantic negation they incorporate

<sup>17</sup> Note that the ambiguity tends to arise mostly when the negative indefinite is in an object position. Subject negative indefinites outscope *can*, and only scope under deontic modals like *must*, *should* and *ought to* and some raising predicates. Moreover, Subject NegDPs never fully reconstruct, only the indefinite part reconstructs giving rise to split scope readings in that case (for more discussion see Iatridou & Sichel 2011, Lasnik 1999).

<sup>18</sup> In nonfinite contexts, the possibility modality cannot be realised by *can*, but needs the paraphrase *be allowed (to)*.

cannot take scope over modal verbs. Whereas (119a), with the standard negator *not* only has the impossibility reading, the examples (119b-c), with negative adjectives, only have an interpretation where the modal takes scope over the negation.<sup>19</sup> Now earlier we saw that negative adjectives like *hard* license strong NPIs in their complement clause (Sect. 3.2). Taking this to be an indication for the presence of a logical negation inside such adjectives (as argued in De Clercq & Vanden Wyngaerd 2019), one might expect this negation to take scope over a possibility modal, but this is not the case.

- (119) a.  $\neg \diamond p$  ( $\equiv \Box \neg p$ )  
It **cannot** be easy to buy squid at Safeway on a Sunday.  
b.  $\diamond > \textit{hard}$   
It can be **hard** to buy squid at Safeway on a Sunday.  
c.  $\diamond > \textit{impractical}$   
It can be **impractical** to buy squid at Safeway on a Sunday.

Note that we did see NPIs in the complement clause of all these adjectives (Sect. 3.2 above), but these are clearly in a different structural position with respect to the negator than the modals in (119), i.e. while the NPIs are c-commanded by the negative adjectives, the modals are clearly c-commanding the negative adjectives.

The same pattern of behaviour is found with negative verbs like *deny* and *refuse* (120), as well as the negative preposition *without* (121).

- (120)  $\diamond > \textit{refuse, deny}$   
a. They could **refuse** to implement a cease-fire.  
b. She could **deny** her involvement in the assassination attempt.  
(121)  $\diamond > \textit{without}$   
He can walk **without** using a stick.

Note that these cases do not have to imply that there is no negation present in negative adjectives, negative verbs, and *without*, particularly in view of the fact that they are anti-additive and may license NPIs in their complement clause. The fact that we do find the impossibility reading when the modality is inside the complement clause to *without* confirms this idea (see (117f) above). What seems to be at issue here is that the negations in these adjectives and verbs cannot take scope in the clause that these modals belong to, a conclusion that will be reinforced by the evidence to be discussed in the next section.

We end with a brief note on squattive negators. Combined with the possibility modal *could*, they can take scope over or below the modal, in the same way as some of the negative indefinites discussed above (see also

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<sup>19</sup> Predictably, the negation in negative adjectives also scopes under necessity modals like *must*, but in this respect they are no different from other negative elements, so we refrain from illustrating this.

De Clercq 2011 for this observation.) The following examples are due to William Harwood (p.c.).

- (122) a.  $\neg\Diamond p$   
 Helga could drink **fuck-all** whiskey, because Claudia had drunk the entire bottle on her own.  
 ‘It was not possible for Helga to drink any whiskey.’
- b.  $\Diamond\neg p$   
 Claudia could drink **fuck-all** and give the booze to her friends, but she decided to down the bottle on her own.  
 ‘It was possible for Claudia to drink nothing.’

The tests discussed in this section show that most negative elements, apart from negatively prefixed adjectives, negative adjectives and negative verbs, interact with modal verbs in the same way as the standard negator does. In other words, the interaction with modality groups these negative words together, in spite of the fact that they can be split into an anti-additive and a merely downward entailing category. This test therefore shows that—across the anti-additive and downward entailing distinction—all of these words share a negative component, that surfaces in interaction with modal operators.

### 3.4 Syntactic effects of negation

In this section we look at a number of syntactic effects of negation. If all the anti-additive and downward entailing words and expressions discussed above were to contain a hidden negation, then we would expect to see syntactic effects of this. For a subgroup of these words that indeed turns out to be the case.

Klima (1964) and McCawley (1998) investigated the negativity of most of the negative words and expressions that we discussed above. These authors have identified a series of diagnostic tests that are sensitive to the polarity of a sentence, i.e., to whether the sentence is affirmative or negative. One such test is the *tag question* test, which has the opposite polarity to the sentence it tags onto.<sup>20</sup>

- (123) a. Hoboken is in New Jersey, **isn’t** it?  
 b. Hoboken **isn’t** in Pennsylvania, is it?

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<sup>20</sup> Note that question tags need to be distinguished from reduplicative tags or same way tags. See Quirk et al. (1985), De Clercq (2011), Brasoveanu et al. (2014) for discussion of the differences.



Another one is the *too/either* test, and the *so/neither* test, where each time the first member of the pair diagnoses an affirmative sentence, and the second member a negative sentence. This is illustrated in the examples below:

- (124) a. John voted for Bergland, and Mary voted for him **too**.  
 b. John **didn't** vote for Reagan, and Mary didn't vote for him **either**.
- (125) a. John voted for Stassen, and **so** did Mary.  
 b. John **didn't** vote for Johnson, and **neither** did Mary.

In (124a) and (125a) the first clause of the coordination is affirmative, and we can get the adverbs *too* and *so* in the continuation, but not *(n)either*. Negative clauses like (124b) (125b) shows the mirror image of this: we get *(n)either* in the continuation, while *so* and *too* are excluded.

In what follows we will apply one of these tests, the question tag test, to the different types of negative words that we discussed in this chapter. We start by applying the question tag test to negative indefinites and the correlative conjunction *neither ... nor*. The examples in (126) show that these words tend to make a sentence negative, i.e. they occur with positive tags in the majority of cases.

- (126) a. **Nobody** knew the answer, did they?  
 b. The travel agents visited **no** Greek islands last summer, did they?  
 c. She knows **nothing** about the surprise party, does she?  
 d. They **never** go to the movies, do they?  
 e. There is **nowhere** to sit here, is there?  
 f. **Neither** Alissa **nor** Marian have read that book, have they?

Other anti-additive expressions like those in (127) also systematically trigger positive tags.

- (127) a. He is **by no means/in no way** a good father, is he?  
 b. Nasrin is **anything but** kind, is he?

However, downward entailing words predominantly trigger negative question tags, while positive tags are also sometimes allowed (see below for more discussion).

- (128) a. He can **hardly/barely/scarcely** move, %can he/can't he?  
 b. They **rarely/seldom** go to the movies, %do they/don't they?  
 c. **Few** hostages were released today, %were they/weren't they?  
 d. The prison released **few** hostages this month, %did it/didn't it?

Negatively prefixed adjectives on the other hand never trigger positive tags, and neither do negative adjectives (129).

- (129) a. Your granddad is **unhappy**, isn't he?  
 b. Your granddad is **sad**, isn't he?  
 c. It's **hard** to find squid at Safeway, isn't it?

The same is true for the anti-additive word *without* (130), as well as sentences with negative verbs like *refuse* or *deny* (131):

- (130) He left **without** finding his keys, didn't he?  
 (131) a. They **refused** to implement a cease-fire, didn't they?  
 b. She **denied** any involvement in the plan, didn't she?

From these examples it seems that the question tags (and by extension the other syntactic tests) are sensitive to the scope of the negation. We can see this clearly in the following sentences from Payne (1985: 200) (also discussed in Penka 2011: 5), in which the negator *not* occurs, which usually always makes the sentence negative, as in (132a), with a positive tag. But in (132b) we get an affirmative sentence because the negation takes scope under the adverb *often* 'often', making the tag sensitive to *often* as it were, and not to the negation.

- (132) a. John **doesn't** often pay taxes, does he/\*doesn't he?  
 b. John often **doesn't** pay taxes, \*does he/doesn't he?

In the sentences of (128), too, the possibility of the different tags can be explained, at least in part, in terms of negation taking sentential scope or not. For example, one can establish that *few* behaves differently in subject position and in object position, as shown in an experimental study by Brasoveanu et al. (2014). In this study, participants in an experiment had to select a question tag (positive or negative) for a stimulus. The results are shown in Table 3.

**Table 3** Stimuli and tags, in ascending order of the frequency of the negative tag (adapted from Brasoveanu et al. 2014: 180)

stimulus	NEG		POS
	N	%	N
negative indefinite subject	60	21%	223
negative indefinite adverb	71	24%	221
<i>not</i>	75	26%	214
negative indefinite object	100	34%	186
<i>rarely, scarcely, hardly</i>	170	59%	119
<i>few</i> subject	183	64%	103
<i>few</i> object	241	84%	45
affirmative sentence	275	95%	14

The relevance of scope is obvious from the contrast between negative indefinites as subjects (which trigger only 21% negative tags) and as objects

(34% negative tags). With *few* in subject position, a negative tag is chosen in 64% of the cases; with *few* in object position, this rises to 84%. In other words, a negative indefinite or *few* in object position has a much harder time taking sentence scope, and thus making the sentence negative. The case of the *un*-prefix in (129) can also be explained in these terms, in the sense that *un*- can never have sentence scope. The same goes for *without* in (130): it never makes the containing sentence negative, though clearly its complement clause is negative in all relevant respects.

Now when we look at squative negation we get a completely different picture: in subject and in object position squat can only license negative tags, as illustrated in (133).

- (133) a. Janet read **squat** didn't she? (Postal 2004: 164)  
 b. Janet read **fuck-all** books, didn't she?  
 c. **Fuck-all** men love her, don't they? (De Clercq 2011: 15-16)

If the question tag test is a syntactic test for negation, then these data suggest that squative negation is either syntactically non-negative, or that the negation inside these elements is not able to scope high enough. We will get back to this in section 3.5.

### 3.5 Discussion

The results of the diagnostic tests for negation that we discussed in the previous sections are summarized in Table 4. In the rows we find the diagnostics that we have used, in the columns the different types of negative elements: the standard negator (SN), negative correlative conjunctions (NCC), negative indefinites and other negators of the anti-additive type (NI), negative adjectives, verbs, and *without* (NAVW), downward entailing (non-anti-additive) negative quantifiers (DE), squative negators of the type discussed by Postal (2004) (SQ), and the British English *fuck-all* (FA). The question mark indicates mixed behaviour, for example the fact that negative indefinites sometimes do, and sometimes do not, trigger positive tags, depending on their syntactic position.

**Table 4** Overview of the diagnostics for negation

	SN	NCC	NI	NAVW	DE	SQ	FA
De Morgan's Law I	✓	✓	✓	✓	✗	✓	✓
NPI-licensing (strong NPI)	✓	✓	✓	✓	✗	✗	✓
NPI-licensing (weak NPI)	✓	✓	✓	✓	✓	✗	✓
Interaction with modality	✓	✓	✓	✗	✗	✓	✓
Positive question tags	✓	✓	?	✗	?	✗	✗

With the exception of squattive items (see below), Table 4 clearly shows that De Morgan's Law I and the strong NPI-licensing similarly distinguish the anti-additive from the merely downward entailing negative words. Modals on the other hand unite these two groups again by being equally sensitive to their underlying negative component, but isolate another group, in that modals do not allow for wide scope negation readings in combination with negative verbal and adjectival predicates and *without* (NAVW). The reason for this seems to be structural in nature: the negative predicate is in most cases contained within a modal complement, and cannot scope into the matrix clause from that position.

The syntactic question tag test discussed in Sect. 3.4 clearly stands out as a diagnostic, yielding results that are rather different from those of the other diagnostics. It indicates that there are not only different types of negation with different scopes, but also that identical forms of negation, like the standard negator in (132), can have different scopes. The sentences that are negative according to the question tag test are those where the negation has scope over the entire sentence, i.e. where negation takes widest scope, and hence types the clause as negative. While one might be inclined to think at first sight that the syntactic tests are sensitive to some type of external negation, as discussed in Sect. 2.1.1. However, the tests could also be sensitive to a form of internal negation. Internal negation has been claimed to be realisable in different structural positions in the clause (e.g. in work by Ouhalla 1990, Zanuttini 1997, Cormack & Smith 2002). One of these could be high up in the clausal structure, i.e. in the CP domain, from where negative clause typing happens (Laka 1990, Progovac 1993, Moscati 2006, De Clercq et al. 2012). This could then also be the position to which question tags are sensitive: if this position gets activated by a negative feature (via whichever mechanism, i.e. base generation of a negator, Agree, movement, or QR), this results in positive question tags. However, whenever this high position cannot be overtly or covertly activated, the syntactic tests will give the impression that the sentence is positive (by means of negative tags for instance).

However, being syntactically positive clearly does not rule out the presence of a negation within the clause, as we saw with the other diagnostics. The reasons for a negation not being able to type the clause as negative can follow from a variety of different reasons. One of these reasons can be that the negative feature is too deeply embedded within the structure to type the clause as negative (as for instance with negative indefinite objects, or with DE quantifiers) (see for instance De Clercq et al. (2012) for an analysis). Another reason can be that there is an intervening positive quantifier preventing the negation from typing the clause as negative, as we saw in (132) (see also De Clercq 2013 for discussion). A third possible reason has to do with the internal syntactic structure of the negative word: under the assumption that the negator does not only consist of a semantic  $\neg$  with a corresponding syntactic [NEG], but also of scope-related syntactic features,

the absence of certain scope features can prevent the negator from taking widest scope as well (as in the nanosyntactic proposal by De Clercq 2013, De Clercq & Vanden Wyngaerd 2019, De Clercq 2020). This can account for why negations contained within negative verbs or (negatively prefixed) adjectives systematically cannot give rise positive question tags (i.e. negative sentences).

Finally, we need to say something about squative items, because they do not give rise to positive question tags, regardless of where they appear in the clause. While it could be claimed that they consist of a low scope negation of the type that we see in negative verbs or adjectives, this seems unlikely given that at least British English FA interacts with modal verbs in the same way as other negative indefinites do (and unlike negative verbs or adjectives). However, if the negation were of exactly the same type as the one in negative indefinites we would expect the clause to be typed negative by squatives, i.e. give rise to positive question tags, contrary to fact. For that reason De Clercq (2011) proposes that squative negation is semantically negative (i.e. anti-additive or downward entailing), but does not contain any syntactic negative features, hence leading to positive clause typing. In other words, it seems that a word can be semantically or conceptually negative, without having any corresponding negative features in syntax (cf. also Zeijlstra 2008).

The diagnostics show that De Morgan's Law I, NPI licensing, and the interaction with modality track the presence of a semantic negation, while the question tag test (and the other Klima tests) is sensitive to the presence of a syntactic negative feature with wide scope. While the presence of a syntactic negative feature always coincides with an underlying semantic negation, the opposite is not the case, as shown by the squative negators, which have semantic but no syntactic negativity.

## 4 Conclusion

In this chapter, we have first classified negative elements in natural language into five different broad categories: standard negators, negative correlative conjunctions, negative indefinites, other types of negative elements, and squative negators. We next discussed a number of criteria by which to diagnose negation, such as the universally negative reading of *or* in the presence of negation (based on De Morgan's Law), the licensing of Negative Polarity Items (NPIs), the interaction with modality, and the syntactic effects of negation. We concluded that the diagnostics point to the fact that the distinction between semantic and syntactic negation is real, and that not all semantically negative words come with a syntactic negative feature, while the opposite is always the case.

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