Negation and the Functional Sequence

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Abstract

There exists a general restriction on admissible functional sequences which prevents adjacent identical heads. We investigate a particular instantiation of this restriction in the domain of negation. Empirically, it manifests itself as a restriction on the stacking of multiple negative morphemes. We propose a principled account of this restriction in terms of the general ban on immediately consecutive identical heads in the functional sequence on the one hand, and the presence of a Neg feature inside negative morphemes on the other hand. The account predicts that the stacking of multiple negative morphemes should be possible provided they are separated by intervening levels of structure. We show that this prediction is borne out.

1 Introduction

The starting observation of this paper is a contrast between negative and positive adjectives: whereas positive adjectives can generally be prefixed with *un-*, negative ones systematically cannot. At the same time, negative adjectives are not resistent to negation *per se*, as they can be negated with *not,* as is shown in (1c).

(1)   a. unhappy   b. *unsad   c. not sad
          unwise   *unfoolish   not foolish
          unclean   *undirty   not dirty
          unfriendly   *unhostile   not hostile
          unhealthy   *unsick   not sick
          unkind   *unrude   not rude
          untrue   *unfalse   not false
          uneasy   *undifficult   not difficult

The observation of this pattern dates back to Jespersen (1942: 466), and has been repeated since in the work of other authors (e.g. Zimmer 1964; Horn 1989: 275; Horn 2005).

Data from the BNC corpus (100m words) and the COCA corpus (450m words), given in Table 1, confirm this pattern. The final two columns in the table in particular reveal the relevant contrast: the prefinal column gives the numbers for *un*-prefixed positive adjectives, and the final column shows the absence of the *un*-prefix with negative adjectives.[1]

Table 1: *un*-prefixation with positive and negative adjectives (BNC–COCA)

	PosA	NegA	un-PosA	un-NegA
wise-foolish	wise	foolish	unwise	unfoolish
	2,118–10,018	1,088–4,406	399–792	**0–0**
happy-sad	happy	sad	unhappy	unsad
	11,166–55,400	3,241–17,549	1,822–5,763	**1–0**
kind-rude	kind	rude	unkind	unrude
	23,349–1,855,404	942–3,386	257–512	**0–0**
true-false	true	false	untrue	unfalse
	17,577–90,165	3,529–14,944	277–1,195	**0–0**
easy-difficult	easy	difficult	uneasy	undifficult
	14,143–65,942	21,433–72,543	915–3,386	**0–1**

On closer scrutiny, the pattern turns out to be more general, in that multiple negative affixes are ruled out in general. For example, noun-derived

[1]In the Tables 1, 2, and 3, the first figure in each cell gives the number of occurrences in the BNC, the second that in COCA.

adjectives with the negative suffix *-less* also resist *un*-prefixation, but not negation per se (see also Siegel 1974, Allen 1978):

(2) breathless   *unbreathless   not breathless
     senseless   *unsenseless   not senseless
     merciless   *unmerciless   not merciless
     useless   *unuseless   not useless
     cheerless   *uncheerless   not cheerless

Here as well, corpus data confirm the judgments, as shown by Table 2.

Table 2: *-less* (BNC–COCA)

N-less	un-N-less	not N-less
breathless	unbreathless	not breathless
459–1,505	0–0	5–2
senseless	unsenseless	not senseless
175–1,088	0–0	0–0
merciless	unmerciless	not merciless
122–611	0–0	0–0
useless	unuseless	not useless
1,244–4,529	0–0	5–20

These cases contrast minimally with positive noun-derived adjectives ending in *-ful* (corpus data in Table 3):[2]

(3) successful   unsuccessful   not successful
     lawful   unlawful   not lawful
     eventful   uneventful   not eventful
     helpful   unhelpful   not helpful
     faithful   unfaithful   not faithful

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[2]The minimal contrast between *un-N-less* and *un-N-ful* is also noted by Allen (1978: 30), who adduces it as an argument against Siegel's (1974) account of **un-N-less* in terms of level ordering.

Table 3: *-ful* (BNC–COCA)

N-ful	un-N-ful	not N-ful
successful	unsuccessful	not successful
10,564–40,400	921–2,711	59–275
lawful	unlawful	not lawful
503–827	896–892	5–12
eventful	uneventful	not eventful
105–255	118–429	1–1

Another instantiation of the general restriction is found in the fact that combinations of *un-* and *dis-* are ruled out, as shown in (4) (Siegel 1977: 190-191). The pattern extends more generally to combinations of *un + iN*, *un + ab, un + a,* as well as the repetition of identical negative prefixes (*un + un* and *dis + dis*), as is shown in (5):[3,4]

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[3]In principle, it should be possible to replicate the pattern in (1) with the *dis-* and *iN*-prefixes, i.e. they should not combine with negative adjectives. In practice, however, it turns out difficult to find relevant cases where the prediction could be tested. The reason is that the negative adjectives that would have to serve as the input to *dis-/iN*-prefixation for the most part either do not exist, or are not Latinate in origin. That is, next to *possible, proper, appropriate, coherent, honest,* etc. we have their polar opposites derived through *dis-/iN*-prefixation (*impossible, improper, inappropriate, incoherent, dishonest,* etc.). But we have hardly any underived adjectives that express the negative meanings of these adjectives, and that could serve as the input for *dis-/iN*-prefixation (Horn 2005). A possible candidate is the word *callous*, which could serve as a synonym of *indifferent.* Given its Latinate origin (< *callum* 'callus'), we would expect it to be prefixed with *iN-*. In line with the pattern in (1), *incallous* indeed does not exist in English, .

[4]R. Kayne (p.c.) suggests to us a number of cases where *un-* attaches to a negative base, and which he finds acceptable (see also Zimmer 1964: 87)):

(i)   a.   I'm happy to see that you've finally learned to act in an uncareless way.
         b.   He's finally made an unincoherent statement!
         c.   Why can't you learn how to make unsenseless remarks?
         d.   I'm trying to learn to wander around unaimlessly.

However, these to us reveal the existence of a different *un-,* one that is necessarily stressed:

(ii)   a.   *I'm happy to see that you've finally learned to act in an unCARELESS way.
         b.   I'm happy to see that you've finally learned to act in an UNcareless way.

(4)   *undishonest   not dishonest
             *undiscourteous   not discourteous
             *undisloyal   not disloyal
             *undiscomfortable not discomfortable

(5)   *unimpossible   not impossible
             *unillogical   not illogical
             *unabnormal   not abnormal
             *unatypical   not atypical
             *ununhappy   not unhappy
             *disdishonest   not dishonest

In sum, the restrictions we observe on morphological negation suggest the following preliminary generalisation:

(6)   Negative morphemes cannot be stacked.

Although the restriction illustrated by (1) was noted a long time ago, it has defied a principled explanation so far. The literature does feature a more specific version of (6), independently formulated by Zimmer and Horn, which we shall call the Zimmer–Horn generalisation (or Z–H generalisation for short).

(7)   a.   Negative affixes are not used with adjectival stems that have a 'negative' value (Zimmer 1964: 15)
        b.   The stem to which a relatively nonproductive negative affix can attach tends to be an UNMARKED, WEAK POSITIVE scalar value (Horn 1989: 286)

This type of stressed UN- has important characteristics of echo negation (Seuren 1976) or metalinguistic negation Horn (1985, 1989). For example, a case like (iii) carries with it a speaker presupposition (Stalnaker 1978) that the person in question's behaviour is usually careless, and the sentence denies that existing presupposition (Vanden Wyngaerd 1999).

(iii)   (We all know you usually act in a careless way, so)
        I'm happy to see that you've finally learned to act in an UNcareless way.

Cases like these contradict the claim by Horn (1989, 1985: 392) to the effect that metalinguistic negation does not incorporate prefixally, or the claim by Seuren (1976) that echo negation is only possible if the negation is in its canonical position, i.e. cliticised onto the auxiliary. See also Kayne (2017).

Siegel (1977: 192) accounts for the data in the left-han dcolumn of (4) by means of an output filter on word formation rules:

(8)   Words in *un* are thrown out if the morpheme *dis* is uniquely contained in the cycle adjacent to *un*.

A somewhat more general formulation is given in Allen (1978: 50), as well as Seuren and Jaspers (2014: 632), respectively:

(9)   Condition on *un*-prefixation:
        Un's base may not have negative content.

(10)   A negative affix can only be attached to the positive member of a positive-negative pair.

Crucial to these generalisations and restrictions is that they formulate a constraint on *morphological* negation. In virtue of this fact, they capture the contrast between (1b) and (1c). At a theoretical level, they appear to provide an argument for the existence of the word (and hence morphology) as a separate domain: word-internal negation is subject to a restriction that syntactic negation is not subject to.

In this paper, we shall show that this conclusion is undermined by the existence of certain cases of syntactic negation, which show exactly the same restriction against stacking multiple negative morphemes. Concretely, the evidence we shall present concerns a negative syntactic modifier which is the cross-linguistic counterpart of *little*, and which can modify positive adjectives but not negative ones. This evidence is found in Dutch and French, amongst other languages; two relevant exapmples are given in (11):

(11)   a. Zijn houding is weinig actief/*passief
            his attitude is little   active/passive
            'His attitude is not very active/passive.'
        b. Son comportement est peu   actif/*passif
            her attitude   is   little active/passive
            'Her attitude is not very active/passive.'

At a theoretical level, we shall argue that the restriction that negative markers are excluded with negative morphemes follows from a general restriction on admissible functional sequences, formulated in (12).

(12)   *<X, X>
      The functional sequence must not contain two immediately con-
      secutive identical projections.

A constraint like (12) is commonly (if mostly tacitly) assumed in the (car-
tographic) literature, i.e. C does not select CP, T does not select TP, AgrS
does not select AgrSP, D does not select DP, etc. An explicit formulation
of it that comes closest to what we have in mind is the *Unlike Category
Constraint* of Hoekstra (1984: 85), a constraint which prevents a head of
category X from taking a complement of the same category XP (see also
Grimshaw 1997).[5] We shall argue that the constraint in (12) explains the
Z–H generalisation, as well as the other restrictions that have been pro-
posed in the literature to capture the data discussed in this section.[6]

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[5]There is also an obvious parallel with the Obligatory Contour Principle in phonology,
which prevents the adjacent occurrence of two identical elements on the melodic tier
within the same lexical item. The OCP has been given a syntactic interpretation by e.g.
van Riemsdijk (2008), Hiraiwa (2010) (and further references cited there). In contrast to
these authors, however, we do not conceive of (12) as a haplology constraint, which is a
constraint on form rather than meaning. Haplology is a restriction against two adjacent
identical phonologies /α+α/. This will result in the removal one form, yielding /α/, while
the underlying features remain intact. This means that whatever it is that gave rise to the
phonology /α+α/ is unaffected by the removal of one occurrence of /α/. In contrast, the
constraint we assume is a constraint on features, not phonologies, more in particular the
syntactic structures underlying negation. These may or may not be realised by identical
exponents. As a result, phonologically identical negative markers may in some cases
be linearly adjacent (as in e.g. *You can**not** **not** invite here*, to be discussed in section 5.2
below), whereas in others phonologically different ones may be precluded from appearing
adjacently (as in *undishonest, discussed above). The restriction in (12) may ultimately
be reducible to a labelling problem (Ott 2011, Chomsky 2013), or a linearisation problem
(Richards 2010). Alternatively, it could be argued to follow from the requirement that
the combination of features through Merge needs to observe the requirements imposed
by the functional sequence, i.e. Merge (α, β) is subject to the requirement that α and
β be distinct adjacent elements of the functional sequence. We shall not explore these
connections any further here.

[6]A reviewer points out a case potentially violating the principle in (12), namely topic
recursion, as discussed in Rizzi (1997). There are a number of possibilities to bring such
cases in line with our principle (12). A first possibility is that different heads are involved,
i.e. different positions in the functional sequence. What looks like an X-X sequence would
then actually be an X-Y sequence. Such an analysis has in fact been proposed for Italian
by Benincà and Poletto (2004). They argue that only one Topic position exists, namely
the one that linearly precedes Focus, and that it can contain only one topic, i.e. there is
no recursion of topics, despite appearances to the contrary (see also Cinque 1977, 1983

A second crucial ingredient of our proposal is the following:

(13)   Negative morphemes contain a Neg-feature.

This assumption presupposes a form of decomposition. The kind of decomposition that we shall assume is one where the syntax works with features, and the lexicon is postsyntactic. In a nutshell, we shall argue that negative morphemes like *sad* and *un-* contain a Neg-feature, and that a word like *unsad* instantiates an illicit stacking of Neg-features, in violation of (12). The concrete means by which a word like *sad* spells out a set of features is by assuming the nanosyntactic mechanism of *phrasal spellout*: every syntactic object created by Merge interfaces with the lexicon, and undergoes spellout if a matching lexical item is found. The organisation of the lexicon is subject to the following restriction (Starke 2014a):

(14)   The lexicon contains nothing but well-formed syntactic expressions.

The consequence of this is that lexical items contain well-formed syntactic trees. More details on the mechanism of postsyntactic lexical insertion will be discussed in section 3.

The paper is structured as follows. In section 2 we discuss our reasons for believing that the contrasts discussed above are to be accounted for in syntactic rather than semantic terms. In section 3 we lay out the prerequisites for our analysis: we introduce the theoretical framework of nanosyntax, we discuss the feature structure of lexical adjectives, and we show how *un*-prefixed positive adjectives are derived. In section 4 we

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on the distinction between hanging topics and CLLD). A single topic position has also been defended for Japanese sentences with multiple *wa*-marked phrases by Vermeulen (2007). Other languages that mark topics with a particle have been argued to admit of only one such topic (e.g. Gungbe, see Aboh 2004: 311). A second possibility is that there is covert intervening structure between these topics, so that what superficially looks like an X-X sequence is in fact an X-Y-X sequence. An analysis of this general format is the ellipsis analysis of Left Dislocation of Ott (2014, 2015), which takes the topic to have been extracted from a sentence that subsequently undergoes ellipsis, and that is followed by a second sentence that contains the (fronted) resumptive pronoun. A third possibility is that multiple topics form a single complex constituent, and a single topic-comment structure. Under such a view, what looks like an X-X sequence would reduce to a single occurrence of X. Multiple topics would then be a case of 'topic concord', i.e. multiple topic-marked constituents interpreted as a single topic. A full investigation of these alternatives is beyond the scope of the present article, however.

present the analysis that accounts for the data pattern above, i.e. the cases of morphological negation stacking, and we provide new data from low scope syntactic negation, arguing that the split is not between morphological and syntactic negation, but between high and low scope negation. Finally, in section 5 we provide an analysis for why both positive and negative adjectives can be combined with *not,* as shown in (1c).

2   Syntax or semantics?

Our decomposition analysis has obvious consequences for the semantic analysis of gradable adjectives. Providing such a fully worked out semantics is the topic of a different paper and therefore not a task we shall undertake here. What we would like to motivate in this section, however, is our approach to the facts discussed in the previous section in terms of a syntactic principle (i.e. (12)), rather than a semantic one.

It is obvious that a simple semantic constraint against the stacking of negations will not do, since there is nothing semantically wrong with the stacking of multiple negative operators:

(15)   ¬¬P(x)

And as we saw in the previous section, double negation is also found in natural language:

(16)   a.   That is **not im**possible.
       b.   He does**n't not** like her.

A more sophisticated version of a semantic approach to the data discussed in the previous section tries to explain the restriction involved in terms of the distinction between contradiction and contrariety, as follows: contradictory negation can be stacked (onto contrary ones and onto each other), whereas contrary negation cannot.[7] Two propositions are contradictory if they cannot be true together, nor be false together, such as the ones in (17):

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[7]This possible alternative was suggested to us by an anonymous reviewer. Though (Cinque 1999: 126) does not make this distinction between contradictory and contrary negation, his position is potentially compatible with this suggested alternative, in that he assumes that negation can occur freely on every adverb-related functional projection.

(17)   a.   Alexandra went to university.

              b.   Alexandra didn't go to university.

Two propositions are contrary if they cannot be true together but can be false together, such as (18a) and (18b), which are both false if Wendy is neither happy nor unhappy:

(18)   a.   Wendy is happy.

              b.   Wendy is unhappy.

As (18b) shows, the negative prefix *un-* gives rise to contrary negation. Similarly, the relation between the adjectives *tall* and *short* is one that gives rise to contrary opposition, given that Rachel could be neither tall, nor short, i.e. the sentences of (19) could be false together:

(19)   a.   Rachel is tall.

              b.   Rachel is short.

Returning to cases of double negation, the more sophisticated semantic approach to our data would imply that the cases in (16) are allowed because they stack a contradictory negator (*not, n't*) onto another contradictory one, or onto a contrary one (like *im-*). What is not allowed, however, is stacking a contrary negation onto a contrary one, and this is precisely what happens in cases like **unshort*.

Contradictory negation would under this approach be identical to logical negation (represented as ¬), whereas contrary negation would involve a different operator altogether (e.g. the **c**-operator proposed by Goddard 1960, the R-operator of McCall 1967, the κ-operator of Humberstone 2005, or Horn's 2014 ©-operator). Representing contrary negation as κ for concreteness, the situation can be summarised as in (20):

(20)   a. $\neg\neg$

              b. $\neg\kappa$

              c. $*\kappa\kappa$

              d. $\kappa\neg$

Since affixal negation is for the most part contrary and syntactic negation contradictory (Horn 1989), this semantic theory to all intents and purposes derives the equivalent results of the Z–H generalisation.

However, there are a number of reasons why we believe such a se-

mantic approach is inadequate. The first of these is that it is empirically deficient, in the sense that there are many instances where contradictory negations cannot be stacked. Collins (to appear) discusses a wide range of such cases, such as the following:

(21)   a.   Not everybody was there.
          b.   *Not not everybody was there.

(22)   a.   Not many people were there.
          b.   *Not not many people were there.

(23)   a.   Not {even/only} John was there.
          b.   *Not not {even/only} John was there.

(24)   a.   Not {more than three/less than three/a lot of} people were there.
          b.   *Not not {more than three/less than three/a lot of} people were there.

(25)   a.   Not often do I manage to go on fall foliage tours.
          b.   *Not not often (do) I manage to go on fall foliage tours.

(26)   a.   I persuaded John not to like Clinton.
          b.   *I persuaded John not not to like Clinton.

These all involve the illicit stacking of two contradictory negations, which therefore must be due to a different constraint, if indeed contradictory negators are semantically freely stackable. Collins argues that this is a syntactic constraint, which prevents the stacking of two negations in identical positions (*NEG NEG).[8]

The other reason why we believe the approach in terms of the semantic distinction between contradiction and contrariety is insufficient is that it is at best a description of the facts, not an explanation. Its potential theoretical interest rests on the assumption that contrary negation is somehow fundamentally different from contradictory negation, and involves a different operator altogether (as shown in (20)). But even if one adopts this view, there is nothing explanatory about (20): it is the mere observation of a pattern, with little generality, and no obvious explanation. The restric-

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[8]Collins' constraint is similar to ours, but does not extend to cases of morphological negation, nor to other types of X-X sequences. We believe his data could also be explained in terms of our general constraint in (12). We refrain from making a detailed comparison of his proposal with ours, as it would lead us too far afield.

tion that we propose in (12), in contrast, is quite general, covering not only all cases of negation, but extending beyond negation to many other cases.

More importantly, we believe that the assumption of a contrariety operator is not necessary. We believe that the contrary nature of the negation we see in the data discussed in section 1 can be derived from an underlying contradictory negation in the internal structure of negative gradable adjectives (whether lexically negative or with a negative prefix or suffix). In the remainder of this section, we shall briefly lay out the core of this analysis, which is largely based on Seuren (1978) (see also von Stechow 1984, 2008). We refer the reader to De Clercq and Vanden Wyngaerd (2018) for a more detailed presentation (and to Collins 2017 for a slightly different approach to the same issue).

We first define the distinction between contradiction and contrariety in terms of sets, as follows:

(27)   a.   Contradiction
            $A \cup B = \mathcal{U}$
            $A \cap B = \varnothing$
       b.   Contrariety
            $A \cup B \neq \mathcal{U}$
            $A \cap B = \varnothing$

The denotation of a proposition under this approach is not a truth value, but the set of situations in which it is true (Van Fraassen 1971). Two propositions are contradictory if their union equals the universe of all possible situations, and contrary if their union does not denote the universe. In either case, their intersection is empty, which represents the fact that they cannot be true together.

The analysis that we propose of gradable adjectives is based on interval semantics, where gradable adjectives denote intervals or extents (Kennedy 2001). A scale $\langle S, <_{DIM} \rangle$ is a set of linearly ordered points along a dimension DIM. An extent E is a nonempty subset of S with the following property (Landman 1991: 110):

(28) $\forall p_1, p_2 \in E, \forall p_3 \in S, [(p_1 < p_3 < p_2) \rightarrow (p_3 \in E)]$

Assume further a degree function d_{DIM}, which maps any entity x which can be ordered along some dimension DIM onto a unique point on the

scale $\langle S, <_{DIM} \rangle$. This unique point divides the scale into two intervals or extents, a positive and negative one. The positive extent of x with respect to $\langle S, <_{DIM} \rangle$ is defined as in (29a), and its negative extent as in (29b).

(29) a. $POS_{DIM}(x) = \{p \in \langle S, <_{DIM} \rangle \mid p \leq d(x)\}$
      b. $NEG_{DIM}(x) = \{p \in \langle S, <_{DIM} \rangle \mid \neg[p \leq d(x)]\}$

The positive and the negative extents of x entertain a relation of contradictoriness as defined above: their union equals the entire scale, and their intersection is empty. We may therefore define a negative extent more concisely as follows:

(30) $NEG_{DIM}(x) = \neg POS_{DIM}(x)$

A crucial assumption is that positive gradable adjectives denote a positive extent, and negative gradable adjectives a negative extent, as shown in (31) for the pair *tall-short* (see also Kennedy 2001, Heim 2006, Büring 2007, Heim 2008, Bobaljik 2012):

(31) a. $[\![tall(x)]\!] = POS_{HEIGHT}(x)$
      b. $[\![short(x)]\!] = NEG_{HEIGHT}(x)$

That is, $[\![tall(x)]\!]$ is the set of degrees to which x is tall, whereas $[\![short(x)]\!]$ is the set of degrees to which x is not tall. Antonymic pairs like these therefore stand in a relationship of contradictoriness, for the reasons just explained. Given the equation in (30) above, we can now assume that negative scalar adjectives contain a logical negation in their internal structure.

(32) $[\![short(x)]\!] = [\![\neg tall(x)]\!] = \neg POS_{HEIGHT}(x) = NEG_{HEIGHT}(x)$

So where does contrariety come from? The contrary nature of the opposition in an antonymic pair like *tall-short* derives from the way these extents interact with the contextual standard, which is a further essential part of the denotation of gradable adjectives (Wheeler 1972, Seuren 1978, Klein 1980, and much subsequent work). Following Seuren (1978), we take this contextual standard or average itself to be an extent, i.e. the set of degrees that counts as neither neither tall nor short. We now define the truth conditions for a sentence like *Linus is tall* as follows: the sentence is true if the positive extent of Linus's height includes the contextual aver-

age A_C.[9] Negative adjectives work similarly, except that they are defined in terms of negative extents: *Kurt is short* is true in case the negative extent of Kurt's height includes A_C. Now suppose Eva is of average height, i.e. neither tall nor short. In this case, $d(Eva)$ yields a value that is included in the contextual average A_C; in such a case, neither the positive nor the negative extent of Eva's height will include A_C. As a result, both the sentence *Eva is tall* and *Eva is short* will come out as false.

The above analysis is represented graphically in Figure 1, where the top line represents the height scale and the contextual average A_C. The second line represents Linus' tallness, with its positive extent as a solid line, and its negative extent as a dashed line. The representation shows that A_C is included in Linus' positive extent, as well as in Kurt's negative extent, but not included in either the positive or the negative extent of Eva's height.
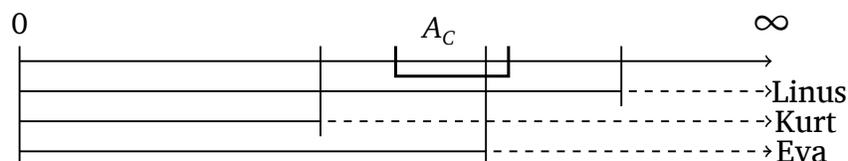

Figure 1: Height scale with positive and negative extents

The result is that *Linus is tall* will come out as true, as will *Kurt is short*, as required. In contrast, the sentence *Eva is tall* will come out as false, as will the sentence *Eva is short*. This derives the contrary opposition of the latter two sentences, since they can both be false at the same time.

In sum, this analysis takes the fundamental semantic distinction between antonymic pairs of adjectives to be one of contradictory opposition, which derives from the presence of a Neg feature with the semantics of logical negation ($\neg$) in the internal makeup of negative gradable adjectives. Contrariety follows from the truth conditions of gradable adjectives, which are formulated in terms of a positive extent for positive ones, and a negative extent for negative ones, and the dependence on a context-dependent average A_C, which is itself an extent.

Given that cases of contrary opposition can be explained in terms of an underlying contradictory negation, the theoretical appeal of the se-

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[9]For two extents X and Y, $X \subseteq Y \iff ((X \cap Y = X) \wedge (X \cup Y = Y))$.

mantic account of our data in terms of the semantic distinction between contradiction and contrariety is greatly diminished. Saying that contrary negations cannot be stacked and contradictory ones can is then ultimately unexplanatory, since in the end all types of negation can be explained in terms of an underlying contradictory negation, plus the effect of scales. More specifically, *unshort* would amount semantically to $\neg\neg POS_{HEIGHT}(x)$, via (32). Since this involves the stacking of two contradictory negations, it should not present a problem from a semantic point of view (see (20) above). So at this point, one would either have to dig deeper into the semantics of scales in order to explain *unshort*, or assume, as we do, that there is no syntax that generates the illicit double negation. In particular, the syntactic restriction that we propose explains the relevant data in terms of a general restriction on admissible functional sequences.

3   Prerequisites for the analysis

3.1   General background assumptions: nanosyntax

The analysis we propose is couched in the theoretical framework of nanosyntax, which finds its origins in cartography (Rizzi 1997, Cinque 1999, Haegeman 2012). In this section we present the most important background relevant to understanding our proposal.[10] Nanosyntax assumes that the lexicon is postsyntactic, and consequently, that the syntax manipulates features. Nanosyntax furthermore takes each feature to be a syntactic head (One Feature, One Head).[11] A lexical item consists of three parts: a phonology, a syntactic tree, and, optionally, a component of conceptual meaning, which is present in cases where the meaning of the lexical item in question is underdetermined by its features, i.e. with nonfunctional lexical items with rich lexical meanings.

Postsyntactic lexical insertion is subject to the *Superset Principle*:

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[10]We refer the reader to Starke (2009), Caha (2009), Pantcheva (2011), De Clercq (2013), Rocquet (2013), Lander (2016), **?** for a more detailed discussion of the nanosyntactic framework.

[11]See also Cinque and Rizzi (2008: 50); Kayne (2007) adopts a similar principle, to the effect that UG imposes a maximum of one interpretable syntactic feature per lexical item.

(33)   *Superset Principle*
   A lexical entry may spell out a syntactic node iff the lexical tree
   is identical to the syntactic tree, or if it contains the syntactic tree
   as a constituent.

As a result of this principle, there may be a competition between several
forms for insertion, for example if one lexical entry is a perfect match for
a syntactic node, and another contains the syntactic node as a subtree.
The winner of the competition is determined by the *Elsewhere Principle*
(Kiparsky 1973):

(34)   *The Elsewhere Principle*
   In case two rules, R_1 and R_2, can apply in an environment E, R_1
   takes precedence over R_2 if it applies in a proper subset of envi-
   ronments compared to R_2.

An informal version of this principle states that the lexical item with the
fewest superflous features wins the competition.
   As already mentioned above, a further important assumption is that
of phrasal spellout. Except (possibly) in strictly agglutinative languages,
features do not map onto phonological exponents in a one-to-one fash-
ion. Rather, the relationship between features and exponents is typically
many-to-one, or even many-to-many. In nanosyntax, the former situation
is accounted for by assuming that lexical items contain stored syntactic
trees, i.e. well-formed syntactic objects. These syntactic objects are then
matched against the syntactic objects created by Merge in the syntax. If
the matching satisfies the Superset Principle, spellout occurs. Every Merge
step is a phase, i.e. after every Merge step, the process of matching the
syntactic object against the lexicon is repeated. We shall discuss some
derivations illustrating how this works in detail below.

3.2   The feature structure of adjectives

Since the syntax works with features, the first question we need to address
is what are the features involved in adjectives. We assume that these in-
volve a (partial) functional sequence or f_{seq} as in (35):

(35) $< \text{Neg, Q, } \sqrt{} >$

Starting at the bottom, the root feature is responsible for the rich lexical content that differentiates different adjectives from one another. The feature Q contributes gradability (an ordering of a set of degrees). Semantically, QP denotes a positive extent. Neg is a feature that maps the positive extent of QP into a negative extent, as explained above.[12] Putting these together in a tree, we get (36):[13]

(36)   NegP $\Rightarrow$ *negative gradable adjective (e.g. sad)*

       Neg   QP $\Rightarrow$ *positive gradable adjective (e.g. happy)*

              Q $\sqrt{}$
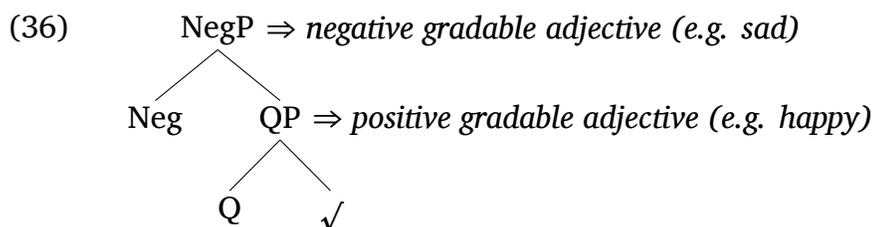
The double arrows informally represent phrasal spellout. Lexical entries for three example adjectives are given in (37):[14]

(37)   a.   < /happy/, [$_{QP}$ Q $\sqrt{}$], HAPPY >
        b.   < /sad/, [$_{NegP}$ Neg [$_{QP}$ Q $\sqrt{}$]], SAD >

The derivation of a positive gradable adjective like *happy* proceeds as follows (we omit irrelevant steps prior to the merging of Q): the syntax merges QP, consults the lexicon, and finds any gradable adjective. At this point, both positive and negative gradable adjectives are possible spellouts because of the *Superset Principle*: their features (i.e. (Neg), Q, and $\sqrt{}$) are

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[12]For ease of exposition, we ignore the contextual average, which is introduced by another head at the top of the structure, in the manner of the POS head of Kennedy (2007). See De Clercq and Vanden Wyngaerd (2018) for discussion.

[13]A reviewer asks if positive adjectives should not receive a Pos feature in place of the Neg feature of negative adjectives. This would in fact amount to a binary feature, like a Pol head that can take two mutually exclusive values [±Neg]. Starke (2004) offers a number of arguments against such an approach. The first is that [+Neg] triggers weak islands, whereas [–Neg] does not (or at least not always). The second is that certain types of movement are sensitive to [+Neg], like negative inversion in English, but there are no similar movements that are triggered by [–Neg]. In this respect, [±Neg] resembles [±Wh] and [±Foc]: movement is often triggered by [+Wh] and [+Foc], but never by the corresponding negative values. Starke's conclusion is that the negative, unmarked, values of these features are syntactically absent. Since they are the unmarked values, they are recoverable in the interpretive component.

[14]Small capitals represent the conceptual meaning component of semantically rich lexical items.

a superset of those of the syntactic tree QP (which dominates Q and $\sqrt{}$). However, negative gradable adjectives will lose the competition against positive ones in virtue of the *Elsewhere Principle* because they have an extra Neg feature, i.e. they have more superfluous features than positive ones, which are an exact match.[15] Positive gradable adjectives are all in a tie with respect to the *Elsewhere Principle*, which cannot designate any one of them as a winner. As a result, any one can be chosen to spell out QP.[16] Optionally, syntax may proceed to merge NegP, and consult the lexicon again, as spellout is a cyclic process that applies after the merger of each XP. If this happens, spellout will find any negative gradable adjective in the lexicon, and since they are all in a tie, any one may get inserted. Note that positive adjectives are not candidates for spelling out NegP, since their features are not a superset of those of the syntactic tree, but a subset.

This analysis, and in particular the presence of a Q-feature in gradable adjectives, receives confirmation from the phenomenon of *much*-support (Corver 1997: 127):

(38) a. John is fond of Mary. Maybe he is **too** *much* SO.
      b. John is fond of Mary. Maybe he is **as** *much* SO as Bill.
      c. The weather was hot in Cairo—**so** *much* SO that we stayed indoors all day.

Much can, and in fact must, appear here, because pro-form *so* spells out less than QP, i.e. its lexical entry contains $\sqrt{}$P, not QP. As a result, *so* can spell out $\sqrt{}$P, but not QP, so that *much* is needed to spell out QP.[17] We also explain the impossibility of *much* as an adjectival modifier (e.g. **much*

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[15]The spellout mechanism does not require the existence of a relation of antonymy between any one positive adjective and a negative counterpart, or vice versa. Even if a negative adjective lacks a positive antonym, it will lose the competition against other, nonantonymous, positive adjectives. Such lexical relations of antonymy could be incorporated into the analysis by means of the mechanism of pointers (Starke 2014a), such that the lexical entry for *short* would contain a Neg-feature plus a pointer to the lexical item for *tall*. Since nothing hinges on this issue, we do not discuss it any further.

[16]In principle, this situation could result in two different outcomes: a crash, or free choice of insertion of equally ranked candidates. In taking the latter option, we follow De Belder (2011).

[17]Kayne (2002: 96n39) argues that *so* is not an adjective because it follows, rather than precedes, the modifier *enough*:

(i)   John is fond of Mary, enough so to invite her to his party.

18

tall). Since gradable adjectives already spell out QP, *much* is not needed to do so. Merging *much* on top of a gradable adjective would incur a violation of (12), as there would be an f_{seq} <Q, Q, $\sqrt{}$>.

3.3 Un-prefixed positive gradable adjectives

We assume that the *un*-prefix spells out a Neg-feature and a Q-feature, as follows (De Clercq 2017):

(39)   < /un/, [$_{QP}$ Q Neg] >

An argument for the presence of Q in *un-* concerns the fact that *un-* makes adjectives gradable. This appears most strikingly in the contrast with *non-*, as noted by Zimmer (1964: 33):

(40)   a.   non-christian: '(not) related to, pertaining to, characteristic of certain religious doctrines'
        b.   un-christian: 'a scale of conformity or opposition to certain norms'

Lieber (2004: 121) observes the same correlation between the negative prefix *non-* and nongradability: '*non-* attaches to all kinds of adjectival bases, both gradable and ungradable [*sic*], and quite consistently forms negatives that are both nongradable and contradictory in meaning'. The systematic nature of this contrast between *un-* and *non-* is shown by the following cases:

(41)

A	non-A	un-A
American	non-American	unamerican
grammatical	nongrammatical	ungrammatical
Cartesian	non-Cartesian	un-Cartesian
maternal	nonmaternal	unmaternal
motherly	??nonmotherly	unmotherly

This is to be contrasted with *tall enough,* where *enough* follows the adjective. We take these facts to show that *so* is smaller than QP. One could think of this contrast in the manner of Starke (2014b), who suggests that a movement operation that targets the highest feature in an f_{seq} <A, B, C> will attract the spellout of AP but not that of BP. Applied to the case of *tall enough* vs *enough so*, the movement attracts *tall* but not *so*, since *so* is smaller than QP.

A further example illustrating the contrast is given in (42):

(42) a. The blood found in the closet was nonhuman/*inhuman.
      b. Their behaviour was inhuman/*nonhuman to the extreme.

In (42a), the denotation of *human* is a set of individuals, and the *non*-prefix selects the complement set.[18] In (42b), in contrast, we are dealing with a scale, i.e. a set of degrees. Since only gradable adjectives can serve as the input for degree comparison, we expect only *un*-prefixed adjectives to allow such comparison, and this is indeed what we find:

(43) a. This sentence is more ungrammatical than that one.
      b. *This sentence is more nongrammatical than that one.

In the same logic, Horn (1989: 281) notes the following contrasts:[19]

(44)   downright un-American/#non-American
        very un-Christian/#non-Christian
        extremely unnatural/#nonnatural
        somewhat immoral/#nonmoral
        awfully irrational/#nonrational
        rather unscientific/#nonscientific

Zwicky (1970) likewise observes a property of adverbs like *usually, typ-*

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[18]A reviewer points out that some cases of *non*-prefixed adjectives can be graded, given the right context e.g. *Despite their perfectly human appearance, the androids' behaviour was nonhuman in the extreme* or *It turned out that the androids were (even) more nonhuman than the aliens*. This reflects the fact that nonscalar adjectives (like *male, French, right*) can generally be coerced into a gradable meaning in the right context; see Matushansky (2013) for discussion.

[19]Horn (1989: 281) further notes that with adjectives that have the *iN*-prefix, *un*- seems to take on the nongradable meaning of *non*-.

(i)   inhuman   unhuman   nonhuman
       irreligious unreligious nonreligious
       impious   unpious   nonpious

Observe, however, that in these cases, *un*- seems to be necessarily stressed, i.e. we have *inHUman* vs *UNhuman*. This is likely a different kind of *un*- than the one we are considering here. See note 4 above, as well as Selkirk (1982: 100) for the claim, in the context of level ordering theory, that there are two different *un*-prefixes in English, one a Level I prefix, and another a Level II prefix.

ically, characteristically, probably and a range of others.[20] These have a meaning as a sentence adverbial, illustrated by the fact that the adverb can be fronted without any change in meaning, as shown in (45b). However, the *un*-prefixed version of these adverbs cannot be fronted, as (46b) shows, and they only have an interpretation as a degree modifier:

(45) a. The children are usually noisy.
     b. Usually, the children are noisy.

(46) a. The children are unusually noisy.
     b. *Unusually, the children are noisy.

In sum, *un-* is a scalar negator with low scope; its scalarity derives from the presence of the feature Q in its lexical entry.

The tree of an *un*-prefixed positive gradable adjective is shown in (47):[21]

(47)

NegP

un- ⇐ QP$_{un}$ Neg′

Q   Neg   Neg   QP ⇒ *happy*

Q   √
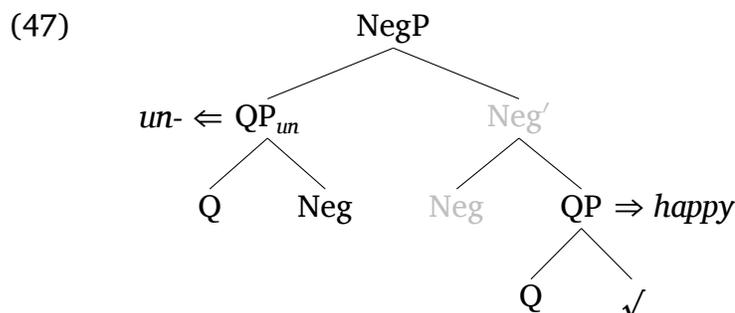
Here, *happy* spells out QP in the usual way. In a parallel derivation, a complex specifier (QP$_{un}$) is created, which spells out as the negative marker *un-*. This complex specifier is then merged in the main spine as the Spec of NegP. An intuition shared between our proposal and more traditional proposals in terms of Spec-Head agreement (cf. Haegeman and Zanuttini 1991, Haegeman 1995) is that there is semantic concord between a head and a Spec with matching features, i.e. the relevant features are interpreted once, not twice.

The more radical implementation of this intuition in Starke (2004) is that two items are interpreted only once because there is only one item, i.e.

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[20]We are grateful to L. Haegeman for pointing this out to us.

[21]We adopt the proposal by **?** to the effect that prefixes, and functional material to the left of the lexical root in general, have a binary structure at the bottom (i.e. [X Y]), whereas suffixes have a unary bottom (i.e. [X [Y]]). The unary bottom is the result of moving the complement of Y across it. See the discussion of *-ful* and *-less* below.

that specifiers, like heads, can project, and if they do, the head is absent. Since our analysis does not hinge on the adoption of Starke's radical idea, we have trees compatible with the more traditional view that both a head and a specifier may be present, with the semantically vacuous heads shown in a lightgray to distinguish them from contentful heads, such as the ones found in e.g. (36). What is most important for our purposes is that the introduction of the negative marker *un-* introduces a Neg in the functional sequence of the main spine.[22]

# 4   Analysis: low negation

4.1   *Un-prefixed negative gradable adjectives*

We now have the elements available to account for the empirical generalisation in (6), which states that multiple negative morphemes cannot be stacked. We show that this generalisation can be explained in terms of the restriction on admissible f_{seqs} formulated in (12).

On the one hand, we have the structure of the *un*-prefix in (39), which involves a Neg feature; on the other hand, we have argued in section 3.2 that negative gradable adjectives also contain a Neg-feature in their internal makeup. Combining the two, as in *unsad*, yields the following tree:[23]

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[22]An issue that we shall not address in any detail here is the relations between the triple *happy-unhappy-sad*, and others like it (see (1) above). Syntactically, the derivation of *unhappy* in (47) is different from that of *sad* in section 3.2 above, in that *un-* is a complex specifier, whereas *sad* only contains a projecting Neg-feature. We remain neutral on the question of the lexical relatedness of the *sad-unhappy* pair, i.e. whether they mean exactly the same or something slightly different. Elements of rich lexical content, if any, are contributed by Encyclopedia (McGinnis-Archibald 2016).

[23]Observe that in the main projection line, Neg is higher than QP, whereas in the complex specifier it is the other way round. The reason for this is that Neg is a feature which may appear at various positions in the functional sequence: if it appears at the bottom, it results in a negative marker (e.g. *un-*), if it appears above Q it results in a negative gradable adjective (e.g. *sad*, or *weinig* 'little', to be discussed below). However, in both cases it projects as Neg in the main spine, in line with Starke (2004).

(48)

NegP*
├── un- ⇐ QP_{un}
│   ├── Q
│   └── Neg
└── Neg′
    ├── Neg
    └── NegP* ⇒ *sad*
        ├── Neg
        └── QP
            ├── Q
            └── √
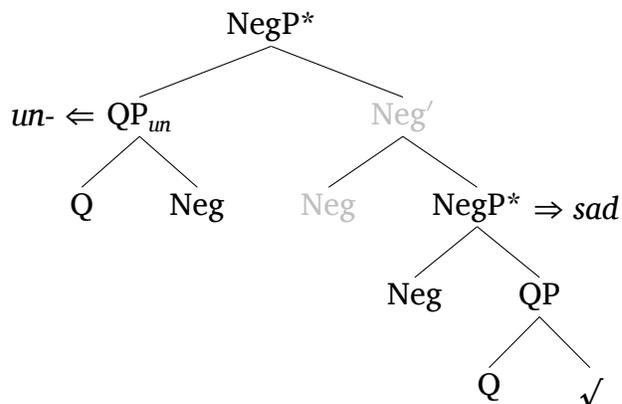
The lexical item *sad* is the phrasal spellout of a NegP that dominates an adjectival projection line $<$Neg, Q, $\sqrt{}>$. In a parallel derivation, a complex specifier is created, which spells out as *un-*. After merging this specifier, a second NegP will project. The resulting tree in (48) violates the restriction on admissible functional sequences, since we now have two immediately consecutive NegP projections (we mark the offending consecutive NegPs with an asterisk).[24]

One might ask why QP_{un} could not occur in the specifier of the lowest NegP, eliminating the higher NegP, and potentially avoiding the violation of (12). Such a derivation is ruled out, however, in a rather classical approach to negation, because a single NegP would contain two interpretable Neg features. In the complex specifier/head framework of Starke (2004) that we have assumed, the f_{seq} determines that there can be a NegP in the main projection line on top of QP. This NegP may result from merging either a head (as in the case of *sad*, see (36) above), or a complex specifier (as in the case of *unhappy*, see (47) above). But crucially one cannot merge both a head and a specifier, as this will necessarily introduce a second contentful negation in the f_{seq}, and therefore lead to a violation of (12).[25]

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[24]P. Caha (p.c.) points out a parallel with a proposal by Starke (2014b), who discusses how differences in the size of indefinites like *someone, something, somewhere* influence their modifiability by *or other*, e.g. *someone or other*. Such modification is not possible in French (**quelqu'un ou un(e) autre* 'someone or other'), which Starke accounts for by assuming that the French indefinites spell out a larger structure than the English ones. In the same spirit, *sad* spells out a larger structure than *happy*, and is therefore not modifiable by *un-*.

[25]See also the Generalized Doubly Filled Comp Filter of Koopman (2000), which pro-

4.2 Un-prefixed derived negative gradable adjectives

As we saw in section 1, the restriction against prefixing negative adjectives with *un-* extends to derived negative adjectives, such as noun-derived adjectives suffixed with *-less*. The lexical entries for the suffixes *-ful* and *-less* are given in (49):

(49) a. $< $ /-ful/, $[_{QP}$ Q] $>$
      b. $< $ /-less/, $[_{NegP}$ Neg $[_{QP}$ Q]] $>$

The feature Q reflects the fact that both suffixes derive gradable adjectives; their functional nature derives from the fact that the lexical entries do not contain a root feature. The negative suffix *-less* contains a Neg feature, which makes it minimally different from *-ful*.[26] We start out with the derivation of *useful*.

(50) NegP
      ┌──────┴──────┐
      Neg   QP
              ┌─────┴─────┐
              Q   nP $\Rightarrow$ *use*
   ┌─────┴─────┐
                    n   √
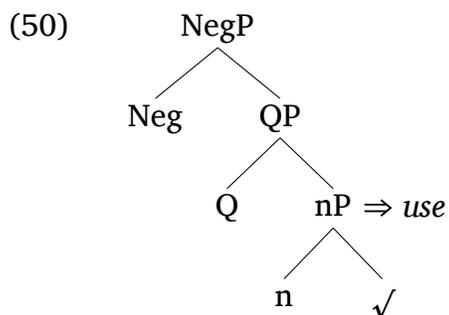
The syntax first merges the nominal structure of the noun. For concreteness, we represent this as an nP, which spells out as any contentful underived noun. Then the Q head is merged, creating QP. The lexicon, however, contains no items that spell out a QP with an nP in it. In order to be able to spell out Q, spellout-driven movement applies, adjoining nP to QP. The lower segment of QP now dominates only its head Q; QP can now be spelled out by the suffix *-ful*, since it is an exact match. The lexical item *-less* is also a candidate for insertion at QP, as its lexical entry contains QP as a subtree, but since it contains more superfluous structure it will lose the competition against *-ful*. We now have the adjective *useful*. The derivation of the adjective may stop here, or continue to merge NegP. Spellout-driven

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hibits lexical material in both the specifier and the head of a given X-bar projection.

[26]It is also minimally different from *un-* in having a unary bottom, which accounts for its suffixal nature; see note 21 above.

movement of nP applies again; at NegP, *-less* is the only candidate, since the features of *-ful* are not a superset of those of the syntactic tree, but a subset. In contrast, *-less* is a perfect match and gets inserted. The insertion of *-less* at NegP overwrites the earlier spellout of QP as *-ful*. The resulting tree after movements is given below (we assume that movement does not leave traces; cf. e.g. Lasnik 1999):[27]

(51)

```
                        NegP
               ┌─────────┴─────────┐
         use ⇐ nP              NegP ⇒ -less
            ┌───┴───┐        ┌────┴────┐
            n       √      Neg     QP ⇒ -ful
                                     │
                                     Q
```
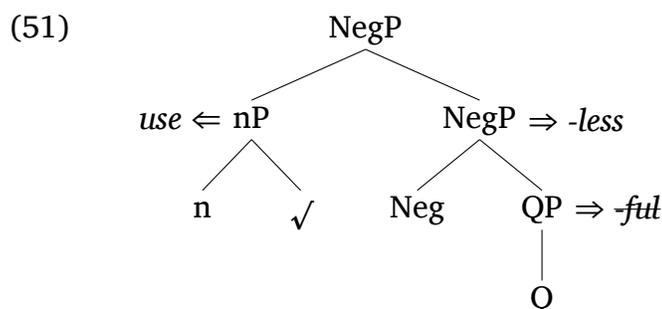
Let us now proceed to show why *unuseless* is impossible. We start out from the tree in (51), and add a complex specifier (merged in a parallel derivation), which spells out *un-*. This specifier needs to be merged into a SpecNegP, but doing so will result in the projection of a second NegP in the main spine, leading to the familiar <Neg, Neg> violation in the functional sequence.

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[27]A way of looking at the relation between *-less* and *-ful* is in terms of suppletion, i.e. *-less* suppletes for *-ful* in a grammatically negative environment. In other words, *-less* equals *-ful* + NEG, in a manner that is similar to the way *went* suppletes for *go* + PST. The overwriting of spellouts of earlier cycles by later spellouts in contexts of suppletion is restricted by a recoverability condition. Assuming that the lexical item for *-less* contains that of *-ful* as a subpart, *-ful* is recoverable once it gets overwritten by *-less*. See Caha et al. (2017) for discussion.

(52)

NegP*
- un- ⇐ QP
  - Q
  - Neg
- Neg′
  - Neg
  - NegP*
    - use ⇐ nP
      - n
      - √
    - NegP ⇒ -less
      - Neg
      - QP ⇒ -ful
        - Q
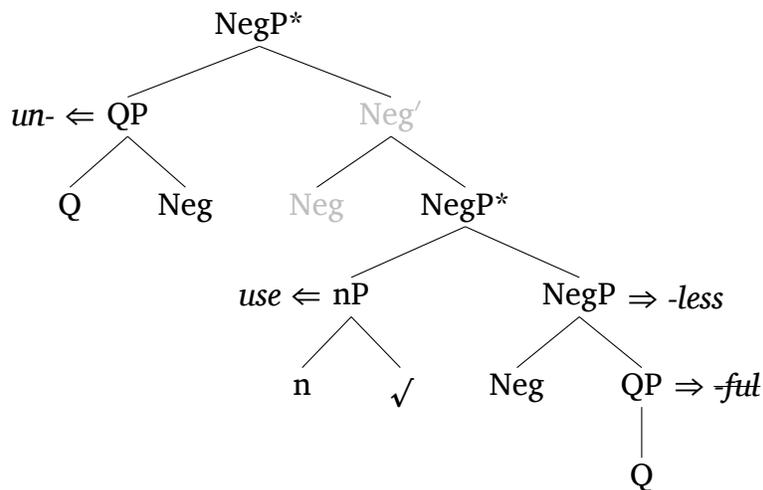
Although we shall not go through all the derivations in detail, it will be clear that examples like *ununhappy* and *undishonest* and others discussed in section 1 will all incur the same violation of the principle in (12). A sample derivation for *undishonest* is given in (53):

(53)

NegP*
- un- ⇐ QP
  - Q
  - Neg
- Neg′
  - Neg
  - NegP*
    - dis- ⇐ QP
      - Q
      - Neg
    - Neg′
      - Neg
      - QP ⇒ honest
        - Q
        - √
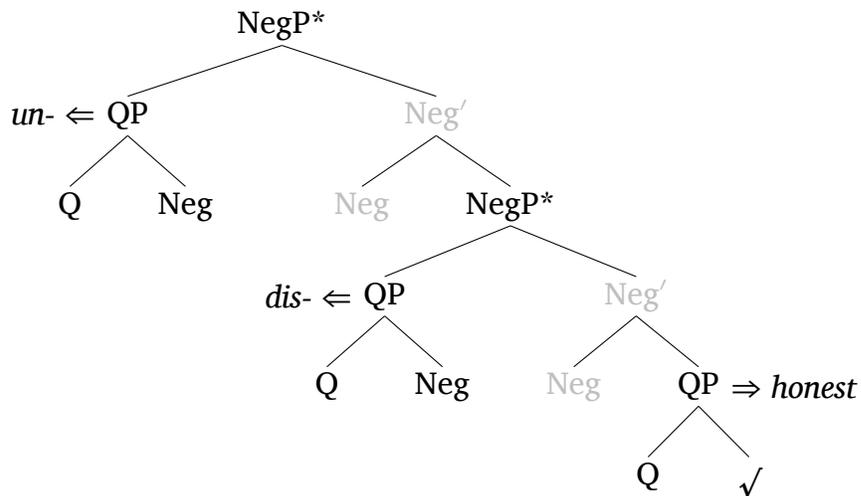
Like the earlier trees involving stacked negative morphemes, this tree features an illegitimate f_{seq} <Neg, Neg, Q, √>.

   In sum, the restrictions on morphological negation discussed in section 1 are accounted for in a principled manner by the restriction on the f_{seq} in (12).

4.3 Additional support

4.3.1 Low syntactic negation

We now present evidence showing that the data pattern in section 1 is not restricted to morphological negation, but extends to cases of syntactic negation. The Dutch adjectival modifier *weinig* 'little' shows exactly the same restriction as the negative prefix *un-* in not combining with negative adjectives:

(54) a. weinig actief/*passief
          little   active/passive
      b. weinig gezond/*ziek
          little   healthy/sick
      c. weinig correct/*fout
          little   correct/wrong
      d. weinig verstandig/*dom
          little   clear/confused
      e. weinig interessant/*saai
          little   interesting/boring
      f. weinig duidelijk/*verward
          little   clear/confused

This restriction extends to *weinig* + derived negative adjective, i.e. adjectives derived with the negative prefix *on-* 'un' or the negative suffix *-loos* '-less'.[28] The former of these cases is illustrated in (55):

(55) a. weinig geloofwaardig/*ongeloofwaardig
          little   credible/unbelievable
      b. weinig verstandig/*onverstandig
          little   intelligent/unintelligent
      c. weinig aantrekkelijk/*onaantrekkelijk
          little   attractive/unattractive
      d. weinig duidelijk/*onduidelijk
          little   clear/unclear
      e. weinig zichtbaar/*onzichtbaar
          little   visible/invisible

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[28]Some speakers find the contrasts in (54) less sharp than those in (55). We found no reflection of this fact in the corpus data that we are going to discuss shortly, however.

f. weinig geduldig/*ongeduldig
    'little patient/impatient'

For the negative suffix *-loos* '-less', we see the same pattern. The noun-derived adjectives with the positive suffixes *-vol* '-ful' or *-rijk* '-rich' in (56) contrast minimally with the negative adjectives in (57): the positive ones are modifiable by *weinig* 'little', the negative ones are not.

(56) a. weinig berouwvol
          little   remorseful
      b. weinig begripvol
          little   understanding
      c. weinig hoopvol
          little   hopeful
      d. weinig succesvol
          little   successful
      e. weinig belangrijk
          little   important

(57) a. *weinig ademloos
          little   breathless
      b. *weinig zinloos
          little   senseless
      c. *weinig genadeloos
          little   merciless
      d. *weinig nutteloos
          little   useless
      e. *weinig belangeloos
          little   disinterested

These judgments are confirmed by corpus data from the *Corpus Hedendaags Nederlands* (Corpus of Contemporary Dutch).[29] Table 4 gives the results for *weinig* followed by three types of adjectives: positive adjectives (first column), *on*-prefixed adjectives (second column), and negative adjectives (third column). The contrast to note is between the first column (*weinig* + positive adjective) on the one hand, and the second and third columns,

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[29]The *Corpus Hedendaags Nederlands* is a collection of more than 800,000 texts taken from newspapers, magazines, news broadcasts and legal writings (1814-2013).

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which in general show zero hits.

Table 4: *weinig + adjective* (CHN)

weinig + PosA	weinig + onPosA	weinig + NegA
aangenaam (11) 'pleasant'	onaangenaam (0) 'unpleasant'	vervelend (1) 'annoying'
vriendelijk (9) 'friendly'	onvriendelijk (0) 'unfriendly'	vijandig (0) 'hostile'
duidelijk (47) 'clear'	onduidelijk (0) 'unclear'	verward (0) 'confused'
interessant (71) 'interesting'	oninteressant (0) 'uninteresting'	saai (0) 'boring'
geloofwaardig (103) 'credible'	ongeloofwaardig (0) 'unbelievable'	
verstandig (7) 'intelligent'	onverstandig (0) 'unintelligent'	dom (1) 'stupid'
aantrekkelijk (137) 'attractive'	onaantrekkelijk (0) 'unattractive'	afstotelijk (0) 'hideous'
zichtbaar (110) 'visible'	onzichtbaar (0) 'invisible'	

Table 5 gives the results for derived adjectives with *-vol/-rijk* and *-loos*. Here, too, we see a marked contrast between the first and the second column in the number of hits:

Table 5: *weinig* + *N-loos/-vol/-rijk* (CHN)

weinig + N-vol/-rijk	weinig + N-loos
waardevol (6) 'valuable'	ademloos (0) 'breathless'
begripvol (5) 'understanding'	zinloos (0) 'useless'
hoopvol (70) 'hopeful'	genadeloos (0) 'merciless'
succesvol (127) 'succesful'	nutteloos (0) 'useless'
sfeervol (2) 'cosy'	sfeerloos (0) 'cheerless'
belangrijk (11) 'important'	belangeloos (0) 'disinterested'

Although we shall not undertake to demonstrate it here, the same restriction can be shown to hold for the French counterpart of *weinig,* namely *peu* 'little' (see De Clercq and Vanden Wyngaerd 2017). Ducrot (1973) notes that most French speakers will avoid using *peu* as a modifier of negative adjectives, an 'avoidance' which will become 'actual refusal if these adjectives have a negative prefix', e.g. **peu désagréable* 'little unpleasant', **peu maladroit* 'little unwieldy', **peu inintéressant* 'little uninteresting'. Another piece of evidence underscoring the parallel between the negative prefix and *peu* is the fact that French takes recourse to modification by *peu* 'little' where prefixation with a negative prefix is impossible, e.g. *peu important* 'little important' rather than **inimportant.* In other words, there seems to be a semantic equivalence between *iN*-prefixation and modification by *peu,* exactly like in Dutch.[30]

The Z–H generalisation, formulated as a restriction on morphological negation, cannot be extended to these cases. However, we will show that such data can be subsumed under the restriction on admissible functional

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[30]We owe this observation to M. van Oostendorp. Also see Ruytenbeek et al. (2017) for similar differences in acceptability between *pas très actif* 'not very active' vs *pas très passif* 'not very passive'.

sequences formulated in (12) above, which gives our theory a larger descriptive and explanatory power. Under our account, there is no need to postulate additional principles to account for the ungrammaticality of *weinig A-loos* 'little A-less', as its degraded status falls under the same theory as the one of *on-A-loos* 'un-A-less'. This theory has the effect of preventing the stacking of multiple negative morphemes if they are too close to one another structurally. Whether the negative marker is morphological or syntactic is immaterial. The relevant distinction is whether the relevant negative heads are adjacent in the functional sequence or not.[31]

Our analysis derives exactly this result. Assume that *weinig* 'little' spells out the features Neg, Q, and $\sqrt{}$:[32]

(58) $< $ /weinig/, $[_{\text{NegP}}$ Neg $[_{\text{QP}}$ Q $\sqrt{}$ $]]_{>}$

Combining *weinig* 'little' with a positive adjective is unproblematic, as (59) shows, but with a negative adjective a violation of (12) will ensue, as shown in (60):

---

[31]A reviewer suggests that the restriction we see here might be unified with or reduced to the following well-known contrast with measure phrases: *The table is 80cm long/*short.* However, neither *weinig* 'little' nor its polar opposite *veel* 'much' are able to occur as measure phrases:

(i)   a.   *De tafel is veel/weinig lang.
              the table is much/little long
        b.   *De tafel is veel/weinig kort.
              the table is much/little short

Also, if indeed *weinig* were a measure phrase and its inability to co-occur with negative adjectives followed from this fact, then we would expect to find this property in the entire system of the Q-words (Solt 2015, Rett 2016) to which *weinig* 'little' belongs, but this is not the case. For one thing, the polar opposite of *weinig, veel* 'much' cannot appear preadjectivally at all, e.g. *veel intelligent* 'much intelligent'; the same is true for its English and French analogues (*much intelligent, *beaucoup intelligent*). With morphological comparatives, the polarity restriction is reversed: *veel/*weinig langer* 'much/little longer'. For another, the comparative degree of *weinig* 'little' (i.e. *minder* 'less') can modify positive and negative adjectives alike (e.g. *minder verstandig/onverstandig* 'less intelligent/unintelligent). This set of facts suggests to us that the system of Q-words of which *weinig* 'little' is a part behaves differently from measure phrases.

[32]Note that the internal structure of *un-* and *weinig* is slightly different, not only in terms of where Neg appears (cf. footnote 23), but also with respect to the presence of a $\sqrt{}$ in *weinig*. We set these differences aside here.

(59)

```
                        NegP
                 ┌────────┴────────┐
        weinig ⇐ NegP             Neg′
             ┌────┴────┐      ┌────┴────┐
           Neg        QP     Neg       QP ⇒ actief
                    ┌──┴──┐         ┌──┴──┐
                    Q     √         Q     √
```

(60)

```
                         NegP*
                  ┌────────┴────────┐
         weinig ⇐ NegP             Neg′
              ┌────┴────┐      ┌────┴──────────┐
            Neg        QP     Neg      NegP* ⇒ passief
                     ┌──┴──┐        ┌────┴────┐
                     Q     √       Neg       QP
                                         ┌──┴──┐
                                         Q     √
```
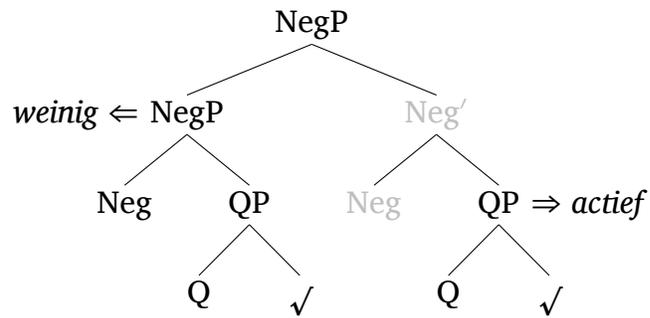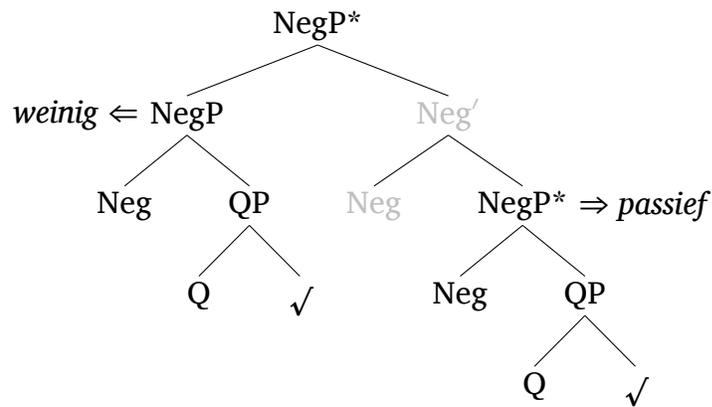
The fact that the negative adjective modifier *weinig* 'little' shows the same polarity restriction as the *un*-prefix is accounted for by the constraint formulated in (12), and assuming that both negative adjectives and *weinig* 'little' contain a Neg feature. The same violation of (12) occurs with derived negative adjectives (e.g. **weinig onaangenaam* 'little unpleasant'; **weinig zinloos* 'little useless'), and for the same reason. The trees for these are given below:

(61)

```
                        NegP*
              ┌───────────┴───────────┐
    weinig ⇐ NegP                     Neg′
          ┌────┴────┐          ┌───────┴───────┐
        Neg        QP         Neg            NegP*
                 ┌──┴──┐             ┌─────────┴─────────┐
                 Q    √    on- ⇐ QP                     Neg′
                              ┌────┴────┐        ┌────────┴────────┐
                              Q        Neg      Neg        QP ⇒ aangenaam
                                                         ┌───┴───┐
                                                         Q       √
```

(62)

```
                        NegP*
              ┌───────────┴───────────┐
    weinig ⇐ NegP                     Neg′
          ┌────┴────┐          ┌───────┴───────┐
        Neg        QP         Neg            NegP*
                 ┌──┴──┐             ┌─────────┴─────────┐
                 Q    √         nP ⇒ zin          NegP ⇒ -loos
                              ┌────┴────┐        ┌────────┴────────┐
                              n        √        Neg              QP
                                                                 │
                                                                 Q
```
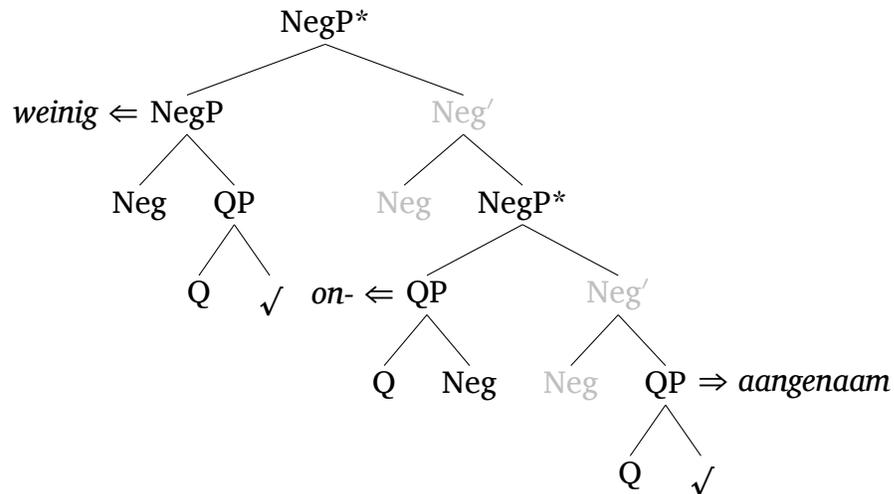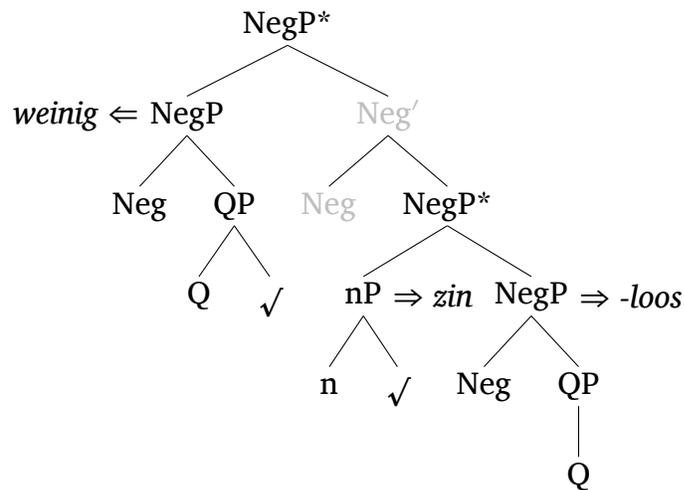
In (62), spellout-driven movement has applied and raised nP from a position below QP to a position left-adjoined to NegP in the manner described earlier (see (50) and surrounding discussion).

4.3.2 Structural nonadjacency

We now turn to some apparent counterexamples to the general pattern preventing the stacking of multiple negative morphemes, which actually turn out to support the general analysis developed in this paper. These are listed below (the English examples are from Siegel 1977, Zimmer 1964, Horn 1989, 2005):

(63) undisheartened unscathed
      undisputed   undefeated
      undiscoverable unblamable
      unharmed   unobjectionable
      invulnerable   irreproachable

(64) ongecompliceerd 'uncomplicated' (compliceren 'complicate')
      ongevaarlijk   'safe'   (gevaar 'danger')
      onschadelijk   'harmless'   (schade 'harm' n.)
      onschuldig   'innocent'   (schuld 'guilt')
      ondogmatisch   'undogmatic'   (dogma 'dogma')

These adjectives are all derived from (negative) verbs or nouns. This means that the negative meaning of *disheartened*, for example, derives from the verbal prefix *dis-* in the verb *dishearten*; in a case like *defeated*, the negative meaning comes from the verb *defeat*; if there is a Neg head in that verb (an issue we remain agnostic upon at this point), it will be contained in the verb itself. Subsequently, a (nonnegative) morpheme is attached that derives adjectives (e.g. *-able, -ed* in English; *-lijk, -ig, -isch* in Dutch), after which the negative prefix *un-/on-* is added. The two negative projections are now structurally separated by the nonnegative, adjective-deriving, suffix. There is consequently no violation of (12), as the two Neg projections are not adjacent in the functional sequence (see also Siegel 1977; Horn 1989: 277). The tree in (65) shows this for *undiscoverable*.[33]

---

[33]The tree ignores the spellout-driven movement of the verb *discover* to the Spec of QP needed to derive the suffixal word order in *discoverable*. Another issue concerns the featural makeup of *dis-*. In view of its reversative or privative semantics when used with verbs (Horn 1989, Plag 2003), it is likely that its feature composition is slightly different from the adjectival *dis-*. At the same time, it is striking that both *un-* and *dis-* have this double adjectival and verbal use (e.g. *untie, undo*). Also note that both *un-* and *dis-* can occur with nouns (e.g. *unrest, disquiet*). The suffix *-able* contains an element of modality that we represent by M. We shall not investigate these issues any further at this point, however, since they are orthogonal to the point we wish to make.

(65)

```
                        NegP
              ┌──────────┴──────────┐
      un- ⇐ QP                     Neg′
        ┌────┴────┐          ┌──────┴──────┐
        Q        Neg       Neg          QP ⇒ -able
                               ┌─────┴─────┐
                               Q          MP
                                      ┌────┴────┐
                                      M        NegP
                                        ┌────────┴────────┐
                                dis- ⇐ QP               Neg′
                                  ┌─────┴─────┐      ┌────┴────┐
                                  Q          Neg   Neg      vP ⇒ cover
                                                         ┌───┴───┐
                                                         v      √
```
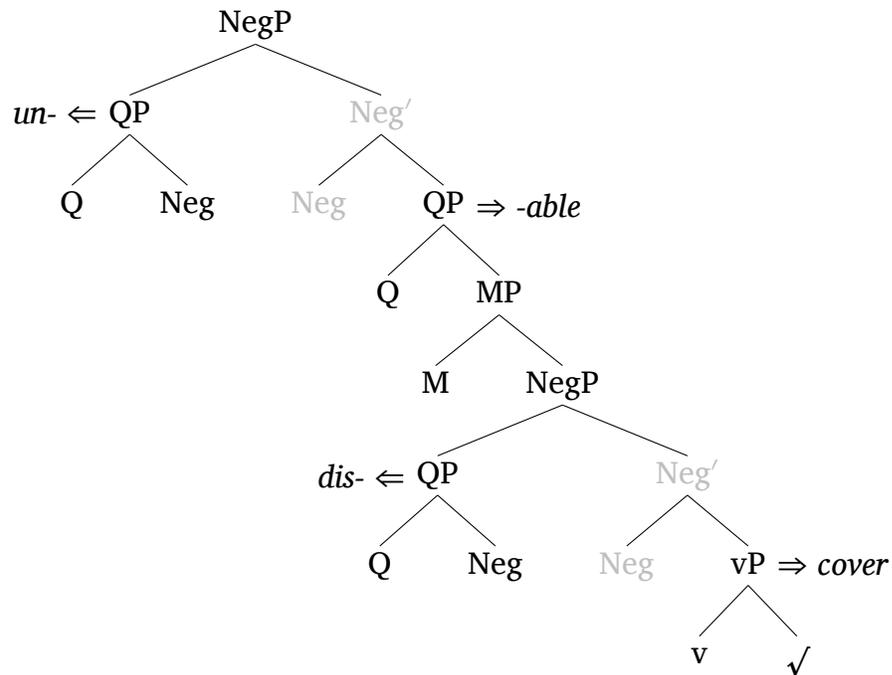
The two NegPs are separated by other projections in the f_{seq}, so that the tree does not violate (12).[34] We leave it to the reader to verify that the other cases in (63) and (64) work in the same way.

---

[34]The grammaticality of *unafraid*, with a negative adjective prefixed with *un-*, also seems an exception to the observed pattern at first. However, its grammaticality presumably also follows from the presence of more underlying structure. *Afraid* is part of a class of a-adjectives, for which it has been observed that they do not occur in attributive position (Bolinger 1971, Beard 1995, Huddleston and Pullum 2002, Larson and Marušič 2004, Cinque 2010, Boyd and Goldberg 2011, Yang 2015) and which have been argued to have developed historically from prepositional phrases (Long 1969). Following Rauh (1993), Bruening (2011a,b), Yang (2015), we assume that prepositional structure can be assumed in these APs. If this proposal is on the right track, then a derivation with additional structure between the negative adjective and the prefix (as in (65)) would explain why *unafraid* is possible.

5 Analysis: high negation

5.1 Sentential negation

At the outset, we noted that positive and negative adjectives alike can be negated with *not*, (1). In this section, we show how this follows from our analysis.

In a nutshell, *not* is a negative marker that takes scope in a higher position in the sentence, as a result of which its insertion will not lead to a violation of (12), due to the presence of intervening levels of structure. The higher scope position of *not* is itself a result of its internal makeup, i.e. its feature composition. We shall in addition argue that the clause contains two positions where *not* may appear. This claim is supported by the fact that cases exist where two occurrences of *not* may be stacked onto one another, in apparent violation of (12). This violation is only apparent, however, since *not* may occupy two different positions.

Languages often have a variety of negative markers. English, for example, has the negative markers *un-, iN-, dis-, -less*, which above we argued all involve (at least) a Neg and a Q-feature. The evidence in section 1 above moreover suggests that these Q-markers form a natural class, given their complementary distribution, i.e. the fact that they cannot co-occur. For this reason, we call them Q^{Neg} markers. It is equally clear that *not* is in a different class, given that it can be stacked on top of the elements of the Q^{Neg} class, as also demonstrated in section 1. The class difference also correlates with a scope difference, in that *not* is a negative marker with sentential scope, whereas the other markers have constituent scope. The scopal difference can be demonstrated using the question tag diagnostic, which is a classical test for sentential negativity (Klima 1964, Brasoveanu et al. 2014).

(66)   a.   She isn't happy, is she?
           b.   She is not happy, is she?

(67)   a.   She is unhappy, isn't she?
           b.   His behaviour was dishonest, wasn't it?
   c.   The tea is sugarless, isn't it?

Sentences with (sentential) *not* make the sentence syntactically negative, as witnessed by the positive tags in (66). Sentences with Q^{Neg} markers

are syntactically affirmative at the sentential level, as shown by the negative tags in (67). Further diagnostics introduced by Klima (1964) include the *either/too*-test, the *neither/so*-test, and the *not even*-test (see also McCawley 1998: 604-612). All of these tests reveal a difference between the sentential negative marker *not* and the Q^{Neg} markers.

(68) a. John didn't vote for Clinton, and Mary didn't vote for him *too/either.
      b. John didn't vote for Clinton, and *so/neither did Mary.
      c. John will not accept suggestions, (not) even reasonable ones.

(69) a. Mary was unfriendly, and John was unfriendly too/*either.
      b. Mary was unfriendly, and so/*neither was John.
      c. Mary was unfriendly, (*not) even to her own children.

We take these facts to indicate that the sentential negator *not* takes scope at a higher position in the clause, as shown in the following tree (we ignore the internal structure of *not* for now and simply represent it as *not* in the Spec of a high NegP in the clausal spine):[35]

---

[35]Regarding the relative positions of NegP and TP, it has been claimed that (one position for) negation is higher than TP in English (or universally) by Haegeman (1995), Holmberg (2003), Moscati (2006, 2010, 2012), Temmerman (2012), Holmberg (2013). The same claim has also been made for French (Rowlett 1998), Italian and English (Zanuttini 1996, 1997) and Spanish (Laka 1994). Zanuttini (1997) distinguishes four different positions for negation within the TP-domain, one of which is the position above TP.

(70)

```
                    AgrSP
                  /       \
                NP         AgrS'
                |         /      \
              John     AgrS      NegP
                |       |       /     \
                is    not     Neg'
                            /      \
                          Neg      TP
                                  /    \
                                 T      vP
                                      /    \
                                     v     NegP ⇒ sad
                                          /      \
                                        Neg      QP
                                                /    \
                                               Q      √
```
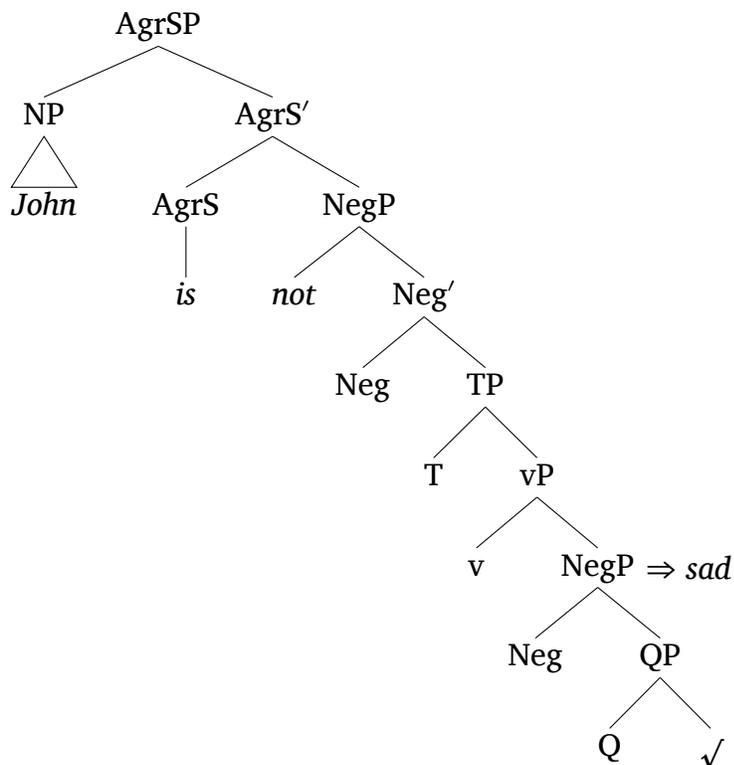
The negative marker *not* is generated in the SpecNegP that sits in the clausal spine at the TP-level. This clausal NegP is separated by (at least) two intervening heads (T and v) from the NegP that spells out *sad*. There is consequently no violation of the restriction against immediately successive identical heads in the f_{seq}, given in (12) above.

5.2 Focus negation

There is evidence for at least one more Neg head in the clausal spine, in addition to the position for sentential negation and the one for the Q^{Neg} markers. There is in fact a wide consensus in the syntactic literature on negation that there are (at least) two syntactic positions for negation in the clause (e.g. Lasnik 1972, Zwicky and Pullum 1983, Zanuttini 1997, Haegeman 1995, van Kemenade 2000, Cormack and Smith 2002, Haegeman 2002, Holmberg 2003, Schwarz and Bhatt 2006, Biberauer 2008, Tubau 2008). Adding morphological negation (largely ignored by the syntactic literature), we arrive at three distinct positions for negation. Our position

in fact agrees with that of Horn (1989: 517), who distinguishes inflected negation (sentence-level) from particle negation (VP-level) and incorporated negation (AP-level: *unhappy*). The following sentences provide evidence for this third position for negation, which is in between the high position of sentence negation and the low position of Q-negation.

(71) a. ALL the students weren't happy, were they? *Neg > ∀*
      b. All the students were NOT happy, weren't they? *∀ > Neg*

These examples (based on Horn 1989: 490) show that sentential negation (as in (71a)) correlates with positive tags and negation scoping over the quantifier. Focus negation (as in (71b)) correlates with negative tags and the negation scoping below the quantifier. The question tag test also identifies the *not* that occurs in small clauses as being nonsentential:

(72) They consider it not likely, don't they?

The negative tag indicates that the sentence in question is syntactically affirmative, and consequently that *not* does not have sentential scope. At the same time its scope cannot be as low as that of *un-* and the other Q^{Neg} markers, since this kind of focal negation stacks onto the Q^{Neg} markers:

(73) a. All the students were NOT unhappy/sad.
      b. They consider it not unlikely.

If focal negation were in the same position as the Q^{Neg} markers, we would expect it to show complementary distribution with them; since this is not what we find, we must conclude that focal negation occupies a different position, separated from the other two positions for negation by intervening heads.

In the same line of reasoning, sentential and focal *not* stack onto each other, suggesting that they, too, occupy different positions (see Horn 2014: 21ff for some attested examples).

(74) A: You should talk to your grandfather more when he comes to visit us.
      B: Well, I haven't NOT talked to him, have I?

(75) A: Did you enjoy the movie?
      B: Well, I didn't NOT enjoy it, but I did look at my watch a couple of times.

(76)   You cannot NOT invite your aunt to your wedding.

We take the low scope or focus *not* to sit in a NegP immediately dominating so-called low FocP (Belletti 2001, 2004, Jayaseelan 2001, 2008, Kandybowicz 2013). This yields the following (simplified) picture of the main clausal spine, with the three positions for negation:[36]

(77)

```
        (NegP)
        /    \
     (Neg)    TP
             /   \
            T    (NegP)
                 /    \
              (Neg)   FocP
                     /    \
                   Foc   (NegP)
                         /    \
                      (Neg)    QP
                              /  \
                             Q    …
```
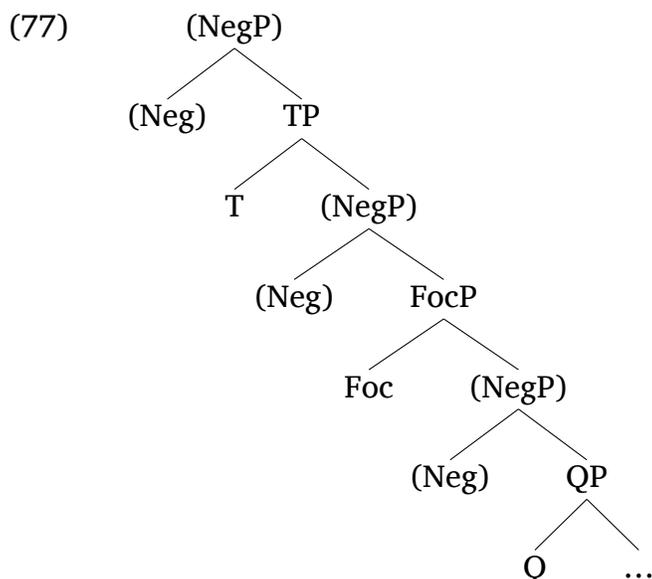
The three different positions for negation in the main clause functional sequence have been put between brackets because we assume, following Starke (2004), that negation is an optional element and does not project in the syntax in the absence of overt negative markers in the clause.

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[36]De Clercq (2013) argues that there is a fourth position for negation, which she calls DegP (or ClassP in later work, De Clercq 2017), and which is situated between QP and FocP. The English negative marker that spells out DegP is *non-*, which seems to be in a different class from the Q^{Neg} markers. For the sake of simplicity, we ignore this fourth type of negation here. See also Zanuttini (1997), Poletto (2017), who likewise argue in favour of four distinct positions for negation on the basis of detailed study of Italian dialects. The positions they distinguish are restricted to the the TP-domain and do not involve positions for affixal or lexical negation.

5.3   The internal structure of negative markers

The clausal functional sequence in (77) provides three possible positions where negative markers can appear: these are the three specifier positions of NegP, where a negative marker may be merged as a complex specifier. Which SpecNegP a negative marker appears in, i.e. its scope position, is determined by its internal makeup. A similar correlation between internal structure and scope-taking position in the clause has been claimed by Endo and Haegeman (2014) with regard to the position and internal structure of adverbial clauses. The same idea is present in the Level Embedding Regime of Williams (2003, 2009). In this section, we consider the question of the internal structure of negative markers in greater detail.

The basic idea we wish to pursue is that the features and the functional sequence $<$T, Foc, Q$>$ of the clausal spine (77) are replicated in the internal structure of negative markers (see also Poletto 2017). Concretely, negative markers have a single Neg-feature at the bottom, which defines them as negative markers, but which is packaged with different sets of features from the $<$T, Foc, Q$>$ sequence, depending on the type of negative marker.

Let us illustrate this with the English negative markers *not* and *un-*. The internal structure for sentential *not* is richer than for the Q^{Neg} markers discussed above, and contains the three scope-related features $<$T, Foc, Q$>$, as well as negation proper (De Clercq 2013). The relevant lexical entries are given in (78) ((78b) being repeated from (39) above):

(78) a. $<$ /not/, [$_{TP}$ T [$_{FocP}$ Foc [$_{QP}$ Q Neg]]] $>$
       b. $<$ /un/, [$_{QP}$ Q Neg] $>$

As we saw, *not* is both a marker for sentential negation and focus negation, i.e. it may spell out two different kinds of syntactic trees, and, as a result of this, take scope in two different positions.[37] This fact is accounted for by the lexical item in (78a). The Superset Principle as formulated in (33) above will ensure that *not* can spell out both a sentential negative marker (TP) and a focus negation marker (FocP). In the case of sentential negation, the lexical tree in (78a) will be an exact match for the syntactic tree, whereas in the case of focus negation, the lexical tree (TP) contains the syntactic tree (FocP) as a subtree. The lexical item in (78a) cannot spell

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[37]We leave aside the possibility of phonological reduction or phonological stress.

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out negation at the QP-level because of the *Elsewhere Principle*: although *not* is a candidate for insertion, it will lose the competition against the Q^{Neg} markers because they contain less superfluous structure.

An important argument in support of this decomposition analysis of negative markers is provided by crosslinguistic syncretism patterns. De Clercq (2013, 2017) shows how crosslinguistically the hierarchy in (77), which is based on scope and stacking facts, is confirmed by syncretism patterns found in Greek, English, French, Czech, Mandarin Chinese, Modern Standard Arabic, Hungarian, and Persian, which represent four different language families.[38] Negative markers are always syncretic in a way that respects the sequence in (77), i.e. there are no ABA-patterns. English, for example, has an AAB-pattern: the T-negator and the Foc-negator are syncretic (*not*), and different from the Q-negators. Greek has an ABC-pattern, i.e. three different negative markers, thus confirming the existence of these three types. Czech has an AAA-pattern, with the three markers fully syncretic. But there appears to be no language with an ABA pattern, i.e with a T-negator that would be syncretic with a Q-negator across a Foc-negator.

(79)

	T^{Neg}	Foc^{Neg}	Q^{Neg}
English	not	not	un-
Greek	dhen	oxi	a-
Czech	ne	ne	ne
unattested	A	B	A

The syncretisms between negative markers show that scopally different negative markers are structurally related, i.e. share certain features (cf. Caha 2009 on Case). They furthermore provide evidence as to how these features can be ordered, i.e. they yield the functional sequence in (77). The lexical entries that we assumed for *not* and *un-* in (78) show the structural relatedness of the two English negative markers: the tree for *un-* is

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[38]De Clercq (2018) has extended the sample of languages to 21 languages, which belong to 10 different language families, with two languages with an affiliation that is under debate: Indo-Euopean (English, Swedish, Dutch, French, Greek, Czech, Macedonian, Russian, Persian), Sino-Tibetan (Chinese), Austronesian (Malagasy), Semitic (Hebrew, MS Arabic, Moroccan Arabic), Finno-Ugric (Hungarian), Turkic (Turkish), Khoe (Khwe), Carib (Hixkaryana), Uto-Aztecan (Tümpisa Shoshone), Dravidian (Malayalam), Korean (family debated), Japanese (family debated)

structurally contained in that for *not*.[39]

As we said above, where a Neg marker takes scope in the clause is determined by its internal structure. A Neg marker with a T feature takes scope at TP: it will be inserted as a complex specifier in the SpecNegP that immediately dominates TP (see (77) above). Similarly, a negative marker that spells out FocP is inserted in the SpecNegP that dominates FocP in the clausal spine, etc.

Summarising the results of section 5, we have seen that the restriction on stacking multiple negative morphemes onto one another that we started out with (see (6) above) turns out not to be a restriction on morphological vs syntactic negation. Neither is it a restriction that can be formulated in terms of phonological identity: although certain phonologically identical negative markers are not stackable (e.g. **unun-, *disdis-*, etc.), others are (e.g. *not not*). The relevant criterion is where a negative marker takes scope: if two markers take scope in identical positions, they are not stackable, because this will create an inadmissible functional sequence. This is so even if they are phonologically different, or not linearly adjacent, as the discussion in section 4 has shown. If two negative markers take different scopes, they can be stacked, even if they are phonologically identical. This is notably the case with English *not*, which may either be a sentential or a focus negator. As a result, two occurrences of *not*—each with different internal structure—may appear in the same clause, because they take scope in NegPs that are separated by intervening levels of structure, thus avoiding a violation of (12).

6   Conclusion

We have proposed a restriction on admissible functional sequences that forbids sequences of immediately successive identical heads. We have shown how it allows an account of a range of facts that have hitherto defied a principled explanation. These facts involve a restriction on the stacking of multiple negative morphemes, both within and across words, i.e. the restriction is not confined to the word-internal domain, but manifests itself across word boundaries. The proper analysis of the facts is in

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[39]The idea of an internally complex negative marker is also present in Poletto (2008, 2017). However, her approach differs from De Clercq (2013, 2017) in many ways and most crucially in that so-called lexical negation is not taken into account.

terms of a distinction between the scope position of different types of negative markers, such that negative markers with different scope positions may be stacked onto each other, but negative markers with identical scope positions may not. The analysis supports an architecture of the grammar where there is no separate domain of morphology, given that the design principles and restrictions apply identically across the domains traditionally labelled as syntax and morphology. Our account crucially relied on the presence of a Neg feature in negative markers and negative adjectives, and on a late insertion model of grammar. The mapping of syntactic feature bundles onto a phonology happens in a maximally straightforward manner under the nanosyntactic mechanism of phrasal spellout.

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