

Splitting Germanic negative indefinites *

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Abstract

Constructions with an intensional verb and the negative indefinite *geen* in Dutch (as well as *kein* in German) routinely lead to split scope readings. English *no* does not systematically give rise to such readings. Observing a number of other differences between *geen* / *kein* and *no*, we claim that there are two kinds of negative indefinites in Germanic: (i) degree quantifiers that consist of a negative and a numeral meaning component and give rise to split scope (Dutch *geen*, German *kein*); (ii) non-degree negative indefinites (English *no*, and its counterparts in e.g. Swedish). We argue that the split scope phenomenon is tied to degree quantifier movement and is essentially a degree phenomenon.

1 Split scope

Negative indefinites in Dutch and German are known to give rise to so-called **split scope readings** – the meaning of the negative indefinite seems to be split in two pieces by another scope-bearing element (Jacobs, 1980; Kratzer, 1995; Geurts, 1996; de Swart, 2000; Penka and Zeijlstra, 2005; Abels and Martí, 2010; Penka, 2011), illustrated here with universal and existential modals in Dutch:

- (1) Je hoeft **geen** stropdas te dragen.
you must-NPI GEEN tie to wear
'You do not have to wear a tie.' $\neg > \square > \exists$
- (2) Henk mag **geen** toetje eten.
you may GEEN dessert eat
'Henk is not allowed to eat a dessert.' $\neg > \diamond > \exists$

In this paper we are concerned with the nature of split scope. The standard quantifier semantics for negative indefinite determiners (including *no*, *geen* etc.), as in (3), does not straightforwardly split and, as such, it does not offer a straightforward account of the splitting phenomenon.

$$(3) \llbracket \text{geen} \rrbracket = \llbracket \text{no} \rrbracket = \lambda P_{\langle et \rangle} \lambda Q_{\langle et \rangle} . P \cap Q = \emptyset$$

As we will argue, whatever analysis substitutes (3) in order to allow for split scope, it should cover the following four observations we will make in this paper: (1) Split scope with negative indefinites is not generally available cross-linguistically; (2) Split scope with degree expressions *is* generally available cross-linguistically; (3) Split scope is constrained by a scope constraint

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observed for degree expressions; (4) Negative indefinites that can modify numerals systematically allow for split scope readings. We will offer an analysis that rests on these observations, arguing that: (i) split scope is a degree phenomenon; (ii) Dutch *geen* and German *kein* are degree quantifiers, while English *no* isn't.

Note that on our proposal, Dutch *geen* and German *kein* are not indefinite determiners, but rather degree quantifiers. In what follows, we will nevertheless keep the descriptive label *indefinite* for these expressions. The reader should bear in mind that this label carries no theoretical commitment.

2 Properties of split scope

2.1 Split scope: Cross-linguistic limitations

Most studies of split scope with negative indefinites concern Dutch or German. Yet, split scope is sometimes discussed for English *no* (Potts, 2000; von Stechow and Iatridou, 2007; Iatridou and Sichel, 2011; Kennedy and Alrenga, 2014), usually illustrated with examples as the following:

- (4) The company need fire **no** employees.
 'It is not the case that the co. is obligated to fire an employee.' $\neg > \square > \exists$

However, the phenomenon is much more restricted in English than in Dutch/German. Changing an NPI *need* to a neutral *have to* leads to the loss of the split scope reading:

- (5) The company has to fire **no** employees.
 '#It's not the case that the company has to fire an employee.' $\neg > \square > \exists$

Similarly, a direct translation of the paradigmatic split scope example (1) into English results in a sentence with no split scope reading. It only has a *de dicto* reading.

- (6) At this party, you have to wear no tie.

We take this to mean that English *no* lacks the *general* scope splitting ability of Dutch *geen*. This discrepancy will play a large role in our story below.

2.2 Split scope beyond negative indefinites

Apart from negative indefinites, *degree expressions* tend to split their scope (e.g. Hackl 2000). Importantly, they do so to the same extent in English as in Dutch / German:

- (7) Tom has to bring **at most two** blankets.
 'Tom does not have to bring more than two blankets' $\neg > \square > >2$
- (8) They are allowed to write **few** letters.
 'It is not the case that they are allowed to write many letters' $\neg > \diamond > \text{many}$

It is important to note several things here. First, all quantifiers in these examples are degree quantifiers. At first sight, degree quantifiers do not seem to form a natural class with *geen*-type expressions (or with *no*, for that matter). Why this particular collection of expressions (degree quantifiers + *geen* / *kein*) gives rise to split scope is a puzzle that our analysis will eliminate by giving *geen* / *kein* a semantics of a degree quantifier. Finally, in contrast to the behaviour of *no* that we observed in the previous subsection, split scope with English degree quantifiers is unlimited. That is, for both English and Dutch/German, degree quantifiers always have the

ability to split scope. The ability of negative indefinites to split scope is general for Dutch and German and severely limited for the case of English. The analysis we will develop below deals with this variation in a straightforward way: by treating split scope as a degree phenomenon and analyzing *geen* / *kein* as degree quantifiers, unlike *no*.

This kind of analysis has immediate appeal due to the fact that split scope readings with degree quantifiers come naturally under a relatively standard analysis of degree quantification, which we adopt here. According to this analysis, quantifiers like *at most n*, *fewer than n* and *few* are not type $\langle\langle e, t \rangle, \langle\langle e, t \rangle, t \rangle\rangle$ quantifiers, rather they are type $\langle\langle d, t \rangle, t \rangle$ (Hackl, 2000; Nouwen, 2008, 2010; Kennedy, 2015) with the kind of meaning shown in (9) for *at most two*. (Also note that under this analysis a silent MANY is needed to mediate the relation between the degree and the noun, see Hackl 2000 and below for more details). Given this analysis, split scope readings with degree quantifiers are straightforward cases of QR:

- (9) $\llbracket \text{at most } 2 \rrbracket = \lambda P_{\langle dt \rangle}. \max(P) \leq 2$
 (10) $\llbracket \text{at most } 2 \llbracket \text{Tom has to bring at most } 2 \text{ MANY books} \rrbracket \rrbracket$
 $= \llbracket \text{at most } 2 \rrbracket (\lambda n. \square \exists x [\text{*bring}(\mathbf{T}, x) \ \& \ \text{*book}(x) \ \& \ \#x = n])$
 $= \max(\{n \mid \square \exists x [\text{*bring}(\mathbf{T}, x) \ \& \ \text{*book}(x) \ \& \ \#x = n]\}) \leq 2$
 (11) $\llbracket \text{few} \rrbracket = \lambda P_{\langle dt \rangle}. \max(P) < d_{st}$

If, as is standardly assumed, *geen*-type negative indefinites are not degree quantifiers, then an analysis of the split scope readings they give rise to will have to be quite different from what is illustrated in (10). That is, split scope will have to be essentially different in nature for degree quantifiers on the one hand and *geen* / *kein* on the other. Naturally, that would make it harder to explain their similar properties.

2.3 Split scope and the Heim-Kennedy generalization

We have seen modal verbs (*must*, *need*, *can*, *may*) split scope of *geen*-type indefinites. Are modals the only scope-splitters? With normal intonation, *geen*-type indefinites do not split scope over non-modal quantifiers. The following example from German illustrates this:

- (12) Genau ein Arzt hat **kein** Auto.
 exactly one doctor has KEIN car
 #‘It’s not the case that exactly one doctor has a car’
 ‘Exactly one doctor has no car’

The distribution of split scope is reminiscent of the Heim-Kennedy generalization (Kennedy, 1997; Heim, 2000): degree quantifiers can scope above (at least some) intensional verbs (14), but nominal quantifiers can never intervene between a degree quantifier and its trace (15).¹

- (13) $*[D_{dt} \dots Q_{ett} \dots t_d]$
 (14) Tom needs at most two blankets.
 ‘Tom does not need more than three blankets.’
 (15) Every student has at most three books.
 ‘#Not every student has more than three books.’

Negative indefinites behave in a parallel fashion (example from Dutch):

¹See Nouwen and Dotlaćil (2017) for discussion of details as to how this constraint should be stated.

- (16) Iedere student heeft **geen** oplossing gevonden.
 every student has GEEN solution found
 #‘Not every student found a solution’

Why would split scope with *geen* obey a generalisation concerning degree quantifiers if it’s not a degree quantifier? Once more, the data suggests that the broad phenomenon of scope splitting, including the splitting of negative indefinites, is a degree phenomenon.

2.4 *Geen*-type negative indefinites with numerals

We have seen above (Section 2.1) that there is a difference between *geen* / *kein* and *no* in that split scope is systematic with the former and restricted with the latter:

- (1) Je hoeft **geen** stropdas te dragen.
 you must-NPI GEEN tie to wear
 ‘You do not have to wear a tie.’ $\neg > \square > \exists$
- (17) At this party, you have to wear **no** tie. $*\neg > \square > \exists$

We observe another difference between *geen* / *kein* and *no* – namely that *geen* / *kein* combine with numerals while *no* generally doesn’t:

- (18) Nigella heeft **geen** 20 taarten gebakken.
 Nigella has GEEN 20 cakes baked.
 ‘Nigella has not baked 20 cakes.’
- (19) *Nigella baked no 20 cakes.

We suggest that this difference is not accidental, both cross-linguistically and semantically. A quick exploration of Germanic languages supports the following generalisation, which we call **the numeral modifier generalisation for negative indefinites in Germanic**: *whenever a negative indefinite can modify numerals, its capacity to create split scope readings with intensional operators is unlimited.*

We found that Icelandic and Frisian pair with Dutch and German in that they have negative indefinites (*eng* and *gjin*, respectively) which can modify numerals and which have unlimited split scope. The Swedish negative indefinite *ing* is like English: it lacks a use as a numeral modifier and does not generally give rise to split scope readings.

These differences, we believe, can help us point in the direction of an analysis of split scope readings of *geen*-type indefinites and the lack of such readings with *no*. In short, we suggest that *geen* is a degree quantifier, quite like other expressions subject to split scope. We first spell out an analysis of ‘geen’ in combination with numerals, as in (18), and then move on to the paradigmatic bare cases.

3 Analysis

3.1 *Geen* with numerals

Let’s first implement the idea of *geen* as a degree quantifier by analysing cases like (18), where *geen* combines with a numeral. Sentences like (18) are ambiguous between a lower and a doubly bounded reading. Correspondingly, we propose that *geen* in construction with numerals comes in two guises, both expressing a particular form of scalar negation:

$$(20) \llbracket \text{geen}_= \rrbracket = \lambda n_d \lambda P_{\langle dt \rangle} . \neg \text{max}(P) = n$$

$$(21) \llbracket \text{geen}_\geq \rrbracket = \lambda n_d \lambda P_{\langle dt \rangle} . \neg P(n)$$

Both these senses of *geen* combine with a numeral of type d (degree) and a degree predicate – but with a somewhat different result.

$$(22) \llbracket \text{N. baked geen}_= 20 \text{ cakes} \rrbracket = \neg \text{max}\{n \mid \exists x [\text{*baked}(\mathbf{N}, x) \ \& \ \text{*cake}(x) \ \& \ \#x=n]\} = 20$$

$$(23) \llbracket \text{N. baked geen}_\geq 20 \text{ cakes} \rrbracket = \neg \exists x [\text{*baked}(\mathbf{N}, x) \ \& \ \text{*cake}(x) \ \& \ \#x=20]$$

(22) is true when the quantity of cakes that Nigella made is not twenty (it could be five or fifty or, in fact, zero – see below). (23) is true when Nigella baked fewer than twenty cakes. These are exactly the interpretations that are attested for (18).

These readings arise by following standard assumptions for the semantics of numerals and degree quantification. First, we assume that the numeral has semantic type d and forms a constituent with *geen* (‘geen₌’ and ‘geen_≥’) in much the same way as a numeral modifier like *at least* combines with a numeral. We also assume a silent MANY, as in Hackl (2000) and much of the subsequent literature, which occupies the position between the numeral and the noun:²

$$(24) \llbracket \text{MANY} \rrbracket = \lambda n_d \lambda P_{\langle e, t \rangle} \lambda Q_{\langle e, t \rangle} . \exists x [\#x = n \ \& \ \text{*}P(x) \ \& \ \text{*}Q(x)]$$

Geen 20 QRs in order to resolve a type clash (as it is of type $\langle dt, t \rangle$ rather than d), leaving behind a trace of type d and creating the following degree predicate, with which *geen 20* will combine:

$$(25) \llbracket \text{Nigella baked } n \text{ MANY cakes} \rrbracket = \lambda n_d . \exists x [\text{*baked}(\mathbf{N}, x) \ \& \ \text{*cake}(x) \ \& \ \#x = n]$$

This set contains numbers such that it’s true that Nigella baked at least this number of cakes.

After *geen 20* combines with (25), the meaning will depend on whether it is an ‘exactly’ (‘=’) version of *geen* or the ‘at least’ (‘≥’) version. The ‘exactly’-version of *geen* (‘geen₌’) will then state that the maximal element of this set of degrees is not 20. ‘At least’ *geen* (‘geen_≥’) will state that this set does not contain 20.

What about zero cakes ($\#x = 0$)? Sentences like (18) are true in a situation when Nigella baked nothing. To make sure our analysis predicts that, we spell out our assumptions about the structure of the plural domain. Following (Landman, 2011; Bylinina and Nouwen, 2017) a.o., we assume the bottom element \perp is in the denotation of pluralised predicates *P . That is, the domain of entities contains atoms and pluralities, including the zero plurality, the entity with cardinality 0. In other words, the domains are as illustrated in figure 1, where the atoms are in bold.

This semantics for plurals ensures that both ‘geen₌ 20’ and ‘geen_≥ 20’ are compatible with the $\#x = 0$ alternative being true. (It also ensures that other downward entailing modified numerals are compatible with $\#x = 0$, which provides extra motivation for this particular setup. See Buccola and Spector (2016), Bylinina and Nouwen (2017) for discussion.)

Let’s now turn to split-scope environments, where *geen* is embedded under a modal. In such an environment, the split scope reading is derived by *geen 20* QR-ing over the modal verb in a straightforward way:

²Note that the $\langle e, t \rangle$ arguments of MANY are pluralised. The syntactic details of this are beyond the immediate scope of this paper, but we believe the differences between DPs like *one book* and *two books* do not reside in the semantics of the numeral or the silent MANY; although *book* and *books* here will have different meanings for us, as soon as they are fed as arguments to MANY these differences are gotten rid of, as pluralization is applied to both (vacuously to the latter, non-vacuously to the former).

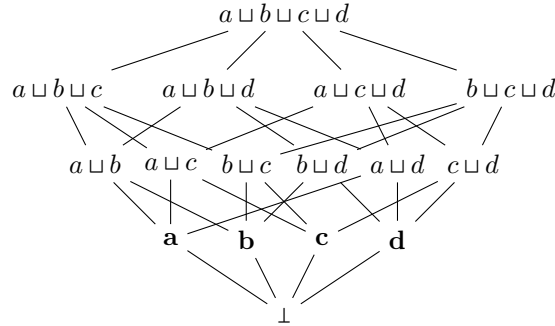


Figure 1: The domain of entities

- (26) Nigella hoeft **geen** 20 taarten te bakken.
 Nigella must-NPI GEEN 20 cakes to bake
 ‘Nigella doesn’t have to bake 20 cakes.’
- (27) $\llbracket \text{Nigella must bake geen}_= 20 \text{ MANY cakes} \rrbracket =$
 $\llbracket \text{geen}_= 20 \rrbracket (\lambda n. \Box \exists x [\text{*bake}(\mathbf{N}, x) \ \& \ \text{*cake}(x) \ \& \ \#x = n]) =$
 $\neg \max\{n \mid \Box \exists x [\text{*bake}(\mathbf{N}, x) \ \& \ \text{*cake}(x) \ \& \ \#x = n]\} = 20$
- (28) $\llbracket \text{Nigella must bake geen}_\geq 20 \text{ MANY cakes} \rrbracket =$
 $\llbracket \text{geen}_\geq 20 \rrbracket (\lambda n. \Box \exists x [\text{*bake}(\mathbf{N}, x) \ \& \ \text{*cake}(x) \ \& \ \#x = n]) =$
 $\neg \Box \exists x [\text{*bake}(\mathbf{N}, x) \ \& \ \text{*cake}(x) \ \& \ \#x = 20]$

The resulting readings are variants of the split-scope reading: it’s not the case that Nigella has to bake 20 cakes. The versions differ in that with ‘geen₌’, the requirement can be any number other than 20 – higher or lower; with ‘geen_≥’, the requirement is lower than 20. These are indeed the readings available for (26).

3.2 Bare *geen*

We propose that occurrences of *geen* that are not followed by a numeral, as in (29), are derived from the numeral modifier *geen* by semantically incorporating the numeral ‘one’ (Dutch: *één*). As before, *geen* gives rise to a split scope reading via degree quantifier movement above the modal verb. The split reading is achieved with an ‘at least’ semantics of *geen* incorporating ‘one’:

- (29) Je hoeft **geen** stropdas te dragen.
 You must-NPI GEEN tie to wear.
 ‘You do not have to wear a tie.’
- (30) $\llbracket \text{geen}_\geq^1 \rrbracket = \lambda P_{\langle dt \rangle}. \neg P(1)$
- (31) $\llbracket \text{You must wear geen tie} \rrbracket =$
 $\llbracket \text{geen}_\geq^1 \rrbracket (\lambda n. \Box \exists x [\text{*wear}(\mathbf{u}, x) \ \& \ \text{*tie}(x) \ \& \ \#x = n])$
 $= \neg \Box \exists x [\text{*wear}(\mathbf{u}, x) \ \& \ \text{*tie}(x) \ \& \ \#x = 1]$

(31) expresses the lack of obligation to wear a tie, as desired. Potentially, we could have the second version of *geen* with incorporated ‘one’, parallel to the prenumeral ‘geen₌’:

- (32) $\llbracket \text{geen}_=^1 \rrbracket = \lambda P_{\langle dt \rangle}. \max\{m \mid P(m)\} \neq 1$

However, bare *geen* only has the ‘at least’ reading – that is, (29) only has (31) as a reading. Using (32) in (31) would amount to the lack of obligation to wear exactly one tie. This reading is not attested. Similarly, ‘I have **geen** book(s)’ with (32) would be a statement that is true in a situation where I have no books or two books, or three books, etc.

We believe there is a very specific reason why bare *geen* does not express the quantificational concept in (32). The reason is that ‘geen₌¹’ denotes a discontinuous fragment of the quantity scale: the complement of 1. This meaning, we suggest, has a disadvantage on a lexicalization path. In particular, we appeal to convexity, or connectedness, of lexical meanings to rule out this lexical entry (cf. Gärdenfors 2004; Jäger 2010; Zwarts and Gärdenfors 2016). A recent version of this idea, due to Chemla (2017), is that whenever the domain of the denotation of a word can be seen as ordered, supporting an in-between relation, it has no gaps. Using Chemla’s term, denotations of words are *connected*. A somewhat simplified version of this constraint says that for any three objects o_1 , o_2 and o^* , if the latter is in between the first two, and o_1 and o_2 belong to the denotation of the word, then o^* also belongs to the denotation of the word. The connectedness constraint rules out the possibility of there being a quantifier meaning ‘less than 5 or more than 10’. Similarly, one can see this constraint as ruling out ‘geen₌¹’: it has an ordered domain of intervals on the quantity scale (although see Section 4). Closed intervals $[0, 0]$ and $[0, 2]$ have the interval $[0, 1]$ in between (this being a consequence of 1 being in between 0 and 2). ‘Geen₌¹’ assigns ‘True’ to $[0, 0]$ and $[0, 2]$ but not to $[0, 1]$, therefore, we take ‘geen₌¹’ to have a gapped denotation in the sense described above, and it is therefore predicted to have a lexicalization disadvantage.

An indirect indication of this restriction comes from *geen* in combination with overt numeral ‘one’: *geen één* (‘**geen** one’). With normal prosody, this combination does get the discontinuous interpretation that is unavailable for bare *geen*. However, when ‘one’ is deaccented and forms a prosodic unit with *geen*, the ‘exactly’-interpretation becomes unavailable. This suggests that the lexicalization process indeed avoids gapped denotations, and ‘geen₌¹’ might be one of them.

(33) Ze heeft geen één boek gelezen, maar twee.
 She has GEEN one book read but two
 ‘She didn’t read one book, she read two’.

(34) Ze heeft geen-één boek gelezen, #maar twee.
 She has GEEN-one book read but two
 ‘She didn’t read one book, she read two’.

4 Extensions

Other uses of *geen* / *kein* — Extensions of our analysis cover two further uses of *geen* / *kein*: i) combinations with mass nouns like in (35); ii) seemingly non-quantificational cases like (36) (both examples from Dutch):

(35) Nigella heeft geen soep gemaakt.
 N. has no soup made.
 ‘Nigella didn’t make soup’

(36) Hij is geen genie
 He is GEEN genius
 ‘He is not a genius’

We analyze both cases by moving from a discrete cardinality scale as the domain of *geen* to a

dense scale. Both examples above involve instances of ‘ geen_{\geq}^1 ’, but in the case of combinations with mass nouns, ‘ geen_{\geq}^1 ’ makes reference not to number ‘1’ but rather to its correlate on a dense scale – the lowest non-zero degree on the dense quantity scale (1 being its correlate on the discrete quantity scale). (35) then states the lack of such non-zero degree that would make the statement ‘Nigella made that much soup’ true.

In the case of (36), the domain of ‘ geen_{\geq}^1 ’ is again a dense domain, but not a numeric one – instead, it consists of degrees of genius. Non-numeric ‘ geen_{\geq}^1 ’ negates that the lowest non-zero degree on the relevant scale holds of the subject. Crucially, like the cases discussed above, such non-quantificational negative indefinites split in Dutch/German, but not in English.

(37) Jan hoeft geen genie te zijn.

Jan needs no genius to be.

‘Jan doesn’t need to be a genius.’

(38) Jan has to be no genius. (no split reading)

We conclude that the meaning of *geen* / *kein* is more general than the discreet cardinality meaning that we developed in Section 3 to cover the basic readings. However, the corresponding extensions are relatively straightforward, as formulated above.

Focus sensitivity — The present account makes similar predictions to the theory of split scope in Blok (2018). Blok argues that the unlimited ability to give rise to split scope readings is a property of focus-sensitive operators. Split readings arise when these operators move over another scope-bearing element, leaving behind their DP complement. Crosslinguistic data provide evidence for what we might call the *focus sensitivity generalization*: whenever an expression is focus-sensitive, it will give rise to split scope readings across the board. This includes expressions we consider degree expressions in this paper: *at least*, *at most*, and negative indefinites in Dutch, German, Frisian, and Icelandic. It excludes negative indefinites in English, Swedish, Danish, and Norwegian. Thus, the empirical picture that ensues is very similar. In addition, the numeral modifier generalisation mentioned in section 2.4 of this paper can be subsumed by the focus-sensitivity generalization. As mentioned there, there is a correlation between the ability to modify numerals and the unlimited ability to create split readings. Blok argues that focus-sensitivity is at the root of this correlation: focus-sensitive expressions yield split readings and are also known for their ability to modify a wide range of different types of expressions, including numerals. One area where the present account differs from Blok (2018) is in the predictions regarding comparative numeral modifiers such as *fewer than* and the Heim-Kennedy generalization. See Blok (2018) for a discussion of these matters and for reasons why the predictions of the two accounts may actually not be as different as they seem.

5 Discussion

We argued that split scope as observed with *geen*-type indefinites is essentially a degree phenomenon. Our analysis of *geen* makes it a degree quantifier, therefore split scope items form a natural class – degree quantifiers. English *no* is not a degree quantifier, as seen in its inability to combine with numerals – unlike *geen*. The mechanism of split scope is that of degree quantifier raising.

We believe that this analysis has an advantage over other existing analyses of split scope with *geen*-type expressions, none of which systematically account for the discrepancy between *geen* and degree quantifiers on the one hand and *no* on the other hand. Existing analyses of split scope can be divided into a class of decompositional analyses and a class of higher-

type analyses. The former treat *geen* as semantically and/or syntactically complex, multiple components being spelled out as one word (Rullmann, 1995), or, alternatively, as a positive indefinite that needs to be licensed by sentential negation (Penka and Zeijlstra, 2005; Penka, 2011). Higher-type analyses come in two flavours: quantification over properties (de Swart, 2000) and quantification over choice functions (Abels and Martí, 2010). According to the former, split scope readings arise when a negative DP QRs, and then a type lifting operation takes place, so that the quantifier quantifies over properties rather than over individuals. According to the latter, natural language determiners are uniformly quantifiers over choice functions. In the case of split scope, after the negative DP QRs, selective deletion takes place: in *no tie*, *tie* is deleted upstairs and *no* is deleted downstairs. Under all of these views, parallels between *geen*-type indefinites come as a mere coincidence, and the difference between *geen* and *no* remains unaccounted for – unlike under the view we propose here.

This said, there are two issues that we have left open. First of all, we have not said anything about cases when split readings of *geen* occur with quantifiers over individuals under hat contour, breaking the Heim-Kennedy generalization, as in (39) from German.³ We do not have an analysis of such cases and leave them for future work.

- (39) /JEDER Arzt hat KEIN\ Auto
 every doctor has no car
 ‘Not every doctor has a car’

Similarly, we do not give an analysis of cases when English *no* does give rise to split scope, as was the case for (4), repeated here as (40).

- (40) The company need fire **no** employees. ¬ > □ > ∃
 ‘It is not the case that the co. is obligated to fire an employee.’

All we say about these examples is that the mechanism must be different from what we suggest for *geen* and other degree quantifiers.

Rather ironically, our analysis suggests then that the *true* split scope puzzle is found not in languages like Dutch or German, where split scope examples involve a rather humdrum form of degree quantifier raising, but rather in languages like English, where in a very restricted set of contexts non-degree negative indefinites appear to split their scope.

References

- Abels, K. and L. Martí (2010). A unified approach to split scope. *Natural language semantics* 18, 435–470.
- Blok, D. (2018). Doctoral dissertation, Utrecht University (expected).
- Buccola, B. and B. Spector (2016). Modified numerals and maximality. *Linguistics and Philosophy* 39(3), 151–199.
- Bylinina, L. and R. Nouwen (2017). On ‘zero’. SALT 27.
- Chemla, E. (2017). Connecting content and logical words. <http://semanticsarchive.net/Archive/WVhYzUwM/Chemla-ConnectWords.pdf>.

³In fact, de Swart (2000) takes such examples to indicate that scope splitting is not a phenomenon restricted to intensional operators. Note, however, that examples like (i) do not generalise to other nominal quantifiers, like for instance *most*.

- de Swart, H. (2000). Scope ambiguities with negative quantifiers. In K. von Stechow and U. Egli (Eds.), *Reference and anaphoric relations*, pp. 109–132. Dordrecht: Kluwer.
- Gärdenfors, P. (2004). *Conceptual spaces: The geometry of thought*. MIT press.
- Geurts, B. (1996). On ‘no’. *Journal of Semantics* 13, 67–86.
- Hackl, M. (2000). *Comparative quantifiers*. Ph. D. thesis, MIT.
- Heim, I. (2000). Degree operators and scope. In *Proceedings of SALT 10*, Ithaca, NY. CLC Publications.
- Iatridou, S. and I. Sichel (2011). Negative DPs, A-movement, and scope diminishment. *Linguistic Inquiry* 42, 595–629.
- Jacobs, J. (1980). Lexical decomposition in Montague Grammar. *Theoretical linguistics* 7, 121–136.
- Jäger, G. (2010). Natural color categories are convex sets. In *Logic, language and meaning*, pp. 11–20. Springer.
- Kennedy, C. (1997). *Projecting the adjective*. Ph. D. thesis, UCSC.
- Kennedy, C. (2015). A de-Fregean semantics (and neo-Gricean pragmatics) for modified and unmodified numerals. *Semantics and Pragmatics* 8(10), 1–44.
- Kennedy, C. and P. Alrenga (2014). No more shall we part: Quantifiers in English comparatives. *Natural language semantics* 22(1), 1–53.
- Kratzer, A. (1995). Scope or pseudoscope? Are there wide-scope indefinites? Ms., University of Massachusetts, Amherst.
- Landman, F. (2011). Boolean pragmatics. Ms.
- Nouwen, R. (2008). Upper-bounded *no more*: the implicatures of negative comparison. *Natural Language Semantics* 16(4), 271–295.
- Nouwen, R. (2010). Two kinds of modified numerals. *Semantics and Pragmatics* 3(3), 1–41.
- Nouwen, R. and J. Dotlačil (2017). The scope of nominal quantifiers in comparative clauses. To appear in *Semantics & Pragmatics*.
- Penka, D. (2011). *Negative indefinites*. Oxford, UK: Oxford University Press.
- Penka, D. and H. Zeijlstra (2005). Negative indefinites in Dutch and German. Ms., University of Tuebingen.
- Potts, C. (2000). When even ‘no’s Neg is splitsville. In S. Chung, J. McCloskey, and N. Sanders (Eds.), *Jorge Hankamer webfest*. Santa Cruz, CA: Linguistics Research Center.
- Rullmann, H. (1995). Geen eenheid. *Tabu* 25, 194–197.
- von Stechow, K. and S. Iatridou (2007). Anatomy of a modal construction. *Linguistic Inquiry* 38, 445–483.
- Zwarts, J. and P. Gärdenfors (2016). Locative and directional prepositions in conceptual spaces: The role of polar convexity. *Journal of Logic, Language and Information* 25(1), 109–138.