German negative indefinites and split scope: a movement approach

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Abstract. German negative indefinites like *kein* 'no' are known to give rise to split scope readings across intensional verbs like *müssen* 'must'. We propose a novel analysis of this phenomenon with two main, independently justified, ingredients: quantification over choice functions (following Sauerland 1998, 2004), and the idea that existential low scope can be simulated via binding (following Kratzer 1998). One important empirical argument for this approach is that our analysis puts together the split scope readings of negative indefinites with those of comparative quantifiers, analyzed as involving movement in Heim (2001) and Hackl (2001). We show that split scope with the two types of quantifiers goes hand in hand in a striking number of cases. We also argue that split scope of negative indefinites across intensional verbs must be a different phenomenon from the split scope that these indefinites give rise to across universal quantifiers.

1   Introduction

It is well-known that German negative indefinites, i.e., words like *kein* 'no', *nichts* 'nothing' or *niemand* 'nobody', give rise to split scope readings in certain contexts, such as that exemplified in (1):

(1) Zu dieser Feier musst   du   keine   Krawatte anziehen
     to   this   party must   you no.fem   tie   wear
     'To this party you don't have to wear a tie'

A sentence like (1) prominently has a reading in which the negative component that one would associate with *kein* seems to scope above the modal verb *müssen*, while the existential component seems to scope below the modal. This is what we and our predecessors (see Bech 1955/57, Geurts 1996, Jacobs 1980, Penka 2007, Rullman 1995, de Swart 2000, a.o.) call a *split scope reading*—a reading in which the negative indefinite is *split* in two by the modal verb.

Sentences such as (1) can, in principle, also give rise to other readings: a wide scope reading in which the negative indefinite as a whole scopes above the modal verb, and a narrow scope reading as well. Depending on independent properties of the modal verb in question, these additional readings may or may not

be (easily) available[1]. We will in general put aside discussion of these readings, though we do come back to them where this is relevant. It is important to realize, nevertheless, that the split scope reading that we try to account for here is indeed independent of the wide and narrow scope readings and thus cannot be derived from them (see Penka 2007: 89-90 for details). Split scope readings tend to be very prominent in German[2].

Further examples of the phenomenon are in (2)-(5):

(2) Bei der   Prüfung   braucht   kein Professor anwesend   zu sein
     at   the   exam   need   no   professor present   to be
     'At the exam it is not necessary that there be a professor present'

(3)   Während der Untersuchung kann   niemand   im   Raum sein
      during   the examination can   nobody   in.the room be
      'During the examination it's not possible for anybody to be in the room'

(4)   Vor   einer Operation   muss man   nichts essen
      before a   operation   must one   nothing   eat
      'Before an operation it is not necessary to eat anything'

(5)   Moslems   dürfen kein   Schweinefleisch   essen
      Muslims   may   no   pork   eat
      'Muslims are not allowed to eat pork'

Following Penka (2207: 91), we exemplify with *kein*. The split scope reading of sentences containing *kein* and an explicit nominal is easier to isolate than with other negative indefinites such as *nichts* or *niemand*, where the restriction boils down to 'thing' and 'person'. In the latter case it is very hard to distinguish *de dicto* from *de re* readings.

We argue in this paper that split scope readings such as those exemplified above result from two basic mechanisms, both of which have been argued for independently in the literature. First, we assume, together with Sauerland (1998, 2004), that quantificational determiners in natural language (i.e., words like *every*, *two*, *most*, *no*, etc. and their correspondents in different languages) are quantifiers over choice functions, instead of quantifiers over individuals as standardly assumed[3]. This means that when quantificational noun phrases undergo QR, they leave a trace of type <et,e> behind (the type of a choice function variable).

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[1] In (2) below, for example, the narrow scope reading is unavailable because in that reading the NPI requirement of *brauchen* 'need' is not satisfied.

[2] See section 3.2.1 for discussion of split scope in other languages.

[3] Interestingly, Sauerland (2000) argues that negative determiners like *no* are not quantifiers, and for split scope readings he advocates a lexical decompositional account (following Jacobs 1980 and Rullman 1995). However, that split scope readings can be generated the way we do below invalidates one of the crucial empirical arguments in Sauerland (2000). As for his proof that negative existential quantifiers are not definable in terms of quantification over choice functions, a crucial assumption in the proof is the availability of scope construals that we argue on independent grounds are not available (see section 3.1.1 below on Kennedy's Generalization). Thus, we assume that negative determiners are also quantifiers over choice functions.

Sauerland justifies his proposal on the basis of intricate data on Antecedent Contained Deletion (ACD), which we briefly review below. The second ingredient is pseudoscope, as in Kratzer (1998). Kratzer argues that certain cases of indefinite scope should not be analyzed as involving movement but a bound variable. In her case, that variable is a pronoun. In our case, the variable is a world variable, the one standardly associated with common nouns such as *Krawatte* 'tie'. Because these two ingredients are independently justified, we argue that our analysis of split scope comes for free.

We discuss the details of this analysis in section 2. In that section we also discuss two additional issues. First, there is the issue of conservativity of natural language quantificational determiners. We offer a formal proof that this property of natural language quantification follows without further assumption in Sauerland's system, which we take to be an argument for his proposal (and therefore ours). The second issue is the issue of generalized split scope: if all natural language quantifiers are quantifiers over choice functions, and if that is a key ingredient of split scope, shouldn't split scope readings be available for quantifiers such as *most* or *two*? We show that, while this reasoning is correct, its consequences are harmless, since the split scope readings we predict for these other quantifiers are equivalent to their narrow scope, *de dicto* readings.

Section 3 provides an extended empirical argument for our position. It concerns the fact that in our approach, it follows naturally that the split scope readings of negative indefinites should pattern together with the split scope readings of comparative quantifiers. Heim (2001) and Hackl (2001) show that comparative quantifiers also give rise to split scope. They account for these cases by appealing to the existence of a quantifier over degrees that is morphologically a part of the comparative quantifier. Our analysis and their analysis are similar enough to warrant the prediction that the two kinds of split scope should pattern the same way. We show that they do: they are subject to the same kinds of constraints (e.g., in terms of the verbs that allow these readings, and in terms of the conditions in which they are blocked). We compare the predictions of our approach with those made by other approaches.

At the end of section 3 we also discuss split scope readings of negative indefinites across universal quantifiers. It is commonly assumed that the kind of split scope that obtains for negative indefinites in this and intensional contexts is the same phenomenon. Our approach predicts that split scope should not be available across universal quantifiers, but we argue that this is not a problem for us because the two cases should be considered separately.

Section 4 is the conclusion. We briefly mention two main issues here. One is the issue of decomposition. Split scope readings have been taken by some to be evidence that one must decompose negative indefinite determiners (e.g. *kein* as *k+ein*), but, if we are right, this doesn't necessarily follow anymore. The other issue is negative concord. Penka (2007) argues that negative concord and double negation languages represent two sides of the same coin, but, again, if we are right, this is not so.
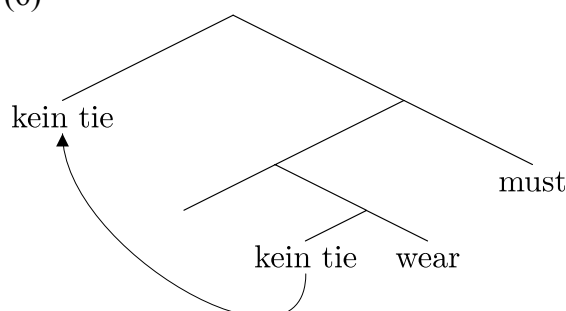
2   Analysis and formal justification

2.1   Generating split scope readings

We propose that quantifier phrases headed by *kein* and other negative indefinites undergo QR and that they leave a copy in the trace position of movement,
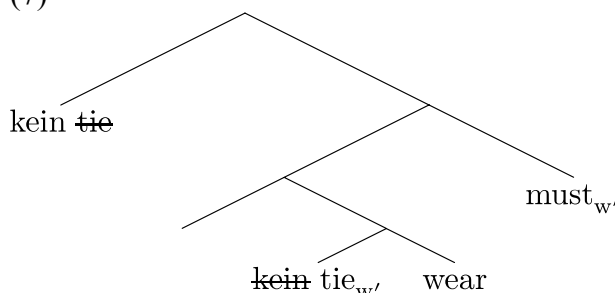
following the Copy Theory of movement, as shown in (6) (most words in trees are translated into English for ease of reference)[4]:

(6)

In a second step, selective deletion applies and deletes the higher copy of the noun and the lower copy of the quantified determiner, as shown in (7). In this tree we also indicate the binding of the world index of the noun by the intensional verb:

(7)

The next issue is how the structure in (7) is interpreted. We need several ingredients—the meaning we assume for *kein* is in (8), and the meaning for the modal verb is in (9):[5]

(8) $[[\mathbf{kein}]]^{W} = \lambda R_{<<et, e>, t>}.\neg \exists f\, CF(f)\ \&\ R(f) = 1$

(9) $[[\mathbf{must}]]^{W} = \lambda p_{<st>}.\forall w'Rw \rightarrow p(w') = 1$

(9) is standard: intensional verbs are quantifiers over possible worlds. In this view, necessity modals are universal quantifiers over possible worlds, and possibility modals are existential quantifiers over possible worlds. So, for example, if it is true that you don't have to wear a tie, in some worlds you wear no tie though there may be worlds where you do.

It is well-known that it is necessary to restrict this quantification and we assume the usual constraints on the possible worlds that count in (9), but we don't make that explicit here because it is independent of the phenomenon we are interested in ('xRy' in (9) stands for 'x is related to y in the appropriate way') (for some basic discussion, see Kratzer 1991). (8) says that *kein* takes a set of choice functions and gives back a truth-value. Here is the definition of choice functions

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[4] We remain agnostic as to the treatment of subjects here—whether they raise to Spec,IP or equivalent positions, whether there is a null PRO in subject position in these structures, etc.

[5] We assume Heim and Kratzer's (1998) rule of Intensional Functional Application and the ensuing intensional system, to keep types maximally simple—we don't think choosing otherwise has consequences for our main points.

from Sauerland (1998); choice functions take sets of individuals and return a member of the set:

(10) $f_{<<et>, e>}$ is a choice function iff $\forall P_{<et>} \in$ domain(f), P(f (P)) = 1

In the trace position, the quantifier leaves a choice function variable that takes a property, denoted by the common noun, as its argument. The interpretation of *tie* in our example, $[[\mathbf{tie}]]^w$, is the set of objects that are ties in w. It is because *kein* is interpreted higher than the intensional verb that we will obtain the result that negation outscopes the intensional verb in the split scope reading. We assume, following standard practice, that common noun denotations are indexed to a world. This index can be bound by intensional operators. It is because of this binding that we obtain the impression that there is existential quantification below the intensional verb (for more on this, see section 2.2.2). This is, in effect, just another way of saying that the split scope reading is a *de dicto* reading.

We obtain the truth-conditions in (12) for our original sentence in (1), repeated here, where '@' stands, as usual, for the actual world:

(11)   Zu   dieser Feier musst   du   keine   Krawatte anziehen
       to   this   party must   you   no.fem   tie   wear
       'To this party you don't have to wear a tie'

(12) $[[\mathbf{(11)}]]^{@} = 1$ iff $\neg\exists f$ CF(f) & $\forall$w'R@, you wear f(tie$_{w'}$) in w'

In words: the sentence is predicted to be true if and only if there is no choice function that in all relevant worlds picks a tie from those worlds that you wear in those worlds. So you don't wear a tie in every world, which is precisely what the split scope reading suggests. To see this, let us go through the tables below, where we also point out a technical problem with our approach ('✘' stands for a tie that is picked by a choice function but is not worn, and '...' indicates that the state of affairs in a particular world with respect to what the choice function picks, or with respect to whether a tie is worn, is irrelevant)[6]. Table I specifies things in such a way that we predict (11) to be true:

	W1	W2	W3	W4	W5	W$_n$
f_1	t1	t2	t3	t4	✘	...
f_2	t1	✘	✘	✘	✘	...
f_3	✘	t2	✘	✘	✘	...
f_4	✘	✘	t3	✘	✘	...
f_5	✘	✘	✘	t4	✘	...
f_m	...	...	...	...	✘	...

Table I: (11) is true and predicted to be true

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[6] Sauerland (1998: 255) excludes consideration of choice functions that are not pointwise different from each other in order to deal with problems that arise with numeral quantifiers. Two choice functions f and g are pointwise different iff $\forall x\in$ domain(f)$\cap$domain(g): f(x) $\neq$ g(x). This would in effect preclude us from considering some of the choice functions in Tables I and II. However, we show in section 2.2.3 below that it is not necessary to appeal to pointwise different choice functions in order to address the problems that arise with numeral quantifiers. Thus, we ignore this restriction here.

In this table, there is no choice function that in every world[7] picks a tie that you wear. W5 is a world that prevents the existence of such a choice function. Thus, (12) is true. The split scope reading of (11) is true as well, since for (11) to be true, there must be worlds in which you wear a tie and worlds in which you don't—that is how it comes about that you don't have to wear a tie.

In Table II, on the other hand, you wear a tie in every world:

	W1	W2	W3	W4	W5	W_n
f_1	t1	t2	t3	t4	t5	t_n
f_2	t1	✖	✖	✖	✖	...
f_3	✖	t2	✖	✖	✖	...
f_4	✖	✖	t3	✖	✖	...
f_5	✖	✖	✖	t4	✖	...
f_6	✖	✖	✖	✖	t5	...
f_m	...	...	...	...	...	...

Table II: (11) is false and predicted to be false

This makes (11) false. (12) is also false: you *can* find at least one choice function, namely, f_1, that in every relevant world picks a tie that you wear. Notice that, if (12) is false, (11) cannot be true: as soon as there is a choice function that in every relevant world gives you a tie that you wear, you wear a tie in every relevant world, and (11) is false.

Finally, table III is our problematic case:

	W1	W2	W_n
f_1	{t1,t2}→t1	✖ {t1,t2}→t1	...
f_2	✖ {t1,t2}→t2	{t1,t2}→t2	...
f_m	...	...	...

Table III: (11) is false but predicted to be true

The problem has been pointed out for choice functions before (see Winter 1997, Geurts 2000) and it arises as follows: if the set of ties is exactly the same in two worlds w_1 and w_2, then for all choice functions f, $f(tie_{w1}) = f(tie_{w2})$. As shown in the table, assume that you are wearing a tie in both worlds and that the tie worn in w_1 is different from that worn in w_2, a plausible assumption. That is, even though f_1, for example, picks t1 in the worlds under consideration, the tie it picks for w_2 is not actually worn in that world—this ensures that neither f_1 nor f_2 are functions that satisfy (12). There are no other functions different from f_1 and f_2 to consider. (12) is true: you cannot find a choice function that in every relevant world picks a tie that you wear. But (11) may be false, since what we just said is compatible with wearing a tie in every relevant world. The crucial ingredient here is that the set of ties is exactly the same in the two worlds—if that were not the case, then we could entertain at least one additional choice function f_3 that would be different from both f_1 and f_2 and that, in every world, would pick a tie that you wear, making (12) false.

Different solutions to the problem have been entertained in the literature

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[7] I.e., every *relevant* world, as discussed above. But we drop this restriction from now on.

(e.g., adding one more parameter of variation would ensure that the set of ties in any two worlds can never be the same—see Kratzer's 1998 parametrized choice functions), but we don't choose among them here because we believe that our account is unaffected by this choice.[8]

Thus, split scope readings can be generated by appealing to quantification over choice functions, coupled with the idea that the world index of common nouns can be bound by intensional operators. In the next subsection, we justify the use of these tools, in part by showing what independent motivation there is for them.

2.2   Independent justification of formal tools

2.2.1 ACD, conservativity and Sauerland (1998, 2004)

First we go through an empirical argument from Sauerland's work for the position that, in A'-chains, such as those generated by QR, the restriction of the quantifier must sometimes be represented and interpreted in the trace position. This is a crucial ingredient of our analysis. Sauerland's argument is based on examples concerning ACD, exemplified in (13) through (16) and based on well-known examples from Kennedy (1994):

(13) I talked to a bachelor who looked like the one/bachelor you did ~~talk to~~
(14) *I talked to a bachelor who looked like the woman you did ~~talk to~~
(15) Polly visited every town that's near the one/town Eric did ~~visit~~
(16) *Polly visited every town that's near the lake Eric did ~~visit~~

Whereas (13) and (15) are grammatical, (14) and (16) are not. The contrast suggests that what is left behind in the trace position of QR matters for the resolution of VP-ellipsis, a process involved in ACD. A rough approximation to the LF of (13) is shown in (17):

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[8] Other problems and issues with the use of choice functions have been identified in the literature—see Endriss (2009, section 4.7) for a recent summary and further references. We accept the problem discussed in the text as ours, but notice that other problems have to do with the fact that choice functions are used to account for the exceptional wide scope of indefinites (i.e., for their scope outside of syntactic islands). For example, there is the issue of intermediate scope readings, and the contexts in which they are (not) available—certain choice function approaches erroneously predict such readings to be always available (e.g., Reinhart's 1997 and Winter's 1997). Such issues do not affect us. We remain agnostic as to what the best treatment of the exceptional wide scope of indefinites is (see Endriss 2009 for a recent proposal and further references), and note that a non-choice-function approach to it is compatible with our proposal in this paper.

(17)

a bachelor who looked like the one/bachelor you did ~~talk to f(bachelor)~~
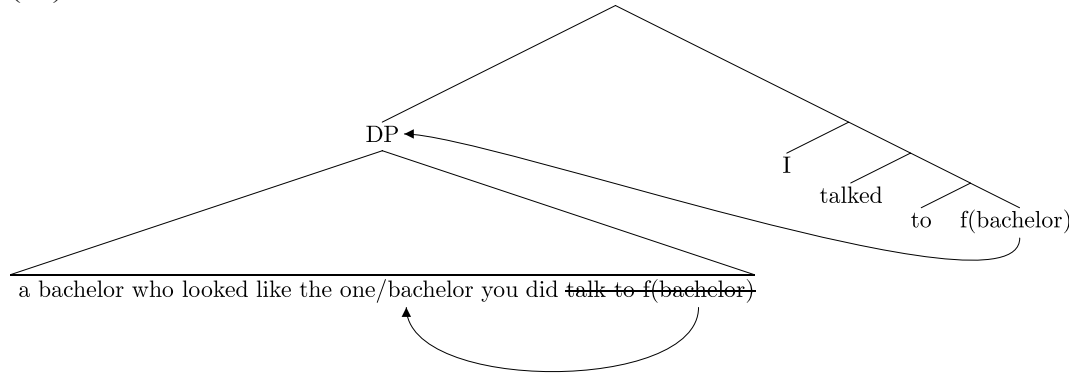
Recall that, in this system, natural language quantified determiners quantify over choice functions. In the derivation of the LF in (17), there is first QR of the quantificational object of main-clause *talk to*. In Sauerland's system, as we saw, this movement leaves behind a copy of the moved phrase and, after selective deletion, we obtain an interpretation in terms of a choice function variable and the argument of that function, provided by the common noun *bachelor*[9]. Within *who looked like the one/bachelor you did*, there is another relevant instance of A'-movement, which affects the lower relative clause *you did*. This movement proceeds as before and leaves behind a copy that is interpreted in terms of a choice function variable together with its argument *bachelor*. We are now ready for VP-ellipsis: the deleted VP is identical to its antecedent. Now, that *bachelor* in the trace position matters can be shown if we compare (13) to (14): if all that A'-movement left behind was a regular trace, there would be no way of distinguishing these two examples.

That the restriction of the quantified determiner is not only represented but interpreted in the trace position of movement is suggested by (18):

(18) I talked to a bachelor who looked like the guy you did ~~talk to~~

It seems that it is the semantic relation between *guy* (in the elliptical VP) and *bachelor* (in the antecedent) that licenses ACD —and thus VP-ellipsis— here. Without representing and interpreting the restriction of quantified determiners in positions other than the top of a movement chain, it would not be possible to make sense of the ACD data.

In addition to this empirical argument from Sauerland, we would like to offer a theoretical argument for the idea that natural language quantification (at least, nominal quantification) is over choice functions. The argument is that within this view, the conservativity of natural language quantified determiners follows as a theorem. We offer a formal proof here (for a related point, see Fox 2001).

To see this informally first, consider the semantics and the syntax of quantified phrases in this system ('D$_S$' stands for 'Sauerland determiner'):

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[9] Notice that this means that, for this LF, the relative clause *who looked like the one/bachelor you did* is deleted downstairs and interpreted upstairs. See Sauerland's work for more on this; he shows that there are cases in which even relative clauses are interpreted in the trace position, not just the common noun. In this system, the common noun *bachelor* can either be interpreted just downstairs, the option that we need for split scope, or both upstairs and downstairs.

(19) $[[D_S]] = \lambda R_{<<et,e>t>}$. D-many choice functions f are such that R(f)=1

(20)
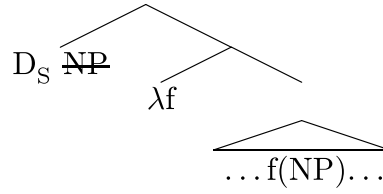
Recall that conservativity says that, in order to evaluate the truth of a quantificational statement, you only "look" at the set of individuals denoted by the NP-restriction; i.e., the NP-restriction is special. To see intuitively what is behind the formal proof below, notice that the argument of all determiner quantifiers in Sauerland's system is always a set of choice functions whose domains are NPs. This way of singling out the NP-restriction ensures that this restriction is special.

For the formal proof, we start out by giving the definition of conservativity for both generalized quantifiers, in (21), and quantifiers over choice functions, in (22):

(21) D is conservative iff for any sets A, B and C such that A∩B=C (i.e., C⊆A) and C≠B (i.e., B⊄A), D (A)(B) = D (A)(A∩B)=D (A)(C)

(22) D_S is conservative iff for any sets A, B and C such that A∩B=C (i.e., C⊆A) and C≠B (i.e., B⊄A), D_S {f: B(f(A))} = D_S {f: (A∩B)(f(A))}= D_S {f: C(f(A))}

Now we show that D_S {f: C(f(A))} follows from D_S {f: B(f(A))} (with A, B, and C as above):

(23) By definition of choice functions, for any choice of f, f(X) ∈ X. Thus, for any choice of f, B(f(A)) = (B∩A)(f(A)) = C(f(A))
By extensionality, D_S {f: B(f(A))} = D_S {f: (A∩B)(f(A))}= D_S {f: C(f(A))}
QED.

So, once you assume that quantified determiners quantify over choice functions, not individuals, conservativity follows as a theorem. Conservativity is one of the few known universal properties of quantified determiners. Sauerland's system explains this property, which we view as a major advantage.

2.2.2 Binding and Kratzer (1998)

Notice that once one adopts Sauerland's system, it is difficult to prevent higher quantificational operators from binding world indices, pronouns, etc. contained in the low copy of nominal restrictions. That is, once the common noun restriction of a quantified determiner is interpreted below the intensional verb, only an additional ad hoc stipulation can rule out this binding.

To the best of our knowledge, Kratzer (1998) was the first to notice that such binding relations can be used to simulate scope. Kratzer argues that certain cases of intermediate indefinite scope can be modeled using just such a bound variable. In these cases, there is no need to move the indefinite to give it scope, the scope of the indefinite is actually a case of *pseudoscope* that obtains because

there is a binding relation. To see this, consider the example in (24) (cf. Abusch 1994 and many others):

(24) [Every professor]$_i$ rewarded every student who read some book she$_i$ had reviewed for the New York Times

(24) has a reading in which the indefinite *some book she had reviewed for the NYT* seems to take scope in between the other two quantificational expressions ("for every professor x there is a book y x had reviewed for the NYT such that x rewarded every student who read y"). This intermediate scope reading is different from both the widest scope and the narrowest scope readings of the indefinite. In this reading, there is potentially a *different* book that each professor reviewed for the NYT, so it cannot be the widest scope reading. It cannot be the narrowest scope reading either: the reading is not about just any book each professor reviewed, but a particular one for each professor (e.g., the first book ever she reviewed for the NYT).

Kratzer notes that this reading is absent in the minimally different (25):

(25) Every professor rewarded every student who read some book I had reviewed for the New York Times

The difference between the two examples is that in (24) the indefinite noun phrase contains a bound variable (bound by *every professor*), whereas (25) contains no bound variable. Kratzer argues that this fact is key in understanding what is going on here. So she proposes that it is this binding that is responsible for the intermediate scope reading of (24), in a framework that uses choice functions to interpret indefinites. *Some book she$_i$ had reviewed* is interpreted as in (26), which results in a different output of the choice function for each professor, as desired:

(26) f(book she$_i$ had reviewed)

In our account of split scope, we bind world indices instead. To see intuitively how this helps, it is easier to consider an example without negation:

(27) You must wear a tie

We understand in (27) that the tie doesn't have to be the same tie in every world; the requirement in this sentence is about tie-wearing, not about the necessity to wear a particular tie (or, if this other, *de re* reading exists, it is not very salient). This is a *de dicto* reading that can be captured by assuming that the intensional verb binds the world index of *tie*. *A tie* is interpreted as in (28):

(28) f(tie$_{w'}$)

The output of the choice function differs from world to world, as desired.

2.2.3 Generalized split scope? Back to Sauerland (1998, 2004)

At this point, the attentive reader might ask whether we aren't erroneously predicting that *all* determiner quantifiers give rise to split scope readings. We are indeed making that prediction, but, as it turns out, the split scope readings we generate for most other determiner quantifiers are equivalent to readings that are

generated for them independently, namely, narrow scope *de dicto* readings. We show that here by considering *a*, *every*, *most* and simple numerals, with two kinds of intensional verbs. At the end of this subsection we briefly consider a problem that arises with *exactly* numerals.

Let's start by considering a[10]. In combination with a necessity modal, as in (29), the split scope reading is "there is a choice function f such that for all worlds w', you buy $f(tie_{w'})$ in w' ":

(29)   you must buy a tie

This is equivalent to the narrow scope *de dicto* reading of the indefinite: "for every world w' there is a tie in w' that you buy in w' ". To see this, consider a choice function f_1 that, in every world, outputs a tie that you buy. The existence of this choice function makes the split scope reading true. And, since you are buying a tie in every world, the narrow scope *de dicto* reading is also true. In combination with a possibility modal, as in (30), the split scope reading is "there is a choice function f and a world w' such that you buy $f(tie_{w'})$ in w' ":

(30)   you can buy a tie

This is true as long as we can find a choice function that, in at least one world, outputs a tie that you buy. If there is a world in which you buy a tie, then the narrow scope *de dicto* reading is also true ("there is a world w' in which you buy a tie in w' ").

For (31), the split scope reading is "all choice functions f and all worlds w' are such that you buy $f(tie_{w'})$ in w' ":

(31)   you must buy every tie

This is true when all choice functions output a tie that you buy in every world. If so, then you buy all ties in all worlds. This makes the narrow scope *de dicto* reading true ("for every world w' and every tie x in w', you buy x in w' "). For (32), the split scope reading is "for all choice functions f there is a world w' such that you buy $f(tie_{w'})$ in w' ":

(32)   you can buy every tie

This is true if each choice function, in at least one world, outputs a tie that you buy—that is, if you buy all the ties in at least one world. This makes the narrow scope *de dicto* reading true as well ("there is a world w' such that for all ties x in w', you buy x in w' "). If there were no world where all ties are bought, we could construct a choice function that falsifies the universal claim.

For *most* and numerals, we depart from the proposal in Sauerland (1998) and interpret both of them "low"[11]. This means that in these cases we don't

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[10] What we say here also applies to *which* and *some*, since both involve existential quantification, though *some* imposes additional restrictions of its own, and *which* is, of course, interrogative.

[11] For evidence that numerals are to be interpreted as adjectives or nouns that combine directly with the nominal restriction, i.e., low, see, among others, Reinhart (1997), Ionin and Matushansky (2004), and Zweig (2004).

"count" choice functions (e.g., more than half for *most*, or three for *three*); instead, we existentially quantify over them with the help of a null existential determiner quantifier[12]. We invite the reader to work out for herself what the readings and equivalences are in the case of *most*. It is more interesting to consider numerals here because, if numerals are interpreted low, certain problems pointed out in Sauerland (1998) don't arise anymore, and hence his proposed solution (in terms of pointwise different choice functions; see footnote 6) is not needed either. For (33), the split scope reading is "there is a choice function f such that in all worlds w', you buy $f(\{X: (ties_{w'}) (X) \& two (X)\})$ in w' ", where the variable 'X' ranges over sets of individuals[13]:

(33) you must buy two ties

This is true as long as there is at least one choice function that outputs a set of two ties per world and you buy the set of two ties in each world. If so, the narrow scope *de dicto* reading is also true: "for every world w' there is a set X of two ties in w' such that you buy X in w' ". For (34), the split scope reading is "there is a choice function f and a world w' such that you buy $f(\{X: (ties_{w'}) (X) \& two (X)\})$ in w' ":

(34) you can buy two ties

This is true as long as there is one choice function and one world such that the choice function outputs a set of two ties that you buy in that world. This also makes the narrow scope *de dicto* reading true: "there is a world w' and a set X of two ties such that you buy X in w' ", since there is a world in which you buy two ties.

If numerals "directly" quantifiy over choice functions, as in Sauerland (1998), then the truth conditions predicted, for example, for (34), are too weak. The reading Sauerland predicts here is "there are two choice functions f and a world w' such that you buy $f(tie_{w'})$ in w' ". This is true even if in reality there is only one tie you buy, because the tie two choice functions f and g pick can be the same in some worlds. To avoid this, Sauerland proposes to restrict quantification to choice functions that are sufficiently different from each other (i.e., they are pointwise different): when two choice functions output the same individual, they cannot both be part of the quantification (see footnote 6). The problem doesn't arise in our version of the story, so the restriction to pointwise different choice functions is not necessary.

Before finishing, we would like to point out that it is not clear how to treat *exactly* numerals. The truth conditions predicted for sentences such as (35) are either too weak (if *exactly* is interpreted low) or too strong (if it is interpreted high):

(35) you can buy exactly two ties

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[12] Notice that in this approach to numerals and *most*, conservativity still follows as a theorem (see section 2.2.1). This is because the argument of the determiner quantifier in these cases (a null existential) is *still* a set of choice functions whose domains are NPs.

[13] It is also possible to use plural individuals as opposed to sets of individuals to account for the plural here.

If *exactly* is interpreted low, then we obtain the following truth-conditions: "there is a choice function f and a world w' such that you buy a set of ties containing exactly two members in w' ". This can be true even if in that world you buy many more ties. If *exactly* is interpreted high, then we obtain: "there is exactly one choice function f and a world w' such that you buy a set of two ties in w' ", which can never be true, since there is surely more than one such choice function. Since *exactly* numerals are notoriously difficult to deal with in other approaches to quantification anyway, we think it is licit to leave this issue unresolved for the time being (for some brief comments, see Geurts 2006).

3 Empirical motivation and comparison to other analyses

We now turn to the empirical motivation behind our approach. The main argument we would like to develop here is based on a comparison between the behavior of the split scope of negative indefinites and the behavior of split scope of comparative quantifiers. Comparative quantifiers are known to give rise to split scope readings too (Heim 2001, Hackl 2001). We think, together with Heim and Hackl, that the analysis of comparative quantifiers involves the movement of a degree quantifier (which can, of course, scope above intensional verbs). In order to capture the similar behavior of negative indefinites and comparative quantifiers, a similar analysis must be entertained for both. Alternative analyses of negative indefinite split scope (most notably, those in Jacobs 1980, Penka 2007 and Rullman 1995) are too different to be able to capture the striking similarities, since they invoke very different processes (in Penka, for example, agreement of the negative indefinite with a null negation operator higher up in the clause).

While we do not provide an in-depth explanation for the restrictions we observe, we do offer a possible way of understanding and implementing them. We take it that pursuing further consequences is material for another paper. Notice that for our argument to go through, it is enough that negative indefinites and comparative quantifiers pattern alike. We take it to be the case that what unifies negative indefinites and comparative quantifiers is movement; that is, that, ultimately, it is properties of the movement involved that should be responsible for the patterns we observe.

3.1 Negative indefinites and comparative quantifiers

3.1.1 Kennedy's generalization

Kennedy (1997) argues that degree quantifiers can scope above (at least some) intensional verbs, but not above other scope-bearing items. For example, while a split scope reading is available in (36), it is unavailable in (37):

(36) Am MIT muss man   weniger   als   drei Bücher   veröffentlichen,
     At MIT must one   less   than three books   publish
     um   fest   angestellt zu   werden
     in.order   permanently   employed   to   be
     'At MIT one must publish less than three books in order to be employed permanently'

(37) (John is 4' tall). Ein   Mädchen   ist   weniger   groß
                       A   girl   is   less   tall
     'A girl is less tall (than that)'

The split scope reading of (36) says that the maximal number such that one publishes that many books and is hired permanently at MIT in all worlds is less than three, which is a sensible thing to say: the requirement is that, in order to be hired permanently, one publishes at least one book or two books (i.e., less than three books). The sentence also has other readings, thought these other readings are less plausible. For example, in the narrow scope reading, the requirement is actually that one *not* publish more than two books: that reading says that, in all worlds, the maximal number such that one publishes that many books and is hired permanently at MIT is less than three. (37), on the other hand, doesn't have a split scope reading: the sentence cannot be understood to mean that the maximum height such that some girl or other is tall to that height is less than 4'; that would be true when there is no girl that as tall as 4'. The sentence has a prominent narrow scope reading which says that there is a girl that is less than 4' tall.

Exactly the same restriction is observed in the case of negative indefinites. We have already seen many examples in which a split scope reading is available for a negative indefinite across an intensional verb. A split scope reading is not available in (38):

(38) Genau ein Arzt   hat kein   Auto
     exactly one doctor   has no   car
     'Exactly one doctor has no car'

(38) cannot be understood to say that there isn't exactly one doctor who has a car, which would be true in a situation in which two or more doctors have a car—this is the split scope reading. In this situation, (38) is false. A prominent reading of the sentence says that there is exactly one doctor who has no car—that is the narrow scope reading.

Not only scope-bearing DPs but also scope-bearing adverbs block split scope readings with both kinds of quantifiers. *Unbedingt* 'unconditionally' is one of them:

(39) ...weil   du   unbedingt   weniger   als   drei Krawatten
      because you   unconditionally less   than   three ties
     einpacken musst
     pack must
     '…because you are unconditionally required to pack less than three ties'

(40) ...weil du unbedingt keine Krawatte einpacken musst
     '…because you are unconditionally required to pack no tie'

Without the presence of *unbedingt*, *müssen* easily allows split scope readings. With *unbedingt* in (39) and (40), there are two potential split scope readings. Sticking to (40), these readings are, abstractly: (a) negation*>>unbedingt>>müssen* and (b) *unbedingt*>>negation*>>müssen*. For independent reasons, the (b) reading, however, is never available, not even in sentences with simple clausal negation. So that split scope reading we put aside. Concentrating now on the (a) reading, (40) does not allow it ("…because it is not the case that you are unconditionally

obliged to pack a tie"—you don't have to pack ties), though a narrow scope reading is allowed ("…because you are unconditionally required to pack no ties"—you have to not pack any ties). (39) patterns the same way: neither of the split scope readings is available, while the narrow scope reading is. (39) is an instance of Kennedy's generalization and, if we are correct, so is (40).

One might object at this point that things are not so straightforward, since a split scope reading seems to be available in (41), with the special intonation associated with the hat contour, as indicated:

(41) /JEDER   Arzt   hat KEIN\ Auto
      every   doctor   has no   car
      'Not every doctor has a car'

We postpone discussion of this kind of example until section 3.2. We argue there that there are reasons that suggest that examples such as (41) constitute a separate phenomenon from the one we have discussed so far.

3.1.2 The verbs

The verbs that allow split scope of negative indefinites are the same verbs that allow split scope of comparative quantifiers. And when the reading in question is absent with one, it is also absent with the other. Many verbs allow both negative indefinites and comparative quantifiers to take split scope, such as those we have already seen and in addition *brauchen* 'need', *anfangen* 'begin', *erlauben* 'allow', *wagen* 'dare' and possibly others. Here are some examples with *brauchen* 'need':

(42) Während   der Untersuchung   brauchen   weniger   als   drei
      during   the examination   need   less   than three
      Chirurgen im   Raum   zu sein
      surgeons in.the room   to be
      'During the examination, there need be less than three surgeons in the room'

(42) has a prominent reading in which the comparative quantifier *less than three surgeons* is split by the intensional verb *brauchen*, with a degree operator taking scope above the verb. This reading can be paraphrased as "...the maximal number of surgeons present in the room in all worlds is less than three". This means that, in all worlds, you find at least one or two (less than three) surgeons present. In some worlds, there may be many more; in other worlds, only one or two are present. If you look at all the worlds, what they have in common is that at least one or two surgeons are in the room. This is different from both a narrow and a wide scope reading of the quantifier. In the narrow scope reading, "in every world, the maximal number of surgeons present in the room is less than three", it must be the case that in no world are there more than two surgeons in the room. This reading is in fact not available in this particular example because *brauchen* is an NPI. And the wide scope reading is necessarily a *de re* reading, which the split reading need not be. Below, we put wide scope readings aside since they can always be told apart from split scope readings on the basis of the *de re*/*de dicto* distinction.

The split reading is available for *kein* across *brauchen* as well:

(43) Während der Untersuchung brauchen keine Chirurgen im Raum zu sein
      '...it's not necessary for surgeons to be in the room'

Here are examples with *erlauben* 'allow':

(44) Ich habe ihm weniger   als drei Bücher   zu   schreiben
      I   have him less   than three books   to   write
      erlaubt
      allowed
      'I allowed him to write less than three books'

The split reading of the comparative quantifier is: "the maximal number of books that I allowed him to write is less than three". I.e., I granted him permission to write a number of books which was less than three—according to what I said, he shouldn't write more than that. This is very different from the narrow scope reading, "I allowed him to write a maximum number of less than three books"—according that what I said, he had the option of writing less than three books, but this is compatible with him writing more books. For negative indefinites, we obtain:

(45) Ich habe ihm keine Bücher zu schreiben erlaubt
      'I didn't allow him to write books'

The split reading in (45) is different from the narrow scope reading in that, in the latter, I allowed him to do something, namely, write no books. But he could have ended up writing books, which is incompatible with the split reading.
      However, *beschließen* 'decide', *aufgeben* 'give up' or *sich weigern* 'refuse' allow neither comparative quantifiers nor negative indefinites to split their scope:

(46) Der   Richter   hat sich keine Geldstrafe   zu erlassen geweigert
      the   judge   has self no   fine   to levy   refused
      'The judge refused to levy no fine'

In the potential but unavailable split reading, the judge didn't refuse to levy a fine. He may not have agreed to one, but he also didn't refuse. This is different from the prominent narrow scope reading in which the judge did refuse to do something, namely, levy no fine—in the judge's opinion, the offense couldn't go without a fine. A similar situation obtains for comparative quantifiers:

(47) Der   Richter   hat sich   weniger   als   €3000 Geldstrafe
      the   judge   has self   less   than   €3000 fine
      zu   erlassen   geweigert
      to   levy   refused
      'The judge refused to levy less than a €3000 fine'

In the unavailable split scope reading, the maximal fine that the judge refused to levy is less than €3000. The judge rejected, for example, a fine of €2000 or less, because the offense was too serious, but he remained uncommitted about a €3000 fine. In the available narrow scope reading, the judge refused to levy less than €3000—i.e., less than €3000 was unacceptable.
      (48) and (50) illustrate for *beschließen* 'decide':

(48) Der Mann hat kein Buch über seine neue Idee zu schreiben
      the man has no book about his new idea to write
      beschlossen
      decided
      'The man decided to write no book about his new idea'

In the unavailable split scope reading, the man hasn't made a decision concerning the writing of a book about his new idea—in the end, he may or may not write books about it. In the available narrow scope reading, the man has, on the contrary, made a decision: to write no books about his new idea.

(49) Der Mann hat weniger als sieben Bücher zu schreiben
      the man has less than seven books to write
      beschlossen
      decided
      'The man has decided to write less than seven books'

In the unavailable split scope reading, "the maximal number such that the man decided to write that many books is less than seven", there is a number of books about which the man has made up his mind, and this number is less than seven. He remains uncommitted about higher numbers. In the available narrow scope reading, the man has made the decision to write less than seven books, so he *is* committed about numbers of books equal to or greater than seven.

    The availability of split scope appears to be roughly aligned with Wurmbrand's (2003) classification of restructuring predicates. Those predicates that are more strongly restructuring (i.e., her lexical restructuring verbs, those that allow non-focus scrambling, long passive, etc.) allow split scope more easily than those predicates that are less restructuring. In future research we hope to be able to demonstrate this correlation experimentally, but we would like to note now that this correlation can easily be understood in terms of movement, as a number of the restructuring properties themselves involve movement.

3.1.3 Extraposition

Interestingly, split scope readings of both negative indefinites and comparative quantifiers disappear if extraposition of the infinitival complement occurs. Compare (50) and (51) with (44) and (45), respectively:

(50) Ich habe ihm erlaubt [weniger als drei Bücher zu schreiben]
      I have him allowed less than three books to write
      'I allowed him to write less than three books'

(51) Ich habe ihm erlaubt [keine Bücher zu schreiben]
      'I allowed him to write no books'

The split scope reading in both of these examples is unavailable.

### 3.1.4 Understanding Kennedy's generalization

How are these restrictions to be understood? There are two parts to this question. First, how can we understand that different intensional verbs behave differently? Second, how can we understand that, while regular QR can occur across

quantificational DPs and adverbs, scope splitting cannot?

Our answer to the first question is that the locality of the movement seems to be aligned with non-focus scrambling in Wurmbrand's (2003) sense; while restructuring and modal verbs allow the movement, others do not or at least not readily. This aspect of the movement process we are proposing forms part of a known generalization. The extraposition pattern is easily understood along the same lines, since extraposed clauses are never restructured.

Our answer to the second question is that Kennedy's generalization can be understood in terms of relativized minimality. Suppose that the property triggering movement of a quantified DP can reside in the noun or in the determiner (N_F or D_F) and that this property is linked, in the case where it resides in the determiner, to quantification. Relativized minimality is the principle that elements that are part of the same abstract class cannot cross each other (see Rizzi 2001 for a review). Crossing is understood in terms of c-command; if some element c-commands another before movement operations take place, then it must also c-command it after movement. In the tree in (52), DP_2/AdvP/V c-command DP_1; DP_2/AdvP/V block the movement of DP_1 if the movement of DP_1 is triggered by a feature that belongs to the same class as the features of DP_2/AdvP/V:

(52)
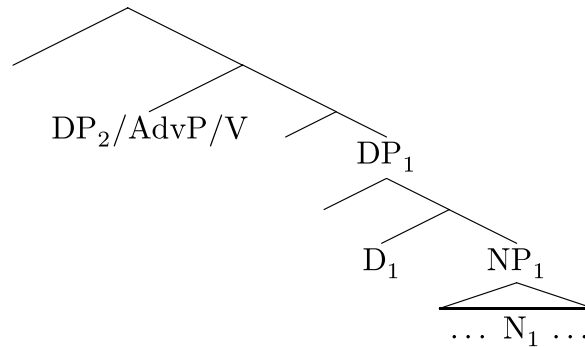
Material that does not trigger the movement but is only pied-piped is usually assumed to be irrelevant to the application of relativized minimality (see e.g. Collins 2005a,b).

Movement triggered by the quantificational property of D_1 across DP_2 and quantifying AdvP is now blocked by relativized minimality. This is so, because the adverb and the projection of D_2 c-command the moving D_1 in its base position. Intensional verbs do not interfere in the same way, because they are members of a different class. The traditional assumption (see Rizzi 2001) would be that they are in a different class by virtue of being heads while the moving element is a phrase. Another rationale for placing them in a different class might take the different domains of quantification as the basis for establishing classes.

We assume that movement that gives rise to scope-splitting, i.e., movement where the nominal restriction is deleted in the head of the movement chain, is triggered by features on D_1. We think that this is a natural assumption. If the relevant movement were triggered by a feature of N_1, it is plausible to assume that the movement should have an effect on the noun. Precisely this effect is obliterated if the noun is subsequently deleted in the head of the chain. This is our suggestion for implementing Kennedy's generalization.

Movement triggered by N_1 *is* possible, though. That gives rise to regular QR. Regular QR results when the movement is triggered by N_1 and deletion the

lower copy of movement is deleted. Notice that movement triggered by features of N_1 is not blocked by DP_2 or quantificational AdvP, since the features on D_2 and Adv are not the same as those on nouns and since the higher N_2 does not c-command the moving N_1.

3.1.5 Comparison with other approaches

The evidence provided in the previous subsections strongly argues in favor of a uniform treatment of negative indefinites and comparative quantifiers: their split scope readings are allowed and blocked in the same circumstances. The readings are allowed across intensional, strongly restructuring verbs, and they are blocked across intensional, weakly restructuring and non-restructuring verbs, across other scope-bearing elements, and in the context of extraposition.

There are two kinds of approaches to indefinite split scope in the literature. There are movement approaches like Geurts (1996) and de Swart (2000) and there are non-movement approaches like Jacobs (1980), Penka (2007) and Rullman (1995).

We take it that other movement approaches can capture the similarities between negative indefinites and comparative quantifiers that we have pointed out here—that is, we take it that it is properties of movement that are responsible for the parallel behavior we have observed. Geurts and de Swart, however, do this at the expense of postulating lexical ambiguity. Geurts captures split scope of negative indefinites by postulating ambiguity in the noun, and de Swart does so by postulating that negative indefinites can themselves be ambiguous. Without going into the details of these proposals, we take it that it is better if one can do without lexical ambiguity.

Non-movement approaches, because they use very different mechanisms to account for split scope with negative indefinites, cannot capture the similarities observed above. For both Jacobs and Rullman, negative indefinties are semantically negative. They are decomposed into two parts, one is clausal negation and the other part is an indefinite. The clausal negation part is sometimes visible morphologically (e.g., the *k-* of *kein*). These two parts are put together via "amalgamation" or some such process under linear adjacency. Split scope arises because material can interfere between the two parts hierarchically, as shown in 0. Penka, on the other hand, argues that negative indefinites are semantically positive generalized quantifiers. Negative indefinites differ from regular indefinites in that the former, but not the latter, need to establish an agreement relation with a null negative operator (under linear adjacency), a need that is sometimes visible morphologically (e.g., the *k-* of *kein*). Split scope arises, as before, because material can interfere between the abstract negative operator and the negative indefinite hierarchically:[14]

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[14] The empty branch in 0 represents the VP-internal thematic position of the subject of *wear*. It is phonologically empty and needs to be disregarded under both approaches for adjacency purposes.

(53)
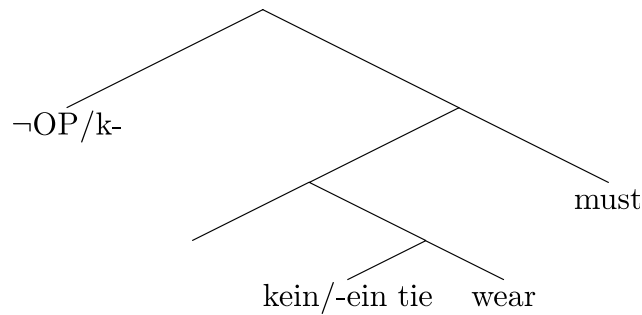
Neither amalgamation nor agreement seem close enough to (degree quantifier) movement to be able to explain the similarities between negative indefinites and comparative quantifiers we have discussed above. Furthermore, it does not seem possible to provide an amalgamation or agreement analysis for comparative quantifiers. For Jacobs and Rullman, this would involve positing an abstract degree quantifier that gets together with the rest of the comparative quantifier, a position that is *ad hoc* at best. In the case of Penka, an additional problem is that agreement with a negative operator is responsible, in her system, for negative concord in negative concord languages. So if the same process was involved in the analysis of comparative quantifiers, we would expect comparative quantifiers to participate in some sort of "comparative" concord, but this does not seem to be empirically correct.

Before closing this section, let us briefly comment on a line of argumentation we have not pursued here. On casual inspection, the coordinate structure constraint seems to provide an argument for our movement account. The potential argument comes from contrasts like the one seen in (54). Only symmetric coordination -- *kein…kein* – is acceptable, and the split reading is available. This could be analyzed as an effect of the coordinate structure constraint, which would rule out the asymmetric version. The licit symmetric version would then be a case of ATB movement. On the other hand, non-movement accounts with an adjacency condition, like those discussed above, give rise to the expectation that the asymmetrical version should be allowed and the symmetrical one disallowed:

(54) Bei der Prüfung braucht [kein Professor und *(k)ein Studentenvertreter] anwesend zu sein
'... it is not necessary for there to be a professor and a student representative present'

The argument is complicated by the fact that in this example only the determiner *kein* would ATB-move rather than the entire NP, even under Sauerland's analysis. This is because the two restrictions are different. The changes in the analysis required to accommodate this case seem possible, but the issues this raises are too complex to pursue in this paper. Similarly complex issues arise under a non-movement approach where special provisions for coordination also need to be made.

3.2   Split scope of negative indefinites across universal quantifiers

Let's return to example (41), repeated here for convenience:

(55) /JEDER   Arzt   hat KEIN\ Auto
       every   doctor   has no   car
       'Not every doctor has a car'

The prediction of our analysis is that split scope should be available only when binding is involved—in the cases we have seen this was binding of a nominal world index. However, binding does not seem to be involved in (55), since there is no relevant binder, such as an intensional verb. Yet this example seems to give rise to a split scope reading for at least some speakers (that reading is, in fact, very prominent for those speakers). We now show that there are reasons to consider that examples like (55) constitute a separate phenomenon from the one we have analyzed here—though we do not really know what is at stake in (55), partly because this phenomenon has not yet been properly investigated. The point we want to stress here is that, because (55) and examples like it constitute a separate phenomenon, we don't want our analysis to make predictions about it.

3.2.1 Split scope splits

The first reason to think that (55) is really part of a different phenomenon is that across German dialects and across languages the two do not pattern together. Thus, while all German speakers allow split scope of negative indefinites across intensional, strongly restructuring verbs, only a subset of German speakers allow it across universal quantifiers. It is not yet clear what the delimitations of the phenomenon are, but there are suggestions in the literature (see Jacobs 1980: 126) that it is available more easily for Southern speakers of standard German (e.g., speakers of standard Austrian, as well as in Bavaria, Frankonia, etc.). The cross-linguistic generalization is that, if a language allows split scope, then it allows it across (some) intensional verbs, but not necessarily across universal quantifiers. For example, English and Norwegian allow split scope, but only across (some) intensional verbs. In this respect, they are like those speakers of standard German who do not get a split scope reading in (55). Some examples from English are in (56) (cf. Norwegian; Svenonius 2002: 125 and Kristine Bentzen, p.c.)[15]:

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[15] Despite claims in the literature, split scope readings across intensional verbs in English are not that rare. Here are a few more examples (Doris Penka, p.c.):

(i)   a. I have been able to find no support whatsoever
         b. There can be no doubt
         c. There could have been no mistake about that
         d. They require no guiding

(56) *English* (Potts 2000)
    a.   The company need fire no employees
    'It is not the case that the company is obligated to fire employees'
    b.   The company must fire no employees
    *'It is not the case that the company is obligated to fire employees'
    c.   All doctors have no car
    *'Not every doctor has a car'   (independently of intonation)

Dutch (see de Swart 2000) and the dialects of German mentioned above, on the other hand, allow split scopes in the two kinds of contexts. The point is that split scope across intensional verbs can exist on its own.

3.2.2 Intonation

Another reason to suspect is that split scope across universal quantifiers always requires the 'hat' contour, the special intonation indicated in (55) with '/' and '\' (on the 'hat' contour, see Büring 1995 and others). Split scope across intensional verbs does not require it, not even in standard Austrian or the other dialects of German that allow split scope in (55). We see that the phenomenon just has different properties, and that it seems to be different from the cases we have analyzed in this paper.

3.2.3 Bound pronouns

The final argument is a bit more complicated and involves negative indefinite DPs containing pronouns as part of the restriction (*none of his patients, no patients of his, no patient that he has treated,...*). If we were to extend the above accounts of split scope with intensional restructuring verbs to cases like (55), the relevant LF representations should have the form in (57):[16]

(57) $\neg\ \forall_i ... \exists$ [$_{NP}$ ... pronoun$_i$] ...

If this were the correct representation, relevant examples should generally allow and in fact strongly prefer split scope readings. However, this is not what we find. In some cases, such as those in (58), split scope is unavailable. As a matter of fact, the sentences are ungrammatical under the relevant indexing (Magdalena Schwager, p.c.); the wide scope reading is impossible because, under the hat contour, the universal quantifier obligatorily reconstructs (see Büring 1995 for an explanation), the split scope structure along the lines of (57) is apparently unavailable, and the narrow scope construal of the universal does not allow binding. In other cases, such as those in (59), the split reading is available (Magdalena Schwager, p.c.). All of the cases in (58) and (59) are instantiations of (57):

(58)   *standard Austrian and other dialects*
    a.   */[JEDER Arzt]$_i$ hat KEINEN\   seiner$_i$ Patienten vergiftet
          every   doctor   has none   his   patients poisoned
    'Not every doctor$_i$ poisoned a patient of his$_i$'

---

[16] An extension of our own account to examples like (55) would give rise to LFs with the same property, namely, that the universal quantifier ought to be able to bind into the nominal restrictions of the negative indefinite.

b. ??/[JEDES Kind]$_i$ hat KEIN\ Spielzeug, das es$_i$ sich   gewünscht
   every child   has no   toy   that it   self asked.for
hat(te), bekommen
had   gotten
'Not every child$_i$ got a present he$_i$ had asked for'

c. ??/[JEDER Arzt]$_i$ hat KEIN\ Geschenk von seiner$_i$ Frau
   every doctor   has no   present   from his   wife
umgetauscht
exchanged
'Not every doctor$_i$ exchanged a present from his$_i$ wife'

(59) *standard Austrian and other dialects*
a. /[JEDES Kind]$_i$ hat KEIN\ Spielzeug bekommen, das es$_i$ sich
   every child   has no   toy   gotten   that he   self
gewünscht   hat
asked.for   has
'Not every child$_i$ got a toy he$_i$ had asked for'

b. /[JEDER Professor]$_i$ hat KEIN\   Buch über sich$_i$ aus
   every   professor has no   book about himself from
der   Bibliothek ausgeliehen
the   library   checked.out
'Not every professor$_i$ checked out a book about himself$_i$ from the library'

As a control, we offer (60), where we show that, in principle, split scope is compatible with the binding of a pronoun, for all German speakers:

(60) *all German speakers*
a. [Jeder Student]$_i$ denkt, dass keiner   seiner$_i$ Professoren
    every student   thinks that none   his   professors
anwesend zu   sein braucht
present to   be   need
'Every student$_i$ thinks that it's not necessary that a professor of his$_i$ be present'

b. [Jedes Kind]$_i$ denkt, dass es$_i$ kein Spielzeug, das es$_i$ sich
   every child thinks that it no   toy   that it   self
gewünscht hat, bekommen kann
wished   has get   can
'Every child$_i$ thinks that it's not possible to get a toy he$_i$ had asked for'

c. [Jeder Arzt]$_i$ denkt, dass er$_i$ kein Geschenk von   seiner$_i$
    every doctor thinks that he no   present   from his
Frau umtauschen darf
wife exchange   may
'Every doctor$_i$ thinks that it's not possible to exchange a present from his$_i$ wife'

We take the fact that the examples in (58) do not allow binding to be an argument against a straightforward split scope treatment of facts like (55).

3.2.4 More comparison with other approaches

All previous approaches assume that split scope across universal quantifiers is the same phenomenon as split scope across intensional verbs. This either follows directly from the analysis (Geurts, de Swart, Jacobs, Rullman), or an analysis of the semantic/pragmatic effects of the 'hat' contour is added to the analysis of split scope across intensional verbs (Penka). Either way, the problem is that the differences we have observed here are not expected.

It is unclear to us at this point what the right analysis of examples like (55) is (other than that it has to be different from the analysis provided for the other split cases). We think that more work needs to be done first in order to find out what the empirical properties of the phenomenon are. That is material for another paper, though.

4 Conclusion

In this paper we have proposed an analysis of the split scope of German negative indefinites across intensional verbs that had two key features. First, we used quantification over choice functions as our approach to natural language determiner quantification in general, following Sauerland (1998, 2004). This allowed us to justify the use of quantification over choice functions in the particular case of negative indefinites. Then, we used binding of world indices as a way of simulating existential low scope, following Kratzer's (1998) observation. Once binding of the world index of common nouns is allowed in principle, Sauerland's system automatically generates the LFs and readings we are interested in. Further justification for our position came from the fact that conservativity follows as a theorem in Sauerland's approach (we offered a formal proof of this), and from an extended empirical argument that the split scope of negative indefinites patterns strikingly alike with the split scope of comparative quantifiers, something that is accounted for if the analysis of the two types of quantifiers is similar enough. We think ours is, and that the analyses proposed elsewhere either aren't or are but have other problems.

We offered a way of understanding the restrictions on movement shown by the scope splitting of negative indefinites and comparative quantifiers. We think part of the account should rely on relativized minimality, and that the other part can easily be integrated into Wurmbrand's (2003) approach to restructuring.

We argued that apparent problems for our analysis turn out not to be problems. First, our analysis predicts split scope to arise for all determiner quantifiers. We showed that this prediction is unproblematic because the readings we generate are equivalent to readings that can be generated independently on all approaches. Second, our analysis predicts split scope of negative indefinites not to be possible across universal quantifiers. We argued that this case should be considered a separate phenomenon from split scope of these same indefinites across intensional verbs, since the two behave differently.

Since we have provided here an alternative analysis of split scope in German, it follows that there is no need for the grammar to generate these readings independently. In the light of Penka's (2007) proposal for double negation languages like German, this means that double negation and negative concord are not two sides of the same coin. In her account, they are: the same mechanisms that account for different negative concord patterns in other languages result, when their values are set differently, in double negation patterns in German, and in split scope. Our suggestion, then, is that negative concord is an

altogether separate issue from double negation. In other words, if we are right, negative indefinites are not the same across languages.

We finish by raising a question: if, as we have shown, negative indefinite split scope does not necessarily constitute grounds for lexically decomposing negative indefinites, is comparative quantifier split scope evidence that comparative quantifiers should be lexically decomposed? Previous approaches (see Hackl 2001 in particular) have taken the answer to this question to be in the positive, but, given what we have done in this paper, it may actually not be so.

Acknowledgments

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