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# *A man who is married to Ann.* – Blocking of indefinites with internal and external modifiers[1]

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**Abstract.** The definite article often blocks the indefinite article in case the uniqueness condition for definite articles is satisfied, as in *#a husband of Mary.* However, this is not always the case; there is no blocking in in *a man who is married to Mary.* We review Alonso-Ovalle, Menéndez-Benito & Schwarz 2011, who noted the phenomenon and proposed an account in terms of the weak/strong definite distinction. We point out problems in their approach, partly based on experimental results of a rating experiment. We then propose, based on German data, that blocking occurs with functional nouns like *husband* and superlatives like *highest mountain* but not when uniqueness arises through modification by prepositional phrases and relative clauses. We give a novel explanation that relies on a syntactic attachment ambiguity between internal and external modification, which results in a semantic ambiguity in case of definites, but no such ambiguity in the case of indefinites. Under low attachment, uniqueness does not hold, and hence the definite article does not compete with the indefinite article. We also consider the case of preposed participial modifiers in German and argue that they tend towards an external modification because they are backgrounded.

**Keywords:** definiteness, indefiniteness, uniqueness, blocking, syntactic ambiguities, superlatives, participial modifiers, syntactic ambiguities, maximize presupposition

## 1. Introduction: The problem

It is well-known that indefinite DPs imply non-uniqueness of their descriptive nominals. When talking on our planet Earth, (1) is odd, as it has only one moon. And when talking in our monogamous society, (2) is odd as people normally have maximally one spouse.

(1) *#A moon was shining.*
(2) *#Yesterday, I talked to a husband of Ann's.*

The generally accepted explanation, due to Hawkins (1991) and Heim (1991), is that the indefinite article competes with the definite article, where the definite article (in the singular and when used with count nouns) comes with a meaning component that expresses either uniqueness (cf. Russell 1905 and much subsequent work) or familiarity (Christophersen 1939 and much subsequent work). In case the definite article is avoided when it *could* be applied, as in (1) and (2), an inference of non-uniqueness will be triggered.

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This inference is an instance of the general scheme of scalar implicatures: If two expressions are alternatives of each other, where one is semantically stronger than the other, i.e. carries more specific information, the use of the weaker expression indicates that the stronger could not be used. Hence, the stronger expression "blocks" the weaker one in case the stronger expression is applicable. The nature of the meaning component that expresses uniqueness has been identified variously as entailment, presupposition, or conventional implicature; these are theoretical options that do not affect the general logic of this explanation (cf. Horn & Abbott 2012 for discussion). We assume here that it is a presupposition and use the term "presupposition maximization" (cf. Heim 1991, Sauerland 2008, Chemla 2008).

However, Alonso-Ovalle, Menéndez-Benito & Schwarz (2011), henceforward AMS, pointed out an interesting class of exceptions to this rule. For example, we observe that (3) is fine, in contrast to (2). The question is: Why is it not blocked by the sentence with the definite article, (4)? This sentence is fully felicitous, and could also be uttered when Ann has a unique husband.

(3) *Yesterday, I talked to a man who is married to Ann.*
(4) *Yesterday, I talked to the man who is married to Ann.*

In Section 2 we will present the solution of AMS and point out a number of problems. Section 3 will point out that cases in which uniqueness is triggered by functional nouns like *husband* are special. In section 4 we will present the core of our own analysis, backed up by experimental results from a rating study. Section 6 will adduce additional evidence for our analysis from coordinated DPs. In Section 7 we will back up our proposal with a formal implementation of low and high attachment modifiers. Section 8 will conclude this article.

## 2. The proposal of AMS

Alonso-Ovalle, Mendez-Benito & Schwarz (2011) follow the general reasoning of blocking the indefinite article by presupposition maximation. They make critical use of the idea that there are two distinct notions of definiteness. According to the first, which goes back to the philosophical literature such as Russell (1905) and Strawson (1950), the definite article expresses uniqueness. According to the second, which goes back to Christophersen (1939) and was further developed by Heim (1982, 1983), the definite article expresses familiarity. Uniqueness is at play in cases like (5) – even if Ann's husband is not familiar, he is presupposed to be unique due to the monogamy assumption.

(5) *Yesterday, I talked to the husband of Ann*.

While uniqueness is well motivated for examples like (1) and (2), the following examples do not necessarily have a unique referent for the subject. Rather, the definite DPs refer to entities that are treated as familiar to the participants in conversation. In (6) this is the president of the state or organization that is most salient in the situation; in (7) this is the girl that was mentioned in the preceding sentence.

(6) *Ann talked to the president.*
(7) *A girl and a boy came in. The girl sat down.*

*A man who is married to Ann*. Blocking of indefinites with internal and external modifiers

AMS argue that *a husband of Ann* competes with *the husband of Ann* both in the uniqueness interpretation and the familiarity interpretation of the definite noun phrase. In contrast, *a man that is married to Ann* competes with *the man that is married to Ann* only in terms of familiarity, because this definite DP does not have the uniqueness interpretation. We then have the following situation: *A husband of Ann* will always be blocked, due to the uniqueness interpretation of *the husband of Ann*. In contrast, *a man that is married to Ann* will only be blocked by the familiarity interpretation of *the man that is married to Ann*. As a consequence, *a man that is married to Ann* survives in case that man is not familiar.

AMS cite supporting evidence for their theory from a peculiarity of definiteness marking in German. German distinguishes between so-called "weak" and "strong" definite DPs as objects of certain propositions, where weak definites require uniqueness, and strong definites require familiarity of the referent (cf. Schwarz 2009, 2014). AMS present the following minimal example to make their point:

(8) *In der Kabinettssitzung wird ein Vorschlag* $\left\{\begin{matrix}\textit{vom / \#von dem Kanzler}\\ \textit{\#vom / von dem Minister}\end{matrix}\right\}$ *erwartet.*
'At the cabinet meeting, people expect a proposal {by the chancellor / by the minister}'

In cabinet meetings, there is a unique chancellor but several ministers; this licenses the weak definite *vom Kanzler* but rules out *vom Minister*. We also should assume a principle that prefers weak definites over strong ones, dispreferring *von dem Kanzler* in (8).

AMS claim that weak definites are possible in cases like (9) but ruled out in case of modification by a relative clause like (10):

(9) *Gestern habe ich bei dem / beim Mann von Maria angerufen*.
'Yesterday I rang up the man (= husband) of Mary'
(10) *Gestern habe ich bei dem / #beim Mann, der mit Anna verheiratet ist, angerufen.*
'Yesterday I rang up the man who is married to Anna'

They predict that (11) is blocked due to the uniqueness definite *beim Mann*, whereas (12) is fine as the uniqueness definite would not be possible in this position.

(11) *#Gestern habe ich bei einem Mann von Anna angerufen.*
'Yesterday I rang up a man (= husband) of Anna.'
(12) *Gestern habe ich bei einem Mann, der mit Anna verheiratet ist, angerufen.*
'Yesterday I rang up a man who is married to Anna.'

Generalizing for the English case (and for most cases in German as well, as the special marker of uniqueness definites is restricted to DPs as complements certain prepositions), AMS assume that definites in general are ambiguous between a uniqueness reading and a familiarity reading, and that blocking of indefinite DPs may happen only in case a definite DP based on uniqueness is possible, e.g. in (2), but not in (3). AMS do not give arguments why the uniqueness interpretation of definite DPs is excluded in the case of relative clauses and mention this as an outstanding question, but see later work by Wiltschko (2012) and Grove & Hanink (2016) for further discussion of this issue.

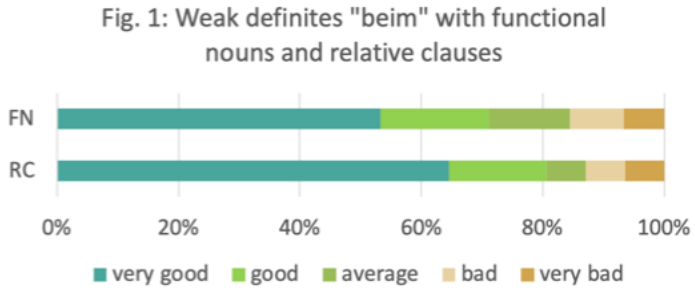
There are several premises of this argument that we would like to highlight. One is the assumption of wide-spread ambiguity or polysemy of the definite article between a uniqueness reading and a familiarity reading. A more plausible option may be to assume that definites always express uniqueness, but that the domain can be restricted to salient or familiar entities, leading to uniqueness with respect to familiar entities. But then it is not clear how the argument of AMS that rules out (2) still goes through.

Another problem of AMS is the following: If we assume an ambiguity of the definite article, then we should assume that *the husband of Ann* has two interpretations, which can be spelled out as 'the unique husband of Ann' and 'the husband of Ann that we know'. The latter interpretation does not block the indefinite *a husband of Ann*, which should refer to Ann's husband and indicate that this person is not familiar. But this interpretation does not exist. It appears that the expression of uniqueness dominates the expression of familiarity.

There is also an empirical problem with the claim that weak (uniqueness) definites are not possible for noun phrases that are modified by a relative clause. As the contrast between (9) and (10) seemed to be subtle to us, we conducted an experiment as part of a larger experiment in which we collected data in support of our own proposal to be discussed below. In this experiment, participants had to rate the grammaticality of the sentences with the functional noun *Mann* and *Ehemann* (13), to (14), with the noun modified by a relative clause. Note that in German, *Mann* 'man' in possessive and genitive constructions typically is interpreted as 'husband', with *Ehemann* 'husband' as an alternative expression in a higher register and is used for legally married men. We also compared the parallel pair (15) and (16).

(13) *Der Detektiv hat beim {Mann, Ehemann} von Olga angerufen.*
'The detective rang up the husband of Olga.'
(14) *Der Detektiv hat beim Mann, der mit Olga verheiratet ist, angerufen.*
'The detective rang up the man who is married to Olga.'
(15) *Die Schülerin hat beim Mittelpunkt des Kreises ein Kreuz gemacht.*
'The student drew a cross at the centerpoint of the circle.'
(16) *Die Schülerin hat beim Punkt, der genau in der Mitte des Kreises liegt, ein Kreuz gemacht.*
'The student drew a cross at the point which is exactly in the middle of the circle.'

Each participant saw one "Detective" sentence (with *Mann* or *Ehemann*) and one "Schülerin" sentence in one of the varieties, and the experimental items were not presented adjacent to each other. Ratings were on a Likert scale from 1 "very good" to 5 "very bad", consonant with the German grading system. We recruited 153 participants on the platform Clickworker, which is screening their participants to ensure good performance, and can guarantee that they were native or near-native speakers of German. We got the results in Figure 1:



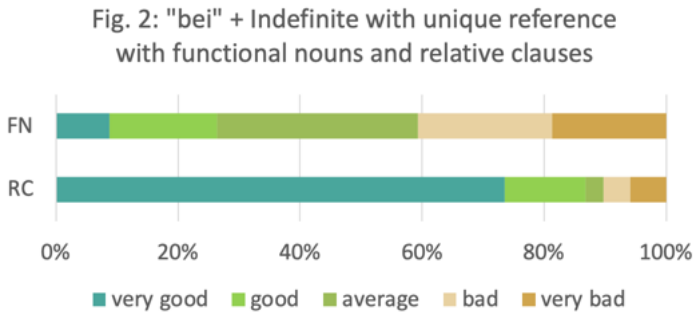

| Mean [1…5] | Observed values v. good | else |
|---|---|---|
| FN: 1.98 | 24 | 21 |
| RC: 1.74 | 20 | 11 |

ChiSquare:
p = 0.33

To put these results into perspective, grammatical violations like the wrong choice of the auxiliary (*sein* vs. *haben*) led to a mean rating of 4.2, and 76% of the evaluations being "very bad".

The ratings between FN (functional nouns, (13) and (15)) and RC (relative clauses, (14) and (16)) differ surprisingly little. Both FN and RC cases were rated "very good" more than 50% of the time. Applying a Chi-square test, contrasting "very good" with all other ratings, does not reveal a significant difference from the null hypothesis ($p = 0.33$). To be sure, our data point towards a difference between the acceptability of *beim* with FNs and RCs, but this difference appears to be too weak to account for the sharp contrast observed with (11) vs. (12).

To be sure, we tested sentences like (11) and (12) with the same material and in the same experiment that gave us the results of Figure 1, again under the condition that participants only saw one example of each test sentence. We found strong evidence for a contrast between FN and RCs, as illustrated in Figure 2.




| Mean [1…5] | Observed values v. good | else |
|---|---|---|
| FN: 3.24 | 8 | 83 |
| RC: 1.56 | 50 | 18 |

ChiSquare: $p < 10^{-16}$

The FN cases in Figure 2 contained *bei einem Mann* and *bei einem Ehemann* (besides *bei einem Mittelpunkt*). There was only a slight difference between *bei einem Mann* (Mean 3.05) and *bei einem Ehemann* (Mean 3.28), which was judged similarly to *bei einem Mittelpunkt* (3.32). The difference was not quite significant ($p = 0.06$), but the tendency is consistent with *Mann* being less clearly unique than *Ehemann.* We also found later that the mentioning of a detective might be a problem as it is suggestive of a bigamist scenario. Both findings would actually improve the rating of FN; nevertheless, we found that it is very low.

Figure 2 gives the results case of unique reference. We also tested cases with *non*-unique references like the following:

(17) *Die Sekretärin hat bei einem Bekannten von Martha angerufen.*
'The secretary rang up an acquaintance of Martha.'
(18) *Die Sekretärin hat bei einem Mann angerufen, der mit Martha bekannt ist.*
'The secretary rang up a man who is acquainted with Martha.'

As expected, the case with genitive modification (17) was rated very good (mean 1.42), even better than cases with RC clauses (18) (mean 1.97). The difference between the two cases, for which we did not form a hypothesis, is presumably due to the added complexity of relative clauses.

We conclude that the solution that AMS provide for the difference between sentences like (2) and (3) is problematic, and that we have to look for an alternative solution.

## 3. Uniqueness by functional nouns vs. other cases of uniqueness

We would like to consider the possibility that the difference between (2) and (3) is due to the way in which uniqueness is encoded: as part of the lexical meaning of the head noun, which is a functional noun, here *husband*, or as result of syntactic construction, here *man who is married to Ann.* It appears to us that the indefinite article is problematic if the head noun has a functional meaning, but fine in cases in which uniqueness results in other ways. This is illustrated in the following contrasts that go beyond the range of examples cited by AMS:

| | | | |
|---|---|---|---|
| (19) | a. | *# a husband of Mary* | *a man that Ann is married to* |
| | b. | *# a centerpoint of the circle* | *a point in the exact center of the circle* |
| | c. | *# a highest mountain* | *a mountain that is higher than all others* |
| | d. | *# a last scene of the movie* | *a scene at the very end of the movie* |

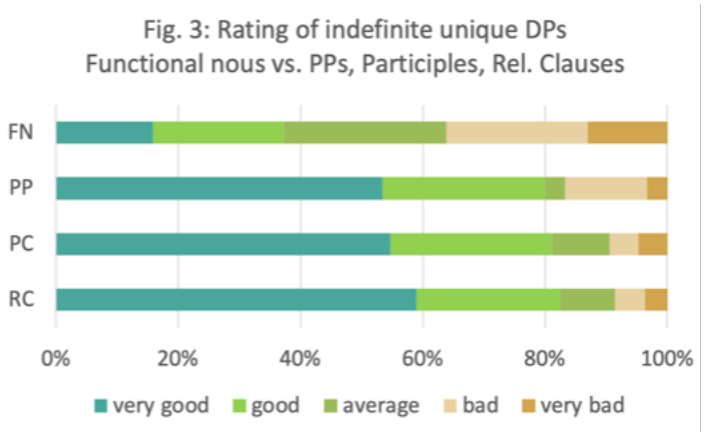
In (19a), it is the head noun *husband* itself (assuming a monogamous setting) that entails uniqueness. In (b), the composed noun *centerpoint* entails uniqueness, at least when talking about circles. In (c), uniqueness arises out of the semantics of the superlative *highest* that modifies the head noun, *mountain*. And in (d), uniqueness comes about through the superlative meaning of *last* 'later than all others'. For these cases, the indefinite article appears to be bad. For the corresponding expressions that achieve uniqueness by a relative clause, as in (19a,c), or by a prepositional phrase, as in (b,d), the indefinite article appears much better.

To investigate this issue further, we included in our rating experiment a survey of sentences that contrasted lexical functional nouns (FN) with three types of expressions that lead to a unique interpretation by a syntactically complex expression, other than modification by a superlative adjective. In addition to relative clauses (RCs) and prepositional phrases (PP), we investigated another type of a clausal modifier: participial phrases (PC). These modifiers differ from RCs insofar as they are non-finite and precede their head noun. The following examples illustrate this with one of the experimental items, where the English gloss for PCs tries to give an idea of the syntactic structure.

(20) FN: *Die Schülerin hat einen Mittelpunkt des Kreises identifiziert*.
'The student identified a centerpoint of the circle.'
PP: *Die Schülerin hat einen Punkt genau in der Mitte des Kreises identifiziert*.
'The student identified a point exactly in the middle of the circle.'
PC: *Die Schülerin hat einen genau in der Mitte des Kreises liegenden Punkt identifiziert*.
lit. 'The student identified [an exactly in the middle of the circle being] point'
RC: *Die Schülerin hat einen Punkt, der genau in der Mitte des Kreises liegt, identifiziert*.
'The student identified a point that is exactly in the middle of the circle.'

In a better design we would have also investigated functional nouns with superlative adjectives, such as *einen höchsten Berg* 'a highest mountain'; we suspect that they would be rated similarly to lexical functional nouns like *Mittelpunkt* 'center point'.

As before, each participant saw and rated each sentence only in one condition. We took all relevant cases in our experiment, including those in which the indefinite followed a *bei*-phrase. We also included appropriate cases from a follow-up experiment reported in section 6. This is the reason of the differences in the number of observations for each case. The results are displayed in Figure 3.



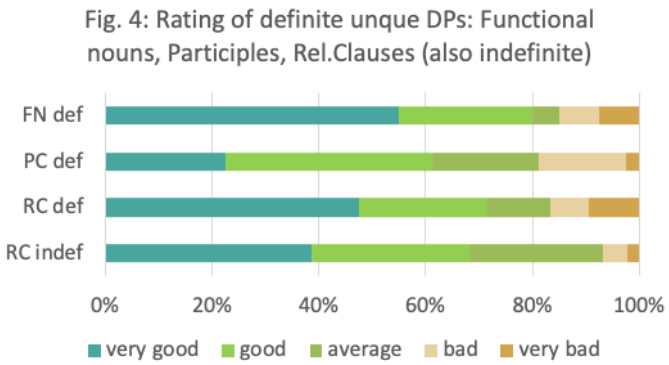

| | Mean [1…5] | Observed values v. good | else |
|---|---|---|---|
| FN: | 2.96 | 28 | 149 |
| PP: | 1.87 | 16 | 14 |
| PC: | 1.78 | 35 | 29 |
| RC: | 1.71 | 208 | 145 |

As it is clear from this figure, RC, PC and PP are judged similarly (the Chi-Square test for each combination is not significant, with $p > 0.5$). However, each of RC, PC and PP differ significantly from FN, with $p < 10^{-5}$, a value that is significant at the $p = 10^{-4}$ level after Bonferroni correction for multiple comparison.

The results reported in Figure 3 depend on the indefiniteness of the DP. When the participants rated unique DPs marked with the definite article, the difference between FNs and RCs vanish. Example (21) gives a subset of the test items that we compared directly; we did not test for PPs but we included a version of relative clauses marked as indefinite.

(21) FN: *Petra hat gestern auf der Party den Mann von Olga getroffen*.
'Petra met the husband of Olga yesterday at the party.'
PC: *Petra hat gestern auf der Party den mit Olga verheirateten Mann getroffen*.
lit. 'Petra met [the [with Olga married] man] yesterday at the party.'
RC: *Petra hat gestern auf der Party den Mann, der mit Olga verheiratet ist, getroffen*.
'Petra met the man who is married to Olga.'

Figure 4 gives our findings for sentences like (21). FNs and RCs are now rated similarly, as expected; the fact that the RC appear a bit degraded (but not significantly) may be attributable to RCs being more complex than FNs. But PCs are interpreted significantly worse than RCs (Chi-square test on very good vs. else: $p < 10^{-3}$), a result that we did not predict, and will come back to in Section 5. We also tested the RC sentence in the indefinite variety and found it to be slightly worse than with the definite article, but this was not significant.



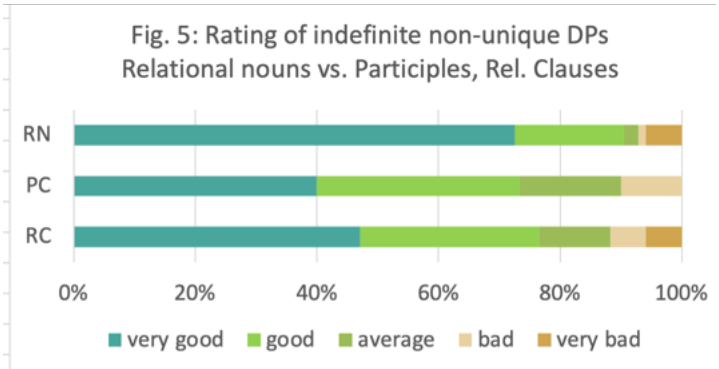

| | Mean [1…5] | Observed values v.good | else |
|---|---|---|---|
| FN def: | 1.88 | 22 | 18 |
| PC def: | 2.38 | 18 | 62 |
| RC def: | 2.07 | 20 | 22 |
| RC ind: | 2.02 | 17 | 27 |

Our findings, of course, support the explanation that the definite article blocks the use of the indefinite article in FNs, leading to the contrast for FNs in Figure 3 vs. for FNs in Figure 4 (Chi-square test on very good vs. else $p = 10^{-7}$). But our results do not explain why there is no blocking effect with RCs under the assumption that there is only one definite article, as illustrated in the lack of a significant difference between RC def and RC indef in Figure 4 (Chi-square test on very good vs. else $p = 0.4$).

Returning to the main issue of this paper, we also observe that the difference between FNs and other noun phrases reported in Figure 3 should depend on the uniqueness implication of FNs. When looking at indefinite DPs that are not lexically unique, i.e. relational nouns RN like *friend* in contrast to *husband*, we should expect that FNs are fine. We tested this as well with examples like the following:

(22) RN: *Die Sekretärin hat einen Bekannten von Marta erkannt.*
'The secretary recognized an acquaintance of Marta.'
PC: *Die Sekretärin hat einen mit Marta bekannten Mann erkannt.*
lit. 'The secretary recognized [a [with Marta acquainted] man].'
RC: *Die Sekretärin hat einen Mann, der mit Marta bekannt ist, erkannt.*
'The secretary recognized a man that is acquainted with Marta.'

The results in Figure 5 below show that RNs are good with indefinites, as predicted. They are in fact better than the corresponding cases with PCs and RCs, presumably because the latter are syntactically more complex. But note that the rating is overall good (very good ≥ 40%).




| | Mean [1…5] | Observed values v.good | else |
|---|---|---|---|
| RN: | 1.5 | 61 | 23 |
| PC: | 1.97 | 12 | 18 |
| RC: | 1.94 | 16 | 18 |

*A man who is married to Ann*. Blocking of indefinites with internal and external modifiers

In this section, we have seen clear evidence for a difference between functional nouns (FNs) and cases in which uniqueness is the result of an interpreted syntactic construction (RCs, PCs, and PPs). Why should this be so? We will offer a proposal in the next section.

## 4. Our proposal: Fixed vs. ambiguous attachment

To rephrase this question: What makes the expression of uniqueness by functional nouns different from the expressions of uniqueness by other syntactic means so that in the first case, the indefinite article is blocked by the definite article, but there is no blocking in the second case? We propose that in cases of functional nouns, there is only one syntactic derivation, and in this derivation the definite article competes with, and blocks, the indefinite article. In contrast, in cases in which uniqueness comes about in other ways there are two distinct syntactic derivations, where in one derivation the definite article does not compete with the indefinite article, and hence the indefinite article is acceptable. One crucial element in our argumentation is the following: While the readings of the two syntactic structures with the definite article are different, they are identical for the indefinite article. This is the reason why the indefinite article is not blocked.

Let us go into the details of the argument. We start with the case of functional nouns like *centerpoint* or relational nouns like *friend*, for which we assume the structure (23), in which a phrasal constituent XP is a complement of the head N.

(23) $[_{DP}$ DET $[_{NP}$ N XP]]

a. $[_{DP}$ *der* / *#ein* $[_{NP}$ $[_{N}$ *Mittelpunkt*] $[_{NP\text{-}GEN}$ *des Kreises*]]]
‘the / #a centerpoint of the circle’

b. $[_{DP}$ *der* / *ein* $[_{NP}$ $[_{N}$ *Freund* ] $[_{PP}$ *von Anna*]]
‘the / a friend of Anna’

We argue that the indefinite article is always blocked in the case of functional nouns, (23a), as the functional noun expresses uniqueness by its semantic interpretation. In the case of relational nouns, (23b), it is blocked just in case it is part of the common knowledge that there is only a single referent. There are also cases of relational nouns that are made functional nouns by adjectival modification. In this case, the indefinite article is blocked as well:

(23) $[_{DP}$ DET $[_{NP}$ N XP]]

c. $[_{DP}$ *der* / *#ein* $[_{NP}$ [ *ältester* $[_{N}$ *Freund* ]] $[_{PP}$ *von Anna*]]
‘the / #an oldest friend of Anna’

How are these structures interpreted? We will sketch our proposal here and go into more detail in Section 7. It turns out that the proposal is best couched in a framework of dynamic interpretation, where the scope of indefinite and definite determiners extend to the right, reflecting that their variables are accessible. In a schematic way, the indefinite case receives the interpretation (24a), and the definite receives the interpretation (24b), where ∃x stands for the existential quantifier, and ∃!x stands for the existential quantifier with uniqueness, defined as $\exists!xP(x) \Leftrightarrow \exists x[P(x) \wedge \forall y[P(y) \rightarrow x=y]]$. The semicolon stands for dynamic conjunction. The dots stand for the verbal predicate, omitted here.

(24) a. $\exists x[\![N]\!]([\![XP]\!])(x)$ ; …

b. $\exists!x[\![N]\!]([\![XP]\!])(x)$ ; …

The syntactic representation (23) and the interpretation (24) illustrate the treatment of relational nouns N (where functional nouns are a specific subcase where the noun denotes a right-unique relation). For regular nouns of the category NP that do not have a complement, we assume a modificational structure. Here we can distinguish between two distinct syntactic structures, which we illustrate with PPs, with the modifier at the NP level (25) or the DP level (26):

(25) [$_{DP}$ DET [$_{NP}$ NP XP]] [$_{DP}$ *ein* / *der* [$_{NP}$ [$_{NP}$ *Punkt*] [$_{PP}$ *in der Mitte des Kreises*]]]
(26) [$_{DP}$ [$_{DP}$ DET [$_{NP}$ NP]] XP] [$_{DP}$ [$_{DP}$ *ein* / *der* [$_{NP}$ *Punkt*]] [$_{PP}$ *in der Mitte des Kreises*]]

Let us first consider the interpretation of indefinite DPs, again in the dynamic framework sketched above. We have the following two interpretations for (25) and (26), respectively:

(27) a. $\exists x[[\![NP]\!](x) ; [\![XP]\!](x)] ; \ldots$
b. $\exists x[\![NP]\!](x) ; [\![XP]\!](x) ; \ldots$

In (27a), an x is introduced that has both the property expressed by NP and the property expressed by the modifier XP, which can be further modified by the verbal predicate and he subsequent text. In (27b) an x is introduced that has the property expressed by NP, which then is further modified by the XP predicate, and which can be further modified. One important observation at this point is: Even if the syntactic structures of (25) and (26) are different, the resulting truth-conditional meanings are exactly the same. This is because dynamic conjunction is associative, we have $[[\varphi ; \psi] ; \pi] = [\varphi ; \psi ; \pi]$.

Let us now consider the interpretation with the definite determiner. The two syntactic structures (25) and (26) allow for the following interpretations:

(28) a. $\exists!x[[\![NP]\!](x) ; [\![XP]\!](x)] ; \ldots$
b. $\exists!x[\![NP]\!](x) ; [\![XP]\!](x) ; \ldots$

In (28a) an x is introduced that is the unique x with the property of having both the meaning of NP and of XP; as in the case of indefinites, this x can be further specified by the verbal predicate and the subsequent text. In (28b), an x is introduced that is the unique x that has the NP property; it is further specified by also having the property XP, and by falling under the verbal predicate and whatever is said about x in the subsequent text. In this case, the interpretations (28a) and (b) are not the same. In particular, the uniqueness condition might be satisfied in (28a), which represents the low modifier attachment (25), but not in (28b), which represents the high modifier attachment (26).

What does this mean for the blocking effect? Let us assume that there is a unique x such that $[[\![NP]\!](x) ; [\![XP]\!](x)]$, but for $[\![NP]\!](x)$, x is not unique. For example, take *point exactly in the center of the circle*: there are many points, but only one point that is exactly in the center of the circle. If we want to refer to that point by a definite DP, we therefore have to choose the low-attachment structure [$_{DP}$ DEF [$_{NP}$ NP XP]], as in [$_{DP}$ *the* [[$_{NP}$ *point*] [$_{XP}$ *exactly in the center of the circle*]]]. This competes with the indefinite determiner in this syntactic structure, [$_{DP}$ IDEF [$_{NP}$ NP XP]], as in [$_{DP}$ *a* [[$_{NP}$ *point*] [$_{XP}$ *exactly in the center of the circle*]]], and blocks the indefinite. But it does not compete with, and hence does not block, the indefinite determiner

in the high-attachment structure, [$_{DP}$ [$_{DP}$ IDEF NP] XP], as in [$_{DP}$ [$_{DP}$ *a point*] [$_{XP}$ *exactly in the center of the circle*]]. Hence this structure is not blocked. Now we have seen that in the indefinite case, the high-attachment structure has the same meaning as the low-attachment structure, cf. the discussion of (24). So we have, as end result, that the reading expressed by ∃x[⟦NP⟧(x) ; ⟦XP⟧(x) ; … ] is not blocked. The indefinite article can be used in the string *a point exactly in the center of the circle* even though the definite article as in *the point exactly in the center* would be justified as well. This is because the definite DP has the structure [*the* [*point exactly in the center of the circle*]] whereas the indefinite DP can have the structure [[*a point*] [*exactly at the center of the circle*]].

Recall that this is different with functional nouns, as for them there is only one structure available: [$_{DP}$ *the / a* [$_{NP}$ [$_{N}$ *centerpoint*] [$_{XP}$ *of the circle*]]]. This is because complements can only be attached at their syntactic heads; there is no high attachment (except for movements like extrapositions, which would have the same truth-conditional interpretation). Consequently, with functional nouns the definite article always blocks the indefinite one.

Our explanation why the indefinite article is available in spite of uniqueness assumes that blocking is sensitive to syntactic structure. If blocking would only be triggered on the level of the meaning of expressions, then the felicity of the definite DP would block the indefinite DP no matter under which syntactic structure, as the parses of the indefinite DP have the same meaning. There is independent evidence that the relevant alternatives are dependent on syntactic structure, and not just on the meaning, of expressions (cf. Katzir 2007). For example, the sentences *Mary talked to John or Bill* and *Mary talked to John or Bill or both* arguably have the same literal meaning, as disjunction is inclusive; however, only the first sentence triggers the implicature that Mary did not talk to both, which is clearly due to the formal difference that the second sentence mentions this alternative explicitly.

Our explanation of the availability of the indefinite article, despite uniqueness, applies to modifiers in general, in particular for PP modifiers as in [$_{DP}$ [$_{DP}$ *a point*] [$_{PP}$ *exactly in the center of the circle*]] and relative clause modifiers as in [$_{DP}$ [$_{DP}$ *a point*] [$_{RC}$ *that is exactly in the center of the circle*]]. This also holds for the German cases, which have a similar constituent order, and allow for high attachment, cf. (29) for PPs and (30) for RCs.

(29) [$_{DP}$ [$_{DP}$ *ein* [$_{NP}$ *Punkt*]] [$_{PP}$ *genau in der Mitte des Kreises*]]
'a point exactly in the middle of the circle'

(30) [$_{DP}$ [$_{DP}$ *ein* [$_{NP}$ *Punkt*]] [$_{RC}$ *der genau in der Mitte des Kreises liegt*]]
'a point which is exactly in the middle of the circle'

In this section we presented the core of our explanation why indefinites are sometimes not blocked by definites, in spite of uniqueness. The reason is that the clauses in which these indefinites occur allow for a parse in which they do not compete with the definites. In the following sections we will consider the case of participial modifiers, we will look at additional set of data that support the analysis, and we will provide an implementation for the compositional derivation of the meanings discussed in this section.

## 5. Participial modifiers and non-restrictive relative clauses

Our explanation for the acceptability of indefinite determiners requires that the modifiers that create uniqueness allow for high attachment to the DP, as in (26). This is fine for postposed modifiers that can attach to NP or DP when looking for an attachment site at [$_{DP}$ [$_{NP}$ … But this appears problematic for the case of PCs, participial attributes, as they precede the NP. We have the structure as in (31), for which only low attachment seems to be an option.

(31) [$_{DP}$ *ein* [$_{NP}$ [$_{PC}$ *genau in der Mitte des Kreises liegender*] [$_{NP}$ *Punk*t]]]
'an [exactly in the middle of the circle lying] point'

We argued (without experimental support) that adjectives that lead to a unique interpretation of the head noun due to their superlative meaning, which like other adjectives always precede the noun in German, indeed block the indefinite determiner, as illustrated in (32) (where the adjective agrees in definiteness with the determiner).

(32) [$_{DP}$ *der* / #*ein* [$_{NP}$ [$_{AP}$ *älteste*(#*r*)] [$_{NP}$ [$_{N}$ *Freund*] [$_{PP}$ *von Olga*]]]]
'the / #an oldest friend of Olga'

Why do participial constructions behave differently? We suspect that this may be due to the fact that they tend to express backgrounded material (cf. Fabricius-Hansen 2006) that are of the status of supplements (cf. Potts 2007). Evidence for that is that they can be prosodically marked as parentheticals, and they can contain discourse operators like *übrigens* 'by the way'.

(33) *ein – übrigens genau in der Mitte des Kreises liegender – Punkt*
'a – by the way exactly in the center of the circle being – point'

Hence in spite of their intermediate position, participial attributes can be interpreted externally, which corresponds to high attachment to the DP, as in the braced constituent in (34). We observed this already in (21) and Figure 4, with our finding that definite DPs with PCs are ranked significantly worse than definite DPs with RC modifiers, and also worse than FNs. We leave the precise nature of this interpretation open.

(34) a. [$_{DP}$ *ein* [$_{NP}$ {$_{PP}$ *genau in der Mitte des Kreises liegender*} [$_{NP}$ *Punkt*]]
b. [$_{DP}$ [$_{DP}$ *ein* [$_{NP}$ _ [$_{NP}$ *Punkt*]] {$_{PP}$ *genau in der Mitte des Kreises liegender*}]

This interpretation of the PC is similar to the non-restrictive interpretation of relative clauses, which also are interpreted under high attachment to the DP. From this, we predict that we should detect a difference when comparing restrictive vs. non-restrictive relative clauses. The situation in English is that both *that* relative clauses and *wh* relative clauses can be interpreted restrictively, while non-restrictive relative clauses are predominantly expressed by *wh* relative clauses, while *that* relative clauses can only marginally receive this interpretation (cf. Huddleston & Pullum 2002: 1059 on "integrated" vs. "supplementary" relative clauses). If relative clauses introduced by the complementizer *that* have a tendency towards low attachment, in contrast to *wh* relative clauses, we should find a distinction along these lines:

*A man who is married to Ann*. Blocking of indefinites with internal and external modifiers

(35) a. *the* / *#a point that is exactly in the middle of the circle*
b. *the* / *a point which is exactly in the middle of the circle*

If *that* has a strong tendency to low attachment, even with indefinites, then the indefinite variant of (35a) should be affected by blocking by the definite article. If *which* is compatible with both low and high attachment, then we do not expect that the indefinite variant of (35b) is affected by blocking. AMS do not discuss this issue; they only discuss relative clauses in German and Spanish, but they use *wh*-relatives in their glosses. The prediction in (35a) vs. (b) remains to be tested experimentally.

## 6. Additional evidence: Coordinated DPs

In Section 4 we explained the occurrence of the indefinite article, despite of reference to an unique entity, with the help of an attachment ambiguity. We argued that in cases in which the definite article requires high attachment to a complex constituent consisting of a head noun together with the modifier to satisfy uniqueness, the indefinite article is admissible because it allows for low attachment to the head noun, resulting in a reading that is indistinguishable from the one with high attachment.

We can derive a prediction from this[2]: When low attachment is prevented for the definite determiner, the indefinite determiner should be blocked in case of reference to a unique entity. One test case for this prediction are NPs that consist of a conjunction of two NPs, each with their own determiners. Consider the following example:

(36) [DP [DP [DP *the man*] *and* [DP *the woman*]] [RC *who know each other best*]]

(36) requires high attachment, given its meaning. The compositional semantic interpretation of (36) is tricky: The uniqueness stemming from the superlative in the relative clause cannot be satisfied locally within the DPs *the man* and *the woman*, as (36) can be interpreted in a domain that has many men and women (cf. von Stechow 1980, Link 1984, and subsequent literature). Effectively, (36) is interpreted as the unique pair or sum of a man and a woman that stand in the relation of knowing each other better than any other pair. This suggests an interpretation of definiteness above the conjoined NPs, which is modified by the relative clause, as in the structure [*the* [[*man and woman*] [*that knew each other best*]].

If syntactic low attachment is blocked, we expect that changing the definite articles to indefinites in (36) leads to degraded results. Recall that it was precisely the possibility of low attachment, under the same meaning assignment, that allowed the indefinite article to escape blocking by the definite article in cases like (25)/(26).

We tested this prediction in a second experiment. We recruited 247 participants, again on the platform Clickworker, and tested the rating of sentences like (37) and (38). The test was part of a larger test, which included some items that we have reported already in Section 3 above. We tested the following two sentences, in two varieties each (with definite + definite and indefinite + indefinite) article.

[2] Thanks to Jonatan Bobalijk for pointing this out.

(37) *Die Schüler mussten auf der Karte {das/ein} Dorf und {die/eine} Stadt, die am nächsten zueinander liegen, mit einer Linie verbinden.*
'The students had to connect with a line on the map {the/a} village and {the/a} city that are closest to each other.'

(38) *Die Mitspieler sollten auf den Fotos {das/ein} Mädchen und {den/einen} Jungen, die sich am ähnlichsten sehen, bestimmen.*
'The players had to identify on the photographs {the/a} girl and {the/a} boy that looked most similar to each other.'

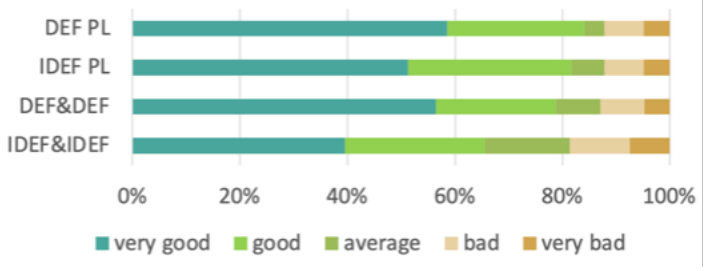
As a baseline, we also tested corresponding sentences with plural DPs, as in (39) and (40).

(39) *Die Schüler mussten auf der Karte {die zwei / zwei} Städte, die am nächsten zueinander liegen, mit einer Linie verbinden.*
'The students had to connect with a line on the map {the two / two} cities that are closest to each other.'

(40) *Die Mitspieler sollten auf den* Fotos *{die zwei / zwei} Personen, die sich am ähnlichsten sehen, bestimmen.*
'The players had to identify on the photographs {the two / two} persons that looked most similar to each other.'

The results are presented in Figure 5.

Fig. 5: Unique DPs with Relative Clause Modifier: non-conjunctive vs. conjunctive DP heads




| | Mean [1…5] | Observed values v.good | else |
|---|---|---|---|
| D PL | 1.74 | 42 | 40 |
| ID PL | 1.84 | 48 | 34 |
| D&D | 1.82 | 48 | 37 |
| ID&ID | 2.21 | 32 | 49 |

We see that the case of a conjunction of two indefinites, IDEF&IDEF, was judged slightly less good than the conjunction with two definites, DEF&DEF. This difference was significant when comparing the "very good" judgements with the "else"-judgements on a Chi-Square test ($p = 0.03$). In contrast, in the case of plural DPs, there was no significant difference between plural indefinites, IDEF PL, and plural definites, DEF PL when comparing "very good" with "else" judgements ($p = 0.34$). We take this to be a confirmation of our hypothesis: In cases in which indefinite article cannot have a low attachment, i.e. in the IDEF&IDEF, the definite article exerts a stronger blocking effect.

However, there is a clear difference in the rating of IDEF&IDEF cases in Figure 5 and the rating of functional noun (FN) cases in Figure 3, which were rated much worse. More specifically, when we take as effect size the difference between mean ratings, for IDEF&IDEF vs. DEF&DEF this is 2.21-1.82 = 0.39, whereas for FN vs. RC this is 2.96-1.71 = 1.25. This

difference might be due to the way how sentences like (37) achieve their interpretation: The two definite articles may be reflections of a definiteness operator over the conjunct, as in [ DEF [[NP (*the*) *man*] *and* [NP (*the*) *woman*]]], a structure that would allow for low attachment to the NP.

## 7. A formal implementation of low and high modification in DPs

We have sketched an interpretation in a dynamic framework to show that in the case of indefinite DPs, low attachment and high attachment lead to the same interpretation. In this section we will spell out this framework as far as necessary for our purposes.

The formal implementation for our proposal should allow for the following: There is a meaning difference between (a) low and (b) high attachment of modifiers in the case of definite DPs, but there is no such meaning difference in the case of indefinite DPs:

(41) a. [DET *a / the* [[NP *point*] [PP *in the center of the circle*]]
b. [DET [DET *a / the* [NP *point*]] [PP *in the center of the circle*]]

Among the versions of dynamic interpretation, the most suitable is Rooth (1987). In this framework, meanings are sets of tuples that contain an input assignment and an output assignment. These tuples are combined by construction-specific rules. For reasons of space, we just give the interpretations and only comment on underlying rules when necessary. We start with the low attachment (41) for the indefinite case, which is rendered in (42):

(42) a. $[\![[_{NP}\ point]]\!] = \{\langle g,x,g\rangle \mid point(x)\}$
b. $[\![[_{PP}\ in\ the_2\ center]]\!] = \{\langle g,x,h\rangle \mid g <_2 h \wedge h_2 = the.center \wedge in(x,h_2)\}$
c. $[\![[_{NP}\ [_{NP}\ point]\ [_{PP}\ in\ the\ center]]]\!]$
$= \{\langle g,x,h\rangle \mid \exists k[g<k \wedge \langle g,x,k\rangle \in [\![[_{NP}\ point]]\!] \wedge \langle k,x,h\rangle \in [\![[_{PP}\ in\ the_2\ center]]\!]]\}$
$= \{\langle g,x,h\rangle \mid point(x) \wedge g <_2 h \wedge h_2 = the\ center \wedge in(x,h_2)\}$
d. $[\![[_{DET}\ a_1\ ]]\!] = \lambda P\{\langle g,x,h\rangle \mid \exists k[g <_1 k \wedge k_1 = x \wedge \langle k,x,h\rangle \in P]\}$
e. $[\![[_{DP}\ a_1\ [_{NP}\ point\ in\ the\ center]]]\!] = [\![\ a_1\ ]\!]([\![[_{NP}\ point\ in\ the_2\ center]]\!])$
$= \{\langle g,x,h\rangle \mid \exists h[g <_{1,2} h \wedge x = h_1 \wedge point(x) \wedge h_2 = the.center \wedge in(x,h_2)]\}$
f. $[\![[_{VP}\ is\ red]]\!] = \{\langle g,x,g\rangle \mid red(x)\}$
g. $[\![[_S\ [_{DP}\ a\ [_{NP}\ point\ in\ the\ center]]\ [_{VP}\ is\ red]]]\!]$
$= \{\langle g,h\rangle \mid \exists x \exists k[\langle g,x,k\rangle \in [\![[_{DP}\ a\ [_{NP}\ point\ in\ the\ center]]]\!] \wedge \langle k,x,h\rangle \in [\![[_{VP}\ is\ red]]\!]]\}$
$= \{\langle g,h\rangle \mid g <_{1,2} h \wedge point(h_1) \wedge h_2 = the.center \wedge in(h_1,h_2) \wedge red(h_1)]\}$

We use g, h, k as partial functions from variables (numbers) to entities, and write $g<h$ / $g \leq h$ for 'h extends / extends or is equal to g', $g <_i h$ for 'h extends g by the variable i', and $g_i$ for g(i). We interpret modification of a predicate by restriction, cf. (42c), application of the article by function application, cf. (e), and predication by restriction and existential binding, cf. (g).

Turning to high attachment modification, we notice that this is possible because the NP *point* and the indefinite DP *a point* have the same type. The result is the same as under low attachment:

(43) a. $[\![[_{DP}\ a_1\ [_{NP}\ point]]]\!] = \{\langle g,x,h\rangle \mid g<_1 h \wedge x=h_1 \wedge point(x)\}$

b. $[\![[_{DP}\ [_{DP}\ a_1\ [_{NP}\ point]]\ [_{PP}\ in\ the_2\ center]]]\!]$
$= \{\langle g,x,h\rangle \mid \exists k[g<k \wedge \langle g,x,k\rangle \in [\![[_{DP}\ a_1\ [_{NP}\ point]]]\!] \wedge \langle k,x,h\rangle \in [\![[_{PP}\ in\ the_2\ center]]\!]]\}$
$= \{\langle g,x,h\rangle \mid g<_{1,2} h \wedge x=h_1 \wedge point(x) \wedge h_2=the.center \wedge in(x,h_2)\}$

Definite DPs differ from indefinite ones by a uniqueness condition. Uniqueness can be relative to the variables accessible in the assignments (in the anaphoric use) or to the model itself; we focus here on the latter. We start again with low attachment:

(44) a. $[\![[_{DP}\ the_1\ ]]\!] = \lambda P\{\langle g,x,h\rangle \mid \exists k[g<_1 k \wedge k_1=x \wedge \langle k,x,h\rangle \in P$
$\wedge \forall y \forall k \forall h[g<_1 k \wedge k_1=y \wedge \langle k,y,h\rangle \in P \rightarrow y=x]]\}$

b. $[\![[_{DP}\ the_1\ [_{NP}\ [_{NP}\ point]\ [_{PP}\ in\ the_2\ center]]]\!]$
$= \{\langle g,x,h\rangle \mid g<_{1,2} h \wedge x=h_1 \wedge point(x) \wedge h_2=the.center \wedge in(x,h_2)$
$\wedge \forall y \forall h[[g<_{1,2} h \wedge h_1=y \wedge point(y) \wedge h_2= the.center \wedge in(y,k_2)] \rightarrow y=x]\}$

This extends g to h such that h maps 1 to x and x is the unique point in the center. In case uniqueness is not satisfied, we end up with the empty set, which reflects the presuppositional status of uniqueness. With high-attachment modification, we get the result (45b); it has different truth conditions from (44b), as it requires that there is a unique point in the model.

(45) a. $[\![[_{DP}\ the_1\ [_{NP}\ point]]]\!]$
$= \{\langle g,x,h\rangle \mid g<_1 h \wedge x=h_1 \wedge point(x) \wedge \forall y[point(y) \rightarrow y=x]\}$

b. $[\![[_{DP}\ [_{DP}\ the_1\ [_{NP}\ point]]\ [_{PP}\ in\ the_2\ center]]]\!]$
$= \{\langle g,x,h\rangle \mid g<_{1,2} h \wedge x=h_1 \wedge point(x) \wedge \forall y[point(y) \rightarrow y=x] \wedge h_2=the.center \wedge in(x,h_2)\}$

We have seen that with indefinite DPs it does not matter whether the modifier is attached high or low, in contrast to definite DPs. With quantified DPs such as *every point* attachment matters as well: In the dynamic framework of Rooth (1987) it can only be low, to the NP, as quantified DPs are necessarily of a different type – for example, a functor that takes a VP meaning:

(46) a. $[\![[_{DP}\ every_1\ [_{NP}\ point]]]\!]$
$= \lambda P\{\langle g,g\rangle \mid \{\langle g,x,h\rangle \mid \exists k[g<_1 k \wedge k_1=x \wedge k \leq h \wedge \langle g,x,h\rangle \in [\![[_{NP}\ point]]\!]\}$
$\subseteq \{\langle g,x,h\rangle \mid \exists k[g \leq k \wedge \langle k,x,h\rangle \in P]\}\}$

b. $[\![[_{S}\ [_{DP}\ every_1\ [_{NP}\ point]]][_{VP}\ is\ red]]\!] = [\![[_{DP}\ every_1\ [_{NP}\ point]]]\!]([\![[_{VP}\ is\ red]]\!])$
$= \{\langle g,g\rangle \mid \{\langle g,x,h\rangle \mid g<_1 h \wedge h_1=x \wedge point(x)\} \subseteq \{\langle g,\ x,\ h\rangle \mid g \leq h \wedge red(x)\}\}$

For completeness we show how relational nouns with complements would be handled in the dynamic framework. In contrast to other nouns they must allow for output assignments that introduce new discourse referents. In (47), *of* is treated as a marker of nominal arguments.

(47) a. $[\![[_{N}\ centerpoint]]\!] = \lambda P\{\langle g,x,h\rangle \mid \exists y[\langle g,y,h\rangle \in P \wedge centerpoint(x,\ y)]\}$

b. $[\![[_{NP}\ centerpoint][_{PP}\ of\ the_2\ circle]]\!]$
$= [\![[_{NP}\ centerpoint]]\!]([\![[_{PP}\ of\ the_2\ circle]]\!])$
$= [\![[_{NP}\ centerpoint]]\!](\{\langle g,y,h\rangle \mid g<_2 h \wedge h_2=y \wedge y=the.circle\}\!])$
$= \{\langle g,x,h\rangle \mid \exists y[g<_2 h \wedge h_2=the.circle \wedge centerpoint(x,\ y)]\}$

One might ask whether it is necessary to give this implementation of our explanation in Section 4 within a dynamic framework, or whether it could be done with static Generalized Quantifiers (Barwise & Cooper 1981). As Generalized Quantifiers, DPs like [$_{DP}$ *a point*] and [$_{DP}$ *the point*] denote second-order predicates, like $\lambda P[[\![point]\!] \cap P \neq \emptyset]$ and $\lambda P[\text{card}([\![point]\!]) = 1 \wedge [\![point]\!] \cap P \neq \emptyset]$, where we take $[\![point]\!]$ to be the set of points. We can define high attachment modifiers as type-lifted modifiers that take a second-order property and address its argument, as in $M^{lifted} = \lambda Q \lambda P[Q(M(P))]$, where M is the regular modifier meaning. In this way we also find that internal and external modification lead to the same result for indefinites but differ for definites. But $M^{lifted}$ could also apply to universal quantifiers, like [$_{DP}$ *every point*], $\lambda P[[\![point]\!] \subseteq P]$, and then would give us non-available interpretation, e.g. for *every point in the circle is red* we would obtain 'every point is in the circle and is red'. There are attempts to deal with external modification in such cases as well (cf. e.g. von Stechow 1980), but these would lead to the same interpretation for high and low attachment in the case of DPs with definite article.

## 8. Conclusion

Let us recapitulate. We started with the observation by Alonso-Ovalle, Menéndez-Benito & Schwarz (2011), who showed that the indefinite article is not blocked by the definite article in cases of modifications by relative clauses that lead to a unique referent, as in *a man who is married to Ann.* This is in contrast to cases where uniqueness is due to functional nouns, as in *#a husband of Ann.*

We provided the first experimental evidence for this contrast, for German, not only for modifiers that consist of relative clauses but also for prepositional phrases and participial phrases. We also presented an analysis for this difference: Relational nouns with their complement allow only for a single parse, as in (48), and this leads to a blocking of the indefinite article in case the referent is unique. Non-relational nouns with modifiers allow for two structures, with low and high attachment of the modifier. The indefinite article is blocked under the low attachment of the modifier, as in (49a), which is the structure that leads to the uniqueness interpretation. It is not blocked under the high attachment of the modifier, as in (49b), as under this attachment the definite article is not appropriate, as uniqueness is not satisfied.

(48) [$_{DP}$ *#a / the* [$_{NP}$ [$_{N}$ *husband* [$_{PP}$ *of Ann*]]]]

(49) a. [$_{DET}$ *#a / the* [[$_{NP}$ *man*] [$_{RC}$ *who is married to Ann*]]
b. [$_{DET}$ [$_{DET}$ *a / #the* [$_{NP}$ *man*]] [$_{PP}$ *who is married to Ann*]]

We also provided conceptual and experimental arguments against the account by AMS that was based on a difference between familiarity definites and uniqueness definites. In our account, familiarity does not play a role. We furthermore observed that participial modifiers are of particular interest: being preposed, they should allow only for low attachment (just like adjectives like *#a / the highest mountain*), but they are rather interpreted similar to high-attachment modifiers. We suspect that this is due to their backgrounded, suppositional nature.

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