Antonymic Prepositions and Weak Referentiality[1]

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Abstract

Analyses that treat determiner omission in terms of weak referentiality have recently been adopted for determinerless PPs. A missing discourse referent is involved in both cases (Farkas and de Swart 2003, Espinal and McNally 2011, de Swart 2012). With regard to the German prepositions *mit* and *ohne,* we will show that the former accepts the determiner omission reluctantly, while determiner omission is almost the rule for the latter. This conclusion is reached through the application of annotation mining to derive multiple factors that influence the omission or realisation of a determiner. We argue that the semantics of the P, the sense of the PP in the context, and lexical influences of the nouns play a major role. As the distributions of *mit* and *ohne* are highly distinct, we conclude that they should not be analysed in a unified way.

0. Introduction

Two different strands of research have been concerned with the omission of otherwise obligatory determiners in recent years. One line of research has

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focused on so-called *Preposition-Noun Combinations* (PNCs), combinations of a preposition with a determinerless NP, often found in languages that do not allow determinerless NPs in object position. Examples from English and German are provided in (1) and (2).

(1)   by train, under discussion, on disc, after school, at local level, in greater detail, on television, over dinner

(2)   auf Anfrage ('after being asked'), ohne Gewinnchance ('without a chance to win'), unter Androhung ('under threat'), mit Vorbehalt ('with reservation')

This line of research tries to identify the conditions for determiner omission by analysing the syntactic, morphosyntactic, and lexico-semantic properties of the noun and preposition involved. Proponents of this line of research are Himmelmann (1998), Stvan (1998), Dömges et al. (2007), and Kiss et al. (2010) among others. The second line of research has focused on determinerless NPs in object position of verbs, and has brought to attention the discourse-semantic effects of determiner omission. Determinerless NPs are claimed to be discourse-opaque, or *weakly referential*. They cannot function as antecedents for anaphors, since anaphors require discourse-transparent antecedents. Proponents of this strand of research are Farkas and de Swart (2003), Espinal and McNally (2011), de Swart (2012), and Alexandropou-lou et al. (2013). Espinal and McNally (2011) illustrate weak referentiality in Spanish by contrasting a DP object with a determinerless N:

(3) a. Busco   un piso.

　　　look.for.1sg a   flat

　　　'I am looking for a flat.'

　　b. Busco   piso.

　　　look.for.1sg flat

　　　'I am flat-hunting.'

It is not accidental that the examples in (3) receive different translations. The referential object in (3a) receives the ordinary interpretation of an indefinite NP, while the determinerless, weakly referential NP in (3b) shows an interpretation akin to a property.

De Swart (2012) proposes to unify the two strands by analysing determiner omission in PNCs headed by *with* and *without* in terms of weak referentiality. She assumes that both prepositions introduce weakly referential complements. They only differ from each other in that they are antonymic, *without* being the logical negation of *with*. So if *with(x, y)* introduces a comitative relation such that *x* is accompanied by *y, without(x, y)* introduces the antonymic privative comitative relation such that *x* lacks the company of *y*.

In the present paper, we would like to argue that such an analysis falls short of accounting for the syntactic distribution of PNCs headed by the German counterparts *mit* and *ohne.* If weak referentiality is made responsible for determiner omission here, we would expect syntactic distributions of *mit* and *ohne* that are very similar, if not identical. We would expect that determiner omission with *mit* is governed by the same conditions as determiner

omission with *ohne,* unless additional factors can be invoked. For *ohne,* negation may count as such an additional factor, and we will discuss the role of negative contexts and non-specific interpretations to this end.

The data presented here have been collected by means of *Annotation Mining* (Chiarcos et al. 2008, Kiss et al. 2010), a corpus-based method of data exploration and analysis. Using annotation mining, large sets of data are annotated on various linguistic levels (part-of-speech, morphology, syntax, semantics). Classification methods such as logistic regression *(Generalized Linear Mixed Modelling, GLMM,* cf. Zuur et al. 2009) are used to identify features that seem pertinent to a binary decision within the construction – such as the presence or absence of a determiner. Given the individual features selected by the models, differences in the syntactic distribution of determiner omission become apparent.

The paper is structured as follows: In the first section, we will review the concept of weak referentiality, as introduced by Farkas and de Swart (2003) and Espinal and McNally (2011). The second section will introduce the meaning spectra of *mit* and *ohne* and explain the data analysis in terms of *Generalized Linear Mixed Models.* Section 3 will discuss PNCs and PPs with instrumental interpretations, and their impact on the analysis of PNCs in terms of weak referentiality. Given that *ohne* introduces a negation, we will also discuss the role of negation for weak and strong referentiality. In

section 4, we will address the realisation of adjectives within otherwise bare NPs; and section 5 will conclude the paper.

1.   Weak Referentiality

Farkas and de Swart's (2003) starting point is the problem of discourse transparency. Nominal arguments are transparent if they may serve as antecedents for pronouns in a discourse. They point out that certain cases of argument incorporation (which usually co-occurs with determiner omission) lead to discourse opaqueness, and provide a version of Discourse Representation Theory (DRT, Kamp and Reyle 1993) to account for this lack of discourse transparency. The analysis crucially distinguishes between thematic arguments and discourse referents. Accordingly, verbs introduce thematic arguments, but thematic arguments must be identified with discourse referents in order to become discourse transparent. We take it for granted that this assumption can be carried over from verbs to prepositions, or to relational predicates in general. In classical DRT, thematic arguments do not play a role. Farkas and de Swart (2003: 33ff.) assume that the instantiation of thematic arguments as discourse referents is only one possibility. Another possibility is that a thematic argument is unified with another thematic argument, but that it is not instantiated by a discourse referent (Farkas and de Swart 2003: 65). In this case, the thematic argument will not serve as antecedent for pronouns in a discourse, as there will be no discourse referent

related to the thematic argument.[2] Now consider the analysis of (4) in light of the distinction between discourse transparent and discourse intransparent complements.

(4)   Un estudiante busca   piso.

        a   student   look.for.3sg   flat

        '*A student is flat-hunting.*'

Here, the subject is discourse transparent, but the object is not. As the object does not contain a determiner, its thematic argument can only be unified with the internal thematic argument of the verb. The subject contains a determiner, thus introduces a discourse referent and this replaces the external thematic argument of the verb as well.[3]

(5) $[u_w : \text{student}(u_w), \text{look-for}(u_w, x), \text{flat}(x)]$

Nominal arguments that correspond to (accessible) discourse referents are discourse transparent or referential, such as the subject in (5). Nominal arguments that are subject to *Unification* can be classified as intransparent or weakly referential, such as the object in (5).

Espinal and McNally (2011: 91) note that weakly referential objects may only receive narrow scope with respect to negation. If we assume that wide scope readings require the presence of a discourse referent, the lack of the

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[2]   Farkas and de Swart (2003: 63) employ a rule of Verification that maps discourse referents and thematic arguments to individuals. As Bart Geurts pointed out to me, the rule erroneously refers to extension contexts only, and thus wrongly predicts that the object of *buscar* (look for) in (4) is extensional.

[3]   We are using the notation of discourse representation structures employed in Geurts (2011), where discourse referents are indicated to the left of the colon.

referent accounts for the narrow scope. By the same line of reasoning, weakly referential NPs cannot antecede non-restrictive relative clauses, or pronouns (or definite anaphors) in subsequent discourse. Both conditions require the presence of an instantiated discourse referent.

Espinal and McNally (2011) point out that determiner omission in Spanish and Catalan is only possible with complements of a restricted class of verbs.[4] Further, Espinal and McNally (2011) seek to reconcile the analysis of Farkas and de Swart (2003) with Chierchia's (1998) assumption that nominal *arguments* cannot be determinerless in Romance languages. They thus propose a lexical rule that is triggered by a general *have*-relation with which the pertinent lexical items must comply. The result of this lexical rule is similar to Farkas and de Swart's *unification* of thematic arguments: the predicate's internal argument is obliterated and can only be accessed indirectly through the *have*-relation. Furthermore, the semantic combination of a determinerless nominal projection with a predicate is taken to be an instance of modification. The analysis thus circumvents the objection that nominal *arguments* require determiners in Romance languages.

De Swart (2012) and Alexandropoulou et al. (2013) apply Espinal and McNally's analysis to prepositions. They argue that the prepositions *met* (Dutch) and *with* can be analysed as *have*-relations. By introducing a logical negation into the semantic representation of the preposition de Swart (2012)

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[4]   The analysis of Farkas and de Swart (2003) does not block weakly referential *subjects* either.

derives *without* from *with.* So PNCs headed by these two prepositions are analysed along the lines proposed for objects of verbs. They are predicted to be weakly referential, their complements not being accessible in the further discourse.

This is an interesting perspective. If the semantics of the two prepositions are taken to be very similar, and the negation to be the major difference between the two, we expect that the syntactic distribution of PNCs headed by these two prepositions should be very similar as well, or should only differ in cases where the negation plays a role. In the following, we will show that the distribution of *mit* and *ohne* in German is clearly much more complex and cannot be accounted for in terms of weak referentiality and negation only.

2. A Logistic Regression Analysis of *mit* and *ohne*

2.1 The Sense Inventory

The interpretation of the prepositions *mit* and *ohne* plays a major role in the analysis. Hence, we will elucidate the pertinent senses of the two prepositions. To this end, it should be noted that *mit* shows more senses than *ohne.* A temporal interpretation *(contemporaneity)* can only emerge with *mit:*

(6)   *Mit dem Startschuss*   setzen sich   die Pferde in Bewegung.
          with the starting.signal set   REFL the horses in motion

'*The horses started to move as the starting signal was heard.*'

The present analysis concentrates on four senses that are shared between *mit* and *ohne: modal* (comprising *instrumental*)*, conditional, participation* (comprising *comitative*)*,* and *presence.* In the following, we present brief definitions of the senses taken from Kiss, Müller and Roch (2013), and one example for each sense.

- *modal (instrumental):* indicates that a device, a tool, or means is (not) used for a certain purpose.

(7) a. Wer *mit Kreditkarte* zahlt, sollte sein Konto im Auge behalten.
       who with credit.card pays should his account in.the eye keep
       '*If you pay by credit card you should keep an eye on your bank account.*'
     b. Er öffnete die Tür *ohne   Schlüssel.*
       he opened the door without key
       '*He opened the door without a key.*'

- *conditional:* used when considering the (negative) condition or the pre-requisite for another situation to happen.

(8) a. Seither   ist eine Übergangsregelung in Kraft,
       since.then is an   interim.arrangement in force
       wonach   auch ausländischer Hausabfall
       according.to-which also foreign   domestic.waste
       nur noch *mit Sondergenehmigung* die französische Grenze
       only   with special.permit   the French   border
       passieren darf.

cross   are.permitted.to

'*Since then an interim arrangement obtains, according to which foreign domestic waste is permitted to cross the French border only if a special permit has been issued.*'

b. Denn *ohne Transplantation* wären   vermutlich alle

because without transplantation would.have presumably all

Personen gestorben.

persons died

'*Because presumably all persons would have died without a transplantation.*'

- *participation (comitative):* expresses that two entities (animate or inanimate) are (not) being together, (not) being involved, or (not) acting together in an activity. The most general meaning is "(not) having or carrying something".

(9) a. Die wenigen Aussenseiter(innen), die *mit Regenschirm* an einer

the few   outsiders   who with umbrella   at a

Strandparty wie dieser erschienen waren, ernteten noch

beach.party like this appeared   were received above.all

mitleidige Blicke.

pitying   looks

'*The few outsiders who had appeared with an umbrella at a beach party like this got nothing but pitying looks.*'

b. Bei der Kollision zog   sich   der *ohne Helm* fahrende

in the collision   sustained REFL the without helmet driving

Mofalenker schwere Kopfverletzungen zu.

motorcyclist severe head.injuries SEPREF

> '*The motorcyclist who drove without a helmet sustained severe injuries to the head in the collision.*'

- *presence (analytic)*: indicates the presence or absence of a thing, an attribute, or a property, which is typically part of something else in a mereological relation. A *mit*-PP with this sense is often modified, because the unmodified expression is actually pleonastic. Modification is not necessary if the preposition is *ohne* because the absence of an implied part always adds new information.

(10)   a.   Das gleiche gilt für Gillettes   zweite Leistung,   die auf das
            the same   holds for Gillette's second achievement the to the
            Jahr 1895 zurückgehende Erfindung eines Rasierapparates
            year 1895   dating back   invention a   razor
            mit auswechselbarer Klinge.
            with replaceable   blade
            '*The same holds for Gillette's second achievement, the invention of a razor with a replaceable blade that dates back to the year 1895.*'

       b.   Sie haben ein groteskes Gartenrestaurant *ohne Garten* aufgestellt,
            they have a   bizarre   garden.restaurant without garden erected
            ein paar fröhliche Tische und Bänke aus Holz.
            a   few bright tables   and benches from wood
            '*They have erected a bizarre garden restaurant without a garden, a few bright tables and benches made of wood.*'

The sense inventory is the result of an iterated annotation and evaluation process, initialized through an analysis of available analyses in German grammars and dictionaries.[5]

2.2 Logistic Regression Modelling and Annotation Mining

The present analysis is based on a methodology called *Annotation Mining* (Chiarcos et al. 2008, Kiss et al. 2010). Annotation mining combines the annotation of large data sets by all available rule sets (annotation schemes, tagsets) with classification methods from machine learning, which are not applied to the data sets but to the annotations.

Currently, we use six different types of annotations:

- Ancillary features including an identifier for each sentence, information about its annotation status, and about special habitats, as e.g. headlines. Sentences occurring in headlines and other special domains are not taken into consideration for classification.

- Features describing the structural complexity and syntactic embedding of the PNC/PP: these features indicate whether the nominal projection is modified prenominally or postnominally, whether the noun realizes a complement, the type of syntactic chunk occurring before the phrase and the type of syntactic chunk occurring after the phrase. These features are provided by the MaltParser (Nivre 2006) as well as by the TreeTagger (Schmid 1995) (for the chunks).

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[5] An initial inter-annotator agreement study reported in Müller et al. (2010) already showed promising scores between 0.644 (overall measure) and 0.860 (for the annotation of temporal senses), a new study is under way.

- Features describing the semantics of the preposition: based on a survey on existing descriptions for the semantics of German prepositions in dictionaries and grammars, Müller et al. (2011, 2012) have developed an annotation scheme for preposition senses that allows the annotation in hierarchical fashion. The relevant interpretations for the present analysis have been introduced in section 2.1.

- Features describing the semantics of the noun: while the semantics of (highly polysemous) prepositions can still be characterized in finite terms, the semantics of an open word class requires a different approach. We employ the *unique beginners* (UB) from the German version of WordNet, GermaNet (Kunze and Lemnitzer 2002).

- Features pertaining to the derivational and inflectional morphology of the noun derived from SMOR (Schmid et al. 2004).

The features provide a 50-element vector description for each sentence containing the pertinent PNC/PP. Given this feature set, we would like to identify which features are most influential for determiner omission and realisation. This problem can be reformulated in terms of *Generalized Linear Modelling* (GLM; the method is also known as *logistic regression,* cf. Kleinbaum and Klein 2010). Here, we map the values provided by the features to the probability of a determiner being realized as follows: if $\alpha+\sum\beta_i\times X_i$ (α = intercept, β_i = i's coefficient, X_i = i's feature value) is the linear combination of the feature's values, and e is Euler's number, the probability for determiner realisation can be given by $\dfrac{e^{\alpha+\sum\beta_i\times X_i}}{1+e^{\alpha+\sum\beta_i\times X_i}}$,

which is bounded between 0 and 1. In GLM, features of various types (particularly including categorical features, but not prohibiting numerical fea-

tures) provide a value, which is then mapped to a value between 0 and 1, indicating whether the dependent feature is realized or not. Let us illustrate this with three features: the intercept α (this is the value provided by the model in absence of the other relevant features), the interpretation of the preposition, restricted to the particular interpretation *presence* (feature name: *prep_m: pres*), and the occurrence of an adjective (feature name: *adj*). As the latter two features are categorical, each can either take the value 1 or 0, and in the latter case, the features cancel out (as e.g. *prep_m: pres* × 0 = 0). The likelihood for determiner realisation can accordingly be determined by (11).

(11) $$\frac{e^{\alpha \ + \ (\beta_{adj} \ \times \ adj) \ + (\beta_{prep\_m:\ pres} \times prep\_m:\ pres)}}{1+e^{\alpha \ + \ (\beta_{adj} \ \times \ adj) \ + (\beta_{prep\_m:\ pres} \times prep\_m:\ pres)}}$$

Let us assume that the coefficients for the three features are as follows, where positive values are influential with respect to the realisation, and negative values are influential with respect to the omission of a determiner.

(12) intercept: 3.1294

   adj: -1.5646

   prep_m: pres: -3.2961

We see that in the GLM of *mit* in (12) that may serve as an illustration here the intercept is positive (the realisation of a determiner is quite likely), and that the other features decrease this likelihood. Finally, the feature *prep_m: pres* exerts more influence on the omission than the feature *adj*.

In the absence of an adjective and with an interpretation of the preposition differing from *presence,* the values for these two features will be 0. We are thus left with the *intercept,* which according to the formula in (11) is mapped to a 95.81 % probability that a determiner be realised. In the presence of an adjective, the likelihood decreases to 82.7 %. If no adjective is present, but the interpretation of the preposition is *presence,* the likelihood decreases to 45.84 %, and if both are present, it decreases to 15.04 %.

A feature like *adjectival modification* can only take two values: either an adjective (or even more than one adjective) is present, or not. If we do not care about the number of adjectives present, the feature's values are fixed: we have represented the whole population of adjectival modification with these two values. Similarly for the interpretation of the preposition: the preposition can only draw its interpretation from the finite set of possible interpretations, and if we have been careful enough to specify this set before annotation, the values are fixed again. We can thus be sure that the possible features represent the population of senses for this preposition (and by extension of all prepositions under investigation).

This is entirely different with the nouns that occur as complements of the preposition. We have drawn our examples from a corpus that cannot claim representativity. With regard to the nouns of a language, this would be futile anyway. If the different nouns would be taken as a feature, this feature would not come from a fixed set, but from a random set, from the random

collection of nouns in the present corpus. Some nouns occur quite frequently, while many others occur only once, and very many do not occur at all. A *Generalized Linear Mixed Model (GLMM)* differs from a GLM in that the former can take the distinction between random features and fixed features into account: the model mixes *random* and *fixed* effects, and we use this mixture to determine whether the presence of a particular noun has a stronger influence on the realisation or omission of a determiner, and also whether the fixed features identified by a GLM are only artefacts of the influence that individual random effects exert on the model. The models that we have developed for *mit* and *ohne* show a small (yet not negligible) influence of the nouns involved, while the pertinent fixed effects identified play their role in the absence and presence of these nouns.

The general distribution of the data subjected to the GLMMs is provided in Table 1:

preposition	determiner realized	determiner omitted	Σ
mit	5,778 (78.1 %)	1,629 (21.9 %)	7,407
ohne	524 (16.4 %)	2,665 (83.6 %)	3,189

Table 1: Distribution of realized and omitted determiners in our sample of *mit* and *ohne*

Two observations are noteworthy here. First, determiner omission occurs more often than determiner realisation with *ohne*. The preposition *ohne* is the only preposition under investigation where determiner omission is more frequent than determiner realisation. For other prepositions, determiner

omission occurs (much) less often than determiner realisation. Secondly, we see that the two prepositions *mit* and *ohne* show a mirror-like distribution, which becomes evident by looking at the proportions. While *mit* roughly shows an 80/20 distribution with respect to determiner realisation, the inverse is correct for *ohne*.

In the GLMMs presented in (13) and (14), we assume that the head noun of the preposition's complement is the only random effect. The following fixed effects are employed. It should be noted that the features *external head* and *nominalisation* are only significant for *ohne*.

–   *adjectival modification:* is an adjective present or not in the preposition's complement?

–   *postnominal extension:* is the noun extended by a genitive complement, a PP, a relative clause or another clause?

–   *chunk after:* an indicator of the right neighbourhood of the PP/PNC. Possible values are pc = prepositional chunk, nc = nominal chunk, and vc = verbal chunk.

–   *external head:* the category of the head from which the PP/PNC is dependent (being its modifier or its complement).

–   *prep_meaning:* a sense of the preposition as presented in section 2.1.

–   *noun_sem:* the semantics of the noun as represented through the unique beginners (UBs) in GermaNet. UBs can be conceived as ontological su-

per-categories that provide a rough estimation of the semantics of the noun. UBs are *person, attribute, artefact, plant, natural phenomenon, event*, among others (cf. Miller 1998). A noun may be polysemous and hence appear under more than one unique beginner. The value of *noun_sem* for a specific UB is the likelihood of occurrence under the UB.

– *nominalisation:* a morphological feature indicating that the noun has been the result of a nominalisation.

(13) GLMM for *mit*

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 Random effects:

 Groups            Name          Variance Std.Dev.
 noun              (Intercept) 3.0282   1.7402
Number of obs: 7407, groups: noun, 1483

Fixed effects:
                    Estimate Std. Error z value Pr(>|z|)
(Intercept)           3.1294     0.1448  21.609  < 2e-16 ***

adjectival
modification         -1.5646     0.1037 -15.087  < 2e-16 ***
postnominal
extension             1.0671     0.1108   9.633  < 2e-16 ***
chunk after is "vc"   0.2493     0.1235   2.019 0.043474 *

prep_meaning is
presence             -3.2961     0.1200 -27.473  < 2e-16 ***

noun_sem is
— communication       0.6877     0.2690   2.556 0.010577 *
— body               -0.9762     0.4933  -1.979 0.047833 *
— possession          1.6322     0.6328   2.579 0.009900 **
— attribute          -1.8831     0.5181  -3.635 0.000278 ***
— event               0.6471     0.2428   2.665 0.007688 **
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(14) GLMM for *ohne*

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Random effects:
 Groups            Name          Variance Std.Dev.
 noun              (Intercept) 1.4086   1.1868
Number of obs: 3189, groups: noun, 755

Fixed effects:
                    Estimate Std. Error z value Pr(>|z|)
```

(Intercept)	-2.8601	0.1716	-16.669	< 2e-16	***
adjectival modification	1.1103	0.1436	7.733	1.05e-14	***
postnominal extension	2.1905	0.1582	13.848	< 2e-16	***
chunk after is "nc"	0.6551	0.1706	3.841	0.000122	***
external head is "VFIN"	0.6774	0.1334	5.078	3.81e-07	***
prep_meaning is "conditional"	1.2842	0.1602	8.015	1.10e-15	***
nominalisation	-1.2888	0.1959	-6.580	4.70e-11	***
noun_sem is — attribute	-1.4081	0.5549	-2.537	0.011169	*
— artefact	-0.6256	0.2803	-2.232	0.025630	*

Let us begin with the explanation of the fixed effects of the GLMMs in (13) and (14). The last column of the fixed effects (Pr(>|z|)) indicates the likelihood that the *Estimate* for the coefficient provided in the first column could actually be 0. Recall from (11) that the coefficients are multiplied with their respective values. With a coefficient of 0, the fixed effect would not play a role. Hence, the estimates (for being 0) should not exceed 0.05 (indicating a 5 % probability that the value could actually be 0). So unless one has other reasons to retain a fixed effect with Pr(>0.05), features with such a value are eliminated from the model (cf. Harrell 2001). Given these considerations, only the features provided in (13) and (14) are actually considered relevant. And since the samples for the models for *mit* and *ohne* differ, we do not expect to find identical sets of features.

Concerning the model for *mit,* it consists of nine features, three related to the structure of the phrase (adjectival modification, chunk, postnominal extension), one describing the preposition sense, and five related to the semantics of the noun. If the preposition takes the interpretation *presence,* it de-

creases the likelihood of determiner realisation by almost 50 %. If in addition the noun is modified by an adjective, the likelihood of a determiner decreases by another 30 %. The presence of these two factors in a PP is thus a strong indicator for a determinerless realisation of the NP. Postnominal extensions, on the other hand, increase the likelihood of determiner realisation. The same holds if the PP occurs in the right periphery of a verbal chunk *(chunk after* is *vc)*, but the influence is comparatively small. With regard to the semantics of the noun, we see that nouns belonging to the UBs *attribute* and *body* decrease determiner realisation (examples for *attribute* are *Frisur* ('haircut'), *Geruch* ('aroma'), or *Nachteil* ('detriment'); examples for *body* are *Ferse* ('heel'), *Oberschenkel* ('thigh'), or *Leiche* ('corpse')). Other UBs increase the likelihood for determiner realisation, but their relative influence is small.

With regard to *ohne,* the intercept has a negative sign, indicating that it is generally more likely that a determiner is omitted in PPs headed by *ohne.* Postnominal extension leads to a strong increase in the likelihood of determiner realisation, as does adjectival modification. In comparison to the model for *mit* this last point is quite puzzling. For *ohne,* we see that all features referring to structural complexity lead to an increase in likelihood of determiner realisation. For *mit,* adjectival modification increases the likelihood of determiner *omission.* This issue will be taken up again in section 4.

2.3   Random Effects in the Model

Random effects are measured in terms of the variation for which they account. Both models show a rather inconspicuous variation due to the random effects, and the variation for *mit* is slightly higher than for *ohne,* so that we will illustrate the role of random effects in the model for *mit.* The variation captured by the random effects in a model may have two consequences. One consequence – not shown here, because it does not emerge – is that fixed effects that have been considered significant in a model *without* random effects become insignificant if random effects are considered as well. Such fixed effects are artefacts of random effects. The second consequence is that the predictions of the model must be adjusted to reflect the random effects. An individual noun class may have a strong positive effect (yielding a construction in which the determiner is never dropped, despite the presence of fixed features to the contrary), or a strong negative effect.

We will illustrate this by considering a small set of nouns that are influential in *decreasing* the likelihood of determiner realisation for *mit.* This observation can be interpreted as assuming that these nouns exert a lexical influence to the effect that the determiner is dropped.
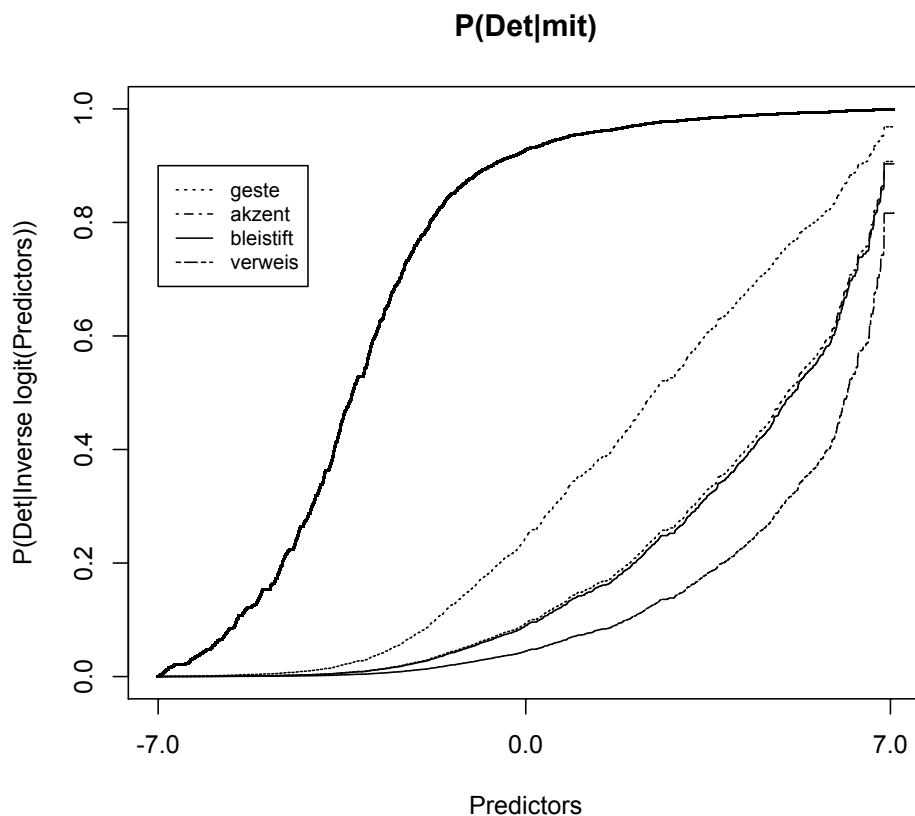
P(Det|mit)

Figure 1: Prediction taking lexical preferences into account

The slightly thicker sigmoidal curve in Figure 1 shows the prediction of the model irrespective of the random effects (i.e. with a noun that is not influential). For illustration of the random effects, we have picked four highly influential nouns (*Verweis* ('link'), *Bleistift* ('pencil'), *Akzent* ('accent'), *Geste* ('gesture')) and plotted their individual influence on the predictor. The four respective curves show how the general prediction of the model must be corrected to take the individual influences of the four nouns into account. Let us further illustrate this with the dotted curve for the noun *Geste*. For a general prediction value of 0.0, the likelihood of determiner realisation (which can be read from the y-axis, and is found where the value crosses the

sigmoidal curve) would already exceed 90 %. If, however, the influence of the noun is taken into account, the likelihood drops to a mere 20 % (as illustrated by the dotted curve). Similarly for the other three nouns, the influence of which on determiner omission is even higher.

This means that even if the PP in which the noun is embedded bears all kinds of fixed effects that lead to determiner realisation (as e.g. no adjectival modification, postnominal extension, and an interpretation of the preposition other than *presence*), it is the noun's random effect that it dampens the intercept to an extent that the presence of the features is insufficient.

3.   Weak Referentiality and the Distribution of Determiner Omission

The analysis presented in the previous section does not take the referential status of the noun into account. Yet, its results can be used to investigate the relationship between weak referentiality and determiner omission. The analysis of de Swart (2012) – an extension of Farkas and de Swart to prepositions – would predict that determiner omission should not differ for *mit* and *ohne.* The present analysis challenges this view. Section 3.1 discusses the influence of different senses of the prepositions. Section 3.2 will further investigate the interplay of senses, and structural factors, the role of adjectives in particular.

3.1   Distribution of determiner omission over different senses

It is a fact that the syntactic distribution of determiner omission for *ohne* differs from the syntactic distribution of determiner omission for *mit.* The figures in Table 1 have already spoken in favour of the conclusion that determiner omission is the rule with *ohne,* but an exception with *mit.* We have also observed an interesting effect of the structure on determiner omission: adjectival modification increases determiner realisation for *ohne,* but decreases determiner realisation for *mit.* Furthermore, certain interpretations have a strong influence on determiner omission. The interpretation *presence* significantly decreases the probability of determiner realisation for *mit,* while the interpretation *conditional* increases the probability of determiner realisation for *ohne.* In light of an analysis in terms of weak referentiality, we would expect a different picture to emerge. De Swart (2012) assumes that *mit* and *ohne* (that is: *with* and *without)* can be described by similar semantics. For a given sense of *mit,* the interpretation of *ohne* would simply be the negation of that sense, i.e. the combination of a logical negation with the sense, i.e. [[ohne x]] = ¬[[mit x]]. Given this equivalence, it seems likely for a sense shared between *mit* and *ohne* that the distribution of determiner omission for *mit* should not differ from the distribution for *ohne.* This assumption can indeed be tested for the four senses *participation (comitative), conditional, modal (instrumental),* and *presence.* The models provided in (13) and (14) have shown that external and internal factors play a role in

determiner omission, but PP-internal features such as the meaning of the preposition and the structure of the preposition's complement are generally much stronger than external features, such as government by an external head of a certain category, or the general embedding of the phrase (as expressed by the feature *chunk after*). We have thus reason to believe that determiner omission is not so much dependent on the context of the PP, and hence, we may assume that if *ohne* may appear without a determiner, and is equivalent with *nicht mit*, then *mit* should also be able to occur without a determiner.

Table 2 gauges the distribution for the 72 nouns that occur most frequently with *mit* and *ohne* in the corpus we employed. The table provides a cross-tabulation of determiner omission vs. realisation for the four senses of *ohne* and *mit* in the first two rows, and determines the ratio between determiner omission and determiner realisation for the different senses in rows 3 and 4.

	participation		conditional		modal		presence	
±determiner	PNC	PP	PNC	PP	PNC	PP	PNC	PP
ohne	1.18	0.30	10.49	3.99	50.66	3.10	28.66	1.33
mit	1.75	13.05	0.78	3.02	15.09	32.33	27.26	6.33
ohne	4:1		2,5:1		16:1		24:1	
mit	1:7		1:4		1:2		4:1	

Table 2: Distribution of senses between PNCs and PPs for 72 high frequency nouns occurring with *mit* and *ohne*

For most senses in Table 2 we observe that the distribution of determiner-less and full PPs differs for *mit* and *ohne*. It is particularly revealing to look

at the ratios. Leaving the sense *presence* aside for the moment, we can observe that the ratios are reversed for *ohne* and *mit.*

Let us look more closely into the modal-instrumental sense of *mit* and *ohne* that shows a 1:2 ratio of determiner omission and realisation, and investigate combinations that omit the determiner. These combinations involve nouns that denote means for writing and paying, *Bleistift* ('pencil') and *Kreditkarte* ('credit card') in particular. We will discuss the first semantic class as the considerations carry over to the second one. The pertinent examples typically involve a contrast or a presupposed partition to the effect that the set of events denoted by the predicate is restricted to or contrasted with the subset requiring the use of the nominal complement of the instrumental preposition.

(15)   Er hatte am Vortag   seine Figuren *mit Bleistift* skizziert.

        he had on.the previous.day his figures   with pencil outlined

        'On the previous day, he had outlined his figures by using a pencil.'

Apart from *Bleistift*, further examples for pertinent nouns are *Feder* ('feather'), or *Kamera* ('camera'). The implication of an instrument in itself, however, is not sufficient to licence such a construction. While unlocking doors typically requires a means or instrument, it is almost impossible to drop a determiner in constructions like *mit einem Schlüssel öffnen (to unlock with a key),* as is illustrated in (16).

(16)   Er hatte die Tür   *mit *(einem) Schlüssel* geöffnet.

he had   the door with a   key   opened

'He had unlocked the door with *(a) key.'

The inability to drop the determiner is correlated with greater freedom in word order: if a determinerless complement of *mit* is possible at all, it must remain in the vicinity of the verb (17), while a PP may be realised to the left of a verb's argument.

(17)   Er hatte am Vortag   *mit ??(einem) Bleistift* seine Figuren
       he has   on.the.previous.day with   a   pencil   his   figures
       skizziert.
       outlined
       'On the previous day, he had outlined his figures by using a pencil.'

With regard to *ohne,* we first note that *ohne Schlüssel öffnen* may appear without a determiner, as is illustrated in (18).

(18)   Und dass die Heckklappe nur in der edelsten   Ghia-Ausführung
       and that the boot.lid   only in the most.classy Ghia.edition
       auch *ohne Schlüssel* geöffnet werden kann, ist ebenfalls nicht sehr
       also without key   opened be.pass can   is again   not very
       praktisch.
       convenient

       'In addition, it is not very convenient that the boot lid can be opened without a key only in the most classy Ghia edition.'

Moreover, a PNC headed by *ohne* may actually appear outside the vicinity of a verb, as is illustrated in (19).

(19) a. Er hat die Tür *ohne   Schlüssel* geöffnet.

      he has the door without key   opened

      '*He opened the door without a key.*'

    b. Er hat *ohne   Schlüssel* die Tür   geöffnet.

      he has without key   the door opened

      '*He opened the door without a key.*'

The different syntactic distributions of *mit-* and *ohne*-PNCs cannot be accounted for in terms of an incorporation analysis, where the respective PNCs (or possibly the preposition) is merged with the verb. Such an analysis leaves it open why the respective construction is possible with *ohne* but barely possible with *mit.* In addition, incorporation does not seem to be a plausible candidate to account for the distribution anyway. The models for *mit* and *ohne* both are mainly built on PP-internal properties, while the position of the PP/PNC in the clause plays a subordinate role at best. The respective features show rather small values *(chunk after),* sometimes bordering at the significance level. We see, however, that nouns like *Bleistift* and *Feder* exert a strong influence on determiner omission with *mit.* Restricting us to the interpretation *modal,* the nouns show a negative influence *(Feder: –2.35; Bleistift: –4.43),* placing the true value of the predictor in the negative area. We may thus conclude that these cases of determiner omission with instrumental senses of *mit* are strongly influenced by the respective nouns. This assumption is further corroborated by comparing the lexical influence of nouns for *mit* with the lexical influence of nouns for *ohne.* For the instrumental sense of *mit,* we find 38 nouns whose lexical influence can

be safely considered as negative, i.e. 38 nouns that strongly support determiner omission. For the instrumental sense of *ohne,* we do not find a single noun with the same properties, which again suggests that determiner omission might be lexically triggered for *mit,* but not for *ohne.*

If we leave the constructions containing these nouns aside (which already account for a large proportion of instrumental *mit*-PNCs), we see that instrumental *mit* usually requires determiner realisation, while instrumental *ohne* allows determiner omission. In the following two examples, we present an instrumental *mit*-PP which is ungrammatical as a *mit*-PNC (the a. case), and the antonymically related, both grammatically well-formed *ohne*-PNC and *ohne*-PP (the b. case). The examples show that *mit*-PPs can be antonymically related to grammatical PNCs and PPs headed by *ohne.* Determinerless complements of *mit, however,* yield ungrammaticality.

(20) a. Die Kantonspolizei nimmt   an,   dass die Beute *mit *(einem)*
       the canton.police   assumes SEPREF that the loot   with a
       Fahrzeug abtransportiert worden ist.
       car   removed   was   is

       'The cantonal police assume that the loot has been carried away
       by using *(a) car.'

    b. Die Kantonspolizei nimmt   an,   dass die Beute *ohne   (ein)*
       the canton.police   assumes SEPREF that the loot   without a
       Fahrzeug abtransportiert worden ist.
       car   removed   was   is

       'The cantonal police assume that the loot has been carried away

without using a car.'

(21) a. Ein amerikanisches Kampfflugzeug hat am Sonntag   eine
an American   warplane   has on.the Sunday an

irakische Radaranlage südlich der   Flugverbotszone über dem
Iraqi   radar.device south of.the no.fly.zone   over the

Nordirak   *mit *(einer) Rakete* zerstört.
North-Iraq with   a   rocket destroyed

'On Sunday, an American warplane has destroyed an Iraqi radar device located south of the northern Iraqi no-fly zone with *(a) rocket.'

b. Ein amerikanisches Kampfflugzeug hat am Sonntag   eine
an American   warplane   has on.the Sunday an

irakische Radaranlage südlich der   Flugverbotszone über dem
Iraqi   radar.device south of.the no-fly zone   over the

Nordirak   *ohne (eine) Rakete* zerstört.
North-Iraq without a rocket destroyed

'On Sunday, an American warplane has destroyed an Iraqi radar device located south of the northern Iraqi no-fly zone without using (a) rocket.'

After replacement of *ohne* by the apparently equivalent *nicht mit,* the grammaticality distribution changes. The grammatical examples (20b) and (21b) allow determiner omission. The same sentences become ungrammatical if *ohne* is replaced by *nicht mit* and the determiner is omitted, as is illustrated for (20b) in (22).

(22)   Die Kantonspolizei nimmt   an,   dass die Beute nicht *mit*

the canton.police   assumes   SEPREF that the loot   not   with

*(einem) Fahrzeug abtransportiert worden ist.

  a   car   removed   was   is

'The cantonal police assume that the loot has been carried away

without using *(a) car.'

While semantically equivalent to (20b), (22) requires the presence of a determiner. It has sometimes been argued that syntactic objects of *ohne* describe the non-specific complement set of the respective object.[6] So [*ohne* N] refers to entities that denote the complement of N, but the elements of this set do not play a role. Consequently, the entities should not be discourse transparent (and neither should the interpretation of N be), and the phrase would not need a determiner. But if [[*ohne N*] V] is grammatical because the non-specific complement set of N is addressed, we should be able to replace it by [*nicht* [[*mit* N] V]] *salva congruitate* – counter to our observations in case the determiner is missing in (20b) and (22).

Consequently an analysis of determiner omission that rests on the semantics of the phrase – assuming non-specificity being at stake here – is not tenable.

3.2   Negative Contexts

The discussion around (20) and (22) has shown that invoking a non-specific complement set as the interpretation of *ohne N* does not account for the different distribution of determiner omission with *mit*. What is more, we can

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[6] This is the gist of an argument raised by an anonymous reviewer, and Annie Zaenen and Chris Potts raised similar concerns in a talk given by the first author. We would like to thank them for addressing this issue.

observe that Ns contained in PNCs headed by *ohne* can be discourse transparent, as is illustrated in (23).

(23) Hans war ohne   Hose$_i$ zur Party   gekommen. Er hatte sie$_i$
      Hans was without trousers to.the party came.part   he had it
      zuhause vergessen.
      at.home forgotten
      '*Hans arrived at the party without wearing trousers. He had forgotten them at home.*'

Although (23) already casts doubt on an analysis of determinerless *ohne*-phrases that may suggest that the determiner is not needed for the simple reason that it cannot escape the negation, let us still pursue the consequences of such a proposal. According to this view, negative contexts must be taken into account: It is well known that negation may block the accessibility of a discourse referent. Kamp and Reyle (1993) illustrate this phenomenon with the following example.

(24) Jones does not own a Porsche. #He likes it.

The discourse referent of the indefinite NP *a Porsche* is embedded in a complex condition prefixed by a negation, and cannot be accessed by the pronouns in the following sentence.

Now, a lack in discourse accessibility must not be confused with weak referentiality. If we assume the analyses in Farkas and de Swart (2003), de Swart (2012), and Alexandropoulou et al. (2013), weak referentiality can be equated with a *missing* discourse referent, while conditions imposed on dis-

course accessibility simply make *available* discourse referents *inaccessible.* Still, one could argue that there is less need for determiners in negative contexts since determination is required to express reference. Since transparency across negation is blocked anyway, there is no need for a determiner. It should be clear that there are various arguments against such an idea, the first being that the NP-internal realisation of a determiner is taken to be dependent on an NP-external negation. From the perspective of syntactic locality, such a combination is doubtful.

Moreover, Kamp and Reyle (1993: 106) and Seuren (2010: 372ff.) have already called into question the barred accessibility of discourse referents introduced by *indefinite* determiners. The following examples illustrate this point:

(25)   a.   Jones does not like a Porsche. He owns it.
       b.   Pedro does not own a donkey. It is a fiction of his mind.

In an experimental study, Kaup (2001) has further argued that invoking the term of situated givenness could provide a more plausible account of the accessibility of discourse referents under negation. Discourse referents embedded under negation are accessible according to Kaup (2001) if the referents relate to something given prior to the situation, while in situations of creation (where the elements are not given prior to the creation), the discourse referents are typically not accessible.

The behaviour of *ohne* seems to confirm Kaup's analysis at least partially – the availability of a discourse referent with determinerless complements of *ohne* seems to depend on the interpretation of *ohne* as well.

(26) a. Hans kaufte ein Haus ohne Garten. #Er interessierte ihn nicht.
Hans bought a house without garden it interested him not
'*Hans bought a house without a garden. #It did not interest him.*'

b. Hans kaufte ein Haus ohne Garten. #Er brauchte ihn nicht.
Hans bought a house without garden he needed it not
'*Hans bought a house without a garden. #He did not need it.*'

The examples in (26) only seem to allow a weakly referential interpretation of *Garten*; the bare noun can neither be taken up by a pronoun in subject (26a) nor in object position (26b). In (26) *ohne* assumes the mereological sense of (privative) presence. If we follow Kaup's reasoning, if a house is without a garden, the latter is simply not given.

If we compare (26) to (23), the observed discourse transparency in the latter case might be derived as follows: in a prototypical situation where people attend a party, they do this being dressed, and trousers ('Hose') form part of the dress code. Hence, the interpretation *participation (comitative)* may resist the context of negation because the pertinent referent is already identified as prototypical. It should be clear that a scope-based analysis cannot deal with the transparency of *Hose* in (23), since it would require that the noun takes scope over or under negation; the former option would wrongly make it possible that (23) received an interpretation where *Hans* in fact

wore a pair of trousers (but not the one that he forgot to take with him). This interpretation is impossible for (23).

Finally, we would like to point out that the invocation of negative contexts would fall short of accounting for *referential* interpretations of *ohne's* determinerless complements that come about due to internal modification, as e.g. through a relative clause.

Espinal and McNally (2011) point out that weakly referential nouns cannot be modified by non-restrictive relative clauses and illustrate the observation with the following examples from Catalan:

(27) Per fi   hem   trobat *(un) pis,   que començarem a
     for final have.1pl found   an apartment that begin.fut.1pl to
     reformar molt aviat.
     renovate very soon
     '*At last we have found *(an) apartment, which we'll begin to reno-
     vate very soon.*'

According to Espinal and McNally (2011), the ungrammaticality of (27) with the determiner dropped is due to the lack of a discourse referent.

Determinerless complements of *ohne,* however, can be modified by non-restrictive relative clauses. The combination of the relative clause with the determinerless complement of *ohne* applies in the scope of negation, and hence, strong referentiality of the complement of *ohne* can be shown to exist irrespective of negative contexts.

(28) a. Mit dieser Initiative wird endlich eingestanden, dass die

with this initiative is finally admitted that the

Problematik der faulen Kredite in Nippon *ohne einen konzisen*

problem of.the bad credits in Nippon without a concise

*Plan***,** in dessen Zentrum der Einsatz öffentlicher Gelder steht,

plan in whose core the use public funds is

nicht aus der Welt geschafft werden kann.

not out.off the world turned be.pass can

'*It is finally admitted with the launch of this initiative that the problem of bad credits in Nippon cannot be solved without a concise plan that is based on the use of public funds.*'

b. KVZ-Geschäftsführer Peter Vonlanthen betonte, dass der KVZ

director.of.the.KVZ Peter Vonlanthen emphasized that the KVZ

nicht generell gegen längere Ladenöffnungszeiten sei; *ohne*

not in general against longer shopping.hours would.be without

Gesamtarbeitsvertrag für das Verkaufspersonal - der

collective.labour.agreement for the sales.personnel that

bekanntlich nicht zustande gekommen ist - könne man die

as.is.known not in.effect came is could one the

Vorlage indes nicht gutheissen.

proposal meanwhile not approve

'*Peter Vonlanthen , the director of the KVZ, emphasized that the KVZ was not generally opposed to long shopping hours; but fir the time being they could not approve the proposal without the collective labour agreement for the sales personnel, which couldn't be reached – as is well-known.*'

Example (28a) shows a non-restrictive relative clause modifying an *ohne*-PP.

The relation between the NP and the relative clause thus corresponds to Es-

pinal and McNally's example (27), which is not surprising in itself since the NP contains a determiner. Example (28b), however, shows a non-restrictive relative clause modifying an *ohne*-PNC. The relationship between the non-restrictive relative clause and the noun is not mediated by an (overt) determiner, and still the example is perfectly grammatical, thus contrasting Espinal and McNally's example (27) where the determiner is not optional.

In addition, the examples further illustrate that *negative contexts* cannot be at the heart of determiner omission with *ohne*. The prepositions *mit* and *ohne* differ with respect to determiner omission, and the difference cannot be accounted for by either assuming that *ohne* introduces a non-specific interpretation of its complement, nor by invoking negative contexts. The distribution of the two prepositions is different; as will be further corroborated in the following section.

4.   Adjectives and omission

According to the two GLMMs for *mit* and *ohne,* the presence of a prenominal modifier (an adjective) is an indicator for determiner realisation with *ohne;* for *mit,* however, adjectival modification speaks in favour of determiner omission. In the foregoing discussion, we have not taken into consideration the syntactic context within the PP, apart from the presence or absence of a determiner. We will now distinguish completely bare PNCs, i.e. PNCs that solely consist of P and N from prenominally modified and post-

nominally extended PNCs. A closer look into the data reveals that the internal structure of PNCs headed by *ohne* differs with respect to prenominal modification, as well as to postnominal extension, from the internal structures typically found with *mit.*

Table 3 lists the occurrences of prenominal and postnominal modification with 15 nouns that occur most frequently in PNCs headed by *mit* and *ohne,* respectively. The first two columns of the table provide the occurrences of the nouns within a PNC and within a PP. The remaining four columns list whether a PNC occurs bare, prenominally modified, postnominally modified or both pre- and postnominally modified. For each noun, the highest figure is indicated by boldface.

ohne	*PNC*	*PP*	*bare*	*pre-nominal*	*post-nominal*	*pre- and post-nominal*
Niederlage	239	2	**230**	0	9	0
Genehmigung	74	6	23	**24**	23	4
Stelle	72	2	**65**	6	1	0
Vorbehalt	63	5	**57**	4	2	0
Gegentor	46	0	**45**	0	1	0
Umweg	44	24	**20**	3	**20**	1
Konzept	44	3	17	**26**	0	1
Warnung	39	1	**30**	8	1	0
Visum	38	0	**33**	5	0	0
Zwischenlandung	36	0	**34**	0	2	0
Medaille	35	3	**32**	0	3	0
Auftrag	35	1	**18**	13	3	1
Eingriff	33	5	6	**17**	8	2
Lehrstelle	30	0	**29**	0	1	0
Lizenz	26	2	**20**	6	0	0

mit	*PNC*	*PP*	*bare*	*preno-minal*	*postno-minal*	*pre- and post-nominal*
Laufzeit	113	107	13	**80**	1	19

Akzent	65	6	3	**45**	5	12
Schwerpunkt	43	15	9	3	**31**	0
Geste	42	18	0	**35**	0	7
Verweis	41	10	12	0	**27**	2
Pensum	41	4	0	12	0	**29**
Zielsetzung	39	9	0	**30**	1	8
Kind	34	19	14	2	**18**	0
Kamera	22	32	0	**16**	0	6
Vorbehalt	21	7	**11**	3	7	0
Predigt	20	1	**19**	0	1	0
Bart	15	6	**8**	4	2	1
Wirkungsgrad	14	3	0	**10**	0	4
Kapuze	14	0	**7**	3	3	1
Feder	13	3	0	**10**	0	3

Table 3: Distribution of completely bare PNCs and internally extended PNCs for the 15 most frequent nouns occurring in PNCs headed by *mit* and *ohne*

The second half of Table 3 shows that the nouns embedded under *mit* in a PNC only reluctantly occur completely bare. The nouns *Laufzeit* ('term'), *Akzent* ('accent'), *Geste* ('gesture'), and *Zielsetzung* ('objective') predominantly occur with prenominal modifiers – six of the 15 nouns actually never occur bare in the corpus. The nouns *Schwerpunkt* ('emphasis') and *Verweis* ('reference') show a preference for postnominal extension. Once again this is strikingly different for nouns occurring in PNCs headed by *ohne,* as the upper half of Table 3 indicates.

The example in (29) illustrates that the prenominal modifier is obligatory. The example becomes ungrammatical if the adjective is left out. The same condition can be illustrated for postnominal genitive complements in (30). If the postnominal complement of *Genehmigung* ('approval') is left out, (30) becomes ungrammatical.

(29) Einen herbeigeeilten Helfer wies er *mit resoluter Geste* zurück.

a   rushed over   aide   turned he with resolute gesture back

'With a resolute gesture, he turned away an aide, who just rushed over.'

(30) *Mit Genehmigung des Verbandes* kehrt der Schwede im September

with approval   of.the association goes the Swede   in.the September

vorübergehend in seine Heimat   zurück.

temporarily   in his home.country back

'With approval of the association the Swede will return temporarily to his home country in September.'

It is unlikely that the PNCs receive generic or even weakly referential readings in the episodic sentences in (29) and (30). In (30), we are talking about a specific approval, without which *the Swede* could not return to his home country. In the same line of reasoning, it is a specific gesture at the aide that turned him away.

We are dealing with referential interpretations despite the fact that a determiner is missing. This assumption can be further corroborated by examples where the noun is taken up by a relative clause, which is a clear indicator of the presence of a discourse referent:

(31) Seit Turnierbeginn   spielt Fernandez *mit einbandagiertem linkem*

since start.of.tournament plays Fernandez with bandaged   left

Oberschenkel, wo   sie   sich   am   French Open eine Zerrung

thigh   where she REFL at.the French Open a   strain
zugezogen hatte.
incurred   had

'Fernandez is playing since the start of the tournament with a bandaged left thigh, where she incurred a strain trauma at the French Open.'

If we once again compare *ohne* and *mit,* we do not only see that *ohne* allows determinerless realisations, but also that the distribution of *ohne* depends much less on internal modification than the distribution of *mit,* which again casts doubt on the idea that *mit* and *ohne* should receive the same analysis.

Although we cannot provide an analysis currently, we would like to stress that an analysis is insufficient that assigns a determiner-like function to the adjective. Such an analysis would experience difficulties arising from the utter ungrammaticality of determinerless noun phrases in object position that contain APs, as illustrated below:

(32)   Der unbekannte Täter   benutzte   *(eine) blutige Spritze.
        the unknown   culprit employed   a   bloody   syringe
        'The unknown culprit employed a bloody syringe.'

So, if an adjective may take over a determiner-like function, it would not license a determinerless NP in object position, but the same structure will be considered grammatical in the context of a preposition, provided that additional, as well as preposition-specific factors are met. These factors allow a broad range of completely bare, and possibly referential nominal comple-

ments of *ohne.* The range of bare referential nominal complements of *mit,* however, is severely restricted in comparison.

5. Conclusion

We have presented a corpus-based study of determiner omission in PPs headed by the German prepositions *mit* and *ohne.* Despite the fact that they constitute an antonymic pair and share several senses, their distribution is distinct. This observation has gone unnoticed so far and casts doubt in a unified semantic analysis, as e.g. proposed in de Swart (2012).

Our starting point was the invocation of discourse-semantic effects, of discourse transparency and weak referentiality in particular. Initially weak referentiality has been discussed for the case of determiner omission in object position, but a refined analysis for determinerless PPs in the general framework of DRT treats them as weakly referential in the same line. The discourse referent is missing and, hence, the complement of the preposition is not accessible in the on-going discourse.

The data we have presented indicate that determiner omission cannot be reduced to weak referentiality. Depending on the interpretation of the prepositions, we see a variety of effects; most strikingly that determiner omission without weak referentiality is more common with *ohne* than with *mit.* While the negation embedded in *ohne* may be considered as a possible starting point to disentangle the distributions of determiner omission for these two

prepositions, the data show that neither negative contexts nor the idea of non-specificity of the objects provides an analysis of determiner omission in terms of weak referentiality. The comparison of the two prepositions also shows a lexical influence of the noun on determiner omission with *mit* but no such influence for *ohne*.

We have presented counterexamples to the proposal that the reference of a complement in a determinerless PP cannot be picked up in the subsequent discourse by a relative clause or pronoun, which is a proof of their referentiality.

The modification of determinerless PPs by adjectives still leaves a puzzle. Adjectives seem obligatory for licensing the construction with *mit* in some cases. We conclude that determiner omission must be analysed as a multifactorial phenomenon, where weak referentiality plays a major role, but cannot account for the full range of data.

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