

Pseudo-Sloppy Readings in Flat Binding

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Abstract

The paper presents an additional argument for a specific account of semantic binding: the flat-binding analysis. The argument is based on observations concerning sloppy interpretations in verb phrase ellipsis when the binder is not the subject of the elided VP. In one such case, it is important that one of the binders belong to the domain of the other. This case can be derived from the flat-binding analysis as is shown in the paper, while it is unclear how to account for it within other analyses of semantic binding.

1 Introduction

In a recent paper, I introduced a new account of semantic binding (Sauerland, 2007b). The purpose of this paper is to develop an additional argument in favor of the account. The argument is based on an investigation of cases of binding into elided structures extending observations by Takahashi and Fox (2005) and Hardt (2006).

Semantic binding is one of the central concepts of linguistic semantics. But since the mechanisms underlying semantic binding are rarely discussed, it is useful to recapitulate some basic properties of the concept. One core case of the phenomenon is binding of a pronoun by a quantificational expression in the same clause as in *Every boy likes his own father*. When applied to this sentence, the mechanism that establishes semantic binding has to ensure that, if John, Bill, and Harry are the relevant boys, John likes John's father, Bill likes Bill's father, and Harry likes Harry's father. To ensure that the subject and the possessor position co-vary, any account of binding must involve a mechanism of storage and retrieval. Furthermore, the mechanism must have the capacity to store and retrieve more than one item since binding dependencies can overlap as in *Every boy told his mother that he likes her*. The core distinction between the standard logic-based accounts binding and the flat-binding account I advocate concerns the nature of this storage and retrieval mechanism: standard accounts are position-based – the memory is organized in a sequence of positions and access to memory is always by reference to specific position. In the flat-binding model, however, memory is not structured into positions and retrieval of a particular kind of item

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from memory is only possible by making use to an inherent property uniquely identifying the item. The two accounts assume the different logical form representations illustrated in (1) for the example already discussed above, where I assume a version close to Heim and Kratzer's (1998) textbook of the position-based account.¹ In particular, where the position-based account makes reference to specific positions of the memory structure assumed (i.e. the assignment sequence), the flat binding account employs definite descriptions to uniquely identify a referent in memory.²

- (1) Every boy likes his own father.
- a. *Position-based*: Every boy $\lambda 1$ t_1 likes hi_1 's own father.
 - b. *Flat binding*: Every boy: the boy likes the boy's own father.

This paper develops a new prediction the flat binding account makes. The prediction concerns the interaction of ellipsis and pronominal anaphora. I call the phenomenon *Pseudo-Sloppy Readings*. These are similar to *true* sloppy readings that are available in many cases of ellipsis as in *The boy likes his father and the man does too*. However, true sloppy readings on the flat binding analysis are derived on the basis of representations like (2) where the definite descriptions the pronoun corresponds to in the antecedent VP and the elided VP are different (Sauerland, 2007a). The flat binding analysis relies on structure sharing for these cases to get the content of the definite description right, which is indicated by the lines connecting the two NPs in (2) (see section 3.3 below).

- (2) The boy likes hi[the boy]'s father and the man does like [the man]'s father

The flat binding account predicts, however, that there should be some cases where use of the same definite description in both the antecedent VP and the elided VP leads to a sloppy reading – these are what I call *pseudo-sloppy* readings here and in the following. I argue below that (3) is a case of a pseudo-sloppy reading.

- (3) Every boy likes hi[the boy]'s father. Even this boy does like [the boy]'s father

The representation for a normal sloppy reading like (2) differs from the pseudo-sloppy reading (3) only by the presence of structure sharing in (2). Furthermore, the interpretations of a normal sloppy reading and a pseudo-sloppy reading of the same sentence are identical. However, pseudo-sloppy readings are expected to be less constrained than sloppy readings. The argument for pseudo-sloppy readings in this paper is therefore based on cases where the normal sloppy reading is blocked, but we nevertheless observe a sloppy interpretation where a pseudo-sloppy interpretation is predicted to be possible. Specifically, I show in this paper that Hardt's surprising sloppy reading

¹I added a λ in the representation in (1-a) over the representations of Heim and Kratzer (1998) since this makes the representations easier to read when not given as trees. The most interesting other variant within the class of position-based accounts are accounts based on combinatorial logic where the storage sequence is unified with the sequence of arguments of a predicate (Curry, 1930; Geach, 1972). For my purposes in this paper, however, the differences between the combinatorial logic based account and the standard position based account do not matter, hence, I concentrate on the standard account.

²When writing *hi's* as in (1-a), I assume that the possessive pronouns consists of a pronoun (*hi*) and a genitive case marker (*'s*), but sometimes often are spelled out by single, suppletive form.

(Hardt, 2006) are a case where normal sloppy readings are blocked, but pseudo-sloppy readings like (3) are possible. This is indicated by contrast in (4), where (4-a) does not allow a sloppy interpretation, but Hardt's (4-b) does if Bill is a boy:

- (4) a. #Nearly every boy said Mary hit him. But the adult witness didn't say she did.
 b. Nearly every boy said Mary hit him. But Bill didn't say she did. (Hardt, 2006, (3))

Such contrasts argue for the existence of pseudo-sloppy interpretations. These in turn corroborate the flat-binding analysis since it predicts the existence of pseudo-sloppy interpretations.

Section 2 discusses the constraint exhibited in (4) in more detail and outlines the approaches of Takahashi and Fox (2005) and Hardt (2006). As we will see neither of the two accounts predict the contrast in (4): Takahashi and Fox (2005) predict the sloppy interpretation to be impossible for both examples, while Hardt (2006) predicts the sloppy interpretation to be possible in both cases. Section 3 develops the relevant parts of the flat-binding account to show that the flat-binding account actually predicts the contrast in (4). Section 4 is the conclusion.

2 Constraints on Sloppy Interpretations

Sloppy interpretations have played a major role for accounts of VP-ellipsis since at least Sag (1976) and Williams (1977) worked on the topic. The initial problem it presents for the ellipsis theorist is that a pronoun that is not bound like *her* in (5-a) must refer to the same individual in both the antecedent and the elided VP. But, a bound pronoun like *his* in (5-b) can refer to two different individuals; John and Bill.

- (5) a. John likes her father. Bill does ~~like her father~~, too.
 b. John likes his father. Bill does ~~like his father~~, too.

Working in a framework where pronominal reference is determined by positions of an abstract assignment sequence, Sag (1976), Williams (1977), and Bach and Partee (1980) all drew the following conclusions. (5-a) shows that the indices born by a pronoun in an ellipsis and the corresponding pronoun in the elided phrase must be identical. Bound pronouns, however, could be bound within the elided VP and its antecedent as shown in (6).³

- (6) John does $\underbrace{\lambda x x \text{ like } x\text{'s father}}_{\text{antecedent}}$. Bill does $\underbrace{\lambda y y \text{ like } y\text{'s father}}_{\text{elided}}$.

The formal system derived from predicate logic these author's assumed predicts that alphabetic variants – constituents that are identical except for the indices of bound ele-

³The analysis assumes one ingredient first made explicit by Heim (1997) as the *No Vacuous Coindexing* Principle in (i). It blocks reuse of the same binder index.

- (i) If an LF contains an occurrence of a variable v that is bound by a node α , then all occurrences of v in this LF must be bound by the same node α .

ments and their binders – have the same interpretation. Therefore, ellipsis is expected to be licensed in (6).

The Sag-Williams analysis predicts that a sloppy interpretation should only be possible when the binder is the subject of the elided VP: Only then can the elided VP and its antecedent both contain the λ -operator binding pronouns. Sag and Williams observe cases where this prediction is borne out. Consider the contrast in (7) from Hardt (2006): While a sloppy interpretation is available for (7-a), it is blocked for (7-b).

- (7) a. John said Mary hit him. Bill did Δ too
 Δ = said Mary hit John / said Mary hit Bill
 b. John said Mary hit him. Bill said she did Δ too
 Δ = hit John / *hit Bill (Hardt, 2006, (2))

However, starting with Evans (1988) researchers found that the generalization predicted by the Sag-Williams analysis is incorrect. Evans (1988) pointed out examples with extraction like (8-a) where the traces in the antecedent and the elided VP have different binders. Later also examples with pronouns like (8-b) were found that do not correspond to the Sag-Williams analysis (Jacobson, 1992). Both examples in (8) are counterexamples for the Sag-Williams analysis because the elided VP contains a bound variable, but its binder is not the subject of the elided VP.

- (8) a. You can tell [which parts]_i Partee wrote t_i and [which parts]_j Bach did ~~write~~ t_j
 (Evans, 1988, 125)
 b. Everyone hopes that Sally will marry him, but Bill knows that she will Δ
 Δ = marry Bill (Hardt, 2006, (5))

Rooth (1992) proposed a new analysis of ellipsis licensing that allows ellipsis in cases like (8-a) and (8-b). In his analysis, ellipsis is licensed by a parallelism domain which must include the elided VP, but can be a bigger constituent than the just the elided VP. Rooth's statement of the parallelism furthermore uses a focus sensitive notion of parallelism according to which focussed constituents are exempt from parallelism. Specifically, Rooth's analysis requires licensing within a bigger constituent for the sloppy readings in (8). For (8-a) the constituents relevant for licensing are indicated in (9), and also the focus on the subject of the second conjunct, which is necessary for parallelism.

- (9) You can tell [which parts]_i Partee wrote t_i and [which parts]_j [Bach]_F did ~~write~~ t_j
antecedent parallelism domain

Rooth's analysis correctly predicts the possibility of ellipsis in (8), but incorrectly predicts that ellipsis should be licensed for the sloppy interpretation of (7-b). Takahashi and Fox (2005) show that this gap is filled by adding a condition that requires ellipsis to be maximized within a parallelism domain. Merchant (2008) showed in detail the need for this condition in cases of sloppy readings.⁴ Takahashi and Fox propose to add the condition in (10) to Rooth's account of ellipsis licensing.

⁴Ellipsis maximization was first suggested by (Fiengo and May, 1994, 107) in this context to the best of my knowledge.

- (10) *MaxElide* Elide the biggest deletable constituent reflexively dominated by P[parallelism]D[omain]. (Takahashi and Fox, 2005, (21))

Now the sloppy interpretation of (7-b) is correctly ruled out as shown by representation (11): The minimal parallelism domain must include the binder of the sloppy pronoun. But, then ellipsis is not maximal within this parallelism domain since ellipsis of the bigger constituent *say she hit him* is also be licensed.

- (11) Bill λx said she did ~~hit x~~
 minimal PD

Takahashi and Fox's account correctly predicts the strict reading of (7-b) to be available since the parallelism domain can be smaller than the one indicated in (11). Furthermore, it predicts that the sloppy reading should become available if any of the material in the higher potential ellipsis target is focused and thereby blocks ellipsis. This prediction accounts for the availability of sloppy interpretations in (8).

Hardt (2006), however, shows that Takahashi and Fox's account makes the wrong prediction for the following example (repeated from (4)):

- (12) Nearly every boy said Mary hit him. But Bill didn't say she did Δ .
 Δ = hit Bill (Hardt, 2006, (3))

Takahashi and Fox's account applied to (12) doesn't predict the sloppy interpretation to be available because ellipsis of the constituent *say she did* is licensed. Therefore, Hardt (2006) rejects the *MaxElide* condition and instead proposes the constraint in (13).

- (13) Rebinding is possible only when necessary to satisfy parallelism.

Hardt assumes furthermore that (13) is checked sequentially for any potential parallelism domain containing the ellipsis site starting with the smallest. Whenever there is a focus domain licenses the strict reading but not the sloppy reading, the sloppy reading is blocked. Therefore, constraint (13) entails that sloppy readings should be constrained to two cases:⁵ either the binder is part of the smallest parallelism domain containing the elided phrase or the binder in the antecedent is a quantifier and therefore a strict interpretation is not available.⁶ Hardt's account correctly predicts (12) to permit a sloppy interpretation because the relevant binder in the antecedent is a quantifier. And for example (7-b), the sloppy reading is correctly ruled out because the strict reading is available.

⁵One further area where Takahashi and Fox's account differs from Hardt's are the examples (8). Hardt predicts (8) to be good because a quantifier binds the pronouns in the first clause, while Takahashi and Fox predict (8) to be good because some material between the binder and the minimal parallelism domain is focused. Hardt offers the absence of a sloppy reading in the example (i) to support his account. However, pragmatic factors independently create a bias towards the strict reading in (i), and the modified version in (ii) seems to allow a sloppy reading.

- (i) Bill believes that Sally will marry him, but everyone knows that she won't. (Bach and Partee, 1980)
 (ii) Bill still believes that Sally will marry him, but everyone else knows that she won't.

⁶Here, we are restricting our attention to examples where the elided VP is outside the scope of the binder of the antecedent clause. In other cases, quantificational antecedents can license strict readings.

However, the contrasts in (14) and (15) are problematic for Hardt's account. A quantifier is the binder in the first conjunct in all four examples. Nevertheless there is a contrast in grammaticality. I propose that the contrast is due to the fact that the binder in the second conjunct is an element of the domain of quantification of the quantifier in the first conjunct in (14-a) and (15-a), but not in (14-b) and (15-b).

- (14) a. Nearly every boy said Mary hit him. But Bill didn't say she did.
 b. #Nearly every boy said Mary hit him. But the adult witness didn't say she did.
- (15) a. Almost every boy hopes that Sally will marry him. Even this boy hopes that she will.
 b. #Almost every boy hopes that Sally will marry him, and even the teacher hopes that she will.

The generalization established is that a sloppy reading in apparent violation of Max-Elide is possible if and only if the nominal binding into the elided VP denotes an individual that is an element of the domain of the quantifier binding into the antecedent VP. In the following section, I derive this generalization from the flat binding account.

3 Pseudo-Sloppy Readings

3.1 Flat Binding

The flat-binding account assumes that pronouns are always reduced definite descriptions. More specifically, pronouns are agreement heads followed by an elided DP in the structure shown in (16). In the following, pronouns are represented as him ~~(the boy)~~.

- (16) him =
- $$\begin{array}{c}
 \phi P \\
 \swarrow \quad \searrow \\
 \phi \quad \quad DP \\
 | \quad \quad \triangle \\
 [3.SG] \quad the\ boy
 \end{array}$$

Languages that assign nouns to grammatical gender or noun classes provide one piece of direct evidence for the presence of a noun in pronouns. For example, a German speaker must use the appropriate gender when referring deictically to a piece of silverware: feminine *sie* for a fork, masculine *er* for a spoon, and neuter *es* for a knife. The appropriate gender is determined by the grammatical gender of the noun: *Gabel* ('fork') is feminine, *Löffel* ('spoon') masculine, and *Messer* ('knife') neuter. The same generalization – the noun class of deictic pronouns is determined by the noun class of the appropriate noun – is also observed in Bantu (Laura Downing, p.c.) and argues directly for the obligatory presence of a noun in every pronoun. Further evidence is presented elsewhere (Sauerland, 2007b, 2008).

The flat binding analysis seems suitable for capturing the generalization developed at the end of the preceding section in a straightforward way: For (15-a), the representation in (17) can capture the sloppy interpretation, where VP-ellipsis should be licensed since antecedent VP and elided VP are identical. I call a sloppy reading resulting from

identity of antecedent VP and elided VP as in (17) *pseudo-sloppy* since for the more familiar cases of sloppy interpretations such as (5-b) a different representation is necessary (see below).

- (17) Almost every boy hopes that Sally will marry him~~{the boy}~~. Even this boy hopes that she will marry him~~{the boy}~~.

Note that a representation like (17) would not predict a pseudo-sloppy interpretation for (15-b) since the subject of the second conjunct there, *the teacher*, is not a possible referent for *the boy*. The division between sloppy and pseudo-sloppy leads me to an account of the facts presented in the previous section where Takahashi and Fox's analysis is essentially maintained as a constraint only on sloppy readings, while Hardt's exceptions are analyzed as pseudo-sloppy readings. The goal of the remainder of this section is to integrate the flat binding account of (17) with general principles of DP and VP-ellipsis and to thereby delineate between cases where sloppy readings are available, where pseudo-sloppy readings are available, and where no sloppy interpretation is possible. This requires a more detailed understanding of the flat binding analysis.

The main concern of my 2007 paper (Sauerland, 2007b) was to show that, in any case of semantic binding, there are appropriate definite descriptions to allow the flat binding account to go through and that furthermore a general account of ellipsis would license DP-ellipsis of the definite description in all cases. Consider the two following examples:

- (18) a. Every actress wrote about every singer that she likes her singing.
b. Every actress wrote about every actress that she likes her singing.

Example (18-a) raises the problem of individuals like Jennifer Lopez who is both an actress and a singer. (18) has an interpretation that is only true if Jennifer Lopez wrote to herself that she likes her singing in addition to many other acts of writing, which seems to result in non-uniqueness in representation (19).

- (19) Every actress wrote about every singer that she~~{the actress}~~ likes her~~{the singer}~~'s singing

For this reason, individual concepts (i.e. functions from a set of worlds to individuals) and not bare individuals are the items stored in memory. In particular, I made use of the following definition: An individual concept x is *maximal for property P* , if and only if a) x is defined for all words w where at least one individual with property P exists and b) wherever defined x yields an individual with property P as value.⁷ Now it is possible to capture Jennifer Lopez as a actress and Jennifer Lopez as a singer by using different concepts, one maximal for *actress*, the other maximal for *singer*, which both yield Jennifer Lopez as value for those worlds that are part of the common ground.

Example (18-b) leads to a further question since both quantifiers range over actresses. I (Sauerland, 2007b) argue though that the second noun phrase *actress* in examples similar to (18-b) can contain additional lexical material in the restrictors of the quantifiers. The representation (20) elaborates this proposal for (18-b).

⁷Properties are of type $\langle e, \langle s, t \rangle \rangle$ and adopt the convention a concept x has property P if and only if for all $w \in \text{domain}(P)$ the statement $P(x(w))(w)$ holds.

- (20) Every actress wrote about every [actress]_F ~~[of interest to the actress]~~ that she ~~[the actress]~~ likes her ~~[the actress of interest to the actress]~~'s singing.

Note that because the property *actress of interest to the actress* is logically strictly stronger than the property *actress*, the maximal concepts corresponding to the former property are always defined for a smaller set of worlds than the later. However, any maximal concept for the property *actress of interest to the actress* also has the property *actress*. The definite *the actress* always chooses the maximal concept introduced by the quantifier *every actress* because a definite always chooses the concept with the biggest domain. Only *contextual* concepts, whose domain is exactly the context set, can be entered into discourse storage, while maximal concepts only remain in memory within a sentence. In sum, the partial salience order among concepts a definite description refers to is the following:⁸

1. maximal concept in memory with wide domain, i.e. maximal *actress*-concept
2. maximal concept in memory with small domain, i.e. maximal *actress of interest to the actress*-concept
3. contextual concepts in memory, i.e. set of *actress*-concept corresponding to the actresses under discussion
4. concept not in memory, i.e. concepts of actresses in the current context set

As representation (19) illustrates, I assume that there may be both partial ellipsis or total ellipsis applying at the DP level. Both kinds of ellipsis may be licensed by a bigger parallelism domain like VP-ellipsis in Rooth's analysis (see above). For ellipsis licensing in DP, I apply the principle of deletion up to recoverability (Chomsky and Lasnik 1993 and others), where I assume that what needs to be recovered is the referent of the DP. Spelling out the condition requires several case distinctions depending on the category of the parallelism domain: definite DPs, other NPs and finally TPs. First consider definite DPs that do not contain a focus: Two structures are defined to be *Ellipsis Alternatives* if their phonological representations are identical. Then, a definite DP that contains no focus is licensed as a parallelism domain if and only if there is no ellipsis alternative DP' such that DP' refers grammatically to a concept x' that has as its domain a superset of the domain of the concept that DP refers to. This case is for example relevant to pronouns, which are elided DPs and therefore must not contain any focus. For example, ellipsis in ~~she~~~~[the actress]~~ in (19) is licensed by this principle because the quantifier *every actress* introduces a maximal actress concept, which has maximal salience for *actress*. However, licensing of the two other ellipses in (19) does not fall under this case because the first contains a focus and the second cannot be licensed at the DP-level since we just saw that the most salient concept for a feminine pronoun to refer is actress-concept introduced by the first universal quantifier *every actress*.

⁸I added the case of a concept not yet in memory where I assume a definite *the P* picks out the contextual concept referring to the plurality of all entities with property *P* in each world of the context set. Sauerland (2007b) uses a second concept of salience in the account of number agreement. This is not relevant in the following. The concept of salience use here corresponds to d-salience

The third condition licenses a definite DP that contains a focus as a parallelism domain: the most salient focus alternative of XP must be more salient than the most salient focus alternative for any focus alternative of XP. This condition is relevant for licensing ellipsis in *every [actress]_F ~~of interest to the actress~~*. Two further assumptions I make are the following: One, the processing of *x write about* makes salient the set of people *x* might write about, i.e. the set of people that are of interest to *x* is added to memory. Two, ellipsis with NP as parallelism domain is licensed if ellipsis of the definite DP consisting of *the* and the NP is licensed. With these assumptions, ellipsis of the adjunct in *every [actress]_F ~~of interest to the actress~~* is licensed: The focus alternative *the people of interest to the actress* refers to the concept of people of interest to the actress. And furthermore, though there is one ellipsis alternative referring to a more salient concept, namely *the actress* referring to the maximal actress-concept, using *the actress* to refer to the maximal actress concept is ruled out by MaxElide.

Finally, consider the ellipsis in *her ~~the actress of interest to the actress~~*. Why is the ellipsis alternative *strikeout[the actress]* not preferred though it refers to a more salient concept? In this case, ellipsis must be licensed with TP as a parallelism domain. The antecedent for *she ~~the actress~~ [likes]_F her ~~the actress of interest to the actress~~ [singing]_F* can be the sentence *Every actress wrote about every actress ~~of interest to the actress~~ that ... since write that ... about* is a focus alternative to *like* via the inference from *x writes about y* to *x knows y*.⁹

3.2 Deriving Pseudo-Sloppy Readings

The system derives pseudo-sloppy readings in a different way from normal sloppy readings. Consider first case (15-a) of a pseudo-sloppy reading. The representation of this reading is shown in (21).

- (21) Almost every boy hopes that Sally will marry him ~~the boy~~.
Even the [demonstrative] boy hopes that she will marry him ~~the boy~~.

The universal quantifier *every boy* adds a maximal boy-concept, but also the contextual concept of all the boys to the memory. The pronoun *him ~~the boy~~* refers to the maximal concept resulting in the bound interpretation. Then in the second clause, *the [demonstrative] boy* selects a contextual *boy*-concept – I assume that the feature *[demonstrative]* is interpreted as the property of being indicated by the center of a possible world through a gesture. Therefore, two contextual *boy*-concepts – that of all boys and that of the demonstrated boy – are contained in the memory set when *him ~~the boy~~* is interpreted.¹⁰ However, the singular marking of the pronoun *him* in the antecedent

⁹Fox (1999) argues that inferencing can be involved in ellipsis licensing. That elided material that is part of the antecedent does not block ellipsis in this case because the parallelism domain containing the ellipsis contains a focus in a relevant position (cf. Sauerland 2004).

¹⁰The concept contributed by the quantifier seems to be available, too: Examples like (i) at least in German allow an interpretation where the store-keeper hopes that Mary will buy all the cats. A possible scenario for (i) is the following: In an animation movie, a pet store-keeper does not treat his cats very well. Mary enters the store and is looking at the cats. All the cats want to be bought and the store-keeper is hoping to make a lot of money.

- (i) Every cat hopes that Mary will buy it. And the store-keeper does Δ , too.

and the recency of *this boy* makes the singular concept it introduced the preferred antecedent for *his*. Finally ellipsis of the VP is licensed for any parallelism domain containing the VP because it is exactly identical to the antecedent.

Note that a pseudo-sloppy reading is predicted to be impossible in (22-a) in contrast to (22-b) because in (22-a) the maximal boy-concept remains available when the elided VP is interpreted.

- (22) a. Almost every boy claims that Sally will marry him and that even this boy claims that she will.
- b. Almost every boy claims that Sally will marry him. Even this boy claims that she will.

The mechanism deriving pseudo-sloppy readings directly predicts the generalization observed at the end of the previous section: pseudo-sloppy readings are only available if the DP binding into the elided clause is an element of the range of the DP quantifier in the first clause. For example, observe representation (23) for (15-b). The DP *the boy* in the elided VP cannot refer to the teacher as would be necessary for the pseudo-sloppy interpretation.

- (23) Almost every boy hopes that Sally will marry him~~[the boy]~~.
Even the teacher hopes she will ~~marry him~~[~~the boy~~].

3.3 True Sloppy Readings

The account for pseudo-sloppy readings does not derive most cases of sloppy readings considered in the literature. To derive true sloppy readings within the flat-binding analysis, I developed an account in Sauerland (2007a) as already mentioned above. The account is based on the syntactic idea of structure sharing. (24) is an example exhibiting a true sloppy reading. If the elided VP has *like the boys father* in (24), only the strict reading results.¹¹

- (24) The boy likes his father and the man does too.

For the sloppy interpretation of (24) the representation in (25) is therefore necessary. Representation (25) makes use of structure sharing (or multi-dominance) (Gärtner 2002 and others). Specifically, the word *boy* is linked to the two positions of the structure marked with XXX and correspondingly *man* is linked to the two positions marked with YYY.

- (25) Every XXX likes hi[the XXX]'s father and
 |-----|
 boy
 the [YYY]_F does like hi[the YYY]'s father, too.
 |-----|
 man

Furthermore the first position *man* is linked to is part of a focussed phrase. I define the focus alternatives of an LF-constituent YP as all phrases that are identical to YP

¹¹For simplicity, the representation (24) does not represent movement of the subject, which I actually assume to be necessary.

except for the constituents dominated by an focus marking F. With this definition, the first conjunct of (25) is a focus alternative of the second conjunct because *man* is dominated by an F. Therefore, ellipsis is predicted to be licensed in (25) applying the ellipsis licensing assumptions of Rooth (1992).

Without the structure sharing relationship the sloppy interpretation of (24) cannot be licensed as the two candidate representations in (26) show: Representation (26-a) would receive the right interpretation, but because only the first occurrence of *man* is focussed (i.e. dominated by an F-mark), the first conjunct is not a focus alternative of the second. In (26-b) ellipsis is licensed, but in the second conjunct there is no unique salient boy that the definite description *the boy* could refer to as I argue in the following paragraph.

- (26) a. Every [boy] likes hi_F{~~the boy~~'s father and
the [man]_F does like hi_F{~~the man~~'s father, too.
- b. Every [boy] likes hi_F{~~the boy~~'s father and
the [man]_F does like hi_F{~~the boy~~'s father, too.

Furthermore the account predicts precisely the MaxElide constraint for true sloppy readings (Sauerland, 2007a). This can be seen quite easily: The key mechanism of the account of Takahashi and Fox (2005) is that ellipsis is not licensed in parallelism domains that do not include the binder of a sloppy pronoun. We can verify that this property is a corollary of the present account by looking at representation (25), specifically by considering the parallelism domain that consists of only the elided VP in (27). In this VP, the lexical item *man* is only dominated by one position and it is not dominated by an F-feature in this position. The mechanism of forming focus alternatives only can see the focus dominating the other position *man* is linked to if that position is part of the parallelism domain. Therefore the first conjunct of (24) does not provide an antecedent that would license (27) as a parallelism domain.

- (27) ~~like hi_F{the YYY}'s father~~
|
man

It follows that parallelism domains must include the binding DP when ellipsis in a true sloppy interpretation is licensed. If we then adopt MaxElide from Takahashi and Fox (2005), all their results follow as constraints on true sloppy readings. Pseudosloppy readings, on the other hand, are not expected to be subject to the MaxElide constraint in the same way since Pseudosloppy readings are compatible with narrow parallelism domains.

4 Gender and Sloppy Interpretations

This section presents an additional argument for the existence of pseudo-sloppy readings and the explanation of them within the flat binding proposal. The argument is based on an interaction between sloppy interpretations and grammatical gender that was first observed by Spathas (2007) first observed in Modern Greek and I refer to it as Spathas's Generalization in the following. Since the same generalization holds in German, I assume that Spathas's Generalization requires a general explanation.

In languages with grammatical gender, pronominals in most cases show the same grammatical gender as their antecedent (see Corbett (1991) for typological discussion). As I mentioned above, I assume that the presence of an elided noun in the pronoun explains this apparent agreement. Specifically, I assume that the grammatical gender is due to a gender feature on the noun with which the other gender inflected words in the noun phrase agree with as shown in (29) for (28): The ϕ -head has to contain a gender feature that can agree with the feature on the noun. Hence, a semantically vacuous gender feature is inserted in ϕ for this purpose – NEUT in (29). Other words in the noun phrase that are inflected for gender like the determiner *to* in (28) must then agree with the gender feature on ϕ , and thereby also exhibit the same grammatical gender as the head noun though there is no direct agreement relation.

(28) To koritsi (GREEK)
the.NEUT girl[NEUT]

(29)

```

graph TD
  phiP[phiP] --- phi[phi]
  phiP --- DP[DP]
  phi --- phi_feats["[3.SG.NEUT]"]
  DP --- to["to.NEUT"]
  DP --- koritsi["koritsi[NEUT]"]
  
```

A pronoun that exhibits an appropriate grammatical gender, I claim, also involves a full definite NP in the LF-representation, but the DP is deleted and instead the content of ϕ is pronounced. For example, when the neuter, possessive pronoun *tu* in Greek is used to refer to a girl, I analyze it as in (30).

(30)

```

graph TD
  phiP[phiP] --- phi[phi]
  phiP --- DP[DP]
  phi --- tu["tu.3.SG.NEUT"]
  DP --- to["to.NEUT"]
  DP --- koritsi["koritsi[NEUT]"]
  
```

This explains what is called agreement in grammatical gender in examples like (31) without any syntactic agreement relation between the subject and the possessive pronoun.

(31) GREEK (Spathas 2007: (40-a))
To koritsi pi je sto jrafio tu
the.NEUT girl[NEUT] went to-the office its

‘The girl went to her office.’

As mentioned above, an appropriate grammatical gender must also be used when pronouns or demonstratives are used without an overt nominal antecedent – for instance, deictically. In such cases, grammatical gender could not be explained by an agreement relation with a nominal antecedent. Therefore my proposal covers a broader range of cases of grammatical gender marking on pronouns compared to an analysis based on agreement.

Agreement in grammatical gender, however, is in some cases not obligatory. Both

Greek and German allow pronouns to not agree, but instead express the natural gender of their antecedent. (32) shows that the pronoun that exhibits neuter gender in (31) can instead also exhibit feminine gender with exactly the same interpretation.

(32) GREEK (Spathas 2007: (40-b))

To koritsi pije sto jrafió tis
the.NEUT girl[NEUT] went to-the office her's

'The girl went to her office.'

Hence, Greek allows a switch to the natural gender of the referent of the pronoun instead of use of grammatical gender. While I do not know what class of nouns in Greek allows such a gender switch, in German the switch to the natural gender is possible with human referents of non-infant age.¹² (33) shows the literal translation of Greek (31) and (32) to German. As in Greek, both the grammatical gender and the natural gender are possible.

(33) GERMAN

a. Das Mädchen ging in sein Büro.
the.NEUT girl[NEUT] went in its.NEUT office

b. Das Mädchen ging in ihr Büro.
the.NEUT girl[NEUT] went in her.FEM office

It is also possible in German to switch to the natural gender if the grammatical gender itself is a gender typically associated with animate referents like MASC, as (34) shows with a switch from masculine to feminine.

(34) GERMAN

Jeder weibliche Star hat direkt nach der Auszeichnung
every.MASC female star[MASC] has directly after the award
seine/ihre Eltern angerufen.
his.MASC/her.FEM parents called

'Every female star called her parents right after the award.'

Examples like (34) are slightly awkward because neither choice of gender for the pronoun is fully appropriate, but in my judgement both genders of the pronoun are grammatical, while use of the third gender NEUT is clearly ungrammatical. Furthermore, there is no contrast in acceptability between the two.

Spathas's Generalization Spathas (2007) discovered an interesting generalization concerning the interaction of gender choice and ellipsis in Greek. He observes that a sloppy interpretation is possible in (35) with grammatical gender, but not in (36) with natural gender. In (35), the pronoun in the first conjunct agrees in grammatical gender.

¹²For *Säugling* ('infant'), which is grammatically masculine, only some speakers allow a switch to female gender pronouns when the infant is in fact female. For other native speaker, for example myself, it is odd.

Even though the grammatical gender NEUT is not the gender an overt pronoun bound by the subject of the elided IP, *Janis*, would receive, a sloppy interpretation is possible.

(35) GREEK:

To koritsi pi je sto jrafio tu ke o Janis episis
the.NEUT girl[NEUT] went to-the office its and the Janis too

‘The girl went to her office and John too.’ (strict/sloppy)

In (36), however, the pronoun in the first conjunct exhibits the natural gender, FEM, of its antecedent. This is also not the correct gender for *Janis* and in this case the sloppy interpretation is not available.

(36) To koritsi pi je sto jrafio tis ke o Janis episis
the.NEUT girl[NEUT] went to-the office her’s and the Janis too

‘The girl went to her office and John too.’ (strict/*sloppy)

The contrast between (35) and (36) shows that despite the identical interpretation of the first conjuncts, the difference in agreement has effects on ellipsis interpretation. When the pronoun is agreeing in grammatical gender, the gender feature does not impose any restriction on ellipsis interpretation. But when the pronoun exhibits the natural gender of its antecedent, sloppy interpretation are restriction to those binders with matching natural gender. (37) demonstrates that a sloppy interpretation indeed is available in an example similar to (36) where the subject of the second conjunct has the matching natural gender.

(37) To koritsi pi je sto jrafio tis ke i Maria episis
the.NEUT girl[NEUT] went to-the office her’s and the Maria too

‘The girl went to her office and Mary too.’ (strict/sloppy)

Therefore, I state Spatas’s Generalization as follows:

(38) *Spathas’s Generalization*: A sloppy interpretation for a pronoun that receives a bound variable inpretation is allowed if

- a. either the pronoun agrees in grammatical gender with its antecedent
- b. or the pronoun exhibits the natural gender of its antecedent and the binder of the elided pronoun has the same natural gender.

Spathas’s Generalization also holds for German. The German data is exactly parallel to Greek: (39-a) shows the availability the unrestricted sloppy raiding of (38-a) with agreement in grammatical gender. (39-b) and (39-c) show that the choice of natural gender restricts sloppy readings to binders with the same natural gender.

(39) GERMAN:

a. Das Mädchen soll seine Zähne putzen und der Junge auch.
the.NEUT girl[NEUT] should its.NEUT teeth clean and the boy too

‘The girl should brush her teeth and the boy should brush his teeth, too.’

‘The girl should brush her teeth and the boy should brush her teeth, too.’

- b. #Das Mädchen soll ihre Zähne putzen und der Junge auch.
 the.NEUT girl[NEUT] should her.FEM teeth clean and the boy too
 *‘The girl should brush her teeth and the boy should brush his teeth, too.’
 ‘The.NEUT girl[NEUT] should brush her teeth and the boy should brush her
 teeth, too.’
- c. Das Mädchen soll ihre Zähne putzen und die Mutter auch.
 the girl should her.FEM teeth clean and the mother too
 ‘The.NEUT girl[NEUT]_i should brush her teeth and the mother_j should brush
 her_{i/j} teeth, too.’

Explanation of the Generalization To describe the variation in agreement on bound pronouns that both Greek and German exhibit, I assume that two different logical forms underly the two different agreement patterns. I assume that a bound interpretation can arise from two kinds of representations: one that involves structure-sharing and a second one that involves two independent NPs. The structure sharing representation is shown in (40):

- (40) the — should its {~~—~~} teeth clean
 Mädchen.[NEUT]

Since here the same noun—*Mädchen* in (40)—occupies both the NP position in the bound pronoun and in the antecedent, both DPs must exhibit the grammatical gender of this noun, i.e. NEUT in (40).

The second class of representations possessing the bound interpretation do not involve structure sharing, but two independent occurrences of an NP as is illustrated in (41). The two NPs can be identical as in (41-a), but need not be. In particular, it is possible that an interpretable feminine feature FEM occupies the noun position as in (41-b).

- (41) a. the Mädchen.[NEUT] should its {~~Mädchen.[NEUT]~~} teeth clean
 b. the Mädchen.[NEUT] should her_{FEM} {~~—~~} teeth clean

Both representations in (41) receive the same interpretation as (40): The subject introduces the individual concept of a girl into the memory set as a maximal girl concept. This girl concept will be the most salient concept for both *the girl* and *the FEM* to refer to.¹³

In interaction with ellipsis, however, the representations in (40) and (41) behave differently. The structure sharing representation in (40) as antecedent licenses another representation with structure sharing and therefore a true sloppy reading. For exam-

¹³In example (i), there is an intervening second female referent, even one with grammatical gender [FEM]. A feminine pronoun in the scope of both is ambiguous between the two referents and could also refer to discourse salient individual that is feminine either by natural or grammatical gender.

- (i) Ein Mädchen hat einer Frau erzählt, dass sie sie mag.
 a.NEUT girl.[NEUT] has a.FEM woman.[FEM] told that she her likes

I assume that the pronoun *sie* can contain in addition to the interpretable FEM feature addition lexical material that uniquely identifies the girl in (i).

ple, ellipsis of the IP in (42) is licensed with (40) as antecedent because replacement of the noun *Junge* with the focus alternative *Mädchen* yields a representation with the interpretation as (40). It is irrelevant that the elided pronoun bears a different grammatical gender since this feature does not affect interpretation, which is the only thing ellipsis licensing is sensitive to.

- (42) the — ~~should his [] teeth clean~~
 └─┬──────────┘
 Junge_{F.}[MASC]

The representations in (41), however, can only license pseudo-sloppy readings. Specifically, (41-b) predicts a pseudo-sloppy reading when the subject of the elided IP has feminine natural gender while (41-a) predicts a pseudo-sloppy reading for a subset of the same cases. For example, IP-ellipsis in (43-a) is licensed because the focus alternative derived by replacing *Frau* with *Mädchen* is (41-b). And because the woman the subject refers to is the most salient referent with feminine gender when the elided pronoun *her*, a sloppy interpretation arises. IP-ellipsis is also licensed by representation (43-b), but in this case a sloppy reading does not arise because the subject is masculine and therefore the elided pronoun cannot refer to it.

- (43) a. the Frau_{F.}[FEM] ~~should her[FEM] teeth clean~~
 b. the Junge_{F.}[MASC] ~~should her[FEM] teeth clean~~

Further Predictions The approach predicts that for the availability of the pseudo-sloppy interpretation the grammatical gender of the subject of the elided IP is irrelevant, as long as the natural gender is FEM. This is confirmed by the availability of sloppy interpretation in both (44-a) and (44-b), where the grammatical gender of the subject of the elided IP is respectively MASC and NEUT.

- (44) a. Das Mädchen hat ihre Zähne geputzt und der weibliche
 the.NEUT girl.[NEUT] has her.FEM teeth cleaned and the.MASC female
 Star auch. (strict/sloppy)
 star.[MASC] also
 b. Das kleine Mädchen hat ihre Eltern angerufen und das
 the.NEUT little girl.[NEUT] has her.FEM parents called and the.NEUT
 weibliche Opfer auch (strict/sloppy)
 female victim.[NEUT] too

A second, theoretical prediction arises from the interaction of the material presented in the first section concerning non-local ellipsis and in the present one. We derive that the mechanism yielding pseudo-sloppy readings discussed above must be further restricted.

Recall from (4) that a sloppy interpretation is not available in example (45) and other examples like it.

- (45) #Nearly every boy said Mary hit him. But the adult witness didn't say she did.

We can conclude, therefore, that representation (46) cannot be available from (45) since otherwise a pseudo-sloppy interpretation would be possible for (45).

- (46) Nearly every boy said Mary hit him ~~{the male}~~. But the adult witness didn't say she did ~~hit the male~~.

I propose that the contrast between (45) and examples with a gender mismatch and use of the natural gender is that in the later case only a representation with a interpreted gender feature in place of the noun is forced. In (46), replacement of MALE with the noun *boy* in the first conjunct yields the same grammatical interpretation and overt form. I assume that the general principle in (47) for the resolution of DP-ellipsis in pronouns:

- (47) The elided material must be as restrictive as possible for a given interpretation, but consistent with the gender marking on the pronoun.

5 Conclusion

The argument in this paper is based on data from the availability of sloppy interpretations with VP-ellipsis in English. In particular, it explained the contrast in (48): (48-a) allows a sloppy interpretation, while (48-b) does not.

- (48) a. Nearly every boy said Mary hit him. But Bill didn't say she did. (Hardt, 2006, (3))
 b. Nearly every boy said Mary hit him. But the adult witness didn't say she did.

The generalization underlying contrast (48) was shown to hinge on the question whether the subject of the second conjunct was an element of the domain of quantification in the first conjunct: *Bill* in (48-a) must be understood to refer to one of the boys quantified over in the first conjunct for the sloppy interpretation to be possible, but *the adult witness* in (48-b) cannot refer to a boy.

The generalization does not as far as I can see follows on position based accounts of binding. It follows however on the flat binding account of Sauerland (2007b). On this account, all pronouns are analyzed as covert definite descriptions. In particular, the first conjunct in (48) would be analyzed as *Nearly every boy said Mary hit him~~{the boy}~~*. The difference between (48-a) and (48-b) then derives from the fact that, if we insert in the second conjunct in (48-a) a VP exactly identical to VP in the first conjunct, an apparently bound reading results: *him* in *Bill didn't say Mary hit him~~{the boy}~~* can be interpreted as Bill if Bill is a boy. Since this mechanism does not derive true sloppy readings, I call the sloppy readings of example like (48-a) pseudo-sloppy. I furthermore showed that the mechanism deriving true sloppy readings within the flat binding analysis does not predict a sloppy reading for either example in (48). Therefore the contrast is accounted for completely. Since I do not know of a similar account on other analyses of binding than the flat binding analysis, the result supports the flat binding analysis.

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