Focusing bound pronouns

Clemens Mayr

Abstract The presence of contrastive focus on pronouns interpreted as bound variables is puzzling because such variables do not refer. Therefore it is unclear how two bound variables can be made to contrast with each other. It is argued that this is a problem for both alternative-based accounts such as Rooth's (*Natural Language Semantics* 1: 75-116, 1992) and givenness-based ones such as Schwarzschild's (*Natural Language Semantics* 7: 141-177, 1999). The present paper shows that previous approaches to this puzzle face an empirical problem, namely the co-occurrence of additive *too* and focus on bound pronouns. The account offered is based on the idea that the alternatives introduced by focused bound pronouns denote individuals. Introducing the novel concept *compositional reconstruction*, it is shown that an accordingly modified Roothian analysis of focus licensing allows one to get bound pronouns to contrast with other bound pronouns. The reason for this is that the number of potential alternatives increases. Furthermore a modification of Rooth's ∼-operator is suggested: contrastiveness is a requirement of the operator, which is modelled as a definedness condition. It is argued that in the case of focused bound pronouns a ∼-operator is necessarily inserted in the scope of the quantifier. If this is on the right track, it follows that the phenomenon discussed warrants both an operator interpreting focus as well as a semantic value for the contribution of focus. In other words, a givenness-based analysis must include these two ingredients as well. I show that such an approach can be more or less straightforwardly amended.

Keywords focus · bound variables · alternatives · two-dimensional semantics · givenness

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1 Introduction

Focus invokes alternatives for the constituent focused. This intuition goes back to at least Jackendoff (1972) and has been formalized and defended by Rooth (1985, 1992). So in the sentence in (1) focus on *Mary* makes alternative individuals available that John could have kissed. The focus operator *only* says that of all these alternatives it is false that John kissed them, except for the one stated, i.e., Mary (throughout capitals indicate focal stress).

(1)   John kissed only MARY.

It seems clear what the alternatives must be like in the case of (1). The alternatives must be a set of individuals – that is, a subset of the domain of quantification. Even at this informal stage it is fairly obvious that this idea can be extended to cases of focused constituents other than individual-denoting expressions. For instance, focus can be used to contrast two linguistic objects as in (2). Here we observe that predicate denoting expressions are contrasted, and again we notice that the focus on the verb provides alternatives to the denotation of the verb itself. That is focusing the verb *hugged* provides alternatives of the form {*kissed, hugged, . . .* }.

(2)   A: John kissed Mary.
        B: No, John HUGGED Mary.

The first one to discuss the particular problems caused by focus on bound pronouns – the subject of this paper – was to my knowledge Sauerland (1998) (also cf. Jacobson (2000) and Sauerland (2000, 2008)). Sauerland cites cases of contrastive focus similar to the ones in (3) and notes that focus on the pronoun is optional when read with the bound variable interpretation.

(3)   a.   Every student cut his (own) arm, and every TEACHER cut HIS arm.
        b.   Every student cut his (own) arm, and every TEACHER cut his arm.

Consider (3a). There are three questions arising with respect to (3a). First, what are the alternatives for bound pronouns? By analogy with the examples discussed above, one would be tempted to say that a bound pronoun has individual-denoting expressions as alternatives, because it is of type e itself. But note that it itself does *not* denote an individual as it is bound. Therefore it seems that bound pronouns have alternatives that are different from themselves in nature. This assumption leads to complications for current theories of focus licensing. The nature of the problem is the following: given that the stressed bound pronoun in (3a) has individuals – that is, objects of type e – as its alternatives, the alternatives for the bound variable interpretation of (3a) will have individuals in place of the bound variable. But then the denotation of the antecedent sentence, where the variable is also bound, is not a member of the relevant alternatives. This has the consequence, as we will see, that focus should not be licensed. A second related problem is the following: what does the pronoun in the second conjunct contrast with? It seems that we would like to say that it contrasts with the one in the first conjunct. But since both pronouns are bound, it is not clear how the notion of contrastiveness is to be defined for them. After all bound pronouns lack reference, and it is not straightforward to claim that the bound pronoun in the

antecedent sentence contrasts with the one in the second sentence.[1] Although it is sometimes claimed that contrastiveness does not play an essential role in the analysis of contrastive focus (Rooth 1992), I will defend the view that it actually does. A last puzzle arises with respect to the question why focus on bound pronouns appears to be optional, as evidenced by (3). As has been shown by Schwarzschild (1999), focus is usually not optional. A condition is necessary that reduces the number of foci, his AvoidF. Otherwise, cases of so-called overfocusing should be grammatical. The data in (3) stand in contrast to this.

The present paper proposes the following answers to the three questions raised in the previous paragraph, using a multi-dimensional semantics along the lines of Rooth (1985) and Kratzer (1991) – that is, for each constituent there is an ordinary value and a secondary value, from the latter of which the corresponding focus alternatives are derived: bound variables when focused are indeed not part of the alternatives invoked by the focus-mark (F-mark) on them. The set of alternatives contains only meanings with individuals instead of the bound variables. When such alternatives are activated, there must be *salient alternatives* in the context that have this form. It is argued that the operator interpreting focus – that is, Rooth's ∼-operator – must be inserted locally, i.e., in the scope of the quantifier binding the variable. The relevant alternatives that must be contextually supplied should be such that the bound variable is replaced by individuals. It is proposed that the antecedent sentence makes such a set of alternatives with individuals salient. This will necessitate a modification of Rooth's 1992 theory of focus licensing. In particular, it is claimed that the system allows for more antecedent values relevant for the licensing of focus than is usually assumed. I will argue that the system provides for the possibility to derive through a process of *compositional reconstruction* additional salient alternatives that would not be available from the denotation of the antecedent constituent alone. Of course, we will have to make sure that this mechanism does not overgenerate. The optionality of focus on bound pronouns is accounted for by two assumptions: first, if a bound pronoun bears stress, there is a ∼-operator embedded in the scope of the quantifier interpreting the focus on that pronoun, as already said above. Second there is a contrastiveness requirement (cf. Büring (to appear) and Wagner (2006) a.o.), which is implemented as a presupposition introduced by the ∼-operator. This contrastiveness requirement will make it impossible to drop the focus on the bound pronoun, as it would not be fulfilled otherwise. In other words, when the ∼-operator is present in the scope of the quantifier, the bound pronoun must be stressed. But when it is absent, focus must be absent from the pronoun as well.

The paper is structured as follows: in section 2, I review the problem posed by (3). I show that these data are indeed problematic for a theory relying on the use of alternatives for focus licensing. Section 3 introduces the proposal defended in the present paper. Section 4 discusses the predictions of the present proposal. In particular, it is shown that it can account for well-known data motivating a condition like AvoidF and does not overgenerate otherwise. Section 5 compares the present analysis to other proposals found in the literature aiming at the explanation of (3), in particular Sauerland (2000, 2008) and Jacobson (2000). We will look at novel data calling these approaches into question. Moreover, we discuss how the present problem can be accounted for in

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[1] We will see evidence that the solution to the problem cannot be to assume that what contrasts is the assignments chosen for the variables, where the respective binders are not taken into account. In other words, we will have to find a way to really let the bound variable readings contrast. See in particular subsection 2.2.2 for discussion of this issue.

Schwarzschild's 1999 approach, for which a problem parallel to the one sketched above arises. I will suggest that what is needed to fix this is a second value for interpretation and an operator interpreting F-marks that can reset that second value. Section 6 briefly summarizes and discusses the findings of the paper.

2 The problem of contrastive focus on bound pronouns

I will now discuss the particulars of the problem posed by cases like (3).

2.1 The problem in a theory with focus alternatives

Rooth (1985, 1992) introduces focus values into the semantic computation, which means that F-marks have semantic content. That is, in addition to ordinary semantic values there are focus values. The former value is the usual denotation of a given constituent ϕ, which is derived by applying the interpretation function $[\![\ ]\!]^g$ to ϕ without taking F-marks into account. For the secondary value of constituent ϕ – the one relevant for focus interpretation – I will follow Kratzer's 1991 implementation of Rooth's theory (also cf. Beck (2006), and Wold (1996)). In that theory the focus interpretation of ϕ is derived via a designated assignment function h, $[\![\phi]\!]^{g,h}$. F-marks are distinguished variables subject to interpretation by h. Notice that h will map the variable on F-marked ϕ onto an object of the same type as $[\![\phi]\!]^g$. The secondary value of a constituent ϕ without F-mark is equal to its normal denotation. The secondary value of a complex constituent ψ is defined recursively by taking the secondary values of the subconstituents of ψ and applying the usual semantic rules to them. Consider (4), where *John* bears an F-mark – that is, a distinguished variable. (5a) gives the compositional steps for the ordinary values ignoring F-marks. (5b) gives the steps for the secondary values, which crucially make use of F-marks. Note in particular that here the assignment function h is relevant for interpretation (5bi). The secondary values of *Mary*, *kissed*, and the VP, on the other hand, are equivalent to the respective normal semantic values. The secondary value of the whole sentence is as in (5bv), where again the interpretation of F-marked *John* is subject to the designated assignment h (throughout subscript F indicates F-marks).[2]

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[2] In Rooth's original theory the second interpretation value corresponds to a set of denotations, i.e., alternatives for the denotation corresponding to the F-marked constituent, also referred to as p-sets or focus values. Focus values are then derived recursively by applying pointwise functional application (also cf. Hamblin (1973)). In the theory chosen in the text, p-sets come about by quantifying over designated assignments h, as discussed below. It would have been possible to adopt Rooth's theory. There are, however, two reasons why I chose to follow Kratzer's version. First, it makes it easier to define a rule of predicate abstraction. In Rooth's theory, the standard rule of abstraction would deliver an object of the wrong semantic type. In order to get this right, one would have to assume that variable assignments are inside the alternatives considered – that is, each expression denotes a function from a world-assignment pair to a meaning. This is already assumed by Rooth (1985). Also cf. Büring (1997) and Novel and Romero (2011) for an approach along these lines. Another formulation of the predicate abstraction rule for alternative semantics is proposed in Kratzer and Shimoyama (2002). It would not run into one of the problems considered in the text below. This is, however, due to the fact that it overgenerates alternatives. It has already been observed in a different empirical domain by Shan (2004) that this is the case. The second reason why Kratzer's system is chosen is that it allows us to straightforwardly extend the solution to the problem of focused bound

(4)   JOHN$_{F1}$ kissed Mary

(5)   a.   (i) $[\![\text{John}_{F1}]\!]^g = John$
                (ii) $[\![\text{Mary}]\!]^g = Mary$
                (iii) $[\![\text{kissed}]\!]^g = \lambda y.\lambda x.\lambda w.kissed_w(x,y)$
                (iv) $[\![\text{kissed}]\!]^g([\![\text{Mary}]\!]^g)([\![\text{John}_{F1}]\!]^g) = \lambda w.kissed_w(John, Mary)$
        b.   (i) $[\![\text{John}_{F1}]\!]^{g,h} = h(1)$
                (ii) $[\![\text{Mary}]\!]^{g,h} = [\![\text{Mary}]\!]^g$
                (iii) $[\![\text{kissed}]\!]^{g,h} = [\![\text{kissed}]\!]^g$
                (iv) $[\![\text{kissed}]\!]^{g,h}([\![\text{Mary}]\!]^{g,h}) = [\![\text{kissed}]\!]^g([\![\text{Mary}]\!]^g)$
                (v) $[\![\text{VP}]\!]^{g,h}([\![\text{John}_{F1}]\!]^{g,h}) = \lambda x.\lambda w.kissed_w(x, Mary)([\![\text{John}_{F1}]\!]^{g,h})$
                        $\qquad\qquad = \lambda w.kissed_w(h(1), Mary)$

In other words, the interpretive system assigns two values to each constituent. (6) states the rules for non-branching constituents. If there is no F-mark on such a constituent, its secondary value is identical to the ordinary value.

(6)   *Semantic values for non-branching constituents*
        a.   (i) $[\![\text{A}_{Fi}]\!]^g = g(A)$
                (ii) $[\![\text{A}_{Fi}]\!]^{g,h} = h(i)$
        b.   (i) $[\![\text{A}]\!]^g = g(A)$
                (ii) $[\![\text{A}]\!]^{g,h} = [\![\text{A}]\!]^g$

The rules of functional application and predicate abstraction are defined as in (7) and (8), respectively. Both derive the ordinary and the secondary value following the same schema essentially (below and throughout σ and τ indicate semantic types).

(7)   *Functional application*
        If A is a branching node with daughters B of type $\langle\sigma\tau\rangle$ and C of type σ
        a. $[\![\text{A}]\!]^g = [\![\text{B}]\!]^g([\![\text{C}]\!]^g)$,
        b. $[\![\text{A}]\!]^{g,h} = [\![\text{B}]\!]^{g,h}([\![\text{C}]\!]^{g,h})$.

(8)   *Predicate abstraction*
        If A is a branching node with daughters B of type τ and a numerical index i,
        a. $[\![\text{A}]\!]^g = \lambda x.[\![\text{B}]\!]^{g[x/i]}$
        b. $[\![\text{A}]\!]^{g,h} = \lambda x.[\![\text{B}]\!]^{g[x/i],h}$

Let us now consider how Rooth's 1992 system deals with focus. For contrastive focus and question-answer pairs he assumes the following: a constituent A having an F-mark must have a constituent B dominating it, and there must be an antecedent constituent B$'$ such that the ordinary semantic value of B$'$, $[\![\text{B}']\!]^g$, is a member/subset of the focus value of B, $[\![\text{B}]\!]^f$. I define focus values as follows. The focus value of a given constituent corresponds to the set of secondary values for that constituent arrived at by quantifying over designated assignments h, with H being the set of designated assignments (cf. Kratzer (1991) and Beck (2006)):

(9) $[\![\phi]\!]^f = \{[\![\phi]\!]^{g,h} : h \in H\}$

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pronouns to the theory of givenness argued for by Schwarzschild (1999). The latter also makes use of a designated assignment h. See subsection 5.2.2 for more discussion.

Rooth moreover formalizes his theory of focus licensing by assuming an operator $\sim$. This operator is attached to B and coindexed with the antecedent constituent B$'$. The $\sim$-operator makes use of the denotation of the contextual restriction C, $g(C)$, which stands for a set of contextual alternatives. These alternatives are provided by the antecedent coindexed with the operator – that is, $g(C)$ is set to the ordinary value of the antecedent constituent B$'$. The operator adds the presupposition that $g(C)$ is a subset or a member of the focus value of the sister constituent of $\sim$. The ordinary value of its sister remains unaffected. In more concrete terms, the question-answer pair in (10) has the LFs in (11) (in what follows I will ignore the distinguished variables associated with F-marks whenever I do not discuss the complete semantic derivation).

(10)   Q: Who married John?
         A: RITA married John.

(11)   a.   [$_{\text{CP}}$ who married John]$_1$
         b. $\sim_1$ C [$_{\text{IP}}$ Rita$_F$ married John]

The $\sim$-operator is defined as in (12), where we focus on the case where $g(C)$ is a subset of the respective focus value because this is the more general case. Note that $\sim$ resets the secondary value of the constituent dominating it to its ordinary value. This way no unused secondary values accumulate. In other words, the semantic contribution of an F-mark is used by the first $\sim$ dominating it (also cf. Beck (2006)).

(12)   a. $[\![\sim \text{C } \phi]\!]^g = [\![\phi]\!]^g$
                           if $g(C) \subseteq [\![\phi]\!]^f$, otherwise undefined
         b. $[\![\sim \text{C } \phi]\!]^{g,h} = [\![\sim \text{C } \phi]\!]^g$

Following Hamblin (1973) and Karttunen (1977), the denotation of a question is the set of propositions that qualify as answers, i.e., the denotation of question Q corresponds to the set of propositions {that Mary married John, that Sue married John, that Rita married John, ... }.[3] The denotation of the question in (11a) is thus as in (13a). $\sim$ requires that the meaning of the question is a subset of the focus value of IP in (11b), given in (13b). Under the present assumptions, the two values are in fact equivalent. (13b) is just another notation for the denotation of the question in (13a). So the requirement of $\sim$ is satisfied and the focus is licensed.

(13)   a. $[\![(11a)]\!]^g = \{p : \exists x[p = \lambda w.marry_w(x, John)]\}$
         b. $[\![\text{IP}]\!]^f = \{\lambda w.marry_w(x, John) \mid x \in D_e\}$

Consider now our initial example with the stressed bound pronoun, repeated in (14).

(14)   Every student cut his (own) arm, and every TEACHER cut HIS arm.

The problem for a theory making use of focus values can be characterized as follows: assume the LFs for the first and the second conjunct are as in (15), respectively. I.e., the first sentence functions as antecedent for the $\sim$-operator attached to the second sentence.[4]

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[3] In Karttunen's 1977 theory, a question denotes the set of true answers. I will not assume that the set denoted by a question has only its true answers in it. I.e., I will follow Hamblin (1973) more closely. See Beck and Rullmann (1999) for an argument supporting this view.

[4] The reviewer asks whether it is safe to assume that the LF in (15a) does not have any focus marking. If there were focus on any constituent in the first conjunct, this would not

(15)   a.   [IP every student 3[t₃ cut 3's arm]]₂

      b.   ∼₂ C [IP every teacher$_{F2}$ 3[t₃ cut 3$_{F1}$'s arm]]

Now let us compute the focus value for the constituent ∼ attaches to. First we compute the secondary value of IP, where the distinguished variables on the F-marks are interpreted relative to the assignment function h. The focus value of IP is then as in (16g), where a set of propositions is derived by quantifying over designated assignments. In particular, h will assign properties to distinguished variable 2 and individuals to distinguished variable 1. This means we get as alternatives for the IP-constituent in (15b) the set of propositions spelled out in (17).[5]

(16)   a. $[\![3_{F1}]\!]^{g,h} = h(1)$

      b. $[\![3_{F1}\text{'s arm}]\!]^{g,h} = h(1)\text{'s arm}$

      c. $[\![\text{cut}]\!]^{g,h} = \lambda y.\lambda x.\lambda w.cut_w(x,y)$

      d. $[\![3\ [t_3\ \text{cut}\ 3_{F1}\text{'s arm}]]\!]^{g,h} = \lambda x.\lambda w.cut_w(x, h(1)\text{'s arm})$

      e. $[\![\text{every teacher}_{F2}]\!]^{g,h} = \lambda Q.\lambda w.\forall x[h(2)_w(x) \to Q_w(x)]$

      f. $[\![\text{IP}]\!]^{g,h} = \lambda w.\forall x[h(2)_w(x) \to cut_w(x, h(1)\text{'s arm})]$

      g. $[\![\text{IP}]\!]^f = \{[\![\text{IP}]\!]^{g,h} : h \in H\}$

          $= \{\lambda w.\forall x[P_w(x) \to cut_w(x, y\text{'s arm})] \mid y \in D_e, P \in D_{\langle e,st\rangle}\}$

(17)
$$
\left\{
\begin{array}{c}
\text{that every boy cut John's arm} \\
\text{that every teacher cut the president's arm} \\
\text{that every teacher cut John's arm} \\
\text{that every girl cut John's arm} \\
\text{that every girl cut Mary's arm} \\
\ldots
\end{array}
\right\}
$$

The problem with the focus value in (17) is that the ordinary semantic value of the antecedent, (18), is not a subset of it. Thus the presupposition of ∼ that $g(C)$ be a subset of the focus value in (17) is not satisfied and the focus on the pronoun – and in fact also the one on the antecedent restrictor – should not be licensed. In other words, (14) is predicted to be ungrammatical.

(18) $[\![(15a)]\!]^g = \lambda w.\forall x[student_w(x) \to cut_w(x, x\text{'s arm})]$

The reason for this is clear. The bound pronoun has as its alternatives the set of individuals, i.e., the domain of quantification. But the pronoun itself lacks a referent. I.e., it itself is not a member of that domain. This means that the problem posed by focus on bound pronouns is that the binding relation is destroyed in the alternatives. In

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affect the argument in the text. For focus to be licensed in the second conjunct the ordinary value of the first conjunct is relevant. But this value is not dependent on focus. Note, however, that the problem might, if anything, become even harder if there were focus marking in the first conjunct. Similarly, having the whole of *every teacher* in (15b) F-marked, does not affect the argument about the focus on the bound pronoun. Note that AvoidF, to be discussed in subsection 2.3, would block such superfluous F-marking.

  [5] The same result would obtain in Rooth's original theory. The only difference is that the semantic composition works with alternatives directly. A pronoun is of type *e*. This means that its alternatives are constituted by the domain of individuals. When combining the object with the verb, one would get the set of properties $\{\lambda x.x\ cut\ John's\ arm,\ \lambda x.x\ cut\ Mary's\ arm,\ \lambda x.x\ cut\ the\ teacher's\ arm,\ \ldots\}$. The antecedent quantifier would have as focus value the set of universal quantifiers of the form $\{\lambda P.every\ boy\ P,\ \lambda P.every\ girl\ P,\ \lambda P.every\ teacher\ P,\ \ldots\}$. Applying each member of this set to each member of the focus value of the VP returns (16g).

other words, the binding relation cannot be recovered in the set of alternatives. What we see is the following: in Rooth's theory we run into the problem that the ordinary semantic value of the sentence is not a member of the focus value of the same sentence – that is, of its alternatives. This is because the binding relation of the original sentence is not carried over into the alternatives.

2.2 Two potential worries

Before turning to the issue of optionality of focus on bound pronouns, I have to address two worries that the reader might have at this stage.

2.2.1 Syntactic agreement fails

Given the fact that focus on the antecedent seems to be absolutely required, (19), whereas the one on the bound pronoun is less stable, (20), one might reason that the latter is only a reflex of the former, inherited by a form of syntactic agreement from it. In other words, the focus on the bound pronoun is not interpreted, but only the one on the antecedent quantifier is. I will not go into detail how such a theory would look like, for the reasons noted immediately below.[6]

(19)   *Every student cut his (own) arm, and every teacher cut HIS arm.

(20)   a.   Every student cut his (own) arm, and every TEACHER cut HIS arm.
         b.   Every student cut his (own) arm, and every TEACHER cut his arm.

Whatever specific implementation is chosen, it seems that the prediction of an account relying on syntactic agreement is that whenever part of the antecedent of a bound pronoun is stressed, the pronoun should be possible to be stressed, too. Jacobson (2000) argues that this is incorrect, as the necessary assumptions would predict that stress on the bound pronoun should be possible in examples like (21b), given that part of the antecedent can be contrastively focused. This is, however, not the case. The reason for this, she argues, seems to be that there is no contrasting antecedent for the pronoun itself. The bound pronoun is obligatorily destressed, as only (21a) is an option.[7]

(21)   a.   Every third grade boy ran together with John, and every FOURTH grade
               boy DANCED with his MOTHER.
         b. #Every third grade boy ran together with John, and every FOURTH grade
               boy DANCED with HIS MOTHER/HIS mother.

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[6] It has been claimed in the literature that features like number are not interpreted on bound pronouns. Rather these features are interpreted on the antecedent, whereas none are present on the pronoun at LF. There are different implementations of this general idea. I refer the reader to Heim (2008), Kratzer (1998), von Stechow (2003), a.o. But see Rullmann (2004) for arguments that some of these features must be interpreted on the bound pronoun.

[7] The actual example used by Jacobson is the one in (i). Gennaro Chierchia (p.c.) notes that it suffers from the fact that it could be construed as a right-node-raising construction, which would defeat its purpose. This is why the example in the text contains an internal argument in the antecedent sentence, as well.

(i)   Every third grade boy ran, and every FOURTH grade boy DANCED with his
         MOTHER/*HIS mother/*HIS MOTHER.
         (Jacobson 2000: (17))

Confronted with the construction in (21b), a defender of the syntactic account might propose that it is unacceptable because it does not fit the structural description where the proposed syntactic rule could apply.[8] In particular, one might be tempted to claim that the rule can only apply given the structure in (22). R is the restrictor of the quantifier Q, and the restrictor as a whole must be focused in order for the rule to apply. One could then assume that the rule is prohibited to apply in the structure in (23). It differs from (22) by having not the whole restrictor focused but only a constituent embedded in it. In other words, under this view one would claim that (21b) is impossible, because *fourth*, an embedded element, is stressed. But this would mean that (21b) would correspond to the prohibited (23). (20a), on the other hand, is fine, because it instantiates the good (22).

(22) $[[\text{ Q } [_\text{R} \ldots \text{X} \ldots]_F] \text{ i}[\ldots \text{i}_F \ldots]]$

(23) $*[[\text{ Q } [_\text{R} \ldots \text{X}_F \ldots]] \text{ i}[\ldots \text{i}_F \ldots]]$

However, it is simply not true that a bound pronoun cannot be contrastively focused under the structural description in (23). As (24) shows, even when the focus on the restrictor of the quantifier is embedded in a relative clause, focus on the bound pronoun is optionally available, as long as there is an antecedent with which the bound pronoun can contrast.[9]

(24) a. Every boy who is in elementary school loves his mother, and every boy who is in HIGH school loves HIS mother.
      b. Every boy who is in elementary school loves his mother, and every boy who is in HIGH school loves his mother (too).

So we conclude that contrastive focus on bound pronouns is not due to an agreement process with a focused antecedent constituent. It follows then that the phenomenon should be accounted for by a semantic theory of focus licensing such as the one discussed above.

2.2.2 The binders must be taken into account

Now that we have convinced ourselves that a syntactic agreement mechanism is not enough to account for focus on bound pronouns, we have to address a different route that one might try to avoid the problem noted in subsection 2.1. One might think that the binder need in fact not be taken into account when checking whether the

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[8] I thank Gennaro Chierchia (p.c.) for bringing up this point.

[9] Sauerland (2000) cites (i) as an additional point against the agreement analysis. He claims that if focus on the pronoun were merely inherited from the antecedent via some agreement mechanism, it should be possible to read (i) under the paraphrase *'Each boy called his own mother before every teacher called the boy's mother'*. I.e., it should be felicitous to take *every boy* to be the antecedent for the stressed pronoun. This is, however, not the case. A defender of the syntactic hypothesis might argue that what blocks the paraphrase given is some version of the minimality principle – that is, the focus on the bound pronoun is not inherited from the closest possible syntactic binder, and this, one could argue, is not allowed. In other words, inheritance of focus would have to be from the closest available binder. At any rate, (i) might be another argument against the agreement approach.

(i) *Every BOY called his mother before every TEAcher called HIS mother.
     (Sauerland 2000: 170)

focus on the bound pronoun is licensed. In particular, all that might be required for focus on a bound pronoun to be licensed is that the value assigned to the variable contrasts with the value assigned to the antecedent variable, and moreover that the value of the antecedent variable is a member of the focus value of the focused variable. To see how this would work, assume that our example (20a) has the LFs in (25) with a $\sim$-operator attached to the DP [2_F's arm]. Moreover assume that the assignment function g delivers differing values for the variables 1 and 2, i.e., $g(1) \neq g(2)$. In that case the focus value of the relevant DP would be as in (26). The value of the antecedent DP is a member of that value. Moreover, by assumption the ordinary values of the DPs differ. Therefore focus would be licensed.

(25)   a.   every student 1[t$_1$ cut 1's arm]
          b.   every teacher$_F$ 2[t$_2$ cut [$\sim$ C [2_F's arm]]]

(26) $[\![2_F\text{'s arm}]\!]^f = \{x\text{'s } arm \mid x \in D_e\}$

Sauerland (1998) indeed proposes such an account. A number of arguments have been given in the literature that contradict these assumptions. First, Jacobson (2000) already notes that data cited by Sauerland (1998) and attributed to personal communication with Irene Heim make the solution just sketched unlikely. In case the quantifier domains overlap as in the example in (27), contrastive focus on the bound pronoun is impossible. If all that were required were, however, that the assignments to the variables involved differ, this behavior would be unexpected. In particular, we would expect that we can choose an assignment that makes the pronouns contrast in the case of (27) as well. The clue seems to be that the bound pronouns in (27) do not really contrast given the fact that the domains of the quantifiers binding them do not fully contrast either. In other words the generalization should be stated as follows: an F-mark on a bound pronoun is only licensed if it is still licensed when the binder of the pronoun is taken into account. The licensing cannot be completely local. This is the intuition that the present proposal will follow.

(27)   *I expected every student to call his father, but only every YOUNG student called HIS father.
        (Sauerland 1998: 206)

Another case against the assignment-dependent approach has been noted by Sauerland (2000, 2008) himself. He notices that what he terms the adnominal use of *however* requires that the denotation of the subject in the antecedent and the one in the utterance sentence contrast, and that the denotations of the VPs involved do so as well. In particular, what seems to be required is that the value of the antecedent VP be a member of the focus value of the utterance VP. This means that focus evaluation should take place at the VP-level. But if this is so, the VP of the antecedent in the discourse in (28) and the one of (28a), for instance, will not differ, because they are alphabetic variants. The use of *however* does not allow focus evaluation at a level lower than VP. In other words, even if the assignment function were to deliver differing values for the variables, this would be of no help in the present case. Note moreover that the focus on the bound pronoun in (28) is obligatory, which is accounted for if *however* requires the VPs to contrast.

(28)   *Discourse:* Every teacher believes that she'll win.
        a.   Every GIRL, however, believes that SHE'll win.

b. #Every GIRL, however, believes that she'll win.

(Sauerland 2000: 171)

It therefore seems that the assignment-dependent approach is not feasible. The binders of the pronouns have to be taken into account when focus on the pronouns is evaluated.[10]

2.3 Optionality of focus

The observed optionality of focus that was meant to motivate a syntactic analysis presents another problem. As noted by Schwarzschild (1999), focus is usually not optional. Consider the discourses in (29) and (30), where A's utterance is followed by the utterances B/B′ or C/C′, respectively.

(29)   A: John kissed Mary.
         B: Yes. And, BILL kissed SUE.
         B′:#Yes. And, BILL kissed Sue.

(30)   A: John kissed Mary.
         C: Yes. And, BILL kissed Mary (too).
         C′:#Yes. And, BILL kissed MARY (too).

We observe that whenever constituents contrast, they must be stressed. Thus both the subject and the object are stressed in B. B′ is an infelicitous continuation of A because *Sue* is not stressed, although it could be stressed according to the view discussed above. On the other hand, C and C′ show that *Mary* cannot be stressed because it does not contrast with the object in A. C′ is a case of so-called overfocusing. The constituent *Mary* is stressed, although it is given – that is, it is given by virtue of there being an antecedent in the context whose denotation is equivalent to it. To ban stress on constituents that are given, Schwarzschild argues for the condition AvoidF that reduces focus on material that is given.[11] Although Schwarzschild does not use focus values in his system, a principle like AvoidF should also be incorporated into a theory with focus values. Otherwise Rooth's 1992 analysis would predict that C′ is actually felicitous. For present purposes we could assume a formulation as in (31), which is a straightforward implementation of Schwarzschild's principle. What this condition says is that if there are two structures with the same interpretation such that in both cases all the foci are licensed, the one with the fewer number of F-marks is preferred. The consequence is that (31) prefers C to C′ as both are fine according to Rooth's system, but C has less F-marks than C′. B′, on the other hand, does not satisfy focus licensing, whereas B does. Therefore (31) does not negotiate between B and B′.

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[10] It should also be noted that the example in (28) is a further point against the syntactic hypothesis already dismissed in the previous subsection. Under this approach it would be hard to make sense of the obligatoriness of focus on the bound pronoun in case adnominal *however* is used. Since a defender of that idea would claim that focus on the pronoun is not interpreted at all, (28) would be a mystery, because it directly argues for a theory were the focus on the pronoun makes a semantic contribution. Otherwise the requirements of *however* could not be satisfied.

[11] For a more detailed discussion of Schwarzschild's 1999 system see subsection 5.2.

(31)   *AvoidF*
        If both structures S_1 and S_2 satisfy focus licensing, $[\![S_1]\!]^g = [\![S_2]\!]^g$, and S_1 has more F-marks than S_2, S_2 is preferred to S_1.

Let us now return to our initial constructions repeated in (32). We observe once more that focus on the bound pronoun is optional in a sense to be made precise below.

(32)   a.   Every student cut his (own) arm, and every TEACHER cut HIS arm.
        b.   Every student cut his (own) arm, and every TEACHER cut his arm.

Example (32b) is moreover licensed by the analysis inspired by Rooth (1992) and introduced in subsection 2.1. To see this consider the following LFs.

(33)   a.   [$_{IP}$ every student 1[t$_1$ cut 1's arm]]$_2$
        b. $\sim_2$ C [$_{IP}$ every teacher$_F$ 1[t$_1$ cut 1's arm]]

The ordinary value for the sentence in (33a), on the one hand, is as in (34). I.e., $g(C)$ is equal to (34). The focus value for the IP in (33b), on the other hand, is as in (35). Here the requirement imposed by the $\sim$-operator is fulfilled, because $g(C)$ is indeed a subset of (35).

(34) $[\![(33a)]\!]^g = \lambda w.\forall x[student_w(x) \rightarrow cut_w(x, x\text{'s } arm)]$

(35) $[\![IP]\!]^f = \{\lambda w.\forall x[P_w(x) \rightarrow cut_w(x, x's\ arm)] \mid P \in D_{\langle e, st \rangle}\}$

Although (32a) is currently blocked from surfacing by our theory of focus licensing, the considerations about AvoidF together with the fact that (32b) is licensed has the consequence that (32a) should even be blocked if we could somehow motivate (32a) using Rooth's theory. This is simply so because (32b) has less F-marks than (32a). This means that not only must we reconsider the assumptions that brought Rooth's theory about. Moreover, we must make sure that either AvoidF as currently formulated does not block (32a), once the theory of focus licensing and the LFs involved have been amended, or that AvoidF is somehow changed as well.

The problem of optionality also argues against another potential approach that one might try to tackle the problem discussed in the present paper. First, consider cases with focus on bound pronouns that are actually unproblematic. In particular, consider the question-answer pair in (36). Here we notice that there is focus on the reflexive bound pronoun. Assume that the corresponding LFs are as given in (37), where the trace of *who* is a function in the sense of Chierchia (1992) (also cf. Dayal (1996) a.o.), as indicated by the complex trace in (37a).

(36)   Q: Who did every boy see?
        A: Every boy saw himSELF.

(37)   a.   [$_{CP}$ who 1[did every boy 4[$_4$ see [t$_1$ 4]]]]$_3$
        b. $\sim_3$ C [$_{IP}$ every boy 4[t$_4$ saw [self$_F$ 4]]]

The ordinary value for the question is given in (38a), and the focus value for the answer in (38b). Here it is assumed that the reflexivization process is brought about by the identity function applying to the bound variable. The focus value therefore quantifies over functions of type $\langle e, e \rangle$. Moreover it is assumed that the antecedent question also involves a function applying to the bound variable. Clearly, (38a) is a subset of (38b).

(38)   a. $[\![(37\mathrm{a})]\!]^g = \{p : \exists f[p = \lambda w.\forall y[boy_w(y) \rightarrow see_w(y, f(y))]]\}$
       b. $[\![\mathrm{IP}]\!]^f = \{\lambda w.\forall x[boy_w(x) \rightarrow see_w(x, f(x))] \mid f \in D_{\langle e,e \rangle}\}$

Now, one might think that our problematic case (32a) also involves identity functions
applying to the bound variables, where it is actually one of the underlying functions
that is F-marked. In this case, our focus principle would in principle license focus on the
bound pronoun. But the problem for this view is that AvoidF would actually predict
that (32a) should not surface. The reason is that neither the identity functions nor any
bigger constituents would contrast (recall that we have already ruled out the option
of focus licensing not taking into account the binder of the bound variable). Therefore
the option without F-mark on the bound pronoun (32b) should be chosen.[12]

3 The proposal

The constructions that we started our discussion with are repeated in (39). We want
our theory of focus licensing to allow for the possibility to contrastively stress bound
pronouns. In particular, we want to account for the apparent optionality of this phe-
nomenon.

(39)   a.   Every student cut his (own) arm, and every TEACHER cut HIS arm.
       b.   Every student cut his (own) arm, and every TEACHER cut his arm.

Moreover, we also want to be able to account for cases of association with focus on
bound pronouns as in (40).

(40)   Every director only discussed HIS film. (No director discussed anyone else's
       film).

3.1 Focus operators in the scope of quantifiers

In subsection 2.1, it was seen that the focus alternatives of a VP denoting a bound
variable configuration where the bound pronoun is focused do not include the ordinary
value of that VP as a member. This was shown to be problematic. In the present
subsection, I suggest that this is the correct way of thinking about such focus values
nonetheless. I first show that the alternatives give the correct result for cases of focused
bound pronouns associating with *only* via an intermediate $\sim$-operator. As will be seen,
no deviation from Rooth's system is necessary for cases of association with focus on
bound pronouns. I then suggest viewing contrastive focus on bound pronouns in a
parallel way – i.e., the evaluating $\sim$-operator must also be in the scope of the quantifier
in such situations.

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[12] In this sense our problematic examples differ from (i) under the bound variable reading.
Here an underlying identity function would differ from the antecedent mother-of-function.
Thereby AvoidF would not block focus on the bound pronoun. I thank the reviewer for asking
me to clarify this.

(i)   A: Every actor discussed his mother's film.
       B: No, every actor discussed HIS film.

As discussed in subsection 2.1, I am following Rooth (1992) in assuming that focus is interpreted by the $\sim$-operator, given in (12) above. Let me now illustrate why what we deemed to be a problematic set of alternatives is actually fine for association with focus on bound pronouns. I will do so by employing an overt focus operator in the scope of a quantifier such as in (40). Following Horn (1969) (also cf. von Fintel (1999)) let us assume that the semantics of *only* has both an assertive and a presuppositional component to it. For (40) it presupposes the truth of the prejacent – that is, it presupposes that every director discussed his film – and it asserts that no director discussed a film other than his own. Following Rooth (1992) (also cf. von Fintel (1994)) we furthermore assume that *only* takes two arguments: its syntactic sister and a contextually determined set of alternatives C. The denotation of C, $g(C)$, is constrained by the $\sim$-operator. Recall that the $\sim$-operator is the only operator that can interpret focus. In other words, in the scope of *only* there is a $\sim$-operator adding the condition on the set of alternatives used. This set is then used as the first argument by *only*. It follows that the LF for (40) must be as in (41). Both *only* and the $\sim$-operator must be part of the structure. But note that I am assuming that the $\sim$-operator together with the contextual restriction C is attached to the constituent denoting a predicate created by abstraction over the trace of the quantifier and the bound pronoun, because it will make the exposition below simpler.[13]

(41)   every director [$_{VP_3}$ only C [$_{VP_2}$ $\sim$ C [$_{VP_1}$ 1[t$_1$ discussed 1$_{F2}$'s film]]]]

This LF has the consequence that we also need a predicate-level *only* alongside a propositional one. Cf. (Rooth 1985: chapter 3) for a cross-categorial semantics for *only*. Assume the following entry:[14]

(42) $[\![\text{only}]\!]^g(C_{\langle\langle e,st\rangle t\rangle})(P_{\langle e,st\rangle}) = \lambda x.\lambda w.\forall Q \in g(C)[Q_w(x) = 1 \rightarrow P(x) \subseteq Q(x)]$
            if $P_w(x) = 1$, otherwise undefined

The compositional interpretation of (41) gives the following result: first we compute both the ordinary value (43a) and the secondary value (43b) of the sister of the $\sim$-operator VP$_1$. From the latter we derive the focus value of VP$_1$ as in (43c). The ordinary value and the secondary value of VP$_2$ are the same (43d). Namely, they are identical to the ordinary value of VP$_1$. This is so because $\sim$ resets the secondary value. The consequence of this is that secondary values are irrelevant for further computation, as they are equivalent to the corresponding ordinary values. VP$_3$ adds the semantic contribution of *only*, (43e). Then we apply the ordinary value of the quantifier to the ordinary value of VP$_3$, (43f). Remember that $[\![\text{VP}_2]\!]^g$, and by extension the whole

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[13] The question how the LF in (41) is derived must be addressed. If we adopt Heim and Kratzer's 1998 convention, where a QRed DP transfers its index onto its sister node, (41) would not be an option because the index that will be interpreted as a λ-abstractor is not on the sister node of the quantifier. Several modifications of this convention come to mind. For instance, one could relax it and assume that the index of a QRed DP must be attached to a node that dominates the trace and denotes a proposition. This is fulfilled by (41). I leave the discussion at these inconclusive remarks because, as will become clear later on (cf. footnote 25), for our problematic cases it is possible to adjoin the $\sim$-operator lower in the structure so that the issue just raised does not even arise.

[14] The propositional entry would accordingly be as in (i):

(i) $[\![\text{only}]\!]^g(C_{\langle\langle st\rangle t\rangle})(p_{\langle st\rangle})(w) = 1$ iff $\forall q \in g(C)[q(w) = 1 \rightarrow p \subseteq q]$
            if $p(w) = 1$, otherwise undefined

sentence, is only defined if $g(C)$ is a subset of the focus value of the sister of VP$_2$, (44a). This is the presupposition of the $\sim$-operator.[15] In addition there is the definedness condition provided by *only*, argued for by Horn (1969). It requires that every director discussed his own film (44b).

(43)   *Assertive component of (41)*

    a. $[\![\text{VP}_1]\!]^g = \lambda x.\lambda w.discuss_w(x, x\text{'s } film)$

    b. $[\![\text{VP}_1]\!]^{g,h} = \lambda x.\lambda w.discuss_w(x, h(2)\text{'s } film)$

    c. $[\![\text{VP}_1]\!]^f = \{\lambda x.\lambda w.discuss_w(x, y\text{'s } film) \mid y \in D_e\}$

    d. $[\![\text{VP}_2]\!]^g = [\![\text{VP}_2]\!]^{g,h} = [\![\text{VP}_1]\!]^g$

    e. $[\![\text{VP}_3]\!]^g = \lambda x.\lambda w.\forall P \in g(C)[P_w(x) \to \lambda w'.discuss_{w'}(x, x\text{'s } film) \subseteq P(x)]$

    f. $[\![\text{IP}]\!]^g(w) = 1$ iff $\forall x[director_w(x) \to$
                                 $\forall P \in g(C)[P_w(x) \to \lambda w'.discuss_{w'}(x, x\text{'s } film) \subseteq P(x)]$

(44)   *Presuppositional component of (41)*

    a. $g(C) \subseteq \{\lambda x.\lambda w.discuss_w(x, y\text{'s } film) \mid y \in D_e\}$

    b. $\forall x[director_w(x) \to discuss_w(x, x\text{'s } film)]$

What do the presuppositions in (44) require when taken together? (44a) requires that the alternative set $g(C)$ be a subset of the set of predicates having the form in (45)

(45) $$\left\{ \begin{array}{c} \lambda x.\lambda w.discuss_w(x, a\text{'s } film) \\ \lambda x.\lambda w.discuss_w(x, b\text{'s } film) \\ \lambda x.\lambda w.discuss_w(x, c\text{'s } film) \\ \dots \end{array} \right\}$$

Notice that the set of alternatives relevant for the presupposition includes only alternatives with individuals standing in for the pronoun. In other words, the alternatives differ in the assignment chosen for the variable. The assertive component in (43f) says that any predicate in (45) with the quantifier $\lambda P.\lambda w.\forall x[director_w(x) \to P_w(x)]$ applied to it, leads to truth in the world of evaluation only if it is entailed by the proposition resulting from applying that same quantifier to the predicate $\lambda x.\lambda w.discuss_w(x, x\text{'s } film)$. (44b), on the other hand, requires that every director discussed his own film. Assume a is a director. Then the semantics just explained has the following consequence: a discussed a's film, and moreover any predicate in (45) when applied to a must be entailed by a having discussed his own film. Only the first alternative in (45) thus can result in a true proposition. And so on for the remaining alternatives. I.e., this is the correct result: every director discussed his own film and only his own film.

    Thus we arrive at the correct meaning for our sentence in (40) without actually having bound-variable configurations in the set of alternatives. I now want to suggest that this approach can be extended to the cases of contrastive focus on bound pronouns, which we started our discussion with. In particular, I suggest that also in these cases the $\sim$-operator is embedded in the scope of the quantifier. It will be seen presently that this assumption alone does not suffice, however, to explain why focus on bound

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[15] Actually, the presupposition in (44a) should read as in (i). Since the presupposition trigger is embedded in the scope of a universal quantifier, it will project in a universal fashion (Heim 1983). But as the quantifier does not bind any variable in its scope, there is no danger in simplifying the presupposition as in (44a).

(i) $\forall x[director_w(x) \to g(C) \subseteq \{\lambda z.\lambda w.discuss_w(z, y\text{'s } film) \mid y \in D_e\}]$

pronouns is possible. Let us first turn to one refinement of Rooth's theory and one assumption carried over from his theory about the placement of $\sim$-operators:

(46)   *Conditions on $\sim$*
    a.   Each sentence has $\sim$ attached to it and must contain at least one $\sim$.
    b. $\sim$ cannot attach to a focused constituent directly.

So, (46a) requires that each sentence has the $\sim$-operator appended at the top node. An immediate consequence of this is that almost all if not even all sentences must have a focus somewhere. Other than that, insertion of $\sim$ is free. That is, further $\sim$-operators are optional. Another consequence of this condition is that focus *must* be checked, similar to Schwarzschild's 1999 theory. Furthermore (46b) says, following Rooth (1992), that the operator cannot be immediately attached to a focused constituent. The latter condition is to make sure that the presupposition introduced by $\sim$ is not too weak. If it were directly adjoined to a focused constituent, the requirement on the context would be very weak. In particular, all that would be required is that there is some alternative to the interpretation of the focused constituent somewhere in the context. Turning to an example with contrastive focus on a bound pronoun like (47), these conditions allow for at least the representations in (48) for the focus sentence. (48b) is the structure that was used to exemplify the problem in the preceding section.

(47)   Every director discussed his film, and every ACTOR discussed HIS film.

(48)   a. $\sim$ C$_2$ [$_{\text{IP}}$ every actor$_F$ [$\sim$ C$_1$ [$_{\text{VP}}$ 1[t$_1$ discussed 1$_F$'s film]]]]
    b. $\sim$ C$_2$ [$_{\text{IP}}$ every actor$_F$ 1[t$_1$ discussed 1$_F$'s film]]

In the following, I will argue that (48a) corresponds to the LF that gives rise to focus on the bound pronoun, whereas (48b) will still suffer from the by now familiar problem. Without going into discussion of the semantics of (48a) at this stage, it is clear, however, that adopting this structure is not enough. As said above, AvoidF modified to be usable in a theory with focus values along the lines of (31) would prefer the version without F-mark on the pronoun. Before discussing the details of the proposal, I want to point out an intuitive argument why individuals should be playing a role for the licensing of contrastive focus on bound pronouns. Sauerland crediting the data to Orin Percus (p.c.) notes that (49) is a problem for his own account, discussed in subsection 5.1 below. (49) shows that focus on bound pronouns can be licensed if the linguistic material in the restrictors of the quantifiers does not contrast. What apparently licenses the focus on the pronoun are the contrasting extensions of the restrictors in the quantifiers. In other words, it is the individuals in the extensions that must contrast in order for focus on bound pronouns to be possible. This opens the door to a theory making use of alternatives parallel to the ones in (45).

(49)   *Discourse:* Did every flight leave at the time it was scheduled for on Tuesday?
    a.   All I know is that, on Wednesday, every flight left at the time IT was scheduled for.
   (Sauerland 2000: (59))

3.2 The first step in the proposal: Salient vs. formal alternatives and compositional reconstruction

Rooth (1992) discusses the example in (50). We notice that contrastive focus is licensed on the pronouns in the second sentence. Rooth assumes that the first sentence serves as antecedent for the second sentence with respect to focus licensing. Although the ordinary value of the antecedent sentence is not a member of the focus value of the second sentence, the contextually entailed proposition *that he insulted her* is a member of that focus value. That is, entailment between the linguistic antecedent and the proposition serving as alternative holds if the context makes it clear that calling someone a Republican is an insult. Rooth thus assumes that it is not only actual linguistic objects that can function as antecedents for focus licensing (also cf. the discussion in (Fox 1999)).

(50)   He$_1$ called her$_2$ a Republican, and then she$_{2,F}$ insulted him$_{1,F}$
         (Rooth 1992: 81 fn.4)

The first part of the present proposal is to widen further the application of contextual focus licensing. Remember that in Rooth's theory the ordinary value of the constituent that $\sim$ is coindexed with serves as the contextually relevant set of alternatives. Even for cases like (50), one can assume that the first sentence serves as intermediate antecedent somehow. For the present problematic cases this will not be enough, though. The problem in a nutshell is that the denotation of an antecedent constituent will involve a binding relation and thus cannot be a member of the focus value in question. Moreover, it itself does not entail propositions that would be members of the focus value. I suggest that Rooth's requirement of focus licensing should be somewhat loosened. In particular, I follow Rooth in keeping the coindexation requirement. In other words, contextual alternatives are tied to a linguistic antecedent. But from such a linguistic antecedent further alternatives can be derived under certain conditions.[16] In the following a distinction is drawn between *formal* and *salient* alternatives. The former are constituted by the set of alternatives provided by the focus value of the sister of the $\sim$-operator. We can say the following:

(51)   *Activation of formal alternatives*
         Given $[\sim C \, [_\phi \, \dots]]$, $\sim$ activates formal alternatives of the form of $[\![\phi]\!]^f$.

Once formal alternatives have been activated, the context must provide actual alternatives that fit the description of the formal ones, so that the presupposition of the $\sim$-operator can be satisfied. In other words, there must be alternatives salient in the discourse that satisfy the presupposition. These salient alternatives are, however, further restricted by the actual linguistic objects present in the context. In particular, they are constrained by coindexation of $\sim$ with an antecedent constituent. I define salient alternatives as in (52).

(52)   *Salient alternatives*
         An alternative is salient if it corresponds to the ordinary value of a linguistic object A in the context, $[\![A]\!]^g$, or it can be inferred from $[\![A]\!]^g$, or it can be

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[16] It might well be that under certain conditions antecedents can be contextually inferred without any overt linguistic material, though.

> compositionally reconstructed using $[\![A]\!]^g$ and other information provided by the context.

The first possibility in (52) conforms to the standard case, where the ordinary value of a given linguistic object in the discourse matches the activated formal ones. The second situation corresponds to what is needed to rule in cases like (50) above. This move increases the number of potential alternatives. Further support that this is not an unwelcome result is provided by the discourse in (53). Note that it is possible to focus *Bill*. The meaning of utterance A, however, is not a member of the focus value of the embedded clause in utterance B. Therefore focus should not be licensed. If, on the other hand, A's utterance makes the proposition that John likes Sue salient, the focus on *Bill* is not surprising. It is worth noting that Schwarzschild's 1999 theory makes similar predictions, as it also allows for antecedents that are not actual linguistic objects.

(53)   A: John kissed Sue.
       B: I thought that BILL likes Sue.
       B′:#I thought that Bill likes Sue.

Notice, moreover, that B′ shows that focus on *Bill* cannot be dropped. This suggests that salient alternatives must be used. That is, if the context makes alternatives available that fit the description of the formal alternatives activated by $\sim$, they must be used, and cannot be left out by $g(C)$. Again, this is similar to Schwarzschild's 1999 system, but can also be found in the principle *Don't Overlook Anaphoric Possibilities* argued for by (Williams 1997: 603):

(54)   *Salient alternatives must be used*
       Given $[\sim C \ [_\phi \ \ldots]]$, the set of salient alternatives provided by the context corresponding to the formal alternatives activated by $\sim$ must be used.

I suggest that we incorporate this last requirement directly into the entry of the $\sim$-operator, thereby modifying the presupposition that the $\sim$-operator adds. In other words, in addition to the requirement that the contextual alternatives $g(C)$ must be a subset of the focus value, it is required that each salient alternative A_S that matches the chosen focus value must be a member of $g(C)$. This is only a slight modification of Rooth's 1992 original definition of the operator:

(55)   a. $[\![\ \sim C \ \phi]\!]^g = [\![\phi]\!]^g$
            if $g(C) \subseteq [\![\phi]\!]^f$, and
            $\forall A_S[A_S \in [\![\phi]\!]^f \rightarrow A_S \in g(C)]$, otherwise undefined
       b. $[\![\ \sim C \ \phi]\!]^{g,h} = [\![\ \sim C \ \phi]\!]^g$

The third option provided by (52) for how to obtain a salient alternative is the crucial one for our problematic cases. It says the following: if by simple compositional processes – that is, in particular functional application – we can obtain a semantic object matching the formal alternatives from a linguistic object whose value would not have matched the formal requirements otherwise, then this semantic object counts as a salient alternative:

(56)   *Compositional reconstruction*
       Given $[\sim C \ [_\phi \ \ldots]]$, for any x inferable from the context and $[\![A]\!]^g$ such that

A is an antecedent for focus licensing and $[\![A]\!]^g \notin [\![\phi]\!]^f$, if by applying $[\![A]\!]^g$ to x or vice versa an object X obtains

    a.   where $X \in [\![\phi]\!]^f$, then X is a A_S, or

    b. X could also be obtained by applying $[\![A']\!]^g$ to x or vice versa, where $[\![A']\!]^g$ is a member of $[\![\phi]\!]^f$, then $[\![A']\!]^g$ is a A_S.

The process in (56) is constrained in such a way that some linguistic object must serve as the actual linguistic antecedent, i.e., it must be coindexed with the $\sim$-operator. The actual salient alternative is obtained by applying its denotation to material provided by the context or vice versa.

    In the following subsection, I will discuss how the assumptions made so far make it possible for us to derive the presence of focus on bound pronouns in an essentially Roothian system. The crucial ingredient for the explanation of the constructions with focus on the bound pronoun will be that the present system allows for more relevant alternatives than Rooth's through the introduction of the notion of compositional reconstruction. In particular, option (56b) will be crucial. Evidence for option (56a) will be discussed in subsection 4.3.

3.3 Licensing focus on bound pronouns

Recall that it was claimed above that the second conjunct in (57) could in principle have at least two representations – that is, (58a) and (58b). We have seen that (58b) is problematic in Rooth's theory, and this will remain so in the present proposal. I will briefly repeat discussion of the interpretation of this LF below. But first let us turn our attention to (58a), which is the representation that I argue to license focus on the bound pronoun in (57)– or rather one of them (cf. footnote 25 below).

(57)   Every director discussed his film, and every ACTOR discussed HIS film.

(58)   a. $\sim$ C$_2$ [$_{\text{IP}}$ every actor$_F$ [$\sim$ C$_1$ [$_{\text{VP}}$ 1[t$_1$ discussed 1$_F$'s film]]]]

           b. $\sim$ C$_2$ [$_{\text{IP}}$ every actor$_F$ 1[t$_1$ discussed 1$_F$'s film]]

When deciding whether (58a) is licensed by our system, we need to consider two focus values, the one of VP and the one of IP. The lower $\sim$-operator activates formal alternatives of the form in (59a), whereas the higher $\sim$-operator activates the ones in (59b). Note that the alternatives introduced by the focus on the bound pronoun do not figure in the focus value of IP. The reason for this is that the lower $\sim$-operator resets the secondary value to the ordinary value. Because of this the semantic contribution of the F-mark on the bound pronoun does not figure in any secondary value (and therefore also not in any focus value) of any constituent dominating the lower $\sim$-operator. This is a crucial ingredient in the present account, as it prevents us from running into the problem discussed in subsection 2.1.[17]

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[17] In Rooth's system one could in principle also argue that the $\sim$-operator interpreting the focus on the restrictor is attached lower, namely to the quantifier. In this case it would not be necessary to have a further sentential $\sim$-operator. Nothing in the argument given in the text would change. The option in the text is chosen to make the system more easily comparable with Schwarzschild's 1999. As we will see in subsection 5.2, this approach could be characterized by claiming that focus must be checked at each branching node. In other words, one could claim that there is a $\sim$-operator attached to each node. For my immediate purposes I chose to force focus evaluation obligatorily only for the sentential level in order to avoid overfocusing.

(59)   a. $[\![\mathrm{VP}]\!]^f = \{\lambda x.\lambda w.discuss_w(x, y\text{'}s\ film) \mid y \in D_e\}$
       b. $[\![\mathrm{IP}]\!]^f = \{\lambda w.\forall x[P_w(x) \rightarrow discuss_w(x, x\text{'}s\ film) \mid P \in D_{\langle e, st\rangle}]\}$

The next question one has to address is whether there are salient alternatives matching the activated formal ones in (59a) and (59b), respectively. We already know that the context makes an alternative fitting the description in (59b) salient, namely the denotation of the first conjunct in (57). The real question is what the salient alternatives fitting the formal ones activated by the lower $\sim$-operator are. Recall that the present approach is characterized by an increase in the number of possible alternatives that can be members of $g(C)$. Moreover, recall that by the modified $\sim$-operator (55) the salient alternatives must be used by $g(C)$. In the preceding subsection it was shown that utterance of the sentence denoting the proposition $\lambda w.kiss_w(John, Sue)$ in most contexts makes at least also the alternative $\lambda w.like_w(John, Sue)$ salient. In the present situation, however, generating a salient alternative through inference will not be enough. Rather, possibility (56b) of deriving salient alternatives must be used, namely reconstruction of alternatives from an existing linguistic object.

Let us assume a concrete situation to facilitate discussion: the directors are $\{a, b, c\}$ and the actors are $\{d, e\}$. Moreover, each of $\{a, b, c, d, e\}$ has discussed his recent film. The antecedent linguistic object for the VP in (58a) is the VP in (60). By applying its denotation point-wise to each director in the domain, we arrive at the set of propositions in (61a).[18] This set is equivalent to the one in (61b), where the subject position is scoped out.

(60)   every director $[_{\mathrm{VP}}\ 1[\mathrm{t}_1\ \mathrm{discussed}\ 1\text{'s film}]]$

(61)   a. $\left\{ \lambda x.\lambda w.discuss_w(x, x\text{'}s\ film) \right\} \left(\left\{ \begin{array}{c} a \\ b \\ c \end{array} \right\} \right) = \left\{ \begin{array}{c} \lambda w.discuss_w(a, a\text{'}s\ film) \\ \lambda w.discuss_w(b, b\text{'}s\ film) \\ \lambda w.discuss_w(c, c\text{'}s\ film) \end{array} \right\}$

       b. $= \left\{ \begin{array}{c} \lambda x.\lambda w[discuss_w(x, a\text{'}s\ film)](a) \\ \lambda x.\lambda w[discuss_w(x, b\text{'}s\ film)](b) \\ \lambda x.\lambda w[discuss_w(x, c\text{'}s\ film)](c) \end{array} \right\}$

We can now see that (61) could be obtained by applying the predicates in (62) to the relevant individuals. Thus we have obtained by a purely compositional process, (56b), predicates that match the formal alternatives. I.e., the members of the set in (62) are the salient alternatives that we need.

(62) $\left\{ \begin{array}{c} \lambda x.\lambda w.discuss_w(x, a\text{'}s\ film) \\ \lambda x.\lambda w.discuss_w(x, b\text{'}s\ film) \\ \lambda x.\lambda w.discuss_w(x, c\text{'}s\ film) \end{array} \right\}$

Without an obligatory sentential $\sim$-operator I do not see how overfocusing can be avoided. The question of where focus domains are formed is an intricate one but not immediately relevant to the present problem (cf. the discussion in (Büring to appear) and (Wagner 2006) a.o.). Therefore resetting the semantic contribution of the lower F-mark will be essential in order to deal with the empirical problem discussed in this paper.

[18] Point-wise function application for sets is defined as follows, following Hamblin (1973) and Rooth (1985):

(i)   For any A of type $\langle\langle \sigma, \tau \rangle t\rangle$ and B of type $\langle \sigma, t \rangle$, $[\![\mathrm{A}]\!]([\![\mathrm{B}]\!]) = \{f(x) \in D_\tau : f \in [\![\mathrm{A}]\!]$ and $x \in [\![\mathrm{B}]\!]\}$.

But if the predicates in (62) are salient alternatives matching the activated formal ones, then they must be used according to the new definition of the $\sim$-operator in (55). Put differently, $g(C)$ denotes the set in (62). If that is so, the presupposition of the lower $\sim$-operator is satisfied. $g(C)$ matches the activated formal alternatives. So it seems that focus on the bound pronoun in (57) is in principle licensed by our system.

A direct prediction of this approach is that the discourse in (63) should be felicitous. Note that in this discourse the antecedent sentences make the alternatives that I argue are necessary for the problematic examples above directly accessible. And in this case, too, the bound pronoun can be focused. This is as expected under the present theory because all salient alternatives matching the formal ones must be used by the modified entry for the $\sim$-operator.

(63)   Actor a discussed his film, and actor b did, too. And Every DIRECTOR discussed HIS film.

Moreover, the data from (49) above, repeated in (64), are directly accounted for. In the present approach it is not required that the linguistic material in the restrictors differs in order for there to be focus on the bound pronoun. Rather the theory is built around the intuition that it is the extensions of the restrictors that must differ. This is what (64) shows. Note, however, that we have not discussed yet how contrastiveness is accounted for in the present system. I will turn to this issue in the following subsection.

(64)   *Discourse:* Did every flight leave at the time it was scheduled for on Tuesday?
         a.   All I know is that, on Wednesday, every flight left at the time IT was
               scheduled for.
         (Sauerland 2000: (59))

The other possible representation for the second conjunct in (57) – i.e., (58b) – is obviously not licensed. The reason is that the problem discussed in subsection 2.1 obtains. The focus value of the sentence is (65). But there are no salient alternatives matching the formal ones in the context that could be the denotation of $g(C)$. Thus (58b) is ruled out. As we already know, if the focus on the bound pronoun is left out, a felicitous representation results. In other words, we have two felicitous LFs with no focus on the pronoun[19] but only one with focus on the pronoun (provided that AvoidF does not rule the latter one out).

(65) $[\![\text{IP}]\!]^f = \{\lambda w. \forall x [P_w(x) \rightarrow discuss_w(x, y\text{'s } film)] \mid y \in D_e, P \in D_{\langle e, st \rangle}\}$

We have accounted for the possibility of focus on bound pronouns in an essentially Roothian system. Once the notion of contrastiveness has been introduced in the following subsection, it will be seen that its specific implementation also allows us to account for the fact that AvoidF does not force us to choose the option without F-mark on the pronoun.

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[19] This is so because LF (58a) without an F-mark on the bound pronoun is, of course, also licensed by our focus principle. In this case the denotation of the antecedent VP is equivalent to the focus value in question. The proposal for contrastiveness to be introduced below will, however, rule that LF out.

3.4 The second step in the proposal: Contrastiveness

Remember Sauerland's 1998 observation credited to Irene Heim (p.c.), and also noted by Jacobson (2000) that contrastive focus on a bound pronoun is prohibited if the domains of the quantifiers used overlap. In the following example repeated from (27) above the second quantifier quantifies over a subset of the domain of the first quantifier. Unacceptability results.

(66)   *I expected every student to call his father, but only every YOUNG student called HIS father.
       (Sauerland 1998: 206)

The following example is another one making the same point. In a situation where some individuals satisfy both predicates used in the restrictors of the quantifiers, a discourse such as (67) is unacceptable. Note that it cannot be claimed that the domains must necessarily overlap if the pronoun is not focused, as shown by the possibility of (68). Here two mutually exclusive predicates are chosen. Nevertheless the example is fine without focus on the bound pronoun.

(67)   *Situation:* John and Bill are both actors and film directors. Sam is only an actor, and Tim is only a director.
       #Every actor called his father, and every DIRECTOR called HIS father.

(68)   Every blond student called his father, and every BLACK haired student called his father.

Thus, when the bound pronoun is focused, the domains of the antecedent quantifiers must not overlap. I propose to implement contrastiveness as follows.[20] Assume that the $\sim$-operator comes with an additional presupposition that requires that the ordinary value of its sister constituent is not a member of the contextual set of alternatives. This new presupposition is the contrastiveness requirement proposed in this paper.[21]

(69)   a. $[\![\sim C\ \phi]\!]^g = [\![\phi]\!]^g$
            if $g(C) \subseteq [\![\phi]\!]^f$,
            $\forall A_S[A_S \in [\![\phi]\!]^f \rightarrow A_S \in g(C)]$, and
            $[\![\phi]\!]^g \notin g(C)$, otherwise undefined
       b. $[\![\sim C\ \phi]\!]^{g,h} = [\![\sim C\ \phi]\!]^g$

What does this amount to in the present context? Assume that the LF for the focus sentence in (67) is as in (70).

(70) $\sim C_2$ [$_{IP}$ every director$_F$ [$_{VP}$ $\sim C_1$ 2[t$_2$ called 2$_F$'s father]]]

In what follows I will ignore the presupposition regulating the use of salient alternatives. The new entry for the $\sim$-operator with the contrastiveness condition requires that

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[20] Thanks to Irene Heim (p.c.) whose suggestions I am following here but adapting them somewhat. So all mistakes are my own, of course.

[21] This would probably amount to saying that there are at least two $\sim$-operators: one for contrastive uses as in (69), and one for non-contrastive uses such as in question-answer pairs. We can assume that the latter one is identical to (69) with the only difference being that it misses the contrastiveness presupposition. In the following when I refer to the $\sim$-operator, I will have (69) in mind.

the ordinary value of the sister of the $\sim$-operator is not a member of the contextual alternatives. For this to work in cases like (70), however, I suggest a cross-categorial semantics for the $\sim$-operator similar to Rooth's 1985 for *only* and *even*. It makes the denotation of the VP a partial function. The predicate-level $\sim$-operator is defined as in (71). Note that $g(C)$ applies point-wise to the variable x.[22] [23] I also suggest that (69) is restricted to the propositional case – that is, ϕ is of type $\langle st \rangle$.

(71)   a. $[\![\sim C\ \phi_{\langle e,st \rangle}]\!]^g = \lambda x.\lambda w : [\![\phi]\!]^g(x) \notin g(C)(x).[\![\phi]\!]^g(x)(w)$
       b. $[\![\sim C\ \phi_{\langle e,st \rangle}]\!]^{g,h} = [\![\sim C\ \phi_{\langle e,st \rangle}]\!]^g$

In our system the salient alternatives matching the activated formal one must be part of $g(C)$. In the present situation these amount to the set in (73), as John, Bill, and Sam are the actors in the context. Now, the function in (72a) is only defined for individuals who with the function $\lambda y.\lambda w'.call_{w'}(y, y\text{'s father})$ applied to them are not in the set of contextual alternatives in (73), where each member in (73) is applied to that individual as well. As a consequence the function is only defined for individuals who are not actors. When the quantifier *every director* is applied to the partial function, it thus follows that no director can also be an actor.[24]

(72)   a. $[\![VP]\!]^g = \lambda x.\lambda w : \lambda y.\lambda w'[call_{w'}(y, y\text{'s father})](x) \notin g(C_1)(x).$
                   $call_w(x, x\text{'s father})$
             $= \lambda x.\lambda w : \lambda w'.call_{w'}(x, x\text{'s father}) \notin g(C_1)(x).$
                   $call_w(x, x\text{'s father})$
       b. $[\![IP]\!]^g = \lambda w.\forall x[director_w(x) \rightarrow call_w(x, x\text{'s father}) \notin g(C_1)(x).$
                   $call_w(x, x\text{'s father})]$

(73) $g(C_1) = \left\{ \begin{array}{l} \lambda x.\lambda w.call_w(x, John\text{'s father}) \\ \lambda x.\lambda w.call_w(x, Bill\text{'s father}) \\ \lambda x.\lambda w.call_w(x, Sam\text{'s father}) \end{array} \right\}$

This explains why (67) is infelicitous. The requirement just discussed is not satisfied. John, for instance, is a director and an actor. Thus when John is chosen to verify (72b), we notice that the proposition that John discussed John's film is a member of (73) when the latter is applied to the denotation of *John*. I.e., the presupposition is not satisfied,

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[22] (71) and other examples to come use Heim and Kratzer's 1998 notation for partial functions. $\lambda \xi : \phi(\xi).\psi(\xi)$ is a function ψ that is only defined for objects of which ϕ is true.

[23] The complete entry for predicate-level $\sim$ would be as in (i).

(i)   a. $[\![\sim C\ \phi_{\langle e,st \rangle}]\!]^g = \lambda x.\lambda w : g(C) \subseteq [\![\phi]\!]^f \wedge$
                   $\forall A_S[A_S \in [\![\phi]\!]^f \rightarrow A_S \in g(C)] \wedge$
                   $[\![\phi]\!]^g(x) \notin g(C)(x).$
             $[\![\phi]\!]^g(x)(w)$
       b. $[\![\sim C\ \phi_{\langle e,st \rangle}]\!]^{g,h} = [\![\sim C\ \phi_{\langle e,st \rangle}]\!]^g$

[24] Had we chosen to simply use the standard $\sim$-operator in (69) – that is, to keep (69) cross-categorial – we would have obtained the interpretation for VP in (i). This only requires that the function that maps individuals to true if they called their own father is not a member of $g(C_1)$, which is satisfied by the particular $g(C_1)$ in (73). Clearly, however, this would not derive the requirement that no director is also an actor.

(i) $[\![VP]\!]^g = \lambda x.\lambda w : \lambda y.\lambda w'.call_{w'}(y, y\text{'s father}) \notin g(C_1).call_w(x, x\text{'s father})$

and the value of (72b) is undefined. This accounts for the obligatory non-overlapping of the domains of quantifiers used in the problematic constructions discussed.[25]

Let us now turn to the question why the focus on the pronoun is not blocked by AvoidF.

3.5 AvoidF cannot apply

It turns out that the contrastiveness requirement introduced in the preceding subsection also explains why AvoidF does not block the LF with F-mark on the bound pronoun and embedded $\sim$-operator. By $\sim$ we obtained a function that is only defined for an individual if that same function applied to that individual is not a member of $g(C)$ applied to the individual as well. Consider the LF from (70) in the preceding subsection with the only difference being that the focus on the bound pronoun is left out. Otherwise, everything stays the same, and in particular there is an embedded $\sim$-operator present. Also remember the definition of AvoidF from subsection 2.3 above, repeated in (75):

(74) $\sim C_2$ [$_{IP}$ every director$_F$ [$_{VP}$ $\sim C_1$ 2[t_2 called 2's father]]]

(75)   *AvoidF*
        If both structures S_1 and S_2 satisfy focus licensing, $[\![S_1]\!]^g = [\![S_2]\!]^g$, and S_1 has more F-marks than S_2, S_2 is preferred to S_1.

Could (74) be a representation for the sentence *Every actor called his father, and every DIRECTOR called his father*? The problem with (74) and similar structures is that they are blocked because they are not contrastive. Let us see why. The embedded $\sim$-operator requires that the ordinary value of its sister constituent when applied to an individual is not a member of $g(C)$ applied to that individual. Again, we get a partial function as the denotation for VP, (76). The difference from the situation before is that the denotation of C_1 differs. $g(C_1)$ must be a member of the focus value of the sister constituent of the $\sim$-operator. But since there is no F-mark present in that constituent, $g(C_1)$ will amount to the singleton in (77), i.e., the set just containing the ordinary value of the constituent under discussion.

(76) $[\![VP]\!]^g = \lambda x.\lambda w : \lambda w'.call_{w'}(x, x\text{'s father}) \notin g(C_1)(x).$
        $call_w(x, x\text{'s father})$

(77) $g(C_1) = \left\{ \lambda x.\lambda w.call_w(x, x\text{'s father}) \right\}$

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[25] Note that the cross-categorial move makes it possible to attach $\sim$ lower in the structure without affecting the outcome. This is fairly obvious when the structure in (i) is assumed, for instance. The ordinary value for v' is as in (ii). When the compositional interpretation proceeds further, though, we ultimately arrive at the same value for VP as in (72a) above. First the function in (i) applies to $g(2)$, but then abstraction over index 2 takes place. The principle of compositional reconstruction also provides the correct set of salient alternatives, as long as $\sim$ is coindexed with a verbal node in the antecedent that denotes a unary function itself. This way it is ensured that the antecedent function can apply to the actors in the context.

(i) $\sim C_2$ [$_{IP}$ every director$_F$ [$_{VP}$ 2[t_2 [$_{v'}$ $\sim C_1$ called 2_F's father]]]]

(ii) $[\![v']\!]^g = \lambda x.\lambda w : \lambda w'.call_{w'}(x, g(2)\text{'s father}) \notin g(C_1)(x).call_w(x, g(2)\text{'s father})$

This state of affairs, however, leads to a requirement for the function in (76) that cannot be fulfilled. Since the ordinary value of $\sim$'s sister is the only member of $g(C_1)$, it cannot hold that this value applied to an individual is not a member of $g(C_1)$ applied to that same individual. This has the consequence that focus on a bound pronoun is obligatory if a representation similar to the one in (74) is chosen. The observed optionality of focus on bound pronouns arises because the LF without an embedded $\sim$-operator is only licensed if there is no F-mark on the bound pronoun. Moreover, this LF does not block the LF with a low $\sim$-operator argued to license focus on the bound pronoun. The latter has a stronger presupposition due to the presence of the additional $\sim$ – that is, the ordinary values of the LFs are not the same, and AvoidF cannot apply.

3.6 Intermediate conclusion

So far we have achieved the following: it has been shown that the individual-denoting alternatives for focused bound variables are indeed all that is needed to account for the observed focusing pattern. An essentially Roothian system has been defended. It was argued that the insertion of $\sim$-operators is free, except for the sentential level. Each sentence must have a $\sim$-operator attached to it. It was seen to be crucial that an embedded $\sim$-operator resets the secondary value to the ordinary value of its sister constituent. It has been argued that once the $\sim$-operator has activated formal alternatives, the context is scanned for all salient alternatives matching the requirements imposed by the formal alternatives. However, this search is restricted by the fact that – as in Rooth's system – the $\sim$-operator is coindexed with an antecedent constituent. The salient alternatives must be derived from the denotation of that antecedent, either by being identical to it, or by being inferred or compositionally reconstructed from it. We modified the $\sim$-operator so that each matching salient alternative must be a member of the contextual alternatives $g(C)$. The optionality of focus on bound pronouns has been shown to stem from a syntactic ambiguity, namely the presence or absence of an embedded $\sim$-operator. In particular, I argued that the observed contrastiveness requirement should be modeled as another presupposition introduced by $\sim$, namely one that requires that the ordinary value of the constituent that $\sim$ is attached to must not be a member of the denotation of C. This was seen to result in a contradictory requirement if there is an embedded operator but the focus on the bound pronoun is left out. The contrastiveness requirement also allowed us to account for the non-overlapping domains requirement.

4 Predictions and Problems

In the present section predictions and consequences of the proposal are discussed.

4.1 Focus on the antecedent quantifier

It was noted above that the focus on the antecedent of the bound pronoun in conjunct two is obligatory. Consider (78), repeated from (19) above.

(78)   *Every student cut his (own) arm, and every teacher cut HIS arm.

The focus on *teacher* in (78) cannot be dropped. Why is this? Since I am operating under the assumption that a $\sim$-operator is attached to at least the sentential node, the representation for (78) must be something like (79b). The embedded $\sim$ is necessary in order to license focus on the bound pronoun. The higher one is obligatory by assumption (46a). Since the lower $\sim$-operator resets the focus value and there is no higher focus, the focus value for IP in (79b) is just the ordinary value of IP. The denotation of the antecedent sentence cannot be a member of that value, of course. The only option is therefore the one where *teacher* bears an F-mark as well.

(79) a. [$_{IP}$ every student 1[t$_1$ cut 1's arm]]
      b. $\sim$ C$_2$ [$_{IP}$ every teacher [$\sim$ C$_1$ 1[t$_1$ cut 1$_F$'s arm]]]

4.2 Overfocusing

In subsection 2.3 we discussed evidence suggesting that so-called overfocusing is not allowed, i.e., that focus is not optional. Overfocusing was ruled out by the condition called AvoidF. Reconsider the data from above. In short, when constituents contrast with each other, focus is obligatorily present, as shown by the contrast between B and B$'$. But if the constituents do not contrast, focus is forbidden, as evidenced by C and C$'$.

(80) A: John kissed Mary.
      B: Yes. And, BILL kissed SUE.
      B$'$:#Yes. And, BILL kissed Sue.

(81) A: John kissed Mary.
      C: Yes. And, BILL kissed Mary (too).
      C$'$:#Yes. And, BILL kissed MARY (too).

But we have also seen that focus on bound pronouns is in general optional. Moreover, it was claimed that more than one $\sim$-operator can be present in a structure. The optionality of the focus in question has been essentially reduced to a syntactic ambiguity, namely the optional presence of embedded $\sim$-operators. The question is whether these assumptions predict the correct pattern for the data in (80) and (81). For each of B-C$'$ there are at least two representations that we have to consider, namely the one with a $\sim$-operator only at the sentential level and the one with an additional embedded $\sim$-operator. That is, for each of B-C$'$ we have to consider both (82a) and (82b) where X stands for *Sue* or *Mary*, and the focus on the latter two is present in B and C$'$, but not in B$'$ and C. The denotations of the relevant contextual alternatives are assumed to be as in (83). I will discuss each continuation of A in turn now.

(82) a. $\sim$ C [Bill$_F$ kissed X$_{(F)}$]
      b. $\sim$ C$_2$ [Bill$_F$ [$\sim$ C$_1$ 1[t$_1$ kissed X$_{(F)}$]]]

(83) a. $g(C) = \{\lambda w.kiss_w(John, Mary)\}$
      b. $g(C) = \{\lambda x.\lambda w.kiss_w(x, Mary)\}$

Consider B with *Sue* for X and an F-mark present. In case representation (82a) is chosen, the relevant focus value is as in (84a). A makes a suitable alternative salient, (83a), and therefore the requirement of $\sim$ is fulfilled. Moreover, the contrastiveness requirement of $\sim$ is fulfilled, as well; the ordinary value of B is not a member of (83a).

Contrastive focus is licensed. Does AvoidF prefer to drop the focus on *Sue*, as in B$'$? The answer is negative. $g(C)$ in (83a) is not a member of the resulting focus value (84b), and A presumably does not make an alternative salient that could satisfy the requirement imposed by the focus value.

(84)   a. $[\![\text{B}]\!]^f = \{\lambda w.kiss_w(x, y) \mid x, y \in D_e\}$
        b. $[\![\text{B}']\!]^f = \{\lambda w.kiss_w(x, Sue) \mid x \in D_e\}$

In case the representation in (82b) is chosen for B, a problem obtains. The focus value for the VP is as in (85ai). Again, A makes a suitable alternative salient, namely the property of kissing Mary (83b). The contrastiveness requirement is also satisfied, as the property of kissing Sue is not a member of (83b). The problem obtains when the lower $\sim$-operator resets the secondary value. This has the consequence that the alternatives introduced by focus on *Sue* are not part of the focus value of the sister of the higher $\sim$-operator.[26] There is no alternative made salient by A that is a member of the focus value in (85aii). For essentially the same reason, representation (82b) leads to infelicity in the case of B$'$. We just need to consider the lower $\sim$-operator. The focus value for the VP is now the singleton in (85b). The property of kissing Mary, made salient by A, is not a member of that set. This means that only B – as licensed by structure (82a) – is an option for the continuation of A, even under the present assumptions.

(85)   a.   (i) $[\![\text{B}_{VP}]\!]^f = \{\lambda x.\lambda w.kiss_w(x, y) \mid y \in D_e\}$
                (ii) $[\![\text{B}_{IP}]\!]^f = \{\lambda w.kiss_w(x, Sue) \mid x \in D_e\}$
        b. $[\![\text{B}'_{VP}]\!]^f = \{\lambda x.\lambda w.kiss_w(x, Sue)\}$

Consider now C$'$ with representation (82a). The focus value relevant for the $\sim$-operator is (86a), again. $g(C)$ in (83a) fits this description. Moreover, the denotations of A and C$'$ satisfy the contrastiveness requirement. The problem is, however, that AvoidF prefers the same structure without F-mark on *Mary* – that is, it prefers C. The resulting focus value is given in (86b). The alternative made salient by A is also a member of that value. Thus, that option is to be chosen.

(86)   a. $[\![\text{C}']\!]^f = \{\lambda w.kiss_w(x, y) \mid x, y \in D_e\}$
        b. $[\![\text{C}]\!]^f = \{\lambda w.kiss_w(x, Mary) \mid x \in D_e\}$

If representation (82b) is chosen for C$'$, the focus value relevant for the lower $\sim$-operator is as in (87ai). A makes an appropriate alternative salient – the property of kissing Mary (83b). The focus value used by the higher $\sim$-operator, on the other hand, is as in (87aii). Again, a suitable salient alternative is available – the proposition that John kissed Mary. AvoidF, of course, prefers the structure without F-mark on *Mary* which leads to the focus value in (87b) for the lower $\sim$-operator to use. The property of kissing Mary is a member of that singleton. The focus value used by the higher $\sim$-operator is again identical to (87aii). The proposition denoted by A is a member of that value. The problem lies, however, in both cases with the ordinary value of the sister of the lower $\sim$-operator. In particular, it does not satisfy the contrastiveness requirement, as it is identical to $g(C)$ in (83b). This means that structure (82b) is blocked for both the option with and the one without focus on *Mary*. This in turn means that only C under the representation (82a) is a possible option.

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[26] Note that here it would not do, to just attach the higher $\sim$-operator lower. This would result in appending it directly to the F-marked constituent *Sue*, which is prohibited by (46b).

(87)   a.   (i) $[\![\mathrm{C}'_{VP}]\!]^f = \{\lambda x.\lambda w.kiss_w(x,y) \mid y \in D_e\}$
           (ii) $[\![\mathrm{C}/\mathrm{C}'_{IP}]\!]^f = \{\lambda w.kiss_w(x,Mary) \mid x \in D_e\}$
      b. $[\![\mathrm{C}_{VP}]\!]^f = \{\lambda x.\lambda w.kiss_w(x,Mary)\}$

We have thus explained the patterns that originally motivated AvoidF. It should be added that the F-mark on *Bill* cannot be dropped in any of the continuations. The reason is that we would not find a suitable salient alternative for the sentence anymore, as A has *John* in the subject position. The proposition denoted by A would not be a member of any of the resulting focus values. The data of overfocusing therefore highlight the importance of the sentential $\sim$-operator. If this operator were to be made optional together with other $\sim$-operators, the theory would not be descriptively adequate any longer. It goes without saying that the present subsection does not represent a complete treatment of overfocusing, but it goes a considerable way to explain some crucial data. I must leave further investigation of this phenomenon to future research, however.

4.3 Salient alternatives

Let us turn to the question of whether the use of salient alternatives that are generated by the process of compositional reconstruction is not too permissive. By incorporating that notion, the present proposal makes more alternatives available that are relevant for focus licensing. We have seen that this was crucial for the account of the basic data. This has the consequence that we should find both more cases of focus licensed than in Rooth's 1992 original theory. In particular, I will show that option (56a) of compositional reconstruction is also needed – that is, a semantic object derived by applying the denotation of some linguistic material to material inferred from the context (or vice versa) can act as a salient alternative.

Consider A's utterance under the bound variable reading. In this situation in order for B's utterance to contrast with A's, there is obligatorily stress on both *John* and *Mary*. B′ is an infelicitous utterance.

(88)   A: Every student likes his mother.
      B: Yes. And, JOHN likes MARY's mother.
      B′:#Yes. And, JOHN likes Mary's mother.

Let us briefly consider what the standard Roothian theory would have to say about the situation posed by (88). In principle one could assume at least two LFs, just as proposed in the present paper. Either there is only one $\sim$-operator attached to the sentential level as in (89), or there is a further embedded one. The $\sim$-operators are coindexed with constituents of A's utterance.

(89)   a.   [every student [1[t_1 likes 1's mother]]]$_4$
      b. $\sim_4$ C [JOHN$_F$ likes MARY$_F$'s mother]

(90)   a.   [every student [1[t_1 likes 1's mother]]$_5$]$_4$
      b. $\sim_4$ C$_2$ [JOHN$_F$ [$\sim_5$ C$_1$ 1[t_1 likes MARY$_F$'s mother]]]

Now consider the focus values for the sentential levels of (89b) and (90b), respectively. Let us assume that proper names can also be optionally treated as quantifiers (Montague 1974). This has the consequence that all objects of type $\langle\langle e,st\rangle st\rangle$ can serve as alternatives to proper names, which seems to be required in order to let *John* and *every*

student contrast with each other. In (89b) there is no embedded ∼-operator that could reset the secondary value. Because of this the alternatives contributed by the F-mark on *Mary* figure in the sentential focus value, as (91) shows. In (90b), however, the embedded ∼-operator does reset the secondary value. The resulting sentential focus value is (92). But even though proper names can function as quantifiers under the present assumptions, the ordinary value of the antecedent sentence is neither a member of (91) nor of (92). The reason is clear, bound variable interpretations are not members of the respective focus values.

(91) $[\![(89b)]\!]^f = \{\mathcal{Q}(\lambda x.\lambda w.like_w(x, y\text{'s mother}) \mid y \in D_e, \mathcal{Q} \in D_{\langle\langle e,st\rangle st\rangle}\}$

(92) $[\![(90b)]\!]^f = \{\mathcal{Q}(\lambda x.\lambda w.like_w(x, Mary\text{'s mother}) \mid \mathcal{Q} \in D_{\langle\langle e,st\rangle st\rangle}\}$

The only way to circumvent this problem and thus license the foci in B would be to have the higher ∼-operator directly adjoined to *John*. This, however, seems highly unlikely for the following reason, already mentioned before: the resulting requirement on the context would be too weak. All that would be required is that there is an individual different from John. Therefore attaching a ∼-operator directly to a focused constituent should be prohibited. But assume for the sake of argumentation that we allow for this possibility.[27] Doing so would lead, however, to a second problem: one possible LF under the traditional account must be (93). Here the ∼-operator evaluating the focus contribution by the F-mark on *John* is directly adjoined to that constituent. The one responsible for focus on *Mary* is adjoined to VP. It must be coindexed with the antecedent VP not including the binder and the subject argument. The reason for the latter requirement is that in the traditional theory for focus on *Mary* to be licensed there must be an individual that could serve as an antecedent. Only if the VP-constituent not involving the binder is assumed to be the antecedent, will the resulting VP-denotation be a member of the focus value in (94), the focus value of the VP in (93).

(93) $[\sim C_2 \text{ JOHN}_F] [\sim C_1 \text{ 1}[t_1 \text{ likes MARY}_F\text{'s mother}]]$

(94) $[\![VP]\!]^f = \{\lambda x.\lambda w.like_w(x, y\text{'s mother}) \mid y \in D_e\}$

But this predicts that both the F-mark on *Mary* and the one on *John* are optional. The reason is that in both cases there is no dominating ∼-operator that would require focus on any of the larger constituents. But as soon as we require a dominating ∼-operator, say at the sentential level, we run into further problems. Consider the LF in (95) with two ∼-operators involved; one ∼-operator on *John* and one at the sentential level. Since the operator evaluating focus on *John* resets the focus contribution on *John*, the focus value for IP would then be as in (96). Clearly, the value of the antecedent sentence is not a member of (96), bringing us back to our original problem.[28]

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[27] Note also that such a move would open the door to sentence internal licensing of focus in example (i) uttered out of the blue. If the ∼-operators were adjoined directly to the F-marked constituents, the foci should be licensed because the individuals contrast with each other.

(i)   #JOHN kissed SUE.

[28] Remember that we must require that the ∼-operator resets the secondary value. Otherwise we could not account for focus on bound pronouns anymore and probably also not for other cases.

(95) $\sim C_2 \, [\sim C_1 \; \text{JOHN}_F] \; 1[t_1 \; \text{likes} \; \text{MARY}_F\text{'s mother}]$

(96) $[\![\text{IP}]\!]^f = \{\lambda w.like_w(John, y\text{'s mother}) \mid y \in D_e\}$

The result is the following: the higher $\sim$-operator must not be directly attached to *John* but to the sentential level. This ensures that neither of the F-marks is optional. Furthermore, our process of compositional reconstruction is necessary. The reason for this is that only this way we can make sure that there are salient alternatives in the context that match the formal ones activated by the sentential $\sim$-operator – i.e., alternatives where the semantic contribution of the F-marks on *John* and *Mary* asks for propositional alternatives with individuals in the slots occupied by *John* and *Mary*. Assume, for instance, the LF in (89b) again. Assume moreover that the sentential $\sim$-operator is coindexed with the VP including the binder in the preceding sentence. Then, in the present proposal, by (56a) the antecedent VP makes alternatives of the form *student a likes a's mother* available. Here a is a particular student, and the denotation of the VP is applied to a. All such alternatives have individual denoting expressions in the positions that contrast with *John* and *Mary*. It is predicted that there must be focus on the latter two. B$'$ in particular is ruled out. The contrastiveness requirement can, of course, be easily satisfied as well.

Now consider the following cases.[29] We notice that stress on the two arguments is only licensed when the two arguments related by the verbs switch their places. Moreover the antecedent sentence does not directly make a value available that is either a member of the focus value for (97bi) or (97bii). So the antecedent serving as salient alternative has to be accommodated through contextual entailment similar to other examples that we have seen before. But what is prohibited is that accommodation proceeds in such a way that an alternative is made salient that would license the foci in (97bii). That is, when accommodating a salient alternative through contextual entailment, the agent-patient relation must stay the same as in the actual linguistic object that the $\sim$-operator is coindexed with.

(97)   a.   John kissed Mary,
        b.   (i)   . . . but SHE dislikes HIM.
              (ii) #. . . but HE dislikes HER.

I am, however, not sure whether this is the correct generalization. First notice that (97a) makes, if anything, the proposition salient that John likes Mary. But that proposition will neither be a member of the focus value of (97bi) nor of the focus value corresponding to (97bii). So let us first complete the paradigm by noting that (98) is a possible continuation of (97a). The salient alternative inferred from the latter is a member of the focus value for (98). Since (98) has only one F-mark and is licensed by our focus principle, it follows that (97bii) will be blocked by AvoidF from ever surfacing. It simply has too many F-marks.

(98)   . . . but he DISLIKES her.

What about (97bi) then? It is not blocked by AvoidF, as it differs from (98) in more than just the placement of F-marks. Moreover it is not blocked by a continuation like (99). (99) is not even licensed because the inferred proposition is not a member of its focus value. So we can conclude that the LF corresponding to (97bi) must be

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something like (100), where each terminal node is F-marked. This is so because no complex node is actually given by the inferred antecedent. In particular the F-mark on the internal argument cannot be dropped, because one would obtain as focus value the set of properties of {disliking John, liking John,. . . }. Crucially, though, the denotation of the antecedent VP is not a member of that set. However, when there is an F-mark on the internal argument, the focus value becomes such that the denotation of the antecedent VP is a member of that set.[30] But if (100) is the relevant LF, one might expect the main stress within the VP – which is the smallest possible focus domain – should shift to the internal argument, given that it is the most deeply embedded element (cf. the discussion in (Truckenbrodt 1995: 160f.)).[31] In other words, the verb in (97bi) is stressed after all, but the stress on *him* is stronger, thereby creating the impression that the verb is unstressed.

(99)   #. . . but she DISLIKES him.

(100) $\sim$ C$_2$ she$_F$ [$\sim$ C$_1$ [dislikes$_F$ him$_F$]]

I therefore conclude that leaving the supply of contextual alternatives to what is essentially in the context or can be inferred from it, is not a drawback of the present theory, but rather a virtue. It allows us to deal with examples of focusing where the classical account would be disadvantageous.

5 Comparison with other proposals

I will now set the present approach in relation to previous ones.

5.1 Complex bound pronouns

5.1.1 Sauerland's and Jacobson's accounts

I will first discuss the approach by Sauerland (2000, 2008). Then we will briefly turn to Jacobson's 2000 account (also cf. Dimitriadis (2001)).

Sauerland offers an account to focus on bound pronouns where the pronoun is more complex than assumed in the discussion so far. In particular, he argues for an optional E-type analysis for bound pronouns along the lines suggested by Cooper (1979) for standard E-type pronouns (also cf. Heim and Kratzer (1998)). This means that "inside" the pronoun there is a silent function variable of type $\langle e, st \rangle$ which applies to the bound variable. For the discussion to follow I will assume the representation in (101) for such bound pronouns. The NP denotes the function variable. It is coindexed

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[30] In other words, the example is treated in parallel to the one in (i) discussed by Schwarzschild (1999). In both cases, both the verb and the internal argument must be obligatorily stressed.

(i)   {John cited Mary} but he DISSED$_{F1}$ SUE$_{F2}$.
         (Schwarzschild 1999: 170)

[31] The reviewer notes that they find (97bi) only acceptable with stress on the verb that is equal in strength to the one on the internal argument. I have to say that I have no judgement about the example. I must leave this to future research. But either way, (97bi) would not be a problem for the account.

with an antecedent NP – in the cases to be discussed the NP in the restrictor of the quantifier. I.e., it gets its denotation from the antecedent NP.[32] The interpretation of the definite article is such that it makes the denotation of the function variable a presupposition on the bound variable (102). In other words, the value of the variable to be bound is only defined if the denotation of the NP supplied by the NP in the restrictor of the quantifier is true of it (after Sauerland's 2000 (24)).

(101)   [the$_i$ NP$_j$]

(102) $[\![\text{the}_i \text{ NP}_j]\!]^g = g(i)$
            if $[\![\text{NP}_j]\!]^g(g(i)) = 1$, otherwise undefined

For the reasons reviewed in subsection 2.2.2, Sauerland assumes that in case a bound pronoun is stressed, the VPs including the binder must contrast and not only the pronouns without the binder. This means that the two sentences in an example like (103) would have the LFs in (104) if we assume Rooth's 1992 traditional theory of focus interpretation. There are two ∼-operators, because we want the VPs to contrast. Note that the F-mark is attached to the NPs in both the quantifier and the pronoun. In other words the restrictor properties in the quantifiers contrast with each other, and the properties in the definite descriptions also contrast with each other.

(103)   Every student cut his (own) arm, and every TEACHER cut HIS arm.

(104)   a.   [every student$_4$ [1[t$_1$ cut [[the$_1$ student$_4$]'s arm]]]$_8$]$_9$
         b.   [∼$_9$ C$_2$ every teacher$_{5,F}$ [∼$_8$ C$_1$ 1[t$_1$ cut [[the$_1$ teacher$_{5,F}$]'s arm]]]]

Since the interpretation of the NP in the pronoun serves as a presupposition for the bound variable, it follows that both VPs in (104) denote partial functions. In particular, they denote the partial functions in (105a) and (105b), respectively. Thus (105a) is only defined for individuals who are students, whereas (105b) is only defined for teachers.

(105)   a. $\lambda x.\lambda w : student_w(x).cut_w(x, x\text{'s }arm)$
         b. $\lambda x.\lambda w : teacher_w(x).cut_w(x, x\text{'s }arm)$

Consider now the focus value of the VP in (104b). Since the F-mark in (104b) is on the NP inside the pronoun, the focus value has the denotation of the NP replaced with all its alternatives. Thus the focus value in (106) contains all the predicates of the form *x cut x's arm* with varying definedness conditions. According to Rooth's semantics for the ∼-operator, $g(C_1)$ must be a subset of (106). The context provides one function that is a member of (106), namely (105a). Moreover (105a) and (105b) contrast with each other. Thus focus on the pronoun should be licensed.

(106) $[\![\text{VP}]\!]^f = \{\lambda x.\lambda w : Q_w(x).cut_w(x, x\text{'s }arm) \mid Q \in D_{\langle e,st\rangle}\}$

What about the higher ∼-operator? According to its standard entry, it resets the secondary value of its immediately dominating node to the ordinary value. The consequence of this is that the lower ∼-operator consumes the alternatives contributed

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[32] In other words, the NP in the restrictor of the quantifier functions as the syntactic antecedent for the NP in the pronoun indicated by coindexation (cf. the discussion in (Heim 1990) and (Chierchia 1990: 158f.) especially). This could, for instance, be done by treating pronouns as cases of ellipsis (cf. Heim (1990), Elbourne (2005) a.o.). Sauerland (2008) himself argues against an ellipsis analysis, but this is immaterial to the present discussion. For simplicity, I will present the semantic content of the NP inside the pronoun syntactically.

by the lower F-mark. The latter can therefore not contribute anymore to any focus value higher than the lower $\sim$-operator. Thus the higher $\sim$-operator only evaluates the higher F-mark. In other words, the focus value of the IP is as in (107). Again, $g(C_2)$ must be a subset of that focus value. But this time the value of the antecedent IP is not a member of the set in (107) because (107) restricts the possible properties in the restrictor of the quantifier to *teacher*. Thus, focus on the quantifier should not be licensed.

(107) $[\![\text{IP}]\!]^f = \{\lambda w.\forall x[P_w(x) \rightarrow teacher_w(x).cut_w(x, x's\ arm)] \mid P \in D_{\langle e,st\rangle}\}$

The obvious remedy for this is to change the semantics of the $\sim$-operator. In particular, one would not require it to reset the focus value. Rather the focus value of its immediately dominating constituent would be equivalent to the focus value of its sister:[33] this option allows for the focus on the quantifier, because now the focus value of the IP in (104b) is as in (108). In other words, the focus on the NP in the pronoun is evaluated twice. The ordinary semantic value of the antecedent IP, (104a), is a member of (108). Moreover, the denotations of the sentences in question contrast with each other.

(108) $[\![\text{IP}]\!]^f = \{\lambda w.\forall x[P_w(x) \rightarrow Q_w(x).cut_w(x, x's\ arm)] \mid P,Q \in D_{\langle e,st\rangle}\}$

But remember that there must be a principle like AvoidF active that strives to minimize the number of foci. Consider, now, what happens when one drops the F-mark on the bound pronoun, but otherwise one leaves the LFs as they were before. In this case we get (109). Note that the embedded $\sim$-operator is also left out for simplicity.

(109) a. [every student$_4$ 1[t$_1$ cut [[the$_1$ student$_4$]'s arm]]]$_9$
 b. [$\sim_9$ C every teacher$_{5,F}$ 1[t$_1$ cut [[the$_1$ teacher$_5$]'s arm]]]

The focus value of the IP in (109b) is as in (107), again. Thus we know already that the structure in (109b) is not licensed. In other words, complex pronouns only allow for the option with the F-mark on the bound pronoun. But how is the optionality of stress on the bound pronoun accounted for then? Sauerland assumes that in addition to the version with complex pronouns there can be LFs with simple pronouns, and we already know that in this case focus on the bound pronoun is not licensed under Rooth's 1992 standard theory. Sauerland's system can thus correctly explain the pattern we find.

Let us now briefly turn to Jacobson's 2000 proposal. Jacobson assumes a variable-free semantics. On that account, pronouns – and bound pronouns in particular – denote the identity function, i.e., they are of type $\langle e,e\rangle$. Via two type shift rules, the semantic information contributed by the identity function is passed up during composition. Although I cannot go into the details of the proposal, it should be clear that contrastive focus on bound pronouns also presents a problem for a variable-free approach. Since pronouns in general denote the identity function, it follows that the two bound ones in

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[33] This in itself is a questionable move, as it seems that foci are in most cases not accessible once evaluated. At any rate, an entry for the $\sim$-operator which does not reset the focus value forces one to adopt a view of focus licensing closer to Schwarzschild's 1999. As will become clear in subsection 5.2 below, the phenomenon discussed in the present paper forces even such a givenness approach to adopt an operator that resets the second interpretation value. Another possibility to avoid the problem in (107) would be to adjoin the higher $\sim$-operator to the QNP itself. All that would be required in this case is that there is a contrasting QNP in the context, which is the case. Remember though that once we give up the requirement that there is a $\sim$-operator attached to each sentence, F-marks in general become optional, as discussed above.

(103) above make the same semantic contribution. But then by AvoidF, focus on the second pronoun should not be licensed – provided focus is evaluated by a $\sim$-operator in the scope of the quantifier. Jacobson's solution to this problem is to let pronouns in cases such as (103) denote the identity function over differing domains. That is, in (103) the first bound pronoun denotes the identity function over the domain of students, and the second one over the domain of teachers. These domains are contextually supplied, which means that they are supplied by the antecedent quantifiers. This is quite close to Sauerland's proposal. In case there is focus on a bound pronoun, the contextually supplied domains of the pronouns involved must differ. If there is no focus on the pronoun, either the domains do not differ or no domains are used at all. Thus it can also be seen that under this approach AvoidF will actually force focus on the bound pronoun if the domains differ. If the focus were dropped, the ordinary value of the antecedent VP would not be a member of the relevant focus value.

5.1.2 Problems for complex bound pronouns

A direct prediction of Sauerland's approach is that focus on the property inside the definite description should be possible whenever focus on the antecedent property inside the quantifier is licensed. We already know that this is not the case. In particular, whenever there is overlap in the extensions of those properties focusing the one in the quantifier is licit, but not focusing the one in the pronoun:[34]

(110)   A: Did every student submit his paper?
           B: #I am not sure. But every YOUNG student submitted HIS paper.
           B′: I am not sure. But every YOUNG student submitted his paper.

As has been shown, the present proposal straightforwardly predicts examples like (110).

Let us turn to another problem by noting that additive *too* in the second conjunct is possible with an unstressed bound pronoun but also with a stressed bound pronoun:

(111)   a.   Every director discussed his film, and every PRODUCER discussed HIS film, too.
           b.   Every director discussed his film, and every PRODUCER discussed his film, too.

We follow the treatment of *too* laid out in (Heim 1992: 189), an extension of Kripke's (for a more recent account along these lines cf. Geurts and van der Sandt (2004)). According to this view, *too* when adjoined to some LF associates with an F-marked constituent X and presupposes that somewhere in the context there is an alternative $[\![Y]\!]^g$ to $[\![X]\!]^g$ different from $[\![X]\!]^g$ such that when $[\![X]\!]^g$ is replaced by $[\![Y]\!]^g$ truth results. This means that *too* is essentially anaphoric:

(112) $[\![_\phi \ldots X_F \ldots] \, too_i]\!]^g(w) = [\![_\phi \ldots X_F \ldots]\!]^g(w)$
           $\qquad\qquad\qquad$ if $[\![Y_i]\!]^g \in [\![X]\!]^f$, $[\![Y_i]\!]^g \neq [\![X]\!]^g$ and

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[34] A similar problem might arise in Jacobson's approach, at least for the sketch of her analysis provided in her paper. There all that is required is that the pronouns are "the identity function over different domains" (Jacobson 2000: 70) in order for there to be focus on a bound pronoun. Clearly the domains of the identity functions in A and B in (110) would differ according to this definition. It would of course be possible to avoid this problem by demanding that the domains must not overlap. But this might appear to be a restatement of the very problem posed by (110).

$$[\![_\phi \ldots Y_i \ldots]\!]^g(w) = 1, \text{ otherwise undefined}$$

This semantics for *too* can deal well with (111b), which does not have complex pronouns, as Sauerland argues, or pronouns ranging over differing domains, as Jacobson would have it. The underlying LFs would be as in (113). Here *too* is co-indexed with *director* and associates with the focus on *producer*. The requirement is thus that $[\![\text{director}]\!]^g$ is a non-identical alternative to $[\![\text{producer}]\!]^g$, which it is. Moreover, it is required that the denotation of the LF in (113b) where we replace *director* for *producer* is true. This is satisfied as well by the first conjunct. Thus (111b) is predicted to be grammatical.

(113)   a.   every director$_5$ 1[t$_1$ discussed 1's film]
         b.   every producer$_F$ 1[t$_1$ discussed 1's film] too$_5$

Let us now see whether (111a) is also predicted. We first assume Sauerland's analysis. Again, *too* requires that $[\![\text{director}]\!]^g$ is an alternative to $[\![\text{producer}]\!]^g$. And it requires that the denotation of the LF in (114b) where we replace *director* for *producer* is true – that is, $[\![\text{every director}]\!]^g$ applied to the partial function denoted by the VP in (114b), $\lambda x.\lambda w : producer_w(x).discuss_w(x, x\text{'s }film)$, should lead to truth. However given the observed non-overlapping requirement, the partial function is undefined for the quantifier *every director*. Thus the LFs in (114) should lead to undefinedness.

(114)   a.   every director$_5$ 1[t$_1$ discussed [[the$_1$ director]'s film]]
         b.   every producer$_F$ 1[t$_1$ discussed [[the$_1$ producer$_F$]'s film]] too$_5$

In Jacobson's analysis a parallel problem arises. Assume the LFs in (115) where D and D$'$ stand for the domains associated with the respective pronouns. Here the second "bound" pronoun has as its denotation the identity function over the domain D$'$ of producers. Now, when the requirement of *too* is checked, it can be seen that it is not satisfied. As just said, replacing *producer* in (115a) with *director* should result in a proposition that is true in the world of evaluation. But since the "bound" pronoun ranges over the producers and moreover the directors and producers must not overlap, the resulting value will not be defined at all.

(115)   a.   every director$_5$ 1[t$_1$ discussed 1$_D$'s film]
         b.   every producer$_F$ 1[t$_1$ discussed 1$_{D'}$'s film] too$_5$

An obvious way to remedy this is by imposing focus association with both instances of *producer* and moreover require co-indexing of *too* with both instances of *director*, as in the LFs in (116) standing in for Sauerland's analysis. This would have the consequence that the requirement of *too* is satisfied. Now, it is required that the meaning of both *director*-instances when replacing both *producer*-instances, should lead to truth.[35] In Jacobson's analysis a parallel process must replace domain D$'$ with D.

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[35] Hans-Martin Gärtner (p.c.) asks whether the complex pronoun analysis coupled with some specific syntactic assumptions about bound pronouns might be able to deal with the problem discussed. In particular, he suggests that the bound pronoun really functions as a copy of the antecedent quantifier. All the correct semantics has to do now is to interpret the restrictor only in the antecedent position, apart from interpreting the lower copy as a definite description following the suggestions by Fox (2002) and Sauerland (2004) but crucially without interpreting the restrictor in the lower copy. The non-trivial problem, however, is that although this might solve the problem with *too*, it does not license contrastive focus anymore. Remember that the whole reason why complex pronouns were introduced to begin with was to license focus on

(116)   a.   every director$_5$ 1[t$_1$ discussed [the$_1$ director$_7$]'s film]
         b.   every producer$_F$ 1[t$_1$ discussed [the$_1$ producer$_F$]'s film] too$_{5,7}$

The problem with this assumption is that it predicts the following sentence to be good under the interpretation in (117a). *too* should be able associate with both F-marked constituents. When replacing each of them with the antecedents that are coindexed with *too*, truth should result. The problem apparently is that *too* simply does not associate with two foci at once. If (117) is good at all, it marginally has the interpretation in (117b). Here *Bill* is contrastively stressed, whereas *too* associates with focus on *Sue*. The antecedent for *Sue* is accommodated – that is, under the most accessible reading *Mary* would function as antecedent. But crucially (117) cannot have the interpretation in (117a) because multiple association with focus is prohibited for *too*.

(117)   John$_6$ kissed Mary$_8$, and BILL$_F$ kissed SUE$_F$, too$_{6,8}$
         a. #'John kissed Mary, and Bill kissed Sue.'
         b. ?'John kissed Mary, and Bill kissed Mary and in addition Sue.'

Satoshi Tomioka (p.c.) reminds me that the restriction of *too* being able to associate with only one focus has already been noted by Kaplan (1984):[36]

(118)   a.   *Jo had fish and Mo had soup too.
         b.   Jo had fish and Mo had soup.
         (Kaplan 1984: 510)

In other words, the LFs in (116a) and (116b) and also the corresponding ones in Jacobson's theory, which were used to address the problem created, should not be available because of the restrictions inherent to *too*. This has the consequence that the presupposition of *too* in (111a) should not be satisfied, and the sentence should be a presupposition failure under the F-marking indicated. But it is acceptable. The VPs in examples like (111a) should count as having the same denotation, they should not be modeled as contrasting partial functions. I therefore conclude that the acceptability of (111a) argues against an approach to stress on bound pronouns by letting the pronouns contrast with differing definedness conditions. Note that it might still turn out that bound E-type pronouns might be needed for other reasons (cf. Elbourne (2005) for instance). But, at least, for the interpretation of contrastive focus on bound pronouns, underlying functions should not be essential. Also, the present paper has nothing to say about the question whether a variable-free semantics is correct or not. Again all that the present paper claims is that differing domains should not be essential for the licensing of focus on bound pronouns.

It should be clear that the present account makes the correct predictions with respect to data involving *too*. Since the present account does not rely on bound E-type pronouns or contrasting domains, a problem parallel to the one raised for Sauerland's and Jacobson's theory does not arise. Consider the crucial example in (119) again.

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bound pronouns. For this licensing to work, we saw it is essential that the property inside the pronoun is interpreted in the lower position.

[36] The reviewer notes that for them (118a) is not impossible. This goes against the reported judgements in the literature (cf. Green (1973), Krifka (1999) in addition to Kaplan (1984)). Krifka notes that sentence-final *too* appears to associate with one contrastive topic (rather than a focus), the subject constituent in our case. Crucially, though, it does not associate with more than one. Sentence-internal *too* behaves differently.

(119)   Every director discussed his film, and every PRODUCER discussed HIS film, too.

When the presupposition of *too* is evaluated, essentially (120) must hold under the present assumptions. Recall that contrastiveness is implemented by requiring that the ordinary value of the focus constituent is not a member of the contextual alternatives used for evaluation, where a variable is abstracted over both in the former and the latter. Note in particular that the contrastiveness presupposition is satisfied in the present situation, as there are relevant properties made salient by the second sentence in (119), and moreover for each director a, it is the case that the proposition that a *discussed a's film* is not a member of $g(C)$. Thus (120) is defined. Furthermore, by (119) the context ensures that the truth conditions in (120) are fulfilled as well. Therefore the presupposition of *too* is fulfilled under the present assumptions, and (119) is correctly predicted to be grammatical.

(120) $\forall x[\text{director}_w(x) \rightarrow \lambda w'.discuss_{w'}(x, x'sfilm) \notin g(C)(x).discuss_w(x, x's\ film)]$

In addition, there is a third problem which only applies to Sauerland's theory. Consider (121) under the bound variable reading for B's utterance. We notice that the bound pronoun must be necessarily focused. This means it seems to contrast with the individual *Mary* in A's utterance.

(121)   A: John likes Mary's mother.
         B: Yes, and every STUDENT likes HIS mother.
         B′:#Yes, and every STUDENT likes his mother.

Let us concentrate on focus evaluation at the sentence level. To license focus on *student*, it must be assumed that it is actually the complete quantifier that bears an F-mark. By default prominence, it is the restrictor that bears phonetic stress then. If proper names can have a quantifier-interpretation, focus on *every student* is licensed. Assume furthermore the E-type analysis for the stressed bound pronoun. Then the focus value for the sentential level is as in (123). The ordinary value in (122), however, is not a member of that value. Focus should not be licensed.[37]

(122) $[\![\text{IP}_A]\!]^g = \lambda P[P(John)](\lambda x.\lambda w.like_w(x, Mary's\ mother))$

(123) $[\![\text{IP}_B]\!]^f = \{\mathcal{Q}(\lambda x.\lambda w : P_w(x).like(x, x's\ mother))|P \in D_{\langle e,st\rangle}, \mathcal{Q} \in D_{\langle\langle e,st\rangle st\rangle}\}$

Recall from subsection 4.3 that one cannot adopt a view where there is no sentential focus evaluation – i.e., one cannot adopt a representation where one $\sim$ is attached to the quantifier and another one to the VP without having one on the top. The reason for this is that in that case all foci would become optional. Utterance B′ shows that this is not allowed.

    The present proposal does not run into the problem just discussed. The reason is that under the present proposal the F-mark on the bound pronoun contributes only individuals as alternatives. Assume an LF with only a sentential $\sim$-operator. The resulting focus value is then (124). (122) is a member of (124). The F-marks are licensed.

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[37] Having an additional $\sim$-operator embedded in the scope of the quantifier would not change anything for the argument. The focus contribution of the F-mark on the pronoun would be reset. But nevertheless, the focus value of the sentential level would correspond to a binding configuration. The antecedent value would not satisfy the requirements.

Crucially, the one on the bound pronoun cannot be dropped because a problem parallel to the one with (123) would obtain.

(124) $\quad [\![\text{IP}_B]\!]^f = \{\mathcal{Q}(\lambda x.\lambda w.like(x, y\text{'s mother})) \mid y \in D_e, \mathcal{Q} \in D_{\langle\langle e,st\rangle st\rangle}\}$

5.1.3 Jacobson's paycheck pronouns argument

Jacobson (2000) presents the contrast in (125) as an argument against an approach to focused bound pronouns making use of bound variables. Whereas the bound pronoun in (125b) can be stressed contrastively, the paycheck pronoun in (125a) cannot be stressed. This is surprising if paycheck pronouns have an underlying representation that is parallel to the DP in (125b) – that is, if the paycheck pronoun *her* is to be constructed parallel to the DP *his mother*, where the antecedent DP provides the mother-of-function for the paycheck pronoun. In other words, under this analysis the mother-of-function applies to an embedded bound variable (cf. Cooper (1979), Engdahl (1986) a.o.).[38]

(125) a. *Every 3rd grade boy loves his mother, while every 4th grade boy HATES HER.
       b. Every 3rd grade boy loves his mother, while every 4th grade boy HATES HIS mother.
       (Jacobson 2000: (24),(25))

Jacobson notes that one cannot claim that AvoidF, the principle that strives to minimize the number of F-marks, is responsible for the obligatory absence of focus on the paycheck pronoun in the grammatical version of (125a). One could imagine that the focus on *her* is blocked because it is possible to stress less material than the whole DP. In particular, since the embedded bound variables contrast, one should stress them directly as this has the consequence that less material is F-marked than if the whole paycheck pronoun is F-marked. The problem is that this predicts that stress on the second paycheck pronoun in (126), i.e., the second instance of *she*, should be bad as well, contrary to fact. The generalization seems to be that only if there is a source providing the underlying function of the paycheck pronoun that applies to the bound pronoun other than the material that the paycheck pronoun is to be contrasted with, F-marking the latter is possible.

(126) Every man$_i$ who loves his$_i$ mother thinks that she$_{f(i)}$ is nice, while every man$_j$ who HATES HIS$_j$ mother thinks that SHE$_{f(j)}$ is a jerk.
       (Jacobson 2000: (28))

The problem is that the present approach can make the underlying bound pronouns contrast. I.e., it predicts (126) to be good. If we make the move to claim that (125a) is unacceptable because too much material is F-marked, it becomes unclear why this is not so in (126).[39] This is a genuine and interesting problem. I would nevertheless claim

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[38] Alternatively, one could assume an ellipsis analysis for paycheck pronouns. Cf. Karttunen (1969), Partee (1975), Heim (1990), Elbourne (2005) a.o.

[39] A parallel problem arises in Sauerland's 2000 theory because here it is also the bound pronoun inside the paycheck pronoun that is supposed to contrast with an antecedent pronoun. In Sauerland's case it would be an E-type pronoun with a bound variable in it that the function applies to. Crucially, though, the paycheck pronoun is also complex in his case.

that (125a) is ruled out by AvoidF, i.e., too much material is stressed. This means that (126) is possible because more than the underlying bound pronouns contrast. In particular, the functions supplied in the first and the second conjunct in (126) differ (cf. footnote 12 above): in the first conjunct the function corresponds to the property of being the mother of x and being loved by man x, whereas in the second conjunct it is the property of being the mother of x and being hated by man x. These functions contrast. Therefore AvoidF dictates the stress on the whole paycheck pronoun. No such option is possible for (125a). Here the paycheck pronoun is directly dependent on the DP *his mother* in the first conjunct, i.e., f denotes the mother-of-function. The details of such an analysis remain to be worked out, of course. But it seems that this approach is a viable one.

5.2 The problem in a givenness-based theory

5.2.1 Givenness

In the present subsection, I will show that the overall problem discussed in the present paper and reviewed in subsection 2.1 also obtains when a theory based on givenness is assumed. In other words, the problem is fairly theory-independent. I will illustrate this by using Schwarzschild's 1999 account based on givenness. In this theory focus values do not play a role, i.e., focus is not semantically interpreted as was the case in the theory discussed so far. Schwarzschild's basic idea is that the notion of givenness drives F-marking. In particular, he assumes the condition in (127). That is, there is a condition that checks for each constituent that is not F-marked whether it is given. F-marked constituents are excluded from that condition and need not be given as a consequence.

(127)   GIVEN*ness*
          If a constituent is not F-marked, it must be GIVEN.
          (Schwarzschild 1999: 155)

Givenness itself is defined as in (128). The definition requires that for each non-F-marked constituent there be an antecedent constituent in the context. The requirement in (128a) is straightforward. The mechanism of existential type shifting existentially binds open argument positions of the expressions to which it applies. By ∃-type shifting the antecedent constituent must then entail the Existential F-closure of the focus constituent. The Existential F-closure of a constituent is the result of replacing each F-mark with a variable of the appropriate type.

(128)   *Definition of* GIVEN (final informal version)
          An utterance U counts as GIVEN iff it has a salient antecedent A and
          a.   if U is type e, then A and U corefer;
          b.   otherwise: modulo ∃-type shifting, A entails the Existential F-closure of
                U.
          (Schwarzschild 1999: 151)

Furthermore there is the constraint AvoidF in (129), which was already discussed above and which is responsible for reducing the number of F-marks. It is basically an economy condition. It states that if material is given it need not be F-marked – that

is, it compares two representations: one with F-mark and one without F-mark. If the former satisfies givenness, it is to be preferred to the latter one.

(129)   AVOIDF
         F-mark as little as possible, without violating Givenness.
         (Schwarzschild 1999: 156)

Schwarzschild's theory is designed to account for the fact that (130bi) is a felicitous utterance, whereas (130bii) is not, with (130a) being the antecedent sentence.

(130)   a.   Obama praised Bush.
         b.   (i)   No, Obama praised CLINTON.
               (ii) #No, OBAMA praised CLINTON.

Let us apply givenness checking now. First consider (130bi). As (131) shows for each constituent we can find an appropriate antecedent. For the Existential F-closure of each focus constituent there is an antecedent constituent entailing it via ∃-type shift.

(131)   a.   [Obama praised CLINTON$_F$]: [$praise(Obama, Bush)$] entails $\exists x[praise(Obama, x)]$
         b.   [praised CLINTON$_F$]: [$praise(Obama, Bush)$] entails $\exists x.\exists y[praise(x, y)]$
         c.   [praised]: $\exists x[praise(Bush, x)]$ entails $\exists x.\exists y[praise(x, y)]$
         d.   [Obama]: $[\![Obama]\!]^g = [\![Obama]\!]^g$

When we consider (130bii), we notice the following: since givenness is already fulfilled by (130bi), it will also be fulfilled by any version with more F-marks than itself. But since option (130bi) has fewer F-marks than (130bii), the former is more economical and to be preferred by AvoidF. The correct distribution of focus is thereby accounted for by Schwarzschild's theory.

Let us now consider how Schwarzschild's theory deals with focused bound pronouns. Recall the problematic sentence, repeated in (132).

(132)   Every student cut his (own) arm, and every TEACHER cut HIS arm.

When we want to see whether the whole second conjunct in (132) satisfies givenness, there is only one constituent in the context that could function as antecedent, namely the first conjunct. The ∃-type shift of the antecedent sentence is equivalent to its semantic value, because it denotes a proposition with no open argument slots. The Existential F-closure of the second sentence is as given in (133). Since both the restrictor and the bound pronoun are focused, both are F-marked and must be replaced by an existentially bound variable.

(133)   Existential F-closure($[\![IP]\!]^g$) = $\exists P.\exists y.\forall x[P(x) \rightarrow cut(x, y\text{'s }arm)]$

The problem is that (133) is not given as no appropriate antecedent can be found. Neither the ∃-type shift of the antecedent sentence (134a) nor, of course, the one of the antecedent VP (134b) entails the Existential F-closure of the second conjunct.

(134)   a. $\forall x[student(x) \rightarrow cut(x, x\text{'s }arm)]$
         b. $\exists x[cut(x, x\text{'s }arm)]$

What exactly goes wrong? The Existential F-closure given in (133) requires that there be some constituent whose ∃-type shift says *there is an individual y such that every x of who some given property holds cut y's arm*. But no such constituent exists. The

antecedent sentence – due to the bound pronoun – says that each student cut his own arm. This does not entail that there is an individual whose arm was cut by every individual under consideration. There are three potential ways out if one wants to maintain a givenness-based approach close to Schwarzschild's one, as far as I can see. One way to circumvent the problem would be to not require givenness checking for the complete sentence. What would rather be required in such a setting is that each non-F-marked *sub*-constituent of the sentence is given. But (135) suggests otherwise. The F-mark cannot be left off of *John*. But note that *John* is given, and so is the VP. Only the whole sentence is not given. If givenness is checked for the sentence, (135) is predicted.

(135)   *Discourse:* John arrived at the party while Bill danced with Mary.

      a.   Then JOHN danced with Mary.
      b. #Then John danced with Mary.

Thus the whole sentence should also be checked for givenness in our problematic (132).

Another possibility to tackle the problem would be to claim that the whole second conjunct in (132) is actually F-marked. This way it would not have to be given. This solution feels a little ad hoc. Note that without our conditions on the placement of $\sim$ it would also have been a possibility in Rooth's 1992 approach, though. Be that as it may. In this case there would be three F-marked constituents. But of course, AvoidF would rule this option out because of the availability of (136) without focus on the bound pronoun.

(136)   Every student cut his (own) arm, and every TEACHER cut his arm.

The third possible solution is to make existential F-closure local. This means that when checking givenness for the whole sentence applies, the contribution by the F-mark on the bound pronoun has already been evaluated. It is not visible anymore for any further evaluation. In the following subsection I will suggest such an approach. This, however, will necessitate a slight departure from Schwarzschild's original account.[40]

5.2.2 The nature of the problem and the nature of the solution

What we see is the following: both in the focus value approach and in the givenness approach contrastive focus on a bound pronoun is not licensed because the binding relation is destroyed and not suitable antecedent can be found. It is interesting to note that two theories that look very different on the surface run into the same problem. One might conclude from this that the accounts are actually compatible variants of

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[40] Giorgios Spathas (p.c.) mentions the following: one could assume for (132) that we choose as restrictor for the actual antecedent the property of being one of the students, say John. Then the resulting antecedent proposition would say that every individual who is John cut his own arm. Notice that this entails the Existential F-closure in (133). Dropping the F-mark on the restrictor would of course lead to a violation of givenness. I am not sure whether such accommodation is allowed. Be that as it may. (i) is a problem for such an approach. In order to let the quantifiers contrast, it must be assumed that *every teacher* as a whole is F-marked. Thus the Existential F-closure of the sentential level is $\exists x.\exists \mathcal{Q}[\mathcal{Q}(\lambda y.cut(y, x\text{'s } arm)]$. Here accommodating a restrictor will not help. The antecedent sentence – the proposition that no student cut his own arm – does not entail the Existential F-closure.

(i)   No student cut his own arm, but every TEACHER cut HIS arm.

each other. The question is whether a solution to the problem in terms of one of the two accounts carries over to the other account.

It appears that if one wants to obtain a parallel account in a givenness-based theory, we must allow for the following: there should be the option that once a focus is evaluated as part of a constituent that is checked for givenness, that focus is not available anymore for further checking. This what is needed for example (136). In other words, once Existential F-closure has applied to the VP as in (137a), the F-mark on the bound pronoun is invisible when the Existential F-closure applies at the sentential level (137b). For both (137a) and (137b) we can find suitable antecedents.

(137) a. Existential F-closure($[\![\text{VP}]\!]^g$) = $\exists x.\exists y[cut(x, y\text{'}s\,arm)]$
       b. Existential F-closure($[\![\text{IP}]\!]^g$) = $\forall x[teacher(x) \to cut(x, x\text{'}s\,arm)]$

On the other hand, we do not want that this local evaluation always takes place. I do not want to discuss the whole pattern of overfocusing again at this point. Let us just briefly consider the continuations B and B$'$ of A in (138) once more. By applying Existential F-closure obligatorily at the embedded level, B would be as infelicitous as B$'$. The existential F-closure of the VP in B would be as in (139a). There is an antecedent for it. But then the focus on *Sue* becomes inaccessible for further application of Existential F-closure. This has the consequence that at the sentential level (139b) should be given. But no antecedent that guarantees this can be found.

(138) A: John kissed Mary.
       B: Yes. And, BILL kissed SUE.
       B$'$:#Yes. And, BILL kissed Sue.

(139) a. Existential F-closure($[\![\text{VP}]\!]^g$) = $\exists x.\exists y[kiss(x, y)]$
       b. Existential F-closure($[\![\text{IP}]\!]^g$) = $\exists x[kiss(x, Sue)]$

This behavior is, of course, parallel to the one we are already familiar with from our analysis in terms of focus values and $\sim$-operators. Therefore local application of Existential F-closure should be optional, whereas application at the matrix level should be obligatory. In the approach advocated here, this optionality of local application is attributed to a syntactic difference – that is, the presence or absence of a local $\sim$-operator. To achieve this in a givenness-based approach we would therefore need an operator in the syntax, as well. More precisely, we need an Existential F-closure operator. Without some sort of representational ambiguity we would have to formulate a principle that only applies sometimes. This is not the favored option, it seems. The operator should have a presupposition requiring that some antecedent entails the Existential F-closure of the constituent the operator applies to modulo $\exists$-type shift. This operator consumes the semantic contribution of the F-mark so that it is not available for higher Existential F-closure operations. The problem is, however, that in Schwarzschild's theory we do not have recourse to focus values. So in the informal version of Schwarzschild's proposal it is unclear what we could let the operator reset. In the formal version of his analysis, however, there is a way to make things work. Following Kratzer (1991), Schwarzschild assumes that there are two assignments, namely g and the distinguished assignment h. h assigns interpretations to focused constituents. Each F-mark is a designated variable subject to interpretation by h. g is the usual interpretation function. In other words, Schwarzschild uses the same formal system that I use. But in contrast to the present proposal, he does not use it to generate alternatives, i.e., p-sets. With this amendment, we have again two values to our disposal. One can think of the second

value, the interpretation with respect to g and h, which is usually referred to as *presup*, as a givenness-value. Now we can define a givenness (G)-operator similar to the one in (140). $\exists\text{-}ts$ stands for $\exists$-type shift.[41]

(140) a. $[\![\text{G}]\!]^g(\phi) = [\![\phi]\!]^g$
        $\quad$ if $\exists[\![\psi]\!]^g[\exists\text{-}ts([\![\psi]\!]^g) \subseteq \exists\text{-}ts(\exists x[[\![\phi]\!]^{g,h[x/i]}])]$, otherwise undefined
    b. $[\![\text{G}]\!]^{g,h}(\phi) = [\![\phi]\!]^g$

Now let us assume that the representation for our crucial example is as in (141). Here the $\sim$-operators have been replaced by G-operators. The values of the crucial steps in the derivation are then as in (142).

(141) G [$_{\text{IP}}$ every actor$_{F5}$ [$_{\text{VP}_2}$ G [$_{\text{VP}_1}$ 1[t$_1$ discussed 1$_{F3}$'s film]]]]

(142) *Assertive component of (141)*
    a. (i) $[\![\text{VP}_1]\!]^g = \lambda x.\lambda w.discuss_w(x, x\text{'s }film)$
        (ii) $[\![\text{VP}_1]\!]^{g,h} = \lambda x.\lambda w.discuss_w(x, h(3)\text{'s }film)$
    b. (i) $[\![\text{VP}_2]\!]^g = \lambda x.\lambda w.discuss_w(x, x\text{'s }film)$
        (ii) $[\![\text{VP}_2]\!]^{g,h} = \lambda x.\lambda w.discuss_w(x, x\text{'s }film)$
    c. (i) $[\![\text{IP}]\!]^g = \lambda w.\forall x[actor_w(x) \rightarrow discuss_w(x, x\text{'s}film)]$
        (ii) $[\![\text{IP}]\!]^{g,h} = \lambda w.\forall x[(h(5))_w(x) \rightarrow discuss_w(x, x\text{'s }film)]$

The G-operators add the presuppositions in (143). Thus, there must first be an existentially closed antecedent value such that it entails that someone discussed someone's film – the $\exists$-type shifted existential closure of (142aii). Second, there must be an existentially closed antecedent value such that it entails that every individual satisfying a particular property discussed his own film, (142cii). Both requirements are satisfied.

(143) *Presuppositional component of (141)*
    a. $\exists\psi[\exists\text{-}ts([\![\psi]\!]^g) \subseteq \lambda w.\exists x.\exists y[discuss_w(x, y\text{'s }film)]$
    b. $\exists\psi[\exists\text{-}ts([\![\psi]\!]^g) \subseteq \lambda w.\exists P.\forall x[P_w(x) \rightarrow discuss_w(x, x\text{'s }film)]$

We have therefore replicated the results of the present proposal in a givenness-based theory. Five remarks are in order, though. First, it is crucial that we have access to two values for each constituent. Whether we do this with p-sets as in my official proposal or presups as just shown does not seem to make an essential difference. Second, operators seem to be necessary, be that a $\sim$- or a G-operator. The reason for this is that thirdly, the secondary values need to be reset in certain situations. Fourth, givenness-checking cannot apply at each node anymore, as in Schwarzschild's 1999 proposal. Rather it is constrained in its application by the syntactic placement of a G-operator. Intuitively, the two theories discussed are now very close, if not equivalent. Notice, however, that it might appear that the process of compositional reconstruction is not necessary in

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[41] In this respect Wagner's 2006 givenness-operator seems relevant. Note that his operator cannot be straightforwardly amended so that it is applicable to the task at hand, as it does not make reference to the special assignment function h. Notice, however, that his operator also directly incorporates the contrastiveness requirement, as does our $\sim$-operator. I will not include contrastiveness for the G-operator in the text, however:

(i) $[\![\text{G}_R]\!]^g = \lambda x.\lambda y.\exists y' \in Alt(y), y' \neq y, s.t.[\![y\text{'}x]\!]^g$ is given:$[\![y \text{ } x]\!]^g$
    (Wagner 2006: 299)

the givenness-based theory if the above amendments are made. Since focus licensing under this conception makes use of entailment, the ∃-type shift of a binding statement will always entail the Existential F-closure of a statement where one of the bound variables is replaced by another variable existentially quantified over. In other words, Schwarzschild's system is more permissive in this respect. On the other hand, it is not clear to me how the contrastiveness requirement argued for in the present paper can be incorporated into a givenness-based system without alternatives. Recall that my conception of contrastiveness made crucial use of alternatives (also cf. Wagner (2006) with respect to this topic). But exactly in order to generate these alternatives, compositional reconstruction was necessary. I must leave investigation of this question to future research. Also it must, naturally, be left for further investigation whether the sketch made in the present subsection generalizes to other focus constructions.

6 Discussion

The present paper has shown how a theory employing focus values can account for the optional presence of contrastive focus on bound pronouns. First it was argued that focus values of bound-variable configurations do not include their own ordinary semantic value as a member. It was shown that this is not a defect, as long as focus interpretation is assumed to be local. Moreover, the supply of contextual alternatives needed for focus evaluation has been increased by the introduction of the process of compositional reconstruction. By these modifications an account fairly close to Rooth's original treatment of focus can be given for contrastive focus on bound pronouns. In addition, it was argued that a notion of contrastiveness is required. In particular, contrastiveness should be viewed as a requirement that says that the ordinary value of the sister constituent of ∼ must not be a member of the contextual alternatives. This derived both the strict contrastiveness phenomenon found with constructions exhibiting focus on bound pronouns, as well as the fact that AvoidF cannot block the F-mark on a bound pronoun if there is local evaluation of focus by ∼. Lastly, we have shown that theories treating focus on bound pronouns as constructions necessitating bound E-type pronouns are not needed and are actually problematic given a novel empirical observation. Similarly, it was shown that domain restrictions of bound pronouns denoting the identity function in a variable-free semantics are problematic in certain situations.

On a more theoretical note the present paper shows the following: a theory of focus needs some value that can be reset which is different from the ordinary semantic value. For this to work one also needs operators interpreting focus and resetting the second value. It has been shown that this can be also couched in a givenness-based framework. If this is done, it appears that theories making use of focus values become almost equivalent to ones based on givenness, the only difference being that the second value is used to generate differing semantic objects: in one case p-sets, and in the other presups. This is a potentially interesting result that deserves future investigation.

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