

Features on bound pronouns: an argument against syntactic agreement approaches*

Itai Bassi & Nicholas Longenbaugh

MIT

1. Introduction and Overview

An old observation in the semantic literature on binding is that when a pronoun is interpreted as a bound variable, its φ -features (person, gender, number) can be semantically ignored (Kratzer 1998, a.o.). For example, on the bound reading of (1a) *my* corresponds to a variable that isn't restricted to the speaker, and (1b) corresponds to a variable that isn't restricted to female individuals.

- (1) a. Only I did **my** homework
 \leadsto *bound reading*: no one besides me did **their** homework
 b. Only Mary did **her** homework
 \leadsto *bound reading*: no one besides Mary, **male or female**, did their homework

It is not obvious how to derive the meanings indicated in (1a) and (1b), if the ϕ -features on the bound pronoun were interpreted like they normally are (Heim 2008). To see this concretely, consider the schematic LF in (2) for (1a), where the quantificational expression *only I* binds the variable that *my* corresponds to (as indicated by the co-indexation between the variable and the λ -operator), and the variable is stacked with the appropriate ϕ -features.

- (2) LF: only I [λ_7 t_7 did $\underbrace{[\mathbf{1ST-SG} \ x_7]}_{\mathbf{my}}$ homework]¹

Assume, as is standard, that pronominal ϕ -features are interpreted on *referential* pronouns as presupposition triggers, see (3) (Cooper 1979, Heim 2008, Charnavel 2017); the analysis of a referential 1st person pronoun in English is then in (4).

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¹In (2), *I* should of course also carry φ -features, but those don't matter to illustrate the point. To reduce clutter, throughout the paper we omit representing φ -feature nodes explicitly if they are irrelevant.

- (3) a. *Semantics of person features:*
 (i) $\llbracket 1ST \rrbracket^{g_c} = \lambda x : x$ includes the speaker in c . x
 (ii) $\llbracket 2ND \rrbracket^{g_c} = \lambda x : x$ excludes the speaker and includes the hearer in c . x
 (iii) $\llbracket 3RD \rrbracket^{g_c} = \lambda x : x$ excludes the speaker and hearer in c . x
- b. *Semantics of gender features:*
 (i) $\llbracket FEM \rrbracket = \lambda x : x$ is female. x
 (ii) $\llbracket MASC \rrbracket = \lambda x : x$ is male. x
- c. *Semantics of number features:*
 (i) $\llbracket SG \rrbracket = \lambda x : x$ is an atom. x
 (ii) $\llbracket PL \rrbracket = \lambda x : x$ is a plurality². x
- (4) $\llbracket I_7 / me_7 / my_7 \rrbracket = \llbracket \llbracket 1ST \llbracket SG \ x_7 \rrbracket \rrbracket \rrbracket^{g_c} = \begin{cases} g_c(7), & \text{if } g_c(7) \text{ is the speaker in } c \\ \text{undefined,} & \text{otherwise} \end{cases}$

Finally assume, again as standard, that presuppositions on bound variables restrict the range of their possible binders, by defining the domain of the predicate that results from λ -abstraction (Heim & Kratzer 1998). This means that the λ_7 -abstract in (2) cannot apply to anyone but the speaker, as shown in (5). But then the predicted truth conditions of (2) are trivial and involve vacuous quantification; the LF cannot express that e.g. Mary did not do her homework. Thus a bound reading for (1a) is not generated if the features are interpreted. Similarly, under the above set of assumptions the quantification expressed by (1b) can only generate a bound reading restricted to female individuals, contrary to fact.

- (5) $\llbracket \lambda_7 [t_7 \text{ did } [1ST-SG \ x_7] \text{ homework}] \rrbracket = \lambda x : x$ **is the speaker**. x did x 's homework

Some mechanism then must be responsible for allowing ϕ -features on bound pronouns to be semantically inert, and the question is what this mechanism is. According to a popular approach (Heim 2008, Kratzer 2009), a bound pronoun simply doesn't carry ϕ -features at LF at all; it is a bare variable whose morphophonological realization is a result of syntactic agreement with its binder. Alternative approaches deny syntactic agreement, and employ special semantic mechanisms to explain the phenomenon under discussion.

This paper provides an empirical argument against agreement-based approaches. We show, based on observations by Sudo (2013) and McKillen (2016), that such approaches systematically undergenerate cases of uninterpreted ϕ -features on '**donkey**' **anaphora** - pronouns whose relationship to their intra-sentential antecedent does not respect conditions usually considered necessary for syntactic agreement. Examples of the core data are in (6).

- (6) a. Only the woman who is dating ME_F says **I** make her happy (\checkmark *co-variation*)
 b. Only if I_F misbehave does the teacher call **my** parents (\checkmark *co-variation*)

²Many assume that 3RD person and PL number are semantically vacuous and that they convey the inferences associated with them due to competition with the other feature values, via *Maximize Presupposition* (Sauerland 2003, a.o.). The paper is compatible with this view, but we opt for the simpler version in the text.

The paper is structured as follows. In section 2 we present two approaches that try to deal with the challenge posed by sentences like (1) - the **morphosyntactic agreement** approach and the **semantic** approach. In section 3 we compare the two approaches in light of data like (6), explaining how the semantic approach, but not the morpho-syntactic one, can readily account for the data. Section 4 presents another advantage of the semantic approach, coming from ‘split-binding’ configurations (Rullmann, 2004), and section 5 discusses open issues for future research.

Before moving on, a brief caveat is in order. This paper deals exclusively with focus constructions like (1), and will not cover other types of sentences that have been said to also involve uninterpreted ϕ -features on bound pronouns. In particular, the paper will not deal with the construction mentioned by Partee (1989, fn.3) given in (7a) (see Kratzer 2009, Jacobson 2012, Wurmbrand 2017) that shows adjectival *only* rather than the focus-associating adverbial *only*, nor with cases of number features on pronouns bound by distributive quantifiers, as shown in (7b) (see Rullmann 2004, Heim 2008, Sauerland 2013, Sudo 2014). The proper analysis of both of these constructions has been debated in the referenced literature.

- (7) a. I am the only one who did **my** homework
 \leadsto No one other than me did **their** homework
- b. The boys each thought that **they** were the only one in the room
 \leadsto Each_{*i*} of these boys thought that **he_{*i*}** is the only one in the room

2. Two approaches

2.1 The morphosyntactic approach

According to the first approach (Kratzer 1998, von Stechow 2003, Schlenker 2003, Heim 2008, Kratzer 2009, Wurmbrand 2017, a.o.), φ -features on bound pronouns are not interpreted; at LF the pronoun consists of a bare, featureless index (a ‘minimal pronoun’):

- (8) LF: only I [$\lambda_7 t_7$ did x_7 homework]
Interpretation of the predicate abstract: [$\lambda x : x \in D_e. x$ did x ’s HW]

This solves the problem encountered in (5), since the restriction to the speaker is now removed from the domain of the λ_7 -predicate. To predict why bound pronouns nevertheless appear on the surface with the overt ϕ -features they do, proponents of this approach hypothesize a syntactic agreement relationship between binders and bindees that results in spell out of the binder’s feature on the bound pronoun at Phonological Form (PF). We thus call it ‘the morphosyntactic approach’. Specific proposals within this approach differ, and we use Heim (2008)’s version for concreteness. Its gist is the rule in (9):

- (9) FEATURE TRANSMISSION UNDER VARIABLE BINDING (Heim, 2008):
 At PF, features on a DP are transmitted to all the variables that the DP binds.

The FEATURE TRANSMISSION rule ensures that the bound variable in (8) will be spelled out as first person, since its binder is first person. Note that (9) presupposes a suitable definition of ‘binding’. Standardly, one condition that has to be met for α to bind β is that α c-commands β at LF (at least). In (8) I indeed c-commands my .³

2.2 The semantic approach

There are alternative analyses of (1) that don’t rely on anything like a Feature Transmission mechanism. We focus here on one such alternative, according to which the inertness of ϕ -features has to do with the special properties of focus constructions (of which (1) is an instance), and specifically with the mechanics of focus semantics. We call this ‘the semantic approach’. In focus semantics (Rooth 1992) expressions have ordinary semantic value and a focus semantic value, the latter delivering a (possibly-singleton) set of alternative denotations. The idea here is that ϕ -features are *always* interpreted, even in (1), but only in the ordinary dimension and not at alternative dimension (see Sauerland 2013, Jacobson 2012, Spathas 2010).⁴ This view comes down to the conjecture in (10), where $\llbracket \cdot \rrbracket^g$ is the ordinary semantic value function, and $\llbracket \cdot \rrbracket_f^g$ is the focus semantic value function.

(10) *Conjecture: ϕ -features aren’t interpreted in focus alternatives*

- a. $\llbracket [1\text{ST-SG}] \rrbracket^g = \lambda x : \mathbf{x \text{ is the speaker. } } x$
- b. $\llbracket [1\text{ST-SG}] \rrbracket_f^g = \{\lambda x : \mathbf{x \in D_e. } x\}$

On the semantic approach, when a pronoun is bound its ϕ -features do serve to restrict its possible binders, but only at the level of the ordinary semantic value, as shown in (11).

- (11) a. $\llbracket [\lambda_7 [t_7 \text{ did } [1\text{ST-SG } x_7] \text{’s homework}]] \rrbracket^g = \lambda x : \mathbf{x \text{ is the speaker. } } x \text{ did } x \text{’s HW}$
- b. $\llbracket [\lambda_7 [t_7 \text{ did } [1\text{ST-SG } x_7] \text{’s homework}]] \rrbracket_f^g = \{\lambda x : \mathbf{x \in D_e. } x \text{ did } x \text{’s HW}\}$

Given the LF in (12), which now represents F(ocus)-marking on I , the problem previously encountered in (5) is now avoided. As standard, an F-marked constituent triggers a (non-singleton) set of focus alternatives, which compose pointwise with the focus alternatives of its syntactic sister until a suitable operator like *only* quantifies over the result. Since the restriction to the speaker is removed at the level of the focus alternatives (11b), applying (11b) to the alternatives of I_F derives a (non-singleton) set of alternatives, see (13).

- (12) LF: $\text{only } [I_F [\lambda_7 [t_7 \text{ did } \underbrace{[1\text{ST-SG } x_7]}_{\mathbf{my}} \text{ homework}]]]$ ⁵

³Or perhaps only *only I* c-commands *my*, in which case this approach must assume that *only I* is specified as a 1st person constituent, maybe by percolation from I . See Heim (2008) for details.

⁴While these authors all share this idea, their implementations vary significantly from each other and from the version we implement. We abstract away from these differences for the purposes of this paper.

⁵Nothing crucial depends on the assumption that *only* is a sentential operator (i.e. attaches to the whole clause at LF); the discussion carries over with minor modifications if one takes *only I_F* to be a constituent.

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- (13) a. $\llbracket [I_5]_F \lambda_7 [t_7 \text{ did } [1\text{ST-SG } x_7]\text{'s homework}] \rrbracket^g = \text{the speaker did his HW}$
 b. $\llbracket [I_5]_F \lambda_7 [t_7 \text{ did } [1\text{ST-SG } x_7]\text{'s homework}] \rrbracket_f^g =$
 $\{ [\lambda x : x \in D_e. x \text{ did } x\text{'s homework}] (\llbracket I \rrbracket),$
 $[\lambda x : x \in D_e. x \text{ did } x\text{'s homework}] (\text{mary}),$ Defined
 $[\lambda x : x \in D_e. x \text{ did } x\text{'s homework}] (\text{john}),$ Defined
 $\dots \} = \{x \text{ did } x\text{'s homework} : x \in D_e\}$

The semantic approach, then, has no problem predicting the morphological shape of the bound pronoun based on its (ordinary) semantics, and a PF agreement rule as in (9) is rendered unnecessary.⁶

2.3 Intermediate summary

The morphosyntactic and semantic approaches give sharply different analyses of the semantic inertness of bound ϕ -features in (1). On the former approach, inertness results from the fact that ϕ -features are simply not interpreted on bound pronouns. On the latter, inertness results because ϕ -features - *regardless of whether the pronoun is bound or not* - aren't interpreted at the level of focus alternatives, but they are *always* interpreted at the level of the ordinary meaning. Both analyses come with a cost: the morphosyntactic approach needs to postulate a syntactic agreement mechanism to explain the surface realization of bound pronouns, and the semantic approach must postulate that ϕ -features don't 'project' their meaning to focus alternatives.⁷ In the cases we have examined thus far, the predictions of the semantic and morphosyntactic approaches line up exactly. In the next section, we turn our attention to a case where the accounts make divergent predictions.

3. Features on Donkey pronoun

3.1 Donkey pronouns

Famously, there is a class of pronouns that show co-variance with another element in the sentence without being (classically) bound by it. These are often called **donkey pronouns** (after Geach 1962). Donkey pronouns are attested in focus and ellipsis contexts (see Tomioka 1999). For example, (14) has a reading where the focused phrase *phonology* co-varies in interpretation with *it*, as the paraphrase indicates. Crucially, *it* is not c-commanded by *phonology*. Moreover, *phonology* is in (the object position of) a relative clause which

⁶The conjecture in (10) applies to all occurrences of pronouns, not just bound ones. But this is unproblematic for ϕ -features on *free* pronouns. A (non F-marked) free variable denotes the same individual in both the ordinary dimension and across all focus alternatives, assuming the contextual variable assignment g_c is one and the same in both these levels. So even though ϕ -features attached to that free variable will not be formally interpreted in the alternatives, the individual referred to will remain the same throughout alternatives.

⁷There are other approaches to the problem illustrated in (1a)-(1b), which don't fall into either of the two approaches we considered here. See e.g. Sudo (2012:161-164) and Cable (2005) for two different proposals that deny the morphosyntactic approach and adopt a more semantic perspective, but do not locate the problem in the special properties of focus semantics. Neither Sudo's nor Cable's analyses can straightforwardly explain the donkey anaphora data we discuss in section 3.2.

are islands for (LF-)movement, suggesting that the co-variation is not a result of covert movement of *phonology* to a position from which it can bind the pronoun.

- (14) Only the student who took PHONOLOGY thought **it** was cool (✓ co-variation)
 \leadsto No $x \neq$ phonology: the student who took x thought x was cool

Before showing how configurations like (14) can be used to tease apart the two approaches to ϕ -features on bound pronouns, we need to take a small detour into the analysis of donkey sentences in general. Broadly speaking, there are two main strategies in the literature for dealing with donkey pronouns: (i) dynamic binding theories (Kamp 1981, Heim 1982, Groenendijk & Stokhof 1991, a.o.) and (ii) E-type theories (Parsons 1978, Cooper 1979, Evans 1980, Heim 1990, Elbourne 2005, a.o.). We will be assuming an E-type framework for dealing with data like (14) due to its relative simplicity. Although many of the points we will be making depend on this choice, we believe that our main argument is not affected by it (in section 5 we briefly expand on this point).

The main idea of E-type theories is that donkey pronouns are underlyingly definite descriptions that contain a bound variable (but aren't themselves bound variables). Following tradition, we henceforth call donkey pronouns **E-type pronouns**. In broad strokes, the E-type pronoun *it* in (14) is taken to be equivalent, at some level of representation, to a full DP *the class he/she₇ took*, with *they₇* bound by *the student who took PHONOLOGY*. To spell this out more concretely, it is sufficient for our purposes to adopt the structure in (15a) along the lines of Cooper (1979) (but see section 5 for a proviso). The free variable R_6 supplies a contextually salient relation which can be resolved as in (15b). After *only* quantifies over the set of focus alternatives of its sister, the resulting meaning is in (15c).

- (15) a. Only [[the student taking phonology_F] $\lambda_7 t_7$ thought the [R_6 x_7]] was cool]⁸
 b. $g(R_6) = \lambda x. \lambda y. x$ took the subject y it
 c. [[15a]] = the student who took phonology thought phonology was cool
 $\wedge \neg$ the student who took syntax thought syntax was cool
 $\wedge \neg$ the student who took semantics thought semantics was cool

As (15c) makes clear, the interpretation of the E-type pronoun *it* ends up co-varying with the interpretation of *phonology* across focus alternatives, even though there is no formal binding relationship between the two - there is formal binding only between a phrase that *contains* the antecedent and a variable *inside* the E-type pronoun.

3.2 Comparing the two approaches to ϕ -features using donkey pronouns

Sudo (2013) and McKillen (2016) observe that ϕ -features on E-type pronouns in focus are semantically inert, just like ϕ -features on 'normally' bound pronouns. Consider the

⁸This is a simplified version of the E-type analysis. More sophisticated versions which incorporate situation variables into the LFs have been developed and motivated (Heim 1990, Elbourne 2005). Since the issues that motivated those complications are irrelevant here, we stick with the naive version in the text.

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sentences in (16), in which a first person pronoun (in bold) has a co-varying interpretation with a matching focused pronoun that does not c-command it and is embedded in an island, hence the bolded pronouns are E-type pronouns with inert features.

- (16) a. Only the woman who is dating ME says **I** make her happy. (✓ *co-variation*)
 \leadsto No $x \neq me$: the woman who is dating x says x make her happy
- b. Only if I_F misbehave will the teacher call **my** parents. (✓ *co-variation*)
 \leadsto No $x \neq me$: if x misbehaves the teacher will call x 's parents.

We argue that (16) pose a serious problem for the morphosyntactic approach. The reason is this: on that approach, for a pronoun to bear semantically inert features the pronoun must be formally bound by its antecedent (cf. the Feature Transmission rule, (9)), and thus must be c-commanded by it at LF. Since E-type pronouns are by hypothesis not formally bound by the element they co-vary with, the morphosyntactic approach predicts then that the 1ST-SG feature on the bolded pronouns in (16) must be base-generated and semantically interpreted. And since 1ST-SG feature is only compatible with one individual (the speaker), this theory undergenerates the co-variation reading. The semantic approach, on the other hand, does not suffer from this problem; on this view a formal binding relationship is not a pre-requisite for ϕ -features to be semantically ignored on co-varying pronouns. In fact, as we show in detail in the next subsection, the semantic approach readily accounted for (16).

The same point holds for gender features. The sentence in (17) (based on Tomioka 1999:238) yields co-variation that isn't limited to female individuals. This, again, is problematic for the morphosyntactic approach, since *Sue* doesn't bind *her*.

- (17) Only if *SUE* has trouble in school I would help **her**

E-type pronouns are observed also in VP-ellipsis environments, which on many analyses are closely related to focus (Rooth, 1992; Tomioka, 1999). The felicity of (18) (for those speakers who accept feature-mismatches on bound pronouns in ellipsis to begin with) indicates that here too ϕ -features on those E-type pronouns are semantically ignored:

- (18) a. The woman who's dating me says **I** make her happy, but the woman who's dating BILL doesn't say ~~he makes her happy~~. (✓ *co-variation*)
- b. If my car gets towed, people will offer **me** a ride. If BILL's car gets towed, people won't offer ~~him~~ a ride. (✓ *co-variation*)

3.3 Deriving the behavior of donkey pronouns in focus

We now turn to showing in detail how the semantic account straightforwardly derives the inertness of ϕ -features on E-type pronouns. We illustrate the analysis with (16a), whose LF we assume is (19). (19) is analogous to the LF in (15a), but with ϕ -features now represented on top of the E-type pronoun (see Sauerland 2003 for independent arguments that ϕ -features attach to full DPs).

- (19) Only \llbracket [the woman dating me_F] [λ_7 says $\underbrace{\llbracket$ 1ST-SG [the [R_6 x_7]]] \rrbracket make her₇ happy] \rrbracket ⁹

As before, R_6 is a contextually-supplied relation. The salient relation it encodes is the “dating” relation, defined in (20a). The E-type pronoun as a whole is thus resolved to *the person she₇ is dating*, which given the presupposition induced by the ϕ -features is the speaker, (20b). Crucially, the analysis says that ϕ -features aren’t interpreted in focus alternatives, so the presupposition in (20b) is not represented at the level of focus semantic value, (20c).

- (20) a. $g(R_6) = \lambda x.\lambda y. x$ is dating y
 b. \llbracket 1ST-SG [the [R_6 x_7]] \rrbracket ^g = the person $g(7)$ is dating
presupposition: the person $g(7)$ is dating is the speaker.
 c. \llbracket 1ST-SG [the [R_6 x_7]] \rrbracket _f^g = {the person $g(7)$ is dating}
No (relevant) presupposition.

The difference in presupposition between (20b) and (20c) projects to the λ -binder of x_7 , as shown in (21): at the level of the ordinary semantic value (21a), the predicate abstract is defined only for one person - the individual who is dating the speaker (assume people are dated only by one person). This restriction is absent at the level of the focus semantic value (21b) (for transparency, in (21) we replaced ‘the [R_6 x_7]’ with ‘the person x_7 is dating’).

- (21) a. *Ordinary semantic value of the λ -abstract:*
 \llbracket λ_7 [t_7 says [1ST-SG [the person x_7 is dating]] makes her₇ happy] \rrbracket ^g =
 $\lambda x : x$ is dating the speaker. x says the person x is dating makes x happy
 b. *Focus semantic value of the λ -abstract:*
 \llbracket λ_7 [t_7 says [1ST-SG [the person x_7 ’s dating]] makes her₇ happy] \rrbracket _f^g =
 $\{\lambda x : x \in D_e. x$ says the person x is dating makes x happy}

Since the predicate in (21b) is not restricted by the content of 1ST-person, the co-variation across alternatives is correctly derived when (21) is composed with the subject, (22)-(23):

- (22) \llbracket the woman who is dating ME_F \rrbracket _f^g = {the woman dating me, the woman dating Sue, the woman dating Fred, ... } = {Mary, Jane, Lisa,...}
 (23) \llbracket the woman who is dating ME_F λ_7 says the person x_7 is dating make her happy \rrbracket _f^g
 = {the woman dating **me** says **I** make her happy,
 the woman dating **Sue** says **Sue** makes her happy,
 the woman dating **Fred** says **Fred** makes her happy, ... }

⁹Our account is also compatible with the syntactically more realistic view (Danon 2011 and references therein) that at least gender and number features (maybe person too) are introduced at the NP level, not DP.

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We can now see more clearly why the morphosyntactic approach undergenerates the co-variation reading of (16a). Since that theory does not distinguish between the ordinary semantic value and the focus semantic value with respect to the contribution of ϕ -features (and again assuming that Feature Transmission at PF is beside the point with E-type pronouns), the 1ST-SG feature should be interpreted in *both* levels in (21), and the co-variation reading cannot be derived. The same goes, *Mutatis Mutandis*, for the other E-type examples in section 3.2. Only the semantic approach can correctly capture these data.¹⁰

3.4 Two ways to save the morphosyntactic approach and their problems

To conclude this section, we briefly consider two mechanisms that suggest themselves for adapting the morphosyntactic approach to handle the data. In both cases, the modifications ultimately fall short, further strengthening our point against that approach.

The first modification is to adopt the movement theory of association with focus. Specifically, the idea is that the focused pronoun moves to associate with *only* (see (24a)-(24b)), and that from this position it can directly bind – and transfer features to – the co-varying 1ST-person pronoun. On this account, the relevant examples don't involve E-type pronouns at all, just ordinary binding.

- (24) a. LF: Only ME_F [λ_7 the woman dating t_7 says x_7 make her happy]
b. LF: Only I_F [λ_7 if t_7 misbehave will the teacher call x_7 's parents]

As mentioned before, the obvious problem with this modification is that both (24a)-(24b) involve island-violating movement. Quantifiers cannot scope out of these positions:

- (25) a. The woman dating each_{*i*} man says he_{**i*} makes her happy
b. If each student_{*i*} misbehaves, the teacher will call his_{**i*} parents.

To defend (24), then, one would be forced to say that *focus* LF-movement is island-sensitive. But it isn't clear what property of focus would make it exempt from island conditions. As Tomioka (1999) points out, putting pitch accent on *each student* does not seem to facilitate binding in (25). Further consideration against focus movement comes from scope interactions. If island-insensitive focus movement is available, we predict that the scope of phrases that undergo such movement will be as high as the position of the focus-sensitive operator that associates with them (e.g. *only*). As (26) suggests, this is not so; there is no reading where the focused *most* together with its restrictor take scope over *the woman who...*

¹⁰For the case of the conditional in (16b), the semantic approach can assume an LF like (i), where the *if*-clause binds a world/situation variable inside the E-type pronoun. The salient relation that \mathbf{R}_6 encodes must then be something like $\lambda s.\lambda x. x$ is the misbehaving child in s . But see section 5.

(i) Only [if I_F misbehave] [λ_4 the teacher will call [1ST [the [\mathbf{R}_6 s_4]]] parents]

- (26) Only the woman who is dating [MOST_F men] arrived (**most > the*)
 $\not\rightarrow$ Only for most (but not all) men x is it the case that the woman dating x arrived.

A second strategy for saving the morphosyntactic account is to essentially broaden the notion of Feature Transmission to apply also to the relationship between antecedents and E-type pronouns (this strategy is hinted at in McKillen 2016, §5.2.3 fn.12). This idea can be executed, for example, by allowing the 1ST-person feature on the focused pronoun to percolate at PF to the containing DP which binds into the E-type pronoun. This is schematized in the PF representation in (27), after percolation + transmission.

- (27) Only [the woman who is dating $ME_{1st}]_{1st}$ [λ_7 [says [the $R_6 x_7]_{1st}$ make her happy]]

The problem with this account is that other pronouns bound by the container DP do not show 1ST person features (cf. *her* in 27). It isn't clear then how this mechanism can distinguish between E-type pronouns and normally-bound pronouns and transfer percolated features only to the former.

4. Split Binding: another advantage of a semantic approach

We now discuss another advantage of the semantic approach which is independent of donkey pronouns, and comes from so called **Split Binding** (Partee 1989, Rullmann 2004, Heim 2008). This section draws on the discussion in Heim (2008).

'Split Binding' refers to cases where a pronoun has two separate antecedents, as in (28). It can be modeled by letting a pronoun be composed of more than one index at LF, (28b).

- (28) Every girl told John that **they** should get together
 a. split-bound reading: Every girl x told John that **x +John** should get together
 b. LF: Every girl $\lambda_7 t_7$ told john that $\underbrace{\mathbf{pro}_{[7+8]}}_{\mathbf{they}}$ should get together ($g(8) = john$)

As Rullmann (2004) and Heim (2008) showed, 1ST (and 2ND) person pronouns can also be split-bound. For example, (29) uttered by one of John's ex-wives to John's other ex-wives has the reading in (29a). Once more, this reading can be captured with a complex structure for the pronoun, as in the LF in (29b) where one part is bound by the focused I_F .

- (29) ("All of us wanted to separate from John on peaceful terms, but)...
 Only I hoped **we** would eventually reunite" (based on Heim 2008:52)
 a. Split-bound reading: No ex-wife x besides me hoped **x +john** would reunite
 b. LF: only [$I_F \lambda_7 t_7$ hoped $\underbrace{\mathbf{pro}_{[7+8]}}_{\mathbf{we}}$ would reunite] (where $g(8) = john$)

Observe that the relevant reading in (29) *requires* the split-bound pronoun to surface as 1ST-person; pronouncing *you* or *they* instead of *we* loses the split-bound reading, which

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raises the question of how to explain it. How to predict that the LF representation **pro**_[7+8] must surface as 1ST-PL in (29), but as 3RD-PL in (28)? More generally, the way that split-bound pronouns are morphologically realized follows the generalization in (30):

- (30) *Generalization about the morphological realization of split-bound pronouns:*
- If one part of a split-bound pronoun **refers to, or is bound by**, a 1ST person element, the split-bound pronoun is spelled out as 1ST-PL. (e.g. in 29)
 - Else, if one part of the split-bound pronoun **refers to, or is bound by**, a 2ND person element, the split-bound pronoun is spelled out as 2ND-PL.
 - Else, the split-bound pronoun is spelled out as 3RD-PL. (e.g. in 28b)

As Heim (2008) points out, the morphosyntactic approach cannot derive (30) without unattractive stipulations. On this view the bound part of split-bound pronouns is a bare variable with no semantically interpreted features, so (30) cannot be explained based on the *semantics* of ϕ -features on split-bound pronouns. Instead, one must hard-code (30) into a separate PF mechanism that operates after Feature Transmission and generates PF features on a complex pronoun based on the PF features of its atomic parts (see Heim's paper for details). But this seems to miss an obvious generalization about the way plural pronouns behave *independently* of split-binding. To wit, whenever a group that contains the speaker is referred to, a 1ST-PL pronoun must be used, and whenever a group that contains the addressee but not the speaker is referred to, a 2ND-PL pronoun must be used; it is these observations that motivate the lexical entries in (3a) to begin with. The generalization about split-binding in (30) ought to fall out from this basic pattern of plural pronouns, but the morphosyntactic approach cannot deliver that. It is a disadvantage of a theory if it must invoke a new mechanism to account for what looks like a reducible phenomenon.

In contrast, the semantic approach, on which features on pronouns are always base-generated and semantically interpreted in the ordinary semantics, readily derives (30) without additional assumptions. (30) follows from the morpho-semantics of run-of-the-mill plural pronouns given our assumptions about the role of ϕ -features on bound variables as restricting the range of possible binders in the ordinary semantic value (cf. (11a)). To be concrete, we show in (31) the ordinary semantic value of the λ_7 -abstract in (29b), according to the semantic approach. The features on the split-bound pronoun are present at LF, imposing the requirement that the binder of the bound-part of the split-bound pronoun refer to the speaker, as is indeed the case in (29b).

- (31) $\llbracket \lambda_7 t_7 \text{ hoped } [\mathbf{1ST-PL pro}_{[7+8]}] \text{ would reunite} \rrbracket^g =$
 $\lambda x : \mathbf{x \oplus g(8) \text{ contain the speaker. } x \text{ hopes } x \oplus g(8) \text{ would reunite } (g(8) = \text{John})$

Crucially, neither 2ND nor 3RD in place of 1ST in (31) could derive a split-bound reading of (29). Those features are not compatible with groups that contain the speaker (cf. 3a), so if they were generated instead of 1ST, (31) would not be able to compose with the subject I_F at the level of the ordinary semantic value. This explains why the split-bound pronoun must be realized at PF as 1ST person: the semantics of person features forces it to. The

point generalizes: the description in (30) is *predicted* rather than stipulated (see Sudo 2014 for a similar claim in a different domain).

5. Open issues

We end the paper with two open issues that we hope to tackle in future research. The first concerns the status of the core hypothesis of the approach we defended here, namely that ϕ -features don't contribute to focus alternatives (10). It remains to be seen how to derive this conjecture from something more basic. Note that it is not in general a property of pre-supposition triggers; (32) shows that e.g. *again* and *stop* must project their presuppositions to focus alternatives, otherwise (32a) and (32b) would be felicitous.¹¹

- (32) a. *Context: Mary talked to Ed before and she is talking to him now. John and Sue aren't talking to Ed now, and it's not known whether they did before.*
#Among Mary, John and Sue, only Mary_F is talking to Ed **again**
- b. *Context: Mary smokes, and it's not known whether the other people do too.*
#Among these people, only Mary_F will **stop** smoking

The second issue concerns the Cooper (1979)-style theory we relied on here (section 3.1), according to which the content of E-type pronouns is retrieved from a relation made salient by the context of utterance. It has long been known that this approach to donkey dependencies is empirically unsatisfying, because it overgenerates unattested readings. The problem is essentially of the 'formal link' variety (see Heim 1990, Elbourne 2005 and references therein). To appreciate the issue, consider (33a) from Jacobson (2012):

- (33) a. *For the party, every faculty member was encouraged to bring their/his or her spouse. But #only MICHAEL brought me* (based on Jacobson, 2012:338)
- b. # Only Michael_F [$\lambda_7 t_7$ brought [**1ST-SG [the R₆ x₇]]]**

(33a) cannot mean that Michael brought me, his spouse, and no one else brought his or her spouse. That is, *me* in (33a) cannot be what is sometimes called a 'paycheck' pronoun.¹² But since the "spouse" relation was made salient by context, our Cooper-style semantic approach overgenerates the LF in (33b), where R₆ encodes the "spouse" relation.

¹¹Sauerland (2013) proposes that the class of triggers that don't contribute their presuppositions to alternatives are the *pure*-presupposition triggers, i.e. those that contribute to the semantics nothing but a presupposition. This definition, however, is too broad: *again* and *too*, for example, also seem to be pure-presupposition triggers but their contribution cannot be ignored in the alternatives (see also McKillen (2016) on this point).

¹²Jacobson (2012) claims that the picture changes when it comes to gender features: *only Michael brought her* does allow for the relevant reading missing in (33a), and crucially the spouses in question can be either female or male. Jacobson's judgments, however, are controversial; a reading where the gender is ignored is nearly inaccessible to us and to our informants (as well as to some of Jacobson's own informants – see fn. 18 in Jacobson 2012). We do agree, though, that *her* can have a co-varying ('paycheck') interpretation in this sentence as long as it is restricted to females. More work is necessary to clarify the empirical picture.

Features on bound pronouns

The upshot is that donkey pronouns in focus environments (at least 1ST-person ones) should not be dealt with a Cooper-style theory that retrieves their content from mere contextual information, at least not if the ϕ -features on them are to be semantically inert in focus alternatives. The correct generalization seems to be that a pronoun can have a co-varying interpretation with its features inert only if it co-varies with the focused phrase itself, and only if the two match in features (as in all the examples we had in section 3). It seems then necessary to have a more restricted, ‘syntacticized’ account of 1ST-person donkey dependencies that requires some ‘formal link’ between the co-dependent phrases.

Within the E-type framework, relevant proposals are found in Elbourne 2005 (formal link in terms of NP-ellipsis) and Sauerland 2007 (multi-dominant structures), although those theories don’t discuss ϕ -feature inertness. On dynamic binding theories, which deny the E-type strategy altogether, it is possible to establish a formal link by way of mere coindexation between a donkey pronoun and its antecedent (we do not know of existing dynamic accounts of focus dependencies at all). Space limitations preclude a thorough discussion of those analyses and their prospects, and we leave to future work how to refine the argument from donkey pronouns so that it may be stated in terms of a more adequate theory. We believe, however, that our point against the morphosyntactic agreement theory of ϕ -features is not affected by this issue. Even with a more ‘syntacticized’ theory of donkey dependencies, the purported structural relationship that must obtain is quite unique and is not characteristic of usual agreement dependencies. All agreement dependencies we are aware of respect c-command at least, and are usually rather local; this does not hold for our donkey data. If the relationship between co-varying pronouns and their antecedents does not have to involve c-command, this speaks against a theory that invokes a morphosyntactic mechanism to explain why ϕ -features are inert on those co-varying pronouns.

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