Features on bound pronouns: an argument for a semantic approach*

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1 Introduction and Overview

- In some cases, φ-features (person, gender, number) on bound pronouns seem to be 'ignored' in the semantics

(1) Only I did **my** homework
$\leadsto$ *bound reading*: no one other than me did **their** homework (features ignored)

(2) Only Mary did **her** homework
$\leadsto$ *bound reading*: no one other than Mary did **their** homework (features ignored)

  - *my* in (1) is a variable that isn't restricted to the speaker ('Fake Indeixical')
  - *her* in (2) is a variable that isn't restricted to female individuals

- The central question: **what mechanism allows ϕ-features to be semantically inert?**

- We limit our discussion to *Focus* contexts as exemplified in (1) and (2), leaving out:

  1. *Partee*-sentences (Partee 1989; Kratzer 2009; Wurmbrand 2015)

     (3) I am the only one who did **my** homework (= no one else did **their** HW)

  2. Binding by distributive quantifiers, which exhibits uninterpreted number features (e.g. Rullmann 2004; Sudo 2014)[1]

     (4) These men each think **they**'re a genius. (= each man thinks **he** is smart)

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[1] See Sudo (2014) for a recent analysis of (4) which is very much in line with our main conclusions in this talk.

- Two families of approaches to be compared:
  - **The morpho-syntactic account**: φ-features on bound pronouns are not semantically interpreted; they are present only in the phonology, as a reflex of agreement with their binder (Kratzer 1998, von Stechow 2003, Schlenker 2003, Heim 2008)
  - **The semantic account**: φ-features on bound pronouns are semantically interpreted, just like on referential pronouns. The appearance of semantic inertness in (1) and (2) is a result of how φ-features behave in the context of focus constructions (Spathas 2010, Jacobson 2012, Sauerland 2013)
- **Defining question**: Does the semantics 'see' ϕ-features on bound pronouns (in focus contexts)?
- So far, there has been limited direct evidence for distinguishing the approaches[2]
- Today: a novel argument for a semantic approach, based on the following observation
  - **Observation**: In focus contexts, it is also possible to "ignore" the φ-features on **donkey** ("E-type") pronouns, i.e. pronouns which show covariance without c-command, as exemplified in (5)

(5) Only the woman who is dating ME_F says **I** make her happy

- We argue that the semantic but not the morpho-syntactic approach can account for (5)
- Outline:
  - Section 2: lay out the challenge that the data in (1) and (2) pose
  - Section 3: present the morpho-syntactic and semantic approaches
  - Section 4: point out a divergent prediction the approaches make
  - Section 5: test the prediction with donkey pronouns and show that the predictions of the semantic approach are borne out
  - Section 6: conclude and discuss further issues

[2]Sauerland (2013) offers an argument from parsimony. Jacobson (2012) offers an empirical argument based on Paycheck pronouns, which doesn't extend to person features; we discuss Jacobson (2012) in the section 6.2. Spathas (2010: 5.4) provides an argument based on languages with grammatical gender on nouns, such as Greek.

2 The challenge

- **This section**: Lay out our assumptions about the syntax and semantics of φ-features and pronouns, then illustrate the challenge posed by (1), (2)

2.1 Background on φ-features and pronouns

- Syntactically, φ-features attach to bare indices to form pronouns

(6) **Syntax** (Cooper 1979, Dowty and Jacobson 1989, Heim 2008):

a. $\text{pro}_j \equiv [\textsc{pers}\ [\textsc{gend}\ [\textsc{num}\ \textbf{pro}_j]]]$

b. $\text{me}_7 \equiv [\text{1st}\ [\emptyset\ [\textsc{sg}\ [\text{pro}_7]]]]$

c. $\text{her}_2 \equiv [\text{3rd}\ [\textsc{fem}\ [\textsc{sg}\ [\text{pro}_2]]]]$

– From here on we focus on person features (as in (1)) but the discussion and analysis extends to gender (as in (2)) as well

- Semantically, φ-features are pure-presupposition triggers that introduce presuppositions on the value of the index (Cooper 1979; Charnavel 2017)

(7) **Semantics** (person features):

a. $[\![\text{1}\textsc{st}]\!]^{g_c} = \lambda x : x$ includes the speaker in c. x

b. $[\![\text{2}\textsc{nd}]\!]^{g_c} = \lambda x : x$ excludes the speaker and includes the addressee in c. x

c. $[\![\text{3}\textsc{rd}]\!]^{g_c} = \lambda x :\ x$ excludes the speaker and addressee[3]. x

(8) Structure/interpretation for *I / me / my*:

a. $I / me / my \equiv \textbf{[1}\textsc{st}\ \textbf{[}\emptyset\ \textbf{[}\textsc{sg}\ \textbf{pro}_7\textbf{]]]}$

b. $[\![\text{I / me / my}]\!] = [\![\textbf{[1}\textsc{st}\ \textbf{[}\emptyset\ \textbf{[[}\textsc{sg}\ \textbf{pro}_7\textbf{]]]}]\!]^{g_c} = \begin{cases} g_c(7) & \text{if } g_c(7) \text{ is the speaker in c} \\ \text{undefined} & \text{otherwise} \end{cases}$

[3]Many assume that 3RD person (and PL number) are semantically vacuous and that they convey the inferences associated with them through competition, via *Maximize Presupposition* or another pragmatic principle (Sauerland 2003, a.o.). The talk is compatible with this view, but we opt for the simple version in the text to facilitate presentation.

2.2 Illustrating the challenge

- **Question**: What happens when (8) gets bound, as in *only I did **my** homework*?

- For concreteness, assume this sentence has the structure in (9b): *my* is bound by the focused pronoun I_F, and *only* is a sentence-level operator[4]

(9) a. Only I did my homework
b. only [I_F [λ_7 [t_7 did [$\underbrace{[\textbf{1}_{\textsc{ST-SG}}\ \text{pro}_7]}_{\textbf{my}}$ homework]]]][5]

- As usual, the focused phrase introduces focus alternatives:

(10) Alt(I_F) = {I, Mary, John, ... }

- As is standard, presuppositions on variables restrict the range of their possible binders[6]

  – It follows that the λ-constituent in (9) is interpreted as in (11), and is **defined only for the speaker**

(11) $[\![[\lambda_7\ [t_7\ \text{did}\ [\underbrace{[\textbf{1}_{\textsc{ST-SG}}\ \text{pro}_7]}_{\textbf{my}}\ \text{homework}]]]]]\!] = \lambda x : x\ \underline{\textbf{is the speaker}}.\ x$ did x's homework

- Since (11) is defined only for the speaker, it will fail to apply to any alternative to I_F:

(12) the set of alternatives of the sister of *only* in (9):
{ [λx : ***x*** **is the speaker**. x did x's homework]($\underline{[\![\text{I}]\!]}$),
[λx : ***x*** **is the speaker**. x did x's homework]($\underline{\text{mary}}$), Undefined!
[λx : ***x*** **is the speaker**. x did x's homework]($\underline{\text{john}}$), Undefined!
... }

- The set of alternatives in (12) thus contains the prejacent and nothing more

  – *only* cannot meaningfully negate any alternatives to *I did my homework*

  ⇒ we predict that (1) only yields an uninformative meaning[7]

[4]Nothing crucial depends on this; everything we say in this talk carries over with minor modifications if one takes *only I* to be a constituent that applies to the λ-abstract.

[5]The focused phrase in (9) of course also carries φ-features, but those don't matter to illustrate the point. So to reduce clutter, we omit representing the φ-features on the focused pronoun.

[6]After Heim and Kratzer (1998), we can formalize this requirement as follows:

(i) **Presupposition projection under binding**:
If $[\![\beta]\!]^g$ presupposes $[\![\gamma]\!]^g$, then $[\![\lambda_1\ \beta]\!]^g = \left[\lambda x : [\![\gamma]\!]^{g[x/1]}.\ [\![\beta]\!]^{g[x/1]}\right]$

[7]In the case of gender features the set of alternatives will contain more than just the prejacent; it will include any alternative that corresponds to the specified gender on the bound pronoun. But this is not enough to avoid the problem, since e.g. (2) can be felicitously used to convey that **male** individuals didn't do their homework.

- But (1) is of course sensible and makes a claim about individuals other than the speaker, so we want the restriction to the speaker not to be there in (12)

- A similar problem arises in ellipsis contexts

  – In (13), a sloppy reading is available despite gender-mismatch (though not all English speakers accept this, see Ross 1967, Williams 1977, Sag 1976)

(13) I did **my** homework. Mary didn't ~~do **her** homework~~

  – Adopting a simple theory of ellipsis licensing, VP-ellipsis requires the ellided VP to be identical in meaning to another VP in the discourse. But it's not clear how identity in meaning is achieved in (13), if the φ-features are interpreted[8]

3 Two approaches

3.1 The morpho-syntactic approach

- **Core proposal**: φ-features on bound pronouns are not interpreted; at LF, the pronoun consists of a bare index (Kratzer 1998; von Stechow 2003; Schlenker 2003; Heim 2008, a.o.; see also Kratzer 2009; Wurmbrand 2015)

(14) LF: only I [λ_7 t_7 did $\emptyset_7$ homework]
Interpretation of the λ-constituent: [$\lambda x : \boldsymbol{x \in D_e}.$ x did x's HW]

- The morphological shape of the pronoun reflects an agreement relationship with its binder

- We present Heim's version of this approach

(15) **Heim's morphosyntactic approach**:
  a. Pronouns can enter the derivation unspecified for φ-features
  b. At PF (but not LF), every pronoun must be specified for φ-features
  c. φ-features are transmitted under binding, according to (16)

(16) Feature Transmission under Variable Binding (Heim, 2008):
At PF, features on a DP are transmitted to all the variables that the DP binds.[9]

- The Feature Transmission rule ensures that the bound pronoun in (14) will be spelled out as a first person pronoun, since its binder is first person

[8] Other ways of stating the condition on VP-ellipsis might not run into a problem with accounting for the feature mismatch in (13). Specifically, a Focus Parallelism condition (Rooth 1992, Fox 1999, a.o.) seems to avoid the problem.

[9] The rule in (16) presupposes an architecture of grammar where LF feeds PF (at least for the purpose of morphological shape of pronouns).

3.2 Semantic approach

- **Core proposal** (cf. Sauerland 2013, Jacobson 2012, Spathas 2010): φ-features **are** interpreted on bound pronouns, but only at the level of the ordinary semantic value, **not** at the level of focus alternatives[10]

(17) ***Implementation*** *(our version): φ-features aren't interpreted in focus alternatives*

a. $[\![\text{1ST-SG}]\!]^g = \lambda x : \boldsymbol{x}$ **is the speaker**. x

b. $[\![\text{1ST-SG}]\!]^g_f = \{\lambda x : \boldsymbol{x} \in \boldsymbol{D_e}.\ x\}$

(18) a. $[\![\text{my}_7]\!]^g = [\![\text{1ST-SG pro}_7]\!]^g = g(7)$ **presupposition: $g(7)$ is the speaker**

b. $[\![\text{my}_7]\!]^g_f = [\![\text{1ST-SG pro}_7]\!]^g_f = \{g(7)\}$ **no presupposition**

- Consequently, when a pronoun is bound, its φ-features serve to restrict the range of its possible binders, but only at the level of the ordinary semantic value:

(19) a. $[\![\lambda_7\ [\text{t}_7 \text{ did } [\text{1ST-SG pro}_7]\text{'s homework}]]\!]^g = \lambda x : \boldsymbol{x}$ **is the speaker**. x did x's homework

b. $[\![\lambda_7\ [\text{t}_7 \text{ did } [\text{1ST-SG pro}_7]\text{'s homework}]]\!]^g_f = \{\lambda x : \boldsymbol{x} \in \boldsymbol{D_e}.\ x \text{ did } x\text{'s homework}\}$

- The problem with (12) is avoided: application of (19) to the focused pronoun I_F derives a non-trivial set of alternatives:

(20) a. $[\![[\text{I}_5]_F\ \lambda_7\ [\text{t}_7 \text{ did } [\text{1ST-SG pro}_7]\text{'s homework}]]\!]^g$ = the speaker did the speaker's HW

b. $[\![[\text{I}_5]_F\ \lambda_7\ [\text{t}_7 \text{ did } [\text{1ST-SG pro}_7]\text{'s homework}]]\!]^g_f =$

$\{\ [\lambda x : \boldsymbol{x} \in \boldsymbol{D_e}.\ x \text{ did x's homework}](\underline{[\![\text{I}]\!]}),$

$[\lambda x : \boldsymbol{x} \in \boldsymbol{D_e}.\ x \text{ did x's homework}](\underline{\text{mary}}),$ Defined

$[\lambda x : \boldsymbol{x} \in \boldsymbol{D_e}.\ x \text{ did x's homework}](\underline{\text{john}}),$ Defined

... $\}\ = \{x \text{ did } x\text{'s homework} : \boldsymbol{x} \in \boldsymbol{D_e}\}$

3.3 Intermediate summary

- The morpho-syntactic and semantic approaches give sharply different analyses of the semantic inertness of ϕ-features in (1) and (2):

  - **Morpho-syntactic approach**: The semantic inertness of bound ϕ-features in (1) and (2) is a result of the fact that ϕ-features are not interpreted on bound pronouns. When the pronoun isn't bound, ϕ-features are interpreted as usual like normal presupposition triggers

  - **Semantic approach**: The semantic inertness of bound ϕ-features in (1) and (2) is because ϕ-features - *regardless of whether the pronoun is bound or not* - are not interpreted at the level of focus alternatives, although they *are* interpreted at the ordinary semantic value.

[10] While the authors listed 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 talk.

4 Divergent Predictions

- It so happened that in the cases we saw so far the predictions of the semantic approach matched exactly those of the morpho-syntactic approach

- But the two approaches make differing predictions for configurations that don't involve (classical) binding

- Specifically, according to the morpho-syntactic account, φ-features on pronouns can be ignored in the semantics only if they are on *bound* pronouns

  - Therefore, on this approach, a pronoun with non-trivial φ-features cannot co-vary with another phrase if it isn't (classicaly) bound by it

- The semantic approach, on the other hand, does not make such prediction: φ-features can in principle yield a covariation reading for their pronoun even if that pronoun isn't bound by a matching pronoun

- Restricting our attention to 1ST person features, we arrive at the following predictions:

(21)

Prediction of Morpho-syntactic approach : Let α be a pronoun with 1ST person features. Then α can co-vary in its interpretation with another phrase, β, only if β binds α (and therefore β c-command α at LF) **Prediction of semantic approach**: β does not have to bind α for the two to covary

- **Next section**: argue that the behavior of **donkey pronouns** - pronouns that exhibit co-variance without (classical) binding - corroborates the prediction of the semantic approach

5 Testing the predictions with donkey pronouns

5.1 Background on donkey pronouns

- Donkey pronouns are pronouns that show co-variation without classical binding (c-command), as in (22) and (23), where *it* varies with the choice of *donkey*

(22) Every farmer who owns <u>a donkey</u> greeted **it**

(23) If a farmer owns <u>a donkey</u>, he greets **it**

- Observe first that donkey pronouns show up also in focus contexts (see Tomioka 1999):

(24) Only the students who took <u>PHONOLOGY</u> thought **it** was cool (✓ co-variation)
$\leadsto$ No x$\neq$ phonology: the students who took x thought $\boldsymbol{x}$ was cool

5.2 Testing the predictions

- The fact that donkey pronouns, which show covariation without classical binding, show up also in focus contexts, allows us to test the predictions in (21)
  - **Morphosyntactic approach**: since donkey pronouns are not classically bound by the element they covary with, their φ-features cannot be ignored, so we shouldn't find 1ST person donkey pronouns
  - **Semantic approach**: 1ST person features can be ignored in the absence of binding, so we expect, in principle, to find 1ST person donkey pronouns
- **Crucial observation**: in focus contexts, donkey pronouns can be 1ST person (and yield a co-variation reading):

(25) Only the woman who is dating *ME* says **I** make her happy. (✓ *co-variation*)

(26) Only if I_F misbehave will the teacher call **my** parents. (✓ *co-variation*)

- This conforms to the predictions of the semantic, but not the morpho-syntactic, account[11,12]
- The same point can be made for ellipsis contexts (for those speakers who accept feature-mismatches in ellipsis to begin with):

(27) 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*)

(28) 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*)

5.3 Deriving the behavior of donkeys in focus

- Before we show how the semantic approach can deal with non-trivial ϕ-features on donkey pronouns, we first need an analysis of donkey pronouns
- There are two strategies for dealing with donkey pronouns:
  1. Dynamic binding theories (Kamp 1981, Heim 1982, Groenendijk and Stokhof 1991, Chierchia 1992, a.o.)
  2. E-type theories (Parsons 1978, Cooper 1979, Evans 1980, Heim 1990, Elbourne 2005)

[11] It was brought to our attention that Yasutada Sudo in unpublished work has independently discovered these data and the challenge that they pose for the morpho-syntactic approach, although he did not provide an analysis for them.

[12] The same point can be made for gender features: the sentence below (from Tomioka 1999) can be used to deny my promise to help **male** individuals as well.

(i) I only promised that if *SUE* has trouble in school I would help **her** (✓ *co-variation*)

- We henceforth assume an E-type framework[13]
- On E-type theories, donkey pronouns are underlyingly definite descriptions that *contain* a bound variable, but aren't themselves bound variables
- For example, (24) is analyzed as in (29), where the e-type pronoun *it* is represented as *the class they*$_7$ *took*, with *they*$_7$ bound by the subject:

(29) only [the students who took phonology$_F$] [λ_7 [thought $\underbrace{\textbf{the class they}_7\textbf{ took}}_{\textbf{it}}$ was cool]]

- To spell this out formally, it is sufficient for our purposes (but see Section 6.2) to adopt the simple structure in (30) for E-type pronouns proposed by Cooper (1979)[14]

(30) LF: Only [[the students who took phonology$_F$] λ_7 thought $\underbrace{\textbf{[the [R}_6\textbf{ pro}_7\textbf{]]}}_{\textbf{it}}$ was cool]

a. $g(R_6) = \lambda x.\lambda y.\ x$ took the subject y

b. The students who took phonology thought phonology was cool
$\wedge \neg$ The students who took syntax thought syntax was cool
$\wedge \neg$ The students who took semantics thought semantics was cool

– R here is a contextually supplied relation on individuals defined as in (30a), and the overall resulting meaning is in (30b)

- Since we assume E-type pronouns are DPs, we need to allow φ-features to attach to full DPs (which has been independently argued for by Sauerland 2003)[15]

(31) **Syntax**: [PERS [GEND [NUM **DP**]]]]

- The LF of (25) is then given in (32a), where I is resolved to "the person she$_7$ is dating", given the contextually-supplied relation defined in (32b)

(32) Only the woman who is dating *ME* says **I** make her happy

a. LF: Only $\Big$[the woman dating ME_F] [λ_7 [says $\underbrace{\textbf{[1ST [the [R}_6\textbf{ pro}_7\textbf{]]}}_{I}$ make her$_7$ happy]]$\Big$

b. $g(R_6) = \lambda x.\lambda y.\ x$ is dating y

c. [1ST [the [R$_6$ pro$_7$]]] ≡ [1ST [the person pro$_7$ is dating]]]

[13] Many of the specific points we will be making from now on depends on the choice to use an E-type framework for donkey sentences. Nevertheless, we believe that our main point in this talk goes through also if the correct framework for donkey sentences is a dynamic one. See appendix for a sketch of an attempt to cast our main point within of a dynamic framework.

[14] A more sophisticated version of the E-type analysis that incorporates situation variables is needed to overcome some well-known difficulties with the naive version we use here. See Elbourne (2005) for discussion. We do not incorporate situation semantics into the analysis since that would make the formulas more complex than necessary, but it would be straightforward to do so.

[15] Nothing crucial hinges on this particular choice, which we make purely for expository simplicity. In particular, our account is compatible with the more syntactically realistic view (Ritter 1991; Zamparelli 1995; Nelson and Toivonen 2000; Longobardi 2001; Matushansky 2006; Watanabe 2006; Danon 2011) that while person features are introduced at the DP level, gender and number are introduced within the DP. Moreover, something additional must be said about cases where the DP is not type e, e.g., in the case of quantifiers. Following Sauerland (2003), we can assume that such cases involve obligatory QR that leaves behind a type e variable, which the φ-features then attach to.

5.3.1 How the two approaches differ

- The focus semantic value of the subject in (32) (on both approaches) is:

(33) $[\![$the woman who is dating ME$_F]\!]^g_f$ = {the woman dating me, the woman dating Sue, the woman dating Fred, ... } = {Mary, Jane, Lisa,...}

- And on both approaches, the **ordinary** semantic value of the λ-predicate is:

(34) $[\![\lambda_7$ [says **[1ST [the person pro$_7$ is dating]]** makes her$_7$ happy]$]\!]^g$ =
λx : ***x* is dating the speaker**. x says the person x is dating makes x happy

- The difference comes in the **focus** semantic value of the λ-predicate:

(35) a. *The morpho-syntactic approach: ϕ-features project to the alternatives*

$[\![\lambda_7$ [says **[1ST [the person pro$_7$'s dating]]** make her$_7$ happy]$]\!]^g_f$ =
{λx : ***x* is dating the speaker**. x says the person x is dating makes x happy}

b. *The semantic approach: ϕ-features don't project to the alternatives*

$[\![\lambda_7$ [says **[1ST [the person pro$_7$'s dating]]** make her$_7$ happy]$]\!]^g_f$ =
{λx : $\boldsymbol{x \in D_e}$. x says the person x is dating makes x happy}

- Only (35b) can generate a non-trivial set of alternatives when combined with (33)
  - So on the morpho-syntactic approach, we don't predict these examples to yield the co-variation meaning they actually have

- **Conclusion**: the morpho-syntactic approach undergenerates in (32); the same goes, *Mutatis Mutandis*, for the other donkey examples in section 5.2

5.4 Two ways to save the morpho-syntactic approach and their problems

- **Question**: Can we revise the morpho-syntactic approach to capture the data?

- We briefly discuss two potential revisions and their problems

  1. Focus movement:
     - **Idea**: to deny that (25)-(26) involve donkey pronouns at all, and to assume normal binding configuration
     - **Implementation**: Focused pronoun undergoes covert movement to *only* and binds the lower pronoun, (36)-(37); Feature Transmission applies to (36)-(37) and transfers 1ST to **pro**$_7$ at PF

(36) LF: Only ME$_F$ [λ_7 the woman dating t$_7$ says **pro**$_7$ make her happy]

(37) LF: Only I$_F$ [λ_7 if t$_7$ misbehave will the teacher call **pro**$_7$'s parents]

- **Problem**: (36)-(37) involve island-violating movement:

  (38) a. The woman dating each$_i$ student says he$*i$ makes her happy

  b. If each student$_i$ misbehaves, the teacher will call his$_{*i}$ parents.

- To defend this way of saving the morpho-syntactic account, then, one would be forced to say that *focus* LF-movement is island-insensitive
- But it isn't clear what property of focus makes it exempt from conditions on movement. As Tomioka points out, putting pitch accent on *each student* does not facilitate binding in (38)

2. Feature Percolation
   - **Idea**: Allow features to percolate from the F-marked pronoun to the containing DP, which is then transfer them to the E-type pronoun.

     (39) Only [the woman who is dating $ME_{1\text{ST}}]_{1\text{ST}}$ [2 [says $\mathbf{I}_{2+1st}$ make her happy]]

   - **Problem**: other pronouns bound by container do not show 1ST person features (cf. *her* in 39)
   - 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

6 Summary and further issues

6.1 Summary

- We started with the observation that ϕ-features on bound pronoun (sometimes) seem not to contribute anything semantically
- We then presented two approaches to account for that: the **morpho-syntactic approach** argued that ϕ-features aren't interpreted at all (they are absent at LF altogether), while the **semantic approach** argued that all ϕ-features are present at LF and interpreted, but that they do not contribute theor meaning at the level of focus alternatives
- We derived a divergent prediction about donkey ('E-type') pronouns in focus contexts: the morpho-syntactic approach predicts that non-trivial ϕ-features on donkey pronouns cannot yield a true covariance interpretation (one where the donkey pronoun co-varies with its antecedent), while the semantic approach predicts that they can
- Finally, we saw that the predictions of the semantic approach were corroborated, and that the morpho-syntactic account undergenerates
  - This is assuming that feature agreement is constrained by ordinary syntactic principles (islands, c-command)
- At the end of the day, we have no argument (from focus contexts) that ϕ-features on bound pronouns are an instance of LF-PF mismatch
- If our account is correct, it remains to be seen how to derive the hypothesis that ϕ-features don't contribute to focus alternatives from independent mechanisms

6.2 Further issues

6.2.1 A challenge

- The assumption that 1st person pronouns can function as Cooper-style E-type pronouns in focus contexts faces a potential overgeneration worry
- Consider the following from Jacobson (2012):

(40) For the departmental Christmas party, every faculty member was encouraged to bring their/his or her spouse. But #*only MICHAEL brought* ***me***
(#Michael, my spouse, brought me, an no one else brought **their** spouse)[16]
(Jacobson 2012:338)

- The question is why (40) can't have the following representation:

(41) Only Michael [λ_7 brought **[1ST [the spouse of pro$_7$]]**]

- (40) seems to be a counterexample to the claim that 1ST person pronouns can "stand for" a bound definite description (see also Kaplan 1989)
- Right now, our account in terms of E-type 1ST person pronouns overgenerates this
- It seems to us that the governing factor behind the difference in acceptability between the bad (40) and the good donkey examples in (25)-(26) is that the focused phrase, which antecedes the donkey pronoun, matches in ϕ-features with it
- To account for this difference we need a more restrictive theory of donkey pronouns than the one we adopted in section 5.3 - Cooper's theory in terms of contextually-supplied descriptive content
  - It is possible that a dynamic theory (like the one we develop in the appendix) where donkey pronouns do not have descriptive content will be able to do the job

6.2.2 Split Binding: another advantage of a semantic approach

- *Split Binding* (Partee 1989; Rullmann 2004; Heim 2008): a pronoun that has two separate antecedents, as in (42)

(42) Every girl told John that **they** should get together
$\leadsto$ split-bound reading: Every girl x told j that $\boldsymbol{x \oplus j}$ should get together

[16] Jacobson claims that the picture changes when it comes to gender features:

(i) For the departmental Christmas party, every faculty member was encouraged to bring their/his or her spouse. But *only BILL brought* ***her*** (Jacobson 2012:335)
(Reported judgment: no one other than Bill brought their spouse, **whether the spouse is female or male**)

There is however some controversy about the data. We as well as a few informants find the reported judgment in (i) to be marginal at best (see also fn. 18 in Jacobson's paper). We furthermore suspect that, independently of focus contexts, paycheck pronouns do not tolerate gender mismatches between the antecedent and the pronoun. More empirical work needs to be done to justify this claim.

- We can model split binding by letting a pronoun be composed of more than one index, (43).

(43) LF: Every girl λ_7 t_7 told john that $\underbrace{\textbf{pro}_{[7+8]}}_{\textbf{they}}$ should get together (where $g(8) = \textit{john}$)

- As Rullman and Heim discuss, 1ST (and 2ND) person pronouns can also be split-bound:

(44) (At a meeting between all of John's ex-wives, one of them says: "All of us wanted to separate from John on peaceful terms, but)...
Only I hoped **we** would eventually get back together"
(based on an example in Heim 2008)

- Again, the split-bound reading can be captured with a complex structure for the pronoun, as in the LF in (45b), where one part is bound by *I* and the other one refers to John:

(45) Only I hoped **we** would get back together
  a. split-bound reading: no x other than me hoped ***x*+john** would get back together
  b. LF: only [$_{TP}$ I_F λ_7 t_7 hoped $\underbrace{\textbf{pro}_{[7+8]}}_{\textbf{we}}$ would get back together] ($g(8) = \textit{john}$)

- The relevant reading in (45) requires the split-bound pronoun to surface as 1ST-person; pronouncing *they* instead of *we* loses the split-bound reading

- **Question**: how to predict that $\textbf{pro}_{[7+8]}$ must surface as 1ST in (45), but as 3RD in (43)?

- More generally, as Heim (2008) points out, the way that split-bound pronouns are morphologically realized follows the generalization in (46):

(46) **Generalization about split-bound pronouns:**
  a. Whenever one part of a complex pronoun **refers to, or is bound by,** a 1ST person element, the complex pronoun is spelled out as 1ST-PL (e.g. in 45)
  b. Else, whenever one part of a complex pronoun **refers to, or is bound by,** a 2ND person element, the complex pronoun is spelled out as 2ND-PL
  c. Else, the complex pronoun is spelled out as 3RD-PL (e.g. in 43)

- The point (see Heim 2008): this generalization would fall out as a consequence of the analysis **if all features on pronouns - whether bound or free - were semantically interpreted**, given the meanings of ϕ-features we gave in section 2, repeated here in (47)

(47) a. *Person features*
    i. $[\![1\text{ST}]\!]^{g_c} = \lambda x : x$ includes the speaker in c. x
    ii. $[\![2\text{ND}]\!]^{g_c} = \lambda x : x$ excludes the speaker and includes the addressee in c. x
    iii. $[\![3\text{RD}]\!]^{g_c} = \lambda x$. x excludes the speaker and addressee in c. x
  b. *Number features*
    i. $[\![\text{SG}]\!] = \lambda x : x$ is an atom. x

ii. $[\![\text{PL}]\!] = \lambda x : x$ is a plurality. x

- These denotations are independently motivated by the way ϕ-features behave on referential pronouns

- The morpho-syntactic approach cannot derive (46) from the semantics alone, since on this approach the features on the bound part of split-bound pronouns are not visible at LF
  - This means that one must stipulate a mechanism at the PF branch that generates features on a complex pronoun based on the feature of its parts, in a way that would mimic what the semantics would do anyway had all features were interpreted (Heim 2008)
  - This is unattractive; the resemblance of (46) to the morphosemantics of pronouns outside of split-binding is too close to be a coincidence

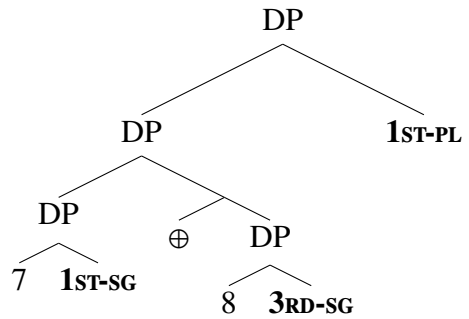
- On the semantic approach, on the other hand, (46) is automatic and doesn't require further stipulations at PF

- Since the semantic account treats all pronouns - free and bound - alike, as semantically interpreted, nothing needs to be stated beyond the assumption that complex pronouns also have base-generated features

- To illustrate this, consider (45) again:

(48) a. <u>LF</u>: only I_F [λ_7 hoped $\underbrace{\textbf{pro}_{[7+8]}}_{\textbf{we}}$ would get back together]

b. Structure of $\textbf{pro}_{[7+8]}$:



- Note that the **1ST-PL** feature combination on the topmost DP in (48b) is the *only* one we could base-generate there, deriving the correct result that *we* must be used here to express the split-bound reading.

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A Appendix: A (quasi-)dynamic account of donkey pronouns in Focus

- This appendix sketches a (quasi-)dynamic account of donkey pronouns in focus contexts, i.e. one in which donkey pronoun do not have covert descriptive content but denote variables
- The goal is the same as in the main text: to develop a system where ϕ-features on pronouns are always interpreted, but only at the regular semantic value and not at the level of focus alternatives
- The presented theory will be partial, and will leave a number of issues unresolved
- However, the take-home message is similar to the E-type version in the main text: even with a dynamic treatment, the morpho-syntactic approach has no natural way (as far as we can see) to explain how non-trivial ϕ-features can appear on pronouns that exhibit co-variance without c-command, whereas a semantic approach can in principle explain that, as we now show - this time with a dynamic version.

A.1 The idea

- In a nutshell, the core of the dynamic version we develop is that a donkey pronoun in focus contexts is a semantic focus of the focus-sensitive operator that associates with the phrase that antecedes the pronoun
  - Therefore, since ϕ-features on a focused pronoun do not project to the alternatives, the features on the donkey pronoun won't either
- We execute this by letting pronominal binding in focus constructions ride on the mechanism proposed originally by Wold (1996) to treat focus interpretation in general as variable binding between focus-sensitive operators and their foci.
- Thus, Focus Sensitive Operators such as *only* are (unselective) binders, just like *every* and *always* are on some versions of dynamic theories, except that the variables it manipulates correspond to focus alternatives

A.2 The implementation - version of Wold (1996)

- Our theory builds on Wold (1996) (it extends his system to deal with pronouns).
- Two components to our proposal
  1. A mildly enriched system for interpreting indices
  2. *only* as a focus binder

A.2.1 The indexation system

- Every constituent is interpreted against two assignment functions - the normal one (g) that is sensitive to indices on pronoun, and one that is extra-sensitive to indices (h). h "takes precedence" over g. As follows:[17]

(49) a. If α has an index:

$$[\![\alpha_i]\!]^{g,h} = \begin{cases} h(i), & \text{if } i \in dom(h); \\ [\![\alpha]\!]^{g,h}, & \text{otherwise} \end{cases}$$

b. If α has no index:

$$[\![\alpha]\!]^{g,h} = [\![\alpha]\!]$$

- g is the ordinary assignment function, and it assigns values to each index (Heim and Kratzer 1998), provided that h doesn't already see that index:

(50) $$[\![\text{i}]\!]^{g,h} = \begin{cases} h(i), & \text{if } i \in dom(h) \\ g(i), & \text{otherwise} \end{cases}$$

- As can be seen in (49a) and (50), we assume that indices can syntactically appear on an any constituent, but the interpretation system treats bare indices in a special way: a bare index is interpreted by the rule in (50), and XPs that bear an index by the rule in (49a).

A.2.2 Focus-sensitive operators

- Syntactically, Focus-sensitive operators are co-indexed with their foci:

(51) a. only JOHN danced

b. <u>LF</u>: only$_1$ [John$_1$ danced]

- Semantically, they are variable binders that bind their foci:[18]

(52) $[\![\text{only}_i\ \varphi]\!]^{g,h}$ is defined only if $i \notin dom(h)$. If defined,

$$[\![\text{only}_i\ \varphi]\!]^{g,h} = \lambda w{:}[\![\varphi]\!]^{g,h}(w)=1.\ \forall p \in \left\{[\![\varphi]\!]^{g,\ h\cup\{<i,x>\}} : x \in D_{\tau_i}\right\}\left[\left([\![\varphi]\!]^{g}\right) \nRightarrow p \rightarrow\ p(w)=0\right]$$

[17]Note: an index i is formally a pair $\langle n, \tau\rangle$ of a number and a semantic type, and the domain of an assignment function is a set of such pairs. For convenience, however, we will represent only the number part of the index whenever its semantic type can be read off of the expression it attaches to.

[18]Focus-sensitive operators can bind more than one focus, as in (i) below. Following Wold (1996), this is handled straightforwardly by letting focus-sensitive operators carry an arbitrary number of indices. Hence, the LF of (i) is in (ii). The lexical entry given in (52) can also be readily generalized to reflect this semantically. But since multiple foci is not our main concern, we stick in the main text to examples with one focus-index per one Focus-sensitive operator.

i. I only said that MARY kissed JOHN (I didn't say that Sue kissed Bill)

ii. only$_{1,2}$ [I said that mary$_1$ kissed john$_2$]

- How (52) works:
  - The index bound by *only* is added to the domain of h when it comes to forming the set of alternatives for the prejacent, the set over which *only* will quantify.
  - To insure that the result of this addition is a function, *only* carries a definedness condition of "novelty": the index was not in the domain of h prior to the addition
  - By mapping i to a variable x (of the appropriate semantic type), the enriched h yields a set of altarnatives to the prejacent - one alternative for each value of x.
- To illustrate, here's the semantic computation of (51b):

(53) a. $[\![\text{only}_1\ [\text{John}_1\ \text{danced}]]\!]^{g,h}$ is defined iff $1 \notin dom(h)$. If defined, =
$\lambda w : [\![\text{John}_1\ \text{danced}]\!]^{g,h}(w) = 1.\ \forall p \in \left\{[\![\text{John}_1\ \text{danced}]\!]^{g,\ h\cup\{<1,x>\}} : x \in D_e\right\}$
$\left[([\![\text{John}_1\ \text{danced}]\!]^{g,h} \Rightarrow p) \rightarrow\ p(w)=0\right]$

b. $[\![\text{John}_1]\!]^{g,\ h\cup\{<1,x>\}} = [h \cup \{<1, x>\}](1) = x$ *(by rule (49a))*

c. (53a) = λw : john danced in w. $\forall p \in \left\{x \text{ danced} : x \in D_e\right\}$
$\left[(\text{that john danced } \Rightarrow p) \rightarrow\ p(w)=0\right]$

A.2.3 Pronoun binding

- Our system allows for the option of binding a pronoun, simply by making use of **co-indexation** with the focus of a Focus-sensitive operator.
- (54b-c) illustrates how this works, ignoring ϕ-features on pronouns for now:

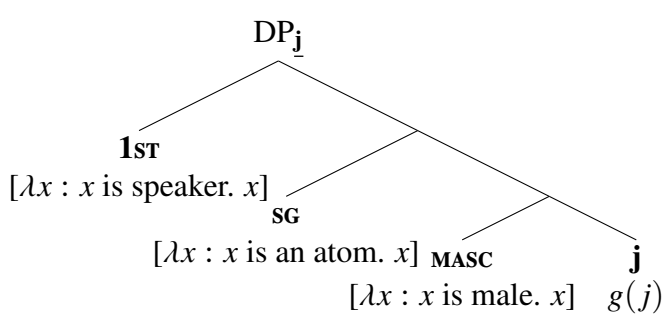
(54) a. only JOHN did his homework

b. <u>LF</u>: only_1 [John_1 did his_1 homework]

c. $[\![(54b)]\!]^{g,h}$ is defined iff $1 \notin dom(h)$. If defined,
$[\![(54b)]\!]^{g,h} = \lambda w : [\![\text{John}_1\ \text{did his}_1\ \text{HW}]\!]^{g,h}(w) = 1.$
$\forall p \in \left\{[\![\text{John}_1\ \text{did his}_1\ \text{HW}]\!]^{g,\ h\cup\{<1,x>\}}{:}x{\in}D_e\right\}\left[([\![\text{John}_1\ \text{did his}_1\ \text{HW}]\!]^{g,h} \Rightarrow p) \rightarrow \neg p(w)\right]$
$= \lambda w :$ John did John's HW. $\forall p \in \left\{x \text{ did } x\text{'s HW} : x \in D_e\right\}$
$\left[(\text{John did John's HW} \Rightarrow p) \rightarrow \neg p(w)\right]$

- Turning to ϕ-features, two assumptions about pronoun structure:
  - (i) Pronouns involve an index, type e, with φ-features stacked on top of it (e.g. Heim and Kratzer 1998)
  - (ii) The index percolates to the pronoun's maximal projection (see 55)

(55) <u>**Structure of pronouns**</u>:



- With this much, we can account for how features on bound pronouns only contribute to the regular semantic value. The derivation is in (56). The 'trick' is that since the ϕ-features are dominated by the index on the whole DP, h will not see them (see the rule in 49a).

(56) a. only I_F did my homework

b. <u>LF</u>: only$_1$ [$_{\mathrm{TP}}$ I$_1$ did my$_1$ HW]

c. $[\![(56b)]\!]^{g,h}$ is defined iff $1 \notin dom(h)$. If defined,
$[\![(56b)]\!]^{g,h} = \lambda w : [\![\mathrm{I}_1 \text{ did my}_1 \text{ HW}]\!]^{g,h}(w) = 1.$
$\forall p \in \left\{[\![\mathrm{I}_1 \text{ did my}_1 \text{ HW}]\!]^{g,\, h\cup\{<1,x>\}} : x \in D_e\right\}\left[\left([\![\mathrm{I}_1 \text{ did my}_1 \text{ HW}]\!]^{g,h} \Rightarrow p\right) \rightarrow \neg p(w)\right]$
$= \lambda w :$ speaker did speaker's HW.
$\forall p \in \left\{x \text{ did } x\text{'s HW} : x \in D_e\right\}\left[\left(s_c \text{ did } s_c\text{'s HW} \Rightarrow p\right) \rightarrow \neg p(w)\right]$

- Now we can straightforwardly account for donkey examples:

(57) a. only the woman dating ME_F introduced me to her parents

b. <u>LF</u>: only$_1$ [$_{\mathrm{TP}}$ the woman dating me$_1$ introduced me$_1$ to her parents]

c. $[\![(57b)]\!]^{g,h}$ is defined iff $1 \notin dom(h)$. If defined,
$[\![(57b)]\!]^{g,h} = \lambda w : [\![\text{the woman dating me}_1 \text{ introduced me}_1 \text{ to her parents}]\!]^{g,h}(w) = 1.$
$\forall p \in \left\{[\![\text{the woman dating me}_1 \text{ introduced me}_1 \text{ to her parents}]\!]^{g,\, h\cup\{<1,x>\}} : x \in D_e\right\}$
$\left[\left([\![\text{the woman dating me}_1 \text{ introduced me}_1 \text{ to her parents}]\!]^{g,h} \Rightarrow p\right) \rightarrow \neg p(w)\right]$
$= \lambda w :$ the woman dating s_c introduced s_c to her parents.
$\forall x \neq s_c :$ the woman dating x didn't introduce x to her parents