Making a Pronoun*

Fake Indexicals as Windows into the Properties of Pronouns

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Abstract

Using local and long-distance fake indexicals as guides, this paper argues that natural languages have two binding strategies that create two types of bound variable pronouns. Bound variable pronouns of the first type, which include local fake indexicals, reflexives, relative pronouns, and PRO may be born with a 'defective' set of features. They can acquire the features they are missing (if any) from verbal functional heads that carry standard λ-operators that bind them. Bound variable pronouns of the second type, which include long-distance fake indexicals, are born fully specified and receive their interpretations via context shifting λ-operators of the kind proposed in Cable (2005). Both binding strategies are freely available and not submitted to syntactic constraints. Local anaphora emerge under the assumption that feature transmission and morphophonological spellout are limited to small windows of operation, possibly the phases of Chomsky (2001). If pronouns can be born underspecified, we need a principled account of what the possible initial features of a pronoun can be and how it acquires the features it may be missing. The paper develops such an account by deriving a space of possible paradigms for referential and bound variable pronouns from a typologically motivated semantics for pronominal features. The result is a comprehensive theory of pronouns that predicts the typology and individual characteristics of both referential and bound variable pronouns.

Keywords: agreement, bound variable pronouns, binding, context shifting, fake indexicals, feature transmission, local anaphora, long-distance anaphora, meaning of pronominal features, morphophonological spellout, referential pronouns, typology of pronouns, variation.

1. Fake indexicals and Minimal Pronouns

Referential and bound variable pronouns tend to look the same. The English 3rd person pronouns *he*, *she*, and *they* can all be referential or bound, for example. Referential pronouns refer to salient individuals in the utterance situation. Bound variable pronouns are interpreted by assignment functions. This looks like ambiguity. The apparent ambiguity is systematic, though, and this is why most existing accounts propose a unified semantics for both types of pronouns[1]. Bound variable readings for 1st and 2nd person pronouns do not often figure in discussions of pronominal ambiguity. They are relatively rare and can only be observed in particular constructions. (1) and (2) below are two examples. *I* in (1) and *you* in (2) are ambiguous between a referential and a bound variable interpretation, hence can be "fake indexicals".

(1) I'm the only one around here who can take care of **my** children.
Modeled after Partee (1989), footnote 3.

(2) Only you eat what **you** cook.

On the bound variable interpretation, (1) implies that nobody else around here can take care of their own children, and (2) conveys that nobody else eats the food they cook. Bound variable readings for 1st and 2nd person pronouns present a major challenge for unified semantic analyses of referential and bound variable pronouns. There seems to be no straightforward way to assign them interpretations that could produce both indexical and bound variable readings, given standard views on indexicals and binding. As illustrated by 3(a) and (b), a unified account for indexical and bound variable uses is easy to achieve for the 3rd person pronoun *he*, for example, but not for the indexical *I*.

(3) For all variable assignments g admissible in a context c:

a. $[[he_5]]^{g,c}$ = g(*5*) if g(*5*) is a single male, undefined otherwise.

b. $[[I_5]]^{g,c}$ = g(*5*) if g(*5*) is the speaker in c, undefined otherwise.

Assuming that admissible variable assignments are constrained by utterance contexts, 3(a) covers both indexical and bound variable uses of *he*. A particular context c might determine that *5* picks out your grandfather, for example. All variable assignments admissible in that context will then assign your grandfather to *5*. Since the reference of he_5 is fixed in such a context, he_5 comes out as a referential pronoun. Other contexts might not determine a reference for *5*. In that case, different assignments admissible in such contexts could assign different individuals to *5*, and he_5 could thus be treated as a non-trivial bound variable pronoun. This type of account can't be extended to 1st or 2nd person pronouns. Any admissible context c must pick out fixed referents for those pronouns. Even if we represent 1st or 2nd person pronouns as bound variables, as in 3(b), all admissible assignments for a

given context c have to assign the same individual to them and, consequently, 3(b) cannot produce a non-trivial bound variable reading for I_5.

That 1st or 2nd person pronouns can have bound variable interpretations has been taken to mean that it must be possible for pronouns to surface with features that are in principle interpretable with pronouns, but are not in fact interpreted. In Kratzer (1998) I explored the idea that when otherwise indexical pronouns end up with a bound variable interpretation, they start their life in syntax as mere indices that pick up the features that make them visible or audible via binding relations in the PF branch of syntactic derivations. On such an account, which is a version of what I now want to call a "Minimal Pronoun" approach[2], fake indexicals like those in (1) and (2) are born as indices and acquire the looks of referential expressions via feature transmission from the expressions that carry their binders. There are variations of the Minimal Pronoun approach in the literature. For example, in Heim (1994) and von Stechow (2003a, b) fake indexicals enter syntactic derivations with completely specified feature sets, but are nevertheless allowed to get bound like other pronouns. For fake indexicals to be interpretable as bound variables, there must then be some provision allowing the semantic interpretation component to ignore person features. Von Stechow invokes feature checking operations for this purpose. I will not attempt an in-depth comparison between feature transmission and checking variants of Minimal Pronoun approaches. Both versions are bound to have crucial properties in common: in both cases we expect bound variable interpretations to depend on agreement relations. On von Stechow's account, fully specified fake indexicals are expected to use binding relations to get rid of uninterpretable features before semantic interpretation. On the constructivist proposal of Kratzer (1998),

underspecified pronouns are expected to use binding relations to inherit features from their binders at a point in the derivation where the semantic interpretation component can no longer see them.

On the conceptual side, considerations of economy seem to tilt the balance towards constructivist versions of the Minimal Pronouns approach. Since the shapes of many bound variable pronouns, including fake indexicals, reflexives, relative pronouns, and PRO, depend on the syntactic configuration they end up in, a constructivist approach spells them out as late as possible. When the initial array of lexical items is assembled, then, no decision about which variety of bound variable pronoun to pick has to be made in those cases. If considerations of optimal design play a role in natural language, as suggested in Chomsky (2004, 2005), there should be a bias against checking operations whose main use is to filter out wrongly assembled feature structures. "Crash-proof syntax" [3] should try to minimize the need for filtering. Whenever the shape of a bound variable pronoun is predictable from local properties of its final position, spellout of such a pronoun should be delayed until it has reached that position[4]. The idea that the ultimate shape of pronouns may depend in part on the syntactic environment they end up in supports a program of "syntactic contextualism" of the kind advocated in Borer (2005a, 2005b), Morzycki (2005), and Moulton (forthcoming), who argue that many properties of verbs, nouns, adjectives, and adverbs are contributed by functional heads, hence by the syntactic environment of the respective lexical items, rather than by the lexical items themselves.

The current paper departs from Kratzer (1998) in two important respects. The first departure consists in the recognition of a distinct class of long-distance fake indexicals. Sections 2 to 4 will show that fake indexicals have a distribution that is familiar from other types of anaphora. Their appearance is constrained within a certain local domain, but beyond that domain, they can be found almost everywhere. Following Cable (2005), I will argue that in addition to standard λ-operators binding pronouns by shifting values for numerical indices, there are also context shifting λ-operators binding pronouns by shifting values for 1st or 2nd person features. Both types of λ-operators can bind pronouns at any distance. The difference between local and non-local fake indexicals is not due to different syntactic licensing conditions, but emerges from the fact that feature transmission and morphophonological spellout operations can only respond to local binding relations.

The second departure from Kratzer (1998) was prompted by Rullmann (2004). Rullmann shows that fake indexicals cannot always be born as mere indices. It must be possible for them to have certain features even at the earliest stage of their derivation. (4) is a partial binding example of the kind Rullmann considered (see also Heim (2005)).

(4) Only you prepared a handout for **our** first appointment.

Imagine that I use (4) to address a former student of mine at a reunion. The reading we are after can be paraphrased as 'you were the only x such that x prepared a handout for the first conversation of x and me'. On the intended interpretation, *our* in (4) has a bound variable

interpretation, but can't have inherited its 1st person feature via an agreement chain originating with *you*. *Our* in (4) must have had a 1st person feature from the very start, then.

If fake indexicals do no longer have to start out as mere indices, but can be born with certain features already in place, we need an account of which features such a pronoun can be born with, and which ones (if any) it needs to acquire via feature transmission. To this end, we have to understand the connection between the meanings of pronominal features and the meanings of the pronouns themselves. In section 5, I will present a compositional semantics for pronominal features that predicts the range of possible feature combinations for referential pronouns in a way that is compatible with current typological knowledge about pronominal paradigms. Section 6 will then show that the proposed semantics for pronominal features also determines the possible initial shapes of Minimal Pronouns. The existence of the partially bound pronouns that Rullmann thought were problematic for the Minimal Pronoun approach can be deduced from the combinatorics of pronominal features.

2. Fake indexicals, binding, and agreement

The great theoretical interest of fake indexicals lies in the fact that bound variable interpretations for 1st and 2nd person pronouns are not freely available. If there are constraints for fake indexicals, the core of those constraints must be hard-wired into the very mechanism that is responsible for establishing anaphoric relationships. We would not expect idiosyncratic constraints on binding to come with lexical entries for indexicals like *I* and *you*. Bound variable readings for 1st and 2nd person pronouns are rare to begin with, and constraints for the availability of those readings look hopelessly chaotic. Generalizations only

emerge after careful experimentation with hard-to-come-by cases. Language learners could not easily extract the right generalizations from the data they encounter. There is a good chance, then, that the investigation of fake indexicals might reveal principles that are at the heart of anaphoric relations.

In this section, I will first document that in German variations of sentence (1), bound variable readings for 1st and 2nd person pronouns are only available if those pronouns have person and number features that are compatible with those of a local verbal inflectional head. I will then argue that the observed constraints for bound variable interpretations find a natural explanation under the Minimal Pronoun approach if we assume with Kratzer (2004) and Adger and Ramchand (2005) that binders for pronouns are provided by verbal inflectional heads, rather than by 'antecedent' DPs.

The following German variations of sentence (1) are all grammatical. Yet they do not all allow bound variable readings for the embedded possessive[5]. Checkmarks after a sentence indicate that a bound variable reading for the possessive pronoun is easily available, and a star after a sentence means that a bound variable reading is strongly dispreferred or impossible. The sentences are all grammatical.

(5) 1st person singular *

Ich bin der einzige, der t **meinen** Sohn
1SG be.1SG the.MASC.SG only.one who.MASC.SG **1SG**.POSS.ACC son

versorg-**t**.
take.care.of-**3SG**

'I am the only one who is taking care of my son.'

(6) 2nd person singular *

Du bist der einzige, der t **deinen**
2SG be.2SG the.MASC.SG only.one who.MASC.SG **2SG**.POSS.ACC

Sohn versorg-**t**.
son take.care.of-**3SG**

(7) 1st person plural √

Wir sind die einzigen, die t **unseren** Sohn
1PL be.1/3PL the.PL only.ones who.PL **1PL**.POSS.ACC son

versorg**en**.
take.care.of-**1/3PL**

(8) 2nd person plural *

Ihr seid die einzigen, die t **euren** Sohn
2PL be.2PL the.PL only.ones who.PL **2PL**.POSS.ACC son

versorg**en**.
take.care.of-**1/3PL**

In (5) to (8), a bound variable interpretation is only possible in (7). What makes (7) special is that, due to systematic 1st/3rd plural syncretism throughout the German verbal paradigm, the 1st person possessive in (7) and the embedded verb have compatible person and number features. In contrast, there is a person feature clash between possessive and embedded verb in (5), (6), and (8).

If it is ϕ-feature compatibility with the nearest verb that makes a bound variable interpretation possible for the possessive in (7), bound variable readings should be generally

available in variations of sentence (5) to (8) in languages or dialects that allow 1st or 2nd person verbal agreement morphology in the relative clause. Interestingly, there are varieties of German that allow this possibility for the 2nd person plural. In addition to (8), there is also the variant (9), which is equally grammatical for many speakers:

(9) 2nd person plural (agreeing embedded verb) √

Ihr **seid** die einzigen, die t **Euren** Sohn
2PL are.**2PL** the.PL only.ones who.PL **2PL**.POSS.ACC son

versorg-**t**.
take.care.of.**2PL**

In (9), the embedded verb and the possessive have compatible ϕ-features, and as a result, a bound variable interpretation for the possessive becomes available.

Dutch verbs do not make any person distinctions in the plural at all, and the expected bound variable interpretations are easily available in those cases. This is illustrated in (10) with examples due to Hotze Rullmann (personal communication). Rullmann's examples are constructed in such a way that the lack of a bound variable reading would lead to ungrammaticality or severe semantic anomaly: you can only do your own best, not somebody else's.

(10) a. Wij zijn de enigen die **ons** best gedaan **hebben**.
1PL be.PL the only-ones who **1PL.POSS** best done have.**1/2/3PL**
'We are the only ones who have done our best'

b. Jullie zijn de enigen die **je** best gedaan **hebben**.
2PL be.PL the only-ones who **2PL.POSS** best done have.**1/2/3PL**
'You are the only ones who have done your best.'

That ϕ-feature compatibility with the closest verb is the crucial factor for licensing the bound variable interpretations in our test sentences, rather than ϕ-feature compatibility with a nominal antecedent[6], for example, is shown by (11). (11) is exactly like (7), as far as nominal antecedents are concerned. The main difference is that the possessive in (11) is contained in the subject, rather than the direct object of the relative clause. As a consequence, there is no longer ϕ-feature compatibility between the possessive and the embedded verb, and, as expected, a bound variable interpretation for the possessive becomes unavailable.

(11) Wir sind die einzigen, die **unser** Sohn *
1PL be.1/3PL the.PL only.ones who.PL **1PL**.POSS.NOM son

t versorg**t**.
take.care.of-**3SG**

'We are the only ones who our son is taking care of.'

It may be tempting to attribute the absence of a bound variable interpretation in (11) to a weak crossover violation and appeal to an independently needed account of that phenomenon – whatever that may be. A standard crossover account of (11) is suspicious, however, once we consider 12(b), where a bound variable interpretation is easily available for the possessive.

(12) a. **Unser** Sohn versorgt nur uns. *
1PL.POSS.NOM son takes.care.of only 1PL.ACC
'Our son only takes care of us.'

b. Nur uns versorgt **unser** Sohn. √
Only 1PL.ACC takes.care.of 1PL.POSS.NOM son.

'Only we are taken care of by our son.'

In (12b), just as in (11), the direct object has moved to the left of the subject containing the possessive. But in contrast to (11), leftward movement in (12b) has made an interpretation available that wasn't there before. (12b) is ambiguous, (12a) is not. Both sentences have a reading that implies that nobody else is taken care of by our son. But (12b) has an additional reading that implies that nobody else is taken care of by their own son. The fact that the relative pronoun has crossed over the subject containing the possessive can therefore not be the reason for the complete unavailability of a bound variable interpretation in (11). We have to look elsewhere for an explanation of this phenomenon. The difference between (11) and (12b) deserves attention as well, of course. I will come back to this contrast shortly.

That bound variable interpretations for the possessive pronouns in sentences (5) to (11) are only possible if there is ϕ-feature compatibility between the possessive pronoun and the closest verb suggests that verbal inflection might provide necessary links for binding relations. That semantic binding might be tied to verbal functional heads has been observed by a number of authors: Finer (1984, 1985), Borer (1989), Hale (1992), Kratzer (1998) all proposed to reduce apparently non-local relationships between anaphors and apparent 'antecedent' DPs to local relationships between verbal functional heads. Adger and Ramchand (2005) and Kratzer (2004) make proposals in a similar spirit and suggest that semantic binders (λ-operators represented as binder indices) are introduced by verbal functional heads, rather than by 'antecedent' DPs, as assumed in Heim and Kratzer (1998), for example. Verbal functional heads, rather than DPs, are then the true syntactic antecedents for bound pronouns.

If v ("little v") introduces external arguments in a neo-Davidsonian fashion (Kratzer (1996)), binding from the closest v creates the phenomenon of reflexivization. That is, when v introduces a binder that locally binds a pronoun within its sister VP, the predicate projected by v winds up "reflexivized" (Reinhart and Reuland (1991, 1993))[7]. Technically, this means that the argument introduced by v and the pronoun bound from v receive co-referent or co-varying interpretations. In the way of illustration, here are the relevant steps for the interpretation of the simple reflexive sentence *I blame myself*, leaving out tense.

(13) a. I blame myself.

b. $[_{vP}$ I [v [*n*] $[_{VP}$ *blame* [*n*]]]], parsed as $[_{vP}$ *I* [v [λ[*n*] $[_{VP}$ *blame* [*n*]]]]]

(14) a. [[v]] = λxλe agent(x)(e)

b. [[*blame*]] = λxλe blame(x)(e)

c. [[λ[*n*] $[_{VP}$ *blame* ([*n*])]]] = λxλe blame(x)(e)

d. [[v [λ[*n*] $[_{VP}$ *blame* ([*n*])]]]] = λxλe [agent(x)(e) & blame(x)(e)]

From (a) and (c) via Predicate Conjunction

e. [[$[_{vP}$ *I* [v [λ[*n*] $[_{VP}$ *blame* ([*n*])]]]]]] = λe [agent(I)(e) & blame(I)(e)]

When (13a) is interpreted, the reflexive pronoun is still a mere index represented as a numerical feature [*n*] that functions as an individual variable. The binder λ[*n*], which is introduced by v in the form of another occurrence of [*n*], is parsed as heading its own projection in (13b). The result of binding is a predicate that has the same denotation as *blame*

itself, as shown in (14c): it denotes a relation between an individual x and an event e that holds just in case e is an event of blaming x. The external argument of *blame* is introduced in a neo-Davidsonian way by v, which also denotes a relation between individuals and events (given in (14a)). In this case, the individual has to be the agent of the event. Combining the denotation of v with that of its sister node by Predicate Conjunction (as shown in (14d)), creates a reflexive predicate that relates an individual x and an event e just in case e is an event of blaming x by x.

The assumption that binders are introduced by verbal inflectional heads has the potential to derive the core binding facts for reflexive pronouns: reflexive pronouns emerge as that class of bound variable pronouns that are bound from the closest v. For example, any argument position within a sister VP should be accessible for binding from a given v, and this is the case:

(15) a. I talked about **myself**.

b. I blamed **myself**.

The subject position of an embedded vP, that is, a small clause or a small-sized infinitival complement[8], should also be accessible for binding from the matrix v, which is the closest verbal functional head for such positions. If bigger infinitival complements are TPs, their reflexive subjects could be bound from the next higher v without there being any other intervening verbal inflectional head. Alternatively, reflexive subjects might move beyond C in infinitival CPs, and possibly even into the next higher clause.

(16) a. I took **myself** off all medicines.

b. I let **myself** grow quiet.

c. I imagined **myself** to be someone else.

d. I had not expected **myself** to say that.

e. I never considered **myself** to be different.

In the sentences in (16), *myself* might occupy the highest position of an embedded vP, TP, or CP, or it may have moved into the matrix clause. In each case, the matrix v would be the closest c-commanding verbal inflectional head for the pronoun, hence the closest possible antecedent. Binding by the closest v should also be able to 'reach' into DPs in argument positions within its sister VP. This is precisely the binding configuration in our test sentences (5) to (10). It is also the configuration where we find possessive reflexives in languages that have them, and is thus a familiar local binding configuration. (17) is an example from Danish:

(17) Drengen viste mig **sin** bamse.
The boy showed me **REFL** teddy bear
'The boy showed me his teddy bear.'
Herslund (1986), 134.

The brief survey of core reflexivization data in (15) to (17) suggests that closeness to v is a promising candidate for defining the locality domain for reflexivization. Returning to our test sentences, we now see that the fake indexicals we have been looking at are in fact reflexives. They are Minimal Pronouns bound from the closest v. As Minimal Pronouns they would acquire their ϕ-features from the head that hosts their binder. This process of feature

transmission seems to be at the heart of the pattern we see in (5) to (11). If binders are generally carried by verbal functional heads, feature transmission to bound pronouns might proceed as in (18).

(18) Feature Transmission under Binding

The ϕ-feature set of a bound DP unifies with the ϕ-feature set of the verbal functional head that hosts its binder.

Since our features are privative, feature structures are just sets of features. Unification can then be an operation that applies to expressions $\alpha_1, \ldots\alpha_n$ with associated feature sets $A_1, \ldots A_n$ and assigns to each $\alpha_1, \ldots\alpha_n$ the new feature set $\cup\{A_1, \ldots A_n\}$. Against the background of an extensive typological investigation, Barlow (1988) argues for feature merging (unification), as opposed to feature copying or feature matching as the correct account for agreement in natural languages, and this view has been adopted in much recent syntactic work. (18) uses unification to bring about ϕ-feature sharing between a bound pronoun and the head that carries its binder. The main benefit of unification based agreement mechanisms is that they are neutral with respect to the direction of feature transmission. The direction of feature transmission is expected to fall out from independently needed principles determining which ϕ-features a verbal functional head or a pronoun can be born with. It is plausible to assume, for example, that all of a pronoun's or inflectional head's interpretable ϕ-features are present at birth and that uninterpretable features are acquired as late as possible, preferably after semantic interpretation has taken place.

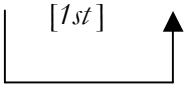
Feature Transmission under Binding is one of at least three mechanisms for ϕ-feature transmission that we have to assume. When a functional head carries a binder, a DP in its specifier position is in a predication relation with its sister constituent (Williams (1980)), and this configuration seems to generally require specifier-head agreement, as stated in (19).

(19) Predication (Specifier-Head Agreement under Binding[9])

When a DP occupies the specifier position of a head that carries a λ-operator, their ϕ-feature sets unify.

Together, (18) and (19) derive the ill-formedness of (20). (20) is ungrammatical, even if uttered by Nina. The deviance can't be accounted for via the semantics of reflexivization, then.

(20) * Nina v respects myself.



It is impossible to derive (20) within our system. If the external argument introduced by v in (20) is *Nina*, v and *Nina* are required to share all of their ϕ-features by Predication. On the other hand, since the reflexive direct object in (20) is a Minimal Pronoun bound by v, the reflexive and v must share all of their ϕ-features via Feature Transmission under Binding. As a result, the reflexive that surfaces would be expected to be the '3rd person' *herself*, not the 1st person pronoun *myself*. If we want to build a 1st person reflexive in a configuration like (20), the external argument introduced by v must be *I*, not *Nina*. (20) is thus excluded

'constructively', rather than 'destructively'. We no longer have to filter out non-agreeing reflexives. We don't build them to begin with.

On the proposed account of reflexivization, a v that makes a reflexive pronoun cannot inherit its ϕ-features from the direct object via the Agree mechanism of Chomsky (2000, 2001). If the direct object is a reflexive pronoun, it is born as a Minimal Pronoun, hence is born without ϕ-features. If the direct object contains the reflexive pronoun, as in a possessor construction, Feature Transmission under Binding dictates agreement between v and that pronoun, rather than the direct object. Functional heads that do not carry binders would still need to pick up their ϕ-features via some version of Agree, however, since Feature Transmission under Binding and Predication do not apply to such heads. We still need some version of Agree, then, as a feature transmission mechanism that can apply in the absence of binding. If unification is the right mechanism for binding related feature transmission, we might hypothesize that it is likely to be the right mechanism for non-binding related feature transmission as well. This is reflected in the version of Agree stated in (21).

(21) Agree

The ϕ-feature set of an unindexed head α that is in need of ϕ-features (the probe) unifies with that of an item β (the goal) if β is the closest element in α's c-command domain that has the needed features.

Our account implies that feature transmission with and feature transmission without binding are different mechanisms. Feature Transmission under Binding and Predication require binding relations. They are grammar's way of showing that there is binding. Agree only operates in the absence of binding. If this dichotomy in the way agreement relations are established is correct, we expect to find languages where the surface realizations of ϕ-features on a given functional head may differ depending on whether the head does or does not carry a binder. With v, the difference would be expected to show up with object agreement morphology. We should then find languages where object agreement may look different in reflexive and non-reflexive constructions. Woolford (1999), following up on Rizzi (1990b), investigated languages with overt object agreement morphology and showed that reflexivization affects the realization of object agreement morphology in all languages in her sample. Moreover, Deal (2007) documents that in Nez Perce, even the presence of reflexive possessives contained within direct objects affects the realization of object agreement on the verb. This is precisely the binding configuration of the possessive fake indexicals we have been discussing. Woolford's and Deal's observations thus lend support to the idea that the mechanics of feature transmission distinguishes heads that bind from those that don't[10].

In our test sentences above, the embedded v invariably starts out with a relative pronoun in its specifier position. If relative pronouns are Minimal Pronouns, too, the cases that allow a bound variable interpretation for the embedded possessive (e.g. (7), (9), or (10)) are all cases where the embedded v has a Minimal Pronoun in its specifier position and also binds a Minimal Pronoun - the possessive in our examples. In such configurations, we have to wonder how the process of feature transmission to the possessive can ever get off the

ground. Assuming a derivational framework where sentences are spelled out in stages, the embedded v cannot immediately inherit ϕ-features from the DP occupying its specifier position via Predication because that DP needs to inherit its own ϕ-features from a higher source. Does that mean that feature transmission, and hence morphophonological spellout of the possessive, have to wait until the referential 1st person pronoun in the matrix sentence is introduced? This would be a highly undesirable state of affair and would go against much recent work advocating local, possibly phase-based, morphophonological spellout, as in among others Chomsky (2001), Kahnemuyipour (2004), Kratzer and Selkirk (2007), and Kramer (forthcoming). The only way to preserve local spellout, so it seems, would be to allow heads like v the option to enter the syntactic derivation with 1st or 2nd person features and number features already in place so that they can initiate feature transmission. Choosing this option gives the clause to be built a '1st or 2nd person perspective' from the very start, and this property is expected to constrain the way that clause is interpreted and used in the end. In all of our examples, perspectival relative clauses are merged into positions where they are part of a predicative DP whose subject is a matching first or second person pronoun. The exact conditions for using perspectival relative clauses need to be investigated further, but that's a project that I have to defer to another occasion. The possibility of a v with initial person features introduces what might be considered an imperfection into our system[11], since 1st or 2nd person features on indexed functional heads seem to be uninterpretable (but see section 4 for an important qualification), hence should be placed *after*, not *before* semantic interpretation takes place, given general considerations of optimal design and economy. Since the uninterpretability is predictable, however, it does not present a serious obstacle.

Reflexives often have distinctive looks that set them apart from other pronouns. English distinguishes *him* and *himself*, for example. Distinctive surface shapes for Minimal Pronouns are the signature of their binders on the current account. The head v only makes reflexive pronouns: it doesn't make relative pronouns, for example. This suggests that in addition to ϕ-features, v may pass along a [*reflexive*] feature that is recognized by the vocabulary insertion rules for pronouns. Transmission of such a 'signature feature' is the characteristic property of pronoun makers. In fact, sometimes, the signature feature is all that is ever passed on to a Minimal Pronoun. As emphasized in Reuland (2007), there are many languages that use reflexives that do not mark any ϕ-feature distinctions at all (e.g. Russian), or mark fewer ϕ-feature distinctions with reflexives than with referential pronouns (e.g. German). If reflexives do not make any person, number, or gender distinctions, they can always be spelled out locally without ever positing initial φ-features on v. All they need to get from v in those cases is the signature feature [*reflexive*], which will then lead to an invariant shape.

Apart from v, different types of specialized Cs seem to have the ability to make distinctive series of pronouns. Chierchia (1989) proposed that PRO is bound from its closest C (see also Heim (1994), Kratzer (1998), Anand (2006)), and this would mean that it is 'made' by C on the current account. The resulting CP expresses a property of individuals, rather than a proposition, and, according to Chierchia, this creates the observed *de se* interpretation in interaction with the semantic selection properties of the verb. Kratzer (1998) suggests that relative pronouns are Minimal Pronouns, too. That proposal was inspired by Hendrick (1988), who argued that relative pronouns are instances of PRO. Relative pronouns would then

originate as mere numerical indices that are bound by local Cs that attract them to their specifier position. When they move they leave a copy of their index behind, which is then bound by the C that attracted them. The pronoun's own index is not interpreted in the position where it is given a pronounceable shape, and, consequently, we end up with a CP that denotes a property and can thus function as a nominal modifier[12].

We are now in a position to offer a tentative explanation for why a bound variable interpretation is unavailable for the possessive in (11) above, which is repeated here:

(11) Wir sind die einzigen, die **unser** Sohn *
1PL be.1/3PL the.PL only.ones who.PL **1PL**.POSS.NOM son

t versorg**t**.
take.care.of-**3SG**

'We are the only ones who our son is taking care of.'

The most important difference between (5) to (10) on the one hand and (11) on the other is that in (11), the intended bound variable interpretations could not have been produced by binding from v. In (11), the possessive is contained in the subject of the relative clause, and thus originates outside the scope of v. The possessive in (11) cannot be a reflexive pronoun, then. Might it have been made by the closest C, then? In that case, it would have to have been made by the same C that made the relative pronoun. But then one and the same C would have had to make both a relative pronoun and a personal pronoun. This seems impossible. If relative pronouns are made by Cs that pass on [*wh*] or [*d*] features to the

pronouns they make, one and the same C cannot make both a relative pronoun and an ordinary personal pronoun.

We can now also explain the difference between (11) and (12b) (repeated from above). In 12(b), C hosts a topicalized 1st person DP in its specifier position and thus carries a binder. Consequently, C has 1st person features via Predication. Since it does not make a relative pronoun, it should be free to make a matching 1st person pronoun via Feature Transmission under Binding.

(12) b. Nur uns versorgt **unser** Sohn. √
Only 1PL.ACC takes.care.of 1PL.POSS.NOM son.
'Only we are taken care of by our son.'

Assuming tentatively that v and C are the only heads that can make pronouns, we can conclude that the possessive in (11) cannot be a Minimal Pronoun at all. It must have been born with all of its features in place, hence can only be referential.

If the above explanation for the absence of a bound variable reading in (11) is on the right track, bound variable interpretations should become available in similar configurations if there are reasons to believe that there is an embedded small clause headed by v, hence an additional potential pronoun maker. (22) and (23) suggest that the expectation might be borne out.

(22) Wir sind die einzigen, die du t ✓
1PL be.1/3PL the.PL only.ones who.PL.ACC you

zu **unseren** Eltern zurückgeschickt hast.
to **1PL**.POSS.DAT parents sent.back have-2SG

'We are the only ones who you sent [$_{vP}$ t v_1 [back to our$_1$ parents]]'

(23) Wir sind die einzigen, die du t ✓
1PL be.1/3PL the.PL only.ones who.PL.ACC you

mit **unseren** Sorgen allein gelassen hast.
with **1PL**.POSS.DAT worries alone let have-2SG

'We are the only ones who you left [$_{vP}$ t v_1 [alone with our$_1$ worries]]'

The relative clause of (22) includes a directional, (23) has a causative verb. Both types of constructions have been argued to involve embedded small clauses headed by the head that is now often referred to as "v" (Bowers (1993, 2001)). The relative pronouns in (22) and (23) would then originate as external arguments of that v, as indicated in the English glosses for the two sentences. Binding of the possessives from the closest v would force their reference to co-vary with that of the corresponding relative pronouns, yielding the observed bound variable interpretations. Features would be transmitted from v to the possessive in the usual way.

Not all ditransitive verbs embed small clauses. Pylkkänen (2002) has argued, for example, that only low applicatives do, in contrast to high applicatives. Only low applicatives would then involve an additional v, hence an additional pronoun maker, and we might expect

fake indexicals to behave differently in the two constructions. The German data below are a first indication that this expectation might be born out.

(24) Wir sind die einzigen, denen du t √
1PL be.1/3PL the.PL only.ones who.PL.DAT you

unsere Röntgenbilder gezeigt hast.
1PL.POSS.ACC x-rays shown have-2SG

'We are the only ones who you showed our x-rays.'

(25) * Wir sind die einzigen, denen du t *
1PL be.1/3PL the.PL only.ones who.PL.DAT you

unsere Katze gefüttert hast.
1PL.POSS.ACC cat fed have-2SG

'We are the only ones for whom you fed our cat.'

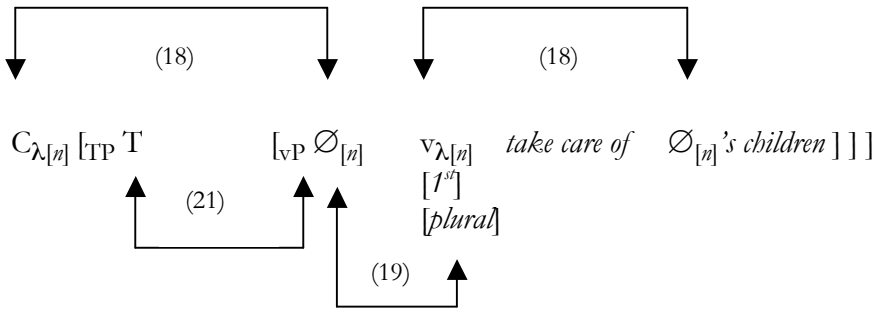
(24) would be a low applicative construction in Pylkkänen's sense. The dative relative pronoun would then be an external argument of an embedded v heading a small clause. (25), on the other hand, is an instance of a "possessor raising" construction where the unavailability of a bound variable interpretation leads to ungrammaticality or severe semantic anomaly. Hole (2005) argues that the dative argument in those constructions is introduced by a separate head located between VP and v in the verbal projection spine, an analysis that is compatible with Pylkkänen's structural assumptions about high applicatives, which she assumes to involve a special applicative head. Binding from v would then not be able to produce the intended bound variable interpretation, only binding from the applicative head would. If that head was

not a pronoun maker, a bound variable interpretation for the possessive *unsere* would be expected to be unavailable in (25) and lead to semantic anomaly.

Which functional heads are pronoun makers? The answer should ultimately come from the kinds of pronominal paradigms we find in natural languages. If applicative heads were pronoun makers, we would expect to find distinctive paradigms of pronouns that are bound by applicative heads, just as we find distinctive paradigms of pronouns that are bound by v or Cs of different kinds. As far as I know, distinctive paradigms of pronouns made by applicative heads do not seem to exist in natural languages.

With a clearer understanding of all participating binding and agreement relations, we can now begin to explain why the possessives in (5) to (10) can only have bound variable interpretations if they have φ-features that are compatible with those of the closest verb. (26) presents a snapshot of the relevant steps in the derivation of the relative clauses in such sentences on our current account[13]. I picked an English example for convenience.

(26) a. We are the only people who take care of our children.



If the possessive in (26a) is to have the intended bound variable interpretation, it must be a Minimal Pronoun bound from the closest v on our account. Since no features can be provided by the Minimal Pronoun it binds, v enters the derivation with all necessary features in place and transmits them to the pronoun. The required features in our example would be [*1st*], [*plural*][14], and a reflexive feature (not shown in (26b)). Being a possessive, the pronoun surfaces as *our* in English. The subject DP in the specifier position of v happens to be a Minimal Pronoun, too, and thus does not have its own ϕ-features. It acquires the ϕ-features of v via Predication. Those features are picked up in turn by T via Agree. The subject DP also picks up a [*wh*] or [*d*] feature from its binder C, which gives it the looks of a relative pronoun, possibly after displacement. The result is an agreement chain linking T to the possessive, and this means that there is agreement between the possessive and verbal subject agreement morphology. Since every link in the agreement chain was obligatory, we can conclude that we should only see bound variable interpretations for the possessives in sentences like (5) to (10) if the possessives agree with the embedded verb. Only if there is such agreement can the possessives be Minimal Pronouns. Because of lack of agreement with the embedded verb, the possessives in (5), (6), and (8) could not be Minimal Pronouns. They must have been born with all of their features in place, hence can only be referential.

The part of the story that is still missing is an account of why feature transmission doesn't always produce an acceptable output. If it did, we would find agreeing alternants for sentences (5) and (6), just as we find the agreeing alternant (9) of (8) for at least some speakers. I will argue in the following section that the relative pronouns in our test sentences also share ϕ-features with the head of their relative clause, and therefore have a '3rd person'

feature in addition to a 1st or 2nd person feature. This produces spellout dilemmas that different languages respond to in different ways. In contrast to German, English has independently attested resolution strategies for such dilemmas, and therefore allows bound variable readings that are absent in German.

3. Coming to terms with variation

I have relied on German, a language with relatively rich verbal inflections, to argue that the availability of bound variable readings for 1st and 2nd person pronouns in our test sentences requires agreement with a local verbal inflectional head. If the account is on the right track, it should carry over to other languages. Interestingly, the situation in English is not as clear as we might expect it to be, as shown by the data in (27).

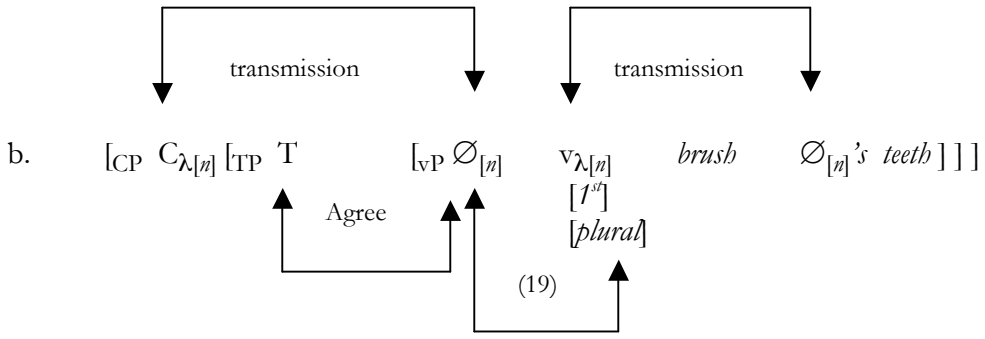
(27)	a.	I am the only one who **has** brushed **my** teeth.	?
	b.	You are the only one who **has** brushed **your** teeth.	?
	c.	We are the only ones who **have** brushed **our** teeth.	√
	d.	You are the only ones who **have** brushed **your** teeth.	√

According to the speakers I consulted[15], bound variable readings are possible in all four cases. All speakers perceived a slight difference between (27a-b) on the one hand, and (27c-d) on the other, though. In (27c-d), bound variable readings were judged to be more readily available than in (27a-b). From the current perspective, the availability of bound variable interpretations in (27a-b) is unexpected. '3rd person' inflection on the embedded verb

shouldn't go together with a 1st or 2nd person bound variable possessive. Bound variable readings for (27a-b) should be impossible in this configuration, which is not the case.

To come to terms with data like those presented in (27), we have to take a second look at the agreement chains in the sentences we have been investigating, this time paying closer attention to the relative pronoun. (28) shows the relevant agreement configuration again:

(28) a. We are the only people who brush our teeth.

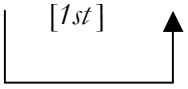


As we saw in the previous section, the possessive *our* in (28a) is a Minimal Pronoun that receives its features from the embedded v on our account. That v enters the derivation with all necessary ϕ-features in place. Via Predication, the subject pronoun that is to become a relative pronoun picks up v's ϕ-features, which are then acquired by T via Agree. The same pronoun is also bound from C, from which it acquires a [*wh*]-feature, a process that seems to eventually trigger displacement into the left periphery for reasons that do not have to concern us here.

Relative pronouns also share ϕ-features with the head of their relative clause. If the head of the relative clause is represented within the relative clause, as advocated in a number

of early and recent analyses (e.g. Lees (1960), Kayne (1994), Bianchi (1999), Zwart (2000), Bhatt (2002), Hulsey and Sauerland (2006)), feature compatibility between a relative pronoun and the head of its relative clause can be established within the relative clause itself. Take Bhatt's proposal for illustration. Following Bhatt (2002), the relative pronoun in (28) might enter the derivation of the relative clause as part of a complex DP like $[_{DP}\ \varnothing_{[n]}\ [_{NP}$ *only people*$]\ ]$. Eventually, this complex DP will become a '3rd person' DP by picking up features from *people*, but this should happen at a later point in the derivation, possibly as late as during morphophonological spellout. The timing of feature transmission to the relative pronoun is of some importance here. Initial uninterpretable ϕ-features on v are an imperfection, hence should be a last resort option that languages try to avoid. But then we expect that DPs should only be merged into the specifier position of an initially perspectival v if they do not yet have ϕ-features of their own. If v could have inherited ϕ-features via Predication, it would not have to be born with ϕ-features to begin with. We correctly expect there to be a crucial difference between (28b) and (20) (repeated from above), then. In (28b) we succeed in merging a (still) underspecified DP into a Predication constellation. In (20), we fail when trying to merge an inherently '3rd person' DP into the same kind of configuration.

(20) * Nina v respects myself.



Given the complete agreement configuration in (28b), we will eventually have to spell out a relative pronoun that has both a '3rd person' and a 1st person feature. That a relative pronoun should ever have a 1st or 2nd person feature comes as a surprise. Is it at all plausible

that what clearly looks like a '3rd person' pronoun might in fact spell out a feature combination that may include a 1st or 2nd person feature? Traditionally, English relative pronouns like *who* and German relative pronouns like *der* are classified as '3rd person' pronouns. If this classification was correct, relative pronouns could not also carry a 1st person or 2nd person feature without suffering a feature clash. However, a long line of researchers[16] has emphasized that there really aren't any '3rd person' features. Technically, this might mean that there is no such thing as a 3rd person feature, and so-called '3rd person' inflections would be inflections that are merely unspecified for person. Alternatively, '3rd person' features might in reality be gender features, not person features. Languages from the Bantu family support the second option. In Kiswahili, for example, the four 1st and 2nd person verbal subject prefixes *ni* (1.SG), *u* (2.SG), *tu* (1.PL), and *m*(*u*) (2.PL) contrast with a much larger group of '3rd person' prefixes that differentially mark gender agreement with the full range of 10 or more noun classes. '3rd person' DPs should then be able to carry 1st or 2nd person features in addition to the gender features that mark them as '3rd person'. Vocabulary insertion for English or German relative pronouns, for example, should be unaffected by the presence of such additional features. According to the Elsewhere Condition of Kiparsky (1973) or the Subset Principle of Halle (1997), a vocabulary item can be inserted into a position if the item matches at least a subset of the features present in that position and there is no other vocabulary item that is a better match. Suppose the vocabulary insertion rules for English and German relative pronouns are as in (30):

(30) Vocabulary insertion rules for English relative pronouns

Relative pronouns have a *wh*-feature and are specified for number and gender.

[*thing*] → *which*

elsewhere → *who*

Vocabulary insertion rules for German relative pronouns

Relative pronouns have a *d*-feature and are specified for number and gender.

[*male*] [*singular*] → *der*

[*female*] [*singular*] → *die*

[*thing*] [*singular*] → *das*

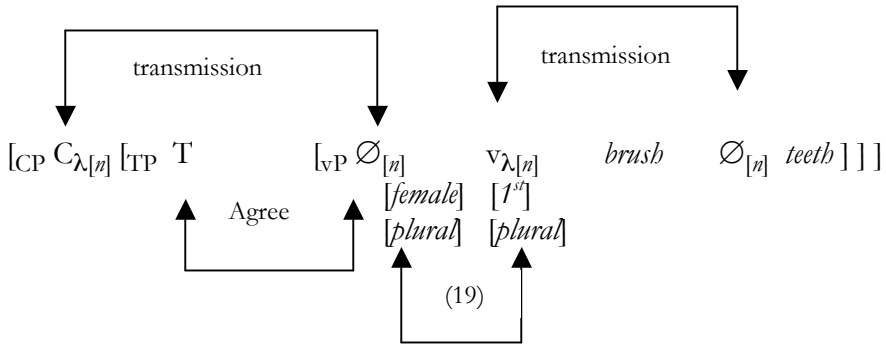
elsewhere → *die*

Assuming the Subset Principle, English *who* or German *der* could spell out a complex feature bundle like {[*male*], [*1st*], [*singular*]}, for example. The vocabulary insertion rules for German and English are thus compatible with the assumption that relative pronouns might have 1st or 2nd person features in addition to their obligatory gender feature[17].

If relative pronouns have obligatory gender features in English or German, we have to update our earlier diagram about feature transmission in configurations like (26) or (28). In addition to a person and a number feature, there should now also be a gender feature in the agreement chain whose ultimate source is the internally represented head of the relative clause. Skipping over the details of how feature compatibility between a relative pronoun and the

head of its relative clause is established, we have agreement chains like that in (31) instead of that in (28), for example.

(31) a. We are the only people who (only people) brush our teeth.

b. 

If all agreement relations shown in (31b) involve unification, the ϕ-feature sets for the relative pronoun, T and the possessive must end up being the same, namely {[*1st*], [*female*], [*plural*]}. But that means that for a structure like (31b) to survive morphophonological spellout, the possessive pronoun, the relative pronoun and verbal subject agreement morphology must all find exponents that can spell out feature bundles that contain *both* a 1st or 2nd person feature *and* a gender feature. Given (30), we do not expect any problems for spelling out the relative pronoun in such a configuration. There is potential trouble, however, when it comes to spelling out singular verbal subject agreement morphology or singular possessive pronouns. In those cases, the simultaneous presence of both a 1st or 2nd person feature and a gender feature creates unresolvable spellout dilemmas in German, but not necessarily in English. This, I will suggest below, ultimately explains the differences between the two languages with respect to data like those illustrated in (27).

If '3rd person' features are gender features, '3rd person' verbal agreement is gender agreement. The insertion of '3rd person' verbal inflection might now require the presence of a gender feature, and would then not merely be a default form that appears in the absence of a person feature. In contrast to Bantu, German doesn't mark any gender distinctions in the plural, though. The vocabulary insertion rules for present tense inflections of German regular verbs should then be as in (32).

(32) Vocabulary insertion rules for German present tense verbal inflections

[*1st*] [*singular*]	→	*-e*
[*2nd*] [*singular*]	→	*-st*
{[*male*], [*female*], [*thing*]} [*singular*]	→	*-t*
[*2nd*] [*plural*]	→	*-t*
elsewhere	→	*-en*

(32) can be seen as an impoverished version of the Kiswahili subject marker paradigm: the exponents for '3rd person' singular inflection depend on gender features, and there are no gender distinctions for 1st or 2nd person. In (32), none of the rules providing exponents for singular verbal inflection is less specified than any of the others. That is, there are no proper subset relations between the sets of features mentioned in those rules: {[*1st*], [*singular*]}, {[*2nd*], [*singular*]}, {[*male*], [*singular*]}, {[*female*], [*singular*]}, and {[*thing*], [*singular*]}. As a consequence,

the three exponents *-e*, *-st*, and *-t* are potential competitors for lexical insertion, and we expect spellout dilemmas if the set of features that are present with T includes [*singular*] and both a 1st or 2nd person and a gender feature. No spellout dilemma is expected when [*plural*] combines with both a 1st or 2nd person feature and a gender feature. (33) illustrates which combinations with a person feature can or cannot be spelled out according to (32), taking [*female*] as the representative of gender features.

(33)

a.	[*1st*] [*singular*] [*female*]	*
b.	[*2nd*] [*singular*] [*female*]	*
c.	[*1st*] [*plural*] [*female*]	*-en*
d.	[*2nd*] [*plural*] [*female*]	*-t*

Similar spellout dilemmas are expected for possessive pronouns that spell out feature bundles that contain both a 1st or 2nd person feature and a gender feature. The vocabulary insertion rules are given in (34).

(34) Vocabulary insertion rules for German possessive pronouns

Pronouns must be specified for person or gender, and for number.

[*1st*] [*singular*]	→	*mein*
[*2nd*] [*singular*]	→	*dein*
[*female*] [*singular*]	→	*ihr*
{ [*male*] / [*thing*] } [*singular*]	→	*sein*

[*1st*]	→	*unser*
[*2nd*]	→	*euer*
elsewhere	→	*ihr*

(35) illustrates which combinations of a gender feature and a 1st or 2nd person feature can or cannot be spelled out according to (34), again taking [*female*] as the representative for gender features.

(35)	a.	[*1st*] [*singular*] [*female*]	*
	b.	[*2nd*] [*singular*] [*female*]	*
	c.	[*1st*] [*plural*] [*female*]	*unser*
	d.	[*2nd*] [*plural*] [*female*]	*euer*

For each of the feature combinations in (33a-b) and (35a-b) there are two competing exponents in the corresponding block of vocabulary insertion rules. German doesn't seem to allow resolution of the resulting spellout dilemmas, and as a consequence, (36a-b) wind up as ungrammatical. Because of the lack of competitors, no spell-out dilemmas are expected to arise for feature combinations that include a 1st or 2nd person feature and [*plural*]. This explains the grammaticality of (37a-b) (sentences (7) and (9) from above).

(36) a. 1st person singular (agreeing embedded verb) √

* Ich bin die einzige, die
I be.1SG the.FEM.SG only.one who.FEM.SG.NOM

meinen Sohn versorg-**e**.
1SG.POSS.ACC son take.care.of-**1SG**

* 'I am the only one who take care of my son.'

b. 2nd person singular (agreeing embedded verb) √

* Du bist die einzige, die
You.SG be.2SG the.FEM.SG only.one who.FEM.SG**.**NOM

deinen Sohn versorg-**st**.
2SG.POSS.ACC son take.care.of-**2SG**

* 'You are the only one who take care of your son.'

(37) a. 1st person plural (agreeing embedded verb) √

Wir sind die einzigen, die t **unseren** Sohn
1PL be.1/3PL the.PL only.ones who.PL **1PL**.POSS.ACC son

versorg**en**.
take.care.of-**1/3PL**

'We are the only ones who take care of our son.'

b. 2nd person plural (agreeing embedded verb) √

Ihr **seid** die einzigen, die t **Euren** Sohn
2PL are.**2PL** the.PL only.ones who.PL **2PL**.POSS.ACC son

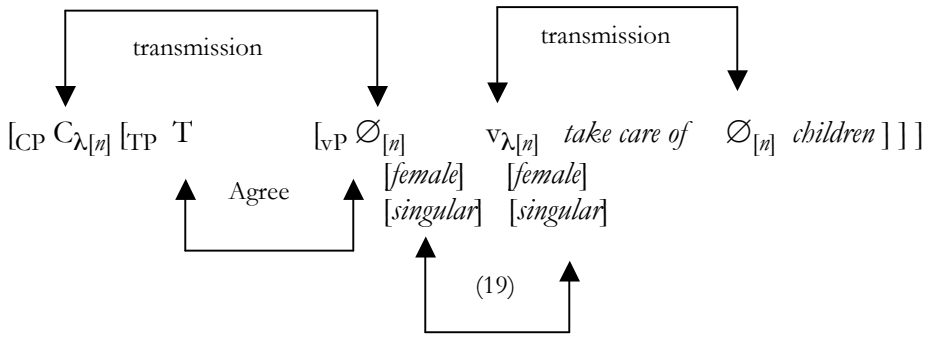
versorg-**t**.
take.care.of.**2PL**

'You are the only ones who take care of your son.'

The only grammatical way to produce the bound variable interpretations intended for (36a-b) is by starting out with a v in the relative clause that is only marked for number and gender. This feature combination yields '3rd person' possessives and '3rd person' verbal agreement, as illustrated for an English example with feminine gender in (38a-b). The same strategy is available in German, as shown in (39a-b).

(38) a. I am the only one who takes care of her children.

b.



(39) a. 1st person singular ✓

Ich bin die einzige, die
I be.1SG the.FEM.SG only.one who.FEM.SG.NOM

ihren Sohn versorg-**t**.
FEM.SG.POSS.ACC son take.care.of-**3SG**

'I am the only one who takes care of her son.'

b. 2nd person singular ✓

Du bist die einzige, die
You.SG be.2SG the.FEM.SG only.one who.FEM.SG

ihren Sohn versorg-**t**.
FEM.SG.POSS.ACC son take.care.of-**3SG**

'You are the only one who takes care of her son.'

We are now ready to return to the English examples (27a-b). Suppose English is like German, in that '3rd person' singular agreement is gender agreement. The main difference between German and English gender marking could then be that in English, most common nouns are neuter. The vocabulary insertion rules for English present tense inflections for regular verbs and the auxiliaries *have* and *be* would then be (40).

(40) a. {[*male*], [*female*], [*thing*]} [*singular*] → *-s*

elsewhere → ∅

b. {[*male*], [*female*], [*thing*]} [*singular*] → *has*

elsewhere → *have*

c. [*1st*] [*singular*] → *am*

{[*male*], [*female*], [*thing*]} [*singular*] → *is*

elsewhere → *are*

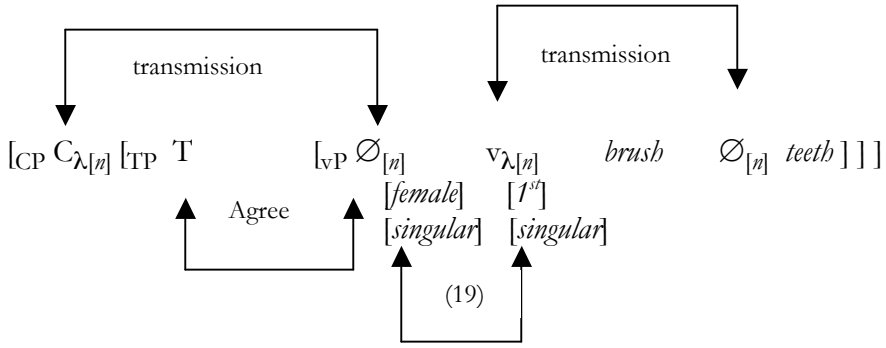
Consider now a situation where a T in English has both a gender and a 1st or 2nd person feature in addition to [*singular*]. Given (40), we do not expect any spellout dilemma, unless the verb is *be* . We do in fact expect to see '3rd person' verbal inflection in this case, since the vocabulary insertion rules in (40a-b) only target gender features. This means that with one exception, '3rd person' singular agreement for present tense verbs is entirely compatible with a 1st or 2nd person subject in English, as long as that subject *also* has a gender feature. In contrast to German, then, the presence of a 1st or 2nd person feature with a singular present tense T does not normally produce a spellout dilemma for verbal inflection in English. The exception is *be*. For *be*, we predict a spellout dilemma for the 1st person singular. As a consequence, no bound variable interpretation should be available for the possessive in (41), an expectation that is not completely borne out. Many speakers do get a bound variable interpretation for *my* in (41), even though for some, a bound variable reading is clearly more marginal than for (27a).

(41) I am the only one who **is** brushing **my** teeth. ? ?

The fact that the '3rd person' form *is* appears in (41) does not necessarily mean that no 1st person feature is present with the embedded T. It could also mean that both a gender and a 1st person feature are present in this position, but in contrast to German, English has a resolution of the potential spellout problem that favors *is* over *am*. On such a scenario, the agreement chain in the relative clause of (41) would be the familiar (42):

(42) a. I am the only one who is brushing my teeth.

b.



If features can be transferred via unification, we must be prepared for the possibility that feature combinations may be produced that lead to spellout conflicts. The question is then whether the resulting feature combination has no pronunciation at all, as in the German cases we looked at in section 2, or whether the spellout dilemma can be resolved[18]. Any theory that is concerned with the morphophonological spellout of syntactic features has to confront the familiar fact that not all features are treated the same by the spellout component. Some features are marked with respect to others. Within a framework like Distributed Morphology, markedness is expected to provide language-specific preferences for the resolution of spellout dilemmas: everything else being equal, marked features should lose out to unmarked ones in the competition for vocabulary insertion. Otherwise, marked features should behave like any other features.

Inspecting English verbal paradigms (see (40) above), we find that the vocabulary insertion rule for *am* is the only case where a (1st or 2nd) person feature is ever targeted. The paradigms of all other verbs only target gender ('3rd person') features. This suggests that verbal person features are marked in English:

(43) Verbal person features are marked in English.

If marked features lose out when competing with unmarked features in agreement conflicts, the fact that *am* loses to *is* in (41) follows. Working within an optimality theoretic framework Bresnan, Deo, and Sharma (2006) document the high ranking of an analogous person markedness constraint in many English dialects. They also show the need for keying markedness constraints to particular syntactic categories like nouns versus verbs. In contrast to English, all regular present tense verbal paradigms in German distinguish 1st, 2nd, and '3rd person' singular forms. There is thus no basis for assuming that verbal person features are marked in German.

Unfortunately, resolving the potential spellout dilemma for *be* does not yet remove all problems for spelling out a configuration like that in (41) or (27a-b). A spellout dilemma is also expected to come up with the possessive pronoun. Possessive pronouns are finely differentiated in English, as shown in (44).

(44) Vocabulary insertion rules for English possessive pronouns (but see section 5 for revisions)

Pronouns must be specified for person or gender, and number.

[*1st*] [*singular*] → *my*

[*female*] [*singular*] → *her*

[*male*] [*singular*] → *his*

[*thing*] [*singular*]	→	*its*
[*2nd*]	→	*your*
[*1st*]	→	*our*
elsewhere	→	*their*

Given (44), we should run into a spellout dilemma every time a singular possessive has both a 1st or 2nd person feature and a gender feature, since neither {[*1st*] [*singular*]} nor {[*2nd*]} is a subset of {[*male*] [*singular*]}, {[*female*] [*singular*]}, {[*thing*] [*singular*]}, or the other way round. There should then still be no bound variable interpretation for the possessive in (41), nor should there be any such interpretations for the possessives in (27a-b). This is wrong. The interpretations are available, albeit slightly marginal for some speakers. We have to explain, then, why a possessive pronoun with the features {[*1st*], [*singular*], [*female*]} can surface as *my* in English, even though it is in systematic competition with *her*, according to (44).

Interestingly, a 'person wins over gender' preference can also be observed when pronouns are anaphoric to conjoined DPs. In (45) and (46), for example, a conflict between a gender feature provided by one of the conjuncts and a 1st or 2nd person feature provided by the other needs to be resolved.

(45) a. The teacher and I have done **our** best to fix the problem.

b. * The teacher and I have done **their** best to fix the problem.

(46) a. The teacher and you have done **your** best to fix the problem.

b. * The teacher and you have done **their** best to fix the problem.

English doesn't tolerate a gender ('3rd person') resolution in those cases, and only accepts person resolutions. The situation in German is much less transparent, there seem to be different preferences for different verbs, and there is a fair amount of speaker uncertainty and variability as well. In my judgment, verbs typically accept a gender resolution and may slightly disfavor a person resolution in certain cases, in particular the 2nd person[19]. (47) and (48) represent my judgments for the inherently reflexive verb *sich freuen* ('be pleased').

(47) a. Mein Team und ich haben **uns** gefreut.
My team and I have.**1/3PL REFL.1PL** pleased
'My team and I were pleased.'

b. Mein Team und ich haben **sich** gefreut.
My team and I have.**1/3PL REFL.3** pleased
'My team and I were pleased.'

(48) a. ? Dein Team und du habt **Euch** gefreut.
Your team and you have.**2PL REFL.2PL** pleased
'Your team and you were pleased.'

b. Dein Team und du haben **sich** gefreut.
Your team and you have.**1/3PL REFL.3PL** pleased
'Your team and you were pleased.'

The fact that, in contrast to German, a 'person wins over gender' strategy is obligatorily used for agreement conflict resolutions with conjoined DPs in English suggests that nominal gender features in English are generally dropped in agreement conflicts, hence are marked:

(49) Nominal gender features are marked in English.

When (49) is relied on in the process of spelling out the possessives in (41) or (27a-b), the person-gender conflict can be removed, and the result is *my* or *your*. (49) might also be responsible for the fact that, under conditions that seem to be largely pragmatic in nature, English can avoid gender marking by using '3rd person' plural forms, as illustrated in (50).

(50) a. A friend of mine forgot their lunchbox.

b. Nobody has lost their job yet.

Assuming vocabulary insertion rules along the lines of (44), disregarding gender features yields the default form *they* instead of *he* or *she* when applied to {[*male*], [*singular*]} and {[*female*], [*singular*]} respectively. In German, it is not possible to neutralize gender features to avoid mentioning the gender of people talked about. Nominal gender neutralization is a specific property of English, then, and an otherwise attested and salient morphophonological spellout difference between English and German.

To summarize this section, we have seen that in English, but not in German, bound variable interpretations are available for sentences like (27a-b) (repeated below). I have presented a morphophonological spellout account of those differences that links them to language-specific markedness differences for person and gender features.

(27) a. I am the only one who **has** brushed **my** teeth. ?

b. You are the only one who **has** brushed **your** teeth. ?

c. We are the only ones who **have** brushed **our** teeth. √

d. You are the only ones who **have** brushed **your** teeth. √

On the proposed account, bound variable interpretations for the possessives in the English sentences (27a-d) involve feature transmission from the embedded v, exactly as in German. If feature transmission could not have produced the pronoun we see, the pronoun must have been born with all of its features in place and must be referential. Since morphophonological spellout decides whether the result of feature transmission can surface or not, we expect variation in the availability of bound variable readings for fake indexicals across languages and dialects, within a language or dialect, and for different speakers of the same language or dialect. Because of the presence of relative pronouns, the transmitted feature sets in the examples we looked at include both a gender and a 1st or 2nd person feature. In German, such feature sets lead to unresolvable spellout dilemmas for the 1st or 2nd person singular. In English, parallel spellout dilemmas do not generally come up with verbs, but they are a problem for the possessives in (27a-b). Unlike German, English can resolve the dilemma by relying on the markedness of nominal gender features. Conflict resolution comes at a price, though, and this seems to be the reason why speakers consider the bound variable interpretations of (27a-b) slightly marginal. As mentioned earlier, a bound variable interpretation is even more marginal in (41) for some speakers. For a bound variable interpretation to be possible in (41), two spellout dilemmas have to be resolved on our account, rather than just one, as in (27a-b). Because of a quirk in the paradigm of *be*, spelling out the copula has to invoke conflict resolution, too.

Fake indexicals illustrate in a perfect way how universal principles might interact with language and dialect particular idiosyncrasies to create data that look hopelessly chaotic. I have argued that even in the English versions of our test sentences, bound variable interpretations for 1st and 2nd person pronouns involve feature transmission from the verbal functional head that carries their binder. Whether pronouns so constructed can be spelled out in the end, and if so, how they surface, depends on the available vocabulary items and language-specific strategies for resolving morphophonological spellout dilemmas.

4. Local and long-distance fake indexicals

The fake indexicals that we have been investigating were all locally bound by the closest v, hence were technically reflexives. The major conclusion of the two previous sections was that binding comes with unification of feature sets and this mechanism may produce feature sets for pronouns that cannot always be spelled out. In those cases, a given 1st or 2nd person pronoun can only be interpreted as referential, that is, as a pronoun that is born with all of its features. Interestingly, the spell-out induced constraints for locally bound fake indexicals that we identified do not carry over to long-distance fake indexicals. There is a very solid contrast between (51) and the sentences in (52):

(51) Du bist der einzige, der **deinen** Aufsatz versteht. *
You.SG be.2SG the.MASC.SG only.one who.MASC.SG your.SG paper grasps.

'You are the only one who understands your paper.'

(52) a. Du bist der einzige, der glaubt, √
You.SG be.2SG the.MASC.SG only.one who.MASC.SG believes

dass jemand **Deinen** Aufsatz versteht.
that somebody your.SG paper grasps

'You are the only one who thinks that somebody understands your paper.'

b. Du bist der einzige, der jemand √
You.SG be.2SG the.MASC.SG only.one who.MASC.SG somebody

kennt, der **Deinen** Aufsatz versteht.
knows who your.SG paper grasps

'You are the only one who knows somebody who understands your paper.'

For (51), a bound variable interpretation for the 2nd person possessive *deine* is impossible, and this is not surprising, given the story I have been telling. But why is a bound variable reading for *deine* easily available in (52a-b)? If those two possessives were Minimal Pronouns, they would have to be bound long-distance from a 2nd person perspectival v in the (higher) relative clause. But the presence of such a v should create all of the familiar spellout dilemmas, affecting both verbal agreement morphology in its own clause and the spellout of the bound possessive further down. No spellout dilemmas are observed, however. I conclude that the two possessives are not Minimal Pronouns and that their shifted interpretation must have another source.

That local and long distance anaphora behave differently does not come as a surprise. Reinhart and Reuland (1991) refer to the discovery that a distinction is needed between long-distance logophoric processes and local structural binding relations as a "major breakthrough" (Reinhart and Reuland (1991), 283). Pollard and Sag (1992) independently arrived at the same

conclusion around the same time. Long-distance fake indexicals do not have to be produced by a standard binding mechanism, but could be the result of context shifting. Schlenker (1999, 2003), Anand and Nevins (2004), and Anand (2006) have made a strong case that context shifting exists and must be reckoned with in one way or other. Anand (2006) has shown moreover that both the Minimal Pronoun strategy and the context shifting strategy are used by natural languages to produce *de se* interpretations for pronouns. A particularly promising implementation of the context shifting strategy has been proposed by Seth Cable. Cable (2005) takes context shifting to be a species of λ-abstraction. Alongside run-of-the-mill λ-abstraction, we also have indexical abstraction. Regular abstraction operators manipulate the values of numerical indices by shifting variable assignments. Indexical abstraction operators manipulate the values of 1st and 2nd person pronouns by shifting the context parameter c.[20]

(53) a. Regular λ-abstraction

$[[\lambda[n]\ \alpha]]^{g,c} = \lambda x\ [[\alpha]]^{g',c}$, where g' is like g, except possibly that $g'([n]) = x$.

b. Indexical λ-abstraction

$[[\lambda[1st]\ \alpha]]^{g,c} = \lambda x\ [[\alpha]]^{g,c'}$, where c' is like c, except possibly that speaker(c') = x.

$[[\lambda[2nd]\ \alpha]]^{g,c} = \lambda x\ [[\alpha]]^{g,c'}$, where c' is like c, except possibly that addressee(c') = x.

(54) a. $[[\ [n]\ ]]^{g,c} = g([n])$.

b. $[[\ [1st]\ ]]^{g,c}$ = speaker(c).

c. $[\![\ [\textit{2nd}]\ ]\!]^{g,c}$ = addressee(c).

Regular λ-operators bind numerical features, indexical λ-operators bind 1st and 2nd person features. Numerical features are standard variables and receive their values from the variable assignment g. 1st and 2nd person features are interpreted via the context index c and denote the speaker or addressee of c[21]. Neglecting the possible presence of number features like [*singular*], whose status will be clarified in sections 5 and 6, 1st and 2nd person features are already pronouns. This property gives features bound by context shifters a leg up for morphophonological spellout. Unlike numerical features, indexical features don't have to rely on feature transmission to acquire shapes. They are pronounceable pronouns from birth, and that's what makes it so easy for them to become long-distance anaphora.

The context shifters in (53b) are powerful. Too powerful, in fact. What prevents those operators from appearing in sentences like (51), or in any one of our test sentences where bound variable interpretations for 1st or 2nd person pronouns were not available? Why are there still constraints for fake indexicals? If there are context shifters in natural languages, they need to come with instructions telling us where to put them. Here is a proposal: If context shifters are λ-operators, we expect them to be features on verbal functional heads like any other λ-operators. Let's tentatively assume that they are always λ-operators on v, hence create perspectival v's. Rather than numerical features, they would have to be 1st or 2nd person features, though. If context shifters are person features carried by v, they are interpretable in this position, and it should therefore not be an imperfection for a v to be born

with such features. This raises the question of how (55b) is excluded as a possible interpretation of (55a), however.

(55) a. **Nina** met somebody who speaks **your** language.

b. Nina met somebody who speaks her (that is, Nina's own) language.

Reading (55b) for (55a) would have to be produced by introducing a 2nd person context shifter with the matrix v. Via Predication, the subject would inherit a 2nd person feature, and would end up with both a 2nd person and an inherent gender feature. Because of the Subset Principle, the presence of an additional person feature should not be an impediment for vocabulary insertion. To avoid this unwelcome consequence we need a tighter constraint for merging DPs into Predication configurations. It seems that a DP with inherent ϕ-features can only be merged into a Predication configuration with a head that has itself inherent ϕ-features if the two feature sets are an exact match. Reading (55b) for (55a) can be constructively excluded, then. The inherently '3rd person' DP *Nina* could never be merged into the specifier position of a v with a 2nd person context shifter. As expected, the situation is different for (56), which readily admits a shifted interpretation for *your*.

(56) **Only you** met somebody who speaks **your** language.

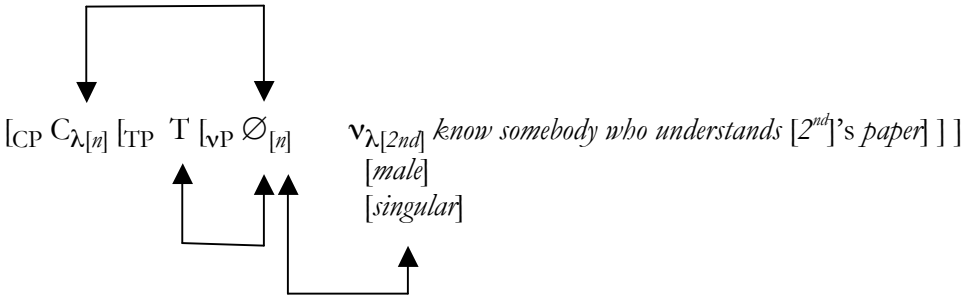
If context shifters are person features they must be marked features, even in German. Otherwise we would run into our by now familiar spellout dilemma with sentences (52a) and

(b). (57b) shows the source of the potential spellout dilemma for (52b) (= (57a)), using English vocabulary items for convenience.

(57) a. Du bist der einzige, der jemand √
You.SG be.2SG the.MASC.SG only.one who.MASC.SG somebody

kennt, der **Deinen** Aufsatz versteht.
knows who your.SG paper grasps

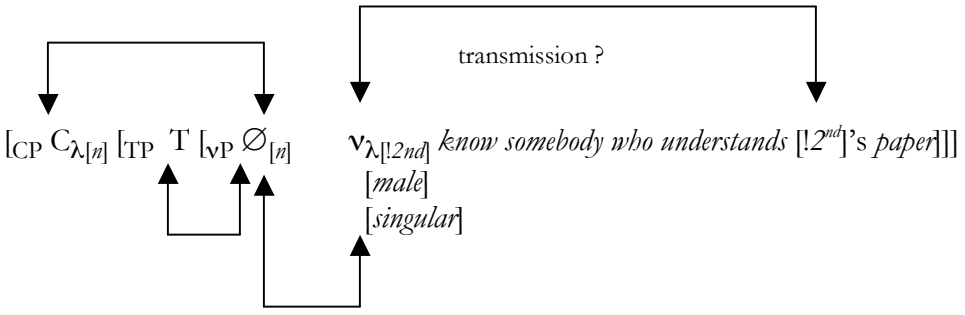
'You are the only one who knows somebody who understands your paper.'

b. 

To get the intended shifted interpretation for the possessive in (57a), a 2nd person context shifter has to be introduced by the v in the higher relative clause. If that v carries a 2nd person context shifter, hence a 2nd person feature, the resulting agreement chain includes both [*male*] and [*2nd*], hence would normally lead to a spellout dilemma in German. If context shifting person features are generally marked, however, the spellout conflict can be resolved even in German, and the '3rd person' form wins. Technically, person features that originate as context shifters and are passed on via unification have to remain recognizable as marked features. This requirement may be implemented by flagging person features that originate as context shifters on verbal inflectional heads. It is then the flagged version of the feature that

gets inherited via unification. A more elegant account would make it possible for the binder feature in the original position to be literally shared with other positions. This form of feature sharing is the standard way of representing agreement in HPSG (Pollard and Sag (1994)) and other feature-based grammars (Blevins (forthcoming); also Pesetsky and Torrego (2007)). While the markedness of person features that 'descend' from context shifters is crucial for avoiding spellout dilemmas in configurations like (57b), there is now also the danger that it might rob us of an account of German long distance fake indexicals in the end. The danger comes with the last link in the completed agreement chain for (57a), which is displayed in (58).

(58)



In (58), the v in the higher relative clause comes with a flagged 2nd person feature (represented as [!*2nd*]) that seems to be obligatorily transmitted to the distant possessive via Feature Transmission under Binding. But the higher relative pronoun also contributes a '3rd person' feature to the agreement chain, as it has all along. Since the 2nd person feature in the chain is flagged, we do not run into a spellout dilemma. But because of the markedness of the flagged person feature, the sentence we derive is not the targeted (57a), but (59):

(59) Du bist der einzige, der jemand √
You.SG be.2SG the.MASC.SG only.one who.MASC.SG somebody

kennt, der **seinen** Aufsatz versteht.
knows who his.SG paper grasps

'You are the only one who knows somebody who understands his paper.'

This leaves us without an account for German long distance fake indexicals, and we therefore have to reconsider some of our assumptions. It seems that our account so far has overlooked the possibility that, just like Agree and Predication, feature transmission from binder to bindee might have to be local, with just a narrow window of operation. If Feature Transmission under Binding is local, it can no longer affect the embedded possessive pronoun in (58), even though the pronoun is bound by a far away binder, hence has a shifted interpretation. No spellout conflict arises, and the pronoun is expected to surface as the 2nd person pronoun we see. Feature Transmission under Binding should then be stated as in (60).

(60) Feature Transmission under Binding (revised)

The ϕ-feature set of a *locally* bound pronoun unifies with the ϕ-feature set of the head that hosts its binder.

There are several ways to flesh out the notion 'locally bound' in (60) that are compatible with the current approach. One possibility comes from Relativized Minimality (Rizzi (1990a)). A pronoun that is bound by v is locally bound iff it is bound by the closest v; a pronoun that is bound by C is locally bound iff it is bound by the closest C, and so on. The embedded *you* in (58b) is not locally bound, then, and Feature Transmission under Binding does not apply. If

the window for feature transmission and morphophonological spellout is defined by phases in the sense of Chomsky (2001), locality is an automatic consequence of the way the derivation proceeds, and locality for Feature Transmission under Binding or Agree does not have to be stipulated separately. With small windows of operation, feature transmission can only *see* local binding relations. Anything beyond the current window is beyond its reach. The system couldn't check whether or not a pronoun is bound by a distant binder, for example. If feature transmission is local, it follows that any bound pronoun that depends on it to acquire a shape must be locally bound. Local anaphors now emerge as a distinctive class of pronouns whose relationship with a binder is close enough to fall within the narrow window of morphophonological spellout. If Minimal Pronouns depend on feature transmission, they must all have local binders. Technically, they are local anaphors, then.

What are the possibilities for pronouns that are bound long-distance on the current account? English or German long distance fake indexicals are expected to be produced by context shifters. They are run-of-the-mill 1st or 2nd person pronouns that are indistinguishable from referential pronouns and receive their shifted interpretations without any syntactic involvement. Theoretically, a pronoun could still be bound long-distance by a regular, rather than a context-shifting, λ-operator, if it didn't have to inherit features but had an invariant shape that could be picked out in a local configuration by the morphophonological spellout component. For '3rd person' pronouns, there is also the D-type/E-type strategy (Berman (1987), Heim (1990), Elbourne (2001, 2002, 2005)), which creates the illusion of '3rd person' bound pronouns without true binding. D-type/E-type pronouns are just definite descriptions. Unfortunately, most existing work on the properties of

bound variable pronouns relies on '3rd person' pronouns without controlling for the possibility that the alleged bound variable pronouns might be D-type/E-type pronouns, hence not truly bound. This has led to erroneous assessments of the properties of bound variable pronouns. The exploration of the full range of devices that are used in natural languages to give shapes to real and apparent long-distance anaphora cannot be addressed here, and has to be left for another occasion.

Given the way we implemented Cable's context shifting strategy, it can never be used to derive the missing bound variable interpretations for German fake indexicals in sentences like (61), which is one of the test sentences from section 2.

(61) Ich bin die einzige, die **meinen** Sohn versorgt. *
I am the only.one who. **my** son takes.care.of

'I am the only one who takes care of my son.'

If we tried to derive the intended, but in fact absent, bound variable interpretation for the possessive in (61) via context shifting, the embedded v would have to be born with a flagged 1st person feature that is interpreted as a context shifter. Because the feature is flagged, and hence marked, we will not run into a spellout dilemma, but the sentence we construct is not (61), but the German counterpart of (62). In contrast to (58), the possessive is locally bound in this case, and Feature Transmission under Binding applies.

(62) I am the only one who takes care of her son.

That the bound variable interpretation of a '3rd person' pronoun in sentences like (62) can be derived via a 1st person context shifter is an interesting result all by itself. It suggests that it should in principle be possible to generate bound variable interpretations of '3rd person' pronouns with the help of context shifting person features, which, due to their marked status, have been 'neutralized' during spellout. This strategy can be seen at work in (63). Under certain conditions, in particular if the '3rd person' pronoun is a reflexive, the effects of neutralization of context shifting person features become visible in German:

(63) Du bist der einzige, der **sich** einen Anzug gekauft hat,
you are the only.one who **REFL.3** a suit bought has

der **dir** nicht gefällt. √
which **you.DAT** not pleases

'You are the only one who bought himself a suit that you don't like.'

a. Nobody else bought himself a suit that he doesn't like.

b. Nobody else bought himself a suit that you don't like.

In (63) the embedded 2nd person pronoun *dir* can have a shifted interpretation, as paraphrased in (a), even though the pronoun follows a 3rd person pronoun with a co-varying interpretation. This is an indication that the '3rd person' reflexive pronoun is bound by a 2nd person context shifter on its local v and that it surfaces as a '3rd person' pronoun because of person feature neutralization. For reasons that are by now familiar, neutralization is obligatory in this configuration in German. Reading (b) could not have been produced with a context shifter, which would not be compatible with a 2nd person referential pronoun in its scope. On

that interpretation, the reflexive *himself* must have been made by a 3rd person v. A 2nd person non-context-shifting v would have produced a spell-out dilemma.

That we need both a binding and a context shifting strategy for fake indexicals is shown by (64).

(64) Only you recommend your books to your librarian.

(a) Nobody else recommends their own books to their own librarian.

(b) Nobody else recommends your books to your librarian.

(c) Nobody else recommends their own books to your librarian.

(d) Nobody else recommends your books to their own librarian.

(64) has all four of the readings paraphrased in (a-d). The mixed readings (c-d) are perhaps a little harder to get, but are brought out clearly by (65) and (66).

(65) (Your librarian doesn't like self-recommendations.) None of your colleagues recommend their books to your librarian. Only you do (recommend your own books to your librarian).

(66) (Your books are really awful). No linguists I know recommend your books to their librarian. Only you do (recommend your books to your own librarian).

The mixed readings illustrated in (64b-c), (65) and (66) could not have been produced with the context shifting strategy. Interestingly, our account predicts that such mixed readings should not be available for long-distance fake indexicals. (67) confirms this prediction according to my judgment, but many more environments have to be scrutinized carefully to reach firm conclusions about the behavior of long-distance fake indexicals.

(67) Only you know somebody who recommends your books to your librarian.

(a) Nobody else knows somebody who recommends their own books to their own librarian.

(b) Nobody else knows somebody who recommends your books to your librarian.

The admittedly very limited array of data we have seen so far bode well for Cable's proposal that context shifting is a variety of λ-abstraction. The main difference between context shifters and regular λ-operators is in the kind of things they bind. Regular λ-operators bind numerical features, which have no shapes of their own. Context shifters bind features that are already 1st or 2nd person pronouns, hence do not need to acquire shapes. This allows shifted indexicals to be far away from their binders. However, their shapes, too, can be affected when they are in the local domain of their binders, as shown by (63) above.

The theoretically most important conclusion from this section is that like other agreement mechanisms, Feature Transmission under Binding has a narrow window of operation and can only see local binding relations. On the account developed in this paper, this is the ultimate source for the distinction between local and long-distance anaphora. We do

no longer have to assume that there are syntactic conditions on binding domains. Binding itself can be local or span great distances. Local anaphora emerge because feature transmission and spellout mechanisms can only *see* local binding relations. Only in local configurations can feature transmission make pronouns which, by the very way they look, bear the signature of their binders. Long-distance anaphora face potential spell-out problems since they can't use feature transmission to inherit a shape from their binder. Context shifting solves the problem for long-distance fake indexicals. '3rd person' long-distance anaphora may have to show up with an invariant shape, or else use the D-type/E-type strategy.

5. The typology of referential pronouns

The major piece that is still missing in our story is an answer to the most pressing question of the Minimal Pronoun approach: where in the grammar is the police that tells a pronoun which features it can or cannot have at the beginning of a syntactic derivation? Kratzer (1998) assumed that Minimal Pronouns are born as mere numerical features, but this assumption was shown wrong by Rullmann (2004). If Minimal Pronouns can be born with some of the features they surface with, what are those features? We want a principled answer to this question that could also be relied on by a language learning child. I will meet Rullmann's challenge in two steps. This section will present a novel semantics for pronominal features that generates a most differentiated paradigm of possible referential pronouns that is not only typologically plausible, but would also allow a child to learn a particular paradigm via elimination of distinctions. In section 6, I will then show that the same semantics of pronominal features that generates the set of possible referential pronouns also determines the set of initial bound variable pronouns. What is a possible initial pronoun is entirely determined

by the semantics, then. In contrast to virtually every current semantic theory of pronouns, referential and regular (as opposed to shifted) bound variable pronouns differ semantically on the current account. The reason why they nevertheless tend to look the same is attributed to obligatory feature transmission, hence to a universally available mechanism of morphophonological spellout.

In the formal semantics tradition, referential pronouns are typically represented as free variables. Meaningful features are taken to introduce presuppositions constraining the values of those variables[22] and thus denote partial identity functions, as illustrated in (68).

(68) a. $[\![[\textit{female}]]\!]^{g,c} = \lambda x$: x is female. x

b. $[\![[\textit{1st}]]\!]^{g,c} = \lambda x$: x includes the speaker in c. x

68(a) says that the feature [*female*] denotes a partial identity function from the set of individuals that is only defined for individuals that are females. According to 68(b), [*1st*] denotes a partial identity function that is only defined for singularities or pluralities that include the speaker in the context c. There are reasons to be skeptical about presuppositional denotations for all pronominal features. If all pronominal features denoted partial identity functions, features could never directly interact with each other, and we would not expect the semantics of features to impose any significant constraints on feature combinations apart from ruling out cases involving incompatibility, redundancy, and some such. The feature combinations that yield pronouns that are possible in natural languages are more constrained than that, however. There seems to be a highly restrictive 'combinatorics' for feature interactions that generate the

space of possible pronoun paradigms in natural languages (Adger (2006), Harbour (2005, 2006), Harley and Ritter (2002)). On the account proposed here, pronouns are born as unordered sets of features, but, via their semantic types, the denotations of the features all by themselves provide the basis for a combinatorics that picks out well-formed feature sets and assigns them a hierarchical organization and a compositional denotation. The meanings of the features are familiar lexical denotations that are also found elsewhere: 1st and 2nd person features refer to speakers and hearers. Gender features and other descriptive features denote properties of individuals. '3rd person' pronouns are literally definite descriptions. The plural forms of 1st and 2nd person pronouns are associative plurals of the singular forms. The meanings of pronominal features induce a typology of pronouns that is consistent with the results of contemporary research on possible pronominal paradigms, in particular Cysouw (2003).

If all pronouns are born as sets of interpretable features, minimal initial pronouns should consist of a single feature with a denotation of type e. Nominal numerical features (index features) and participant features (1st and 2nd person features) are of this type[23]. Nominal numerical features are variables and are interpreted via variable assignments:

(69) Nominal numerical features: $[\mathit{1}]_N$, $[\mathit{2}]_N$, $[\mathit{3}]_N$ …

$[[\ [\mathit{n}]_N\ ]]^{g,c} = g(\mathit{n})$

1st and 2nd person pronouns play a special role in many pronominal systems. As noted in Siewierska (2004, 5), one indication of the special status of 1st and 2nd person is that

speakers and listeners are normally only referred to by person markers, whereas reference to any other things or individuals can, and in some languages must, be achieved via demonstratives or full-fledged definite descriptions. Semantically, the special status of 1st and 2nd person is likely to mean that nominal 1st and 2nd person features are irreducibly referential. They refer to speakers and hearers:

(70) Participant features

a. $[[\ [\textit{1st}\ ]_N\ ]]^{g,c}$ = the speaker(s) in c

b. $[[\ [\textit{2nd}\ ]_N\ ]]^{g,c}$ = the hearer(s) in c

c. $[[\ [\textit{1st+2nd}\ ]_N\ ]]^{g,c}$ = the sum of speaker(s) and hearer(s) in c

The denotations in (70) are number neutral and do not yet distinguish between single speakers or hearers and pluralities of speakers or hearers. A number feature will eventually have to draw this distinction. (70) includes a separate person feature [*1st+2nd*]. The need for a [*1st+2nd*] pronoun was first recognized by Thomas (1955) for Ilocano, an Austronesian language of the Philippines. According to Cysouw (2003), monomorphemic pronouns exclusively referring to the sum of speaker(s) and hearer(s) occur in a number of unrelated languages in different areas around the world.

Instead of a basic feature [*1st+2nd*] there might be a sum feature that can freely combine individual features with denotations of type e within a single feature set. As we'll see in the following section, a feature of this kind will play a crucial role in our account of the

Rullmann cases. If a sum feature combines just two referential features, its meaning is as in (71):

(71) Sum feature[24]

$[\![[sum]]\!]^{g,c} = \lambda x \lambda y.\ x \oplus y$

Because of their semantic types, pronominal features determine a simple categorial grammar that can be put to use to pick out interpretable feature sets and assign them one or more denotations in a compositional way (see Steedman (2000) for ways to implement this proposal). As long as each feature is used exactly once, features combine in whatever way they can. Here is an illustration of how a feature set can be interpreted compositionally by allowing features within the same set to freely combine with each other:

(72) $[\![\{[sum], [1st], [2nd]\}]\!]^{g,c} =$

$[\![[1st]]\!]^{g,c} \oplus [\![[2nd]]\!]^{g,c} = [\![[2nd]]\!]^{g,c} \oplus [\![[1st]]\!]^{g,c} =$

the sum of the speaker(s) and hearer(s) in c.

As mentioned earlier, many scholars have argued against a '3rd person' feature, and I have been assuming that the alleged '3rd person' features are in fact gender features, a variety of descriptive features. If feature meanings are recruited from a general pool of basic concepts, descriptive features should express properties, as illustrated in (73):

(73) A selection of descriptive features

a. $[[\ [\textit{male}]_N\ ]]^{g,c} = \lambda x.$ x is one or more males

b. $[[\ [\textit{female}]_N\ ]]^{g,c} = \lambda x.$ x is one or more females

c. $[[\ [\textit{thing}]_N\ ]]^{g,c} = \lambda x.$ x is one or more things

(73) assumes that descriptive features are number neutral, too, and thus denote properties that can be true of singularities or pluralities. Krifka (1992) conjectured that basic predicates in natural languages are always cumulative. That is, whenever such a predicate is true of individuals a and b, it is also true of a $\oplus$ b, the sum of a and b. Predicative features are prime examples of basic predicates, of course, so we expect them to satisfy Krifka's cumulativity universal.

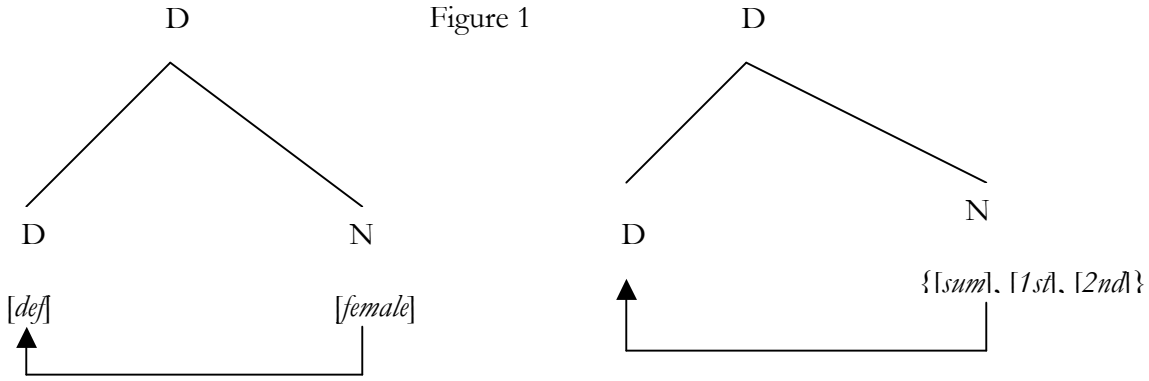
A single descriptive feature cannot be a pronoun yet. It does not have a denotation of type e. If it is to grow into a pronoun, it has to combine with a feature [*def*] that turns it into a definite description. If [*def*] is the familiar feature that can also be pronounced as a definite determiner in certain configurations, it should head its own functional projection, hence be a D. It would then not originate in the same feature set as descriptive features, which are nominal, hence Ns. '3rd person' pronouns are literally definite descriptions, then, and we expect the feature [*def*] to be interpreted like the English definite article *the* on the proposal of Link (1983), for example:

(74) Definite determiner

$[[\ [\textit{def}]_D\ ]]^{g,c} = \lambda P_{<et>}.\ \sigma x\ P(x)$

The operation denoted by [*def*] maps properties of individuals to the maximal individual that has the property. If there is no such individual, the operation is undefined. If the property is the property of being a cat, for example, then undefinedness results if there is no cat, but also if there is more than one. On the other hand, if the property is the property of being one or more cat and there is at least one cat, the operation denoted by [*def*] maps that property to the sum of all cats. Since '3rd person' pronouns are definite descriptions, it is not surprising that they can be used as descriptive or 'D-type/E-type' pronouns[25], and might even look like definite descriptions in some languages. '3rd person' features are very different from participant features, then, which are directly referential, hence need not, and in fact cannot, semantically combine with [*def*]. 1st and 2nd person pronouns may still be required to be Ds by the morphophonological spellout component, though. They may then have to move into a D-position, which would be an instance of N-to-D-raising of the kind Longobardi (1994) has advocated. In the end, pronouns could be uniformly Ds (Postal (1966), Elbourne (2001, 2002, 2005)), and we would have structures as in figure 1.

Figure 1



Since person and numerical features are the only features with denotations of type e, they should be the only features that can combine with [*sum*] within one and the same feature set. If the construction of '3rd person' pronouns involves a feature [*def*] that always projects in the syntax, as we have been assuming, [*sum*] should not be able to combine with them, unless it projects in the syntax, too. In that case, it is spelled out as *and* in English, however. The crosslinguistic expectation is that there should be no non-compound pronouns in natural languages[26] that can only refer to the sum of a male and a female, for example, or to the sum of a male and the speaker, etc. Setting aside combinations with numerical features, which will become very important in section 6, [*1st+2nd*] should be the *only* non-compound sum pronoun in natural languages. This prediction is correct, according to Cysouw (2003).

Another prediction made by our system of features so far is that descriptive features should not be able to combine with participant or numerical features in the same feature set. The result would be a feature set with a denotation of type t, which is a truth value, hence not a possible pronoun denotation. Referential 1st or 2nd person pronouns should never be able to surface with gender features, then. There are typological data about the appearance of 1st or 2nd person pronouns with gender features that make clear that our prediction is only borne out as a tendency. Siewierska observes that "Gender oppositions are characteristic of third rather than first or second person" (Siewierska (2004), 104). Nevertheless gender-marked 1st and 2nd person pronouns do exist (e.g. in Semitic), and we have to account for this possibility.

The rationale behind my positing the feature denotations I did was the assumption that meaningful features for pronouns are recruited from a general pool of lexical meanings

and compose in the way familiar from phrasal syntax. If a feature denotes a property, for example, its compositional behavior should match that of other property denoting expressions. Interestingly, sometimes, predicates can combine with DPs of type e without affecting the type of the DP. This happens in non-restrictive modification, as in (75):

(75) Ich **armes Kind** hab' kein eigenes Bett.
I poor kid have no own bed
'Me poor kid, I don't have my own bed.'

Potts (2004, 2005) has argued that non-restrictive modifiers like the one illustrated in (75) are interpreted as contributing conventional implicatures. The truth-conditional content of an utterance of (75) could then be paraphrased as saying that the speaker doesn't have his or her own bed. The conventional implicature conveys that the speaker considers herself a poor child. According to Potts, the computation of conventional implicatures uses the same kind of composition mechanisms as the computation of truth-conditional meanings, except that the implicatures themselves are assigned types that prevent them from being the input to any further semantic computation. If Potts is right about non-restrictive modification, we expect descriptive features to contribute conventional implicatures when they occur with 1st or 2nd person pronouns. Their function would be quite similar to that of honorific markers, then, which Potts and Kawahara (2004) also analyze as contributing conventional implicatures. Corbett (1991) reports that in Diuxi Mixtec, an Oto-Manguean language of Mexico[27], the form of the 2nd person pronouns depends on the sex of the speaker, the age of the addressee, and the relationship between them. In the North-East Caucasian language Andi[28] the forms of

both 1st and 2nd person singular pronouns depend on the speaker's sex. Corbett notes that with 1st or 2nd person pronouns, apparent gender markers are sometimes closely related to markers that indicate social status or distinguish men's and women's language. In connection with 1st or 2nd person features, then, descriptive features are expected to merely contribute conventional implicatures. Crucially, descriptive features should not be able to semantically combine with numerical features at all. Bound variable pronouns do not generally tolerate non-restrictive modification, as shown in (76), and Pott's type logic accounts for this intolerance in a principled way.

(76) * No boy was admitted to the Mystery Spot, before he, who had to wait in line for at least two hours, signed a waiver of liability form.

Our account implies that a numerical feature can never directly combine with a descriptive feature, and this only leaves a narrow range of possible explanations for the many instances of apparent '3rd person' bound variable pronouns that we find. If the pronoun is 'truly' bound and its descriptive features are ϕ-features, feature transmission could be responsible for the presence of the features. Descriptive features that are not ϕ-features or appear on pronouns that are not truly bound could not have been inherited on our account, and what we might be seeing might be D-type/E-type pronouns, hence not true bound variable pronouns.

In the family of semantico-syntactic features, those that are related to 'number' in one way or other are the most elusive. That number is not a unified concept is one of the main lessons from Corbett (2000). In the formal semantics literature, plural operators are most

commonly identified with ∗-operators (Link (1983)), which pluralize predicates. But ∗-operators cannot be responsible for the plurality of 1st or 2nd person pronouns. Plural pronouns typically refer not to pluralities of speakers or hearers, but to groups including speakers or hearers[29]. This property of plural 1st and 2nd person pronouns suggests that there is a feature available for pronouns that shares properties with associative or group plurals[30], as proposed in Moravcsik (2003) and Cysouw (2003). Cysouw (2003) remarks that "a much better approach for the analysis of pronominal paradigms is to talk about group marking instead of plural marking"[31]. There could be a pronominal number feature [*group*], then, whose semantics is given in (77):

(77) Group feature

$[\![[group]]\!]^{g,c} = \lambda x.\ \text{group}(x)(c)$

(77) assumes that in addition to speakers and addressees, contexts c may determine a function that assigns to selected individuals a not necessarily proper plurality of individuals that consists of them and their associates with respect to c. If [*group*] combines with [*1st*], [*2nd*], or [*1st+2nd*] in the same feature set, the result are plural 1st and 2nd person pronouns. If '3rd person' pronouns are built in the syntax, associative interpretations of '3rd person' pronouns can only be produced if [*group*] can project in the syntax, too. In that case, we get a fully productive associative plural of the kind found in Japanese or Hungarian. This explains the puzzling fact that there are many languages (including English) that have associative plurals for just 1st and 2nd pronouns without using associative plurals otherwise[32].

If a feature set consists of [*group*], [*1st*], and [*2nd*], we have an inclusive 1st person pronoun. Its features can semantically compose with each other in exactly three ways:

(78) a. The common group for you and me: ([*group*] ([*1st*] [*2nd*]))

b. The sum of you and my group: (([*group*] ([*1st*])) [*2nd*])

c. The sum of me and your group: (([*group*] ([*2nd*])) [*1st*])

In the absence of any principles dictating preference for one grouping over the other, 1st person pronouns corresponding to the feature combination {[*group*], [*1st*], [*2nd*]} should generally be able to refer to all three kinds of pluralities. This seems to be the case. No language has pronouns that distinguish meanings (78a-c).

As is, the semantics of [*group*] does not guarantee that plural {[*group*], [*2nd*]} excludes speakers. Nor does it guarantee that {[*group*], [*1st*]}, which corresponds to exclusive *we*, excludes hearers[33]. Exclusion conditions of this kind are likely to be pragmatic effects that should be given a Gricean explanation, as argued in Krifka (2005), following a long line of earlier researchers going back at least to de Saussure. In languages that have exclusive *we*, for example, {[*group*], [*1st*]} is likely to exclude hearers because it contrasts with the 'stronger' pronoun {[*group*], [*1st+2nd*]}, which includes them. A possible notion of strength could be defined on the basis of the possible pluralities given speakers or hearers can be part of. For fixed pairs of distinct speaker(s) and hearer(s), the set of possible pluralities that both speaker(s) and hearer(s) are part of is a proper subset of the set of possible pluralities that the speaker(s) is/are part of.

We still need number features proper, which are the ϕ-features [*singular*], [*dual*], etc. that do not just appear with pronouns, but with any kind of DP. Those features are not really part of 'pronoun making', and might very well have the traditional presuppositional denotations, as illustrated in (79).

(79) Number features

a. $[\![[\textit{singular}]]\!]^{g,c} = \lambda x$: x is an atom. x

b. $[\![[\textit{dual}]]\!]^{g,c} = \lambda x$: x consists of two atoms. x

Evidence that associative or group features are different from number features proper comes from Corbett and Mithun (1996) and Corbett (2000) with data from Central Pomo and Central Alaskan Yup'ik. In Yup'ik, the associative morpheme *-nku-* and the number morphemes *-k* (dual) and *-t* (plural) are realized separately[34]. The following data are from Corbett (2000, 109):

(80) a. cuna-nku-k
Chuna-associate-dual

Chuna plus one associate

b. cuna-nku-t
Chuna-associate-plural

Chuna plus two or more associates

Corbett (2000) argues that associative morphemes themselves do not express number. If they trigger plural agreement with verbs, as they often do, this is so because a single morpheme expresses *both* associativity and plural number. A systematic morphological difference between associativity and number cannot be derived from the semantics. Number features and [*group*] both have denotations of the same type. There must be a syntactic difference between the two types of features, then. One possibility that has been considered in the literature is that number features head their own functional projections in the higher regions of DPs (Ritter (1991), Bernstein (2001)). There are reasons to believe, then, that number features might be introduced via number projections in the syntax and are never born in the same feature set as [*group*]. Since '3rd person' pronouns only acquire denotations of type e via a determiner, number projections have to originate *above* DP on our account, though. A welcome consequence of the assumption that number features are always introduced in the syntax is that it excludes certain types of pronouns that we would otherwise expect to find in at least some languages. For example, there don't seem to exist monomorphemic 2nd person pronouns that can be used to pick out either the possibly quite numerous associates of two addressees or a plurality consisting of the addressee and one associate. Such pronouns should exist if [*dual*] and [*group*] could both live in one and the same feature set with [*2nd*].

Kratzer (in press) argues that the nominal number feature [*plural*] is not interpreted on the DP that hosts it, but functions as an operator that pluralizes the DP's sister constituent and thereby produces distributive interpretations. An alternative way of implementing this proposal is to assume that nominal [*plural*] is a default that denotes the identity function (Sauerland (2003)), but matches a truly contentful verbal counterpart. If nominal [*plural*]

doesn't contribute any non-trivial meaning and groups do not have to be proper pluralities, all plural pronouns (except those that have to include both speaker and hearer) should be able to refer to singularities as well as proper pluralities. Krifka (2005) and Sauerland, Anderssen, and Yatsushiro (2005) have presented typological and experimental evidence that confirm this prediction. There is a catch, though. If the group an individual is associated with is not necessarily a proper plurality, [*singular*] should be able to co-occur with [*group*] in pronouns corresponding to [*singular*]([*group*]([*1st*])), for example. Using such pronouns would not necessarily lead to presupposition failure. However, the uses of [*singular*]([*group*]([*1st*])) where no presupposition is violated are precisely the uses where [*group*] is redundant. This should make pronouns like [*singular*]([*group*]([*1st*])) dispreferred in natural languages.

We now have a hypothesis about how a pronoun is built. Pronouns enter the derivation as meaningful bundles of meaningful features. Confining our attention to referential pronouns in this section (bound variable pronouns will be taken up in section 6), the initial features are interpretable combinations of [*1st*], [*2nd*], [*sum*], [*group*], and whatever descriptive features there may be. '3rd person' pronouns need [*def*] to acquire denotations of type e. Like other DPs, pronouns, too, appear within determiner and number projections in the syntax (see section 6 for more discussion of number projections). Table 1 displays the semantic possibilities for singular and plural referential pronouns. There are some obvious omissions: left out was not only [*plural*], which has trivial content, hence is irrelevant for the combinatorics, but also combinations with [*dual*], [*trial*], etc. or with any other descriptive features apart from [*female*].

[*singular*] [*1st*]	Refers to a unique speaker.	1
[*singular*] [*2nd*]	Refers to a unique hearer.	2
[*singular*] ([*def*] [*female*])	Refers to a unique female.	3
[*1st*]	Refers to the speaker(s)	1+1
[*2nd*]	Refers to the hearer(s)	2+2
[*1st+2nd*]	Refers to the sum of speaker(s) and hearer(s)	1+2
[*group*] [*1st+2nd*]	Refers to a group including speaker(s) and hearer(s) and possibly non-participants	1+2(+3)
[*group*] [*1st*]	Refers to a group including speaker(s) and possibly non-participants	1(+3)
[*group*] [*2nd*]	Refers to a group including hearer(s) and possibly non-participants.	2(+3)
[*def*] [*female*]	Refers to one or more females.	3(+3)

Table 1. Semantically possible referential pronouns

Unfortunately, Table 1 reveals what looks like a serious flaw in our system. It generates two pronouns that might not exist: 1+1 and 2+2. As observed in Moravcsik (1978) and much subsequent work[35], natural languages do not seem to have pronouns that exclusively refer to (not necessarily proper) pluralities of speakers, and pronouns that exclusively refer to (not necessarily proper) pluralities of hearers are extremely rare if they exist at all. Since our

system of pronominal features defines the space of semantically possible pronouns, it might be correct to include 1+1 and 2+2. As Cysouw (2003) emphasizes, there is nothing conceptually wrong with those two pronouns. Audiences are often pluralities, as in a lecture, a church service, or a political rally, and speaking in chorus is a possibility, too, albeit not a very common one. If the semantics doesn't object to 1+1 and 2+2, the problem with 1+1 and 2+2 is likely to come from morphophonological spellout constraints. There may be a constraint militating against spelling out features like [*sum*] or [*group*], which would then lead to syncretism between 1+1 and 1+(3), and between 2+2 and 2+(3). There might, in fact, be no feature [*sum*] to begin with. I posited a [*sum*] feature to account for the existence of 1+2 and certain cases of partial binding that will come up in section 6. But instead of a [*sum*] feature, there could just as well be a sum operation that is freely available within feature sets without being carried by a feature. The feature [*group*] was better motivated to begin with, but, setting aside cases of full-fledged associative plurals, we may wonder why we hardly ever see it spelled out transparently in the world's languages[36]. There could be a general constraint blocking its spellout, then. The constraint might take the form of (81):

(81) Vocabulary insertion rules for pronouns only target ϕ-features.

If (81) is relied on by a language learning child, for example, the result is obligatory syncretism between 1+1 and 1+(3), and between 2+2 and 2+(3), since the two forms of each pair have identical ϕ-feature sets. There are no longer any separate forms for 1+1 and 2+2, then. This is good, but, we also have a new potential problem now: the distinction between 1+2 and 1+2(+3) is gone, too. There are some interesting facts about this distinction, though, which

Cysouw (2003) reports and which suggest that it may take an exceptional move for the distinction between 1+2 and 1+2(+3) to emerge in a paradigm. Pragmatic reasons might then explain why that exceptional move is sometimes made for the distinction between 1+2 and 1+2(+3), but not at all, or very rarely, for the other two distinctions.

According to Cysouw (2003), the majority of the world's languages do not distinguish between 1+2 and 1+2(+3), even though the pattern does occur in a fair number of unrelated languages in different parts of the world. Cysouw found that if languages do draw the distinction, it seems to be the last distinction in the historical development of the paradigms in question[37]. In our system, the only feature that distinguishes 1+2 and 1+2(+3) is [*group*]. Adding the distinction means violating (81), and it is conceivable that this only happens when all distinctions that are in compliance with (81) have been grammaticalized. Moreover, since 1+2(+3) is the member of the pair that requires an exceptional move to be spelled out, we also expect that 1+2(+3), rather than 1+2, might look like an exception. Evidence confirming this expectation can be found both within individual paradigms and by comparing cognate paradigms of closely related languages and dialects. For example, as Cysouw points out, in Ilocano, the 1+2(+3) form *tayo* is the only bisyllabic pronoun in the paradigm, it is the odd item that stands out in the paradigm. The same is true of the 1+2(+3) pronoun in the closely related language Pampangan (Cysouw (2003), 90). Cebuano and Tagalog have almost identical pronoun paradigms, except that Tagalog, but not Cebuano draws a distinction between 1+2 and 1+2(+3). Interestingly, the form that Tagalog has, but Cebuano is missing, is again the form for 1+2(+3), not the one for 1+2 (Cysouw (2003), 261).

The main tools a language learning child has to bring to the task of pronoun learning on the proposed analysis is (a) a small set of designated interpretable features that generate the space of possible pronouns and (b) the violable spellout principle (81) telling her to focus on the ϕ-features when recording the shapes of the pronouns she encounters. It is now not too hard to see how a language learner can extract vocabulary insertion rules like those in (82) below from the data she hears if she works with a universal most differentiated paradigm like that in table 1. The rules in (82) are updated versions of earlier rules I posited for possessive pronouns in section 3. One difference is that we now have to allow for the possibility that a pronoun has both a 1st and a 2nd person feature. Another difference is that we no longer have to stipulate what feature a pronoun needs to be specified for. The space of possibilities to be spelled out is given by the meaning of pronominal features.

(82) Vocabulary insertion rules for English personal pronouns

[*1st*] [*singular*]	→	*I*
[*2nd*]	→	*you*
[*female*] [*singular*]	→	*she*
[*male*] [*singular*]	→	*he*
[*thing*] [*singular*]	→	*it*
[*1st*] ([*2nd*])	→	*we*
elsewhere	→	*they*

The investigation of pronominal features in this section led to a novel semantics of features for referential pronouns that is plausible from both a typological and an acquisition point of

view. What still has to be shown is that the very same semantics of features also determines the feature combinations that a Minimal Pronoun can be born with, and thereby accounts for the Rullmann facts.

6. Coming to terms with Rullmann's data

The system of pronominal features developed in the previous section not only generates possible paradigms of referential pronouns that are plausible from the point of view of typology and acquisition. It also tells us what possible bound variable pronouns are. Pronouns that are bound via 1st or 2nd person context shifters look just like referential pronouns, hence do not have to be given special attention here. Regular bound variable pronouns are born with a numerical feature, that is, with an 'index' in the traditional sense. Interpretability determines the other features that such a pronoun can be born with. Combinations with [*group*] or [*sum*] give us the partial binding cases discussed in Rullmann (2004) and Heim (2005, 2007). (83) is an example.

(83) Only I mentioned **our** audiovisual capabilities.

(83) could be part of my report on a SALT business meeting where offers for hosting next year's SALT conference were solicited and discussed. SALT is not hosted by individuals, but by whole departments, so what I said with my utterance on the intended reading can be paraphrased roughly as 'I was the only person x such that x mentioned the audiovisual capabilities of x and her group'. The intended interpretation of *our* in (83) can be produced with a 1st person context shifter or with a regular λ-operator. I am illustrating the second

option here since it has more interesting consequences for spellout. The pronoun that surfaces as *our* in (83) is then born as {[*group*], [*n*]}, where [n] is some numerical feature. We are assuming that a pronoun's number features are meaningful, too, but do not originate in the same feature structure as [*group*]. Following Ritter (1993), they are added in the form of special number projections in the syntax that appear with all number-marked DPs, not just with pronouns. The pronoun we are building will then grow into a DP of the kind shown in figure 2:

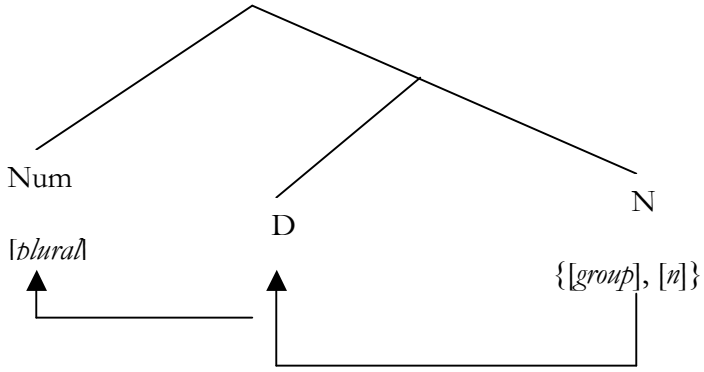
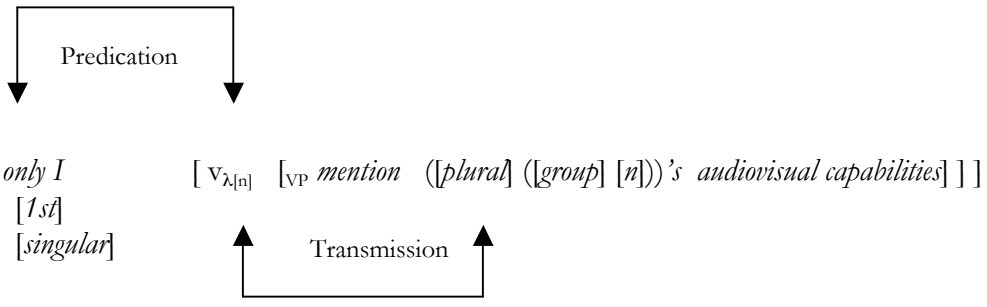


Figure 2

In (83), the pronoun is bound from v via the numerical (= index) feature it contains. This triggers the agreement relations shown in (84).



Since v hosts a binder, it inherits the ϕ-features of the DP in its specifier position via Predication and transmits them to the pronoun it binds via Feature Transmission under Binding. Suppose that the number projection is the place that negotiates agreement relations, hence the target position for feature transmission. We now have a problem. The ϕ-feature set that v inherits from the subject *only I* is {[*1st*], [*singular*]}. The number projection of the pronoun to be built is headed by the feature [*plural*]. If the mechanics of feature transmission is unification of ϕ-feature sets, the pronoun ends up with the feature set {[*1st*], [*singular*], [*plural*]}. If we leave it at that, the vocabulary insertion rules in (82) (adapted for possessives) tell us to spell out the pronoun as *my*, rather than *our*.

The problem we have just run into is a general problem that is familiar from the literature on unification (e.g. Ingria (1990), Blevins (forthcoming)), and ultimately calls for a general solution. Here is a possibility. If number features are heads of number projections, they are category defining features, and that may make them ineligible for participation in feature transmission processes. There would be a very basic asymmetry between number features on the one hand, and person and gender features on the other. The special status of number features is defended in Ritter (1993, 795), who argues on the basis of evidence from Hebrew and Romance that there should be a separate functional head for number, but "a distinct functional projection for gender is not only unnecessary, but undesirable". According to Ritter, gender is a feature, and not a category defining head. The same seems to be true of the person category. Consequently, if number features are functional heads that project in the syntax, number features might not be ϕ-features *of* those heads. But then number features are not members of the ϕ-feature sets that are unified in (84)[38]. If this is correct, only the 1st

person feature is transmitted to the possessive in (84), and the possessive is expected to surface as *our*.

If all number features head number projections, bound variable pronouns can *never* inherit number features via feature transmission on our account, and this means that number features should always be interpretable on bound variable pronouns and should always be added before semantic interpretation takes place. This is a very strong prediction, but it has been defended (in spite of many apparent counterexamples) by Rullmann (2003), who argues that "number agreement between a bound pronoun and its antecedent is a matter of semantics rather than syntax" (pages 243/244; see also Winter (2001, 2002)).

Rullmann (2004) and Heim (2005, 2007) discuss a class of examples that, from the current perspective, show that Minimal Pronouns can be born with a [*sum*] feature. Here is a variation of one of Rullmann's examples. Imagine my using (85) to address one of my former students at a reunion of former students.

(85) Only you remember **our** first appointment.

On the intended reading, (85) can be paraphrased as 'only you are an x such that x remembers the first appointment of x and me.' In this case, there is no antecedent that could provide even a 1st person feature. Following Higginbotham (1983) and Sportiche (1985), Rullmann (2003, 2004) uses set indices to represent the intended interpretation in such cases. (85) could be represented along the lines of (86):

(86) Only you (λx. x remembers the first appointment of $x_{\{n, I\}}$)

We can replicate the effect of set indices with the help of [*sum*]. To represent the reading of (85) we are interested in, the possessive would have to start out as $[_N$ {[*sum*], [*1st*], [*n*]}] and would grow into $[_{Num}$ [*plural*] $[_D$ $[_N$ {[*sum*], [*1st*], [*n*]}]]] in the syntax before semantic interpretation takes place. During morphophonological spellout, the number head acquires the feature [*2nd*] from the v that hosts the pronoun's binder via feature transmission. The result is $[_{Num}$ [*plural*] [*2nd*] $[_D$ $[_N$ {[*sum*], [*1st*], [*n*]}]]]. If the whole pronoun is scanned for the presence of ϕ-features at vocabulary insertion, the expected pronunciation is again *our*. Continuing with the student reunion scenario, imagine now that one of the assembled former students talks to me, uttering (87)[39]:

(87) Only I remember **our** first appointment.

In this example, the pronoun has to start out as $[_N$ {[*sum*], [*2nd*], [*n*]}] on the intended interpretation, which can be paraphrased as 'only I am an x such that x remembers the first appointment of x and you.' As before, a [*plural*] feature is added before semantic interpretation takes place. Transmission of [*1st*] to the number head during morphophonological spellout yields $[_{Num}$ [*plural*] [*1st*] $[_D$ $[_N$ {[*sum*], [*2nd*], [*n*]}]]], which is again spelled out as *our*.

In this section, I have illustrated the predictions of the semantics for pronominal features proposed in section 5 for possible bound variable pronouns. We saw that the system of pronominal features that determines the right typology of referential pronouns also generates the correct space of possible bound variable pronouns, including the 'baroque' fake indexicals that Rullmann (2004) and Heim (2005) showed to be major problems for the earlier Minimal Pronoun approach.

7. Conclusion

This paper has proposed a novel theory of referential and bound pronouns where the semantics of pronominal features determines the make-up of a pronoun at the beginning of a syntactic derivation. Bound variable pronouns may be the result of context shifting, and might then be indistinguishable from referential pronouns. Or else they may be Minimal Pronouns that can be born underspecified and then acquire the shapes they surface with via feature transmission from the functional heads that carry their binders. Local anaphora emerge as a by-product of the fact that features can only be inherited in local configurations. On the proposed analysis, the class of local anaphora is much wider than has been thought. It is likely to include not only reflexive pronouns, which are locally bound by v, but also PRO and relative pronouns, which are locally bound by C. A unified, constructivist, view of the diverse class of bound variable pronouns became possible once we gave up the traditional idea that binders for pronouns are carried by antecedent DPs, rather than by functional heads. There is now no longer a need for a syntactic 'binding theory'. Local anaphora do no longer have to be *legitimized* by local binding configurations. They are never *built* in any other configuration to begin with.

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[1] . Kamp (1981), Heim (1982), Heim and Kratzer (1998) and Elbourne (2001, 2002, 2005) are some examples.

[2] . In Kratzer (1998), I called those pronouns "Zero Pronouns". This term is too similar to "Null Pronouns", though, hence may suggest that we are dealing with unpronounced pronouns. While the unpronounced pronoun *PRO* is also a Minimal Pronoun, *pro* doesn't have to be. Like its overt counterparts, *pro* can be born with all its features in place, in which case it is referential.

[3] . Frampton and Gutmann (2002).

[4] . This argument is essentially the one made against the feature checking approach in the postscript of Halle and Marantz (1993). See also Bobaljik (2007) for further support of the PF ϕ-feature transmission architecture of Kratzer (1998).

[5] . I thank an anonymous reviewer for helpful suggestions about the choice of examples. That German and English differ with respect to the availability of a bound variable interpretation in the original sentence discussed in Partee (1989) was observed by Irene Heim in lectures at the École Normale Supérieure in Paris in January (2005): http://www.diffusion.ens.fr.

[6] . I am grateful to Irene Heim (personal communication) and to an anonymous reviewer for alerting me to the fact that data like (11) are crucial at this point of the discussion because Heim's feature transmission rule (Heim (2005), (2007)), which presupposes binding from antecedent DPs, rather than functional heads, may be sufficient to explain the data in (5) to (10) if supplemented with some version of the spellout dilemma account given in section 3. Apart from (11), the "possessor raising" construction in (25), and most examples in section 4 present factual challenges for such a proposal, however.

[7] . The semantics of reflexivization given in (14) only yields 'weak' reflexive interpretations. We ultimately want to account for 'strong' reflexive interpretations in the sense of Moulton (2005, forthcoming). Interestingly, Moulton's strong reflexive interpretations have to be imposed via v as well. Reflexivization has always been a headache for theories where binders are introduced by antecedent DPs. Heim and Kratzer (1998) are forced to assume that antecedent DPs for reflexives move out of their base positions, for example, and Büring (2005) stipulates a special type of abstraction operation to avoid this kind of movement.

[8] . See Bowers (1993, 2001) for an analysis of small clauses involving a head that might plausibly be identified with v.

[9] . Chung (1998), Koopman (2003, 2006), Kramer (to appear) document the continued need for specifier-head agreement. On the current account specifier-head agreement is restricted to heads that carry binders, however.

[10] . We would now also expect, for example, that Ts that carry binders acquire ϕ-features differently from Ts that don't. Middle Egyptian and Arabic (Kramer forthcoming) may be languages to investigate for possible confirmation of this prediction. In Middle Egyptian and Arabic, verbs show different subject-verb agreement patterns in VSO and SVO configurations.

[11] . See Reinhart (2006) for placing imperfections in the context of repair strategies at the interfaces.

[12] . The movement properties of relative pronouns and other Minimal Pronouns are parallel to those of PRO in Heim and Kratzer (1998) and of dream *de se* pronouns and resumptive pronouns in Percus and Sauerland (2003a, b). Within the current framework, it might also be possible that the very final step of a Minimal Pronoun's moving into the specifier position of a C that gives it a shape takes place after semantic interpretation.

[13] . The diagram in (26) and all subsequent diagrams of this kind only show the relevant agreement chains and abstract away from movements of heads or DPs: the subject may have to move to the specifier of T position, the object may have to move beyond v. I am also neglecting case features throughout this paper, which seems legitimate in light of Bhatt (2005), which argues for a dissociation of case and agreement.

[14] We'll see in section 6 that number features are *not* among the features that are transmitted, but are generated before semantic interpretation takes place. I will skip over this issue for the time being.

[15] . Gregory Carlson, Barbara Partee, Chris Potts, and Lisa Selkirk.

[16] . See for example Forcheimer (1953), Benveniste (1966), Zwicky (1977), Harley & Ritter (2002), and Wechsler (2004).

[17] . Ito and Mester (2000) discuss German data with 1st or 2nd person resumptive pronouns in non-restrictive relative clauses of the form *I, who* … Ito and Mester's data lend further support to the assumption that relative pronouns can end up with both person and gender features. In German non-restrictive relative clauses, 1st or 2nd person resumptive pronouns appear in addition to the relative pronoun in precisely those cases where the presence of a 1st or 2nd person feature with the relative pronoun would lead to a spellout dilemma for verbal agreement morphology. As a result, the dilemma can be resolved in favor of person agreement.

[18] . Resolution of agreement conflicts is a much-discussed topic in work on agreement (e.g. Corbett (2006)). See also Ingria (1990) and Blevins (forthcoming) for discussions of agreement dilemmas in the context of feature-based grammars and unification.

[19] . Findreng (1976), Corbett (2006), 241. A preference for a gender resolution for the 2nd person was confirmed by a Google search, which yielded 320 hits for *und du habt euch* (person resolution, '*and you have*.2PL REFL.2PL') as opposed to more than 6400 hits for *und du haben sich* (gender resolution, '*and you have*.1/3PL REFL.3PL').

[20] . Plural context shifters need a much longer discussion, which I will have to defer to another occasion. Footnote 34 in section 5 gives a first idea of what the critical issues are.

[21] . The denotation of [*1st*] and [*2nd*] given here is preliminary. A more adequate analysis would posit number neutral denotations for the two features and would rely on a separate number feature to pick out atomic speakers or hearers. Section 5 will correct this simplification.

[22] . Cooper (1983), Dowty and Jacobson (1989), Heim and Kratzer (1998), Büring (2005), Heim (2005, 2007).

[23] . I will drop the category indication when it's clear that we are dealing with the nominal version of the feature.

[24] . Eventually we want a more general sum feature that can map any number of individuals to their sum.

[25] . Neale (1990). See Elbourne (2001, 2002, 2005) for a recent account of D-type pronouns.

[26] . See Hyman (1979), Noyer (1992), and Cysouw (2003) for discussion of compound pronouns.

[27] . Kuiper & Pickett (1974), 54-55.

[28] . Cercvadze (1967), 285.

[29] . Benveniste (1966), Zwicky (1977), Noyer (1992), Moravcsik (2003), Corbett (2000), Cysouw (2003), Siewierska (2004), and many others.

[30] . See Nakanishi & Tomioka (2004) for a discussion of associative plurals in Japanese.

[31] . Cysouw (2003), 72.

[32] . See Moravcsik (2003) for discussion of this issue. Also Wechsler (2004).

[33] . It might not even be required that the speaker's or addressee's groups contain the speakers or addressees themselves. A close, possibly emphatic, association in the utterance context may be sufficient (Tomioka (2006)). This would not only explain otherwise exceptional uses of 1st person pronouns like *we won five gold medals in the 2004 Olympics*, the nurse's *we*, or the cases of "emphatic shift" in Japanese that Tomioka discusses. It might also help with the analysis of 1st or 2nd person plural context shifters. When plural 1st or 2nd person pronouns have shifted interpretations, there is no requirement that the alternative groups considered should contain speakers or addressees. If the speaker's or addressee's groups do not have to contain the speakers or addressees themselves, we might consider the following denotation for the 1st person plural context shifter, for example: $[[\lambda[\textit{1st}][\textit{plural}]\ \alpha]]^{g,c} = \lambda x\ [[\alpha]]^{g,c'}$, where c' is like c, except that group(speaker(c'))(c') = x. The issue needs further thought and investigation, though.

[34] . I added the glosses and the translations according to the descriptions given by Corbett.

[35] . See also Zwicky (1977), Greenberg (1988), Noyer (1992), Cysouw (2003), Siewierska (2004), Wechsler (2004).

[36] . Cysouw (2003, 89) remarks that "augmented morphemes", which correspond to our [*group*] feature, are hardly ever spelled out transparently in so-called "minimal/augmented" paradigms.

[37] . "A minimal/augmented opposition in the inclusive is only added when all other referential categories have already been grammaticalized" (Cysouw (2003), 260).

[38] . Number would still have to be a ϕ-feature for the purposes of (81), though, even if it is not in its own ϕ-feature set.

[39] . This is an example of the kind discussed in Heim (2005).