

Reflexives, Reciprocals and Contrast ¹

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ABSTRACT: In many languages, reflexively marked predicates with plural arguments can describe situations of reciprocal action. This paper analyzes such cases, and shows that they can be given a rather simple, univocal analysis, one that follows from certain now-commonplace assumptions in the semantic theory of plurals (Krifka 1992, Kratzer 2003). In addition, I analyze the effect of focus-marking upon reflexives in these languages. Such marking is sometimes said to ‘disambiguate’ the sentence, only allowing it to describe cases of distributive reflexive action. This is shown to be only partly true, as there are contexts where such sentences can also describe reciprocal action. Moreover, it is shown that a rather basic semantics for focus can predict all the effects observed. Finally, I analyze reflexive anaphors in languages like English, where reflexive sentences never seem able to describe reciprocal action. I propose that reflexives in these languages have a kind of grammaticalized focus, and I show how this view can be implemented and clarified via recent proposals made concerning scalar implicatures (Chierchia *et al.* 2011).

Keywords: reflexives, reciprocals, reflexive-reciprocal polysemy, focus, cumulativity

1. Introduction

In many languages, ‘reflexively marked’ verbs appear to have rather different use conditions from ‘reciprocally marked’ verbs. For example, the English reflexive sentence in (1a) seems not to overlap in meaning with the English reciprocal sentence in (1b).

(1) English Reflexives and Reciprocals With Plural Antecedents

- a. The boys slapped themselves.
- b. The boys slapped each other.

To illustrate, sentence (1a) is most commonly understood to describe a situation like that in (2a), while (1b) is understood to describe a situation like that in (2b). Moreover, in the absence of a facilitating context, (1a) cannot be understood as true or appropriate in situation (2b), and (1b) can never serve as a true description of the situation in (2a).

(2) Reflexive and Reciprocal Situations

- a. Reflexive Situation
Each boy slapped himself. Dave slapped himself. Tom slapped himself. Bob slapped himself.
- b. Reciprocal Situation
Each boy slapped some other boy. Dave slapped Tom. Tom slapped Bill. Bill slapped Dave.

¹ This paper wouldn’t have been possible without the patient work of the following individuals, who provided key data on reflexives and reciprocals in their languages: Rajesh Bhatt (Hindi), Maria Biezma-Garrido (Spanish), Yelena Fainleib (Hebrew), Nancy Gachigo (Kikuyu), Simone Gugliotta (Italian), Seda Kan (Turkish), Suzi Lima (Portuguese), Alexei Nazarov (Russian), Magda Oiry-Pater (French), Jennifer Rau (German), Aynat Rubinstein (Hebrew), Lorenzo Sorbo (Italian), Martin Walkow (German). Of course, any errors are entirely my own.

While the English pattern above is found in a majority of the world's languages (61.4%; Heine & Miyashita 2008), many languages show an extensive overlap between the use of reflexively and reciprocally marked verbs. This pattern, illustrated below, is especially prevalent within Europe (Heine & Miyashita 2008), though it is by no means exclusive to that area.

(3) **French Reflexives and Reciprocals With Plural Antecedents**^{2,3}

- a. Les étudiants se sont frappés.
 the students REFL AUX slap
The students slapped themselves.
 Judgment: Can truthfully describe both (2a,b).
- b. Les étudiants se sont frappés l'un l'autre.
 the students REFL AUX slap the.one the.other
The students slapped each other.
 Judgment: Can truthfully describe only (2b).

(4) **Spanish Reflexives and Reciprocals With Plural Antecedents**

- a. Los estudiantes se golpeaban
 the students REFL slap.IMPF
The students were slapping themselves.
 Judgment: Can truthfully describe both (2a,b).
- b. Los estudiantes se golpeaban unos a otros
 the students REFL slap.IMPF one.PL to other.PL
The students were slapping each other.
 Judgment: Can truthfully describe only (2b).

(5) **Portuguese Reflexives and Reciprocals With Plural Antecedents**

- a. Os estudantes se bateram
 the students REFL slap.IMPF
The students were slapping themselves.
 Judgment: Can truthfully describe both (2a,b).
- b. Os estudantes bateram um no outro
 the students slap.IMPF one to other
The students were slapping each other.
 Judgment: Can truthfully describe only (2b).

² Unless otherwise indicated, all data in this paper are taken from my own interviews with native speakers.

³ Throughout this paper, I use the following abbreviations in my example glosses: ACC 'accusative case', AgrS 'subject agreement', ASRT 'assertive marker', AUX 'auxiliary', DAT 'dative case', ERG 'ergative case', IMPF 'imperfective aspect', PERF 'perfective aspect', PL 'plural', REFL 'reflexive'.

(6) **Italian Reflexives and Reciprocals With Plural Antecedents**

- a. Gli studenti si sono picchiati.
 the students REFL AUX hit/fight
The students slapped themselves
 Judgment: Can truthfully describe both (2a,b).
- b. Gli studenti si sono picchiati uno all'altro
 the students REFL AUX hit/fight one to.the.other
The students slapped each other.
 Judgment: Can truthfully describe only (2b).

(7) **German Reflexives and Reciprocals With Plural Antecedents**⁴

- a. Die schüler schlagen sich.
 the students hit REFL
The students are slapping themselves.
 Judgment: Can truthfully describe both (2a,b).
- b. Die schüler schlagen einander
 the students hit one.other
The students are slapping each other.
 Judgment: Can truthfully describe only (2b)

In each of the languages in (3)-(7), reflexively marked sentences like those in (a) can easily be understood as truthfully describing either the reflexive situation in (2a) or the reciprocal situation in (2b). Further examples of this pattern can be found in Nedjalkov (2007), Heine & Miyashita (2008), and Maslova (2008), amongst many others. Many such languages also possess uniquely reciprocal markers, illustrated in the (b) sentences above. When containing these markers, the resulting sentences can only truthfully describe the reciprocal situation in (2b).

The ability for reflexively marked sentences like (3a)-(7a) to be true in either (2a) or (2b) has sometimes been informally described as a case of ‘ambiguity’ or ‘polysemy’ (Heine & Miyashita 2008, Gast & Haas 2008, Maslova 2008). It should be noted, however, that for the

⁴ Gast & Haas (2008) argue that the ability of (7a) to describe both (2a,b) rests on a lexical ambiguity in the element *sich*. They argue that there is both a pronoun *sich* and a clitic *sich*, and that only the latter can be used in descriptions of reciprocal situations like (2b). Moreover, they propose that clitic *sich* permits such use because it has a more general use as a ‘middle marker’, and reciprocal situations are frequently described via the use of middles.

The main argument for this view is the oft-observed fact that *sich* cannot be used to describe reciprocal situations when it is complement to PP. However, as Gast & Haas themselves note, there are other languages where such a lexical ambiguity analysis would be incorrect. Moreover, we should note that there are many languages where (a) reflexively marked predicates can describe reciprocal situations, but (b) reflexive markers are *not* generally used as ‘middle’ markers. As described by Fortescue (2007), Kalaallisut is one such language.

(i) immi-ssin-nut tuqun-niar-pusi
 REFL-2PL-ALL kill-FUT-2PL.IND

You are all going to kill yourselves / each other (Fortescue 2007: 820)

For this reason, I will in this paper put aside the view that the data in (3a)-(7a) are due to the reflexive being interpreted as a ‘middle maker’. I will also put aside the view that these reflexive markers are ambiguous in any way. As we will see in Section 2, it is possible to have a rather simple, univocal analysis of these facts.

languages studied here, it is more accurate to say that the reflexively marked (a)-sentences have an especially ‘vague’ or ‘underspecified’ meaning, relative to their English counterpart in (1a). To illustrate, consider the ‘mixed’ scenario in (8).

(8) **Mixed Reflexive and Reciprocal Scenario**

About half the boys are each slapping themselves (Dave is slapping himself. Tom is slapping himself, etc.). The other half of the boys are slapping one another (Bill is slapping Bob, Bob is slapping Tony, etc.).

Importantly, neither of the English sentences in (1) are true or appropriate in a mixed scenario like (8). Thus, if the behavior of (3a)-(7a) were due to an ambiguity or polysemy between the meaning expressed by the English (1a) and that expressed by (1b), we would expect that (3a)-(7a) would similarly fail to accurately describe the ‘mixed’ scenario in (8). This appears not to be the case. That is, speakers report that each of (3a), (4a), (5a), (6a), and (7a) can describe the mixed scenario in (8). Thus, we can conclude that these sentences are not ambiguous between a reading equivalent to (1a) and one equivalent to (1b). Rather, they possess a single, weak interpretation, one that encompasses all the situations in (2a), (2b) and (8). This point will be returned to in Section 2, where we will see that – given current assumptions regarding the semantics of plurals – the truth-conditions predicted for sentences (3a)-(7a) are weak enough to hold in (2a), (2b), and (8).⁵

Interestingly, many languages exhibiting the pattern in (3)-(7) also possess a means for specifying a reflexive situation like (2a). That is, along side the vague/weak sentences in (3a)-(7a), there are the sentences in (9)-(13), each of which is only true or appropriate in (2a).⁶ Note that in each of the sentences below, the reflexive marker bears focus. In the languages considered here, focus on the reflexive marker requires the use of a special ‘focal’ form of the reflexive marker, indicated in boldface below.

(9) **Focused Reflexives in French**

Les	étudiants	se	sont	frappés	aux	mêmes.
the	students	REFL	AUX	slap	to.the.PL	same.PL

The students slapped themselves.

Judgment: Can truthfully describe only (2a), not (2b) or (8).

(10) **Focused Reflexives in Spanish**

Los	estudiantes	se	golpeaban	a	sí	mismos.
the	students	REFL	slap.IMPF	to	REFL	same.PL

The students were slapping themselves.

Judgment: Can truthfully describe only (2a), not (2b) or (8).

⁵ McGregor (2000: 118) similarly argues that use of reflexives in Nyulnyulan languages to describe ‘reciprocal’ situations is due to vagueness rather than true ambiguity or polysemy: “...specific senses such as reflexive, reciprocal, chaining, etc. are contextual senses of the general meaning of the reflexive/reciprocals; the construction is not polysemous, and there is no ambiguity – merely vagueness...”.

⁶ Note that this claim will be qualified in Section 3.1 below. There, we will see that there are ways of augmenting the context so that even the sentences in (9)-(13) can describe situations (2b) and (8).

(11) **Focused Reflexives in Portuguese**

Os estudantes bateram **neles** **mesmos**.
the students slap.IMPF to.the.PL same.PL

The students were slapping themselves.

Judgment: Can truthfully describe only (2a), not (2b) or (8).

(12) **Focused Reflexives in Italian**

Gli studenti si sono picchiati **a se stessi**.
the students REFL AUX hit/fight to REFL same.PL

The students slapped themselves

Judgment: Can truthfully describe only (2a), not (2b) or (8).

(13) **Focused Reflexives in German**⁷

Die schüler schlagen sich **selbst**.
the students hit REFL **self**

The students are hitting themselves.

Judgment: Can truthfully describe only (2a), not (2b) or (8).

The main goal of this paper is to develop a formal semantic analysis of the contrast between the sentences in (3a)-(7a) and those in (9)-(13). That is, we will primarily be concerned with (i) the vague/underspecified semantics of (3a)-(7a), and (ii) the effect that focus seems to have on the truth-conditions of the sentences in (9)-(13). I will not in this paper be concerned with the effect of the reciprocal markers in (3b)-(7b), though that is also an important part of the overall picture.

In the following section, I show that current approaches to the semantics of plural NPs predict that reflexively marked predicates with plural arguments can receive especially weak truth-conditions, ones that hold in situations (2a), (2b) and (8). Thus, the behavior of (3a)-(7a) is easily accounted for under current semantic assumptions, and those sentences can easily be provided a single, univocal analysis.

Having accounted for the facts in (3a)-(7a), I turn in Section 3 to the complementary facts in (9)-(13). There, I argue that a relatively novel (but plausible) assumption regarding the semantics of focus predicts that F(ocus)-marking of the reflexive anaphors in (3a)-(7a) will create a structure that (without a facilitating context) only truthfully describes situation (2a). Importantly, the proposed analysis correctly predicts that certain key changes to the context in which (9)-(13) are uttered allows for those sentences to again describe the reciprocal situation in

⁷ Gast & Haas (2008) claim that focal accent on the reflexive marker *sich* does not really require presence of the modifier *selbst*, as sentences like the following are (to them) acceptable.

(i) Die schüler schlagen SICH
the students hit REFL

The students are hitting themselves.

Judgment: Can truthfully describe only (2a), not (2b) or (8).

However, as noted by Wiemer & Nedjalkov (2007), most speakers of German tend not to like sentences like (i), preferring that a focused *sich* also appear with the intensifier *selbst*. Thus, I will put aside sentences like (i) in my discussion here.

(2b) and the mixed situation in (8). Thus, under this analysis, the placement of focus in (9)-(13) doesn't truly preclude the weak/vague interpretation of (3a)-(7a). Rather, it causes that interpretation to only be felicitous if certain discourse conditions are satisfied. In contexts where those conditions are *not* satisfied – such as null (out-of-the-blue) contexts – focus of the reflexive marker will force a stronger, distributive reading of (3a)-(7a), one that only holds in (2a). These points will become clearer in Section 3, where the details of the analysis are put forth.

I conclude by offering some informed speculations regarding languages where reflexive sentences seem to only ever be true/appropriate in reflexive situations like (2a), and not reciprocal or mixed situations like (2b) and (8). I show that, in nearly all the languages examined, the same contextual manipulations that allow (9)-(13) to describe reciprocal and mixed situations also allow reflexive sentences in those languages to describe such situations. I therefore speculate that in these languages, the reflexive markers retain something of the focus-semantics of the F-marked reflexives in (9)-(13). I argue that some support for this comes from languages where reflexive markers never bear focus, such as Kikuyu.

2. The Semantics of Reflexive Predicates with Plural Arguments

The ability of (3a)-(7a) to describe any of the situations in (2a), (2b), or (8) has sometimes been informally labeled a case of 'ambiguity' or 'polysemy' (Heine & Miyashita 2008, Gast & Haas 2008, Maslova 2008). Importantly, however, current approaches to the semantics of plurals predict that reflexive predicates with plural arguments have especially weak truth-conditions, ones that hold in reflexive, reciprocal and mixed situations (Sternefeld 1998, Beck 2001, Faller 2007).⁸ Thus, under these common semantic assumptions, it is the behavior of reflexive sentences in languages like English that is the unexpected puzzle, as reflexive sentences like (1a) are expected to be logically weaker than reciprocal ones like (1b).

To begin laying this out in detail, it's long been observed that sentences containing multiple plural arguments allow for readings with very weak truth conditions (Scha 1984). For example, a sentence like (14a) can be read as true as long as each girl hit some boy, and each boy was hit by some girl. Thus, it can be read as true in a situation like (14b), where the girls are Mary, Sue and Jen, and the boys are Dave, Tom and Bill.

(14) The Weak Truth Conditions of Sentences Containing Multiple Plurals

a. The girls hit the boys.

b. Verifying Situation for (18a)

<i>Event of Hitting</i>	<i>Agent</i>	<i>Theme</i>
e ₁	Mary	Dave
e ₂	Sue	Tom
e ₃	Jen	Bill

A key insight into the nature of these 'cumulative' readings was made by Krifka (1992, 1999), who recognized that they could follow from a simple generalization of the cumulative

⁸ Although this fact is hinted at by Sternefeld (1998), Beck (2001) and Faller (2007), none of them draw attention to it, nor its connection to the well-known facts in (3a)-(7a).

operator ‘*’ introduced by Link (1983) for plural NPs. The operator ‘*’ is assumed to have the definition below.

(15) Definition of the ‘*’-Operator

Let S be any set of entities. *S is defined as the smallest set such that:

- a. $S \subseteq *S$
- b. For all $x, y \in *S$, $x+y \in *S$

In the notation above, ‘x+y’ is understood as the plural entity formed from x and y together (Link 1983). Thus, if the extension of *boy* is the set in (16a), the extension of plural *boys* is as in (16b).

(16) Semantics of Plural NPs

- a. $[[\text{boy}]]$ = { Dave, Tom, Bill }
- b. $[[\text{boys}]]$ = $*[[\text{boy}]]$ = $*\{ \text{Dave, Tom, Bill} \}$ =
 $\{ \text{Dave, Tom, Bill, Dave+Tom, Dave+Bill, Tom+Bill, Dave+Tom+Bill} \}$

In the system developed by Link (1983), the plurality forming operator ‘+’ is assumed to be an operator on entities. Krifka (1992, 1999) introduces the definition in (17) below, which allows ‘+’ to hold between arbitrarily long tuples.

(17) Generalized Plurality Formation (Krifka 1992, 1999)

$$\langle x_1, \dots, x_n \rangle + \langle y_1, \dots, y_n \rangle = \langle x_1 + y_1, \dots, x_n + y_n \rangle$$

With this generalization of the plurality operator ‘+’, the cumulatvty operator ‘*’ is able to apply to sets of tuples, including tuples of entities and events. Note, then, that in a scenario like (14b), the extension of the verb *hit* is commonly taken to be the set of tuples in (18a). Therefore, if we allow ‘*’ to apply to this extension, we obtain the set in (18b).

(18) Cumulation of the Extension of Verbs

- a. $[[\text{hit}]]$ = { $\langle e_1, \text{Mary, Dave} \rangle$, $\langle e_2, \text{Sue, Tom} \rangle$, $\langle e_3, \text{Jen, Bill} \rangle$ }
- b. $*[[\text{hit}]]$ = { $\langle e_1, \text{Mary, Dave} \rangle$, $\langle e_2, \text{Sue, Tom} \rangle$, $\langle e_3, \text{Jen, Bill} \rangle$,
 $\langle e_1 + e_2, \text{Mary+Sue, Dave+Tom} \rangle$,
 $\langle e_1 + e_3, \text{Mary+Jen, Dave+Bill} \rangle$,
 $\langle e_2 + e_3, \text{Sue+Jen, Tom+Bill} \rangle$,
 $\langle e_1 + e_2 + e_3, \text{Mary+Sue+Jen, Dave+Tom+Bill} \rangle$ }

Finally, if we hypothesize that sentence (14a) can have an LF like that in (19a), we predict that the sentence can receive the T-conditions in (19b).

(19) **Derivation of the Weak Truth-Conditions of Sentences Containing Plurals**

- a. [the girls [*hit [the boys]]]
- b. $\exists e . < e , \text{Mary+Sue+Jen} , \text{Dave+Tom+Bill} > \in *[[\text{hit}]]$

Given that the tuple $\langle e_1+e_2+e_3 , \text{Mary+Sue+Jen} , \text{Dave+Tom+Bill} \rangle$ does lie within the extension of $*[[\text{hit}]]$ in scenario (14b), we predict the sentence (14a) can be read as true in that scenario. Thus, by generalizing the plurality forming ‘+’ operator as in (17), we are able to obtain the weak, ‘cumulative’ reading of (14a).

In the account sketched above, it was assumed that (14a) can be assigned an LF like that in (19a), where the cumulative operator ‘*’ applies to the verb *hit*. In recent work, some have questioned the necessity of such LFs for obtaining cumulative T-conditions. Following Krifka (1992, 1999), Kratzer (2003, 2007) proposes the principle in (20), whereby all simple/lexical predicates of natural language are inherently cumulative.

(20) **Cumulativity Universal (Kratzer 2003, 2007)**

The denotations of simple (i.e., lexical) predicates in natural languages are cumulative. Thus, if P is a lexical predicate of natural language, then if $x, y \in [[P]]$, then $x+y \in [[P]]$

If the cumulativity universal in (20) holds, then the extension of *hit* in scenario (14b) would not be the simple set in (18a), but rather the complex, cumulative set in (18b). More generally, in any given scenario, the extension of the verb *hit* will be the cumulative set in (21).

(21) **Verbal Extensions Under the Cumulativity Universal**

$$[[\text{hit}]] = * \{ \langle e, x, y \rangle : \text{hit}(e) \ \& \ \text{Agent}(e) = x \ \& \ \text{Theme}(e) = y \}$$

Therefore, we need only assign (14a) the simple LF in (22a) to obtain the weak ‘cumulative’ T-conditions in (22b). Note that (22b) does indeed hold in scenario (14b).

(22) **Cumulative Readings with the Cumulativity Universal**

- a. LF For Sentence (18a) [[the girls] [hit [the boys]]]
- b. Predicted T-Conditions
 $\exists e . \langle e , \text{Mary+Sue+Jen} , \text{Dave+Tom+Bill} \rangle \in$
 $* \{ \langle e, x, y \rangle : \text{hit}(e) \ \& \ \text{Agent}(e) = x \ \& \ \text{Theme}(e) = y \}$

For further discussion of this method of capturing ‘cumulative’ readings, I refer the reader to the literature cited above.

With all this in mind, consider the T-conditions that are predicted for the reflexive sentence in (23a), assumed to have the LF in (23b) (Heim & Kratzer 1998).

(23) **Reflexive Sentences and Their LFs (Heim & Kratzer 1998)**

- a. The boys hit themselves.
b. $[[[\text{The boys}] [1 [t_1 [\text{hit themselves}_1]]]]$

Given that the reflexive anaphor is bound by the plural subject, the T-conditions we obtain for LF (23b) are those in (24).

(24) **T-Conditions Predicted for Reflexive LF (23b)**

$$\exists e. \langle e, [[\text{the boys}]] , [[\text{the boys}]] \rangle \in * \{ \langle e, x, y \rangle : \text{hit}(e) \ \& \ \text{Agent}(e) = x \ \& \ \text{Theme}(e) = y \}$$

Importantly, it can be shown rather easily that these T-conditions will hold in each of the three situations below.

(25) **Scenarios Verifying the T-Conditions in (24)**

- a. Reflexive Situation: Each both hit himself.

<i>Events of Hitting</i>	<i>Agent</i>	<i>Theme</i>
< e ₁	, Tom	, Tom >
< e ₂	, Dave	, Dave >
< e ₃	, Bill	, Bill >
< e ₄	, Frank	, Frank >

Sum of the tuples above:

$$\langle e_1+e_2+e_3+e_4, \text{Tom+Dave+Bill+Frank}, \text{Tom+Dave+Bill+Frank} \rangle$$

- b. Reciprocal Situation: Each boy hit some other boy and was hit by some other boy

<i>Events of Hitting</i>	<i>Agent</i>	<i>Theme</i>
< e ₁	, Tom	, Dave >
< e ₂	, Dave	, Bill >
< e ₃	, Bill	, Frank >
< e ₄	, Frank	, Tom >

Sum of the tuples above:

$$\langle e_1+e_2+e_3+e_4, \text{Tom+Dave+Bill+Frank}, \text{Tom+Dave+Bill+Frank} \rangle$$

- c. Mixed Situation: Half the boys each hit themselves. The other half hit each other.

<i>Events of Hitting</i>	<i>Agent</i>	<i>Theme</i>
< e ₁	, Tom	, Tom >
< e ₂	, Dave	, Dave >
< e ₃	, Bill	, Frank >
< e ₄	, Frank	, Bill >

Sum of the tuples above:

$$\langle e_1+e_2+e_3+e_4, \text{Tom+Dave+Bill+Frank}, \text{Tom+Dave+Bill+Frank} \rangle$$

Note that in each of the situations in (25), the extension of the verb *hit* contains the four tuples indicated. Thus, given the Cumulativity Universal in (20), in each of these situations, the extension of *hit* will contain the *sum* of those four tuples. Finally, note that in each of (25a-c), the sum of the four tuples is $\langle e_1+e_2+e_3+e_4, \text{Tom+Dave+Bill+Frank}, \text{Tom+Dave+Bill+Frank} \rangle$. Thus, in each of the three situations above, the T-conditions in (24) hold, and so we predict that the sentence in (23a) will be true in each of these situations.

Of course, as noted earlier, this prediction does not actually hold of the English sentence in (23a). However, it *does* hold for the non-English sentences in (3a)-(7a). Let us, then, assume this analysis for those sentences. In Section 4, we will return to the interpretation of English sentences like (23a), and why they might appear to be stronger than what is predicted in (24).

We therefore find that rather basic (and commonly held) assumptions regarding the semantics of plural predication entail that reflexive sentences like (3a)-(7a) will receive very weak truth-conditions, ones that hold in reflexive situations like (2a), reciprocal situations like (2b) and mixed situations like (8). It is no mystery, then, that a significant minority of languages can use reflexive sentences to describe reciprocal and mixed situations. Moreover, we find that such breadth of use is not due to an ambiguity or polysemy in the reflexive marker/anaphor itself. Rather, in all cases the reflexive marker is assumed to simply be a reflexive anaphor, bound by a plural argument within the sentence. Given the Cumulativity Universal in (20), such an LF will receive a very weak – but univocal – interpretation, one that encompasses many situation types beyond the purely reflexive one in (2a).

Although we needn't posit an ambiguity to account for the facts in (3a)-(7a), our semantics does predict a kind of 'hidden ambiguity' in these sentences. That is, under certain common assumptions, sentences like (23a) do possess a structural ambiguity: in addition to the LF in (23b), such sentences can be assigned the LF in (26), where the sister of the plural subject contains a 'distributivity' operator (Link 1983, Schwarzschild 1996, Winter 2000).⁹

(26) Distributive LF For Plural Reflexive Sentences

$[[[\text{The boys}] [\mathbf{D} [1 [t_1 [\text{hit themselves}_i]]]]]]$

If we assume the semantics for the D-operator in (27a), we predict the T-conditions in (27b) for the LF in (26).¹⁰

(27) Distributive T-Conditions for Plural Reflexive Sentences

- a. $[[[\mathbf{D}]]] = [\lambda P_{\langle et \rangle} : \lambda x_e : \forall y \leq x \ \& \ \text{ATOM}(y) : P(y) = T]$
- b. $\forall y \leq [[\text{the boys}]] \ \& \ \text{ATOM}(y):$
 $\exists e. \langle e, y, y \rangle \in * \{ \langle e, x, z \rangle : \text{hit}(e) \ \& \ \text{Agent}(e) = x \ \& \ \text{Theme}(e) = z \}$

⁹ In recent years, it has become common for 'D'-operators to be replaced with cumulative '*'-operators (Kratzer 2003, 2007). Such replacement could (and I believe should) be done in (26) as well. I use D-operators in this paper simply to make the proposed T-conditions somewhat more transparent.

¹⁰ Under the semantics in (27a), the D-operator obligatorily distributes over the atoms of the plural argument. As discussed extensively by Schwarzschild (1996), this is not generally correct. Rather, (27a) should be augmented so that the quantification of the D-operator is sensitive to a contextually supplied 'cover' of the plurality. I avoid doing so here merely for purposes of simplicity.

Note that the T-conditions in (27b) will hold if and only if each atomic boy y is such that there is an event of y hitting y . Thus, the distributive LF in (26) will only hold in a reflexive situation like (25a), and not a reciprocal one like (25b) or a mixed one like (25c).

Since the distributive LF in (26) receives a stronger interpretation than the basic LF in (23b), it is difficult to detect the presence of this syntactic ambiguity. Furthermore, this ambiguity plays no role in our explanation of (3a)-(7a). However, the LF in (26) will play an important role in our analysis of sentences like (9)-(13), where the reflexive marker bears focus.

3. The Contribution of Focus to Reflexive Sentences

In the preceding section, we saw that certain common assumptions regarding the semantics of plurals correctly predict that (3a)-(7a) will be true in situations (2a), (2b) and (8). In this section, we consider the contrasting behavior of the focus-marked reflexive sentences in (9)-(13).

First, we will observe that there are indeed contexts where such sentences can describe both reciprocal and mixed situations. With this fact in mind, we will introduce a few relatively novel assumptions regarding the interaction of focus-semantics and plurality. We will see that these assumptions correctly predict that, in null ('out-of-the-blue') contexts, sentences like (9)-(13) will only be true in reflexive situations like (2a). We will then see that these assumptions also correctly predict the contexts where (9)-(13) can be read as true in reciprocal and mixed situations.

3.1 The Interpretation of Sentences Containing F-Marked Reflexives

We saw in (9)-(13) that placement of focus on the reflexive marker in (3a)-(7a) appears to strengthen the meaning of the sentence, so that it is only true in reflexive situations like (2a). This basic pattern is further illustrated below. Consider first the three scenarios in (28).

(28) Basic Washing Scenarios

- a. Reflexive Situation:
Each boy is washing himself. (Dave is washing himself, Tom is washing himself, Frank is washing himself, etc.)
- b. Reciprocal Situation:
Each boy is washing some other boy. (More concretely, we can imagine that the boys have dirty backs, and each boy is washing the back of some other boy. Thus, Dave is washing Tom, Tom is washing Frank, Frank is washing Dave, etc.)
- c. Mixed Situation:
Half the boys are each washing themselves (Dave is washing himself, Tom is washing himself, etc.). The other half of the boys are each washing some other boys (Frank is washing Tony, Tony is washing Frank, etc.).

As observed in Section 1, we find that the plain reflexive sentences below can describe all three situations in (28). However, the sentences with focused reflexive markers can (in these contexts) only describe the reflexive situation in (28a).

(29) **Reflexive Sentences in French**

- a. Les garçons se sont lavés
the boys REFL AUX washed
The boys washed themselves.
Judgment: True/appropriate in (28a,b,c)
- b. Les garçons se sont lavés aux mêmes.
the boys REFL AUX washed to.the.PL same.PL
The boys washed themselves.
Judgment: True/appropriate only in (28a)

(30) **Reflexive Sentences in Spanish**

- a. Los chicos se lavan
the boys REFL wash.IMPF
The boys washed themselves.
Judgment: True/appropriate in (28a,b,c)
- b. Los chicos se lavan a sí mismos
the boys REFL wash.IMPF to REFL same.PL
The boys washed themselves.
Judgment: True/appropriate only in (28a)

(31) **Reflexive Sentences in Portuguese**

- a. Os meninos se lavaram
the boys REFL washed.IMPF
The boys washed themselves.
Judgment: True/appropriate in (28a,b,c)
- b. Os meninos lavaram eles mesmos.
the boys washed.IMPF their same.PL
The boys washed themselves.
Judgment: True/appropriate only in (28a)

(32) **Reflexive Sentences in Italian**

- a. I ragazzi si sono lavati
the boys REFL AUX washed
The boys washed themselves.
Judgment: True/appropriate in (28a,b,c)
- b. I ragazzi si sono lavati a se stessi
the boys REFL AUX washed to REFL same.PL
The boys washed themselves. Judgment: True/appropriate only in (28a)

(33) **Reflexive Sentences in German**

- a. Die jüngen haben sich gewaschen.
the boys AUX REFL washed
The boys washed themselves.
Judgment: True/appropriate in (28a,b,c)
- b. Die jüngen haben sich selbst gewaschen.
the boys AUX REFL self washed
The boys washed themselves.
Judgment: True/appropriate only in (28a)

The judgments above cohere with the general pattern observed in Section 1 and widely reported in the literature on reflexive and reciprocal constructions (Nedjalkov 2007).

Interestingly, however, a rather minimal change to the linguistic context accompanying (28b) and (28c) has a dramatic effect upon the judgments of speakers. Consider the slight augmentation of (28b,c) below.

(34) **Washing Scenarios With Possible Contrastive Focus**

- a. Reciprocal Situation:
We work as assistants at a sleep-away camp for boys, along with some other assistants. I see that the boys we're in charge of all have really dirty backs (from rolling around in the dirt). I say to you "these boys need to get clean", and then I leave to do some errands. You tell the boys to go to the showers and clean up. You supervise, and this is what you see: each boy washes some other boy (Dan washes Tom's back, Tom washes Frank's back, etc.).
When I get back, I see that the boys are all sparkling clean. Taken aback, I say the following to you: "This is great! Who did this? Was it you? Did you wash them? Or did the other assistants wash them?..."
- b. Mixed Situation:
Same as (34a), except that when you supervise, this is what you see: half the boys are washing themselves (Dave is washing himself, Frank is washing himself, etc.), and half the boys are washing some other boy (Dan washes Tom's back, Tom washes Bill's back, etc.).
When I get back, I see that the boys are all sparkling clean. Taken aback, I say the following to you: "This is great! Who did this? Was it you? Did you wash them? Or did the other assistants wash them?..."

Strikingly, speakers report that *all* the focalized reflexive sentences in (29b)-(33b) *can* be construed as true/appropriate answers to the prompting questions in (34a) and (34b). Note that this is despite the fact that in (34a), each boy washes some other boy, rather than themselves, while in (34b), about half the boys are washing some other boy. In other words, although the focused reflexive sentences in (29b)-(33b) are not felt to be true/appropriate in the simple

contexts in (28b) and (28c), if those contexts are augmented as in (34a,b), then speakers feel that those focused sentences *can* describe both reciprocal and mixed situations.

What is the crucial difference between (28b,c) and (34a,b)? The view I will pursue here is that in (34a,b), the context is one where there are other salient entities that can contrast with the antecedent of the reflexive anaphor. That is, in the sparse descriptions under (28b,c), the only entities introduced into the discourse are the boys who are washing. However, in the more articulated contexts under (34a,b), the discourse also explicitly incorporates the speaker, the addressee, and the other individuals who serve as ‘assistants’ at the camp.

This same effect of contrast can be seen the data below. To begin, consider the very basic scenarios sketched in (35).

(35) Basic Grading Scenarios

- a. Reflexive Situation:
In this class, there is a rather unorthodox grading procedure. Every student assigns their own grades on their assignments. Thus, Dave has graded himself. Mary has graded herself. Tom has graded himself, etc.
- b. Reciprocal Situation:
In this class, there is a rather unorthodox grading procedure. Every student assigns the grade of some other student. Thus, Dave has graded Mary. Mary has graded Tom. Tom has graded Dave, etc.
- c. Mixed Situation:
In this class, there is a rather unorthodox grading procedure. About half the students each assigned their own grades (Dave graded himself, Mary graded herself). The other half assigned the grade of some other student (Tom graded Sue. Sue graded Tom, etc.)

As we’ve seen before, in these very basic contexts, speakers report that focalized reflexive sentences can only describe reflexive situations like (35a), and not the situations in (35b,c).

(36) Reflexive Sentences in French

- a. Les étudiants se sont évalués
the students REFL AUX graded
The students graded themselves.
Judgment: True/appropriate in (35a,b,c)
- b. Les étudiants se sont évalués aux mêmes.
the students REFL AUX graded to.the.PL same.PL
The students graded themselves.
Judgment: True/appropriate only in (35a)

(37) **Reflexive Sentences in Spanish**

- a. Los estudiantes se puntuaron
the students REFL grade.IMPF
The students graded themselves.
Judgment: True/appropriate in (35a,b,c)
- a. Los estudiantes se puntuaron a sí mismos
the students REFL grade.IMPF to REFL same.PL
The students graded themselves.
Judgment: True/appropriate only in (35a)

(38) **Reflexive Sentences in Portuguese**

- a. Os estudantes se deram uma nota
the students REFL gave.IMPF a grade
The students graded themselves.
Judgment: True/appropriate in (35a,b,c)
- b. Os estudantes deram uma nota para eles mesmos
the students gave.IMPF a grade to they same.PL
The students graded themselves.
Judgment: True/appropriate only in (35a)

(39) **Reflexive Sentences in Italian**

- a. Gli studenti si sono dati i voti
the students REFL AUX given their grades
The students graded themselves.
Judgment: True/appropriate in (35a,b,c)
- b. Gli studenti si sono dati i voti a se stessi.
the students REFL AUX given their grades to REFL same
The students graded themselves.
Judgment: True/appropriate only in (35a)

(40) **Reflexive Sentences in German**

- a. Die schüler haben sich benotet.
the students AUX REFL graded
The students graded themselves
Judgment: True/appropriate in (35a,b,c,)

- b. Die schüler haben sich selbst benotet.
 the students AUX REFL self graded
The students graded themselves
Judgment: True/appropriate only in (35a)

Again, though, the judgments regarding (36b)-(40b) change when the contexts are altered to the ones in (41) below.

(41) Grading Scenarios With Possible Contrastive Focus

- a. Reciprocal Situation:
 You taught a class where the students were graded in a somewhat unorthodox fashion. Because it was an advanced class, the students were responsible for assigning the grades. Each student graded the work of some other student. You and I are now talking about your class, and I'm curious about how the grades in your class were assigned. I ask the following question: "How was the work in your class graded? Did you grade the work? Did the TAs grade it?..."
- b. Mixed Situation:
 Same as (41a), except that half the students each graded their own work, while the other half graded the work of some other student. You and I are now talking about your class, and I'm curious about how the grades in your class were assigned. I ask the following question: "How was the work in your class graded? Did you grade the work? Did the TAs grade it?..."

Just as we saw for (34), within these more articulated contexts, speakers feel that the sentences in (36b)-(40b) *would* be truthful and appropriate answers to the prompting questions. Again, this is despite the fact that in (41a), each student grades some other student, rather than themselves, while in (41b), about half the students grade some other student.

Taking these facts together, the following picture comes into view. First, in a very basic, 'out-of-the-blue' context, a sentence containing an F-marked reflexive anaphor is felt to have stronger truth-conditions than one without F-marking on the anaphor. That is, in such contexts, these sentences are felt to only truthfully/felicitously describe reflexive situations like (2a), and not reciprocal situations like (2b) or mixed situations like (8). I assume that the key property of such 'out-of-the-blue' contexts is that the only salient entities in the discourse are those making up the referent of the plural antecedent of the reflexive anaphor. Consequently, if the context is such that there are *other* salient entities besides the referent of the plural antecedent, then reflexive sentences with F-marked anaphors are judged to have the weak truth-conditions of the non-focalized sentences. In such contexts, even sentences containing F-marked anaphors are judged to be true/appropriate in reciprocal and mixed situations. In the sections to follow, these will be the key generalizations I will seek to predict; for this reason, I summarize them below.

(42) The Relation Between Focus, Contrast and Weak Readings of Reflexive Sentences¹¹

In a sentence (S) where (i) a reflexive anaphor bears focus, and (ii) the antecedent of the anaphor is a plural NP (NP_{pl}), then

- a. If the discourse is such that $\{x : x \leq [[NP_{pl}]]\}$ are the only salient entities, then S is felt to only be true/appropriate in a reflexive situation.
- b. If the discourse contains other salient entities besides $\{x : x \leq [[NP_{pl}]]\}$, then S is felt to be true in both reflexive, reciprocal and mixed situations. That is, it is felt to have the exact same weak truth-conditions as the corresponding sentence without focus on the anaphor.

In the following subsection, I will begin to lay out an explanation for the generalizations in (42). Before we come to this, however, I would like to address a claim sometimes found in the descriptive and typological literature. In their study of reflexive markers in German, Gast & Haas (2008) similarly note that German sentences with stressed reflexive anaphors can sometimes describe reciprocal situations. However, they claim that what is crucial about such cases is that the predication in question can be understood as ‘collective’. They claim that:

“... a reflexive with a plural subject is ambiguous between a distributive reflexive and a collective reflexive reading... In the first case, each of the individuals denoted by the plural subject acts on him- or herself and in the second case the individuals collectively act on themselves as a group. The latter reading is conceptually very similar to the reciprocal reading: if a,b,c act on themselves as a group, a indirectly acts on b and c, b indirectly acts on a and c, etc.” (Gast & Haas 2008: 318).

Similar comments are made by Maslova (2008: 240-242), who likewise claims that ‘collectivity’ is what allows reflexive sentences to be understood as true in reciprocal situations.

Since the authors in question do not assume a formal semantics, it is somewhat unclear what exactly they mean by ‘collective readings’ of reflexive sentences. Under one charitable interpretation, their claims are exactly those that we made earlier in Section 2: sentences like (23a) are syntactically ambiguous between a simple, ‘cumulative’ LF in (23b) and an obligatorily distributive LF (26). Thus, reflexive sentences with focused anaphors can receive ‘reciprocal’ interpretations precisely when the cumulative LF in (23b) is available to them. If we simply trade the term ‘cumulative’ for the term ‘collective’ in the works cited above, the resulting (informal) analysis comes very close to the (formal) one defended here.

We should note, however, that ‘collective (group) action’ in the technical sense preferred by semanticists is *not* what underlies the judgments regarding (34) and (41). That is, it does not seem plausible to view the crucial contrast between (28) and (34) – and that between (35) and

¹¹ I have also found this effect at play in the interpretation of reflexive sentences translating “The boys shot themselves.” Again, when only very basic, ‘out-of-the-blue’ contexts are presented, the sentences containing focused reflexives are judged not to be true/appropriate in ‘reciprocal’ and ‘mixed’ situations. However, in richer contexts, where the subject ‘the boys’ can contrast with some other discourse-salient entities, speakers report that even the focused reflexive sentences can describe the reciprocal and mixed situations. For reasons of space, however, I omit here this further confirming data.

(41) – as one of whether the plural subject can be construed as a ‘substantive plurality’ (Kratzer 2003, Chapter 4: 28-39). After all, the only real change between (28)/(35) and (34)/(41) is in whether certain other entities are explicitly mentioned in the discourse. Thus, it seems that the action in (28)/(35) could be understood as ‘collective’ just easily as that in (34)/(41). Furthermore, as noted by Aynat Rubinstein (p.c.), if sentences (36b)-(40b) were truly understood ‘collectively’, then the reading would be one in which the students *as a group* assigned a grade to the students *as a group*. However, in the situation in (41), the students are not graded *as a group*, but rather are graded individually.¹² Thus, it would be wrong to view the interpretation of (36b)-(40b) relative to (41) as involving ‘group’ or ‘collective’ predication/action.

For this reason, I will put aside the view that a ‘collective’ reading is required for focused reflexive sentences to describe reciprocal or mixed situations. Furthermore, we should note that – in the terminology preferred by formal semanticists – it is *cumulative* rather than collective predication that allows reflexive sentences to describe reciprocal situations.

3.2 Hypotheses Regarding Focus, Pluralities and Reflexives

Since we are examining the effect of focus upon reflexives, I will lay out here the key assumptions I make regarding the general semantics of F(ocus)-marking. For our purposes here, I will adopt a somewhat simplified version of the well-known theory of Rooth (1985, 1992).

I assume that besides the regular, ‘normal-semantic’ interpretation function “ $[[\cdot]]^g$ ”, there also exists the special ‘focus-semantic’ interpretation function “ $[[\cdot]]^{g,F}$ ”. The focus-semantic value of a given expression is defined partly in terms of its normal-semantic value. The definitions below are fairly typical.

(43) The Definition of Focus-Semantic Values

- a. If X_F is a head/phrase bearing F-marking, then $[[X_F]]^{g,F} = \{x \in D_\tau : [[X]]^g \in D_\tau\}$
- b. If X is a head that does not bearing F-marking, then $[[X]]^{g,F} = \{ [[X]]^g \}$
- c. If X is a phrase that does not bear F-marking, and if X is composed of the daughters Y and Z , then if
 - (i) $[[Y]]^{g,F} \in D_{\langle\langle\sigma, \tau\rangle, t\rangle}$
 - (ii) $[[Z]]^{g,F} \in D_{\langle\sigma, t\rangle}$
 then $[[X]]^{g,F} = \{f(a) : f \in [[Y]]^{g,F} \text{ and } a \in [[Z]]^{g,F}\}$

Thus, the focus-semantic value of an expression X depends upon whether X bears F-marking. If X does bear F-marking, then its focus semantic value is the set of all things within the semantic type of the normal-semantic value of X (43a). If X does not bear F-marking, then its focus-semantic value depends upon whether it is a head or a phrase. If X is a head, then its focus-semantic value is simply the singleton set consisting of X ’s normal-semantic value (43b). If X is a phrase, however, then X ’s focus-semantic value is the ‘point-wise semantic composition’ of the focus-semantic values of X ’s daughters (43c).

¹² That is, the students as a whole do not receive a single ‘group’ or ‘class’ grade. Rather, each student receives their own grade, assigned at potentially different times from one another.

Let us illustrate these definitions by computing the interpretation of the sentence in (44a), where the reflexive anaphor *himself* bears F-marking.

(44) **Illustrative Example: F-Marking of a (Singular) Reflexive Anaphor**

- a. Surface Form: Dave washed HIMSELF.
- b. LF Structure: [Dave [1 [EXH [t_1 washed himself_{F,1}]]]]

I assume that the LF for (44a) is that in (44b). As noted in Section 2, I adopt the binding system of Heim & Kratzer (1998), whereby the reflexive anaphor is bound by a lambda operator (‘1’) introduced by movement of the subject antecedent. Moreover, given that the reflexive bears focus in (44a), I assume that the anaphor bears the F-marking subscript ‘F’ in the LF-representation.

The last element of (44b) to mention is the ‘exhaustive’ operator *EXH*. Following much work on the semantics of focus, I assume that all structures containing F-marking also contain some (potentially covert) focus-sensitive operator (Chierchia *et al.* 2011). I assume that one such (covert) operator is ‘*EXH*’, though others may exist as well. The operator *EXH* is assumed to have the semantics in (45).¹³

(45) **Semantics of the *EXH* Operator**¹⁴

$$[[EXH\ XP]]^g(w) = T \quad \text{iff} \quad [[XP]]^g(w) = T \text{ and } \forall p \in [[XP]]^{g,w,F}, \\ \text{if } [[XP]]^{g,w} \neq p, \text{ then } p(w) = F$$

Thus, *EXH* contributes the information that the normal-semantic value of its complement *XP* is true, but the propositions in the focus-semantic value of *XP* are false, unless they are entailed by the normal semantic value of *XP*. Finally, as shown in (44b), I will assume that the operator *EXH* has scope below any lambda operators binding the anaphors in its complement. This assumption is made purely in order to simplify the semantic calculations; we could easily allow *EXH* to scope above such lambdas, but the semantic computation would require additional rules I choose to avoid here.¹⁵

With these ideas in place, we can compute the T-conditions of (44b) as follows.

(46) **Calculation of the T-Conditions of (44b), Part 1**

- a. $[[[\text{Dave} [1 [EXH [t_1 \text{ washed himself}_{F,1}] \dots]]]]^g(w) = T \quad \text{iff}$
- b. $[EXH [t_1 \text{ washed himself}_{F,1}] \dots]]^{g(1 \rightarrow \text{Dave})}(w) = T \quad \text{iff} \quad \text{(by (45))}$

¹³ Note that, under the semantics in (45), *EXH* is essentially a phonologically null version of the particle *only*. See Chierchia *et al.* (2011) for some independent evidence for such a null operator.

¹⁴ Note that, as is typical for systems of focus semantics, we must now assume that sentences are of propositional type, rather than of type *t*. I will make this augmentation without further comment throughout the remainder of this paper.

¹⁵ The reader may note that computing the semantics of the LF below would require calculating the focus-semantic value of the lambda-expression, and so would require a rule of focus-semantic lambda abstraction.

(i) [EXH [Dave [1 [t_1 washed himself_{F,1}]]]]

- c.
$$\begin{aligned} & [[t_1 \text{ washed himself}_{F,1}]]^{g(1 \rightarrow \text{Dave})}(w) = T \text{ and} \\ & \quad \forall p \in [[t_1 \text{ washed himself}_{F,1}]]^{g(1 \rightarrow \text{Dave}),w,F}, \\ & \quad \text{if } [[t_1 \text{ washed himself}_{F,1}]]^{g(1 \rightarrow \text{Dave})} \Rightarrow p, \text{ then } p(w) = F \end{aligned}$$

To calculate further, we will need to determine both the normal-semantic and the focus semantic value of ‘ $[t_1 \text{ washed himself}_{F,1}]$ ’, relative to the variable assignment $g(1 \rightarrow \text{Dave})$. The normal-semantic value is calculated in (47). Note that, in order to simplify the T-conditional statements, I will not employ the complex Neo-Davidsonian event semantics of Section 2. The reader is invited to confirm that the semantics from Section 2 can be incorporated into the proposals here and in the following sections.

(47) Calculation of the T-Conditions of (44b), Part 2

- a.
$$[[t_1 \text{ washed himself}_{F,1}]]^{g(1 \rightarrow \text{Dave})} =$$

b.
$$[[\text{washed}]]^{g(1 \rightarrow \text{Dave})} ([[\text{himself}_{F,1}]])^{g(1 \rightarrow \text{Dave})} ([[t_1]])^{g(1 \rightarrow \text{Dave})} =$$

c.
$$[\lambda x: \lambda y: \lambda w: y \text{ washed } x \text{ in } w](\text{Dave})(\text{Dave}) =$$

d.
$$[\lambda w: \text{Dave washed Dave in } w]$$

Furthermore, the focus-semantic value will be calculated as in (48).

(48) Calculation of the T-Conditions of (44b), Part 3

- a.
$$[[t_1 \text{ washed himself}_{F,1}]]^{g(1 \rightarrow \text{Dave}),F} = \text{(by (43c))}$$

b.
$$([\text{washed}]]^{g(1 \rightarrow \text{Dave}),F} ([[\text{himself}_{F,1}]])^{g(1 \rightarrow \text{Dave}),F} ([[t_1]])^{g(1 \rightarrow \text{Dave}),F} = \text{(by (43b))}$$

c.
$$(\{ [\lambda x: \lambda y: \lambda w: y \text{ washed } x \text{ in } w] \} ([[\text{himself}_{F,1}]])^{g(1 \rightarrow \text{Dave}),F}) (\{ \text{Dave} \})$$

$$= \text{(by (43a))}$$

d.
$$(\{ [\lambda x: \lambda y: \lambda w: y \text{ washed } x \text{ in } w] \} (\{ z : z \in D_e \})) (\{ \text{Dave} \}) = \text{(by (43c))}$$

e.
$$(\{ f_{\langle e, st \rangle} : \exists z \in D_e . f = [\lambda y: \lambda w: y \text{ washed } z \text{ in } w] \}) (\{ \text{Dave} \}) = \text{(by (43c))}$$

f.
$$\{ q_{\langle st \rangle} : \exists z \in D_e . q = [\lambda w: \text{Dave washed } z \text{ in } w] \}$$

With the results in (47) and (48), we can continue the calculation in (46) as follows.

(49) Calculation of the T-Conditions of (44b), Part 4

- a.
$$\begin{aligned} & [[t_1 \text{ washed himself}_{F,1}]]^{g(1 \rightarrow \text{Dave})}(w) = T \text{ and} \\ & \quad \forall p \in [[t_1 \text{ washed himself}_{F,1}]]^{g(1 \rightarrow \text{Dave}),w,F}, \\ & \quad \text{if } [[t_1 \text{ washed himself}_{F,1}]]^{g(1 \rightarrow \text{Dave})} \Rightarrow p, \text{ then } p(w) = F \\ & \quad \text{iff (by (47))} \end{aligned}$$
- b.
$$\begin{aligned} & \text{Dave washed Dave in } w \text{ and} \\ & \quad \forall p \in [[t_1 \text{ washed himself}_{F,1}]]^{g(1 \rightarrow \text{Dave}),w,F}, \\ & \quad \text{if } [\lambda w: \text{Dave washed Dave in } w] \Rightarrow p, \text{ then } p(w) = F \\ & \quad \text{iff (by (48))} \end{aligned}$$
- c.
$$\begin{aligned} & \text{Dave washed Dave in } w \text{ and} \\ & \quad \forall p \in \{ q_{\langle st \rangle} : \exists z \in D_e . q = [\lambda w: \text{Dave washed } z \text{ in } w] \} \\ & \quad \text{if } [\lambda w: \text{Dave washed Dave in } w] \Rightarrow p, \text{ then } p(w) = F \\ & \quad \text{iff (by meta-logic)} \end{aligned}$$

- d. Dave washed Dave in w and
 $\forall p . \exists z \in D_e . p = [\lambda w : \text{Dave washed } z \text{ in } w]$,
 if $[\lambda w : \text{Dave washed Dave in } w] \neq p$, then $p(w) = F$
iff (by meta-logic)
- e. Dave washed Dave in w , and he didn't wash anyone (or anything) else.

Thus, we find that the assumptions in (43)-(45) correctly predict that a sentence like (44a) will be interpreted as true if and only if Dave washed himself and Dave washed no others. This does seem to be one observable interpretation for (44a). I assume that other potential interpretations are due to the presence of focus operators other than *EXH*, which I leave aside for the purposes of this paper.

Although the definitions in (43) are sufficient for most work on the semantics of focus, the semantic interactions between focus, reflexives and plurality will require us to make a few (relatively minor) augmentations to those definitions. The first augmentation will be the following: *the focus-semantic value of some expression X cannot contain parts of [[X]]*. In order to motivate this condition, observe that the sentence in (50a) can be interpreted as true in a scenario like (50b).

(50) The Interaction Between Focus and Plurality

- a. Focus on Plural Anaphor: Dave, Bill and Tom only washed THEIR cars.
- b. Verifying Scenario:
- (i) Dave washed Tom's car.
 - (ii) Dave, Bill and Tom washed Bill's car.
 - (iii) Bill washed Dave's car.

That is, there is a clear, cumulative interpretation of (50a) where it is T *iff* each boy washed some other boy's car, each of the boys' cars was washed by some boy, and the boys washed nothing else. Under this interpretation, there are no constraints on which boy or how many boys washed each car. Thus, under this reading (50a) can be true in a situation like (50b), where *all three boys* washed one of the cars (e.g. Bill's car).

With this in mind, consider the T-conditions that our current semantics predicts for (50a). As the reader can confirm, (50a) will have the LF in (51a), and so the T-conditions in (51b).¹⁶

¹⁶ Note that the T-conditions in (51b) assume that *only* has the same semantics as *EXH* in (45).

(51) Predicted Interactions Between Focus and Plurality

a. LF of (50a): [[Dave, Bill and Tom] [1 [only [t_1 washed their_{F,1} cars]]]]

b. T-Conditions of (51a):¹⁷

D+B+T washed the cars of D+B+T in w , and

$\forall p . \exists z \in D_e . p = [\lambda w : D+B+T \text{ washed the car of } z \text{ in } w]$,

if $[\lambda w : D+B+T \text{ washed the cars of D+B+T in } w] \neq p$, then $p(w) = F$

Note, however, that one proposition p of the form ' $[\lambda w : D+B+T \text{ washed the car of } z \text{ in } w]$ ' is the proposition ' $[\lambda w : D+B+T \text{ washed the car of Bill in } w]$ '.¹⁸ Furthermore, note that the proposition ' $[\lambda w : D+B+T \text{ washed the car of Bill in } w]$ ' is not entailed by the proposition ' $[\lambda w : D+B+T \text{ washed the car of D+B+T in } w]$ '.¹⁹ Thus, according to the T-conditions predicted in (51b), the truth of (50a) should entail that the proposition ' $[\lambda w : D+B+T \text{ washed the car of Bill in } w]$ ' is *false*.²⁰ Thus, the T-conditions in (51b) predict that the truth of (50a) should entail that the event in (50bii) does not exist, and so they wrongly predict that (50a) should be interpreted as *false* in scenario (50b).

We should note, however, that this problem arises because the focus-semantic value of the bound pronoun *their* in (51a) is *all* entities of type e , *including those entities that are part of*

¹⁷ Note that these T-conditions again abstract away from the Neo-Davidsonian event semantics of Section 2. Moreover, they blur over the precise semantics of relational plurals like *the boys' cars*. For some of the arguments to follow, it would be worth also spelling out a more precise semantics for (51a). Under our assumptions in Section 2, as well as the theory of relational plurals in Beck (2000), the exact truth-conditions for (51a) would be as follows:

(i) $\exists e . \langle e, D+B+T, [\sigma y . y \text{ is a car} \ \& \ \exists z \leq D+B+T . z \text{ owns } y] \rangle \in$
 $\quad \quad \quad * \{ \langle e, t, s \rangle : \text{wash}(e, w) \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \} \ \&$
 $\forall p . \exists z \in D_e . p = [\lambda w' : \exists e . \langle e, D+B+T, [\sigma y . y \text{ is a car} \ \& \ z \text{ owns } y] \rangle \in$
 $\quad \quad \quad * \{ \langle e, t, s \rangle : \text{wash}(e, w') \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \}]$
 if $[\lambda w' : \exists e . \langle e, D+B+T, [\sigma y . y \text{ is a car} \ \& \ \exists z \leq D+B+T . z \text{ owns } y] \rangle \in$
 $\quad \quad \quad * \{ \langle e, t, s \rangle : \text{wash}(e, w') \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \}] \neq p$, then $p(w) = F$

As the reader can confirm the T-conditions in (i) can be informally stated as in (ii), which ultimately reduce to the informal statement in (iii).

(ii) Dave, Bill and Tom *cumulatively* washed the group of cars that belong to at least one of them, and any proposition of the form 'Dave, Bill and Tom cumulatively washed the cars belonging to z ' is false, unless it is entailed by 'Dave, Bill and Tom cumulatively washed the cars belonging to at least one of them.'

(iii) Dave, Bill and Tom (cumulatively) washed their cars, and they washed nobody else's cars.

¹⁸ Or, more precisely, one of the propositions of the form in (iv) is the one in (v).

(iv) $[\lambda w' : \exists e . \langle e, D+B+T, [\sigma y . y \text{ is a car} \ \& \ z \text{ owns } y] \rangle \in$
 $\quad \quad \quad * \{ \langle e, t, s \rangle : \text{wash}(e, w') \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \}]$
 (v) $[\lambda w' : \exists e . \langle e, D+B+T, [\sigma y . y \text{ is a car} \ \& \ \text{Bill owns } y] \rangle \in$
 $\quad \quad \quad * \{ \langle e, t, s \rangle : \text{wash}(e, w') \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \}]$

¹⁹ Or, more precisely, the proposition in (vi) below does not entail the proposition in (v) above:

(vi) $[\lambda w' : \exists e . \langle e, D+B+T, [\sigma y . y \text{ is a car} \ \& \ \exists z \leq D+B+T . z \text{ owns } y] \rangle \in$
 $\quad \quad \quad * \{ \langle e, t, s \rangle : \text{wash}(e, w') \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \}]$

²⁰ Or, more precisely, the T-conditions in (i) above predict that the truth of (50a) should entail that the proposition in (v) above is false. Thus, the T-conditions in (i) predict that the truth of (50a) entails the non-existence of the event in (50bii), and so they wrongly predict that (50a) will be interpreted as false in scenario (50b).

the denotation of the pronoun (i.e., D+B+T). Suppose, then, that we were to augment the definition in (43a) to the one given in (52) below.

(52) **Revised Definition of Focus-Semantic Values (Replaces (43a))**

If X_F is a head/phrase bearing F-marking (and $[[X]]^g$ is of type e), then $[[X_F]]^{g,F} = \{ x \in D_\tau : [[X]]^g \in D_\tau \ \& \ \neg x \leq [[X]]^g \}$

‘The focus semantic value of an F-marked head/phrase X are all those things of the same semantic type as X and which are not also parts of the normal semantic value of X .’

As the reader is invited to confirm, the augmentation in (52) would predict that the T-conditions of the LF in (51a) would be those in (53).

(53) **Revised T-Conditions for the LF in (51a)**²¹

D+B+T washed the cars of D+B+T in w , and
 $\forall p . \exists z \in D_e \ \& \ \neg z \leq D+B+T . p = [\lambda w : D+B+T \text{ washed the car of } z \text{ in } w]$,
 if $[\lambda w : D+B+T \text{ washed the cars of } D+B+T \text{ in } w] \Rightarrow p$, then $p(w) = F$

Happily, these T-conditions are entirely consistent with the scenario in (50b). Note that, since Bill *is* a part of the plurality Dave+Bill+Tom, the proposition ‘ $[\lambda w : D+B+T \text{ washed the car of Bill in } w]$ ’ is *not* of the form ‘ $[\lambda w : D+B+T \text{ washed the car of } z \text{ in } w]$ ’, where z is an entity that is *not* part of D+B+T.²² Therefore, the T-conditions in (53) do not entail that the proposition ‘ $[\lambda w : D+B+T \text{ washed the car of Bill in } w]$ ’ is false, and so they will indeed hold in scenario (50b). Thus, we now correctly predict that (50a) will be true in scenario (50b).

In summary, the truth of “Dave, Bill and Tom only washed THEIR cars” in situation (50b) demonstrates that this sentence should be consistent with that group of boys washing the car(s) belonging to some *member* of that group. In order to achieve this result, we must augment the definition of ‘focus alternatives’ so that it reads as in (52). Under this augmented definition, the focus semantic value of an F-marked expression *never* contains parts of the normal-semantic value of that expression.

²¹ Again, if we assume event semantics of Section 2 and the theory of relational plurals in Beck (2000), the T-conditions predicted by (52) are as follows:

(i) $\exists e. \langle e, D+B+T, [\sigma y. y \text{ is a car} \ \& \ \exists z \leq D+B+T . z \text{ owns } y] \rangle \in$
 $\quad \quad \quad * \{ \langle e, t, s \rangle : \text{wash}(e, w) \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \} \ \&$
 $\forall p . \exists z \in D_e \ \& \ \neg z \leq D+B+T . p = [\lambda w' : \exists e. \langle e, D+B+T, [\sigma y. y \text{ is a car} \ \& \ z \text{ owns } y] \rangle \in$
 $\quad \quad \quad * \{ \langle e, t, s \rangle : \text{wash}(e, w') \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \}]$
 if $[\lambda w' : \exists e. \langle e, D+B+T, [\sigma y. y \text{ is a car} \ \& \ \exists z \leq D+B+T . z \text{ owns } y] \rangle \in$
 $\quad \quad \quad * \{ \langle e, t, s \rangle : \text{wash}(e, w') \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \}] \Rightarrow p$, then $p(w) = F$

²² Or, more precisely, the proposition in (ii) is not of the form in (iii). Thus, (i) does not entail that (ii) is false, and so (i) can hold in scenario in (50b). Thus, we correctly predict that (50a) can be true in that scenario.

(ii) $[\lambda w' : \exists e. \langle e, D+B+T, [\sigma y. y \text{ is a car} \ \& \ \text{Bill owns } y] \rangle \in$
 $\quad \quad \quad * \{ \langle e, t, s \rangle : \text{wash}(e, w') \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \}]$
 (iii) $[\lambda w' : \exists e. \langle e, D+B+T, [\sigma y. y \text{ is a car} \ \& \ z \text{ owns } y] \rangle \in$
 $\quad \quad \quad * \{ \langle e, t, s \rangle : \text{wash}(e, w') \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \}]$, where $\neg z \leq D+B+T$

Although the augmented definition in (52) was motivated by sentences containing plural NPs, some motivation can also be found in simpler, singular sentences. Consider, for example, the sentence in (54a). Importantly, (54a) is true in a situation like (54b). The reader is invited to confirm that the definition in (43a) predicts that (54a) has the T-conditions in (53c), while the definition in (52) predicts the T-conditions in (54d)

(54) **Further Empirical Motivation for Definition (52)**

- a. Dave only washed HIMSELF₁
- b. Verifying Scenario for (54a)
 - (i) Dave washed his hands.
 - (ii) Dave washed his feet.
 - (iii) Dave washed legs.
- c. T-Conditions Predicted by (43a)
 Dave washed Dave in w, and
 $\forall p . \exists z \in D_e . p = [\lambda w: \text{Dave washed } z \text{ in } w]$,
 if $[\lambda w : \text{Dave washed Dave in } w] \neq p$, then $p(w) = F$
- d. T-Conditions Predicted by (52)
 Dave washed Dave in w, and
 $\forall p . \exists z \in D_e \ \& \ \neg z \leq \text{Dave} . p = [\lambda w: \text{Dave washed } z \text{ in } w]$,
 if $[\lambda w : \text{Dave washed Dave in } w] \neq p$, then $p(w) = F$

The key point here is that the domain of entities D_e contains not only Dave, but also the various parts making up Dave. Therefore, the T-conditions in (54c) perversely entail that the proposition ‘ $[\lambda w: \text{Dave washed } \textbf{Dave's feet}$ in w]’ is false. On the other hand, since Dave’s feet are a part of Dave ($\text{Dave's feet} \leq \text{Dave}$), the T-conditions in (54d) are entirely consistent with the truth of ‘ $[\lambda w: \text{Dave washed } \textbf{Dave's feet}$ in w]’. Thus, even simple singular sentences like (54a) can provide some support for our key proposal in (52), the claim that the focus-semantic value of an F-marked expression X should not contain parts of $[[X]]$ itself.

In addition to the proposal in (52), our analysis of the data in Section 3.1 will rest upon one other key assumption. Happily, this second assumption is much less controversial than (52), though it’s rarely explicitly made. It is simply that the ‘alternatives’ invoked by an F-marked expression vary with the context, and depend upon what entities are ‘contextually salient’. For example, consider the discourse in (55); note that it can be read as true in the scenario in (55b).

(55) **Focus Alternatives Depend Upon the Context**

- a. Illustrative Discourse
 - (i) Dave went to the movies with Karen, Beth and Sue.
 - (ii) Dave only sat next to SUE.
- b. Verifying Scenario for (i) and (ii)
 - (i) Dave went to the movies with Karen, Beth and Sue (together).
 - (ii) Karen and Beth sat in the back, while Dave sat in the front next to Sue.
 - (iii) *In the front row, Dave also sat next to some man (Carl) he didn’t know.*

Unfortunately, even with (52), our current semantics predicts that (55aii) will be false in scenario (55b). As the reader can confirm, our semantics predicts that (55aii) will receive the T-conditions in (56). Since Dave *did* sit next to Carl as well, (56) does not hold in scenario (55b).

(56) Truth-Conditions Predicted for (55aii)

Dave sat next to Sue in w , and

$$\forall p. \exists z \in D_e \ \& \ \neg z \leq \text{SUE} . p = [\lambda w: \text{Dave sat next to } z \text{ in } w], \\ \text{if } [\lambda w : \text{Dave sat next to Sue in } w] \neq \Rightarrow p, \text{ then } p(w) = F$$

This problematic result arises chiefly because our definition in (52) states that the focus semantic value of Sue_F will be all those entities that are not part of Sue. Thus, they also include Carl, Barack Obama, the Voynich Manuscript – everything in D_e that is not part of Sue. Intuitively, however, when we interpret (55a) as true in (55b), we understand the focused SUE to be contrasting only with Karen and Beth. Thus, in this context, the ‘focus alternatives’ of SUE should only be the salient entities Karen and Beth, and not necessarily non-salient (or non-introduced) entities such as ‘Carl’.

Let us implement these observations in the following way. We will assume that every context consists of some salient set of entities, which we will notate with C (Heim & Kratzer 1998). We will include this set C as a parameter of interpretation, superscripted to our evaluation function ‘[[.]]’. Consequently, we can augment our definition in (52) to the one in (57).

(57) Revised Definition of Focus-Semantic Values (Replaces (52))

If X_F is a head/phrase bearing F-marking (and $[[X]]^{g,C}$ is of type e), then $[[X_F]]^{g,C,F} = \{ x \in D_\tau : [[X]]^{g,C} \in D_\tau \ \& \ \neg x \leq [[X]]^{g,C} \ \& \ x \in C \}$

‘The focus semantic value of an F-marked head/phrase X are all those things of the same semantic type as X , which are not also parts of the normal semantic value of X , *and which are members of the set C (of salient entities).*’

With this change in place, we now correctly predict that (55a) will be true in (55b). Note that in the context of (55a), the set C of salient entities will be $\{\text{Karen, Beth, Sue, Dave}\}$. Thus, as the reader can confirm, the T-conditions we predict for (55aii) will be as in (58) below.

(58) Truth-Conditions Predicted for (55aii)

Dave sat next to Sue in w , and

$$\forall p. \exists z \in D_e \ \& \ \neg z \leq \text{SUE} \ \& \ z \in \{\text{Karen, Beth, Sue, Dave}\}. \\ p = [\lambda w: \text{Dave sat next to } z \text{ in } w], \\ \text{if } [\lambda w : \text{Dave sat next to Sue in } w] \neq \Rightarrow p, \text{ then } p(w) = F$$

Since Carl is by assumption not a member of C , the propositions p quantified over in (58) do not contain the proposition ‘ $[\lambda w: \text{Dave sat next to Carl in } w]$ ’. Thus, (58) does not entail that that proposition is false, and so it is entirely consistent with the scenario in (55b). Moreover, (58)

does entail that the propositions ‘[λw : Dave sat next to Beth in w]’ and ‘[λw : Dave sat next to Karen in w]’ are false. Thus, we correctly predict that (55aii) will be true in scenario (55b).

The revised definition in (57) incorporates the two key assumptions our analysis will rest upon. In the following subsections, we will see that these two additions to the definition in (43a) are sufficient to predict the empirical pattern observed in Section 3.1

3.3 The Effect of Focus Upon Reflexive Sentences

We ended Section 3.1 with the empirical generalizations repeated below. In this section, we will see that preceding hypotheses regarding focus semantics – particularly the revised definition in (57) – is able to predict both these generalizations.

(59) The Relation Between Focus, Contrast and Weak Readings of Reflexive Sentences

In a sentence (S) where (i) a reflexive anaphor bears focus, and (ii) the antecedent of the anaphor is a plural NP (NP_{pl}), then

- a. If the discourse is such that $[[NP_{pl}]]$ are the only salient entities, then S is felt to only be true/appropriate in a reflexive situation.
- b. If the discourse contains other salient entities besides $[[NP_{pl}]]$, then S is true in both reflexive, reciprocal and mixed situations. That is, it has the exact same weak truth-conditions as the corresponding sentence without focus on the anaphor.

We will begin by considering the generalization in (59a). This generalization covers data such as those repeated in (60) below.

(60) Illustration of Generalization (59a)

- a. Contexts
 - (i) *Basic Reflexive Situation*
Each boy is washing himself. (Dave is washing himself, Tom is washing himself, Frank is washing himself, etc.)
 - (ii) *Basic Reciprocal Situation*
Each boy is washing some other boy. (Dave is washing Tom, Tom is washing Frank, Frank is washing Dave, etc.)
 - (iii) *Basic Mixed Situation*
Half the boys are each washing themselves (Dave is washing himself, Tom is washing himself, etc.). The other half of the boys are each washing some other boys (Frank is washing Tony, Tony is washing Frank, etc.).
- b. Truth-Conditional Judgments

Die	jungen	haben	sich	selbst	gewaschen.
the	boys	AUX	REFL	self	washed

The boys washed themselves.
Judgment: True only in (60ai); Not true in (60aii) or (60aiii)

In the discussion to follow, I will focus specifically upon the German sentence in (60b). The reader is invited to confirm that the account developed here will extend to the parallel data from Section 3.1.

To begin, recall my assumption that the key property of the contexts in (60a) is that the only salient entities are the boys who are washing. In other words, in the discourses in (60a), the set C consists solely of the atomic entities making up the extension of the plural subject *die jüngen* ‘the boys’. With this in mind, let us consider the readings our semantics predicts for sentence (60b). First, note that our syntactic assumptions allow (60b) to have the LF below.

(61) ‘Cumulative’ LF for Sentence (60b)

$[[[\text{Die jüngen}] [1 [EXH [t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]]]]$

Under this LF, the reflexive *sich selbst* bears F-marking and is bound by a lambda operator adjacent to the plural antecedent *die jüngen*. Furthermore, as explained in Section 3.2, we assume that the (covert) focus-sensitive operator *EXH* takes scope just below the lambda operator binding *sich selbst*. For purposes of simplification, I ignore and omit the auxiliary *haben*.

Let us now consider the interpretation our semantics assigns to (61) relative to a context where $[[\text{die jüngen}]]^{g,C} = D(\text{ave}) + T(\text{om}) + B(\text{ill})$, and $C = \{ D(\text{ave}), T(\text{om}), B(\text{ill}) \}$. Note that such contexts include any of those in (60a). Importantly, our semantics actually predicts that the LF in (61) *will not be interpretable* in such a context. To see this, let us attempt to compute the semantic value of (61). This is done in (62) below.

(62) The Interpretation of LF (61), Relative to the Contexts in (60a)

- a. $[[[\text{Die jüngen}] [1 [EXH [t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}] \dots]]]^{g,C}(w) = T \quad \text{iff}$
- b. $[[EXH [t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]]^{g(1 \rightarrow D+T+B), C}(w) = T \quad \text{iff (by (45))}$
- c. $[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow D+T+B), C}(w) = T$ and
 $\forall p \in [[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow D+T+B), C F}$
 $\text{if } [t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow D+T+B), C} \neq p, \text{ then } p(w) = F \quad \text{iff}$
- c. $D+T+B$ washed $D+T+B$ in w and
 $\forall p \in [[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow D+T+B), C F}$
 $\text{if } [\lambda w': D+T+B \text{ washed } D+T+B \text{ in } w'] \neq p, \text{ then } p(w) = F$

In order to compute any further, we will need to compute the focus semantic value of the structure ‘ $[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]$ ’. However, this structure does not have a defined focus-semantic value relative to the context-set $C = \{ D, B, T \}$. To see this, let us attempt to compute its focus-semantic value, as in (63) below.

(63) Computation of the Focus-Semantics of (61)

- a. $[[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow D+T+B), C F} = (\text{by (43c)})$
- b. $([[\text{sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow D+T+B), C F}) ([[t_1]]^{g(1 \rightarrow D+T+B), C F}) = (\text{by (43b)})$
- c. $([[\text{sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow D+T+B), C F}) (\{ D+T+B \})$

Although our semantics allows us to compute as far as (63c), we cannot compute any further. In order to do so, we would need to compute the focus-semantic value of the structure ‘[*sich-selbst*_{F,1} *gewaschen*]’. Given rule (43c), however, such further computation would require us to compute the value of $[[\text{sich-selbst}_{F,1}]]^{g(1 \rightarrow D+T+B), C \text{ F}}$, and this is where the computation ultimately fails. As shown below, relative to the context-set $C = \{D, T, B\}$, the focus-semantic value of *sich selbst* is the null set.

(64) **Computation of the Focus-Semantics of the F-Marked Anaphor**

- a. $[[\text{sich-selbst}_{F,1}]]^{g(1 \rightarrow D+T+B), C \text{ F}}$ = (by (57))
- b. $\{x \in D_e : \neg x \leq [[\text{sich-selbst}_{F,1}]]^{g(1 \rightarrow D+T+B), C} \ \& \ x \in C\}$ =
- c. $\{x \in D_e : \neg x \leq D+T+B \ \& \ x \in C\}$ = (by def. of ‘C’)
- d. $\{x \in D_e : \neg x \leq D+T+B \ \& \ x \in \{D, T, B\}\}$ =
- e. \emptyset

According to our definition in (57), the focus-semantic value of an F-marked expression X relative to a context-set C are those entities within C that are *not* part of the normal-semantic value of X. However, given that the reflexive *sich selbst* is bound by the plural subject *die jüngen*, its normal semantic value is the plurality of boys, D+T+B. Since the context set C consists only of those boys, it follows that every entity in the context is also part of the normal-semantic value of the anaphor. Thus, *there is nothing that can lie within the focus-semantic value of the reflexive anaphor*, and so its focus-semantic value is the null set. Consequently, the focus-semantic value of *gewaschen* will not be able to compose with $[[\text{sich-selbst}_{F,1}]]^{g(1 \rightarrow D+T+B), C \text{ F}}$ via rule (43c), and so the entire expression $[[\text{sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow D+T+B), C \text{ F}}$ is undefined. Thus, the computation in (63) cannot proceed, and so neither can that in (62). The LF in (61) is therefore undefined relative to a context where C = the set of boys.

We find, then, that relative to the contexts in (60a), the LF in (61) is not interpretable. Put informally, the problem is that there are no possible focus-alternatives for the F-marked anaphor *sich selbst*. The focus alternatives of an expression X must be those elements in C that are not part of the normal-semantic value of X. In the contexts in (60a), however, the contextually-salient entities in C are all part of the normal-semantic value of the bound anaphor. Consequently, the focus-semantic value of that anaphor is the empty set, and so it cannot semantically compose with the other words in the sentence. We must conclude, then, that any available interpretation of sentence (60b) relative to the contexts in (60a) cannot be derived from the LF in (61).

Fortunately, however, (61) is not the only LF available to (60b). As noted in Section 2, sentences like (60b) can also receive a ‘distributive’ LF such as that in (65) below.

(65) **‘Distributive’ LF for Sentence (60b)**

$$[[[\text{Die jüngen}]] \text{ D } [1 [\text{EXH } [t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]]]]$$

Importantly, the distributive LF in (65) *does* receive a sensible interpretation in the contexts under (60a). If we assume that $[[\text{die jüngen}]]^{g,C} = D+T+B$ and $C = \{D, T, B\}$, semantic computation of (65) proceeds as follows.

(66) **The Interpretation of LF (65), Relative to the Contexts in (60a), Part 1**

- a. $[[[\text{Die j\u00fcngen}] [\mathbf{D} [1 [EXH [t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}] \dots]]]]^{g,C}(w) = T$
iff (by (27a))
- b. $\forall y \leq D+T+B \ \& \ \text{ATOM}(y): [[EXH [t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]]^{g(1 \rightarrow y), C}(w) = T$
iff (by (45))
- c. $\forall y \leq D+T+B \ \& \ \text{ATOM}(y): [t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow y), C}(w) = T$ and
 $\forall p \in [[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow y), C F}$
if $[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow y), C} \neq p$, then $p(w) = F$ iff
- d. $\forall y \leq D+T+B \ \& \ \text{ATOM}(y): y \text{ washed } y \text{ in } w \text{ and}$
 $\forall p \in [[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow y), C F}$
if $[[\lambda w': y \text{ washed } y \text{ in } w']] \neq p$, then $p(w) = F$

At this point, to continue the calculation, we must compute the focus-semantic value of the structure $[[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow y), C F}$. Unlike (63), however, this focus-semantic value *is* defined relative to the context-set C . Note that for any atomic boy y , the value will be computed as follows.

(67) **Computation of the Focus-Semantics of (65)**

- a. $[[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow y), C F} = (\text{by (43c)})$
- b. $([[\text{sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow y), C F}) ([[t_1]]^{g(1 \rightarrow y), C F}) = (\text{by (43b)})$
- c. $([[\text{sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow y), C F}) (\{y\}) = (\text{by (43c)})$
- d. $([[\text{gewaschen}]]^{g(1 \rightarrow y), C F} ([[\text{sich-selbst}_{F,1}]]^{g(1 \rightarrow y), C F})) (\{y\}) = (\text{by (43b)})$
- e. $(\{ [\lambda x: \lambda y: \lambda w: y \text{ washed } x \text{ in } w] \} ([[\text{sich-selbst}_{F,1}]]^{g(1 \rightarrow y), C F})) (\{y\}) = (\text{by (57)})$
- f. $(\{ [\lambda x: \lambda y: \lambda w: y \text{ washed } x \text{ in } w] \}$
 $(\{ x \in D_e : \neg x \leq [[\text{sich-selbst}_{F,1}]]^{g(1 \rightarrow y), C} \ \& \ x \in C \}) (\{y\})) =$
- g. $(\{ [\lambda x: \lambda y: \lambda w: y \text{ washed } x \text{ in } w] \}$
 $(\{ x \in D_e : \neg x \leq y \ \& \ x \in \{ D, T, B \} \}) (\{y\})) = (\text{by (43c)})$
- h. $\{ q_{<st>} : \exists z \in D_e \ \& \ \neg z \leq y \ \& \ z \in \{ D, T, B \} . q = [\lambda w: y \text{ washed } z \text{ in } w] \}$

The crucial point here is that, for any atomic boy y , the set $\{ x \in D_e : \neg x \leq y \ \& \ x \in \{ D, T, B \} \}$ is non-empty. Therefore, relative to each atomic boy y , $[[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow y), C F}$ is defined. Therefore, the computation in (67) can proceed successfully, and so can the computation in (66), as illustrated below.

(68) **The Interpretation of LF (65), Relative to the Contexts in (60a), Part 2**

- a. $\forall y \leq D+T+B \ \& \ \text{ATOM}(y): y \text{ washed } y \text{ in } w \text{ and}$
 $\forall p \in [[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]^{g(1 \rightarrow y), C F}$
 if $[[\lambda w': y \text{ washed } y \text{ in } w']] \neq p$, then $p(w) = F$ *iff* (by (67))
- b. $\forall y \leq D+T+B \ \& \ \text{ATOM}(y): y \text{ washed } y \text{ in } w \text{ and}$
 $\forall p \in \{q_{\langle st \rangle} : \exists z \in D_e \ \& \ \neg z \leq y \ \& \ z \in \{D, T, B\}. q = [\lambda w: y \text{ washed } z \text{ in } w]\}$
 if $[[\lambda w': y \text{ washed } y \text{ in } w']] \neq p$, then $p(w) = F$ *iff*
- c. $\forall y \leq D+T+B \ \& \ \text{ATOM}(y): y \text{ washed } y \text{ in } w \text{ and}$
 $\forall p. \exists z \in D_e \ \& \ \neg z \leq y \ \& \ z \in \{D, T, B\}. p = [\lambda w: y \text{ washed } z \text{ in } w]]$
 if $[[\lambda w': y \text{ washed } y \text{ in } w']] \neq p$, then $p(w) = F$ *iff*
- d. *Every atomic boy washed himself, and he did not wash any other boys.*

In summary, we find that sentence (60b) can be assigned an LF (65) that is interpretable relative to the contexts in (60a). Crucially, though, that ‘distributive’ LF is found to have the T-conditions in (68). Thus, we predict that – relative to the contexts in (60a) – sentence (60b) can only be true if every atomic boy washed himself (and no other boys). Therefore, we correctly predict that (60b) will only be able to truthfully describe scenario (60ai). In other words, our semantic assumptions from Section 3.2 predict the generalization in (59a).

Our overall explanation for generalization (59a) is difficult to summarize informally. However, it could be put as follows. A sentence where a plural DP binds an F-marked anaphor can receive two possible LFs: (i) a distributive LF, where the sister of the DP contains a D-operator, and (ii) a cumulative LF, where the sister of the DP contains no such D-operator. In a context where the only salient entities are those that constitute the extension of the DP, the only interpretable LF is the distributive one. In the cumulative LF, the anaphor is coextensive with the plural DP. Thus, the contrastive focus on that anaphor requires that the plurality denoted by the DP contrast with some other (non-overlapping) entity. In a context where the only salient entities are parts of the DP’s extension, there is no such contrasting entity, and so the cumulative LF does not receive a licit interpretation. On the other hand, in the distributive LF, the anaphor is (in a sense) interpreted as each of the atomic members of the extension of the DP. Thus, the contrastive focus on the anaphor requires that the atomic members of the DP’s extension contrast with some other salient entities. Of course, such contrasting entities could be the other members of the DP’s extension, and so the distributive LF does receive a licit interpretation. Finally, since only the distributive LF receives a licit interpretation in such contexts, the sentences in question will only receive the truth-conditions of the distributive LF. Therefore, they can only be read as true in reflexive situations, ones where each atomic member of the plural DP bears the reflexive relation to itself.

Having accounted for the generalization in (59a), let us now consider that in (59b). This generalization covers data such as those repeated in (69) below. As before, I will focus upon the specific judgments in (69b). The reader is invited to confirm that the account developed here will extend to the parallel data from Section 3.1.

(69) **Illustration of Generalization (59b)**

a. Contexts

(i) *Contrastive Reciprocal Situation*

You tell the boys to go to the showers and clean up. You supervise, and this is what you see: each boy washes some other boy (Dan washes Tom's back, Tom washes Frank's back, etc.).

When I get back, I see that the boys are all sparkling clean. Taken aback, I say the following to you: "This is great! Who did this? Was it you? Did you wash them? Or did the other assistants wash them?..."

(ii) *Contrastive Mixed Situation*

Same as above, except that when you supervise, this is what you see: half the boys are washing themselves (Dave is washing himself, Frank is washing himself, etc.), and half the boys are washing some other boy (Dan washes Tom's back, Tom washes Bill's back, etc.).

When I get back, I see that the boys are all sparkling clean. Taken aback, I say the following to you: "This is great! Who did this? Was it you? Did you wash them? Or did the other assistants wash them?..."

b. Truth-Conditional Judgments

Die jüngen haben sich selbst gewaschen.
the boys AUX REFL self washed
The boys washed themselves.

Judgment: True in both (69ai) and (69aii)

To begin, recall my assumption that the key property of the contexts in (69a) is that there are now salient entities *besides* those making up the extension of *die jüngen* 'the boys'. With this in mind, consider now the interpretation of the 'cumulative' LF repeated below.

(70) **'Cumulative' LF for Sentence (69b)**

$[[[\text{Die jüngen}] [1 [\text{EXH} [t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen}]]]]]$

We will interpret (70) relative to a context where $[[\text{die jüngen}]]^{g,C} = D(\text{ave}) + F(\text{rank}) + T(\text{om}) + B(\text{ill})$, and $C = \{ D(\text{ave}), F(\text{rank}), T(\text{om}), B(\text{ill}), S(\text{peaker}), A(\text{ddresse}), As(\text{sistants}) \}$. Note that such contexts include any of those in (69a). Interestingly, relative to a context such as this, the LF in (70) is interpretable. The first parts of the semantic computation will proceed much as before in (62) and (63). What differs is the calculation of the focus-semantic value of $[[\text{sich-selbst}_{F,1}]]^{g(1 \rightarrow D+F+T+B), C, F}$. As shown below, the value of $[[\text{sich-selbst}_{F,1}]]^{g(1 \rightarrow D+F+T+B), C, F}$ will no longer be the null set.

(71) **Computation of the Focus-Semantics of the F-Marked Anaphor**

- a. $[[\text{such-selbst}_{F,1}]]^{g(1 \rightarrow D+F+T+B), C F} = \text{(by (57))}$
- b. $\{ x \in D_e : \neg x \leq [[\text{such-selbst}_{F,1}]]^{g(1 \rightarrow D+F+T+B), C} \ \& \ x \in C \} =$
- c. $\{ x \in D_e : \neg x \leq D+F+T+B \ \& \ x \in C \} = \text{(by def. of 'C')}$
- d. $\{ x \in D_e : \neg x \leq D+F+T+B \ \& \ x \in \{D, F, T, B, S, A, As\} \} =$
- e. $\{ S, A, As \}$

Given that there are now entities in C besides the individual boys, the focus-alternatives of the anaphor *sich-selbst_F* is a non-empty set, $\{ S(\text{peaker}), A(\text{ddresse}), As(\text{sistants}) \}$. Consequently, the semantic computation begun in (63) can continue as in (72).

(72) **Computation of the Focus-Semantics of (70)**

- a. $[[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen }]]^{g(1 \rightarrow D+F+T+B), C F} = \text{(by (43c))}$
- b. $([[\text{such-selbst}_{F,1} \text{ gewaschen }]]^{g(1 \rightarrow D+F+T+B), C F}) ([[t_1]]^{g(1 \rightarrow D+F+T+B), C F}) = \text{(by (43b))}$
- c. $([[\text{such-selbst}_{F,1} \text{ gewaschen }]]^{g(1 \rightarrow D+F+T+B), C F}) (\{D+F+T+B\}) = \text{(by (43b), (71))}$
- d. $(\{ [\lambda x: \lambda y: \lambda w: y \text{ washed } x \text{ in } w] \} (\{ x \in D_e : \neg x \leq D+F+T+B \ \& \ x \in \{D, F, T, B, S, A, As\} \})) (\{D+F+T+B\}) = \text{(by (43c))}$
- e. $\{ q_{\langle st \rangle} : \exists z \in D_e \ \& \ \neg z \leq D+F+T+B \ \& \ z \in \{ D, F, T, B, S, A, As \} .$
 $q = [\lambda w: D+F+T+B \text{ washed } z \text{ in } w] \}$

Given the derivation in (72), the computation begin in (62) can now be completed as in (73).

(73) **The Interpretation of LF (70), Relative to the Contexts in (69a)**

- a. $[[[\text{Die j\u00fcngen }] [1 [EXH [t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen }] \dots]]]^{g,C}(w) = T \quad \text{iff}$
- b. $[[EXH [t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen }]]]^{g(1 \rightarrow D+F+T+B), C}(w) = T \quad \text{iff (by (45))}$
- c. $[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen }]]^{g(1 \rightarrow D+F+T+B), C}(w) = T \text{ and}$
 $\forall p \in [[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen }]]^{g(1 \rightarrow D+F+T+B), C F}$
 $\text{if } [t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen }]]^{g(1 \rightarrow D+F+T+B), C} \neq p, \text{ then } p(w) = F$
 iff
- d. $D+F+T+B \text{ washed } D+F+T+B \text{ in } w \text{ and}$
 $\forall p \in [[t_1 \text{ sich-selbst}_{F,1} \text{ gewaschen }]]^{g(1 \rightarrow D+F+T+B), C F}$
 $\text{if } [\lambda w': D+F+T+B \text{ washed } D+F+T+B \text{ in } w'] \neq p, \text{ then } p(w) = F$
 iff (by (72))

- e. $D+F+T+B$ washed $D+F+T+B$ in w and
 $\forall p \in \{ q_{<st>} : \exists z \in D_e \ \& \$
 $\neg z \leq D+F+T+B \ \& \ z \in \{ D, F, T, B, S, A, As \} .$
 $q = [\lambda w: D+F+T+B \text{ washed } z \text{ in } w] \}$
 if $[\lambda w': D+F+T+B \text{ washed } D+F+T+B \text{ in } w'] \Rightarrow p$, then
 $p(w) = F$ *iff*
- f. $D+F+T+B$ washed $D+F+T+B$ in w and
 $\forall p . \exists z \in D_e \ \& \ \neg z \leq D+F+T+B \ \& \ z \in \{ D, F, T, B, S, A, As \} .$
 $p = [\lambda w: D+F+T+B \text{ washed } z \text{ in } w] \}$
 if $[\lambda w': D+F+T+B \text{ washed } D+F+T+B \text{ in } w'] \Rightarrow p$, then $p(w) = F$ *iff*
- g. *The boys washed the boys in w, and they washed nobody who was not part of the boys.*

We therefore find that, relative to the contexts in (69a), the ‘cumulative’ LF in (70) can receive a sensible interpretation. Furthermore, the interpretation assigned to LF (70) is one that is true in both the ‘reciprocal’ scenario in (69ai) and the ‘mixed’ one in (69aai). To see this, we must bring back into our discussion the Neo-Davidsonian event semantics of Section 2. Up to this point, we have been simplifying our exposition by abstracting away from the detailed event semantics of Section 2. As the reader can confirm, if we combine our semantic proposals from Sections 2 and 3 together, then the predicted T-conditions for LF (70) are the ones given below.

(74) The Truth-Conditions of LF (70), Relative to the Contexts in (69a)

- $\exists e. \langle e, D+F+T+B, D+F+T+B \rangle \in$
 $*\{ \langle e, t, s \rangle : \text{wash}(e, w) \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \} \ \&$
- $\forall p . \exists z \in D_e \ \& \ \neg z \leq D+F+T+B \ \& \ z \in \{ D, F, T, B, S, A, As \} .$
 $p = [\lambda w': \exists e. \langle e, D+F+T+B, z \rangle \in * \{ \langle e, t, s \rangle : \text{wash}(e, w') \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \}]$
- if $[\lambda w': \exists e. \langle e, D+F+T+B, D+F+T+B \rangle \in$
 $* \{ \langle e, t, s \rangle : \text{wash}(e, w') \ \& \ \text{Ag}(e) = t \ \& \ \text{Th}(e) = s \}] \Rightarrow p$, then $p(w) = F$
- ‘The boys (cumulatively) washed the boys, and they (cumulatively) washed nobody who wasn’t part of the boys.’*

The T-conditions in (74) are rather complex; however, they are equivalent to the somewhat simpler formula in (75).

(75) **The Truth-Conditions of LF (70), Relative to the Contexts in (69a)**

$$\begin{aligned} \exists e. \langle e, D+F+T+B, D+F+T+B \rangle \in * \{ \langle e, t, s \rangle : \text{wash}(e, w) \ \& \ Ag(e) = t \ \& \ Th(e) = s \} \ \& \\ \forall z. z \in D_e \ \& \ \neg z \leq D+F+T+B \ \& \ z \in \{ D, F, T, B, S, A, As \} \rightarrow \\ \neg \exists e. \langle e, D+F+T+B, z \rangle \in \\ * \{ \langle e, t, s \rangle : \text{wash}(e, w) \ \& \ Ag(e) = t \ \& \ Th(e) = s \} \} \end{aligned}$$

‘The boys (cumulatively) washed the boys, and for any entity z that is not part of the boys, the boys did not (cumulatively) wash z’

With these T-conditions at hand, consider again the scenarios in (69a). Note that in each the events of ‘washing’ are as follows.

(76) **The Events of Washing in (69a)**

a. Reciprocal Situation (69ai):

Each boy washed some other boy and was washed by some other boy

<i>Events of Washing</i>	<i>Agent</i>	<i>Theme</i>
< e ₁ ,	Dave ,	Frank >
< e ₂ ,	Frank ,	Tom >
< e ₃ ,	Tom ,	Bill >
< e ₄ ,	Bill ,	Dave >

Sum of the tuples above: <e₁+e₂+e₃+e₄, D+F+T+B, D+F+T+B>

b. Mixed Situation (69aii):

Half the boys each washed themselves. The other half washed each other.

<i>Events of Washing</i>	<i>Agent</i>	<i>Theme</i>
< e ₁ ,	Dave ,	Dave >
< e ₂ ,	Frank ,	Frank >
< e ₃ ,	Tom ,	Bill >
< e ₄ ,	Bill ,	Tom >

Sum of the tuples above: <e₁+e₂+e₃+e₄, D+F+T+B, D+F+T+B>

It is apparent, then, that the T-conditions in (74)/(75) hold in each of the scenarios in (69a). We thus find that the cumulative LF in (70) will be true in both (69ai) and (69aii), and so we correctly predict that sentence (69b) can be interpreted as true in those contexts.²³ Generalizing beyond this one case, we find that our semantics successfully predicts the generalization in (59b).

²³ Curiously, however, it remains a mystery why sentence (69b) can be understood as a felicitous (true) *answer* to the *question* prompts in (69a). Since the question is ‘Who washed the boys’, we would typically expect that the F-marking must appear on the subject, rather than on the object. The ability for (69b) – and its English translation (Section 4) – to serve as an answer to this question must remain a puzzle for future research.

Again, our explanation of (59b) is a bit difficult to summarize succinctly, but it is basically as follows. As before, a sentence where a plural DP binds an F-marked anaphor can receive two possible LFs: (i) a distributive LF, where the sister of the DP contains a D-operator, and (ii) a cumulative LF, where the sister of the DP contains no such D-operator. In a context where the salient entities include ones that are *not* part of the extension of the DP, the cumulative LF becomes interpretable. As before, in the cumulative LF, the anaphor is coextensive with the plural DP, and so the contrastive focus on that anaphor requires that the plurality denoted by the DP contrast with some other (non-overlapping) entity. Since such contrasting entities do exist in these contexts, there is no problem interpreting the cumulative LF. Finally, the T-conditions of the cumulative LF are such that they hold in both reciprocal and mixed situations. Consequently, we correctly predict that the sentences in question can be interpreted as true in both those types of situations.

Taking these results together, we see that our semantics from Sections 2 and 3 indeed predicts the two key generalizations in (59), and thus the empirical patterns observed in Section 3.1, as well as the contrasts between (9)-(13) and (3a)-(7a). In general, the following perspective emerges regarding the effect of focus upon reflexive predicates with plural arguments. The addition of focus to the reflexive anaphor requires that the denotation of the anaphor contrast with some other (non-overlapping) salient entity. In contexts where the only salient entities overlap with the plural argument of the sentence, the only way to achieve this contrast is for the sentence to be interpreted distributively, so that the anaphor (essentially) denotes each of the atomic members of the plural argument. Moreover, out-of-the-blue contexts will generally be ones where the only salient entities are those making up the plural argument of the sentence. Thus, in out-of-the-blue contexts, sentences where a reflexive anaphor bears focus can only be interpreted distributively, and so will only be interpreted as true in reflexive situations like (2a). However, in other, more richly structured contexts, there may be salient entities that do not overlap with the plural argument of the sentence. In such richer contexts, sentences where a reflexive anaphor bears focus needn't be interpreted distributively. Rather, they may again be interpreted cumulatively, and so will also be interpreted as true in reciprocal situations like (2b) and mixed situations like (8).

We find, then, that the standard semantic theory of plurals, reflexives and focus can provide a rather clear formal explanation of the facts in (3)-(13), as well as the novel data paradigm presented in Section 3.1. In the following section, I offer some tentative thoughts regarding reflexives in languages like English, where reflexive sentences never seem able to describe either reciprocal or mixed situations.

4. Languages Where Reflexive Sentences Only Ever Describe 'Reflexive' Situations

We saw in Section 2 that the pattern of judgments in (3a)-(7a) is an easy consequence of certain commonly held semantic assumptions. Nevertheless, as noted in Section 1, it appears that only a relative minority of languages exhibit this pattern. In most languages (61.4%; Heine & Miyashita 2008), reflexively marked predicates cannot (at first blush) describe reciprocal or mixed situations. For example, the English sentences in (77) can describe neither the 'basic' cases of reciprocal/mixed washing in (28b,c), nor the 'basic' cases of reciprocal/mixed grading in (35b,c).

(77) **Reflexive Sentences in English**

- a. The boys washed themselves.
Judgment: Of the scenarios in (28), can describe only (28a), not (28b,c)
- b. The students graded themselves.
Judgment: Of the scenarios in (35), can describe only (35a), not (35b,c)

It should be noted that the reflexive anaphor *themselves* in (77) is the only reflexive anaphor English possesses. There is no productive reflexive marker in the language that contrasts with it and allows sentences like (77a,b) to describe the situations in (28b,c) and (35b,c).

This same situation holds for quite a number of languages, as the following data illustrate. In each of the sentences below, the reflexive marker shown is the only productive reflexive marker in the language.

(78) **Reflexive Markers in Turkish**²⁴

- a. Erkekler kindilerini yıkadılar
boys their.selves.ACC washed
The boys washed themselves.
Judgment: Of the scenarios in (28), can describe only (28a), not (28b,c)
- b. Öğrenciler kindilerine not verdiler
students their.selves.DAT grade gave
The students graded themselves
Judgment: Of the scenarios in (35), can describe only (35a), not (35b,c)

(79) **Reflexive Markers in Russian**²⁵

- a. Mal'chiki myli sebja.
boys washed REFL
The boys washed themselves.
Judgment: Of the scenarios in (28), can describe only (28a), not (28b,c)
- b. Ucheniki proverjali sebja
students graded REFL
The students graded themselves.
Judgment: Of the scenarios in (35), can describe only (35a), not (35b,c)

²⁴ Turkish also possesses a verbal affix *-n-* that can directly mark the verb as reflexive. However, this affix is not fully productive, and so I set it aside in the current study.

²⁵ Russian also possesses a verbal affix *-s'* that can directly mark the verb as reflexive. However, this affix is not productive, and so I set it aside in the current study. Furthermore, the reflexive pronoun *sebja* can be 'emphasized/focalized' by adding the particle *samix* 'same'. Note that the sentences in (79) lack this emphasis marker.

(80) **Reflexive Markers in Kikuyu**

Ihĩĩ nīciethambirie

Ihĩĩ nī-ci-e-thambia-ire

boys ASRT-AgrS-REFL-wash-PERF

The boys washed themselves.

Judgment: Of the scenarios in (28), can describe only (28a), not (28b,c)

(81) **Reflexive Sentences in Hebrew**²⁶

a. Habanim raxcu et acmam
the.boys washed ACC REFL.PL

The boys washed themselves.

Judgment: Of the scenarios in (28), can (clearly) describe only (28a), not (28b,c)²⁷

b. Hatalmidim badku et hamivxanim Sel acmam.
the.students checked ACC exams of REFL.PL

The students graded themselves.

Judgment: Of the scenarios in (35), can describe only (35a), not (35b,c)

(82) **Reflexive Sentences in Hindi**

laRkoN-ne apne aap-ko dho-yaa
boys-ERG REFL-ACC wash-AUX

The boys washed themselves.

Judgment: Of the scenarios in (28), can (clearly) describe only (28a), not (28b,c)²⁸

As shown above, speakers report that it is not possible (or is somewhat ‘degraded’) to offer (77)-(82) as true descriptions of the ‘basic’ reciprocal/mixed scenarios in (28b,c) and (35b,c). Nevertheless, it is possible to find contexts where these sentences *can* truthfully describe reciprocal and mixed scenarios. Intriguingly, these are the same contexts that allow sentences with focused reflexives to describe such situations. That is, as shown below, the ‘contrastive’ reciprocal/mixed situations can be described with the reflexive sentences above.

²⁶ Hebrew also possesses a verbal affix that can directly mark the verb as ‘reflexive’ or ‘reciprocal’ (Siloni 2008). However, since this affix is not fully productive, I set it aside in the current study.

²⁷ One speaker found that (81a) was slightly acceptable in scenario (28c), though she felt that it was not in (28b). Another speaker found (81a,b) acceptable in all the scenarios in (28) and (35). I assume that this latter speaker was implicitly performing the contextual manipulations described below.

²⁸ The speaker I consulted found that (82) was somewhat acceptable in scenarios (28b,c). Since he also felt that such use of (82) markedly improves in the contexts described below, I group Hindi together with the other languages in (77)-(81).

(83) **Reflexive Markers in English**

- a. The boys washed themselves.
Judgment: Can be a truthful answer in both (34a) and (34b).
- b. The students graded themselves.
Judgment: Can be a truthful answer in both (41a) and (41b).

(84) **Reflexive Markers in Turkish**²⁹

- a. Erkekler kindilerini yikadiler
boys their.selves.ACC washed
The boys washed themselves.
Judgment: Can be a truthful answer in both (34a) and (34b).
- b. Öğrenciler kindilerine not verdiler
students their.selves.DAT grade gave
The students graded themselves
Judgment: Can be a truthful answer in both (41a) and (41b).

(85) **Reflexive Markers in Russian**

- a. Mal'chiki myli sebja.
boys washed REFL
The boys washed themselves.
Judgment: Can be a truthful answer in both (34a) and (34b).
- b. Ucheniki proverjali sebja
students graded REFL
The students graded themselves.
Judgment: Can be a truthful answer in both (41a) and (41b).

(86) **Reflexive Sentences in Hindi**

- laRkoN-ne apne aap-ko dho-yaa
boys-ERG REFL-ACC wash-AUX
The boys washed themselves.
Judgment: Can (unquestionably) be a truthful answer in both (34a) and (34b).

²⁹ The speaker I consulted with found (84a,b) to still be somewhat odd in the scenarios in (34) and (41). However, she also reported that such use is markedly better than using (78a,b) to describe (28b,c) and (35b,c).

(87) Reflexive Sentences in Hebrew

- a. Habanim raxcu et acmam
 the.boys washed ACC REFL.PL
 The boys washed themselves.
 Judgment: Can be a truthful answer in both (34a) and (34b).
- b. Hatalmidim badku et hamivxanim Sel acmam.
 the.students checked ACC exams of REFL.PL
 The students graded themselves.
 Judgment: Can be a truthful answer in both (41a) and (41b).³⁰

We find, then, that the reflexive markers of English, Turkish, Russian, Hindi and Hebrew exhibit the same behavior as focused reflexive markers in French, Spanish, Portuguese, Italian and German. Optimally, we should seek a unified explanation for all reflexive markers found to exhibit this pattern. Given the analysis developed in Section 3, it would seem that such a unified account must postulate that the reflexive pronouns in (83)-(87) invoke contrastive ‘alternatives’, just as the focused reflexives of (9)-(13) do. However, an obvious difficulty for such an account is that *none* of the reflexive markers in (83)-(87) need bear prosodic focus. For example, the English sentences in (77) are most naturally read with a pitch accent on the verbs *wash/grade*, and with de-accenting of the reflexive anaphor *themselves*. Even under this intonation, however, the facts in (77) stand: these sentences cannot be used to describe basic reciprocal/mixed scenarios. Thus, even when they are de-accented, reflexive markers in English behave like the focused reflexive markers of (9)-(13). Whether this also holds for the other reflexive markers in (83)-(87) is difficult to say, but it does seem rather implausible to suppose that all these reflexive markers are obligatorily focused.

How, then, can we hope to extend the analysis of Section 3 to the cases in (83)-(87)? Perhaps the most viable path is one provided in recent work by Chierchia, Fox and Spector (2011). This work argues that focus is not the only means for introducing ‘contrasting alternatives’ into the semantic computation. In particular, certain words – such as those triggering scalar implicatures – are simply lexically specified as invoking certain contrasting alternatives. For example, as noted by Chierchia *et al.* (2011), the sentence in (88b) can be read without any focus upon the determiner *some*. Even under such intonation, however, use of this determiner invokes the alternative *all*, and thus generates the widely observed scalar implicature.

(88) Scalar Implicatures Do Not Require Focus (Chierchia *et al.* 2011)

- a. So, what happened when you went to school?
b. Well, I saw some of the students.

Even more interesting from our point of view is the way in which Chierchia *et al.* (2011) obtain the scalar implicature associated with (88b). They propose that sentences invoking such contrasting alternatives can contain a covert version of the particle *only*, essentially the *EXH*

³⁰ One speaker I consulted with found (87b) to still be an infelicitous/false in (41a) and (41b), though she did find marked improvement in using (87a) as a truthful description of (34a) and (34b).

operator we introduced in Section 3.2. This operator takes as argument both the truth-conditional meaning of the sentence as well as the alternatives that result from the scalar item.

Although Chierchia *et al.* (2011) are somewhat agnostic as to how the scalar alternatives are compositionally obtained, something along the following lines seems to be in the spirit of their proposal.³¹ First, we suppose that certain lexical items are stipulated to invoke certain ‘contrasting alternatives’. Thus, numerals such as that in (89) are stipulated to invoke higher numerals. We implement this by appealing to an ‘alternative-semantic value’ ‘ $[[\cdot]]^A$ ’, which stands along side both the normal-semantic and focus-semantic values.³²

(89) Lexically Specified Alternatives

- a. $[[\text{three}]]$ = $[\lambda x : |x| = 3]$
- b. $[[\text{three}]]^A$ = $\{ [\lambda x : |x| = n] : n > 3 \}$

Thus, the numeral *three* has the commonly assumed normal-semantic value in (89a). However, alongside its normal-semantics, *three* also has the lexically stipulated ‘alternative-semantic’ value in (89b). Note that the alternatives to *three* in (89b) are the normal-semantic values of numerals greater than three (*e.g. four, five, six, etc.*).

Although some items have their alternative-semantic value lexically stipulated, others do not. For those latter elements, their alternative-semantic value is computed as follows.

(90) Computation of Alternative-Semantic Values

- a. If X is a head, then $[[X]]^{g,A} = \{ [[X]]^g \}$
- b. If X is a phrase, and if X is composed of the daughters Y and Z , then if
 - (i) $[[Y]]^{g,A} \in D_{\langle \langle \sigma, \tau \rangle, t \rangle}$
 - (ii) $[[Z]]^{g,A} \in D_{\langle \sigma, t \rangle}$
 then $[[X]]^{g,A} = \{ f(a) : f \in [[Y]]^{g,A} \text{ and } a \in [[Z]]^{g,A} \}$

Thus, for items without a lexically specified alternative-semantics, their alternative-semantic value is computed in the same way that one computes the focus-semantic value of non-F-marked expressions (43).

Finally, we assume the existence of a phonologically null operator EXH_A , which serves to introduce the scalar implicature itself (Chierchia *et al.* 2011). We assume that this operator has the semantics below.

(91) Semantics of the EXH_A Operator

$$[[EXH_A XP]]^g(w) = T \quad \text{iff} \quad [[XP]]^g(w) = T \text{ and } \forall p \in [[XP]]^{g,w,A}, \\ \text{if } [[XP]]^{g,w} \neq p, \text{ then } p(w) = F$$

³¹ The primary focus of Chierchia *et al.* (2011) is the existence of scalar implicatures in environments where standard Gricean theory would not expect them. Thus, they rightly remain agnostic as to certain details of compositional interpretation.

³² However, see Fox & Katzir (2010) for arguments that focus-semantic values should be viewed as a subspecies of alternative-semantic values.

Thus, EXH_A is assumed to be a version of the operator EXH that is sensitive to alternative-semantic values, rather than focus-semantic values.

With these ingredients in place, we can easily obtain the observed scalar implicature for sentences like (92ai) below. Moreover, our method for doing so follows the key proposals of Chierchia *et al.* (2011). The reader is invited to confirm that our proposals in (89)-(91) predict that the LF in (92b) will have the T-conditions in (92c).

(92) **Computation of Scalar Implicatures**

- a. (i) Sentence: Dave ate three sandwiches.
(ii) Implicature: Dave did not eat more than three sandwiches
- b. Logical Form for (92ai) [EXH_A [[three sandwiches] [1 [Dave ate t_1]]]
- c. Truth-Conditions of LF (92b)
 $\exists x . *sandwich(x) \ \& \ |x| = 3 \ \& \ \text{Dave ate } x \text{ in } w$, and
 $\forall p \in \{ q_{<st>} : \exists n > 3. q = [\lambda w' : \exists x . *sandwich(x) \ \& \ |x| = n \ \& \ \text{Dave ate } x \text{ in } w'] \}$
if $[\lambda w' : \exists x . *sandwich(x) \ \& \ |x| = 3 \ \& \ \text{Dave ate } x \text{ in } w'] \neq p$, then
 $p(w) = F$

‘Dave ate three sandwiches, and he ate no more than three sandwiches.’

Let us now return to the reflexive anaphors in sentences (83)-(87). To simplify our discussion, I will focus upon the English reflexive *themselves*. Note that the entry in (93) can capture the observed similarities between *themselves* and the focused anaphors in (9)-(13).

(93) **Lexically Specified Alternative Semantics for *Themselves***³³

- a. $[[\text{themselves}_i]]^{g,C} = g(i)$
- b. $[[\text{themselves}_i]]^{g,C,A} = \{ x \in D_e : \neg x \leq g(i) \ \& \ x \in C \}$

Thus, the alternatives invoked by English *themselves* will be all those contextually salient entities that are *not* part of the normal-semantic denotation of *themselves*. Note that this is precisely the same set of alternatives that stand as the focus-semantic value of the focused reflexives in (9)-(13). Thus, we are able to straightforwardly extend the analysis in Section 3.3 to the parallel English data in (77) and (83). More concretely, in a context where the set of salient entities C only contains parts of the extension of *the boys*, then – just as we saw in Section 3.3. – the ‘cumulative’ LF in (94a) will not be interpretable, while the ‘distributive’ LF in (94b) will be.

(94) **Possible Logical Form for The English (77)/(83)**

- a. Cumulative LF: [The boys [1 [EXH_A [t_1 washed themselves₁]]]]
- b. Distributive LF: [The boys [**D** [1 [EXH_A [t_1 washed themselves₁]]]]]

³³ It should be noted that this proposal runs somewhat counter to the spirit of Chierchia *et al.* (2011), where the lexically specified alternatives are generally those found within classic ‘Horn scales’.

The distributive LF in (94b), however, will only be true in purely reflexive scenarios, and so speakers will report that (77a) can only truthfully describe (28a), and not (28b,c). On the other hand, as long as there are salient entities in *C* that are *not* parts of the extension of *the boys*, then the cumulative LF in (94a) will be interpretable. As we saw earlier, the LF in (94a) can be true in both reciprocal and mixed scenarios, and so speakers will report that (83a) can truthfully describe both (34a) and (34b).

Thus, the formal proposals of Chirechia *et al.* (2011) provide a possible means of extending the analysis from Section 3.3 to the non-focused reflexive anaphors in (77)-(87). Of course, this kind of an approach raises many very difficult questions. One of the most pressing concerns the key stipulation in (93b). Why should the reflexive markers in (83)-(87) come packed with this stipulated alternative-semantic entry, *but not the reflexive markers in (3a)-(7a)*?

One possible explanation concerns the historical source of these markers. Each of the markers in (83)-(87) derives historically from what was originally a stressed, emphatic reflexive marker, one that contrasted with an unstressed marker, much as the sentences in (9)-(13) contrast with those in (3a)-(7a). In English, *himself* contains the marker *self*, which originally functioned like German *selbst* as an ‘intensifier’ or ‘focalizer’. The same holds for Turkish *kindi-* ‘self’ and Hindi *apne aap* ‘self’s self’. Furthermore, in Russian, the pronoun *sebjja* originally contrasted with a reduced reflexive clitic, one that has become grammaticalized in Russian as the (unproductive) verbal reflexive suffix *-s’*. A similar situation seems to hold in Modern Hebrew regarding *acm-* ‘self’.

Thus, each of the anaphors in (83)-(87) was, at an earlier state of the language, a focused reflexive pronoun. It would be natural to suppose, then, that at this earlier stage of the language, those reflexive pronouns exhibited exactly the behavior noted in Section 3.1 for the focused reflexives of (9)-(13). Over time, however, the unstressed reflexives that these pronouns contrasted with disappeared, leaving these once specialized anaphors to become the general, productive means for signaling reflexivity. It is quite possible that, when the anaphors in (83)-(87) became grammaticalized as general reflexive markers, their characteristic contrastive meaning also became grammaticalized. That is, the contrasting alternatives that these pronouns regularly invoked via focus became reanalyzed as part of their basic lexical semantics. Thus, these reflexive anaphors would naturally come to have the stipulated alternative-semantic entry in (93). On the other hand, the reflexive markers in (3a)-(7a) did not historically arise from focused reflexive pronouns. The reflexive clitics in Romance language originate from the Latin reflexive pronoun *se*, which was a general reflexive marker in the language. Similarly, German *sich* originates from Proto-Germanic *si(c)h*, also a general reflexive marker. Thus, the diachronic path sketched here for the reflexives in (83)-(87) would not hold for them, and so they would not come to have the grammaticalized alternative-semantics in (93).

Some indirect support for this overall picture can be found in the Kikuyu reflexive prefix *-e-*. As noted in (80), verbs marked with this reflexive prefix cannot be used to describe basic reciprocal or mixed situations. In this regard, Kikuyu *-e-* behaves like the anaphors in (83)-(87). Unlike those anaphors, however, the contrastive context in (34) does *not* allow the sentence in (80) to describe reciprocal/mixed situations, as illustrated below.

(95) **Reflexive Markers in Kikuyu**

Ihĩĩ nīciethambirie

Ihĩĩ nī-ci-e-thambia-ire

boys ASRT-AgrS-REFL-wash-PERF

The boys washed themselves.

Judgment: *Cannot* be a truthful answer to either (34a) or (34b)

Clearly, our analysis from Section 3.3 has nothing to say about the intriguing behavior of this reflexive marker. The analysis of its meaning must instead be left to future research.³⁴ Nevertheless, we should note that the Kikuyu reflexive *-e-* does not originate from a focused reflexive pronoun. Rather, it seems to directly descend from the Proto-Bantu reflexive marker *-i-*, which served as a generalized reflexive marker (Kioko 2005). Therefore, we would not expect Kikuyu *-e-* to have the lexically stipulated alternative-semantics in (93b), and so we would not expect contexts like (34) to permit it to describe reciprocal and mixed scenarios.

5. Conclusion

The main focus of this paper has been the behavior of reflexive markers in languages such as French and German, particularly the contrast between the simple reflexive sentences in (3a)-(7a) and the sentences containing focused reflexives markers in (9)-(13).

First, we saw that the oft-noted ability of the simple reflexive sentences to describe reciprocal situations is not a case of lexical ambiguity or polysemy. Rather, as shown by their ability to describe mixed scenarios like (8), these sentences simply have especially weak/vague truth-conditions. Moreover, we saw in Section 2 that now-standard views regarding the semantics of plurals straightforwardly predict that reflexive sentences should exhibit such weak truth-conditions. Thus, the facts in (3a)-(7a), (8) receive a rather simple, univocal analysis.

Next, we turned our attention to sentences containing focused reflexive markers, such as those in (9)-(13). As widely noted, in an ‘out-of-the-blue’ context, such sentences can only be understood as truthfully describing purely reflexive situations, and not reciprocal or mixed ones. However, we also saw that there are indeed contexts where such sentences can truthfully describe reciprocal and mixed scenarios. The key property is one of contrast: sentences with focused reflexives can describe reciprocal/mixed situations as long as there are contextually salient entities that don’t overlap with the extension of the reflexive. We saw in Section 3.3 that one can give a rather explicit formal explanation for this generalization, one that makes relatively few special assumptions and largely rests upon very basic notions in the semantics of focus.

Finally, we examined languages like English, where reflexive sentences never seem able to describe reciprocal or mixed situations. We found that in many of those English-like languages, there are indeed contexts where reflexive sentences can describe reciprocal/mixed scenarios. Intriguingly those contexts were the same as those that allow focused reflexives to

³⁴ One possibility, suggested by Angelika Kratzer (p.c.), is that reflexive markers like Kikuyu *-i-* might bear a feature [SAC] that requires the *vP* to satisfy the ‘Single Agent Constraint’ of Kratzer (2003: Chapter 4). The ‘Single Agent Constraint’ requires all the sub-events of an event to also share the same agent. Thus, sentences like (95) could not be true in reciprocal or mixed situations. They could, however, be true in a purely reflexive situation if the sentence were assigned a distributive LF. For reasons of space, I choose not to spell out this analysis here, and leave it for possible future work.

describe such situations. Consequently, we sought to extend the formal account developed in Section 3.3 to these English-like languages. The main complication in doing so is that even *unstressed* reflexives in these languages exhibit the properties of the stressed reflexives in (9)-(13). We therefore propose that the alternatives invoked by the focused reflexives in (9)-(13) have become grammaticalized as part of the meaning of reflexives in English-like languages. We saw that the work of Chierchia *et al.* (2011) provides the formal means for implementing this proposal, though very difficult questions remain.

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