

“People are fed up; don’t mess with them.”
Non quantificational arguments and polarity reversals.

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Abstract: The first sentence in the title means roughly: **All** the people around are tired. The second means: Do not mess with **any** of them. Even though the second sentence looks just like a negative counterpart of the first, it doesn’t have the expected compositional meaning: it doesn’t mean “do not mess with **all** the people”. This phenomenon is extremely general. It takes place with Bare Plurals, as in the title. It figures prominently in the behavior of Plural Definites (*I spoke to the students in trouble* $\cong \forall$ / *I didn’t speak to the students in trouble* $\cong \neg \exists$). It also takes place with Donkey pronouns (*Every farmer who had a donkey sold it* $\cong \forall$ / *No man who had a donkey sold it* $\cong \neg \exists$). These switches of quantificational force under polarity reversals calls to mind Free Choice phenomena. In particular, a determiner like *any* is interpreted as a narrow scope existential in a sentence like *I didn’t talk to any student in trouble* $\cong \neg \exists$; however, in positive environments, the existential meaning of *any* emerges as strengthened to universal *I spoke to any student in trouble* $\cong \forall$. It is tempting to conjecture that the source of this uniform behavior is a uniform mechanism. While these constructions (Free Choice *any*, Bare Plurals, Plural Definites, and Donkey pronouns) have been studied extensively, and insightful approaches to Plural Definites in terms of Free Choice mechanisms have also been proposed (Bar Lev 2018, 2021), a unitary analysis has not been attempted to the best of my knowledge. In spite of the many challenges that a unified analysis faces, it is worth a try, for, if successful, it would considerably push forward our understanding of a wide range of very diverse constructions.

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1. Plural Definites, Bare Arguments and Donkey-pronouns: Three related phenomena?

The first sentence in the title means roughly: **All** the people around are tired. The second means: Do not mess with **any** of them. Even though the second sentence looks just like a negative counterpart of the first, it doesn't have the expected compositional meaning: it doesn't mean "do not mess with **all** the people". This phenomenon is extremely general. Looking at the data in (1), it seems undeniable that a common pattern emerges.

(1) a. Plural Definites

- i. As graduate program director,
I interviewed the incoming students. 'Maximal' interpretation: $\forall$
- ii. I heard the kids upstairs. 'Non maximal' interpretations possible $\exists \sim \forall$
- iii. This year, I didn't interview the incoming students $\neg \exists$
- iv. I didn't hear the kids upstairs $\neg \exists$
- b. Bare plurals (/mass nouns)
 - i. Mosquitos kept me awake last night $\exists$
 - ii. Bears are now hibernating around here $\forall$
 - iii. For once, mosquitos didn't keep me awake last night $\neg \exists$
 - iv. Bears are not hibernating yet $\neg \exists$
- c. Donkey pronouns
 - i. Everyone who bought an appliance insured it $\forall$
Everyone who bought an appliance insured *every* appliance he bought
 - ii. Everyone who had a credit card paid the bill with **it** $\exists$
Everyone who had a credit card paid the bill with *one* of his cards
 - iii. No one who bought an appliance paid cash for **it** $\neg \exists$
No one who bought an appliance paid in cash for *any* of the appliances he bought
 - iv. No one who had a credit card paid the bill with **it** $\neg \exists$
No one who had a credit card paid the bill with *any* of his cards

In (1) we see three very different types of nominal arguments: Plural Definites (PDs) in (1a), bare plural or mass arguments in (1b) – to which I will refer to as Bare Arguments (BAs), and (singular) Donkey pronouns in (1c), which since Evans (1980), have often been assimilated to elliptical, possibly number neutral descriptions (cf., e.g., Neale 1990). There are two specific features that the interpretation of these diverse nominal arguments share.¹ The first is that all of them in Upward Entailing (UE) contexts, get maximal (universal) as well as non maximal (weaker than universal, often times existential) interpretations, depending on the context. The second is that in Downward Entailing (DE) environments, we find that the ' $\neg \exists$ ($\neg \forall$)' interpretation is clearly predominant, if not the

¹ I use the label "nominal argument" rather than the more traditional 'Determiner Phrase (DP)' because it is controversial whether bare arguments are full blown DPs (as opposed to some 'smaller' projection) and I do not wish to prejudge the issue.

only option. This constitutes a form of ‘polarity sensitivity’ which affects all of this diverse range of nominal arguments.

Let us take a closer look. With Plural Definites, in UE contexts the preferred interpretation is uncontroversially universal. But, as noted in much of the literature, this universality tolerates exceptions, which in some contexts leads to quite weak construals. This oscillation in force feels much more limited under negation, where the $\neg \exists$ ($\neg \forall$) construal is clearly predominant, a property of PDs that has come to be known as ‘homogeneity’.² With BAs, which are generally viewed as indefinites of the weakest type, the most widespread interpretation in UE (episodic) sentences seems to be existential (1b.i).³ But universal construals can also be quite natural (1b.ii); and in DE environments the $\neg \exists$ interpretation seems to be the only option (1c.iii-iv). Although similar conceptually to homogeneity, the behavior of BAs, since Carlson’s (1977) seminal work, has been referred to as ‘scopelessness’, and I will stick to this terminology. Finally, Donkey pronouns in sentences like those in (1c) are not confined to situations with people owning just one appliance or credit card.⁴ In such cases, the pronoun is understood as having some kind of quantificational import that oscillates between maximal and non maximal poles in a way that seems fully parallel to the oscillations of the other two types of nominal arguments, as per the glosses in (1c.i-iv). In all three cases, there is an asymmetry between the UE and the DE environments, where the DE cases are uniform in maximizing logical strength, while the UE ones do so in a more context dependent manner. I will refer to this pattern with the label *Oscillating Quantificational Force* (OQF). It is very tempting to conjecture that OQF is driven by a uniform underlying mechanism. While these phenomena have been studied separately in fairly extensive ways, a uniform account of their sensitivity to polarity reversals has not been thus far developed, to the best of my knowledge. The present paper tries to develop one, for treating these phenomena separately might well undermine our chances at understanding what is going on.

1.1. A daunting task.

Attaining a uniform theory of OQF of the nominal arguments in (1) faces many challenges, for PDs, BAs, and Donkey pronouns are syntactically and semantically very different from each other. To illustrate some of the differences, consider, for example, their behavior in there-sentences, where only BAs are felicitous:

- (2) a. I went to the stable; there were sick donkeys in a corner

² See, e.g., Dowty (1987), Schwarzschild (1994), Lasnik (1999), Löbner (2000), Brisson (2003), among many others. As an example of ‘weak’ construal, Malamud (2012), elaborating on an example originally due to Krifka (1996), invites us to consider a sentence like *Oh no! I’ve left the windows open* in a context where while driving away from home, we find out that a storm is approaching, and we remember having left one or two windows open. On homogeneity specifically, cf. also Gajewski (2005), Magri (2014), Križ (2016), Križ and Spector (2017), Bar Lev (2018, 2021) a.o.

³ I will limit myself here to a discussion of BAs in episodic environments, building on Carlson (1977), Chierchia (1998), Dayal (2004, 2013), a.o.. For a discussion of BAs in generic contexts, besides the papers just mentioned, see Krifka et al. (1995).

⁴ The classical reference in this connection is Heim (1982). See also Kanazawa (1994), Chierchia (1995), Geurts (2002) a.o.

- b. I went to the stable; * there were the sick donkeys in a corner
- c. John had a sick donkey; * there was it in a corner.

This diverging behavior is matched by a parallel difference with respect to anaphora. PDs and Donkey pronouns are amenable to anaphoric interpretations, while BAs (in languages without articles like English) systematically disallow anaphoric readings:

- (3) a. I you have *a dog_i*, you must keep *it_i* in a separate room from your cat.
- b. If you have *cats* and *dogs_i*, you must keep *the dogs_i* in a separate room.
- c. * If you have *cats* and *dogs_i*, you must keep *dogs_i* in a separate room.

The two tests above pit PDs and Donkey-pronouns (also definite) against BAs, generally regarded as indefinites. The following paradigm, which involves low pluractional adverbs or PP modifiers, also sharply separates PDs from BAs.

- (4) Differentiated scope of PDs vs. BAs
- a. ?? I killed the /those mosquitos for an hour/repeatedly/twice PD > ADV
- b. I killed mosquitos repeatedly/for an hour/twice ADV > BA

It is as if PDs gets *wide* scope over the pluractional modifier in (4a), which results in deviance if the action is not really iterable. Sentence (4a) seems to be interpreted as: the mosquitos were such that I killed them more than once. In contrast with this, it looks like BAs are very systematically interpreted as if they had *narrow* scope with respect to those same adverbials. Sentence (4b) has the interpretation “it was repeatedly the case that I killed (some) mosquitos”. It is interesting to remark, in this connection, that Donkey-pronouns seem to pattern with PDs or BAs depending on their antecedent. This is again made particularly clear by contexts involving non iterable actions:

- (5) a. Context: Yesterday we went shopping and had to park around.
- b. i. ?? Each of us who had a dime, had to use it repeatedly
- ii. Each of us who had change, had to use it repeatedly

‘Dime sentences’ notoriously favor a $\exists$ -construal of donkey pronouns, where $\exists$ seems to take wide scope with respect to the iterative adverb, if the antecedent is an indefinite singular (count) DP. Sentence (5b.i) says something like: “Each one of us who had a dime, had to use the same dime more than once”, which is pragmatically odd. On the other hand (5a.ii) says that each one of us who had change, repeatedly used some of it to feed parking meters. Following a terminology originally due to Carlson, I will refer to the contrasts in (4) and (5) as the ‘Differentiated Scope’ phenomenon. I should hasten, however, to underscore that the use of ‘scope’ to describe the behavior of various DPs vis-à-vis iterative adverbs is not at all meant as a theoretical statement: the solution we will offer to the contrasts in (4) and (5) won’t be (directly) a matter of scope, but a consequence of event modification. Be that as it may, the contrasts in (4) and (5) are to date rather puzzling.

Table 1: summary of the main differences between PDs, BAs and E-type pronouns

	<i>there</i> -sentences	Anaphoric	Pluractional Mod
Definite DPs	*	√	Arg > Mod
Bare Arguments	√	*	Mod > Arg
E-type pronouns	*	√	Arg > Mod / Mod > Arg

The challenge is to account for the uniform behavior with respect to quantificational force of our three constructions, while also doing justice to their differences.

1.2. Outline of the main idea.

In this section I sketch the main idea, which builds on Bar Lev's (2021) proposal on homogeneity. The key data point is exemplified by pairs of the following sort:

- (6) a. John individually met his advisees, without exception.
b. Nobody individually met his advisees yet, without exception.

Sentence (6a) is interpreted as in (7) (where the adjunct *without exception* underscores that all relevant advisees were seen by John):

- (7) John λx [$\forall y$ y an advisee of x [x met y]]

The plural definite description *his advisees* is clearly construed universally. This being so, we would expect to get (8a) as the interpretation of (6b):

- (8) a. Expected interpretation of (6b): Nobody λx [$\forall y$ y an advisee of x [x met y]]
b. Attested interpretation of (6b): Nobody λx [$\exists y$ y an advisee of x [x met y]]

But uncontroversially (8a) is *not* a possible reading for (6b); the only reading (6b) gets is something like (8b): Nobody saw *any* of his advisees. The quantificational force associated with the object seems to switch from universal to existential, as we go from an upward entailing environment to a downward entailing one. This is typical of polarity driven quantificational phenomena.

One might conjecture that the desired interpretation of the definite object in (6b) stems from assigning to *his advisees* widest scope, as in (9):

- (9) $\forall y$ [y an advisee of x [Nobody λx [x met y]]

Once construed with widest scope, the object might get to be interpreted quasi-universally through whatever mechanism assigns it universal force in upward entailing contexts such as (6a). But the presence of a bound pronoun within the object makes this approach unviable, as it is made evident by the Logical Form in (9), where the first occurrence of x that corresponds to the pronoun *his* remains (incorrectly) unbound. So, the switch in quantificational force under negation cannot be a matter of scope. Furthermore, the presence in both of the sentences in (6) of the qualification *without*

exception, seems to suggest that this switch of quantificational force also has nothing to do with the exception tolerance of definites (for if explicitly excluding exceptions doesn't exclude exceptions, then what does?).

The behavior in (6) is fully general and the parallelism with Free Choice (FC) phenomena, made explicit by the near synonymy of the paraphrases given below, is, at this point, quite hard to miss or discount.

- (10) a. i. I talked to the students who were manifestly in trouble
 ii. I talked to any student who was manifestly in trouble
 b. i. I didn't talk to the students who were manifestly in trouble
 ii. I didn't talk to any student who was manifestly in trouble

Bar Lev proposes that the parallel behavior in (10) is due to the fact that Plural Definites *do* indeed yield a FC effect, in ways that are parallel to how *any*'s FC effect comes about, even though there are strong differences between *the* and *any*: the latter is modal in nature and the former is not (cf., e.g., Dayal 1998). Bar Lev's take, with small (?) adjustments, readily extends to bare plurals and donkey pronouns. Perhaps other approaches can also be modified along lines similar to those explored here. But at present I do not quite see how.

So what *is* the FC mechanism that drives the interpretation of definite plurals? What is responsible for the quasi universal construal of definites in positive contexts and for their existential construal in the scope of negation? Here is the main idea. The basic logical form of (6a) is not (7), but rather (11a):

- (11) a. John $\lambda x [\exists y \in D. y \text{ an advisee of } x [x \text{ met } y]]$
 b. Nobody $\lambda x [\exists y \in D. y \text{ an advisee of } x [x \text{ met } y]]$
 c. $\forall D$ John $\lambda x [\exists y \in D. y \text{ an advisee of } x [x \text{ met } y]]$ ⁵
 └ Free Choice strengthening

In (11a), an *existential* operator over instances of the plurality is inserted. In presence of negation, we thus get (11b), which is just the reading we want. But in absence of negation, we get something that seems way too weak. We want to strengthen (11a) as in (11c). Bar Lev proposes that this is a FC implicature triggered by the activation of sub domain alternatives associated with the existential operator he posits. Such a mechanism is fully general. Existential operators do give rise to FC effects. Even the lamest indefinite, like, say, the indefinite article gives rise to them in appropriate environments. Out of the blue, my saying *pick a card* clearly implicates that the choice is yours; my utterance is in fact equivalent to *pick any card* ($\approx$ *for every card, you may pick it*). We know, in other words, that items that are essentially existential *can* wind up having a meaning which is way stronger than what their lexical semantics would warrant. Strengthening of $\exists$ to $\forall$ is particularly sweeping (in that it does not require a modal context) when a weak $\exists$ -element lacks a scalemate, as is the case for, e.g., the propositional connective *manu* in Warlpiri, discussed in Bowler (2014):

⁵ The universal quantifier has to range over Ds that "stand a chance" (i.e. have a non empty intersection with John's advisees). Formal details to be spelled out shortly.

- (12) a. Kula-rna yunparnu manu wurntija jalangu. Lawa
 NEG-1 SG-SUBJ sing-PAST or dance-PAST today. Nothing

“I didn’t sing or dance today. I did nothing”

- b. Ngapa ka manu warlpa ka wangkami
 Water AUX fall-NON PAST or wind AUX speak-NON PAST

“Rain is falling and wind is blowing.”

In (12a), the connective *manu* seems to be ‘disjunctive’, i.e. weak/existential, with narrow scope with respect to negation. In (12b), however, *manu* switches to a ‘conjunctive’, i.e. strong interpretation.⁶ Bar Lev proposes that the existential operator in (11a) is similar to *manu* in lacking a scalemate and thereby triggering strengthening to $\forall$ in upward entailing contexts without requiring the presence of modalities (on the role of modals, cf. Dayal 1998, Chierchia 2013 a. o.).

In a way, Bar Lev’s proposal turns classical approaches to PDs on their head. Classical approaches (like Roberts 1987, Schwarzschild 1994, 1996) assume that the universal force of definites comes from the insertion a universal distributive operator, that interprets, e.g. (6a) as (6a.i).⁷ This then leaves the problem of how to get the switch of quantificational force in the scope of negation. Bar Lev assumes that in the positive cases a weaker operator is inserted; this yields the right result under negation; for the positive case he appeals to a FC implicature.

While this is an appealing proposal, it faces a conceptual issue, namely *where* is the existential operator needed to trigger the FC effect coming from? In Bar Lev (2018), it is assumed that it is a kind of distributor, like the one posited by Roberts and others, only weaker. But besides being stipulative, this proposal faces the problem that overt distributive operators (like *each*) don’t have any of the properties that Bar Lev’s operator has (e.g. they do not give rise to changes of quantificational force under negation). In Bar Lev (2021), it is argued that the existential operator is a kind of pluralization operator on verbs. But this proposal too is not very plausible. Verbs are assumed to be inherently closed under pluralization, and at any rate, pluralization can be formulated without resorting to syntactically projected existential operators. So the presence of an existential as in (7a) remains a problematic stipulation in his proposal. To use Bar Lev’s own words:

⁶ See also Bar Lev and Margulis (2014) on Hebrew *kol*, Singh et al. (2016) on child language.

⁷ For example:

a. The boys ate a pizza

b. $\text{DIST}[\lambda x. x \text{ ate a pizza}] (\iota x \in D. \text{boys}_w(x)) = \forall y [y <_{\text{AT}} \iota x \in D. \text{boys}_w(x) \rightarrow y \text{ ate a pizza}]$,
 where:

$y <_{\text{AT}} x =_{\text{df}} y$ is an atomic part of x

for any $P_{\langle e, t \rangle}$, $\text{DIST}[P] =_{\text{df}} \lambda x. \forall y [y <_{\text{AT}} x \rightarrow P(y)]$

“It would undoubtedly be desirable to find some independent evidence for an existential pluralization operator (*on the V -- NdA*)...; unfortunately, I can offer no such conclusive evidence at this point.”

(Bar Lev 2021, Sec. 4.5., p. 26).

But help is on the way and it comes, surprisingly, from an area which seems to have precious little to do with any of the above: Dynamic Semantics (DS). DS embodies a (controversial) take on non C-command anaphora, as in, e. g., sentences like (12a), based on the idea that the DP-arguments activate ‘Discourse Referents’ (DRs) that are then ‘passed on’ to semantically accessible domains, where they can be picked up by pronouns.

- (13) a. Mary met a neighbor. She greeted him
 b. $\exists y_2 [Mary = y_2 \wedge \exists y_1 \text{ neighbor}(y_1) \wedge \exists e_4 \text{ meet}(e_4)(y_1)(y_2)]$
 c. $\exists e_5 \text{ greet}(e_5)(she_2)(him_1)$

The sentences in (13a) are interpreted as in (13b-c). The DRs activated in (13b) can provide an antecedent to the pronouns in (13c) across, e.g., conjunction/discourse sequencing. The activation of DRs is done via a special version of an existential quantifier, which I will notate as ‘ $\exists$ ’, to distinguish it from the ordinary, familiar existential quantifier ‘ $\exists$ ’. The same goes in the case of plurals like:

- (14) a. Bandits attacked the guards. They were, however defeated by the guards’ strong reaction.
 b. First sentence in (a):
 $\exists y_2 [\text{bandits}(y_2) \wedge \exists y_1 y_1 \leq \iota x \in D. \text{guards}_w(x) \wedge \exists e_4 \text{ attacked}(e_4)(y_1)(y_2)]$
 Where: $\iota x \in D. \text{guards}_w(x) = \text{df}$ the sum of all guards in w (from a contextually supplied domain D)

Do you see what it is happening? DS seems to be positing an *existential* operator right where Bar Lev wants it to be, namely whenever arguments are fed into their predicates, and it does so on the basis of reasons that are totally independent of homogeneity and related phenomena. The details of this need to be fleshed out, of course. But it is *prima facie* plausible that such an operator is what triggers strengthening, as it is an existential operator that lacks a paradigmatic scalemate. To put it differently, DS motivates the presence of an existential operator to trigger a FC effect exactly where Bar Lev had to stipulate its presence out of nowhere. It thus provides just the independent source of evidence for the $\exists$ -operator we were looking for.

If we succeed in linking OQF phenomena *in general* to Free Choice effects, we would have a single grammatical mechanism regulating a very large number of seemingly disparate constructions, from the behavior of specific lexical items like *any* or *manu*, to the interpretation of quantifier-less nominal arguments. Our objective is to come up with an existence proof that there is a reasonably elegant mechanism possibly embracing all Free Choice effects.

In what follows, I will begin by outlining the aspects of Dynamic Semantics necessary to understanding the mechanisms of DR introduction. Then I will move onto a discussion of each of the relevant types of nominal arguments.

2. Background: Dynamic Semantics and Discourse Referent-introduction.⁸

While we are going to adopt Dynamic Semantics, we will follow a somewhat unorthodox branch thereof. In ‘classic’ Dynamic Semantics, possible/impossible anaphoric links are generally taken to be determined by the nature of Determiner Phrases (DPs): e.g. whether they are quantificational or not, their scope possibilities, etc. Here, we are going to go a different way, following Chierchia (2020), and assume that anaphora is regulated by predicates and predication, rather than by DPs, for it is that variant of DS that actually puts an existential operator exactly where it should be. We first sketch this particular type of dynamics informally. Then, we outline it in more explicit terms, providing the formal framework at the basis of the present proposal.

2.1. Dynamic predication, informally.

The standard dynamic view on anaphora is summarized in (15):

- (15) a. Basic assumptions in Dynamic Semantics:
- i. There is an operation of DR activation
(marked as ‘ $\exists$ ’, which has a different semantics from static ‘ $\exists$ ’).
 - ii. Pronouns get their antecedents (only) from active DRs.
 - iii. Active DRs are passed along to accessible domains, determined by the lexical semantics of Boolean operators.
- b. Standard implementation of Dynamic Semantics: DRs are introduced by nominal arguments.
- i. a man walked in
 - ii. $a \text{ man} \Rightarrow \lambda P \exists z_1 [\text{man}(z_1) \wedge P(z_1)]$ ‘ $\exists$ ’ introduces a DR
 - iii. $\text{walked in} \Rightarrow \lambda u. \text{walked-in}(u)$
 - iv. $\lambda P \exists z_1 [\text{man}(z_1) \wedge P(z_1)](\lambda u. \text{walked-in}(u)) = \exists z_1 [\text{man}(z_1) \wedge \text{walked in}(z_1)]$

Chierchia (2020) retains the assumptions in (15a) but proposes to replace the implementation in (15b) with the following one:

- (16) Dynamic predication: Only predicates introduce DRs.
- i. $a \text{ man} \Rightarrow \lambda P \exists u [\text{man}(u) \wedge P(u)]$ ‘ $\exists$ ’ does **not** introduce a DR
 - ii. $\text{walked in} \Rightarrow \lambda x \exists z_1. x = z_1 \wedge \text{walked-in}(z_1)$ DR introduction takes place here
 - iii. $\exists u [\text{man}(u) \wedge \exists z_1. u = z_1 \wedge \text{walked-in}(z_1)] \Leftrightarrow \exists z_1 [\text{man}(z_1) \wedge \text{walked in}(z_1)]$

⁸ This section summarizes the version of DS in Chierchia (2020) and maybe skipped by readers familiar with that framework.

The outcome of the mapping in (16) is identical to the one obtained by the traditional mapping in (15b). So why bother? A significant advantage arguably comes from a consideration of crossover configurations such as:

(17) Weak Crossover

- a. His son saw a man
- b. i. *a man* introduces no DR
 - ii. The object slot of *see* does; but presumably at a level where it is *not* accessible to the subject. This is self-evident if we couch clause structure in an event-based semantics:
- c. Event semantics:

$\exists z_1 \text{ AG}(e)(z_{1\text{his son}}) \wedge \exists z_2 \text{ Th}(e)(z_{2\text{man}}) \wedge \text{see}(e)$
 DR 1 DR 2
 DR1 is accessible to DR2 but not viceversa (in virtue of the dynamics of ‘ $\wedge$ ’)

If DPs never introduce DRs, *a man* in (17a) won’t, even when assigned scope. Thus, the pronoun *his* in (a) will lack a sentence internal antecedent and won’t be able to co-vary with *a man*. This is, arguably, the source of WCO.

What “DPs never introduce DRs” actually means is two things: (i) only predicates introduce DRs and (ii) derived predicates created for the sole purpose of scope assignment do not. In other words, the interpretation of a structure like (18a) must be as in (18b), not (18c)

(18) Scope assignment/Quantifier Raising (QR)

- a. i. His son saw a man.
 - ii. $a \text{ man}_i [\text{his son saw } t_i]$
- b. i. $\lambda P \exists x [\text{man}(x) \wedge P(x)] (\lambda x_i. \text{his son saw } x_i)$
 - ii. $\text{DP}_i [\phi] \Rightarrow \text{DP}(\lambda x_i. \phi)$ (cf. Heim and Kratzer (1998))
- c. NOT: $\text{DP}_i [\phi] \Rightarrow \text{DP}(\lambda x_i. \exists y. x_i = y \wedge \phi)$

Which predicates, then, introduce DRs? Clearly, to get things going, we must assume that the lexical ones do. I.e., in an event semantics, theta roles/applicative heads must (be allowed to) activate DRs. Of the derived predicates, constructed by movement, some may also activate DRs, but those created just to discharge scope (e.g. via QR) never do. This is just a partial answer to the *which predicates?* question, but one that has the potential of providing a new take on crossover phenomena.

The present sketch is no more than a pointer to a possible line of argumentation on Weak Crossover, which I have no pretense of selling to readers here. What is crucial for the present purpose is that the idea of there being a process of DR-introduction associated with thematic positions is for better or worse motivated independently of homogeneity. Dynamic predication puts existential operators right where we need them in order to understand the coming about of generalized Free Choice effects.

2.2. A formal framework.

Types are as follows:

(19) Types.

- a. Basic: $e, t, \mathbf{n}, w$; where:
 - $D_e = U$ (domain of individuals, including events),
 - $D_t = \{0,1\}$
 - $D_w = W$, the set of worlds
 - $D_n = N$ (the set of positive integers). Integers are used to model DRs.
- b. Derived types: $D_{\langle a,b \rangle} = [D_a \Rightarrow D_b]$
(the set of all total or partial functions from D_a into D_b)
- c. Key derived types:
 - i. $\omega = \langle \mathbf{n}, e \rangle$ Assignments (functions from numbers into individuals)
 - ii. $\langle \omega, e \rangle$ DRs (functions from assignments into individuals)
Pronouns are going to be interpreted as DRs.
 - iii. $T = \langle \omega, \langle \omega, t \rangle \rangle$ Context Change Potentials (CCPs, functions from an input assignment into a set of possible output assignments)

Sentences are going to be interpreted as CCPs, i.e. relations between an input assignment and an output assignment, as in Dynamic Predicate Logic (Groenendijk and Stokhof 1991). The treatment below is going to be mostly extensional, since we deal primarily with anaphora. But when necessary, reference to worlds will be made explicit.

The sets of meaningful expressions, models, etc. for a formal language with these types are to be defined as for TY2 (Gallin 1975). The key operation of a dynamic system is DR activation. This is an operation $\exists^n$ that applies to an individual u and an index n and creates a CCP whose input assignment ω gets changed by putting u at the n^{th} coordinate of the output assignment. This activation requires that the input be *undefined* for the n^{th} coordinate (Novelty).

(20) Dynamic lifting and DR-introduction.

For any P , of type $\langle e, t \rangle$:

- a. $[P_{\langle e, t \rangle}] = \lambda u_e [\lambda \omega \lambda \omega'. \omega = \omega' \wedge P(u)]$ Dynamic Lifting
- b. For any u of type e , and any n , $\exists^n u = \lambda \omega \lambda \omega'. \omega =^{n/u} \omega'$ DR-introduction
where $\omega =^{n/u} \omega'$ is an abbreviation of $\omega' = \omega \cup \langle n, u \rangle$, defined only if the input assignment ω is *undefined* for the n^{th} coordinate.
- c. $[P_{\langle e, t \rangle}]^n = \lambda u. \exists^n u \wedge [P](u)$ Predicate-level DR Introduction

Pronouns, of type $\langle \omega, e \rangle$, combine with predicates of type $\langle e, t \rangle$ via function composition:

(21) Pronouns.

- a. $he_n = \lambda \omega. \omega_n$

- b. If β is of type $\langle e, T \rangle$, and α is of type $\langle \omega, e \rangle$, then
 $\beta (\alpha_n) = \lambda \omega \lambda \omega'. \beta (\alpha(\omega(n))(\omega)(\omega'))$

A sentence containing a pronoun like *he₃ runs* requires that its input be defined for the 3rd coordinate (Familiarity).

The logic is essentially that of DPL (enriched by novelty presuppositions for DR introduction and familiarity presuppositions for pronouns); the interaction between the various connectives determines accessibility, i.e. which active DRs are accessible to which pronouns. Conjunction is defined as composition of relations, the key to the passing on of active discourse referents from the structurally higher/first conjunct to the lower/second one.

(22) The logic.

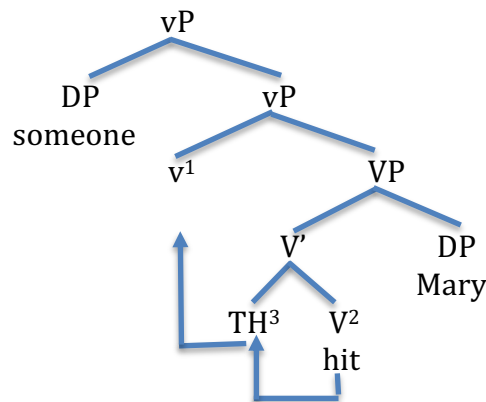
For any ψ, ϕ of type T , any variable ω, ω' of type ω , and any variable α_a of type a :

- a. $\downarrow_{\omega} \phi = \exists \omega' [\phi(\omega)(\omega')]$ ' ϕ is true relative to ω ;' $\downarrow$ is of type $\langle \omega, \langle T, t \rangle \rangle$
- b. $\neg \phi = \lambda \omega \lambda \omega'. \neg \downarrow_{\omega} \phi \wedge \omega = \omega'$
 [It checks whether ϕ is false relative to ω ; if so, it returns ω unchanged; this is a 'test']
- c. $(\phi \wedge \psi) = \lambda \omega \lambda \omega'. \exists \omega'' [\phi(\omega)(\omega'') \wedge \psi(\omega'')(\omega')]$
 [Composition of relations]
- d. $\phi \rightarrow_{\forall} \psi = \neg (\phi \wedge \neg \psi)$
 [ϕ is accessible to ψ (internally dynamic); but $\phi \rightarrow_{\forall} \psi$ is externally static]
- e. $\phi \vee \psi = \neg (\neg \phi \wedge \neg \psi)$
 [Neither ϕ is accessible to ψ , nor viceversa]
- f. $\exists \alpha_a \phi = \lambda \omega \lambda \omega'. \exists \alpha_a [\phi(\omega)(\omega')]$
 [Function composition; It keeps active all DRs active in ϕ]
- g. $\forall \alpha_a \phi = \neg \exists \alpha_a \neg \phi$
 [It closes off all DRs active in ϕ]

In (23) below we apply this apparatus to the interpretation of a clause in an event-based semantics

(23) a. Someone¹ [hit]² Mary³.

He₁ was from out of town. She₃ wasn't hurt; but it₂ was scary.



- b. $\exists u[\text{person}](u) \wedge \exists e [[\text{AG}(e)]^1(u) \wedge [\text{TH}(e)]^3(\text{mary}) \wedge [\text{hit}]^2(e)]$
- c. $\lambda\omega\lambda\omega' \exists u\exists e [\omega = \langle 1/u, 3/\text{mary}, 2/e \rangle \wedge \omega' \wedge \text{person}(u) \wedge \text{AG}(e)(u) \wedge \text{TH}(e)(\text{mary}) \wedge \text{hit}(e)]$
- d. $\text{TH}^n = \lambda P_{\langle e, T \rangle} \lambda u \lambda e. [\text{TH}(e)]^n(u) \wedge P(e)]$
- e. Intensional version of (a):
 $\lambda w \exists u[\text{person}_w](u) \wedge \exists e [[\text{AG}_w(e)]^1(u) \wedge [\text{TH}_w(e)]^3(\text{mary}) \wedge [\text{hit}_w]^2(e)] =$
 $\lambda\omega\lambda\omega' \lambda w \exists u\exists e [\omega = \langle 1/u, 3/m, 2/e \rangle \wedge \omega' \wedge p_w(u) \wedge \text{AG}_w(e)(u) \wedge \text{TH}_w(e)(m) \wedge \text{hit}_w(e)]$
 Where $p = \text{person}$ and $m = \text{Mary}$

The formula in (23b) is the interpretation of the first sentence in (23a), in which three DRs are activated: one for the agent, one for the theme, plus the event argument. These DRs can act as antecedents in subsequent discourse. The activation of DRs for the arguments is done by thematic/applicative heads: little v and TH , respectively, which have the semantics in (23d). Applicative heads are null in English, but overt in other languages; the lexical head V (which activates the DR corresponding to the event argument) cyclically incorporates into applicative heads. The semantic composition is completely standard, only adjusted for type to CCPs. In primitive notation, i.e. applying the definitions in (20)-(22), (23b) reduces to (23c). In (23a-d), I omit representing worlds, as they are irrelevant to the illustration at hand. In (23e) I show how the intensional version of (20a) would look like, assuming that Verbs as well as Th-roles have a world-argument. The goal of the paper is to show how a simple extension of this framework accounts in a uniform way for OQF phenomena.⁹

3. Definites and homogeneity.

We will now work out the approach to PDs informally sketched in Section 1.2. The main data point, namely the paradigm in (6), is repeated here in simplified form:

(24) Homogeneity

- a. I interviewed the prospective students, without exception
 $\Rightarrow$ I interviewed each of/all the prospective students
- b. Nobody interviewed the prospective students yet, without exception
 $\nRightarrow$ Nobody interviewed each of/all the prospective students
 $\Rightarrow$ Nobody interviewed any of the prospective students

In Section 1.2 we have provided an argument based on pronoun binding that this switch in quantificational force cannot be in general due to scoping the definite above negation. Here we provide a second argument against the idea that homogeneity is a scope phenomenon, based of VP-ellipsis. It is well known that in the configuration in (25a), at the ellipsis site, the existential quantifier in subject position must have wide scope with respect to the object:

⁹ For further details on this framework, see Chierchia (2020),

- (25) a. John met every witness in this case. Some friend of his did too.
 b. * For every witness there is some friend of John who met him/her.
 c. John met the witnesses in this case; but no friend of his did.
 $\equiv$ no friend of his met any of the witnesses
 d. John met every witness in this case; no friend of his did.
 $\equiv$ no friend of his met every witness

The second sentence in (25a) cannot mean (25b): for every witness, there was some friend of John's who met the witness. According to, e.g., Fox (1999), this impossibility follows from economy considerations (the object in the first sentence *John saw every witness* cannot have wide scope because it wouldn't yield a reading distinct from the narrow scope construal) and a parallelism condition on ellipsis (scope of quantifiers has to be isomorphic across the antecedent and the ellipsis site). Notice now that in (25c) the only available reading is again the 'not any witness' reading, and on the basis of the facts in (25a) this *cannot* be imputed to a wide scope construal of the definite, impossible in this configuration, as we just saw. This is corroborated by (25d) which shows that an overt quantifier in the same position indeed cannot outscope the subject: sentence (25d) cannot mean that for every witness no friend of John's saw him/her.

The asymmetry in the interpretation of definites in upward vs. downward entailing contexts is thus identifiable from multiple angles, and *not* imputable to scope.

There are two further important data points to consider, one about tolerance of exceptions, the other about first language acquisition. I will discuss them briefly because they constitute empirical evidence that favors Bar Lev's approach over its competitors. Let us start with tolerance of exceptions, which has two facets: the first facet is that the universal interpretation of definites readily tolerates exceptions. The second is that exception tolerance is harder in the scope of negation than in positive sentences. Of these two facets, the first is uncontroversial, while the second is controversial. Consider:

- (26) NonMaximality
- a. i. I heard the kids in the playroom upstairs
 ii. I saw the kids in the playroom upstairs
 - b. Nobody else did
 - c. Somebody else did too

One or two noisy kids would suffice to make (26a.i) true. *To hear* has a high exception tolerance. *To see*, on the other hand, has a lower exception tolerance. Seeing just few of the kids we know to be around is not so likely to make (26a.ii) true, though in special contexts it may. This illustrates exception tolerance and how lexical meanings and the context play a key role in determining the 'slack'. This facet of the exception tolerance issue is uncontroversial. The second facet is the claim that under negation, particularly where the confound of scope is factored out, one gets a decrease of 'slack'. This second facet of the issue is controversial. For me, the facts

are clear enough. Hearing just one of the kids upstairs might suffice for the truth of (26a), but (26b) can only mean that nobody else heard *any* of the kids. Zero exception tolerance. The same applies, mutatis mutandis, to (26a.ii). This effect *must* be an effect specific to negation, for tolerance of exceptions clearly *is* carried across in, e.g., (26c), when a non DE quantifier is involved.

On the basis of these considerations, we may venture the following diagnosis. Consider the pair in (27), adapted from Lasersohn (1999):

- (27) a. All the inhabitants of the city are now asleep
 (Well, I don't mean, of course, the doctors on call)
 b. The inhabitants of the city are now asleep

It is not that sentence (27a) doesn't tolerate exceptions, as shown by the fact that the continuation *well, I didn't mean...* is admissible. However, non maximality effects are easier to get, with Definite Plurals as in (27b). To use Lasersohn's insight, every expression (including the quantifier *all*, negation, etc.) may admit a 'halo' of vagueness (perhaps determined by some implicit restriction on the quantificational domain). However, such a halo appears to be much 'broader' with Plural Definites, particularly in absence of negation.¹⁰ It's as if regular quantifiers and negation have some common potential source of slack, while Plural Definites (when not in the scope of negation) have an additional one, that makes them *more* prone to generating exceptions.

The third relevant data point that bears on homogeneity is not controversial and concerns first language acquisition. Karmiloff-Smith (1981) and Caponigro et al. (2012) have shown that children display a non adult like behavior in the interpretation Plural Definites: in particular, they tend to accept sentences like *the hearts are red* in situations in which just one or two hearts are, while adults controls reject the sentence in the same scenario. Tieu et al. (2019) explore the issue further by checking what happens under negation. And they found out that in negative sentences, children appear to be very much adult like in interpreting sentence like *the hearts are not red*, not as *not every heart is red* but as *every heart is not red*, without much tolerance for exception. This constitutes evidence that the asymmetry between positive and negative environments involving plural definites runs deep.

Summing up, there are three main pieces of data we want to account for: (i) polarity reversals under negation, (ii) greater exception tolerance of definites not in the scope of negation vis-à-vis definites in the scope thereof, and (iii) the acquisition data. The first data point is in itself quite challenging and is at the core of most approaches to homogeneity: PDs are usually taken to denote plural individuals and how is such a semantics to be brought in line with (i)? The other two data points are especially important in distinguishing Bar Lev's approach from its competitors. I

¹⁰ A further phenomenon tied to those we have discussed is 'Gappiness'. Bar Lev proposes to reserve this term to the observation that a sentence like *Mary read the books* is felt to be neither true nor false in contexts where she read some though not all of the relevant books, an observation that prima facie seems to strongly favor tri-valent approaches. Space limits force us to wholly refer to Bar Lev's discussion (and proposal) of this matter.

will proceed as follows. In Section 3.1 I will discuss the main strategies that have been pursued on homogeneity, and their shortcomings. In Section 3.2 I will outline a proposal that views homogeneity as a Free Choice effect stemming from dynamic predication, which fares better in accounting for (i)-(iii) than its alternatives. In section 3.3. I explore further extensions and consequences of (my variant of) Bar Lev's proposal, particularly with respect to the Differentiated Scope phenomenon.

3. 1. Strategies on homogeneity.

Important steps in dealing with these phenomena are constituted by works like Dowty (1987), Laserson (1999), and Brisson (2003). In particular, Brisson develops an approach to non maximality based on the notion of 'ill-fitting cover'. Starting from the idea that plurals trigger the presence of distributivity operators (e.g., Roberts (1987) and Schwarzschild (1996)), Brisson proposes that the relativization of distributivity to 'covers' of the domain of quantification, as in (28), might be the key to non maximality.

- (28) a. The boys laughed
 b. $\text{DIST}[\lambda x. x \text{ laugh}](\iota x \in D. \text{boys}_w(x)) = \forall y \in \text{Cov}_n [y \leq \iota x \in D. \text{boys}_w(x) \rightarrow y \text{ laugh}_w]$
 c. The boys didn't laugh.
 i. $\neg \text{DIST}[\lambda x. x \text{ laugh}](\iota x \in D. \text{boys}_w(x))$ 'not all boys laughed'
 ii. $\text{DIST}[\lambda x. \neg x \text{ laugh}](\iota x \in D. \text{boys}_w(x))$ 'all boys didn't laugh'

Cov_n in (28) is a variable ranging over a cover of the domain.¹¹ Certain covers, Brisson proposes, may be 'ill-fitting' and exclude some individuals from consideration. The presence of a universal operator like *all* eliminates (or reduces) the tolerance for ill-fitting covers. This is an interesting starting point, but it leaves unexplained the behavior of definite plurals under negation, i.e. homogeneity proper. In particular, she has no explanation why reading (28c.i.) is not really there.¹² To address this, two broad lines of research have emerged. The first is to impose an 'all-or-none' presupposition on distributive operators, e. g. as in (29):¹³

- (29) $\text{DISTP} = \lambda x \lambda w: \forall y [y \leq x \rightarrow P_w(y)] \vee \forall y [y \leq x \rightarrow \neg P_w(y)]. \forall y [y \leq x \rightarrow P_w(y)]$

For example, *DISTate a pizza* applies to *the boys* only in contexts where it is taken for granted that either all of them or none of them ate a pizza. Such a presupposition

¹¹ There are many ways of defining covers. If the domain D is of type $\langle e, t \rangle$ and forms an atomic join semilattice, a cover $\text{Cov}_n(D)$ for D , is any subset of D such that $\cup \text{Cov}_n(D) = \cup D$. For example, if D is as in (a), the subsets in (b) are covers for D and those in (c) are not:

(a) $D = \{a, b, c, a \cup b, b \cup c, a \cup c, a \cup b \cup c\}$
 (b) $\{a, b, c\}, \{a \cup b \cup c\}, \{a, a \cup b, b \cup c\}$
 (c) $\{a, b\}, \{a, a \cup b\}, \{b, c, b \cup c\}$

¹² She would probably argue that the ambiguity is there, but just blurred by exception tolerance. We have, however, provided evidence from pronoun binding and VP ellipsis that this cannot be the whole story.

¹³ See e.g. Löbner (2000), Gajewski (2005), Kriš (2016), a.o.

would project through negation, and so the two readings in (28c) become (Strawson-)equivalent and negation no longer runs the risk of weakening unduly the interpretation of the positive sentence. This presuppositional approach can then be integrated by an account of non maximality along Brisson's (or some other) lines.

A second take on homogeneity is "alternative based" and hypothesizes that sentences involving definite plurals may have a whole range of potential meanings, from a weakest extreme ($\exists$) to the strongest one ($\forall$). Independent principles of 'contextual fitness' would determine which of these candidate interpretations gets selected.¹⁴ If one assumes that something like 'pick the strongest interpretation compatible with contextual knowledge' plays a role in the selection process, one gets a potentially interesting account of the polarity sensitivity in the interpretation of definite plurals.

Both the presupposition based and the alternative based approaches get right the flip of preference across polarity reversals. Neither of them really gets, though, the greater resistance to exceptions that seems to characterize PDs under negation. Nor do they provide an account for the child language data. This is so because, as Bar Lev points out, they share a common architectural trait: they treat positive and negative sentences symmetrically. The way in which the interpretation of positive and negative sentence is arrived at is one and the same. The first family of approaches rides on a lexical presupposition; the second exploits a uniform mechanism of selection out of a candidate set of meanings. On this basis, there is no reason why negative sentences should be less exception prone than positive ones. Nor is there any reason why children should be non adult like with positive sentences, while being adult like with negative ones.

3.2. The proposal.

We have seen how thematic roles introduce DRs. Our main conjecture is that in the case of plurals, they introduce DRs ranging over *parts* of the pluralities. Thus, for example, a sentence like (30a) is interpreted as in (30b).

- (30) a. I interviewed the students
 b. $\exists e \exists z_1 \in D(\text{ix. students}(x)) [\text{AG}(e)(I) \wedge \text{TH}(e)(z_1) \wedge \text{interview}(e)]$ ¹⁵
 c. $D(\text{ix. students}(x)) = \{u: u \text{ is an atom} \wedge u \leq \text{ix. students}(x)\}$
 For example, if $\text{ix. students}(x) = a \cup b \cup c$, $D(a \cup b \cup c) = \{a, b, c\}$
 d. Sub-Domain Alternatives to (c): $\{D' : D' \subseteq D(\text{ix. students}(x))\}$

The effects of DR introduction are similar to that of a distributive operator, only weaker, because the operator that introduces DRs has to be existential. However, existentials can trigger FC effects, by activating subdomain alternatives. Now, what would be the domain of $\exists$ in (30b)? Quite clearly, the things over which $\exists$ ranges are the parts of the plurality *the students*. For totally distributive interpretations, we

¹⁴ See e.g. Krifka (1996), Magri (2014), Križ (2016), Križ and Spector (2017) a.o.

¹⁵ I am using the informal notational convention of Section 2.1. and I skipping over the DR associated with the agent. The formal notational conventions for formulae like (30b) are in Section 2.2.

can limit ourselves to a consideration of the set of atoms constitutive of *the students*, as in (30c). Sub-Domains thereof would therefore be all the subsets of *the students*. Active Sub-Domain alternatives must undergo a process of exhaustification. The details of how exhaustification works do not matter here: just plug in your favorite approach.¹⁶ The operation of DR introduction lacks scalar alternatives, since the theta role/applicative heads that drive it are not part of Horn scales (nor are Definite Plurals, arguably).¹⁷ In absence of scalar alternatives, exhaustification delivers a universal reading, by requiring that (30b) be true with respect to *all* Sub-Domain alternatives, including the singletons:

- (31) a. $\text{Exh}_{\text{Sub-D}}(\exists e \exists z_1 \in D(\iota x. \text{students}(x)) [\text{AG}(e)(I) \wedge \text{TH}(e)(z_1) \wedge \text{interview}(e)])$
 b. $\forall D' \in \text{SubD} \exists e \exists z_1 \in D'(\iota x. \text{students}(x)) [\text{AG}(e)(I) \wedge \text{TH}(e)(z_1) \wedge \text{interview}(e)]$

We thus obtain the full-fledged effects of a distributive operator, using the very same mechanism at play in e.g. the interpretation of *manu* in Warlpiri and, for that matter, of *any* in English.¹⁸ The main advantage of this approach comes in presence of negation, where the proposed semantics delivers the following:

- (32) a. I didn't interview the students
 b. $\neg \exists e \exists z_1 \in D(\iota x. \text{students}(x)) [\text{AG}(e)(I) \wedge \text{TH}(e)(z_1) \wedge \text{interview}(e)]$
 c. $\{ \neg \exists e \exists z_1 \in D'(\iota x. \text{students}(x)) [\text{AG}(e)(I) \wedge \text{TH}(e)(z_1) \wedge \text{interview}(e)] : D' \subseteq D \}$

The Sub-Domain alternatives to (32a) are going to be, as before, the subsets of the atoms of *the students*, as in (32c). All the alternatives are entailed by (32b), i.e. the basic meaning of (32a). Thus, exhaustification is vacuous and (32b) winds up as the final meaning of (32a).

The theory just outlined yields a straightforward account of the OQF effect with Plural Definites, as a FC effect. The only stipulation we need to make is that the existential operator that introduces DRs activates subdomain alternatives, something that existential operators quite generally do. To put it bluntly, if DRs are introduced as argued in Chierchia (2020), then Bar Lev's approach to homogeneity comes virtually for free.

¹⁶ Fox (2007) proposes a mechanism of recursive exhaustification that employs the notion of 'Innocent Exclusion'. Chierchia (2013) proposes that Sub-Domain alternatives can be 'pre-exhaustified', i.e. considered as if they were, in turn, exhaustified. Bar Lev and Fox (2017) develop a mechanism based on 'Innocent Inclusion'. While there are a number of conceptual and empirical differences among these methods, they converge on the core cases, and for our purposes they are equivalent.

¹⁷ This is so because *the* is interpreted as a ι -operator that creates a referential term out of a predicate, and hence does not have the type of a quantifier. And at any rate, if one were to view it as a quantifier, it would have to be assimilated to a universal one; universal quantifiers being the strongest members of their scale would generate no (scalar) implicature in positive contexts. For a different take on this, which however, reaches the same conclusion, see Bar Lev (2020, Section 4).

¹⁸ The main difference with *any* is that the latter *does* have Scalar Alternatives, which limits the occurrence of FC effects to modal environments. See, e.g., Chierchia (2013, Chapter 5) for one way of spelling it out; see Crnic (2019) a. o. for a different exhaustification based approach to *any*.

Apart from the introduction of DRs, the interpretation of Plural Definites is the canonical (presuppositional) Link-style one: it employs the ι -operator and it contains, in turn, an implicit domain variable, like any other DP:

- (33) a. the students = $\iota x \in D_{INT}. \text{students}(x)$ $D_{INT} = \text{DP-internal domain.}$
 b. I visited a class and interviewed the students/but didn't manage to interview the students
 c. $D_{INT} = \{u: u \text{ is the class the speaker visited}\}$

Accordingly, *the students* in (33b) is interpreted as *the students in the class the speaker visited*. Thus, the full-fledged interpretation of (33) always contains in the end *two* Domain variables: the internal one, introduced by the article/quantifier, and an external one introduced by the theta-role:

- (34) $(\neg) \exists e \exists z_1 \in D(\iota x \in D_{INT}. \text{students}(x)) [AG(e)(I) \wedge TH(e)(z_1) \wedge \text{interview}(e)]$
 Where if, e.g., the students in class where a, b, and c, then
 $D(\iota x \in D_{INT}. \text{students}(x)) = D(\iota x \in \{u: u \text{ is in class}\}. \text{students}(x)) = D(a \cup b \cup c) = \{a, b, c\}$

This may look like over-killing and the two domain variables could be easily collapsed/co-bound. But as we will see, this distinction may turn out to be handy in connection with BAs that cannot get an internal domain through the determiner. Moreover, if Bar Lev is right, the external domain variable can be used to play the role of covers, when it comes to collective predicates.¹⁹

The presupposition of definites is expected to project in the usual way. For example, a negative sentence like (35a) would be *infelicitous* in a situation in which there are no students. Similar considerations apply to anaphoric uses of definites, which can be readily worked into the above picture.

- (35) a. Bandits_i attacked the guards. But in the end, the bandits_i were quashed
 b. the bandits_i = $\iota x \in \{u: u \leq z_i\}. \text{bandits}(x)$, where z_i is anaphorically bound.

This is not the place to attempt a full-fledged analysis of plural anaphora. There are many ways in which the anaphoric construal of *the bandits* in (35a) can be handled consistently with the general line we are taking. For example, if the DR associated with the first occurrence of *bandits* in (35a) is i , this index can be picked up by the second occurrence of *the bandits*, perhaps through an anaphoric interpretation of the internal domain restrictor, along the lines indicated in (35b). Be that as it may, the main features of the traditional analysis of definite plurals are going to be inherited by the present approach. The novelty resides in the fact that the role of the distributivity operator is subsumed by DR introduction and the FC effect it triggers.

Non maximality with definites, then, comes to have *two* sources in this set up. One is internal domain selection. This is common to all quantifiers (and to negative sentences). A second source, specific to Definite Plurals in UE environments is

¹⁹This is something we won't be able to fully pursue here, but cf. Section 5 below for some relevant points. See also, e.g., Bar Lev (2018, Ch. 4, 2019, Sec. 8).

alternative pruning, a phenomenon we know implicatures are subject to. Here is an example of the latter, taken again from Bar Lev.

- (36) a. Context: There is a children's party, with a clown. We ask "how did it go?
Was the clown funny?"
b. The children laughed

Sentence (36b) can be taken as true in context (36a) even if some children didn't laugh, if their number is small enough. This 'size'-effect can be readily obtained by pruning 'small' subdomain alternatives. (For example, in a domain with three children, pruning the singleton yields a reading equivalent to 'at least two children laughed' – see Bar Lev 2021, Section 5 for details). This kind of weakened reading would be hard to get via Internal Domain selection alone. In general, pruning in the present set up is subject to formal constraints, governed by grammar, constraints which can involve addressing, e.g., 'questions under discussion', such as the ones in context (36a), something we will not pursue further here.²⁰

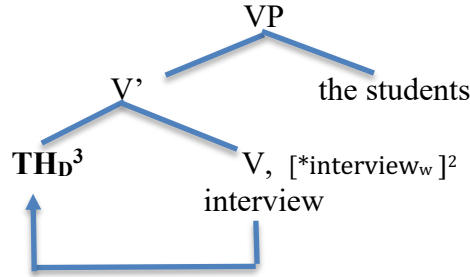
It should be clear by now why the present approach comes with a built in radical asymmetry between positive and negative sentences. The mechanisms through which the final reading is obtained, in the positive case, involve a grammatically driven implicature. In the negative cases no implicature is (or can be) activated. This, in turn, has as a consequence that positive sentences have two independent paths to non maximality: D-selection (which is common to all quantificational structures and involves an implicit D-variable) and pruning of alternatives. In negative sentences, only D-selection can be playing a role. These multiple asymmetries between positive and negative sentences explain the variance between child and adult grammar. The simplest hypothesis to entertain is that children, at first, fail to compute the implicature associated with PDs, and thus obtain a weak $\exists$ -reading in UE contexts, but a strong one in DE ones, a behavior that seems hard to account for on other approaches.

To sum up, the structure of predication involving definite plurals is as follows (I illustrate this with respect to the theme-argument, but the same holds of course of any other theta-position):

²⁰ As an example of grammatically driven constraints on pruning, consider a disjunctive operator $a \vee b$, with Sub-Domain alternatives $\{a, b\}$. viz. the disjuncts, from which we prune a ; then $\text{Exh}_{\{b\}} a \vee b = a$, which is absurd. Essentially, exhaustification must be prevented from getting in a round-about way something which is already included among the formal alternatives. This matter is discussed at length in, e.g. Fox and Katzir (2011), under the rubric of 'symmetry breaking', and in Chierchia (2013) under the rubric of 'exhaustification economy'. For ways of linking pruning to Questions Under Discussion in a systematic way, see Bar Lev 2021, Section 5.

(37) Extending Dynamic Predication to plural definites.

a.

b. $VP = \lambda e. \exists z \in D(\text{the}_{DINT} \text{ students}) [TH_w(e)]^3(z) \wedge [interview^*_w]^2(e)$ c. $TH_D^3 = \lambda P \lambda x \lambda e. \exists z \in D(x) [TH_w(e)]^3(z) \wedge P_w(e)$ where, If x is an atom, $D(x) = \{x\}$; If x is a plurality, $D(x) = \{y \text{ is an atom} : y \leq x\}$ d. TH_D^3 activates Sub-Domain alternatives: $ALT(TH_D^3) = \{ \lambda P \lambda x \lambda e. \exists z \in D'(x) [TH_w(e)]^3(z) \wedge P_w(e) : \forall u D'(u) \subseteq D(u) \}$

TH introduces the theme-argument of the V, but all applicative heads work in the same way.²¹ If the argument is plural, the applicative head adds a DR ranging over parts of the plurality, for anaphoric pick up. It also activates subdomain alternatives, which eventually undergo exhaustification, yielding the universal reading.²²

3.3. Further consequences and developments.

The approach to OQF with Plural Definites sketched in the previous section is rich in consequences to be fleshed out further. We shall limit ourselves to two consequences that bear most directly on our goals. The first concerns ‘halo-removal’ by *all/each*, the second concerns scope matters involving pluractional adverbs.²³

²¹ The V is assumed to be closed under sum, and hence cumulative. This assumption is irrelevant for distributive interpretations, but it matters once one considers collective/cumulative interpretations (cf. Section 3.3. and Section 5.2). The definition of the *-operator is standard, adjusted for the dynamics:

(a) $[*interview_w]^2 = [\lambda e. \exists E [E \subseteq _interview_w \wedge e = \cup E]]^2$

I should add that the assumption that the D-alternatives are activated by the applicative heads is not a necessary one. It is also very conceivable that they are activated directly by the definite DP.

²² Let me briefly point out the main differences with Bar Lev’s proposal. The single most important difference is in the nature of the existential quantification over members of the plurality associated with Definite Plurals. As mentioned in Section 1.2., for Bar Lev (2018), it is a distributive operator, while for Bar Lev (2021) it is a verb oriented ‘pluralization’ operator, both of which are problematic assumptions. On the present approach, the relevant existential operator derives from DR-introduction. There are several other minor differences concerning the treatment of D-alternatives (e.g., Bar Lev doesn’t distinguish between an ‘inner’ and an ‘outer’ Domain, like we do) and the treatment of *all* in Section 3.3. Also Bar Lev does not engage with the behavior of his distributive/pluralizing $\exists$ -operator vis a vis pluractional adverbs, to be discussed in the next section.

²³ In our presentation so far, we limited ourselves to atomic domains, which only yield distributive interpretations. But, as is well known, predicates like *gather*, *lift a piano*, etc. allow for distribution to subgroups. E.g. a sentence like *the boys gathered in the hallway* can be true if they gathered all at once, or if there were several separated gatherings by different subgroups. To get *partial* distributivity which is typical of collective predicates we will have to consider domains that include also pluralities and not just atoms. We will sketch how to do so in Section 5, when we deal with

3.3.1. *Halo removal*. Sub-Domain alternatives play a key role in relation to how quantificational elements like *all* or *each* may ‘remove’ homogeneity. A natural hypothesis in the present set up is to assume that elements like *all* directly operate on the subdomain alternatives active whenever definite plurals are involved, much like other alternative sensitive operators, e.g. *only*, do. In (38) I give a simplified illustration of the idea:

- (38) a. All the boys laughed/The boys all laughed
 b. $All_{\Delta} \sim_{\Delta} [\text{the boys } AG_D^i \text{ laughed}]$
 c. $[\text{the boys } AG_D^i \text{ laughed}] = \exists e \exists z_i \in D(\text{the boys}) [AG_w(e)(z_i) \wedge \text{laughed}_w(e)]$
 $D\text{-ALT} = \{ \lambda w \exists e \exists z_i \in D'(\text{the boys}) [AG_w(e)(z_i) \wedge \text{laughed}_w(e)] : \forall x D'(x) \subseteq D(x) \}$
 d. $ALL_{\Delta}(p) = \lambda w : p \in \Delta . \forall q \in \Delta [q_w]$
 = the proposition defined only if p is in Δ and true in the worlds where *all* the members of Δ are true.
 e. $\forall p \in D\text{-ALT}(\lambda w \exists e \exists z_i \in D(\text{the boys}) [AG_w(e)(z_i) \wedge \text{laughed}_w(e)]). p_w$

I am treating ALL_{Δ} as a propositional operator like *only* on Rooth’s (1992) classic approach. Wherever adjoined at spell out, the key Logical Form looks like (38b), where ALL_{Δ} operates on the subdomain alternatives of its sister (via Rooth’s $\sim$ -operator), yielding the meaning in (38e). What it says is that all the subdomain alternatives associated with *the_D students left* are true. Formally, Δ here is a free variable over sets of propositions that differ with each other relative to some domain variable. The value of Δ is fixed by the focus value of its sister, exactly like it is done for *only*. The lexical entry for ALL_{Δ} is provided in (38d); its presupposition demands that its argument be a member of the contextually supplied restriction. The outcome is a universal quantification over domain alternatives. Since such alternatives are bound by ALL_{Δ} , they are not subject to contextual pruning, and (the main source of) non maximality disappears. Moreover, homogeneity effects disappear as well, since the outcome is a quantificational interpretation that is *not* expected to be polarity sensitive. In a sense, ALL_{Δ} is just a spell-out of $Exh_{\text{Sub-D}}$. The details of all this do not matter much; what matters is the general idea, which is very much in the same spirit, if not in the same letter, as previous proposals on this score (such as e.g., Brisson 2003).²⁴

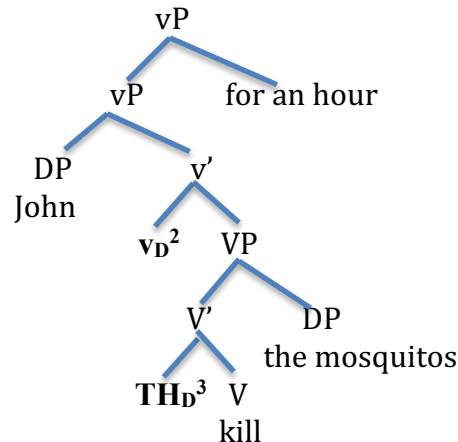
3.3.2. *Durative modifiers*. The second issue I would like to discuss has to do with the interaction of definite plurals with pluractional adverbs, noted in Section 1. I’ll focus here on the durative ones, hoping that the present approach will extend to other pluractional modifiers (e.g., along the lines discussed in Bassa Vanrell 2017).

donkey pronouns, as the difference between total vs. partial distributivity becomes crucial in that connection.

²⁴ The analysis just sketched is not meant to extend to partitives like *all of the boys*, because it operates on the subdomains that are activated only when a definite is directly merged in a thematic position. For partitives, a classical analysis à la Ladusaw (1982) would be adequate and yield, through a different path something equivalent to (38e).

Definite Plurals systematically behave with respect to durative modifiers as if they had wide scope.²⁵ This can be readily appreciated with verbs that refer to ‘non iterable’ eventualities like *kill* or *eat*:

- (39) a. * John killed the mosquitos for an hour
 b. * John ate those apples for an hour
 c.



- d. It was the case for an hour that there were members of the relevant set of mosquitos such that John killed them.

Here and throughout, I assume that pluractional adverbs are adjoined to little vP, i.e. at a site where all the arguments of the V have been discharged. Quantificational DPs would have to scope, generally, at some site above that (e.g. TP or higher), which might explain

²⁵ Here are some examples, from the literature, where a low pluractional adverb, uncharacteristically, takes scope over the object:

- a. Intervention by a quantifier:
 i. #John found a flea on his dog for a month
 ii. John found a flea on his dog every day for a month (cf. Bassa Vanrell 2017)
 b. Negation:
 John didn't kill a rabbit for a month (good on the ‘throughout not’ reading - from Mittwoch 1977)
 c. Pragmatic framing:
 i. We built a huge snowman in our garden for many years (Deo and Piñango 2011)
 ii. This bike carried two kids for many years (Landman and Rothstein 2009)

Also, there is a certain degree of variability among different pluractional adverbs. An anonymous referee points out examples of the following kind that work with *twice*, but not with *for an hour*:

- d. You have to draw two cards twice/?? for an hour

What (9a-d) show is that pluractional operators can sometimes be assigned wide scope over quantificational DPs, either through some generalized version of event semantics like Champollion (2015), or via (predictable) propositional variants of event modifiers as on Dowty's (1979) original approach. The question of when exactly wide scope construal of pluractional adverbs are allowed is complex. A very interesting and predictive approach to it can be found in Bassa Vanrell (2017), who argues that the scope possibilities of low ADVs are governed by a version of ‘Maximize Strength’. It is impossible, however, to pursue this issue further within the limits of the present paper.

their tendency to get wide scope over pluractional adverbs. But non quantificational DPs, like definites, have the option of staying in situ. If so, the existential quantification over members of the group which comes with the applicative head, would take place within the scope of the iterative adverb, as shown in (37c). This ought to yield a coherent and plausible interpretation along the lines of (37d). However, Plural Definites clearly disallow such an interpretation. Our approach seems to be making the wrong prediction.

Forcing PDs to have wide scope with respect to pluractional modifiers, though conceivable, is not a very explanatory option.²⁶ Perhaps, the solution lies not so much in a scope based maneuver, but in the nature of event modification. This can be best seen by sketching a first approximation semantics for durative adverbs along the following lines:

- (40) a. for an hour (P_w) = λe . for each temporal cell of a salient partition of a one hour interval, there is an event e' in P_w with the same participants as those in every other cell of the interval and e is the sum of all such events e' .²⁷
- b. Two P-events e and e' have the same participants relative to P in w iff:
- i. e and e' are both P-events in w
 - ii. For any core thematic role θ which is necessarily defined relative to P ,
 $\theta_w(e) = \theta_w(e')$
- where:
- iii. A theta role θ is necessarily defined relative to P iff for any world w and any event e such that $P_w(e) = 1$, $\theta(e)$ has a value.
 - iv. A core thematic role is any member of the following set:
 $\{AG(ENT)/EX(PERIENCER), THEME/PATIENT, GOAL/ADDRESSEE\}$ ²⁸

²⁶ Or maybe the culprit is exhaustification, which requires in essence, that *John killed the mosquitos for an hour* should be true for each subdomain containing an individual mosquito. But as we shall see in Section 4.2, there is strong evidence that BAs undergo exhaustification as well. And yet *John killed mosquitos for an hour* is perfect. So exhaustification is probably not the culprit either.

²⁷ This is a hybrid of the ‘measure out’ approach – Krifka (1998), Landman and Rothstein (2009) – and the ‘Universal Quantifier’ approach – Mittwoch (1977), Dowty (1979). For important discussion, cf. Bassa Vanrell (2017).

²⁸ For the present purposes, I just list what I take to be “core” thematic role, as they are relevant to the definition of “events with the same participants” vis-a-vis durative adverbs. Intuitively, core thematic roles correspond to those arguments than in a decompositional approach like, say, Parsons (1990) would be part of the definition of the lexical entry for a verb. These thematic roles form a natural class distinct from other thematic roles usually coded as adjuncts (like LOCATION, TIME, INSTRUMENT, etc.). Core thematic role are “essential” in defining the identity of an event across worlds. Consider, for example, Bobby Kennedy’s assassination. That very assassination might have involved a different bullet; and it might have occurred at a different time. But certainly it might not have involved a different patient. And arguably also it might not have involved a different shooter. To define more precisely the distinction between core vs. non core thematic roles and their role in event identification is as important as it is hard and would take us too far afield. When it comes to identity criteria for events, the positions in the literature oscillate between extreme ‘unifiers’ (like Quine (1985) which take events to be extremely coarse grained) to extreme “multipliers” (like, e.g. Kim 1966). The line on event identity I have in mind is intermediate between these extremes, in the spirit of Davidson (1969) and Parsons (1990), according to which, very roughly, two events are the same iff they have the same causes and the same effects.

The one just sketched is obviously not meant as a complete formalization of this type of event modifiers, but it is enough for our present purposes. Durative modifiers look at members of the vP-denotation and return a sub-property thereof true of aggregates of P events distributed over an hour, each of which must have the *same* core participants. The key notion here is that of ‘same participant’. First we have to look at the core thematic roles for which P is necessarily defined, in the case at hand TH and AG. Then, it must be the case that $TH_w(e) = TH_w(e')$ and $AG_w(e) = AG_w(e')$. This means that if e and e' are atomic, then e and e' must have the same killer and the same victim; if they are sums, then their atomic components must. Either way, this is impossible if e and e' are *distinct* killing events, which explains why *John killed the mosquitos for an hour* is deviant, even if the object is not scoped out.

Let us take a closer look at a specific example, to make sure that we are not playing fast and loose. Suppose that the mosquitos around in w are a and b , as in (41a) and that John killed both; then the property in (41b) will be true in w of three events, the killing of mosquito a by j , the killing of mosquito b by j , and their sum.

- (41) a. The mosquitos = $\{x \in \{x: x \text{ is around}\} : \text{mosquitos}(x) = a \cup b\}$
 b. $\lambda e \ AG_w(e) = j \wedge \exists z_1 \in D(a \cup b) [TH_w(e)(z_1) \wedge \text{kill}^*_w(e)] = \{e_a, e_b, e_a \cup e_b\}$

A modifier like *for an hour* applies to the property (41b), looking for sums of members of (41b) with the same themes and agents. But there are none, nor could there be any, given the nature of killing. Thus the extension of *killed the mosquitos for an hour* is necessarily empty. Similarly for, e.g., the property of *killing a mosquito*, *killing two mosquitos*, etc. Notice that with iterable events like *hit*, the semantics in (48) achieves the same effects as assigning wide scope to the definite object. E.g. *John hit those targets for an hour* would require summing up atomic hitting events with same agents and same themes. This in turn requires separate events in which the same individual targets are hit more than once. Things are going to be very different, in non trivial ways, for event properties with kinds as themes, such as *killing mosquitos* and we will see how in Section 4. For now, it seems warranted to maintain that given a semantics for pluractional modifiers along the lines in (40), the right behavior with respect to plural definites follows, without having to stipulate anything about scope.

In sum, Plural Definites denote pluralities, allow anaphoric uses, are presuppositional (and hence deviant in there-sentences), etc as on traditional approaches. However, theta roles/applicative heads introduce DRs, which in the case of plurals, are allowed to range over their parts. Theta roles/applicative heads also activate subdomain alternatives. This is the source of a FC effect which we offer as the explanation for the OQF phenomenon. We have explored some arguably positive consequences of this view in the domain of slack removal by *each/all* and with respect to interactions of PDs with pluractional quantifiers.

4. Bare Arguments and Differentiated Scope.

We are now going to extend the theory of OQF outlined in Section 3 to BAs. After discussing the basics, we work through some consequences of the proposal, having to do

with Scopelessness, Differentiated Scope and (a)telicity (Section 4.1), and maximization effects (Section 4.2).

Since Carlson (1977), it is widely accepted that BAs involve reference to kinds; in fact, he and others argued that BAs in English are unambiguously kind denoting, an idea that we will follow here. Kinds are entities that can bear theta roles (e.g., the dinosaur-kind has been the theme of a state of being extinct for a while), and have varying instances across worlds. A kind x_K , say the coyote-kind, is instantiated in a world w by all the coyotes in w , so that a natural way of conceptualizing kinds is as individual concepts, i.e. functions from worlds into pluralities.²⁹ In every world w , $x_{K,w}$ is the (maximal) scattered plurality of coyotes in w (and if x_K fails to have instances in w , $x_{K,w}$ will be undefined). Kinds correlate naturally with cumulative properties: the natural property-correlate of x_K (notated as $\cup x_K$) will be that property true in w of any instance or instances of x_K in w (i.e. any y such that $y \leq x_{K,w}$); and if x_K has no instances in w , $\cup x_K$ will have an empty extension in w . In other words, $\cup x_K$ is just the what is usually taken to be the denotation of plural properties like *coyotes* (and notated as $*\text{coyote}_{\langle s, \text{et} \rangle}$). By the same token, if X is a cumulative property, generated by a set of atoms, $\cap X = \lambda w. \iota X_w$ can be taken to represent the corresponding kind.³⁰ Certain kinds like *coyotes*, *tables*, *red cars* may legitimately be regarded as ‘natural’, while others (*coyotes I have eaten for lunch yesterday*, or *cars in that store*) wouldn’t. Dayal (2013) proposes to use the label ‘indexical kinds’, for the latter.³¹ Quantized properties (i.e. properties not closed under sum, like *two coyotes*, *one coyote*, or, for that matter, the singular property *coyote*, which in English has the same denotation as *one coyote*) do not naturally correlate with kinds, and we can, therefore, assume that $\cap X$ is undefined, whenever X is quantized. This is summarized in the following diagram:

²⁹ This conceptualization directly reflects the view that the instantiation of kinds varies across circumstances. In Chierchia (1998), kinds are treated as functions from situations into instantiations of the kind. Situations in part play the role of worlds, in part the one of domains. Here we back away from that analysis, and separate more sharply the modal dimension from the role of domain restrictions. Kinds lack any ‘internal’ domain-restriction, unlike Plural Definites. Domain restrictions only come with determiners and quantifiers (or their null counterparts, in Determiner-less languages) or via applicative heads.

It is also possible to think of kinds as primitives, and to develop a separate machinery to link kinds to their instances (as originally proposed by Carlson).

³⁰ The fact that kinds may be defined via the (plural) supremum operator has been proposed as an explanation for why the definite plural article is used in many languages as device for kind reference. See, e.g., Chierchia (1998) and Dayal (2004) for different ways of making the case.

It is easy to see that the functors $\cup$ and $\cap$ commute over the respective domains, i.e.:

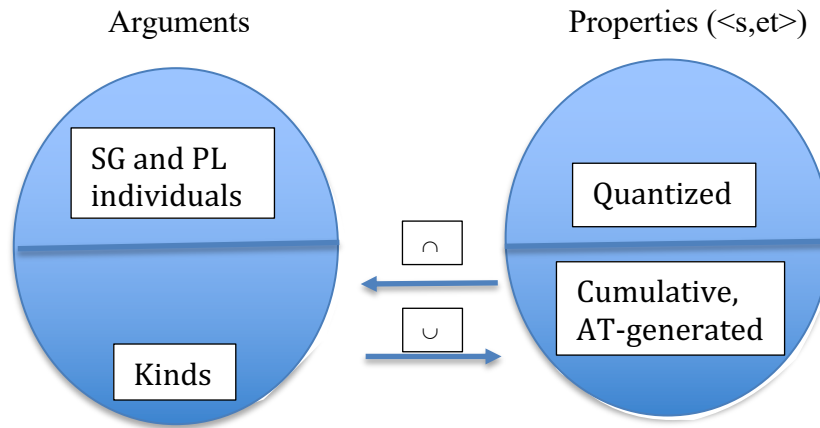
(a) For any sum closed property X generated out of a set of atoms, and any (plural, unquantized) individual concept x_K :

i. $\cup \cap X = X$; ii. $\cap \cup x_K = x_K$.

³¹ The characterization of a kind as ‘natural’ is to a certain degree context dependent, particularly when it comes to modified BAs like *red car*. One of the main tests to distinguish natural from not so natural kinds is how they sound with kind-level predicates:

(a) Red cars are rare/come in three sizes
(b) ?? Coyotes I have eaten are rare/come in three sizes/grow bigger as you drive south.

(42) Kind-structures:



What happens when BAs are merged with kind-level predicates such as those in (43a) is straightforward – cf. (43b):

- (43) a. i. coke bottles are being produced in three sizes (Carlson 1977)
 ii. dogs evolved from wolves
 iii. alligators grew bigger as we were driving south
 b. i. $\exists z_1 \exists e [\cap \text{coke bottles} = z_1 \wedge \text{TH}_{K,w}(e)(z_1) \wedge \text{producing in three size}_w(e)]$
 ii. $\approx \exists e [\text{TH}_{K,w}(e)(\cap \text{coke bottles}) \wedge \text{producing in three size}_w(e)]$
 Where for any world w , and event $\text{TH}_{K,w}(e)(x)$ is defined only if x is a kind.

A kind level DR (z_1 in (43b.i)) is activated, as part of the general process of DR activation at theta-positions. Such a DR is linked to the coke-bottles-kind and plugged in as the kind level theme of a (complex) event of being produced in three different sizes.³² Formula (43b.i) is truth-conditionally equivalent to (43b.ii), modulo the presence vs. absence of an active DR. So far so good. But what happens when predicates that apply primarily to objects?

4.1. Kind level (episodic) predication.

There are two main options that have been proposed in connection with episodic predicates involving BAs. We will now review them and show that neither of them works on its own, which will motivate the search for a synthesis. The first approach is based on the idea that kinds can be directly taken as arguments of object-level predicates (the ‘kind-as-direct-argument’ approach, or ‘Direct Approach’ for short). The second assumes

³² Plural NPs quite generally allow kind level anaphora. An anonymous referee points out, for example, cases like (a); and (b) illustrates how sometimes even singular NPs can sustain kind level anaphora

(a) We saw some wolves, even though they were thought to be extinct around here
 (b) We failed to spot any bear. They must have gone extinct in this island.

There are various strategies for dealing with this type of anaphora in both dynamic and non dynamic frameworks. For example, Kamp and Ryle (1993) argue that NPs may prompt the introduction of plural and kind level DRs at the ‘top-level’ in a Discourse Representation Structure. Be that as it may, our main point is not affected.

that whenever an object level predicate applies to a kind an automatic type adjustment (dubbed ‘Derived Kind Predication’ (DKP) -- Chierchia 1998) takes place. We will call the DKP based approach, the Indirect Approach. Let’s consider them in turn.

4.1.1 *The Direct Approach.* On this take, predicates like *chirp*, which primarily apply to objects, may also, in fact, directly apply to kinds. Thus, the structure of sentences like (44a), would be as in (44b).

- (44) a. Birds were chirping loudly this morning
 b. i. $\exists z_1 \exists e [\cap \mathbf{birds} = z_1 \wedge TH_{K,w}(e)(z_1) \wedge loud_w(e) \wedge chirp_w(e)]$
 ii. $\approx \exists e [TH_{K,w}(e)(\cap \mathbf{birds}) \wedge loud_w(e) \wedge chirp_w(e)]$
 c. Instantiation Postulate:
 $\forall w \forall e \forall z [TH_{K,w}(e)(z) \rightarrow \exists e' \exists x [e' \leq e \wedge \cup z_w(x) \wedge TH_w(e')(x)]]$

In (44) the bird-kind as a whole is taken to be the theme of a chirping episode. Of course, a kind can be the theme of a chirping event only through (some of) its instances, as per the Instantiation Postulate in (44c).³³

The Direct Approach accounts straightforwardly for scopelessness. For example, the LF associated with the negation of (44a), namely (45) says that there is no chirping event of which the bird-kind is the theme (in some relevant time frame). And scoping the kind term *birds* above negation would not affect truth conditions in any way, for kind terms are unaffected by scope just like proper names.

- (45) a. Birds weren’t chirping at all this morning
 b. $\neg \exists z_1 \exists e [\cap \mathbf{birds} = z_1 \wedge TH_{K,w}^K(e)(z_1) \wedge loud_w(e) \wedge chirp_w(e)]$

This approach also potentially sheds light on Differentiated Scope/(a)-telicity: the non scopal line outlined in Section 3 naturally extends to kind predication, as we will illustrate presently. The relevant contrast is repeated below:

- (46) a. *John killed a mosquito/the mosquitos for an hour
 b. John killed mosquitos for an hour

The phenomenon in (46) has been known and extensively discussed in the literature. While the preference for wide scope construal of the DP over the adverb in (46a), as everything else in linguistics, is not exceptionless (cf. fn. 25), the fact that bare arguments are systematically understood with lowest scope *is* exceptionless and crosslinguistically quite steady. A reasonable explanation for that, which in its main lines goes as far back as Dowty (1979), is the following. In section 3.3 we have argued that the adverb *for an hour* applies to properties of events and returns a property that is true of a plural event *e* iff for each cell of a partition of a one hour interval there is a different P-event *e'* with the same protagonists throughout the partition cells and *e* is the sum of such P-events. Looking at, e.g., (46a), where the theme of the killing are individual mosquitos, *for an hour* requires

³³ This approach is taken in, e.g., Carlson (1977, Chapter 4) and Landman and Rothstein (2009).

repeated killing of the same mosquitos. On the other hand, for (46b) where the theme is the mosquito-kind, *for an hour* will naturally merely require repeated killings which involving the mosquito-kind as theme. This approach generalizes to any bare plural arguments in any thematic slot:

- (47) a. i. * A tourist arrived at the hotel for an hour
 ii. Tourists arrived at the hotel for an hour
 b. i. I've sent Ph.D. students some emails on these issues for an hour
 (same e-mails)
 ii. I've sent Ph.D. students emails on this issue for an hour
 (different e-mails)

Notice, for example, the pairs in (47b), pointed out by an anonymous reviewer. Here, in (47b.i), two of the protagonists of the event are individuals (the agent and the theme) and one is a kind (the goal). They have to be identical through the iterations required by *for an hour*. This is possible, but then the *same* e-mails have to be sent out throughout (to possibly different students, because the goal is kind-level and only requires kind-identity). This yields the same effect as construing *some emails* as having wide scope with respect to *for an hour*. In (47b.ii), on the other hand, only the agent is an object-level theme; hence the goal and the theme can be satisfied by distinct instances of the relevant kinds (students and e-mails, respectively), yielding the effect of (ultra-) narrow scope for the kind instances. This has the making of an elegant approach to this complex issue, in the same spirit as Dowty's proposal, now simplified by event-semantics.³⁴ The key definition of P-events with the same participants provided in (40b) above is now updated as follows:

- (48) e, e' have the same participants relative to P in w iff :
- i. e and e' are both P-events in w
 - ii. If there is some kind level core theta role θ_K necessarily defined relative to P, then $\theta_{K,w}(e) = \theta_{K,w}(e')$.
 - iii. If there is no kind level core theta role necessarily defined over members of P but there is an object level core theta role θ which is, then $\theta_w(e) = \theta_w(e')$.
 - iv. A theta role θ/θ_K is necessarily defined relative to P iff for any world w and any event e such that $P_w(e) = 1$, $\theta/\theta_K(e)$ has a value.

Compare, in this light, the two event properties in (49)

- (49) a. i. $\lambda w \lambda e. \text{kill}_w(e) \wedge \text{TH}_{K,w}(e)(\cap \text{mosquitos})$ kill mosquitos
 ii. for an hour $(\lambda w \lambda e. \text{kill}_w(e) \wedge \text{TH}_{K,w}(e)(\cap \text{mosquitos}))$
 b. i. $\lambda w \lambda e. \exists x \leq t_y \in D. \text{mosquitos}(y)[\text{kill}_w(e) \wedge \text{TH}_w(e)(x)]$ kill the mosquitos
 ii. for an hour $(\lambda w \lambda e. \exists x \leq t_y \in D. \text{mosquitos}(y)[\text{kill}_w(e) \wedge \text{TH}_w(e)(x)])$

³⁴ Landman and Rothstein (2009) defend a version of this idea based on the notion of 'incremental eventuality'.

(For simplicity, in (49.b.i) I'm giving the pre-exhaustification interpretation for *kill the mosquitos*; nothing hinges on this). Clearly, for any event in the extension of (49a.i) in any world, TH_K has to be defined; so *for an hour* will be looking for plural events with the same kind as theme. On the other hand, TH_K is not *necessarily* defined relative to the property of killing the mosquitos. There are certainly going to be worlds in which a killing of some member of the relevant group is not also a killing of the mosquito kind as such. At the same time, the object level TH is necessarily defined relative to the property in (49b). Hence, identity of individual themes across pluralities of killing events is going to be required by *for an hour* modification.

While the Direct Approach does very well with respect to Scopelessness and Differentiated Scope / (a)telicity, it runs into problems with respect to anaphora. The issue was noted by Carlson himself (1977, Chapter 5). The following examples illustrate:

- (50) a. This morning, dugongs were letting themselves die, because they were trapped.
 b. I saw cats that were chasing their tails.
 c. In the garden, foxes are trying [PRO to free themselves]
 d. $\lambda x \exists e [AG(e)(x) \wedge TH(e)(x) \wedge \text{let-die}(e)] (\cap \text{dugongs})$
 $= \exists e [AG(e)(\cap \text{dugongs}) \wedge TH(e)(\cap \text{dugongs}) \wedge \text{let-die}(e)]$

Starting with (50a), let us assume that reflexives are associated with an interpretive procedure that creates a reflexive predicate such as the one in (50d). The reading we then get on the Direct Approach is not quite right. Sentence (50a) *doesn't* say that this morning the dugong kind was letting the dugong kind die. It says that each individual dugong in some set was letting itself die (something that dugongs in captivity do, by refusing to come to the surface to breathe). Similar issues arise also with, e.g., relative clause operators, PRO, and any item that requires a syntactically projected antecedent. It looks like object level variables have to be introduced and be active whenever episodic kind predication takes place, something not readily explainable in terms of the Direct Approach.

4.1.2. *The Indirect Approach.* On this approach, kind-level thematic roles θ^K are only defined for kind-level predicates like *being extinct*.

- (51) Dinosaurs are extinct $\rightarrow \exists s [TH^K(s)(\cap \text{dinosaurs}) \wedge \text{extinct}(s)]$

For object level predicates, a generalized type-shifting mechanism ("Derived Kind Predication" – DKP) kicks in:

- (52) a. Birds are chirping $\rightarrow \exists e [[AG(e)]^K (\cap \text{birds}) \wedge \text{chirp}(e)]$
 b. $[P]^K = \lambda e \lambda x_k \exists y [\cup x_k(y) \wedge P(y)]$
 c. $\exists e [[AG(e)]^K (\cap \text{birds}) \wedge \text{chirp}(e)] = \exists e \exists y [\cup \cap \text{birds}(y) \wedge AG(e)(y) \wedge \text{chirp}(e)]$

On this approach, Scopelessness with respect to negation follows straightforwardly:

- (53) a. Students didn't show up (at the meeting)
 b. $\neg \exists e [AG(e)]^K (\cap \text{students}) \wedge \text{show-up}(e)$

$$= \neg \exists e \exists x [\cup \text{students}(x) \wedge \text{AG}(e)(x) \wedge \text{show-up}(e)]$$

And, as on the Direct Approach, scoping the subject above negation does not affect the reading in (53b). Also, the anaphora facts follow quite elegantly. Consider reflexives again:

- (54) a. Dugongs OP_i were killing themselves _{i}
 b. $[\lambda x \exists e [\text{AG}(e)(x) \wedge \text{TH}(e)(x) \wedge \text{kill}(e)]]^K(\cap \text{dugongs})$
 $= \exists x [\cup \text{dugongs}(x) \wedge \exists e [\text{AG}(e)(x) \wedge \text{TH}(e)(x) \wedge \text{kill}(e)]]$

DKP applies at the level of the reflexive predicate, aptly introducing object level variables. Similarly, for relative clauses and control structures.

Where the Indirect Approach loses hands down is with respect to pluractional and durative modification, i.e. Differentiated Scope/ (a-)telicity. The problem is that kinds never figure as theta-role bearers, as they are automatically shifted to their instances in the argument position of object level predicates. The semantics of properties like *killing mosquitos* and *killing the mosquitos*, on the Indirect approach comes out as nearly identical:

- (55) a. $\lambda w \lambda e \exists y \in D [[\text{TH}_w(e')]^K(\cap \text{mosquitos}) \wedge \text{kill}_w(e)]$ kill mosquitos
 $= \lambda w \lambda e \exists y \in D [\cup \text{mosquitos}_w(y) \wedge \text{TH}_w(e)(y) \wedge \text{kill}_w(e)]$
 b. $\lambda w \lambda e \exists y \in \iota x D \text{mosquitos}_w(x) \wedge \text{TH}_w(e)(y) \wedge \text{kill}_w(e)]$ kill the mosquitos

Both event properties in (55) involve just ordinary individuals. Hence our scopeless approach to durative adverbs predicts that the outcome of modification by, e.g., *for an hour* should be a set of plural events involving the same individuals in pretty much the same way for (55a) and (55b). It can well be that our approach to modification is too simple to be right, and that scope based approaches should be explored further. But PDs and BAs are both referential expressions, and it is really not obvious how they can come to have different scopes vis-à-vis adverbial modifiers.

The balance so far of the Direct and Indirect approaches can be summarized as follows:

(56) Balance on Kind Level predication in episodic contexts

	Direct Approach	Indirect Approach
Interaction with negation (Scopelessness)	√	√
Durative adverbs (Differentiated Scope)	√	*
Anaphora facts	*	√

Neither gets the whole picture. We should be looking for a new synthesis.

4.1.3. *On having one's cake and eating it too: the Enriched Approach.* Let us take the 'union' of the two theories we have considered: whenever a kind level term is plugged into the argument position of an object level predicate, it is on the one hand directly taken

as theta role bearer, while simultaneously instances of the kind are introduced as themes of subevents, along the following lines:

- (57) a. i. Birds are chirping
 ii. $\exists e \exists x_k [x_k = \cap \text{birds} \wedge \text{AG}(e)(x_k) \wedge \exists y \in \mathbf{D} [\cup \text{birds}(y) \wedge \exists e' e' \leq e \wedge \text{AG}(e')(y) \wedge \text{chirp}(e') \wedge \text{chirp}(e)]]$
 b. $\text{AG}_{K,D}^{n,m} = \lambda P \lambda x_K \lambda e \exists y_n [y_n = x_K \wedge \text{AG}(e)(x_K) \wedge \exists y_m \in \mathbf{D} [\cup x_K(y_m) \wedge \exists e' e' \leq e \wedge \text{AG}(e')(y) \wedge P(e') \wedge P(e)]]$
 c. For any e and w :
 i. $[\text{AG}_{K,w}(e)(\cap \text{birds}) \wedge \text{chirp}(e)] \Rightarrow$
 ii. $\exists y \in \mathbf{D} [\text{birds}(y) \wedge \exists e' e' \leq e \wedge \text{AG}(e')(y) \wedge \text{chirp}(e')]$

The interpretation in (57a) is based on defining kind-level applicative heads as in (57b) -- generalizable to all theta roles. The choice between object level vs. kind level theta roles is free, modulo type coherence. If the ‘wrong’ choice is made (e.g. a kind-level applicative is selected, but then an object-level argument is fed) the result would yield a presupposition failure. The move of introducing object level instances in parallel with kind level predication is very unnatural from the point of classical semantics: Because of the Instantiation Postulate, (57c.i) classically entails (57c.ii.) and hence the part in bold face of the logical form in (57a) is redundant. This is not so, however, in a dynamic setting, where the introduction of discourse referents, coded in the output assignments of formulae, makes a difference and drives anaphora. In fact, quite clearly on this Enriched Approach, the anaphora facts fall into place, just as on the Indirect Approach. The activated object level variables will be able to antecede object-level anaphors as the case may be.

Scopelessness with respect to negation is unaffected by the move in (57) and it still follows, as it does on both the Direct and the Indirect Approach:

- (58) a. i. Birds, strangely, aren’t chirping
 ii. $\neg \exists e \exists x_k [x_k = \cap \text{birds} \wedge \text{AG}(e)(x_k) \wedge \exists y \in \mathbf{D} [\cup \text{birds}(y) \wedge \exists e' e' \leq e \wedge \text{AG}(e')(y) \wedge \text{chirp}(e') \wedge \text{chirp}(e)]]$
 b. $\neg \exists e \exists y \in \mathbf{D} [\cup \text{birds}(y) \wedge \exists e' e' \leq e \wedge \text{AG}(e')(y) \wedge \text{chirp}(e') \wedge \text{chirp}(e)]$

Negation ‘shuts down’ DRs within its scope. Therefore, unlike what happens in the positive case, (58a.ii) turns out to be equivalent to (58b), as desired, and scoping out kind terms won’t affect this result.

Finally, the treatment of pluractional adverbs can be maintained exactly as on the Direct Approach. Event properties involving kinds will have kind level thematic roles necessarily defined with respect to core thematic roles. Hence, modifiers will be looking for plural events involving the same kinds. The fact that also object level participants will be involved in subevents of the relevant event is irrelevant and doesn’t affect modification. It does look like that with this simple move, we can have our cake and eat it too.

(59) New balance on kind level predication in episodic contexts

	Direct Approach	Indirect Approach	Enriched Approach
Interaction with negation (Scopelessness)	√	√	√
Durative adverbs (Differentiated Scope)	√	*	√
Anaphora facts	*	√	√

4.2. Maximization

The proposal developed so far makes a further prediction. Kind level predication involves quantification over instances of the kind and activates Sub-Domain alternatives, just like it happens with PDs. So, we expect maximization effects with BAs exactly like with definites. This is something that neither the Direct nor the Indirect Approaches were, by themselves, capable of delivering. Maximization will be particularly salient when the location of the sentence is in evidence, as with Condoravdi's (1997) sentences. Sentence (60a), after exhaustification is interpreted universally as (60c). It is interesting to compare (60a) with (60b), which has a more existential feel to it:

- (60) a. There was rumor of a ghost on campus. Students were scared.
 (...But not all of them).
 b. I looked outside; chipmunks were running around but birds were strangely silent.
 c. $\text{Exh}_{\text{Sub-D}} (\exists s \exists s' \exists z_2 \exists z_3 \in D(z_2) [z_2 = \text{students}_K \wedge \text{TH}(s)(z_2) \wedge s' \leq s \wedge \text{TH}(s')(z_3) \wedge \text{scared}(s) \wedge \text{scared}(s')]) =$
 $\forall D' (\exists s \exists s' \exists z_2 \exists z_3 \in D'(z_2) [z_2 = \text{students}_K \wedge \text{TH}(s)(z_2) \wedge s' \leq s \wedge \text{TH}(s')(z_3) \wedge \text{scared}(s) \wedge \text{scared}(s')])$
 Where D' ranges over subdomains of $D = \text{entities on campus}$.

The observation that (60b) feels 'more existential' than (60a) may be simply due to the fact that the exact location with which the domain D is associated is more open ended in (60b) than in (60a).³⁵

Dayal (2013) finds further interesting and subtle evidence that Bare Arguments indeed involve maximization, having to do with their behavior with incompatible predicates. The relevant paradigm is as in (61):

- (61) a. I looked outside. ?? Dogs were barking and dogs were sleeping
 b. (?) Dogs were barking and dogs were running around
 c. Context: live report from a disaster scene
 "People are screaming, people are jumping out of the window, people are trying to force the doors open,..." (Dayal 2013, p. 76)

³⁵ The felicity of the continuation "but not all of them" in (54a) shows that even when BAs are construed universally, gaps are possible (as one would expect on the present approach).

Both sentences in (61a) and (61b) are degraded, probably due to the repetition of the Noun Phrase, without the possibility of a ‘phonological reduction’. However, (61a) is worse than (61b) and this judgement is systematic enough when incompatible predicates are involved – in fact, Dayal shows, it is cross-linguistically stable, for, e.g., languages like Korean display it in the same manner. Notice, moreover, that both (61a) and (61b) contrast with (61c), which is fine. The reason for this is that the interpretation of sentences like (61a-b) involve a unique domain over which the existential quantifier associated with BAs ranges; sentence (61c), instead, naturally evokes a break up of the scene in a series of different sub-domains over which instances of the people-kind are to be considered. Dayal’s diagnostics thus unveils significant new evidence for a maximization process to which BAs are subject, a phenomenon previously unnoticed. Needless to say that maximizations of this sort is just what one would expect on the theory developed here: exhaustification requires that the relevant predicates apply to the relevant domain in its entirety, impossible if predicates are incompatible.

Dayal makes a concrete proposal in this connection arguing for maximization in the analysis of bare plurals and forwards the idea that their perceived indefiniteness in episodic contexts is akin to pragmatic slack with plural definites. Her proposal, which has the merit of being the first one on this topic, should be addressed, since we are offering here an alternative. In the rest of this section, I first sketch Dayal’s proposal, then present arguments that cast doubts on it. As a way of background, she adopts a situation-based framework where predicates and kinds are functions of situations, and situations subsume both the role of worlds, and the role of domains of quantification. She proposes that the merger of kind denoting terms into predicates in an episodic setting is subject to two conditions:

- (62) Conditions on kind predication (Dayal 2013, p. 68)
- a. Maximization:
If P in s applies primarily to objects and k is a kind, then for any s, $P_s(k) = P_s(k_s)$.
 - b. Proper Widening
If P in s applies primarily to objects and k is a kind, then
 $\|P_s(k_s)\| = 1/0$ iff $\|\exists s' s < s' \wedge P_{s'}(k_{s'})\| = 1/0$, where $\exists x [x < k_{s'} \wedge \neg \text{in}(s, x)]$, and is undefined otherwise.³⁶

Maximization simply assimilates BAs to full-fledged definites, by assuming that their denotation is the totality of their instances in the situation of evaluation. Proper Widening is meant to link predication of bare plurals in s to predication of the same bare plural in a situation s’ properly larger than s in that it contains more instances of k than those present in s.

I’ll present here three reasons for being skeptical of Dayal’s proposal. First, Dayal’s Proper Widening puts an arguably too strong requirement on the interpretation of

³⁶ I do not find (62b) easy to interpret. In particular, it is difficult to see whether the $\|\exists s' s < s' \wedge P_{s'}(k_{s'})\|$ part is a component of the presupposition or of the truth conditions associated with the assertion part $\|P_s(k_s)\|$. Normally, presuppositions have to be true for the assertion to have a truth value. But here, $\|\exists s' s < s' \wedge P_{s'}(k_{s'})\|$ is required to have the *same* truth value as the assertion, which is not as presuppositions are usually taken to work. Rather than attempting formal a re-interpretation of (62a-b), I go by the prose with which Dayal expands on her proposal, which is clear enough.

simple sentences like (63a) below, to be interpreted for Dayal as in (63b). Proper Widening requires the existence of more chipmunks than those in my basement. Intuitions tells us quite clearly that while it is indeed very likely that more chipmunks exist, if by chance all of the chipmunks in the world but those few specimens we are watching had died out while we weren't looking, sentence (63a) would not eo ipso become false or truth-value less, as shown by the flawlessness of the continuation in (63a).

- (63) a. I heard noise coming the basement. I went down and saw chipmunks running around. I later found out that they were the only ones left.
 b. $\text{saw}_s(\cap \text{chipmunks}_s)(I)$
 c. I finally reached Dr. Moreau's island. Cats with human heads, three-legged dogs, and even unicorns were grazing around.³⁷

Dayal predicts that with the given continuation, (63a) should be contradictory (or perhaps truth-value less). Sentences like (63c) further support this claim: in the worlds described by it, it is *not expected* there to be three-legged dogs or unicorns outside of Dr. Moreau's island.

The second argument concerns there-sentences. On Dayal's approach the denotation of BAs is identical to that of definites, modulo Proper Widening: a definite *the chipmunks* and a Bare Argument *chipmunks* have the very same denotation for any s ; they only differ presupposition-wise: definites presuppose maximality and existence, bare plurals presuppose maximality, existence, *and* Proper Widening. This is bound to make it hard to understand why the sentences in (64a) are fine and those in (64b) deviant:

- (64) a. i. There are/there aren't hermaphrodite dogs
 ii. There were/there weren't sick horses (in the stable)
 b. i. * There are/there aren't the hermaphrodite dogs
 ii. * There were/there weren't the sick horses (in the stable)

If the only difference between (64a) and (64b) is in the Proper Widening condition, to which only BAs are subject, I fail to see where the radically different status of (64a) vs. (64b) comes from— short of stipulating it. On the present approach, kinds are functions from worlds into the unrestricted totality of their instances. Situations play no role and domain restrictions for kinds only come from predication. It is *not* going to be hard to integrate this view with your favorite take on the Definiteness Effect.

The third argument against Dayal's proposal has to do with anaphoric uses, which are possible with definite plurals, but completely impossible in English with BAs:

- (65) a. * Some children came in. Children sat down (Dayal 2013, p. 74)
 b. $\exists x [\text{childrens}_s(x) \wedge \text{came-in}_s(x) \wedge s \leq s' \wedge \text{sat down}_{s'}(\text{childrens})]$
 c. $\exists z_1 \in D [\text{childrens}_w(z_1) \wedge \text{came in}_w(z_1) \wedge \exists z_2 \in D(\text{children}_{K,w}) \wedge \text{sat down}_w(z_2)]$

³⁷ From "The Island of Dr. Moreau", 1996 movie.

According to Dayal, BAs are interpreted by applying the kind to some specific resource situation. This predicts that we can get an interpretation for (65a) as in (65b), where the situation associated with *children_i* is set to the situation containing the children that came in (if Proper Widening is met). Thus, her approach requires some way to rule out anaphoric construals of Bare Plurals in English. On the present approach, the interpretation of the discourse in (65a) would have to be something like (65c). Even if the quantificational domain associated with *children* in the second sentence is set to be the same as the one in the first sentence, an anaphoric construal cannot be obtained.

Summing up, while Dayal (2013) uncovers interesting new evidence in favor of a process of maximization in the interpretation of bare arguments, a phenomenon previously unnoticed, her proposal seems to run into both conceptual and empirical problems. Our approach to maximization with BAs not only avoids those problems, but it doesn't rely on any assumption specific to BAs as such.³⁸

In this section, we have extended the apparatus set in place for Plural Definites to BAs on the assumption that the latter are kind-denoting. The account of the OQF for Definite Plurals extends to BAs under the assumption that kind level predication, besides introducing kind-level DRs, also taps *instances* of the kind; when Definite Plurals and BAs have diverging behavior, this seem to follow from independently observable differences between the two constructions (like the fact that definite plurals are presuppositional and kinds are not). Particularly striking is how Differentiated Scope phenomena fall out, which directly stems from the fact that kind level predication involves as themes of an eventuality complex *both* the kind as such and its instances, which plausibly affects how event iterations are understood.

³⁸ Dayal offers a further piece of evidence relevant to maximalization, consisting in the contrast between (a) vs. (b):

- (a) John saw some students, namely John and Bill.
- (b) ?? John saw students namely John and Bill
- (c) John saw some students, namely at least John and Bill.

Unlike full fledged DPs, BAs disallow namely-lists. If (a) and (b) have the same existential semantics, this contrast is mysterious. Dayal claims that her semantics, and in particular her Proper Widening constraint on BAs accounts for this. I fail to see how. Why having to implicitly refer to an expanded group/situation would make listing harder? Notice, that namely-lists admits partiality, as the explicit insertion of *at least* in (c) shows. Moreover, DPs that are known to have strongest epistemic ignorance effects, such as modified numerals, are compatible namely-listing:

- (d) At most three people can solve this problem, namely John, Mary, and possibly Sue
- In so far as I can make out, uncertainty about domains seems to be no obstacle to namely-lists.

Alternative ways of understanding the contrast in (a) vs. (b) do come to mind. E.g., one might go along the following lines. Full-fledged DPs, headed by a determiner or quantifier always contain a covert DP internal domain variable. Namely-constructions have to be anaphoric to domain variables within DPs. BAs do not inherently contain domain variables (their domain variables only come from applicative heads) and, in fact, they may not even be full-fledged DPs. Hence, they fail to meet the necessary criteria for serving as antecedents to namely-lists.

I should add that Dayal 2013 unveils a number of other important generalizations concerning the distribution of BAs, particularly in connection with indexical kinds, and makes interesting proposals about them. But these issues are orthogonal to our present concerns.

5. Donkey pronouns, *vexata questio*.

The basic pattern of readings that Donkey pronouns are associated with, as it emerges from the rich literature on the topic, can be summarized in simplified form as follows, where ‘>’ indicates preference among possible readings:³⁹

(66) The basic pattern

- a. *Every*: $\forall > \exists$
 - i. Every man that has a donkey beats it $\forall$
= Every man that has a donkey beats all the donkeys he owns
 - ii. Every man who had a dime put it in the meter $\exists$
= Every man who has a dime puts one dime he owns in the meter
- b. *No*: $\exists > \forall$
 - i. No one with a teen age son lends him the car on weekdays $\exists$
 - ii. No one who has an umbrella leaves it home on a rainy day $\forall$
- c. *Some/a*: $\exists > \forall$
 - i. A friend who had a car lent it to me $\exists$
 - ii. A friend who had a car refused to lend it to me $\forall$

Basically, when uniqueness presuppositions are absent, the strongest reading is preferred, with the exception of indefinites. It is tempting to account for this paradigm along the same lines adopted for definite plurals and BAs. In this connection, a rather simple architecture suggests itself:

(67) The architecture of Donkey-dependencies.

- a. There are no Dynamic Generalized Quantifiers. The Donkey-pronouns in (66a-b) are elliptical descriptions (E-type pronouns).
- b. E-type pronouns, even when morphologically singular, are semantically number neutral (Neale 1990), but subject to a distributivity constraint triggered by their morphological number.
- c. A Free Choice effect kicks in in the usual manner, via activation of subdomain alternatives, which yields maximization (= $\forall$ - readings)
- d. Weaker $\exists$ -readings in Upward Entailing contexts are obtained by excluding irrelevant individuals (D-selection/pruning)
- e. Existential DPs have the option of dynamically binding pronouns.

The claim that there are no Dynamic Generalized Quantifiers (allowing transfer of antecedent-hood from the restriction into the scope) may seem strange in a dynamic framework like the present one. This claim is part of the unorthodox mapping hypothesis defended in Chierchia (2020), which is argued to both provide a principled account for

³⁹ See e.g. Kanazawa (1994), Chierchia (1995), Geurts (2002), Champollion et. al (2018) a.o. Within the limits of the present paper, I limit myself to a consideration of donkey anaphora with monotonic (i.e. DE or UE) quantifiers, ignoring non monotonic ones. While I think that this limitation does not affect my point, whether it is actually so must be left for further research to determine.

Crossover effects, and to simplify dynamic approaches.⁴⁰ We will adopt it here, but regardless of whether Chierchia (2020) is on the right track or not, the considerations that follows do apply to ‘Paycheck’ pronouns, which are uncontroversially a case of indirect binding and display a paradigm fully parallel to that of canonical Donkey-pronouns:

- (68) a. We give students their assignment for each course at the beginning of the term.
 This year,
 i. Every first year student turned it in on time. ∀
 Every first year student turned *all* of his/her assignments on time
 ii. Some second year did too. ∃
 Some second year student turned in on time at least *some* of his assignments
 iii. But surprisingly, no third year did. ¬∃
 No third- year student turned in on time *any* of his/her assignments

It in (i)-(iii) is interpreted as *his assignment(s)*, and its quantificational import is as indicated by the glosses.

Kanazawa (2001) raises some important issues against the idea that Donkey-pronouns may be semantically number neutral. But we will see that an alternative based approach to homogeneity gives us a natural way of addressing Kanazawa’s concerns. In what follows, I first flesh out the architecture in (67). Then, I address the issue of distributive vs. collective readings and, with those, Kanazawa’s concerns.

5.1. The right mix?

Let us begin by showing how indefinites allow for direct binding, which explains, ultimately, why they favor $\exists$ -readings. As is well known, indefinites allow for predicative uses (cf. 70a), which suggests that they must have a property-level interpretation (cf. 70b). Property-level DPs can be merged in argument position, much like kind level arguments, through a straightforward generalization of the semantics of applicative heads, which introduces instance of the property:

- (69) Indefinites
 a. i. John is a friend of mine
 ii. I consider John a good colleague
 b. a friend of mine $\rightarrow \lambda w \lambda x. \text{friend of mine}_w(x)$

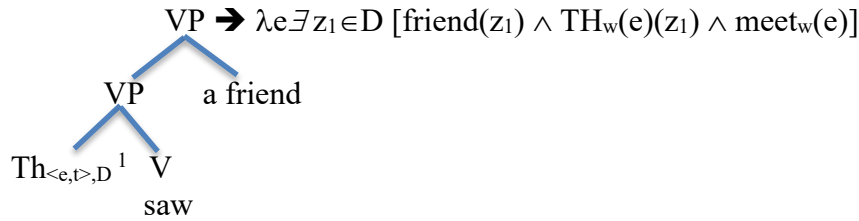
⁴⁰ In particular, the absence of Dynamic Generalized Quantifiers is key in understanding the impossibility of ‘Donkey-crossover’

(a) * Its₂ mother kicked every farmer who beat a donkey₂

(b) [Every farmer who beat a donkey₂]₁ its₂ mother kicked t₁

Standard Dynamic Semantics has no way of ruling (a) out, which after scoping yields the canonical donkey sentence in (b). On Chierchia’s (2020) approach, the pronoun *its* in (a) simply lacks a sentence internal accessible antecedent. For an alternative solution, see Büring (2004); Büring’s proposal is extensively discussed by Chierchia.

c. (I) saw a friend:



d. $\text{Th}_{\langle e, t \rangle, D}^n = \lambda P \lambda Q \lambda e \exists z_n \in D [Q_w(z_n) \wedge \text{TH}_w(e)(z_n) \wedge P_w(e)]$

Applicative heads can be taken to be flexible enough to allow combination also with predicative DPs, by letting the existential quantifiers that introduces DRs range over the extension of the predicate, as in (69c-d). The DR associated with indefinites is an object level one. Hence, indefinites will pattern on a par with definites with respect low pluractional adverbs: *I met a friend for an hour* will have to involve plural events with the same friend.⁴¹ Moreover, unlike definites and BAs, indefinites do have scalar alternatives (i.e. they are part of the Horn scale: *a/one friend, two friends, ...*). This will block maximization much like *or* in English doesn't get strengthened to *and* because it has a scale mate, unlike Warlpiri *mapu*. Finally, indefinites also allow for wide scope construal, through, e.g., the possibility of being associated with choice functions (cf., e.g., Reinhart 1996, Winter, 1997).

Summing up, indefinites start out as predicates and are turned into arguments in two ways, either via an extension of theta-role saturation to predicates as in (64), or through choice functions, subject to (non local) existential closure. Both ways lead to the introduction of DRs, which affords direct binding of accessible pronouns. It is plausible to maintain that direct binding is less costly than indirect binding, as the latter requires extracting descriptive information from the context, and hence direct binding is to be preferred, when they are both available. This is why the $\exists$ -interpretation emerges as the preferred option for indefinites in donkey anaphora environments such as (66c).⁴²

⁴¹ As with Definite Plurals, the scope of indefinite singulars with respect to pluractional modifiers is affected by the presence of further quantificational adverbs:

- | | |
|---|----------------------------|
| (a) Intervention of a quantifier like <i>every day</i> . | |
| i. #John found a flea on his dog for a month | only $\exists \forall$ |
| ii. John found a flea on his dog every day for a month | $\forall \exists$ possible |
| (b) Pragmatically salient partitions | |
| i. What was his daily intake of statins? He took a pill for a month | $\forall \exists$ possible |
| ii. We built a huge snowman in our garden for many years | $\forall \exists$ possible |

I refer to Bassa Vanrell (2017) for further data and discussion of these matters.

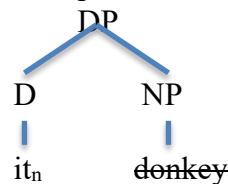
⁴² The DP *a friend who had a car* contains an active DR associated with *a car* (introduced by the applicative head associated with the internal argument of *have*); higher applicative heads, associated with the upper verb *lent*, defined as in (60d) will keep open all the DRs active in their arguments.

In contrast with this, ‘true’ quantificational DPs, lacking predicative counterparts, disactivate DRs in their restriction or scope. Hence, indirect binding becomes a necessity. Before looking at a possible implementation, it is worth recalling that donkey anaphora does not require, in general, sameness of phi-features between antecedent and Donkey-pronouns:

- (70) Number agreement in donkey anaphora.
- i. Every man that has a donkey beats it / ?*them
 - ii. Every farmer that owns at least one donkey beats it/them
 - iii. Every farmer who owns one or more donkeys/more than one donkey beats them/*it
 - iv. At most three students who wrote a paper turned it/them in on time.
 - v. No father with a teen ager son lends him/ ?them a car on weekdays

This is so even for truth-conditionally equivalent variants such as those in (70.i-ii). It is not clear what drives these judgements and I won’t attempt an account here. Having, nonetheless, taken due notice, we proceed by adopting an Elbourne (2005)-like framework for the syntax and semantics of pronouns:

- (71) Syntax of pronouns.



Elbourne’s syntax affords us *two* formal notions of antecedent. The first is the binder of the pronominal determiner he_n (binding-antecedent); the second is the NP that triggers the ellipsis (elision -antecedent). According to Elbourne, there are two ways of resolving these antecedents. In the first case (direct binding) the binding- and the elision-antecedents coincide. In such a case, the pronoun won’t be number neutral, and its interpretation will be something like *the man identical to x_n* .⁴³ In the second case (indirect binding) the binding antecedent and the elision antecedent do not coincide. The content of the description must, then, be retrieved from the context, as must be semantic number. In this case we get semantically number neutral descriptions. Here are relevant examples:

- (72) a. Direct binding: Binding antecedent = elision antecedent.
- i. Every employee₁ hoped that the director would choose him₁ ~~employee~~
 - ii. $\forall x_1[\text{employee}(x_1) \rightarrow \text{hoped}(\lambda w.\text{choose}_w(\lambda z.\text{employee}(z) \wedge z = x_1)(\iota \text{director}_w))]$
- b. Indirect binding: Binding antecedent $\neq$ elision antecedent.
- i. Every man₁ who has a donkey beats it₁ ~~donkey~~
 - ii. $\forall x_1[\text{man who has a donkey}(x_1) \rightarrow \text{beat}(\lambda z.\text{donkeys}(z) \wedge \text{own}(z)(x_1))(x_1)]$

⁴³ The interpretation of directly bound pronouns is analogous to how traces are interpreted according to, e.g., Fox’s (1999) trace convention.

So far, we are just following Elbourne, without his situation theoretic garb -- I am giving the logical forms in (72) skipping the event-argument for simplicity. The interpretation of the indirect pronoun in (72b) is number neutral. The fact that in Donkey anaphora binding antecedent and elision antecedent do not coincide accounts for why mismatches in number such as those in (72b) are possible: mismatches are common in ellipsis.

(73) John and Bill are crazy about their wives; Mark is not ~~crazy about his wife~~.

Given the possibly plural interpretation of indirect pronouns, the same mechanism at play for Definite Plurals (and BAs) kicks in, as illustrated in (74a) -- this time with the event argument in place. Therefore, maximization ensues, deriving $\forall$ -readings, as in (74b):

(74) Maximization

- a. Base form of the second argument of (72b.ii) [_{VP} *t_l beats it_l ~~donkey~~*] in event semantics:

$$\exists e \exists z_2 \in D(\lambda z. \text{donkeys}(y) \wedge \text{own}(y)(x_1))[\text{AG}(e)(x_1) \wedge \text{TH}(e)(z_2) \wedge \text{beat}^*(e)]$$

- b. Exhaustification of (a):

$$\forall D \exists e \exists z_2 \in D(\lambda z. \text{donkeys}(y) \wedge \text{own}(y)(x_1))[\text{AG}(e)(x_1) \wedge \text{TH}(z_2) \wedge \text{beat}^*(e)]^{44}$$

Of course, exhaustification is polarity sensitive, and it won't lead to strengthening in DE environments, because the base reading in such cases is already the strongest possible one. Weaker readings can be obtained via Domain selection and/or pruning, which will be sensitive to contextual factors, questions under discussions, etc., as these mechanisms generally are.

The semantics for E-type pronouns just sketched can be summarized as follows:

(75) Semantics of anaphoric pronouns

- a. [_{DP} *it_n NP*] $\rightarrow \lambda x \in D[\text{NP}(x) \wedge \Delta(y_i)(x)]$,
where Δ is a variable over the semantic relation between the binding-antecedent and the elision-antecedent.
- b. Case (i): The elision-antecedent is accessible (e.g. via C-command/Dynamic Binding) to the pronoun
[_{DP} *it_n NP*] $\rightarrow \lambda x \in D[\text{NP}(x) \wedge x = y_i]$ not number neutral
 Δ = identity; elision-antecedent and binding-antecedent (the index *i*) coincide.
- c. Case (ii): The elision-antecedent is not accessible to the pronoun.
[_{DP} *it_n NP*] $\rightarrow \lambda x \in D[\text{NP}(x) \wedge R(y_i)(x)]$ number neutral
 R must be retrieved from the context. The elision- antecedent and a-antecedent do *not* coincide.

The nature of binding (direct vs. indirect) is structurally determined by whether the elision antecedent and binding antecedent coincide or not. Only in the latter case, the indirectly bound pronoun is allowed to have a number neutral reading by (76c). As we shall see, this never overgenerates, as the D-alternatives of a morphologically singular

⁴⁴ I omit representing the subject quantifier, and assume that exhaustification takes place at the vP level only for simplicity. Nothing would change if we were to exhaustify at the TP level.

pronoun are (in a precise sense to be determined in the next section) always singular, which only yields distributive readings. The pattern of interpretation of indirect anaphoric dependencies falls out as a special case of the general mechanism at the basis of Free Choice effects.

5.2. Distributivity vs. cumulativity.

Kanazawa (2001) takes issue with the idea that the interpretation of singular Donkey pronouns can be number neutral on the basis of the observation that (i) they are systematically infelicitous with collective readings -- (76a), and (ii) they disallow cumulative readings -- (76b). Here are some of his key examples.

(76) Kanazawa (2001) against the number neutrality of donkey pronouns.

- a. Collective predicates
 - i. * every man who has a donkey rounds it up at night
 - ii. if friends come under attack, they should stick together
 - iii. * if a friend comes under attack, he should stick together
- b. Cumulative readings
 - i. Every farmer that bought donkeys sold them for twice their price.
 - ii. Every farmer that bought a donkey sold it for twice its price.

Sentence (76b.i) has two readings: a cumulative and a distributive one; sentence (76b.ii) has only a distributive reading. How so, if *it* in (76b.ii) can range over pluralities just like *them* in (76b.i)?

We have assumed so far that the Sub-Domain alternatives activated by applicative heads range over atomic individuals. This only delivers strictly distributive readings for a simple reason: the minimal Sub-Domain alternatives will be singleton sets containing atoms, and exhaustification requires the assertion to be true of every such domain (and hence for each atom). This is clearly too restrictive in the general case (i.e. for Definite Plurals/BAs), but it is just perfect for singular Donkey pronouns: If they only associate with atomic Sub-Domain alternatives, it becomes clear why (76a.i, iii) are ungrammatical or why (76b.ii) only has a distributive interpretation. In what follows, we first show how to generalize the present approach so that cumulative readings may be obtained (following Bar Lev 2018, 2020). Then we go back to how and why singular Donkey-pronouns *only* allow for distributive interpretations.

As is well known, collective predicates allow for distribution to subgroups. For example, a sentence like (77a) can be true if there are separate gatherings of the relevant kids. Imagining a domain of four kids, a, b, c, and d, a gathering event of $a \cup b$ and a distinct gathering event of $c \cup d$ could make the sentence *the kids gathered* true (while a gathering of just $a \cup b$ would not suffice). In order to account for partial distributivity we must let the domain associated with the totality of the kids range over sub-pluralities, for pluralities can be the direct bearers of theta-roles when collective predicates are involved.

(77) Partial distributivity.

- a. The kids gathered (in the school hallway)
 - i. $\exists z_1 \in \mathcal{D}(a \cup b \cup c \cup d) \exists e[\text{TH}(e)(z_1) \wedge \text{gathered}(e)]$, where:

- ii. Example of a collective domain (a cover) for $a \cup b \cup c \cup d$, $\mathcal{D}(a \cup b \cup c \cup d) = \{a \cup b, c \cup d, a \cup b \cup c, a \cup b \cup d, b \cup c \cup d, a \cup b \cup d, a \cup b \cup c \cup d\}$
- iii. Distributive Domain: $D(a \cup b \cup c \cup d) = \{a, b, c, d\}$
- b. Minimal Sub-Domain alternatives:

Collective	Distributive
i. $\mathcal{D}(a \cup b) = \{a \cup b\}$	$D(a) = \{a\} \quad D(b) = \{b\}$
ii. $\mathcal{D}(c \cup d) = \{c \cup d\}$	$D(c) = \{c\} \quad D(d) = \{d\}$

I use here script $\mathcal{D}$ for collective domains and plain D for distributive ones. I assume furthermore, in line with the literature on plurals, that collective domains amount to cumulative covers of the plurality as in example (77a.ii). As usual, the truth conditions of (77a), namely (77a.i) are weak in virtue of the existential nature of DR introduction: it merely requires that some subgroup of within the cover met. Its negation *the kids didn't meet* would be, instead, strong (in virtue of the cumulative nature of covers). The weakness of (77a.i) is compensated in the usual way, by exhaustification, which requires that (77a.i) be true for all subdomain alternatives of $\mathcal{D}(a \cup b \cup c \cup d)$; the minimal subdomain alternatives for $\mathcal{D}(a \cup b \cup c \cup d)$ are those in the first column in (78b). We are imagining that (77a) is true in virtue of two gatherings of subgroups of the kids, namely gatherings of $a \cup b$ and $c \cup d$. In such a case (77a.i) is clearly true. Moreover, (77a.i) is also true of each of the minimal subdomains in (77b). On the other hand, suppose that there was just a gathering of $a \cup b$. Then (77a.i) would still be true. But its exhaustification wouldn't be, because it fails for $\mathcal{D}(c \cup d)$. This accounts correctly for the intuition that in a situation with only say $a \cup b$ gathering, (77a) would be false. This approach to covers, not only allows us to accommodate partial distributivity in a general way, but it also gives us a neat way of separating it off from total distributivity.

Let us go back to singular donkey pronouns. The simple idea is to allow them to range over pluralities, but force them to activate only alternatives of the distributive kind, viz. the second column in (77b). While this is, if you wish, a stipulation, it is arguably a natural, indeed a necessary one. We know that a feature like SG can be multiply exposed, while being meaningful in only one of its exponents. We also know that the meaning of SG has to vary depending on where it is interpreted. On a DP like *every man*, the semantic requirement is that the denotation the NP *man* not be closed under sum; on a DP like *John*, the semantic demand is that John be an atom. On a mass noun, singularity has to be interpreted yet differently. We propose that on a morphologically singular anaphoric pronouns the semantic requirement is that its alternatives are always singular in the sense specified above (i.e. of the shape on the second column in (77b)), thereby enforcing a distributive interpretation. This amounts to requiring that SG-morphology when not directly meaningful on the denotation of a DP, is meaningful on its alternatives. The development of alternative-based semantics, unavailable at the time of Kanazawa's paper, affords us a local device to easily get this.⁴⁵ And the sensitivity of donkey pronouns to the polarity of their environments (as well as their different behavior in presence of indefinite antecedents) fall out from a very general approach.

⁴⁵ See the Appendix for a formal implementation.

6. Concluding remarks.

Argument saturation is ‘smarter’ than a mechanical, type-driven operation that applies a function to an argument. It systematically regulates the interpretation of quantifier-less argument, be it a plural definite, a bare plural, an indefinite or an E-type pronoun. In generic environments, which we didn’t consider here, this happens through the presence of a Gn-operator, typically encoded in aspect, with universal force. Episodic predication is, instead, existential. Each applicative head/theta role comes with an existential operator, which introduces a DR over instances of the argument. If the argument is of type *e* and atomic, this boils down to simple function application (plus DR introduction). For more complex arguments, there are options. The choices are fundamentally along two dimensions: what are the bearers of the thematic role? The whole argument, parts thereof or both? The answer has to do with the nature of the events that are being described. The second issue is what DRs are activated? This has to do with the anaphoric potential of the predicate complex. For the cases considered here, we have made the following proposals:

Argument type	Bearers of TH-roles	Type of DR-introduced
Definite plurals: <i>the cats</i> $\iota x \in D. \text{cats}(x)$	Instances of the plurality (atomic or groups)	Instances of the plurality
Indefinites: <i>A cat, two cats...</i> $\lambda x \in D. \text{cat}_w(x)$ $\lambda x \in D. \text{two cats}_w(x)$	Members of the extension of the property of being a cat, two cats, etc.	Members of the extension of the property of being a cat, two cats, etc
Bare arguments: <i>Cats, gold</i> $\cap \text{cats}, \cap \text{gold}$	The kind as a whole <i>and</i> instances thereof	The kind as whole <i>and</i> instances thereof
Singular donkey pronouns: <i>it₃ [donkey]</i> $\iota x [\text{donkeys}_w(x) \wedge \text{owns}_w(x)(z_3)]$	Atomic instances of the plurality	Atomic instances of the plurality

This general approach can be further tested and articulated by exploring in a similar vein other argument types like the definite singular generics (*the cat*), as well as incorporation phenomena and even compounding.

Existential operators, including those induced via predication, activate sub-domain alternatives, which give rise to Free Choice effects in a wholly general manner. Differences among different argument types have to stem from their inherent semantics (e.g. being definites with existence presuppositions, vs. being presupposition less kinds/properties, or being part of a scale, vs. not being part of it). This way, the OQF effect receives a uniform explanation across different types of plural denoting arguments.

An interesting side result of the present proposal concerns the phenomenon of Differentiated Scope, related to pluractional modifiers, which systematically separates off BAs from full blown DPs. We have proposed a ‘deflationary’ (non scope based, non

ontology based) solution: pluractional modifiers form pluralities of events with the same protagonist(s), where the notion of same protagonist is a function of the property we use to identify the relevant events. This solution rides on the fact that properties like *killing mice* vs e.g. *killing some mice* while truth conditionally related, are different and also have different anaphoric profiles, which leads to different ways of resolving the notion of “event with the same protagonist(s)”. This way of addressing the issue has no natural counterpart in non dynamic frameworks, in so far as I can make out. One would hope that a similar perspective may generalize to other cases of (a)telicity, such as the difference between *eating a sandwich* vs. *eating* (= *eating stuff*) or *running to the store* vs. *running* (= *running to places*).

This proposal is explicit enough and general enough to be tested and developed further across languages, and it should turn out to be particularly fruitful in the study of determiner less ones.

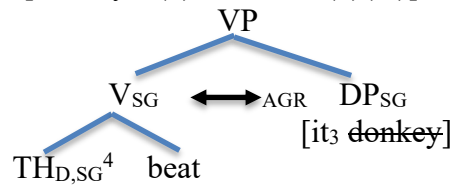
APPENDIX: Alternative activation by existential applicative heads.

(1) Main Assumption:

- a. Applicative heads carry number features that must agree with those of their argument (a case of Spec-Head agreement or whatever subsumes its effects).
- b. Applicative heads may introduce D-ALTs that are subsequently exhausted.

(2) Case 1: Singular E-type pronouns

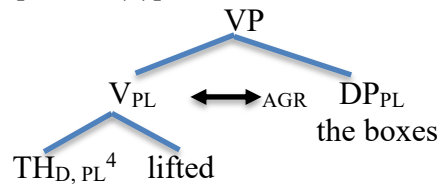
- a. Every man₃ that has a donkey TH_{D,SG^4} -SG beats [it₃ ~~donkey~~]
- b. [it₃ ~~donkey~~] = ιx [donkeys_{sw}(x) $\wedge$ owns_{sw}(x)(z₃)]
- c.



- d. $TH_{SG^4} = \lambda P \lambda x \lambda e. \exists z_4 \in D(x) [TH_w(e)(z_4) \wedge P_w(e)]$, where $D(x) = \{y \in AT: y \leq x\}$
- e. $ALT(TH_{SG^4}) = \{ \lambda P \lambda x \lambda e. \exists z \in D'(x) [TH_w(e)(z_4) \wedge P_w(e)]: \forall u D'(u) \subseteq D(u) \}$

(3) Case 2: Plural Definites

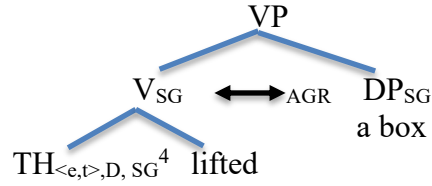
- a. John lifted the boxes
- b. [the boxes] = ιx [boxes_{sw}(x)]
- c.



- d. $TH_{D,PL^4} = \lambda P \lambda x \lambda e. \exists z_4 \in D(x) [TH_w(e)(z_4) \wedge P_w(e)]$, where $D(x)$ is either a cumulative or a distributive cover of x .
- e. $ALT(TH_{D,PL^4}) = \{ \lambda P \lambda x \lambda e. \exists z \in D'(x) [TH_w(e)(z_4) \wedge P_w(e)]: \forall u D'(u) \subseteq D(u) \}$

(4) Case 3: Indefinite singulars

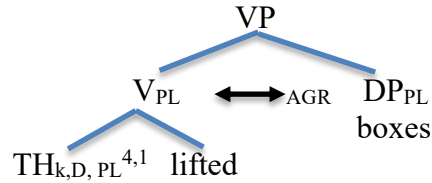
- a. John lifted a box
 b. $[a \text{ box}] = \lambda x [\text{box}_w(x)]$
 c.



- d. $\text{TH}_{\langle e,t \rangle, D, \text{SG}^4} = \lambda P \lambda Q \lambda e. \exists z_4 \in D [\text{TH}_w(e)(z_4) \wedge Q(x)]$, where D is a contextually salient location or set
 e. $\text{ALT}(\text{TH}_{\langle e,t \rangle, D, \text{PL}^4}) = \{ \lambda P \lambda Q \lambda e. \exists z_4 \in D' [\text{TH}_w(e)(z_4) \wedge Q(x)] : D' \subseteq D \}$
 $\text{TH}_{\langle e,t \rangle, D, \text{SG}^4}$ activates sub-domain alternatives optionally (cf. Chierchia 2013). It also inherits the scalar ALTS of *a box*.

(5) Case 4: Bare plurals

- a. John lifted boxes
 b. $[\text{boxes}] = \cap \text{boxes}$
 c.



- d. $\text{TH}_{k,D, \text{SG}^{4,1}} =$
 $\lambda P \lambda k \lambda e. \exists z_4 \exists z_1 \in D(z_4) \exists e' [e' \leq e \wedge z_4 = k \wedge \cup k(z_4) \wedge \text{TH}_{k,w}(e)(k) \wedge \text{TH}_w(e')(z_1) \wedge P(e) \wedge P(e')]$, where $D(z_4)$ are instances of the kind associated with z_4 in world w at some contextually salient location.
 e. $\text{ALT}(\text{TH}_{k,D, \text{SG}^{4,1}}) =$
 $\{ \lambda P \lambda k \lambda e. \exists z_4 \exists z_1 \in D'(z_4) \exists e' [e' \leq e \wedge z_4 = k \wedge \cup k(z_4) \wedge \text{TH}_{k,w}(e)(k) \wedge \text{TH}_w(e')(z_1) \wedge P(e) \wedge P(e')] : \forall u D'(u) \subseteq D(u) \}$

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