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Dependent indefinites and their post-suppositions*

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Abstract This paper presents an analysis of a new scope puzzle that arises through the interaction of two lesser-studied constructions, dependent indefinites and verbal pluractionality. The result is a novel account of dependent indefinites that correctly predicts their grammaticality with pluractionals by recognizing two ways of establishing the covariation they require: (i) true distributive quantifiers, and (ii) pluractional operators that structure thematic dependencies. The core insight is that both routes, while compositionally different, lead to similar output structures in Dynamic Plural Logic (DPlL) (van den Berg 1996) or its closely related alternatives (Brasoveanu 2008, Nouwen 2003), which is what dependent indefinites constrain. The analysis not only permits a better understanding of dependent indefinites in Kaqchikel, an endangered and understudied Mayan language of highland Guatemala, but it clarifies their place in a crosslinguistic typology of similar expressions (e.g., Balusu 2006, Choe 1987, Farkas 1997a, 2002, Yanovich 2005). Along the way I produce the first description and analysis of these phenomena in Kaqchikel.

Keywords: dependent indefinites, pluractionality, Dynamic Plural Logic, Mayan, Kaqchikel

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1 Introduction

In addition to morphologically simple indefinites like *a*, *some*, *one*, *two*, etc., many languages have special versions of these expressions with similar quantificational meanings, but one crucial difference — they require covariation. More precisely, if Dy is such an indefinite, there must be a second operator Qx such that the value of y covaries with respect to the value of x. In the canonical case this is possible when Q is a distributive quantifier and takes scope over Dy. Called *dependent* by Farkas (1997a), such indefinites have been reported in the theoretical literature for a variety of languages, including Hungarian (Farkas 1997a, 2001), Romanian (Farkas 2002), Telugu (Balusu 2006), Korean (Choe 1987, Gil 1993), and Russian (Pereltsvaig 2008, Yanovich 2005). One goal for this work is to add the Mayan language Kaqchikel to this list. Examples (1-2) show the basic contrast. In (1), as in English, the plain indefinite *jun* 'a' / 'one' can take either wide or narrow scope with respect to the universal quantifier *konojel* 'all (of them)'. In contrast, when the indefinite is partially reduplicated as in (2), the wide scope reading is unavailable.

(1)

K-onojel	x-Ø-ki-kano-j	*jun*	wuj.
E3p-all	CP-A3s-E3p-search-SS	*one*	book

'All of them looked for a book (and at least two books were looked for).'
'There is a book and all of them looked for it.'

(2)

K-onojel	x-Ø-ki-kano-j	*ju-jun*	wuj.
E3p-all	CP-A3s-E3p-search-SS	*one-RED*	book

'All of them looked for a book (and at least two books were looked for).'
*'There is a book and all of them looked for it.'

One way to state the generalization is that *jujun* 'one' is exactly like *jun* 'one' except that there must be a non-constant function from the individuals looking for books to the books that are looked for by them. This is clearly not possible under a wide scope reading of the indefinite (or the equivalent narrow scope reading with an accidental lack of covariation).

But what happens when there is simply no way for the dependent indefinite to covary, for instance, when it has only singular coarguments and there are no overt event quantifiers? Examples (3-4) show that Kaqchikel dependent indefinites are infelicitous in such contexts.[1]

(3) *X-e'-in-chäp *ox-ox* wäy.
CP-A3p-E1s-handle *three-RED* tortilla

Desired reading: 'I took (groups of) three tortillas.'

(4) *X-e'-ok *ox-ox* tz'i'.
CP-A3p-enter *three-RED* dog

Desired reading: '(Groups of) three dogs entered.'

While not all dependent indefinites crosslinguistically have such strict licensing requirements, as Section 2 discusses in detail, the most common account of licensing for Kaqchikel-style dependent indefinites is parasitic on scope (Brasoveanu & Farkas 2011, Choe 1987, Farkas 1997a, 2001, 2002, Szabolcsi 2010). If dependent indefinites are to covary with respect to the values of a variable, they must take scope under some distributive operator over that variable. Importantly, dependent indefinites in these analyses covary by taking narrow scope in the same way as plain indefinites (albeit obligatorily). This makes the strong prediction spelled out in (5), which I will show to be incorrect, arguing for a reanalysis of the semantics of dependent indefinites, both for Kaqchikel and other languages.

(5) *The plain indefinite scope entailment:*
Everywhere a dependent indefinite is licensed, a plain indefinite should also have a narrow scope reading.

The empirical problem for the prediction in (5) arises through the interaction of dependent indefinites and a second construction in Kaqchikel, namely verbal pluractionality. Many different phenomena have been talked about under the heading of pluractionality (see Cusic 1981, Wood 2007 for typological overviews). In this work, I will use the term to identify verbal derivational morphology generating predicates that cannot be satisfied in single-event scenarios. The Kaqchikel suffix *–la'* meets these criteria, which we can see from the contrast in (6-7). While example (6) requires that there be at least

1 A grammatical sentence can be created by putting *oxox* in adverbial position with the preposition *chi* or *pa*. But this is a different construction akin to English *three by three*.

one event of me looking for a book (though maybe more), example (7), which bears the pluractional suffix, is false if there is only one of these events.

(6)

X-Ø-in-kano-j	*jun*	wuj.
CP-A3s-E1s-search-SS	*one*	book

'I looked for a book.'

(7)

X-Ø-in-kan-*ala'*	*jun*	wuj.
CP-A3s-E1s-search-*la'*	*one*	book

'I looked for a book (in various locations or at various times).'
False if there is only one looking-for event
False if there is more than one book

It is important to note that in example (7) the plain indefinite cannot covary with respect to the event variable. The speaker must look for the same book in each event that is a part of the plural event satisfying the pluractional predicate. When a dependent indefinite is used in the same environment, though, a contrast emerges. While a plain indefinite cannot provide a new witness for each pluractional subevent, this is exactly what a dependent indefinite can do, as in example (8).

(8)

X-Ø-in-kan-*ala'*	*ju-jun*	wuj.
CP-A3s-E1s-search-*la'*	*one-RED*	book

'I looked for a book (in each location or at each time).'
False if there is only one looking-for event
False if there is only one book looked for

The contrast between example (7) and (8) presents a puzzle for extending previous accounts of dependent indefinites to Kaqchikel because it violates the generalization in (5). The dependent indefinite is licensed by the pluractional operator, but a plain indefinite has no narrow scope reading in the same context. This shows that we cannot satisfy the covariation requirement that dependent indefinites impose by forcing them to take narrow scope and covary in the same way as a plain indefinite. At the same time, dependent indefinites in the scope of normal distributive quantifiers, like in (2), appear to be paraphrasable by a narrow scope plain indefinite.

The question is then how to alter the semantics of dependent indefinites so that (i) they can covary with respect to a pluractional unlike a plain indefinite, yet (ii) remain paraphrasable with a narrow scope indefinite under more familiar operators. The proposal I pursue is one in which dependent indefinites are not required to take narrow scope. Instead, like modified numerals in Brasoveanu 2012, they contribute a special kind of cardinality constraint called a *post-supposition*, which must be satisfied only after the context has been updated with the at-issue content of the expression containing the dependent indefinite. In particular, the post-supposition will check that the indefinite has introduced a plurality of witnesses into the discourse context, which I will model as in Dynamic Plural Logic (DPlL) (van den Berg 1996, Brasoveanu 2007, 2008, Nouwen 2003).

The intuition this analysis captures concerns the relationship between covariation and plurality. For instance, when a plain singular indefinite takes narrow scope and covaries (and only then), it introduces a plurality into the discourse context. We can see this in a small discourse like (9).

(9) Every student brought a^{x} lunch box to school. They$_{x}$ were kept in the cabinet until it was time to eat.

Thus, we can partially assimilate dependent indefinites to narrow scope plain indefinites if the former are just like the latter, except that they check that the variable they bind is plural *after* the at-issue update (e.g., after the first clause in (9)). Importantly, this kind of analysis allows the licensing of dependent indefinites to be separated from scope-taking. While taking narrow scope is one property that permits the dependent indefinite to introduce a plurality into the discourse, it is not the only one that permits this. I show that being the coargument of a pluractional like that in (8) is a second route, even though the pluractional is not scope-taking.

The result is a novel account of dependent indefinites that draws new theoretical connections to previous work on quantification in discourse. For instance, DPlL was developed, in part, to account for the fact illustrated above — pluralities can be introduced into the discourse when quantifiers interact. Dependent indefinites show us that this kind of quantificationally derived plurality is lexicalized in some languages. Furthermore, the account makes crucial use of post-suppositions, connecting dependent indefinites to previous work on modified numerals more generally. While I show that dependent indefinites and modified numerals have different kinds of post-suppositions, what unites them is that they alter the interpretive possibilities of quantifiers in the same way. They constrain quantificational alternatives by placing conditions on possible output assignments.

Because the result depends on the interaction of two lesser-studied constructions in a lesser-studied language, the analysis is broken down into two parts. Section 2 starts by introducing dependent indefinites and the scope puzzle that arises when we consider the fact that they are licensed by both pluractional distributivity and *bona fide* distributive quantifiers. I then develop a new account of dependent indefinites in the first part of Section 3 that makes use of evaluation pluralities and involves reference to the outputs of dynamic updates like Brasoveanu 2012. Section 3.3 returns to the problematic data from pluractional distributivity. It provides an analysis of the Kaqchikel pluractional, and shows how it correctly predicts that it should license dependent indefinites even though it is not scope-taking. The final substantive section, Section 4, considers extensions of the account to dependent indefinites in other languages.

2 Introducing dependent indefinites

We have seen that when a dependent indefinite in Kaqchikel co-occurs with a quantifier, it must covary with respect to the variable bound by that quantifier. If there is no quantifier (or pluractional), and thus no way to covary with respect to a second variable, using a dependent indefinite is ungrammatical. The immediate question is what constitutes an appropriate licensor for these indefinites. In order to flesh out their distribution in Kaqchikel, we can compare and contrast them to similar expressions in other languages, which will additionally provide a small typology of dependent indefinites and an overview of previous approaches. We find that crosslinguistically there are dependent indefinites with both stronger and weaker licensing requirements. Crucially, for the middle category in which Kaqchikel dependent indefinites fall, we must not make the licensing requirement dependent on scope-taking. This conclusion motivates the proposed analysis in Section 3.

2.1 Strong licensing: Russian nibud'-indefinites

Russian has a series of dependent indefinites formed by affixing *–nibud'* to a *wh*-word. Example (10) gives representative examples from Pereltsvaig 2008.

(10) a. kto-nibud' 'x-person'
b. kogda-nibud' 'x-time'
c. kak-nibud' 'x-manner'
d. otčego-nibud' 'x-reason'
e. čto-nibud' 'x-place'

Like in Kaqchikel, when a *nibud'*-indefinite co-occurs with a quantifier, it cannot have a wide scope reading. If it has no quantificational clause-mate, ungrammaticality results.

(11) Yanovich 2005, ex. 18a
Každyj mal'čik vstretil kogo-nibud' iz svoix odnoklassnic.
Every boy met who-NIBUD' of his girl-classmate

'Every boy met one of his girl classmates.'
False if they all met the same classmate.

(12) Yanovich 2005, ex. 17
*Petja vstretil kogo-nibud' iz svoix odnoklassnic.
Petja met who-NIBUD' of his girl-classmate

'Petja met one of his girl classmates.'

Kaqchikel dependent indefinites and *nibud'*-indefinites are also similar in that they are both also licensed by quantifiers over events, as examples (13-14) show.[2]

(13) Yanovich 2005, ex. 18b
Petja často vstrečal kogo-nibud' iz svoix odnoklassnic.
Petja frequently met who-NIBUD' of his girl-classmates

'Petja frequently met a (different) girl.'

2 In what follows I will set aside one important difference between Kaqchikel, Romanian, Hungarian, and Telugu dependent indefinites on one hand and *nibud'*-indefinites on the other, namely that only the latter are licensed by quantifiers over possible worlds. I leave this contrast to future work because it does not touch on the core issue concerning the interaction of dependent indefinites and pluractional markers, and any analysis would require a lengthly intensional reformulation of the proposal developed in Section 3.

(14) Jantape' e' k'o ox-ox ixtan-i' ch-u-wäch r-ochoch ajaw.
Always A3p exist three-RED girl-PL P-E3s-face E3s-house lord

'There are always three (different) girls out front of the church.'

While Russian and Kaqchikel dependent indefinites exhibit these similarities, one major difference is that the latter are licensed by distributively interpreted plural arguments, while *nibud'*-indefinites are only licensed by *bona fide* quantifiers.

(15) Rije' x-Ø-ki-chäp el ox-ox kab'.
they CP-A3s-E1p-handle DIR three-RED candy

'They took three candies.'
False if they took three in total to share.

(16) Pereltsvaig 2008, ex. 2
*Ego o čëm-nibud' sprosili.
him about what-nibud' asked.PL

'They asked him about something.'

Since *nibud'*-indefinites are only licensed by quantificational distributivity, and not distributive predication, I say they require strong licensing. This fact suggests a tight connection between quantifiers and *nibud'*-indefinites, which Yanovich (2005) explicitly argues for. He proposes that *nibud'*-indefinites are choice functions that come pre-Skolemized, as in (17b). They have an extra argument that can be bound, making them logically equivalent to examples like (17a) where the choice function gets bound by existential closure (Reinhart 1997).

(17) Every girl kissed a boy.

a. $\forall x[\textsc{girl}(x)]\exists f(\textsc{kiss}(f(\textsc{boy}))(x))$

b. $\forall x[\textsc{girl}(x)](\textsc{kiss}(f(x,\textsc{boy}))(x))$

Yanovich further argues that the extra argument in a skolemized choice function must be bound and can only be bound by a quantifier. If this is the case, then *nibud'*-indefinites must necessarily be interpreted in the scope of *bona fide* quantifiers. This further predicts that the domain of quantification should not matter because all quantifiers are able to bind the argument of the skolemized choice function. Moreover, because individuals cannot bind this argument, as long as predicative distributivity does not come about via covert quantification, the analysis predicts that distributively interpreted plural subjects should not license *nibud'*-indefinites.

2.2 Weak licensing: Telugu reduplicated-indefinites

While the strongly licensed dependent indefinites in Russian are closely connected to quantification, other languages have similar indefinites with weaker licensing requirements (or potentially even no licensing requirement). Telugu presents such a case. Balusu 2006 gives an analysis of reduplicated numerals in Telugu, which, like expressions we are familiar with, bar a wide scope reading when co-occurring with quantifiers like *prati* 'every'.

(18) Balusu 2006, ex. 13

Prati	pillavaaDu	renDu	renDu	kootu-lu-ni	cuus-ee-Du.
every	kid	two	two	monkey-PL-ACC	see-Past-3PSg

'Every kid saw two monkeys.'
False if there are two monkeys and every kid saw them (at the same time and location).

As expected, Telugu reduplicated indefinites, like their Kaqchikel counterparts, can also covary under distributive predication.

(19) Balusu 2006, ex. 9

Pilla-lu	renDu	renDu	kootu-lu-ni	cuus-ee-ru.
Kid-PL	two	two	monkey-PL-ACC	see-Past-3PPl

'The children saw two monkeys each.'

Where the two constructions diverge is that Telugu reduplicated numerals have what Balusu calls spatial key and temporal key readings in the absence of overt quantifiers or a plural coargument. Crucially, these readings are available in discourse-initial environments.[3]

3 Otherwise, we might think they are licensed in these cases by quantificational subordination.

(20) Balusu 2006, ex. 9

Raamu	renDu	renDu	kootu-lu-ni	cuus-ee-Du.
Ram	two	two	monkey-PL-ACC	see-Past-3PSg

Spatial Key: 'Ram saw two monkeys in each place.'
Temporal Key: 'Ram saw two monkeys each time'

Kaqchikel dependent indefinites are ungrammatical in environments like those in example (20).

(21)

*X-e'-in-tz'ët	ox-ox	b'atz'.
CP-A3p-E1s-see	three-RED	monkey

Desired reading: 'I saw three monkeys in each place.'
Desired reading: 'I saw three monkeys each time'

The contrast between examples (20) and (21) shows that Telugu reduplicated numerals have significantly weaker licensing requirements than Kaqchikel dependent indefinites. In fact, the analysis proposed in Balusu 2006 places no licensing requirement on reduplicated numerals. They themselves introduce a universal quantifier over a partition of the event argument (see $\pi(e)$ in (22)). In addition to universal quantification over events, the dependent indefinite contributes a second condition, (22b), which is separate from the at-issue content and forces covariation.

(22) "Two-two" monkeys jumped.

a. $\exists e \exists \pi [\forall e' \in \pi(e) \exists X[\textsc{two.monkeys}(X) \wedge \textsc{jumped}(X, e')]]$

b. $|\{X\colon \textsc{two.monkeys}(X) \wedge \textsc{jumped}(X, e)\}| > 1$

Ambiguity in which partition is selected is what generates the three core readings (whether times, locations, or participants), not variation in potential licensors. The conclusion is that some items that look like Kaqchikel dependent indefinites either have a very weak licensing requirement, or they have no licensing requirement and instead introduce their own distributive quantifier.

2.3 The middle case: Romanian/Hungarian dependent indefinites

It has been established that there are dependent indefinites with both stronger and weaker licensing requirements than those in Kaqchikel. The final class of cases is just right. They need a licensor, but not a strong quantificational one. For instance, Farkas 1997a examines reduplicated indefinites and numerals in Hungarian. As we have come to expect, they cannot have a wide scope reading with respect to a co-occurring quantifier.

(23) Farkas 1997a, ex. 34

Minden	gyerek	olvasott	egy-egy	/	hét-hét	könyvet.
every	child	read	a-RED	/	seven-RED	book-ACC

‘Every child read a / seven book(s)’
False there is exactly a / seven book(s) that they each read.

Dependent singular indefinites and higher numerals have to be treated separately because, as Farkas 1997a, 2001 show, they have different distributions. This work focuses on the singular indefinite, where the parallels are more clear. First, Hungarian dependent indefinites are similar to Kaqchikel dependent indefinites, and different than Russian *nibud'*-indefinites, in that they can be licensed by quantifiers over events as well as predicative distributivity (see (14) and (15) respectively).

(24) Brasoveanu & Farkas 2011, ex. 15

Olykor-olykor	egy-egy	ember	felkiáltott.
occsionally	a-RED	man	cried-out

‘Occasionally a man cried out.’

(25) Farkas 1997a, ex. 36

A	gyerekek	hoztak	egy-egy	könyvet.
the	children	brought	a-RED	book.ACC

‘The children brought a book each.’

Finally, Hungarian dependent indefinites, like those in Kaqchikel, are usually ungrammatical without a licensor.[4] They do not have a weak licensing requirement like reduplicated numerals in Telugu.

4 Section 4 takes up cases where dependent singular indefinites appear to need no licensor. Reduplicated numerals in both languages, though, never occur in these exceptional contexts.

(26) Farkas 1997a, ex. 46
*Mari nem olvasott egy-egy regényt.
Mari not read a-RED novel

'Mary didn't read a novel.'

(27) Farkas 2002, ex. 17
*Mari meglátogatott tegnap délután egy-egy ismerőst.
Mari visited yesterday afternoon a-RED acquaintance

'Mary visited an acquaintance yesterday afternoon.'

Hungarian is not the only language with dependent indefinites that pattern with those in Kaqchikel. Brasoveanu & Farkas 2011 describes similar facts for Romanian (first reported in Farkas 1997b). The particle *cîte* in Romanian forces narrow scope readings of indefinites it modifies.

(28) Brasoveanu & Farkas 2011, ex. 19
Fiecare băiat a recitat cîte un poem.
every boy has recited cîte a poem

'Every boy recited a poem.'
False if there is exactly one poem and every boy recited it.

In the absence of a licensor, *cîte* is ungrammatical, as in (29). The examples that follow show that *cîte* is licensed by both distributive predication and quantifiers over events. Its distribution is therefore like Kaqchikel dependent indefinites.

(29) Brasoveanu & Farkas 2011, ex. 22
*Cîte un student a plecat.
cîte a student has left

'A student left.'

(30) Brasoveanu & Farkas 2011, ex. 20
Din cînd in cînd, trenul se oprea în cîte o gară.
from when in when train.the refl stopped in cîte a station

'Occasionally, the train stopped in a station.'

(31) Brasoveanu & Farkas 2011, ex. 21

Am	decis	să	lucrăm	amindoi	cîte	un	album	solo.
we-have	decided	to	work	both	cîte	un	album	solo

‘We have decided to both work at a solo album.’

How do previous authors deal with dependent indefinites of the Kaqchikel-type, namely those with neither weak nor strong licensing requirements? The most prominent class of analyses assimilates them to *nibud'*-indefinites. For example, Brasoveanu & Farkas (2011) build an account of Romanian *cîte* in a version of Independence-Friendly Logic (Hintikka 1979, Sandu 1993, Hodges 1997, Väänänen 2007, among others). In these logics, variables are indexed with the quantifiers they are (in)dependent of/on. Brasoveanu & Farkas (2011) accomplish this by indexing indefinites with the variables against which they are allowed to covary. For instance, the indefinite in (32) is tagged with $\{x\}$, meaning that the value of y is permitted to covary with respect to the value of x. In contrast, the indefinite in (33) is indexed with the empty set, meaning the value of y is completely independent of all other variables — that is, it takes widest scope.

(32) Every^{x} student read a$^{y}_{\{x\}}$ book.

(33) Every^{x} student read a$^{y}_{\emptyset}$ book.

Against this backdrop, dependent indefinites come with a covariation condition, preventing them from being indexed with the empty set. When the clause contains no other quantifiers, they must be indexed with the empty set, which results in ungrammaticality. What is important is that this analysis of dependent indefinites assimilates them to a subclass of plain indefinites. They are indefinites that must be indexed by a variable and covary with respect to it. But everywhere a dependent indefinite can meet these conditions, a plain indefinite should be able to behave in the same way.

We can now see why the Kaqchikel pluractional causes problems for extending approaches like this to Kaqchikel dependent indefinites. While Kaqchikel dependent indefinites behave like those in Romanian and Hungarian, I cannot follow previous authors in requiring them to covary by taking narrow scope (in essence assimilating them to Russian *nibud'*-indefinites). The problem is that the Kaqchikel pluractional licenses dependent indefinites, but does not license similar readings with plain indefinites. This should not be possible if dependent indefinites are just plain indefinites with a restricted class of readings.

The other option, of course, is to assimilate medium-strength dependent indefinites to those in Telugu, which have weak licensing requirements. Perhaps we can treat them basically the same, while adding a condition to restrict their distribution in languages like Kaqchikel, Hungarian, and Romanian. To my knowledge, no one has worked out such an account in detail, though Szabolcsi (2010, pp. 138-9) lays out what it might look like. Recall that Balusu 2006 has two components: (i) Dependent indefinites introduce universal quantification over a partition of the event argument, and (ii) Dependent indefinites come with some sort of not-at-issue cardinality requirement. In this account, covariation with respect to a universal quantifier is an illusion mediated by the event partition. When we have a universal quantifier, we use the trivial partition, as in (34), where we assume $\pi(e) = \{e\}$.

(34) Every kid saw "two-two" monkeys.

a. $\exists E[\forall y[\textsc{kid}(y) \rightarrow \exists e \in E \exists \pi[\forall e' \in \pi(e)$
$[\exists X[\textsc{two.monkeys}(X) \wedge \textsc{saw}(u, X, e')]]]]]$

b. $|\{X\colon \textsc{two.monkeys}(X) \wedge \exists y[\textsc{kid}(y) \wedge \textsc{saw}(y, X, E)\}]| > 1$

If for every $e \in E$, the partition of $e = \{e\}$, then (34) is true if E has an event of seeing two monkeys for each kid and the number of sets of two monkeys seen by a kid is at least two. The idea in Szabolcsi 2010 is that languages like Hungarian, Romanian, and Kaqchikel always use the trivial partition. Without some higher scoping operator, using the trivial partition blocks covariation, preventing the plurality condition from being satisfied. Because the account makes use of both an event partition and scope-taking quantifiers to license dependent indefinites, it could explain the troubling data from pluractionality. We simply say that the pluractional relaxes the requirement that dependent indefinites quantify over trivial event partitions.

While this analysis should work (and what I propose is in the next section is in the same spirit), there are problems. First, note that the Szabolcsi 2010 proposal requires quantification over a singleton domain to be the normal case for dependent indefinites in languages like Kaqchikel. Usually trivial universal quantification is infelicitous in natural language, but for dependent indefinites, it would be built into their denotation. A second related problem is that all of the work in Szabolcsi's extension of Balusu 2006 is done by the plurality condition, but dependent indefinites are still taken to contribute a universal quantifier over an event partition. The analysis would be simpler if we could just get rid of the partition and the universal quantifier, leaving only the plurality condition. This is what the next section does.

In addition to these difficulties, the plurality condition has its own problems. First, its grammatical status is not clear. How are we supposed to interpret it relative to the sentence in which the dependent indefinite occurs? Both Szabolcsi (2010) and Balusu (2006) suggest that it might be a scalar implicature like that which accompanies bare plurals (Zweig 2008, 2009). The analogy does not go through, though. Recall that the plurality implicature in Zweig 2008, 2009 is evaluated inside the scope of a universal in order to block dependent readings of bare plurals with quantificational clause-mates. In contrast, the plurality condition in (34) must be interpreted outside the scope of the universal for precisely the opposite reasons. Moreover, the plurality condition cannot be an implicature because it is not cancelable. Otherwise, we would not be able to talk about how dependent indefinites need to be licensed. Balusu (2006) also suggests that the plurality condition could be a presupposition, but this is similarly problematic. It would be strange to presuppose most of the lexical content of your main assertion, as (34) would if the plurality condition were a presupposition. The account proposed in the next section resolves these issues. The plurality condition is neither a presupposition, nor an implicature, but a *post-supposition*, which is interpreted after the at-issue content.

In light of these difficulties, I do not believe that the analysis of dependent indefinites in Telugu can be easily extended to account for the behavior of dependent indefinites in Kaqchikel (or Hungarian and Romanian). At the same time, we have seen that Kaqchikel dependent indefinites cannot be forced to take narrow scope without running into empirical problems. The next section proposes a new analysis that accounts for the pattern we see in Kaqchikel. The proposal makes use of a cardinality condition that is separate from the main assertion, like that in Balusu 2006, but one that is less complex and can be evaluated in a compositional way. Moreover, we are able to understand why some dependent indefinites need to be licensed without forcing them to contribute trivial universal quantification.

3 Dependent indefinites and evaluation plurality

The last section has shown that previous approaches, which require dependent indefinites to take narrow scope, cannot be extended to Kaqchikel. The intuition behind the alternative analysis presented in this section can be seen by considering the well-known fact that narrow scope indefinites license plural anaphora.[5]

(35) John baked every^x girl a^y personalized cupcake. He put them$_y$ on their$_x$ desks before school.

(36) John baked a^x girl a^y personalized cupcake. He put it$_y$ / *them$_y$ on her$_x$ desk before school.

Even though the indefinite *a cupcake* is not plural, when it covaries in the scope of a quantifier, the result is a plural individual that can be picked up later by a plural pronoun. When there is nothing to covary with respect to, as in (36), only singular anaphora is possible. I propose that dependent indefinites are just like plain indefinites, but they require the variable they bind to be plural in the way that y is in (35) after the first clause has been evaluated.

Even at this non-formal level, it should be clear that the plurality condition cannot be evaluated at the same point as the dependent indefinite that introduces it. In (35) the variable y is not plural until after the scope of the universal has been evaluated. What we need is a way to let the plurality condition be evaluated after interpreting some expression containing the dependent indefinite. While delaying the interpretation of an expression's asserted content is not standard, there are analogs in the literature. For instance, Brasoveanu (2012, §2-3) argues that the cardinality conditions contributed by modified numerals should be interpreted in a delayed manner, which he calls *post-suppositional*. Though dependent indefinites will not behave exactly like the post-suppositional expressions in this previous work, they will similarly place conditions on output contexts, and I will show that my use of post-suppositions is consistent with their use in Brasoveanu 2012, §2-3.

One way to view the post-suppositional account of dependent indefinites developed in this section is that it is a refinement of the plurality condition proposed by Balusu (2006). While not formalized as such, Balusu's account is essentially two-dimensional. The content of the dependent indefinite is divided up, where some of it is interpreted separately from the rest of the

5 In examples (35-36) and those that follow, I use superscripts to show the discourse referents that quantifiers introduce.

clause. Post-suppositions will allow for a unidimensional account, where the dependent indefinite's plurality condition is not interpreted separately from the clause, but just outside the scope of a licensing quantifier, which is all that is required.

Most importantly, the post-suppositional account will allow us to understand the similarities and differences between distributive quantifiers and the pluractional operator that licenses dependent indefinites. Since a dependent indefinite is licensed in this account by checking that there are a plurality of witnesses for the indefinite accessible in the context after interpreting the indefinite's containing clause, I only need to show that interpreting quantifiers and the pluractional produce similar output contexts. Crucially, the internal compositional structure of the pluractional and quantified clauses does not matter. This means that it will not matter if quantifiers, but not pluractionals, can take scope over the internal argument.

3.1 Formal backdrop

The backdrop for the account is Brasoveanu's extension of van den Berg's Dynamic Plural Logic (DPlL) (see Brasoveanu 2011a, 2012) that has been stripped to its barest essentials. Like Dynamic Predicate Logic (Groenendijk & Stokhof 1991), DPlL formulas are binary relations between variable assignments, which we can think of as input and output contexts. That is, a formula ϕ is true relative to g just in case there is an assignment h such that the result of updating g with ϕ is h. Where DPlL departs from Dynamic Predicate Logic is that instead of single variable assignments, formulas are interpreted relative to sets of variable assignments $\langle G, H\rangle$ (van den Berg 1996, Brasoveanu 2008, Nouwen 2003, among others). A set of assignments can be represented as a matrix. The columns of a matrix, like that in (37), represent variables (or discourse referents). The rows represent assignments $h_1, \ldots, h_n$ in the set of assignments H. The cells of the matrix are the entities that each variable is mapped to under each assignment.

(37)

H	$\ldots$	x	x	$\ldots$
h_1	$\ldots$	$entity_1$	$entity_4$	$\ldots$
h_2	$\ldots$	$entity_2$	$entity_4$	$\ldots$
h_3	$\ldots$	$entity_3$	$entity_4$	$\ldots$
$\ldots$	$\ldots$	$\ldots$	$\ldots$	$\ldots$

An important consequence is that once we have access to pluralities of variable assignments, we can talk about plurality at a higher level, that is, over and above the distinctions made in the mereology of individuals. For instance, $entity_1$, $entity_2$ and $entity_3$ might all be atomic individuals, but if we look across the set of variable assignment H as a whole, we see that x is mapped to a plurality of individuals. In contrast, $entity_4$ might be a non-atomic individual, but we if we look across H, we see that y is only mapped to one individual (albeit a plural one). In this way, y is singular relative to H. Brasoveanu 2011a calls the plurality of individuals stored in x above an *evaluation plurality*, in contrast to a *domain plurality*, which is a non-atomic entity (or group-entity) in the domain. I will continue to use this terminology in what follows.

Why should we move to a dynamic semantics with plural variable assignments? In early work like van den Berg 1996, one goal is to account for examples like (35), where plural antecedents emerge from quantificationally embedded indefinites and the dependencies that arise from this embedding are preserved in subsequent discourse — that is, John bakes a plurality of cupcakes and puts on each girl's desk the particular cupcake he baked for her. Consider how universal quantification is usually interpreted in Dynamic Predicate Logic (Groenendijk & Stokhof 1991), which has only singleton assignments. If the quantifier binds x, then the formula is true relative to an input assignment g just in case $\langle g, k\rangle$ satisfies the scope formula for any k that differs from g at most with respect to the value it assigns to x. Crucially, though, universal quantification in DPL is a test, so all of these extra assignments k must be discarded after the quantifier is evaluated. Only a single assignment, which is equivalent to the input assignment g, is passed into the output. Things are different in DPlL, which countenances sets of assignments. In this case, each of the intermediate assignments k that differ with respect to x can be collected together and passed into subsequent discourse. For instance, if the indefinite in (35) is interpreted as covarying in the scope of the universal, each output assignment h that assigns x to a different girl will have to assign y to the cupcake that John baked for her. When we look across the resulting set of assignments we find that x stores a plurality of girls, but also that y stores a plurality of cupcakes. When this set of assignments is passed on to the continuation, not only will $they_y$ in (35) be able to find a plural antecedent, but desks, girls, and cupcakes can be correlated because the dependencies between girls and cupcakes established in the first clause are not lost.

Using the DPlL framework makes sense for our purposes, then, because it allows indefinites to yield plural discourse referents when they are embedded in quantificational domains. In this account, dependent indefinites mandate plural discourse reference for the variable they bind, and in doing so, require distributive dependencies to hold between this variable and one that has been previously introduced. They do this by contributing a post-suppositional test that their variable is evaluation plural, exactly the kind of test that the indefinite in (35) would pass. This yields the formal typology of indefinite plurality in Figure 1, which Kaqchikel completely instantiates. The rest of this section is devoted to developing denotations for these indefinites and the expressions that contain them.

	Domain Singular	Domain Plural
Evaluation Singular	*jun*	*oxi'*
	one	three
Evaluation Plural	*ju-jun*	*ox-ox*
	one-RED	three-RED

Figure 1 Typology of indefinite plurality

While I have discussed evaluation singularity/plurality in detail, domain-level singularity/plurality has been treated at an intuitive level. It can be formalized following Lasersohn 1995, Link 1983/2002. The domain of individuals $\mathfrak{D}_e$ and the domain of events $\mathfrak{D}_\epsilon$ are the powersets (minus the empty set) of designated sets of individuals and events, respectively. I use x, x', y, y' as variables for individuals and e, e' as variables for events. The 'part of' relation $\leq$ over individuals or events is set inclusion over these powersets. The sum operation $\oplus$ is set union. I use a metalanguage predicate atom to pick out the singleton sets in these domains. Non-atomicity in $\mathfrak{D}_e$ and $\mathfrak{D}_\epsilon$ corresponds to domain plurality.

We can now show how basic formulas are interpreted, and introduce special formulas for managing domain-level and evaluation-level plurality. Note that while the version of DPlL given here is extended over the course of the analysis, Appendix A presents the formal system in its entirety for reference.

First, in addition to the domains and relations discussed above, models consist of the basic interpretation function $\mathfrak{I}$, which assigns to any n-ary relation R of type $\tau_1, \ldots, \tau_n$ a subset of $\mathfrak{D}_{\tau_1} \times \ldots \times \mathfrak{D}_{\tau_n}$. As noted before, formulas are interpreted relative to pairs of sets of total assignments $\langle G, H\rangle$. Atomic formulas are tests (they only pass on input contexts that satisfy them). Note that they are interpreted distributively with respect to assignments in H.

(38) $[\![R(x_1,\ldots,x_n)]\!]^{\langle G,H\rangle} = \mathbb{T}$ iff $G = H$ and $\forall h \in H$, $\langle h(x_1),\ldots,h(x_n)\rangle = \mathfrak{I}(R)$

Domain-level cardinality predicates — $\mathsf{one}(x)$, $\mathsf{two}(x)$, $\mathsf{three}(x)$, etc. — are evaluated by checking the cardinality of the set of atomic parts of an individual.

(39) $[\![\mathsf{one}(x)]\!]^{\langle G,H\rangle} = \mathbb{T}$ iff $G = H$ and for all $h \in H$,
$|\{x'\colon x' \leq h(x) \wedge \mathsf{atom}(x')\}| = 1$

(40) $[\![\mathsf{two}(x)]\!]^{\langle G,H\rangle} = \mathbb{T}$ iff $G = H$ and for all $h \in H$,
$|\{x'\colon x' \leq h(x) \wedge \mathsf{atom}(x')\}| = 2$

There are also tests for evaluation-level cardinality. They work by gathering all values of a variable under a set of assignments, as in (41), and checking the cardinality of the resulting set, as in (42-43).

(41) $G(x) := \{g(x)\colon g \in G\}$

(42) $[\![x = n]\!]^{\langle G,H\rangle} = \mathbb{T}$ iff $G = H$ and $|H(x)| = n$

(43) $[\![x > n]\!]^{\langle G,H\rangle} = \mathbb{T}$ iff $G = H$ and $|H(x)| > n$

Dynamic conjunction is defined as relation composition.

(44) $[\![\phi \wedge \psi]\!]^{\langle G,H\rangle} = \mathbb{T}$ iff there is a K such that $[\![\phi]\!]^{\langle G,K\rangle} = \mathbb{T}$ and $[\![\psi]\!]^{\langle K,H\rangle} = \mathbb{T}$

Quantification proceeds via pointwise manipulation of assignment functions. I overload the notation $[x]$ to define random assignment in the object language.

(45) Random assignment: $[\![[x]]\!]^{\langle G,H\rangle} = \mathbb{T}$ iff $G[x]H$, where

a. $G[x]H := \begin{cases} \text{for all } g \in G\text{, there is a } h \in H \text{ such that } g[x]h \\ \text{for all } h \in H\text{, there is a } g \in G \text{ such that } g[x]h \end{cases}$, and

b. $g[x]h$ iff for any variable v, if $v \neq x$, then $g(v) = h(v)$

I translate plain indefinites according to the following schema. Note that brackets [...] demarcate the restrictor and parentheses (...) the nuclear scope.

(46) $\exists x[x = 1 \wedge \mathsf{one}(x) \wedge \phi](\psi)$ one ϕ-atom is ψ

Verbs have an event argument, which is existentially closed by default. They are connected to their arguments via theta-roles (AG, TH, etc.), which are distinguished functional relations from the domain of events to the domain of individuals. I also assume that these theta-roles, in addition to basic lexical relations (SEARCH, EAT, STUDENT, etc.), are cumulatively closed by default, though I suppress the common star notation for readability.[6] Putting it together, the sentence 'A student danced' is translated as in (47).

(47) A student danced $\rightsquigarrow$
$\exists x[x = 1 \wedge \mathsf{one}(x) \wedge \textsc{student}(x)](\exists e(e = 1 \wedge \textsc{dance}(e) \wedge \textsc{ag}(e, x)))$

The formula in example (47) just abbreviates the dynamic version in (48). In what follows I will give both versions. The former makes clearer the number and scopes of the relevant quantifiers, while the latter is what is evaluated.

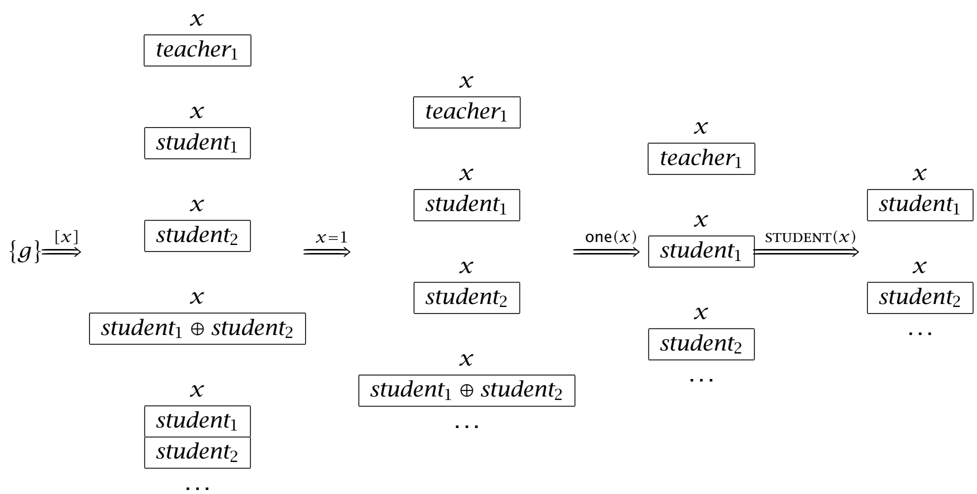
(48) $[x] \wedge x = 1 \wedge \mathsf{one}(x) \wedge \textsc{student}(x) \wedge [e] \wedge e = 1 \wedge \textsc{dance}(e) \wedge \textsc{ag}(e, x)$

Given the definition of truth in (49), example (48) is true relative to an input set of assignments just in case there is an accessible set of output assignments storing in x one atomic student who is the agent of a dancing event stored in e. We can see how this works schematically below.

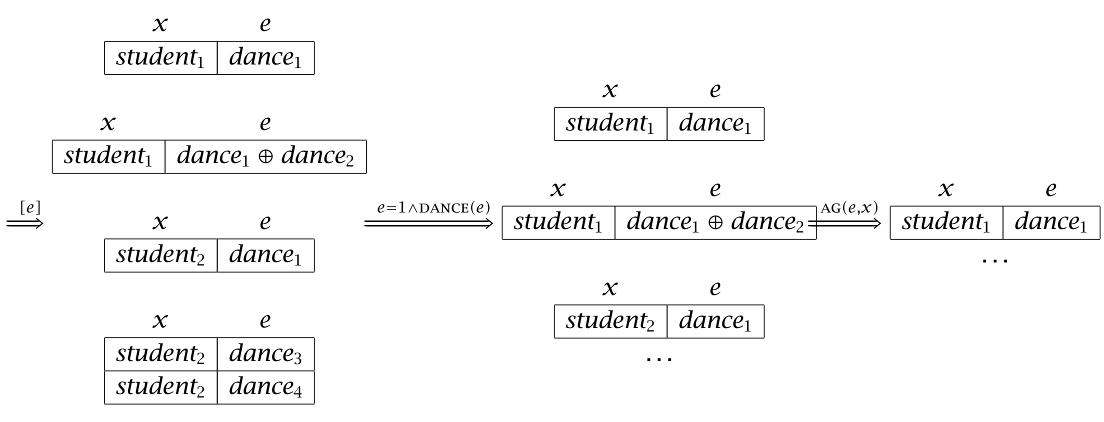
Suppose that our input context is a singleton assignment assigning some value to every variable. First we introduce x, meaning we assign it a random value, spawning all sets of assignments that differ at most with respect to x. The next update eliminates those sets of assignments where x is evaluation plural, here just the final matrix that stores *student*$_1$ and *student*$_2$ in stacked boxes, which would correspond to a pair of output assignments h and h'

6 That is, I assume that all theta-roles and n-ary lexical relations R are always $**R$, where $**R$ is the smallest set such that $R \subseteq **R$ and if $\langle a_1, \ldots, a_n \rangle \in **R$ and $\langle b_1, \ldots, b_n \rangle \in **R$, then $\langle a_1 \oplus b_1, \ldots, a_n \oplus b_n \rangle \in **R$. Note that domain-level cardinality predicates are not to be interpreted cumulatively, just like the metalanguage predicate atom, which is why they will also be written in sans serif throughout.

such that $h(x) = student_1$ and $h'(x) = student_2$.[7] The third condition throws out those sets of assignments where x stores a non-atomic individual. The final test in the top block ensures that all possible outputs will assign to x an individual that is a student.



The next block begins by introducing an event e. Just as before, potential outputs could store in e a non-atomic event or an evaluation plurality.



After eliminating those assignments that store an evaluation plurality of events, as well as those that do not assign to e a dancing event, we come to

7 It is important to note that the evaluation-level cardinality constraints $x = 1$ and $e = 1$ ensure that a simple indefinite or existential quantification over events does not introduce a multiplicity of entities into the discourse satisfying the restrictor and nuclear scope. This rules out the anomalous continuation in (36).

the final test. It removes all potential output assignments where the agent of the events stored in e is not the individual stored in x. Here we can see that it is *student*$_1$ who is the agent of *dance*$_1$, not *student*$_2$.

We can think of each of these sets of assignments, represented by a matrix, as a point in a graph. Updates are transitions. As we add more updates, the set of points consistent with the current information state shrinks. A formula ϕ is true if there is at least one path through this graph consistent with ϕ.

(49) Truth: a formula ϕ is true relative to an input context G iff there is an output set of assignments H such that $[\![\phi]\!]^{\langle G,H\rangle} = \mathbb{T}$.

In the illustrated examples that follow, I will only represent one typical path through the graph.

$$\xRightarrow{[x]\wedge x=1\wedge \mathsf{one}(x)\wedge \textsc{student}(x)\wedge[e]\wedge e=1\wedge \textsc{dance}(e)\wedge \textsc{ag}(e,x)} \begin{array}{cc} x & e \\ \hline \textit{student}_1 & \textit{dance}_1 \end{array}$$

Because distributive quantifiers license dependent indefinites, let's consider how universal quantification is treated in the present variant of DPlL. This will lay the foundation for analyzing how dependent indefinites are licensed in their scope. I follow the basic strategy in Brasoveanu 2008, decomposing universal quantification into a maximization operation over the restrictor formula and a distributive operator over the nuclear scope formula, that is, $\forall x[\phi](\psi)$ abbreviates $\mathsf{max}^x(\phi) \wedge \delta(\psi)$. The max operator max^x introduces a new variable x and stores in H the maximal set of individuals satisfying the formula it scopes over.

(50) $[\![\mathsf{max}^x(\phi)]\!]^{\langle G,H\rangle} = \mathbb{T}$ iff $[\![[x] \wedge \phi]\!]^{\langle G,H\rangle} = \mathbb{T}$ and

a. There is no H' such that $H(x) \subsetneq H'(x)$ and $[\![[x] \wedge \phi]\!]^{\langle G,H'\rangle} = \mathbb{T}$

Speaking procedurally, the distributive operator δ takes the output of maximization and distributively updates the singleton assignments $\{g\}$ in G with the nuclear scope formula. Finally, it sums all of the resulting assignments.

(51) $[\![\delta(\phi)]\!]^{\langle G,H\rangle} = \mathbb{T}$ iff there exists a partial function $\mathcal{F}$ from assignments g to sets of assignments K, i.e., of the form $\mathcal{F}(g) = K$, s.t.

a. $G = \mathsf{Dom}(\mathcal{F})$ and $H = \bigcup \mathsf{Ran}(\mathcal{F})$

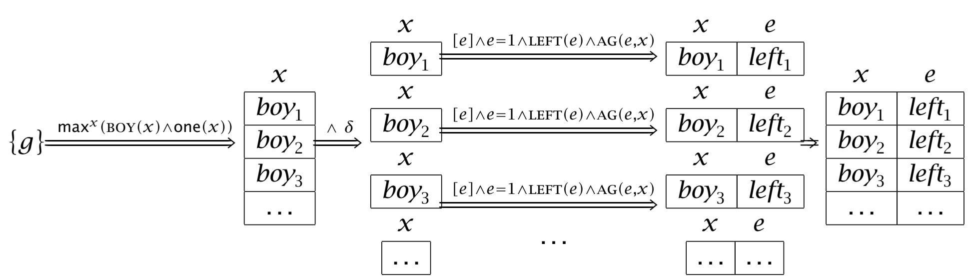
b. for all $g \in G$, $[\![\phi]\!]^{\langle\{g\},\mathcal{F}(g)\rangle} = \mathbb{T}$

Consider an example like 'Every boy left', whose translation appears in (52-53).

(52) $\forall x[\textsc{boy}(x) \wedge \mathsf{one}(x)](\exists e(e = 1 \wedge \textsc{left}(e) \wedge \textsc{ag}(e, x)))$

(53) $\mathsf{max}^x(\textsc{boy}(x) \wedge \mathsf{one}(x)) \wedge \delta([e] \wedge e = 1 \wedge \textsc{left}(e) \wedge \textsc{ag}(e, x))$

Suppose our input is a singleton assignment assigning random values to every variable. The max^x condition restricts possible output assignments to those whose singleton sub-assignments store atomic boys and which collectively store every boy. The distributive condition then checks that each of those atomic boys satisfies the scope formula. Call the set of assignments storing boys in x below G'. The distributive operator does its work by checking that each $g' \in G'$, which we know stores an atomic boy in x, can be successfully updated with the scope formula without reference to the other assignments in G'. Here this means that we have to be able to extend each g' with a leaving event that the boy in $g'(x)$ is the agent of. The result is a set of output assignments storing dependencies between restrictor entities and the entities introduced by indefinites in the universal's scope formula, here just the event argument.



To presage the analysis of dependent indefinites, note that as long as more than one individual in the model satisfies the restrictor, interpreting a universal quantifier can result in evaluation plural discourse referents for indefinites in its scope. If dependent indefinites introduce a discourse referent that must be evaluation plural in the output, then being interpreted in the scope of a universal quantifier is clearly one way this can come about.

3.2 Dependent indefinites

The heart of the proposal is that dependent indefinites are like simple indefinites, except that they must come to contribute an evaluation plurality from the perspective of the *global* discourse context. In this way, dependent indefinites are similar to expressions bearing presuppositions or conventional implicatures. Just like these expressions, part of their meaning contributes to the at-issue content, while a second part is interpreted separately. The difference is where this secondary content is interpreted. For presuppositions, it must be interpreted relative to the input context, that is, before the at-issue content (van der Sandt 1992, Kamp 2001, among others). In contrast, I argue that the cardinality constraint of dependent indefinites is a post-supposition interpreted *after* the at-issue update. In essence, this allows the dependent indefinite to be interpreted *in situ*, but take a global perspective on the environment in which it is interpreted. For example, in the canonical case where a dependent indefinite is licensed by a universal quantifier, the dependent indefinite is free to behave like a plain indefinite. It can take either scope and covary as it pleases. It is only after this at-issue update that the dependent indefinite checks that it behaved in such a way as to have created an evaluation plurality.

Post-suppositions are not a new class of meanings. They are discussed in Constant 2012, Farkas 2002, Lauer 2009, though Brasoveanu (2012) gives the most thorough formal treatment, which I will follow closely. His goal is to account for van Benthem's puzzle (van Benthem 1986), which concerns cumulative readings of sentences with two modified numerals like (54).[8] Deriving the relevant reading is difficult for accounts that treat *exactly* as a maximization operator, while assuming a normal syntax-semantics interface for quantified DPs. In the surface scope case, the resulting interpretation for (54) will look like (55), with the subject's maximization operator scoping over the object's maximization operator.

(54) Exactly three boys saw exactly five movies.

(55) $\mathsf{max}^x(\textsc{boy}(x) \wedge \mathsf{three}(x) \wedge \mathsf{max}^y(\textsc{movie}(y) \wedge \mathsf{five}(y) \wedge \textsc{see}(x, y)))$

8 Note that Brasoveanu 2012 contains two different formal systems. In Sections 2 and 3 of that work, plural noun phrases denote non-atomic individuals, that is, domain pluralities, and modified numerals contribute post-suppositions. In contrast, Section 4 of Brasoveanu 2012 discusses cumulative readings with distributive quantifiers in a formal system without domain pluralities or post-suppositions. Because my formal assumptions most closely match those of Sections 2-3 in Brasoveanu 2012, I see the analysis developed here as an extension of that account. The question of how to analyze cumulative readings of plural numerals with distributive quantifiers is left for future research because the Kaqchikel facts are not known.

The problem is that (55) says that the greatest number of boys that saw exactly five movies between them is three, which will be true in a cumulative situation, but also in situations that make (54) false. For instance, if three boys watched five movies between them, and then a fourth boy watched a sixth movie that no one else saw, (54) is false, but (55) continues to be true. The reason is that even though four boys watched six movies, the greatest number of boys that watched exactly five movies between them is still three. Since the fourth boy didn't watch any of the movies the other boys watched, neither he nor his movie matters for evaluating the truth of (55), which is the wrong prediction.

Instead, example (54) should have the interpretation (56), where the cardinality constraints are evaluated outside the scope of both max operators. This will be true if the greatest number of boys who saw a movie is three and the greatest number of movies seen by a boy is five, which are the correct truth conditions for (54).

(56) $\mathsf{max}^x(\textsc{boy}(x) \wedge \mathsf{max}^y(\textsc{movie}(y) \wedge \textsc{see}(x,y))) \wedge \mathsf{three}(x) \wedge \mathsf{five}(y)$

While (56) is false in aberrant situations like the one discussed above, to generate the interpretation in (56), the cardinality conditions introduced by modified numerals must be able to escape the scope of maximality operators in which they are introduced. This is descriptively parallel to what is needed for dependent indefinites, which should contribute a cardinality condition that is reckoned globally after the at-issue content is evaluated.[9] It makes sense, then, to try to extend Brasoveanu's analysis to dependent indefinites. That doing so will also account for the fact that dependent indefinites can be licensed by non-scope-taking operators is only an extra advantage.

To assimilate (55) to (56), Brasoveanu 2012, §2-3 treats the cardinality conditions of modified numerals as post-suppositions, namely tests that are evaluated after the at-issue update. The core definition is that in (57), where post-suppositions are marked via an $\overline{\text{overline}}$.

9 The two phenomena are not perfectly parallel because in a system like ours that countenances both domain-level and evaluation-level pluralities, modified numerals like *exactly three* most naturally concern the former, while dependent indefinites should concern the latter. In principle, their analysis could differ, though I would ideally prefer a system that treats both types of post-suppositions uniformly with respect to various operators, like max and δ. The discussion around examples (80-81) takes up this point.

(57) $[\![\overline{\phi}]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff ϕ is a test, $G = H$ and $\zeta' = \zeta \cup \{\phi\}$.[10]

In the new system truth and satisfaction is defined relative to sets of assignments that have been indexed with sets of post-suppositional tests — here ζ and ζ'.[11] As we see in (57), post-suppositions do not update input sets of assignments, they just get added to the input set of tests ζ to yield ζ', which is passed along into the output. Example (57) interacts with the definition of truth in (58) to ensure that post-suppositions are evaluated after the at-issue content. A formula ϕ is true relative to an input set of assignments just in case there is an output set of assignments indexed with the post-suppositions introduced in ϕ that satisfy two conditions: (i) The output is a possible output for the at-issue content ϕ relative to the input, and (ii) the post-suppositions are all satisfied relative to the output set of assignments alone.

(58) Truth: ϕ is true relative to an input context $G[\emptyset]$ iff there is an output set of assignments H and a (possibly empty) set of tests $\{\psi_1, \ldots, \psi_m\}$ s.t. $[\![\phi]\!]^{\langle G[\emptyset],H[\{\psi_1,\ldots,\psi_m\}]\rangle} = \mathbb{T}$ and $[\![\psi_1 \wedge \ldots \wedge \psi_m]\!]^{\langle H[\emptyset],H[\emptyset]\rangle} = \mathbb{T}$.

For a concrete example, consider a formula like $\overline{\phi} \wedge \psi$, where ψ contains no post-suppositions.[12] This is true relative to an input set of assignments indexed with the empty set of post-suppositions, $G[\emptyset]$, just in case there is an output set of assignments indexed with a set of tests, e.g., $H[\{\phi\}]$, such that (59) and (60) hold.

(59) $[\![\overline{\phi} \wedge \psi]\!]^{\langle G[\emptyset],H[\{\phi\}]\rangle} = \mathbb{T}$

(60) $[\![\phi]\!]^{\langle H[\emptyset],H[\emptyset]\rangle} = \mathbb{T}$

Given the definition of dynamic conjunction in (61) and post-suppositions in (57), (59) holds just in case there are $K = G$ and $\zeta'' = \emptyset \cup \{\phi\}$ such that $[\![\psi]\!]^{\langle K[\{\phi\}],H[\{\phi\}]\rangle} = \mathbb{T}$. Clearly we have just passed along the post-suppositional content into the index ζ'' and only check that $\langle K, H\rangle$ is an

10 ϕ is a test just in case for any sets of assignments G and H and any sets of formulas ζ and ζ', if $[\![\phi]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$, then $G = H$ and $\zeta = \zeta'$.

11 A consequence is that I now have to rewrite all of the DPlL definitions to interact with post-suppositions. Appendix A gathers these all in one place.

12 This is just to keep things simple. Otherwise the set of output assignments in the schematic example would have to be indexed with any post-suppositions in ψ.

input-output pair satisfying ψ. Finally, (60) cashes out the post-supposition. We check that ϕ, which is a test, is satisfied relative to the set of output assignments H alone.

(61) $[\![\phi \wedge \psi]\!]^{\langle G[\zeta], H[\zeta']\rangle} = \mathbb{T}$ iff there is a K and ζ'' such that $[\![\phi]\!]^{\langle G[\zeta], K[\zeta'']\rangle} = \mathbb{T}$ and $[\![\psi]\!]^{\langle K[\zeta''], H[\zeta']\rangle} = \mathbb{T}$

The effect is that post-suppositions are not interpreted *in situ*, but get passed into the indexed set of tests, only to be checked for whether they are satisfied relative to the output set of assignments. A post-suppositional formula therefore gets something like obligatory widest scope. Instead of being first to update an input context, it is last to update an output context. This means that (62) is actually equivalent to (56), which gives the correct truth conditions for the cumulative reading of sentences with two modified numerals.

(62) $\mathsf{max}^x(\textsc{boy}(x) \wedge \overline{\mathsf{three}(x)} \wedge \mathsf{max}^y(\textsc{movie}(y) \wedge \overline{\mathsf{five}(y)} \wedge \textsc{see}(x, y)))$

The result is that by analyzing the cardinality conditions of modified numerals as post-suppositions, Brasoveanu (2012, §2-3) can avoid generating the problematic readings predicted by (55), while treating modified numerals compositionally like any other quantified DP.

My proposal is that dependent indefinites are like modified numerals in that they contribute a post-suppositional cardinality test, but the condition concerns evaluation pluralities, not domain pluralities. Recall that plain indefinites contribute variables that are evaluation singular in their local context.

(63) one ϕ is ψ $\rightsquigarrow \exists x[x = 1 \wedge \mathsf{one}(x) \wedge \phi](\psi)$

Where dependent indefinites differ is that they place the post-suppositional test $\overline{x > 1}$ on the variable they bind.[13] This requires that x be assigned different values across the global output context, that is, it must be evaluation plural.

(64) one$_{dependent}$ ϕ is ψ $\rightsquigarrow \exists x[\overline{x > 1} \wedge \mathsf{one}(x) \wedge \phi](\psi)$

To see the translation in (64) in action, consider example (65), which has the reduplicated form of the indefinite *jun* 'one'.

13 For dependent numerals, replace one in (64) with the appropriate cardinality predicate (two, three, etc.).

(65)

Chi-ki-jujunal	ri	tijoxel-a'	x-Ø-ki-q'etej	ju-jun	tz'i'.
P-E3p-each	the	student-PL	CP-A3s-E3p-hug	one-RED	dog

'Each of the students hugged a dog.'
False if they all hugged the same dog.

I assume *chikijujunal* can be translated as a universal quantifier taking surface scope over the dependent indefinite.[14] Examples (68-69) give equivalent translations of (65), where (69) is the dynamic version couched in terms of max and δ, while (68) is the $\forall / \exists$ shorthand making relative scope easier to see.

(68) $$\forall x[\mathsf{one}(x) \wedge \textsc{student}(x)] \\ (\exists y[\overline{y > 1} \wedge \mathsf{one}(y) \wedge \textsc{dog}(y)] \\ (\exists e(e = 1 \wedge \textsc{hug}(e) \wedge \textsc{ag}(e, x) \wedge \textsc{th}(e, y))))$$

(69) $$\mathsf{max}^x(\mathsf{one}(x) \wedge \textsc{student}(x)) \wedge \delta([y] \wedge \overline{y > 1} \wedge \mathsf{one}(y) \wedge \textsc{dog}(y) \wedge [e] \wedge e = 1 \wedge \textsc{hug}(e) \wedge \textsc{ag}(e, x) \wedge \textsc{th}(e, y))$$

Because the dependent indefinite's post-supposition is evaluated globally, (69) is equivalent to (70), where $y > 1$ takes widest scope.

(70) $$\mathsf{max}^x(\mathsf{one}(x) \wedge \textsc{student}(x)) \wedge \delta([y] \wedge \mathsf{one}(y) \wedge \textsc{dog}(y) \wedge [e] \wedge e = 1 \wedge \textsc{hug}(e) \wedge \textsc{ag}(e, x) \wedge \textsc{th}(e, y)) \wedge y > 1$$

Here it can have its intended effect. There are various quantificational alternatives available for an indefinite in the scope of the universal, which

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14 Evidence supporting this assumption is that *chikijujunal* is unable to target arguments of collective predicates like (66-67).

(66)

*Chi-ki-jujunal	x-Ø-ki-mol	k-i'	pa	k'ayb'al.
P-E3p-each	CP-A3s-E3p-gathered	E3p-REFL	in	market

'Each of them gathered in the market.'

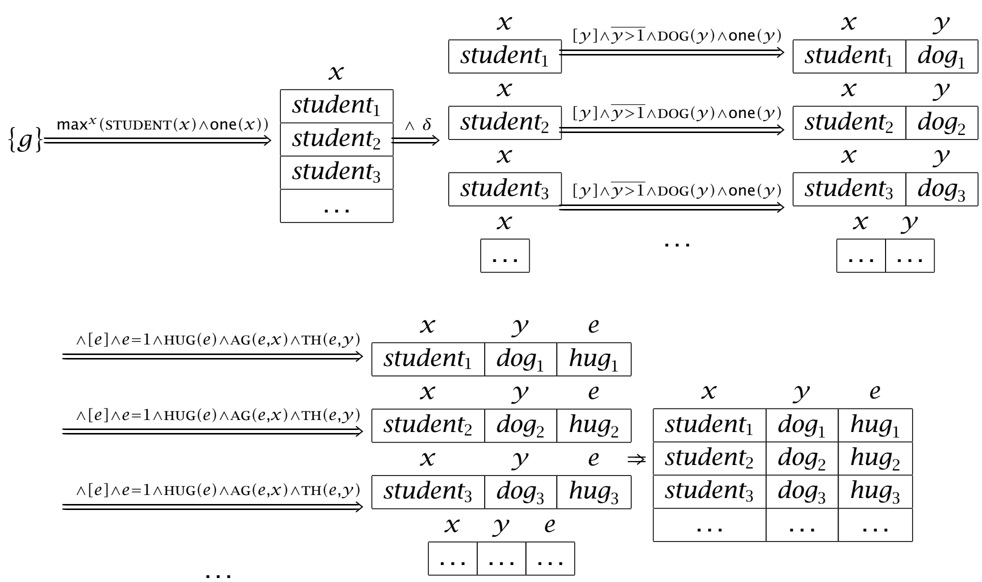
(67)

*Chi-ki-jujunal	e	k'iy.
P-E3p-each	A3p	numerous

'Each of them are numerous.'

are encoded by possible output assignments. If y is evaluation singular in the output, then the indefinite takes narrow scope, but doesn't covary with respect to the universal. If it is evaluation plural, it must do both. What the post-supposition does is constrain these quantificational alternatives so that only the latter kind are possible.

The following diagram illustrates the update in (69). Starting with a singleton assignment, the max operator stores in a set of assignments the maximal set of atomic students. The distributive operator takes scope over the rest of the formula. It checks that we can successfully update each singleton assignment storing an atomic student with the nuclear scope formula. In this case, that means finding a dog and a hugging event in which the student hugged that particular dog. If we can successfully do this for each singleton assignment, then the sentence is true.



The figure above illustrates how the analysis hinges on treating the test $\overline{y > 1}$ as a post-supposition. If it were interpreted locally, that is, in the scope of the distributivity operator, we would have to satisfy $y > 1$ as we interpret the nuclear scope relative to each singleton assignment storing an atomic student. That is, we would incorrectly require each student to hug at least two dogs. Instead, the test $\overline{y > 1}$ is interpreted last, relative to the final matrix above. Here it is satisfied because y is evaluation plural in virtue of the indefinite taking narrow scope and covarying with respect to x and e.

Crucially, until the post-suppositional cardinality condition $\overline{y > 1}$ is evaluated, a formula like (69) is completely consistent with an output like (71). This would be the result if y were independently assigned to the same dog for each assignment that is distributively updated with the quantifier's nuclear scope. This is precisely the case that the dependent indefinite rules out. The post-supposition $\overline{y > 1}$ will not be satisfied in an output like (71), preventing the indefinite from taking narrow scope, but failing to covary.

(71) $\xRightarrow{\text{alternative output}}$

x	y	e
$student_1$	dog_1	hug_1
$student_2$	dog_1	hug_2
$student_3$	dog_1	hug_3
...	...	...

It is this same reasoning that prevents a dependent indefinite from taking wide scope. In this case, the variable that the indefinite binds will fail to covary in principle and thus fail to be evaluation plural in the output.

Finally, note that $\overline{y > 1}$ will enforce covariation, but not total covariation. This is desirable because (65) is false if each student hugged the same dog, but it does not require each student to hug a different dog. The post-supposition is clearly consistent with this latter situation, as desired, but full covariation is not built into the truth conditions of dependent indefinites. This is not only correct for Kaqchikel, but appears to be the case crosslinguistically.[15]

The analysis clearly explains why dependent indefinites take narrow scope and covary when they can, but what is the cause of ungrammaticality when they do not have a quantificational clause-mate? This is due to the fact that, by default, other existential quantifiers contribute evaluation singularities. In particular, the existential closure of the event argument introduces a variable that is evaluation singular. Without a quantificational clause-mate (or a pluractional, as we will see), a theta dependency linking the event and dependent indefinite always fails to hold. Consider again the sentence in (73) and the translation of its VP in (73-74).

15 While it is not part of the truth conditions of dependent indefinites, speakers tend to prefer scenarios with full covariation. It is not clear what pragmatic pressures underlie this preference, making it an interesting avenue for future research.

(72) *X-e'-in-q'etej ox-ox ak'wal-a'.
CP-A3p-E1s-hug three-RED child-PL

Desired reading: 'I hugged groups of three children.'

As a dependent indefinite, *oxox* contributes the cardinality constraint in the restrictor of the existential quantifier over individuals. It requires the variable x to store an evaluation plurality.

(73) $\exists x[\,\overline{x > 1} \wedge \mathsf{three}(x) \wedge \textsc{child}(x)](\exists e(e = 1 \wedge \textsc{hug}(e) \wedge \textsc{th}(e, x)))$

(74) $[x] \wedge \overline{x > 1} \wedge \mathsf{three}(x) \wedge \textsc{child}(x) \wedge [e] \wedge e = 1 \wedge \textsc{hug}(e) \wedge \textsc{th}(e, x)$

If x were evaluation singular, as with a plain indefinite, every $h \in H$ of any set of output assignments satisfying the formula would store the same sum of three children in x. Therefore a theta-role function can hold between e and x.[16]

(75)

H	...	e	x	z
h_1	...	hug_1	$child_1 \oplus child_2 \oplus child_3$	...
h_2	...	hug_1	$child_1 \oplus child_2 \oplus child_3$	...
h_3	...	hug_1	$child_1 \oplus child_2 \oplus child_3$	...
...	...	...	...	...

The situation is completely different with (73-74), as we see graphically below.

(76)

H	...	e	x	z
h_1	...	hug_1	$child_1 \oplus child_2 \oplus child_3$	...
h_2	...	hug_1	$child_4 \oplus child_5 \oplus child_3$	...
h_3	...	hug_1	$child_6 \oplus child_7 \oplus child_8$	...
...	...	...	...	...

Here e is still evaluation singular — every $h \in H$ assigns e to the same event. But now the reduplicated numeral requires that at least two $h \in H$ disagree on their assignments to x because it is evaluation plural. The result is that no exhaustive theta-role function can hold between e and x because there can be no functional dependency between e and x. This is the case

16 Recall that such functions are interpreted distributively with respect to sets of assignments (see definition (38)).

even if e is domain plural, for instance, under the distributive or cumulative predication of *hug three children*. Unless there is something generating an evaluation plurality of events, like a wide-scoping nominal quantifier, sentences with singular subjects and reduplicated numerals are predicted to be ungrammatical.

Another class of expressions that can generate the right kinds of outputs are frequency adverbials like *always*, *frequently*, *occasionally*, etc., which we have seen have the ability to license dependent indefinites crosslinguistically. Most analyses of adverbial quantifiers treat them as distributive quantifiers over events. This immediately predicts their ability to license dependent indefinites under the analysis above. The reason is that the distributivity operator they contribute can scope over the dependent indefinite and default existential closure of the verb phrase. For instance, we can paraphrase a sentence like (77) as saying that for all contextually relevant events e (e.g., when he goes to the pub), there is a related event e' which is an event of him singing three songs. Rothstein 1995, which has similar neo-Davidsonian commitments as this work, uses a matching function M like that in (78-79) to model the underspecified relation between relevant restrictor and nuclear scope events.

(77) Jantape' n-Ø-u-b'ixaj oxox b'ix.
always ICP-A3s-E3s-sing three-RED song

'He always sings three songs.'
False if they are the same three songs.

(78) $$\forall e[\mathsf{C}(e)] \\ (\exists y[\overline{y > 1} \wedge \mathsf{three}(y) \wedge \textsc{song}(y)] \\ (\exists e'(e' = 1 \wedge \textsc{sing}(e') \wedge \textsc{ag}(e', x) \wedge \textsc{th}(e', y) \wedge \mathsf{M}(e, e'))))$$

(79) $$\mathsf{max}^e(\mathsf{C}(e)) \wedge \delta([y] \wedge \overline{y > 1} \wedge \mathsf{three}(y) \wedge \textsc{song}(y) \wedge [e'] \wedge e' = 1 \wedge \textsc{sing}(e') \wedge \textsc{ag}(e', x') \wedge \textsc{th}(e', y) \wedge \mathsf{M}(e, e'))$$

The important thing is that the wide-scoping event quantifier takes scope over both the dependent indefinite and default VP-level existential closure. This means that for each contextually relevant event in C, the dependent indefinite can introduce (potentially) three different songs to be the theme of a different M-related event e' of singing. Because the adverbial quantifier provides an opportunity for the dependent indefinite to introduce an evaluation plurality into the discourse, it can be felicitously used.

What unites the ability of adverbial and nominal quantifiers to license dependent indefinites is that they are both decomposed into max and δ, the latter of which can scope over a dependent indefinite and the existentially closed event argument. It is this distributive quantification that allows the right kinds of evaluation pluralities to be created. We have also seen, though, that distributive pluractionality in Kaqchikel cannot usually scope over indefinite internal arguments. This means that the sort of explanation we have in (78-79) will not be available.[17] Instead, the next section argues that the Kaqchikel pluractional pluralizes the event argument without a supporting δ operator. This distinguishes it from *bona fide* adverbial quantifiers — it will be scopeless, for example — but it will still license dependent indefinites. First, though, I summarize the advantages of the analysis of dependent indefinites developed in this section. The reason is that even putting aside the pluractional data, my analysis is a viable alternative approach to dependent indefinites crosslinguistically, and shows improvements over previous accounts.

To begin, recall that one of the problems with the analysis in Balusu 2006 was that it enforced covariation through the plurality condition, which had to be evaluated separately from the at-issue content. It was not clear what its semantic status should be. The options, either presupposition or scalar implicature, were both lacking. In DPlL, where formulas are interpreted relative to pairs of input-output assignments, the plurality condition is naturally interpreted as a post-supposition. Not only does this make the contribution of dependent indefinites formally precise, it also allows a compositional treatment of dependent indefinites and connects them to the previous literature on anaphora to quantifiers, which introduce evaluation pluralities as well (van den Berg 1996, Nouwen 2003, Brasoveanu 2008).

Another advantage of this account is that it successfully predicts the typological generalization discussed in Farkas 1997a that if a language allows dependent indefinites to be licensed by quantifiers over events, then it also allows them to be licensed by quantifiers over individuals. In the analysis above, licensing is intimately related to whether a thematic dependence can hold between an event variable and the individual variable introduced by the

17 Importantly, I do not mean to say that no pluractionals are quantificational in this way. It might be the case that Hungarian or Telugu have pluractionals that are better analyzed like adverbial quantifiers. For me, the crucial question is whether the pluractional permits a reading where a plain indefinite covaries. If so, it should be analyzed like (77), and not like the Kaqchikel pluractional.

dependent indefinite. Since all licensing is mediated by the event argument, the typological implication is immediately accounted for.

Finally, the analysis improves on previous accounts by requiring only minimal changes to the denotation of the dependent indefinites' plain counterparts. In the proposal for Kaqchikel-style dependent indefinites made by Szabolcsi (2010), which extends Balusu 2006, the dependent indefinite has to contribute the plurality condition, as well as a quantifier over an event partition. This account makes do with only the former. The analysis also improves over that in Brasoveanu & Farkas 2011 for dependent indefinites with medium-strength licensing requirements. In that approach, the semantics of indefinites is enriched to include an anaphoric component. All indefinites are anaphorically related to the quantifiers that they are dependent on. In the account presented here, the analysis of plain indefinites can remain classical. The only difference is that they contribute a cardinality post-supposition, which has been independently motivated in the analysis of other kinds of numeral quantification.

I close out this section by discussing the use of post-suppositions in the analysis of dependent indefinites. One might worry that their use is contrived, but I will show that it is a natural extension of how they are employed in previous work. Brasoveanu (2012, §2-3) sees post-suppositions as a way of constraining quantificational alternatives, which are the various assignments that are the possible outputs of interpreting a quantificational expression. In a system that represents quantificational alternatives as input-output pairs, it is only natural for quantifiers to be able to talk about those alternatives, which means being able to place conditions on output assignments. Framed like this, the core difference between dependent indefinites and modified numerals is that the former concern quantificational alternatives that are representable in terms of sets of assignments, while the latter concern quantificational alternatives at the level of single assignments.

The relevant quantificational alternatives for modified numerals are singleton assignments because, in Brasoveanu 2012, §2-3, they concern domain cardinalities. For example, the post-supposition of *exactly three*^{x} eliminates alternatives where x is assigned, relative to a single variable assignment, to individuals with more or less than three atomic parts. We know, though, that when quantifiers interact, new quantificational alternatives emerge that can be represented with sets of assignments. For instance, in a sentence like *Every student read exactly three*^{x} *books*, the quantifier *exactly three*^{x} must take narrow scope if x is plural relative to a set of output assignments satisfying the sentence. Crucially, though, the modified numeral's post-supposition says nothing about this. It only cares that each of those output assignments maps x to an individual composed of three atomic books. It's dependent indefinites that care about the former notion, which is clearly a generalization of the latter. They are just numerals that constrain quantificational alternatives at the level of sets of assignments, not just individual assignments.

If the kind of post-supposition contributed by dependent indefinites generalizes that of modified numerals, their analysis in Brasoveanu 2012, §2-3, which is not formalized in DPlL, should be able to peacefully coexist with my account of dependent indefinites in a unified theory. While presenting such an account in its entirety is outside the scope of this work, there is one surface difference between the behavior of post-suppositions in this work and in Brasoveanu 2012 that must be resolved. In particular, Brasoveanu argues that the post-suppositions of modified numerals should be discharged in the scope of other quantificational operators like modals, negation, and, most importantly, distributivity operators. That is, in a sentence like (80), the post-supposition of *exactly five* must be evaluated last in the scope of the distributivity operator, not after *a coke*.

(80) Every student δ(ate $\overline{\text{exactly five}}$ cupcakes) and I drank a coke.

If post-suppositions have to be evaluated in the scope of distributivity operators, as (80) suggests, it would be impossible for dependent indefinites to be licensed by distributive quantifiers. This would be a major problem. The good news is that it is possible to define a version of δ that discharges post-suppositions in its scope, as Brasoveanu (2012, §2-3) needs, while allowing dependent indefinites to be licensed. The definition in (81) is like (51), except like all formulas now, satisfaction is defined relative to pairs of assignments indexed with (possibly empty) sets of post-suppositions.

(81) $[\![\delta(\phi)]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff $\zeta = \zeta'$ and there exists a partial function $\mathcal{F}$ from assignments to sets of assignments such that

a. $G = \mathsf{Dom}(\mathcal{F})$ and $H = \bigcup\mathsf{Ran}(\mathcal{F})$

b. there is a possibly empty set of tests $\{\psi_i, \ldots, \psi_n\}$ such that for all $g \in G$, $[\![\phi]\!]^{\langle \{g\}[\zeta],\mathcal{F}(g)[\zeta\cup\psi_i,\ldots,\psi_n]\rangle} = \mathbb{T}$ and $[\![\psi_1, \ldots, \psi_n]\!]^{\langle H[\zeta],H[\zeta]\rangle} = \mathbb{T}$

All of the new work is in (81b). Since $\zeta = \zeta'$, any of the post-suppositional tests $\psi_i, \ldots, \psi_n$ must be introduced within the scope of δ. Crucially, all of these post-suppositions are discharged, meaning they must be satisfied relative to the output $H[\zeta]$ and are not passed on. Since H is the sum of output assignments resulting from the distributive update of each g in G, dependent indefinites in the scope of δ can be licensed by checking that the value of its variable is evaluation plural across H. At the same time, the post-suppositions of modified numerals, which are domain-level cardinality tests like (39), can be satisfied relative to each h in H. Finally, since both kinds of post-suppositions are discharged in the scope of δ, the analysis of the interaction between modified numerals and distributive operators in Brasoveanu 2012, §2-3 can be maintained without further alteration.

While there is clearly more to be said about analyzing modified numerals in a theory allowing both domain and evaluation pluralities, such an account will be consistent with, and come to complement, my treatment of dependent indefinites. The account of modified numerals in Brasoveanu 2012, §2-3 is developed within a system that does not countenance plural assignments, which means that modified numerals can only contribute post-suppositions about domain cardinality. Once we move to a system with plural assignments, which are needed independently, we expect there to be numerals that contribute post-suppositions about evaluation cardinality. This is precisely what dependent indefinites are.

3.3 Interpreting pluractional distributivity

This section explains how the proposed analysis of dependent indefinites allows them to be licensed by operators that cannot take scope over plain indefinites, like the Kaqchikel pluractional *–la'* exemplified in (6-8). To analyze the interaction, though, we first need an analysis of the pluractional. This section starts by presenting three core generalizations about *–la'*: (i) it requires a plurality of events, (ii) plural internal arguments of *la'*-marked predicates must be interpreted distributively, and (iii) this distribution is scopeless (or obligatorily narrowest scope). With these generalizations in mind, I develop an analysis that is similar to previous accounts of distributive modifiers like *one by one* in English (Brasoveanu & Henderson 2009). The core idea is that *–la'* generates distributive dependencies by requiring a verb's theta-role to map small parts of the event argument to small parts of an individual argument. Crucially, it will do so in a way that allows a dependent indefinite to be evaluation plural, and thus licensed.

Examples (82-83) are a series of minimal pairs illustrating that *–la'* is not just pluractional, but also a distributive operator. Using the pluractional blocks collective readings of a verb's internal argument.[18]

(82) a. X-e'-in-pitz'.
CP-A3p-E1s-squeeze

I squeezed them.

b. X-e'-in-pitz'-*ila'*.
CP-A3p-E1s-squeeze-*la'*

I squeezed them individually.
False if I picked them up in a group and squeezed them

(83) a. X-e'-in-kam-isa-j ri sanik.
CP-A3p-E1s-die-CAUS-SS the ant

I killed the ants.

b. X-e'-in-kam-isa-*ala'* ri sanik.
CP-A3p-E1s-die-CAUS-*la'* the ant

'I killed the ants individually.'
False if I killed groups of the ants simultaneously

We might worry that distributivity is not entailed, but merely a salient inference when the event argument is plural. That is, a collectively interpreted internal argument participating in a plurality of events might also be grammatical. Examples (84-85) show that this is not the case.

(84) Suppose you pick up a bag of tomatoes and squeeze them many times all at once.
*X-e'-in-pitz'-*ila'*.
CP-A3p-E1s-squeeze-*la'*

I squeezed them individually.

18 The Kaqchikel example sentences often have a copied vowel absent from the morphological gloss. The copied vowel is the result of a regular morphophonological process, and so it is not represented in the morpheme by morpheme gloss.

(85) Suppose I give some children a bunch of group hugs.
*X-e'-in-q'ete-*la'* ri ak'wal-a'.
CP-A3p-E1s-hug-*la'* the child-PL

'I hugged the children individually.'

While –*la'* generates distributive entailments, there are two ways that it is different than other distributivity operators. First, usually distributive operators are ungrammatical when forced to have an atomic key.

(86) a. *John each left.

b. *John left one by one.

In contrast, pluractional distributivity is perfectly grammatical with a singular object. It merely requires repetition. Examples (87-88) illustrate this fact with illuminating speaker comments.

(87) X-Ø-u-chap-*ala'* ri ala'.
CP-A3s-E3s-handle-*la'* the youth

'He touched the boy repeatedly.'
Speaker comment: Like a police officer checking someone for weapons

(88) X-Ø-u-k'ut-*ula'* ri po't ch-w-e'.
CP-A3s-E3s-show-*la'* the blouse P-E1s-DAT

'She showed me the blouse repeatedly.'
Speaker comment: She showed me all the various designs in the weaving

The generalization is that pluractional distributivity requires an object to be interpreted distributively when it can be, but if it cannot, repetition is licit.

The second way that pluractional distributivity differs from distributive quantification, as we have seen previously, concerns its scope-taking ability. If pluractional distributivity were like other distributive event quantifiers in Kaqchikel (and English for that matter), we might expect –*la'* to take scope over an indefinite. This is not the case. While the adverbial quantifier *q'ij q'ij* 'every day' can take scope over an indefinite *jun* 'a', in example (89), this is not possible in example (90).

(89)

Q'ij	qij	x-Ø-u-kano-j	jun	wuj.
day	day	CP-A3s-E3s-search-SS	a	book

'Every day she looked for a (different) book.'

(90)

X-Ø-u-kano-*la'*	jun	wuj.
CP-A3s-E3s-search-la'	a	book

'She looked for a (particular) book many times (many places).'

These three generalizations can be captured if *–la'* generates distributive entailments by forcing a verb's theta-role to apply to the smallest relevant parts of an event and its participant.[19] Example (93) gives the proposed translation for *–la'*.[20] The pluractional introduces two fresh discourse referents to store all of the smallest relevant parts (r-part) of both the event and an individual argument (given by (91-92)). It then requires the theme theta-role to hold between these discourse referents.

(91) $$\mathsf{parts}_G(x) := \begin{cases} G(x) & \text{if } |G(x)| > 1, \text{ else} \\ \mathsf{atoms}_G(x), & \text{where } \mathsf{atoms}_G(x) := \{y\colon \mathsf{atom}(y) \wedge y \leq \bigoplus G(x)\} \end{cases}$$

Returns the set of individuals stored in x if that variable is evaluation plural, else it returns the atomic parts of the particular individual stored in $g(x)$ for all g in G.

(92) $[\![\mathsf{r\text{-}part}(x,y)]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff $G = H$, $\zeta = \zeta'$ and $x \in \mathsf{parts}_G(y)$

(93) Pluractional Distributivity, *–la'*
$\mathsf{max}^{e',x'}(e' > n \wedge \mathsf{r\text{-}part}(e',e) \wedge \mathsf{r\text{-}part}(x',x)) \wedge \textsc{th}(e',x')$

To show that the analysis in (93) captures the core properties of *–la'*, compare the following pluractional/non-pluractional minimal pairs. Example (95) gives the bottom-line truth conditions for the VP in (94), which is not pluractional.

(94)

X-e'-in-q'etej	oxi'	ak'wal-a'.
CP-A3p-E1s-hug	three	child-PL

'I hugged three children.'

19 In this way, *–la'* is like *one by one* in Brasoveanu & Henderson 2009, except that the latter requires a plural nominal target.
20 $\mathsf{max}^{x,y}(\phi)$ is like $\mathsf{max}^{x}(\phi)$, but selectively targets each superscripted variable.

(95) $[x] \wedge x = 1 \wedge \mathsf{three}(x) \wedge \textsc{child}(x) \wedge [e] \wedge e = 1 \wedge \textsc{hug}(e) \wedge \textsc{th}(e, x)$

Example (97) alters the bottom-line truth conditions of (95), taking into account the discussion of the pluractional, shown in (96). Note that the only difference is that the theta-role in (97) is replaced on the second line by what *–la'* contributes.[21]

(96) X-e'-in-q'ete-*la'* oxi' ak'wal-a'.
CP-A3p-E1s-hug-*la'* three child-PL

'I hugged three children individually.'

(97) $[x] \wedge x = 1 \wedge \mathsf{three}(x) \wedge \textsc{child}(x) \wedge [e] \wedge e = 1 \wedge \textsc{hug}(e) \wedge$
$\mathsf{max}^{e',x'}(e' > n \wedge \mathsf{r\text{-}part}(e', e) \wedge \mathsf{r\text{-}part}(x', x)) \wedge \textsc{th}(e', x')$

(98)

H	...	e	x	e'	x'
h_1	...	$hug_1 \oplus \ldots \oplus hug_{n+1}$	$child_1 \oplus child_2 \oplus child_3$	hug_1	$child_1$
h_2	...	$hug_1 \oplus \ldots \oplus hug_{n+1}$	$child_1 \oplus child_2 \oplus child_3$	hug_2	$child_2$
h_3	...	$hug_1 \oplus \ldots \oplus hug_{n+1}$	$child_1 \oplus child_2 \oplus child_3$	hug_3	$child_3$
...	...	...	...	...	...

Focusing on the contribution of *–la'* in the second line of (97), and illustrated above, the hugging event e is broken into its atomic parts and stored in e'. The cardinality constraint requires that there be more than n such atoms, that is, *–la'* contributes an evaluation plurality of events — it is *evaluation pluractional*. In the same way, the pluractional breaks up the plural individual consisting of the three children and stores each atomic child in x'. Finally, the pluractional requires that e' and x' stand in the theme relation. That is, $h(x')$ is the theme of $h(e')$ for each $h \in H$.

First, the account correctly predicts the distributive entailments of (96). Group hugs are ruled out because the variables e' and x' can only store atoms. Thus, because all relations are interpreted distributively with respect to sets of assignments (see (38)), $\textsc{th}(e', x')$ will require each atomic child stored across x' to be the theme of its own hugging event.[22] The fact that TH

21 Note that I treat pluractional predicates syncategorematically for expository simplicity. A compositional account of the pluractional morpheme is possible if it is treated as a theta-role modifier. That is, I represent theta-roles in the syntax and allow *–la'* to compose with them directly (before composing with the verb).

22 For example, if $h(e') = event_1 \oplus event_2$ and $h(x') = entity_1 \oplus entity_2$, then because of the cumulativity of relations, $\textsc{th}(e', x')$ would be consistent with a situation in which $entity_1 \oplus$

is a function rules out the aberrant case where the same event under e' has a different participant under x'. Nothing rules out the opposite case, though, since TH need not be one-to-one. This means that (97) correctly predicts that the pluractional, while distributive, should be grammatical with domain singular themes. In this case, the same individual will be stored in x' for each $h \in H$. This means that it will be the theme of multiple events, which is the source of the repetition in examples like (88). Finally, the analysis predicts that pluractional distributivity should not be able to take scope over an indefinite. The reason is that *–la'* does not make use of a distributivity operator δ that the indefinite could scope under. Instead, it forces parts of the event argument and parts of an individual argument to be related by participanthood.[23]

In addition to capturing the three core generalizations, the theta-role-based analysis makes at least two more correct predictions. First, note that the pluractional does not require the pluractional subevents stored in e' to satisfy the predicate the pluractional derives. It only requires that each of those subevents is mapped by TH to a relevant part of the verb's theme. The prediction is that these events are allowed (though not forced) to satisfy a different predicate than the main event. This prediction is borne out in the behavior of collective predicates, which are grammatical with pluractional distributivity.

(99) *X-Ø-in-mol jun kinäq.
CP-A3s-E1s-group one bean

'I grouped one bean.'

(100) X-e'-in-mol-*ola'* ri kinäq.
CP-A3p-E1s-group-la' DET beans

'I grouped the beans individually.'

---

entity$_2$ is the theme of *event*$_1$ and *entity*$_1 \oplus$ *entity*$_2$ is the theme *event*$_2$. The pluractional clearly rules out this option.

23 One might think there is a syntactic counter-analysis in which the distributive pluractional is treated like a normal event quantifier. What would distinguish the dependent indefinite is that it would be allowed to take exceptional narrow scope in the syntax, for instance, through (pseudo-)incorporation. I think this kind of analysis will have problems, though, because dependent indefinites are free to undergo topic and focus movement to the left periphery without disrupting their normal interpretation.

Example (100) would be appropriate for describing a situation where I put the beans in a basket one by one. What example (99) shows is that none of those events of putting individual beans in the basket can fall in the denotation of *mol* 'group'. Crucially, under the analysis above, it is predicted that these events need not do so.

Second, because the analysis is couched in terms of the theme theta-role, it predicts that the ability for *–la'* to target an argument for distributive predication should be dependent on its theta-position, not its grammatical function. This is borne out. While the pluractional freely targets objects, which must be related to the event via TH, it never forces transitive or root intransitive subjects to be interpreted distributively, both of which bear other thematic roles, like agent.[24] In contrast, the pluractional can target passive subjects, which presumably start as underlying objects, and thus stand in the correct thematic relation.

(101) X-e-pitz'-*ilä*-x.
CP-A3p-squeeze-*la'*-PAS

'They were squeezed individually.'

The analysis immediately predicts grammaticality of (101), even though –*la'* is usually ungrammatical with intransitives, precisely because nominal arguments retain their thematic roles when argument structure changes. This is strong evidence that *–la'* generates distributive entailments by modifying a theta-role.

We can now see why dependent indefinites are licensed under this independently motivated account of pluractional distributivity. The reason is that the pluractional alters which variables the verb's theme theta-role applies to. Recall that dependent indefinites are ungrammatical without a licensor because they cannot introduce an evaluation plurality while standing in a thematic relation with the verb's event argument, which must be evaluation singular. It is clear in examples like (96-98) that the pluractional introduces

24 Given this generalization, it would be natural to check whether unaccusative and unergative predicates behave differently. If the former have theme subjects, they should be able to be targeted by the pluractional. In my fieldwork, though, I have not been able to find a clear contrast between verbs that tend to be unergatives crosslinguistically and those that tend to be unaccusatives. Exploring the ungrammaticality of *–la'* with intransitives will have to wait for future work that also explores more deeply the unergative/unaccusative contrast in Mayan.

new discourse referents over which the theta-role holds. This allows the dependent indefinite to introduce its own evaluation plurality. The following example illustrates their interaction.

(102) X-e'-in-piskoli-*la'* ju-jun wäy.
CP-A3p-E1s-flip-*la'* one-RED tortilla

'I kept flipping tortillas one by one.'

False if there is only one flipping or if the same tortilla is flipped repeatedly.

Example (103) combines the analysis of pluractional distributivity and reduplicated numerals, while the following matrix illustrates a typical set of output assignments satisfying (103).

(103) $[x] \wedge \overline{x > 1} \wedge \mathsf{one}(x) \wedge \textsc{tortilla}(x) \wedge [e] \wedge e = 1 \wedge \textsc{flip}(e) \wedge \mathsf{max}^{e',x'}(e' > n \wedge \mathsf{r\text{-}part}(e', e) \wedge \mathsf{r\text{-}part}(x', x)) \wedge \textsc{th}(e', x')$

(104)

H	...	e	x	e'	x'
h_1	...	$flip_1 \oplus \ldots \oplus flip_{n+1}$	$tortilla_1$	$flip_1$	$tortilla_1$
h_2	...	$flip_1 \oplus \ldots \oplus flip_{n+1}$	$tortilla_2$	$flip_2$	$tortilla_2$
h_3	...	$flip_1 \oplus \ldots \oplus flip_{n+1}$	$tortilla_3$	$flip_3$	$tortilla_3$
...	...	...	...	...	...

The first line in (103) gives the contribution of the dependent indefinite, specifically an evaluation plurality of atomic tortillas. The pluractional alters the usual theta dependency in the second line, as before. It introduces an event variable e' and stores in it an evaluation plurality, namely all of the atomic parts of e. Simultaneously, it stores the elements of $G(x)$ in x' (since $\mathsf{parts}(x)$ returns the elements of $G(x)$ when x is evaluation plural), here just atomic tortillas. Finally, it says that e' and x' stand in the theme relation.[25] The crucial contribution of the pluractional are the new variables e' and

25 A reviewer points out the similarities between my analysis and the analysis of exceptionally narrow scope bare plurals in Carlson 1977 (compare *Dogs were everywhere* and **A dog was everywhere*). While dependent indefinites are not kind-denoting, the licensing mechanisms are formally similar. For Carlson (1977), *everywhere* does not scope over the subject itself, but instead scopes over an existential quantifier that introduces a stage of the subject for each location. Because of the nature of kinds, each of these stages of the kind *dogs* can be a different dog. This is not possible for individual-denoting subjects like *a dog*. The

x', which provide a way for the theta-role to link up the plurality of events satisfying the verb and the evaluation plurality of individuals the dependent indefinite must introduce.

The analysis not only captures the fact that distributive pluractionality licenses dependent indefinites, but it makes a correct prediction about the space of readings where they interact. Note that the evaluation plurality introduced by *jujun* in (103) is made up of domain atoms. Thus, when the pluractional takes the atoms stored in the variable *jujun* introduces, it is equivalent to taking the elements that make up the evaluation plurality. This is different with reduplicated numerals like *kaka* 'two-RED', *oxox* 'three-RED', etc. With these items, each individual stored across G is non-atomic. Given the denotation of r-part in (92), the atomic subparts of the pluractional event will have to stand in the theme relation with pluralities of the specified cardinality. That is, the internal argument of such sentences must have a group reading. This is the case, as (106) shows.

(105) X-e'-in-tij-*la'* ox-ox wäy.
CP-A3p-E1s-eat-*la'* three-RED tortilla

'I kept eating the tortillas in groups of three.'

Speaker comment: It's really like you have stacks of three tortillas and you keep putting them in your mouth like that.

(106) $[x] \wedge \overline{x > 1} \wedge \mathsf{three}(x) \wedge \textsc{tortilla}(x) \wedge [e] \wedge e = 1 \wedge \textsc{eat}(e) \wedge \mathsf{max}^{e',x'}(e' > n \wedge \mathsf{r\text{-}part}(e', e) \wedge \mathsf{r\text{-}part}(x', x)) \wedge \textsc{th}(e', x')$

(107)

H	e	x	e'	x'
h_1	$eat_1 \oplus \ldots \oplus eat_{n+1}$	$tortilla_1 \oplus tortilla_2 \oplus tortilla_3$	eat_1	$tortilla_1 \oplus tortilla_2 \oplus tortilla_3$
h_2	$eat_1 \oplus \ldots \oplus eat_{n+1}$	$tortilla_4 \oplus tortilla_5 \oplus tortilla_6$	eat_2	$tortilla_4 \oplus tortilla_5 \oplus tortilla_6$
h_3	$eat_1 \oplus \ldots \oplus eat_{n+1}$	$tortilla_7 \oplus tortilla_8 \oplus tortilla_9$	eat_3	$tortilla_7 \oplus tortilla_8 \oplus tortilla_9$
...	...	...	...	...

Crucially, sentences without the distributive pluractional can, but do not need to, have the group interpretation, as (108) shows. This means that the effect must be attributed to the pluractional, which is what is done here by means of the parts function. It controls how the pluractional distributes events over parts of the denotation of the internal argument.

pluractional behaves similarly. It does not scope over the object, but can still retrieve different individuals stored in an evaluation plural object, a possibility that is unavailable if the object is a plain indefinite.

(108) Suppose each of us eats three tortillas over the course of a meal:

X-e-qa-tij	ox-ox	wäy.
CP-A3p-E1s-eat	three-RED	tortilla

'We each ate three tortillas.'

This contrast shows that when the internal argument is evaluation plural, the pluractional distributes over the (possible plural) individuals stored across different assignments, not necessarily the parts of an individual in the domain.

To summarize, this section introduced the formal analysis of dependent indefinites as contributing a post-suppositional cardinality constraint like modified numerals in Brasoveanu 2012, §2-3. After showing how the account can capture licensing in normal quantificational environments, I showed how the analysis permits dependent indefinites to be licensed by non-scope-taking operators like pluractional distributivity. Accounting for these facts in alternative analyses of dependent indefinites is difficult because they tie their licensing too closely to scope-taking. Instead, what unifies pluractionals and distributive quantifiers under my approach is that they both allow dependent indefinites to introduce an evaluation plural variable. While this analysis is able to resolve the scope puzzle and account for the fact that dependent indefinites are licensed by both distributive pluractionality and *bona fide* distributive quantifiers in Kaqchikel, the analysis has a variety of extensions which the next section discusses.

4 Extensions

While the analysis developed in the previous section is targeted at dependent indefinites like those in Kaqchikel, it can be extended to other kinds. First, consider the case of Telugu, whose reduplicated indefinites are different than those in Kaqchikel in that they do not need a licensor. Balusu (2006) takes this as evidence that the dependent indefinites themselves contribute a universal quantifier and an event partition (in addition to their cardinality condition). My analysis, which is simpler in that it only makes use of a cardinality condition, can account for languages like Telugu. One way to do this is to say that in Telugu, unlike in Kaqchikel, Hungarian, or Romanian, existential closure of the event argument is ambiguous between an evaluation singular and an evaluation plural instantiation. That is, it takes one of the two forms below. In the latter case, the existential closure would be a sort of pluractional operator.

(109) $\lambda V_{\epsilon t} \exists e[e = 1 \wedge V(e)]$

(110) $\lambda V_{\epsilon t} \exists e[e > 1 \wedge V(e)]$

When the existential closure in (110) is chosen, the so-called spatial key and temporal key readings of Telugu dependent indefinites would be generated. One piece of evidence in favor of this analysis concerns the behavior of dependent indefinites in the scope of universal quantifiers in Telugu. Balusu (2006) gives two additional readings for example (18), namely 'Every kid saw two monkeys in each location' and 'Every kid saw two monkeys in each time interval', where the dependent indefinite has a spatial or temporal key reading in the scope of the universal. These are telling because once the universal quantifier takes scope over the dependent indefinite, it should already be licensed. That being said, if existential closure is ambiguous in Telugu between (109-110), then the analysis correctly predicts the readings where each kid participated in a plurality of events of seeing two monkeys (namely two monkeys in each location for each kid). Crucially, languages like Kaqchikel do not have these readings, showing that they do not have free access to evaluation plural existential closure.

(111)

K-onojel	ri	ak'wal-a'	x-e-ki-tz'ët	ka-ka	b'atz'.
E3o-all	the	child-PL	CP-A3p-E3s-see	two-RED	monkeys

'All the kids saw two monkeys each.'
*'In each location, all the kids saw two monkeys each.'

It will take more work to definitively show that Telugu has evaluation plural existential closure, but it should not be out of the question. Even English has been argued to have covert pluractionality operators (van Geenhoven 2004). If this position can be maintained, the analysis given to Kaqchikel-style dependent indefinites extends without modification to Telugu.

The second class of extensions involves unexpected readings of the singular dependent indefinite, in comparison to higher numerals. For instance, the reduplicated singular indefinite in Kaqchikel is also used as a simple plural indefinite, which is the only reading available when there is no licensor. Dependent higher numerals have no such reading.

(112)

Xta	Mariy	x-e-ru-k'waj	apo	ju-jun	/	*ox-ox	wuj.
CLF	Mary	CP-A3p-E3s-carry	there	a-RED	/	three-RED	book

'Mary brought some books over there.'

Kaqchikel is not alone in this. Hungarian dependent singular indefinites also have non-dependent uses. For instance, Farkas 2001 gives example (113), which has no licensor and is grammatical under a reading like the English *occasional*-construction in the translation. As in Kaqchikel, dependent higher numerals are missing these readings.

(113)

Egy-egy	/	*hét-hét	diák	megbukik.
a-RED	/	seven-RED	student	fails

'An occasional student fails.'

Example (114) presents a similar case. The salient reading of this example is not the spatial/temporal key reading; it does not mean that for each salient place or time, I picked up an object and peeked into a drawer. Instead, it means that I peeked into some small number of random drawers and picked up some small number of random objects. Once again, the reduplicated numerals have no such reading, only the indefinite.[26]

(114)

Körülnéztem	a	szobában.	Felvettem	egy-egy	tárgyat,
looked-around	the	room	pick-up	a-RED	object

bekukkantottam	egy-egy	fiókba.
peeked-into	a-RED	drawer

'I looked around in the room. I picked up various objects, peeked into various drawers.'

What can help explain these contrasts is that Kaqchikel and Hungarian are both languages in which the singular indefinite and the numeral one are morphologically indistinguishable. This means that (112-113) could contain reduplicated indefinites, not reduplicated numerals (which is what Farkas 1997a says for Hungarian). This allows for a uniform analysis of dependent numerals in terms of evaluation pluralities, while assigning a different denotation to the reduplicated singular indefinites. The Kaqchikel examples

26 I need to thank Anna Szabolcsi for bringing these examples to my attention.

are easiest to handle. Example (115) shows how the reduplicated singular indefinite is translated. It does not introduce evaluation pluralities of cardinality greater than one, but domain pluralities of cardinality one. It is thus the domain plural counterpart of the dependent numeral *jujun* 'one-RED'.

(115) a-RED ϕ is $\psi \rightsquigarrow \exists x[x = 1 \wedge \neg \mathsf{one}(x) \wedge \phi](\psi)$

Building an account of the Hungarian reduplicated singular indefinites is more involved, but note that under the salient readings of (113-114), it has the interpretation of an infrequency adverbial. It is well know from previous work on the Germanic *occasional*-construction that only infrequency adverbials can form complex DP-internal quantifiers, not frequency adverbials (Gehrke & McNally 2009, Stump 1981, Zimmermann 2003). This suggests that they should be analyzed as a derived infrequency quantifier along the lines of Zimmermann 2003. I will postpone giving an explicit analysis for future work, though. The rich literature on infrequency adverbials suggests that an analysis of (113-114) will need more space than can be given here. It is clear, though, that they have a different set of readings than the dependent numerals and should be treated differently.

Finally, the analysis of dependent indefinites developed here can shed light on an account of Russian *nibud'*-indefinites, though we expect them to be very different than those we find in Kaqchikel or Telugu. First of all, they are morphologically distinct. Most dependent indefinites are morphologically related to their plain indefinite counterparts, but the Russian *nibud'*-indefinites are derived from *wh*-words. This means that there are no higher cardinality *nibud'*-indefinites. Second, the Russian dependent indefinites are only licensed by *bona fide* quantificational distributivity. They are not licensed by distributive predication. The fact that *nibud'*-indefinites require quantificational distributivity makes them similar to sentence-internal readings of singular *different* in English, which are not available under distributive predication (Brasoveanu & Dotlačil 2012, Dotlačil 2010).

(116) a. Each student ordered a different drink.

b. *The students ordered a different drink.
Desired reading: 'Pairwise, the students ordered different drinks.'

This suggests an analysis that draws the two together. For example, Brasoveanu 2011b argues that sentence-internal readings of singular *different* is quantifier-internal anaphora. The distributivity operator associated with *bona fide* quantifiers checks whether pairs of restrictor entities distributively satisfy the nuclear scope formula. To do so, the distributivity operator concatenates the two matrices, which provides an opportunity for *different* to test that the discourse referent it is anaphoric to (namely the one introduced by the indefinite in which it is embedded), is non-identical across both stacks. Consider the following examples, which graphically illustrate the update described in Brasoveanu 2011b for an example like (116a).

(117) Each^{x_1} student $\mathsf{dist}^{*}_{x_1}$ (ordered a^{x_2} different$^{+2}_{x_2}$ drink)

(118)
$$\begin{array}{cc} x_1 & x_2 \\ \hline \multicolumn{1}{|c|}{\textit{student}_1} & \multicolumn{1}{c|}{\textit{drink}_1} \\ \hline \end{array} \; * \; \begin{array}{cc} x_1 & x_2 \\ \hline \multicolumn{1}{|c|}{\textit{student}_2} & \multicolumn{1}{c|}{\textit{drink}_2} \\ \hline \end{array} \; = \; \begin{array}{cccc} x_1 & x_2 & x_3 & x_4 \\ \hline \multicolumn{1}{|c|}{\textit{student}_1} & \multicolumn{1}{c|}{\textit{drink}_1} & \multicolumn{1}{c|}{\textit{student}_2} & \multicolumn{1}{c|}{\textit{drink}_2} \\ \hline \end{array}$$

The nominal modifier *different*$^{+2}_{x_2}$ is anaphoric to the discourse referent introduced by the indefinite and its superscript points to which dref it must check for non-identity, in this case, x_4. Since the drink stored in x_2 and x_4 above are non-identical, the condition imposed by *different* is satisfied. This procedural talk is of course metaphorical and can be formalized, which Brasoveanu (2011b) does. What the informal discussion shows, though, is that if Russian *nibud'*-indefinites enforced covariation by checking non-identity of an individual stored in a dref referenced by an offset like singular *different*, the analysis would correctly account for the fact that they are only licensed in the scope of true quantifiers. The reason is that only these operators would make use of stack concatenation, allowing a dependent indefinite *nibud'*$^{+m}_{x_n}$ to enforce covariation by checking that the individuals stored in x_n and x_{n+m} are distinct.

If given this kind of analysis, Russian *nibud'*-indefinites would be very different than dependent indefinites in languages like Kaqchikel and Telugu because they would not contribute a cardinality condition. This is not a bad result, though, given the real differences between them. Importantly, moving to this kind of treatment of quantificational distributivity does not interfere with an analysis of dependent indefinites that makes use of a postsuppositional cardinality condition. The reason is that in Brasoveanu 2011b, after updating with the content of the scope formula, the concatenated stacks are de-concatenated and summed into a set of plural output assignments. This means that Kaqchikel-style dependent indefinites could still be licensed.

While enriching the type of distributivity associated with *bona fide* quantifiers does not change my analysis of dependent indefinites, it does have important consequences for the analysis of distributive predication, which licenses dependent indefinites in many languages. Under the proposed analysis of *nibud'*-indefinites, distributive predication must not involve a distributivity operator that contributes stack concatenation. Instead, it could use familiar versions of max and δ, which are defined in (50) and (51) respectively. This flavor of distributivity would be able to license dependent indefinites because δ scopes over existential closure of the event argument, but it would block the use of *nibud'*-indefinites by failing to distribute over pairs of restrictor entities that are concatenated in its scope. While I leave developing these ideas to future work, I believe that dependent indefinites provide an important insight into the varieties of distributivity in natural language, which can be fruitfully explored in a DPlL-style framework.

5 Conclusions

This work has shown that Kaqchikel dependent indefinites, like a subclass of special indefinites crosslinguistically, only appear when they can covary with respect to a second operator. Crucially, both distributive pluractionality and *bona fide* distributive quantifiers license dependent indefinites, though only the latter are scope-taking. Since previous analyses closely tie the licensing of dependent indefinites to their ability to take narrow scope, the fact that such indefinites are licensed by distributive pluractionality is surprising. I showed that the puzzle can be resolved if dependent indefinites contribute a post-suppositional cardinality condition that prevents them from being related by a theta-role to an evaluation singular event variable. Then, if both distributive quantifiers and distributive pluractionality alter how events and their participants are related, which is a plausible assumption, both can come to license dependent indefinites.

The analysis not only explains the distribution of dependent indefinites in Kaqchikel, but also helps situate them in a typology of similar expressions crosslinguistically. For languages with medium-strength licensing requirements, like Hungarian and Romanian, the analysis developed here immediately extends. Moreover, I showed that there were plausible extensions to account for other kinds of dependent indefinites crosslinguistically. In particular, I showed that the analysis could account for Telugu unamended, as long as the language allows evaluation plural existential closure, which would be a kind of covert pluractional. Finally, I argued that Russian *nibud'*-indefinites are most likely sensitive to more complex forms of distributivity, not merely evaluation plurality.

One theoretical consequence of the analysis is that it reveals previously unnoticed connections between dependent indefinites and modified numerals like *at least n* or *exactly n*. In recent work, Brasoveanu (2012) argues that the cardinality condition of modified numerals is a post-supposition that must be satisfied only after other at-issue content. I showed that dependent indefinites, which are another type of non-canonical numeral quantifier, also contribute cardinality post-suppositions. The core difference is that while the post-suppositions of modified numerals in Brasoveanu 2012, §2-3 concern domain-level cardinality, those of dependent indefinites concern evaluation-level cardinality. I showed how this was a natural extension when using a formal system that makes use of sets of assignments.

A final product of this account is an elegant picture of plurality in the determiner domain. Indefinites introduce variables that, in addition to being either domain singular or domain plural, can also be either evaluation singular or evaluation plural. It is this fact that drives the analysis, explaining both covariation and the need for a licensor. This four-way contrast is not only supported by the semantic generalizations explored here, but also in the morphological instantiation of dependent indefinites crosslinguistically. It is well known that reduplication is iconically associated with plurality (Gil 1993, 2011). It is fitting then that dependent indefinites, which are often reduplicated indefinites, should have their primary contribution be a plurality, even if a distinguished subtype of plurality (Brasoveanu & Farkas 2011).

Glossing Conventions:
1 = First Person, 2 = Second Person, 3 = Third Person, A = Absolutive,
CAUS = Causative, CP = Completive Aspect, DAT = Dative, DIR = Directional,
E = Ergative, ICP = Incompletive, PAS = Passive, p = Plural Person, PL = Plural,
RED = Reduplicant, SS = Status Suffix

A DPlL with post-suppositions and domain pluralities

We work with standard models $\mathfrak{M} = \langle \mathfrak{D}_e, \mathfrak{D}_\epsilon, \mathfrak{I} \rangle$, where $\mathfrak{D}_e$ is the domain of individuals, $\mathfrak{D}_\epsilon$ is the domain of events, and $\mathfrak{I}$ is the basic interpretation function assigning n-ary relations of type $\tau_1, \ldots, \tau_n$ a subset of $\mathfrak{D}_{\tau_1} \times \ldots \times \mathfrak{D}_{\tau_n}$.

The domain of individuals $\mathfrak{D}_e$ is the powerset of a designated set of individuals IN minus the empty set $\wp^+(\mathsf{IN}) = \wp(\mathsf{IN}) \setminus \emptyset$. Similarly, the domain of events $\mathfrak{D}_\epsilon$ is the powerset of a designated set of events EV minus the empty set $\wp^+(\mathsf{EV}) = \wp(\mathsf{EV}) \setminus \emptyset$. The 'part of' relation $\leq$ over individuals or events is set inclusion over $\wp^+(\mathsf{IN})$ or $\wp^+(\mathsf{EV})$. The sum operation $\oplus$ is set union over $\wp^+(\mathsf{IN})$ or $\wp^+(\mathsf{EV})$. Singleton sets in $\wp^+(\mathsf{IN})$ and $\wp^+(\mathsf{EV})$ are picked out by the predicate atom.

$\mathfrak{M}$-assignments are sets of total functions from variables of type τ to elements of $\mathbb{D}_\tau$. $\mathfrak{M}$-interpretations are defined for post-suppositional DPlL as follows, where ζ and ζ' in $[\![\cdot]\!]^{G[\zeta],H[\zeta']}$ are sets of formulas.

(119) $G[x]H := \begin{cases} \text{for all } g \in G, \text{ there is a } h \in H \text{ such that } g[x]h \\ \text{for all } h \in H, \text{ there is a } g \in G \text{ such that } g[x]h \end{cases}$, where $g[x]h$ iff for any variable v, if $v \neq x$, then $g(v) = h(v)$

(120) $G(x) := \{g(x)\colon\ g \in G\}$

(121) $|\cdot|$ is the cardinality of a set

(122) $\mathsf{atoms}_G(x) := \{y\colon\ \mathsf{atom}(y) \wedge y \leq \bigoplus G(x)\}$

(123) $\mathsf{parts}_G(x) := \begin{cases} G(x) & \text{if } |G(x)| > 1, \text{ else} \\ \mathsf{atoms}_G(x) \end{cases}$

(124) ϕ is a test just in case for any sets of assignments G and H and any sets of formulas ζ and ζ', if $[\![\phi]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$, then $G = H$ and $\zeta = \zeta'$

(125) $[\![R(x_1,\ldots,x_n)]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff $G = H$, $\zeta = \zeta'$ and $\forall h \in H$, $\langle h(x_1),\ldots,h(x_n)\rangle = \mathfrak{I}(R)$

(126) $[\![x = n]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff $G = H$, $\zeta = \zeta'$ and $|H(x)| = n$

(127) $[\![x > n]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff $G = H$, $\zeta = \zeta'$ and $|H(x)| > n$

(128) $[\![\mathsf{one}(x)]\!]^{\langle G,H\rangle} = \mathbb{T}$ iff $G = H$ and for all $h \in H$, $|\{x'\colon\ x' \leq h(x) \wedge \mathsf{atom}(x')\}| = 1$

(129) $[\![\mathsf{two}(x)]\!]^{\langle G,H\rangle} = \mathbb{T}$ iff $G = H$ and for all $h \in H$, $|\{x'\colon\ x' \leq h(x) \wedge \mathsf{atom}(x')\}| = 2$

(130) $[\![\mathsf{r\text{-}part}(x,y)]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff $G = H$, $\zeta = \zeta'$ and $x \in \mathsf{parts}_G(y)$

(131) $[\![\phi \wedge \psi]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff there is a K and ζ'' such that $[\![\phi]\!]^{\langle G[\zeta],K[\zeta'']\rangle} = \mathbb{T}$ and $[\![\psi]\!]^{\langle K[\zeta''],H[\zeta']\rangle} = \mathbb{T}$

(132) $[\![\phi \vee \psi]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff $G = H$, $\zeta = \zeta'$ and there is a K and ζ'' such that $[\![\phi]\!]^{\langle G[\zeta],K[\zeta'']\rangle} = \mathbb{T}$ or $[\![\psi]\!]^{\langle G[\zeta],K[\zeta'']\rangle} = \mathbb{T}$

(133) $[\![[x]]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff $G[x]H$ and $\zeta = \zeta'$

(134) $[\![\mathsf{max}^x(\phi)]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff $[\![[x] \wedge \phi]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ and there is no H' such that $H(x) \subsetneq H'(x)$ and $[\![[x] \wedge \phi]\!]^{\langle G[\zeta],H'[\zeta']\rangle} = \mathbb{T}$

(135) $[\![\mathsf{max}^{x,y}(\phi)]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff $[\![[x] \wedge [y] \wedge \phi]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ and there is no H' such that $H(x) \subsetneq H'(x)$ or $H(y) \subsetneq H'(y)$ and $[\![[x] \wedge [y] \wedge \phi]\!]^{\langle G[\zeta],H'[\zeta']\rangle} = \mathbb{T}$

(136) $[\![\overline{\phi}]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff ϕ is a test, $G = H$ and $\zeta' = \zeta \cup \{\phi\}$

(137) $[\![\delta(\phi)]\!]^{\langle G[\zeta],H[\zeta']\rangle} = \mathbb{T}$ iff $\zeta = \zeta'$ and there exists a partial function $\mathcal{F}$ from assignments to sets of assignments such that

a. $G = \mathsf{Dom}(\mathcal{F})$ and $H = \bigcup \mathsf{Ran}(\mathcal{F})$

b. there is a possibly empty set of tests $\{\psi_i, \ldots, \psi_n\}$ such that for all $g \in G$, $[\![\phi]\!]^{\langle \{g\}[\zeta],\mathcal{F}(g)[\zeta \cup \psi_i,\ldots,\psi_n]\rangle} = \mathbb{T}$ and $[\![\psi_1, \ldots, \psi_n]\!]^{\langle H[\zeta],H[\zeta]\rangle} = \mathbb{T}$

(138) Truth: ϕ is true relative to an input context $G[\emptyset]$ iff there is an output set of assignments H and a (possibly empty) set of tests $\{\psi_1, \ldots, \psi_m\}$ s.t. $[\![\phi]\!]^{\langle G[\emptyset],H[\{\psi_1,\ldots,\psi_m\}]\rangle} = \mathbb{T}$ and $[\![\psi_1 \wedge \ldots \wedge \psi_m]\!]^{\langle H[\emptyset],H[\emptyset]\rangle} = \mathbb{T}$.

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