Multiple event readings with dependent indefinites*

Donka F. Farkas
UC Santa Cruz

1   Introduction

Noun phrases (DPs) refer to entities known as their referents. The linguistic expressions within DPs such as *a/the/some/three dog(s)* give information concerning this referent, such as the class of entities it belongs to, whether it is uniquely identifiable within the context or not, and whether it is a singleton or not.[1] Common to the semantic contribution of the linguistic expressions in these DPs is that they target only the referent of the DP, and as such, its characterization does not have to involve any elements in the immediate linguistic context of that DP.

Below, we are concerned with a class of DPs that are special in that they carry a morpho-syntactic marker whose role is more complex: it constrains the way in which the referent of the DP connects to the interpretation of another element in its immediate linguistic context. To exemplify, consider the contrast in Hungarian between (1) and (2) below:

(1)   A   gyerekek énekeltek egy/két éneket.
       the children sang   a/two   song.
       'The children sang a/two song(s).'   Hungarian

(2)   A   gyerekek énekeltek egy-egy/két-két éneket.
       the children sang   a-a/two-two   song.
       'The children sang a/two song(s) each.'   Hungarian

In (1), the object DP *egy/két éneket* has a simple determiner: *egy*, which is the Hungarian equivalent of the English indefinite determiner *a(n)*, as well as of the numeral *one*, or *két*, which is the Hungarian equivalent of the English numeral *two*. Just like its English translation, (1) has several possible interpretations, the following two of which are of interest here: (i) The object DP can be interpreted as referring to a single song/set of two songs that the children sang (either collectively, in one singing event, or distributively, in many events involving the same song(s)). In this case, the interpretation of the DP is not affected by the interpretation of the rest of the sentence. (ii) The object DP can be interpreted as referring to a/two song(s) *per* child. In this case the sentence is necessarily interpreted as referring to multiple singing events, one for each child, each of which involves a song/a set of two songs that are not necessarily constant across children (or singing events). Under this interpretation the sentence says that for each child, there was a singing event involving a song/two song(s), not necessarily the same across children (or events).

Under the interpretation described in (ii), the predicate is interpreted *distributively* over the elements of the set denoted by the subject. In order for distributive predication to be possible

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[1]This paper makes the simplifying assumption that the referent of a plural DP is a non-singleton set, while that of a singular DP is an atomic entity.

here, the subject has to denote a non-singleton entity. Thus, if the subject in (1) is replaced by a singular DP, as in (3), distributive predication is ruled out: the sentence in (3), just as its English counterpart, receives only the interpretation described in (i).

(3)   Mari énekelt egy/két éneket.
        Mari sang   a/two   song.
        'Mari sang a/two song(s).'   Hungarian

In contrast, in (2), the determiner of the object DP is reduplicated. This morphological marking correlates with an interpretive difference: the only possible interpretation of (2) is the one described in (ii) above. Thus, the presence of determiner reduplication forces an interpretation under which the referent of the object DP is said to be allowed to co-vary with the referent of the subject, or alternatively, with the singing events involved, which in turn co-vary with the elements of the set denoted by the subject. Note that a DP whose determiner is reduplicated cannot occur in sentences whose constituents do not allow an interpretation that provides an appropriate element for the nominal with the reduplicated determiner to possibly co-vary with, such as (3):

(4)   *Mari énekelt egy-egy/két-két éneket.
        Mari sang   a-a/two-two   song.
        'Mari sang a/two song(s) each.'   Hungarian

The term 'dependent indefinite' is used for DPs that impose this type of possible co-variation condition.[2] The term 'dependent' is justified by the fact that in order for such indefinites to be felicitous, their linguistic context must supply an appropriate item for them to co-vary with. In our example, distributive predication provides the condition necessary for the DPs marked by determiner reduplication to occur. Because of their connection with distributive predication, this kind of DPs are sometimes called 'distributive'. Neutralizing the distinction, we refer to them below as *d-indefinites*.[3]

A cross-linguistically stable characteristic of d-indefinites is that they exhibit special morpho-syntax whose contribution is precisely to render them dependent on the interpretation of some other element in the sentence. Thus, no language has been found where the equivalent of the d-indefinite in (1) is marked by special morpho-syntax, while a DP with the overall properties of the indefinite in (2) is morpho-syntactically simpler. In this sense, d-indefinites are formally marked relative to ordinary indefinites.

The existence of d-indefinites is of interest to semanticists because it shows that nominal morpho-syntax can be sensitive to properties that arise in virtue of *semantic relations* between elements within a sentence. The d-indefinite marker signals that the interpretation of the DP in which it occurs has to be influenced by the interpretation of another element in the sentence. In this respect, d-indefinites are reminiscent of polarity items, though in the case of the latter the condition does not involve co-variation.

The type of semantic relation at work here has been studied under the rubric of semantic scope, characterized as the influence of the interpretation of one linguistic element on the semantic interpretation of another. The dependent marker imposes a restriction on the interpretation of the DP that can be met only when the DP is within the semantic scope of a particular type of operator. This operator must bind a variable that ranges over a set, and the d-indefinite must be allowed to co-vary with the values of this variable. In (2), this set (or domain) is given by the set of children denoted by the subject DP, over which the predicate distributes. In this case then, the

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[2]It is a stable cross-linguistic property of such DPs that they are indefinite, rather than definite.

[3]Choe (1987) calls such DPs anti-quantifiers because they are licensed by the presence of a quantifier.

d-indefinite is said to be within the semantic scope of the distributive predication. More precisely, the set of children gives us what Choe (1987), p. 90 calls the SORTAL KEY while the rest of the sentence provides the DISTRIBUTIVE SHARE. The d-indefinite must be interpreted as occurring in the distributive share of a distributive predication, which makes it possible for its referent to co-vary with the elements of the sortal key. Thus, if (5) is interpreted distributively,

(5)   The children sang.

the set of children given by the semantic contribution of the subject provides the sortal key. The VP is interpreted as the distributive share in the sense that singing events are distributed over the elements of the set of children, resulting in an interpretation involving one such event per child.

Scope matters have been at the center of much work in nominal semantics. One reason d-indefinites have attracted attention is the fact that they can be seen as providing a morpho-syntactic marker sensitive to it, and therefore they can give us a window into scope mechanisms. In addition, subtle intra- and cross-linguistic variation was uncovered within the family of d-indefinites, raising the issue of how to account for what is common and what varies within the realm of these DPs.

A defining feature of d-indefinites is that they can occur only in sentences whose interpretation provides a set with whose elements the d-indefinite can co-vary. The element of the sentence responsible for fulfilling this condition, and in whose semantic scope the d-indefinite must be interpreted, is called the LICENSOR of the d-indefinite. For the examples discussed above, the licensor is the distributive predication over the set denoted by the subject DP. An account of the properties of d-indefinites within a language, as well as across languages, has to specify the details of their licensing conditions and, ideally, explain why they obtain.

At the morpho-syntactic level, the special marker signaling dependency may occur outside the determiner area, as in English binominal *each* used in the translations of sentences involving d-indefinites above, or within it, as in the case of determiner reduplication in Hungarian illustrated above.[4] Below, we focus our attention on cases where the dependency marker occurs within the determiner area, and therefore leave binominal *each* in English, and its position within the class of d-indefinites outside the scope of the paper.[5]

As already illustrated by the examples above, the d-marker may occur either on an otherwise ordinary indefinite or on a DP whose determiner is a numeral. In the former case, the DP will be called a D-EXISTENTIAL, while in the latter, it will be called a D-NUMERAL. Thus, in Hungarian, the reduplicated form of *egy* when used as an indefinite determiner is a d-existential. D-numerals are marked by a reduplicated numeral – in the example above, *két* 'two'. This terminology is summarized in (6):

(6)   a. *d-indefinites*: indefinites morphologically marked for dependency
         b. Subtypes of d-indefinites:
             (i) *d-existentials*: ordinary indefinites enhanced with a dependency marker
             (ii) *d-numerals*: indefinites whose determiner is a numeral, enhanced with a dependency marker

Romanian is like Hungarian in that it has both d-existentials and d-numerals. We have already seen that in Hungarian both types of d-nominals are marked by reduplication, a marker that is commonly used across languages. In Romanian, both types of d-nominals are marked by the morpheme *câte* (see Brasoveanu and Farkas (2011), and Panaitescu (2018). There are also languages that only

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[4]Reduplication is a common though not universal means of marking dependency within the DP.

[5]For discussion of binominal *each*, see Safir and Stowell (1988), Zimmermann (2002), Szabolcsi (2010) and Champollion (2016), among others.

have d-numerals, as for instance Kaqchikel and Telugu, discussed in Henderson (2014) and Balusu (2006) respectively, as well as languages that only have d-existentials, as is the case for Russian *nibud'* marked nominals, discussed in Pereltsvaig (2008) and Yanovich (2005). Early discussion of d-numerals is to be found in Moravcsik (1978) and Gil (1995).

Below we focus on some of the empirical and theoretical challenges posed by d-indefinites and on some of the ways these challenges have been met. One possible analytical path is to assume that d-indefinites are subject to a distributional restriction requiring them to occur in a particular position in the semantic or syntactic structure of the sentence. Under this approach, d-indefinites are required to occur within the scope of particular operators. The interpretive properties that characterize them, namely that of co-varying with other entities, are a consequence of their distributional restriction.

Alternatively, one can aim to characterize directly the relevant interpretive property of d-indefinites, and derive their distributional properties from this restriction. Under this approach, the interpretation of d-indefinites has to have a particular property, for instance, possible co-variation. The distributional restrictions on these items are derived from their interpretive requirement: d-indefinites are predicted to be felicitous only in environments in which their interpretive requirement can be met. If the interpretive requirement of a d-indefinite can be met only if the d-indefinite occurs within the scope of certain operators, the account predicts that only those operators will license the d-indefinite in question.[6]

The approaches to be discussed below take this second route. One such proposal, to be discussed in Section 3, is that in Farkas (1997), where d-indefinites in Hungarian are claimed to require their value to (possibly) co-vary with that of another expression, thus giving rise to a special type of plurality that Brasoveanu (2008) calls EVALUATION PLURALITY. In this type of approach then, the fact that d-indefinites occur in the distributive share in examples like (2) is the result of the fact that this configuration allows their interpretive requirement to be met. Section 4 discusses an approach closer to the initial insight of Choe (1987), proposed in Balusu (2006), according to which d-indefinites impose an interpretive restriction requiring them to distribute over subevents in a set of events denoted by the predicate. Section 5 discusses the account in Henderson (2014), according to which d-numerals in Kaqchikel, the language Henderson concentrates on, are subject to an interpretive constraint simply requiring them to be evaluation plural. Note that in all these accounts, d-indefinites occur as arguments of predicates denoting multiple events. They differ, however, in how this connection is captured.

The empirical questions that drive the discussion below are the following:

1. What are the particular distributional restrictions d-indefinites are subject to within a particular language?

2. What are the parameters along which these distributional restrictions vary cross-linguistically?

These empirical issues inform analytical choices both with respect to accounts of particular d-indefinites in particular languages, and with respect to the larger issue of capturing the common thread uniting the class of d-indefinites cross-linguistically.

Before turning to three proposed accounts of d-indefinites we present, in Section 2, the empirical challenges such accounts face, focusing on three languages that have figured in discussions of d-indefinites, Hungarian, Telugu and Kaqchikel.

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[6]See Farkas (2002) for a discussion of the desideratum that all scopal restrictions associated with special nominals be made to follow from interpretive constraints.

2 A corner of the empirical landscape

We start this tour of a corner of the relevant empirical landscape with Hungarian because, as mentioned above, this language distinguishes between d-existentials and d-numerals; Telugu and Kaqchikel are simpler in that they only have d-numerals. Interestingly, however, the distribution of d-numerals in these languages is close to that of d-existentials in Hungarian. Consequently, Hungarian d-indefinites pose a more complex empirical and analytical challenge than d-indefinites in Telugu and Kaqchikel.

2.1 Dependent indefinites in Hungarian

As exemplified above, Hungarian d-indefinites are marked by reduplicating the indefinite article *egy* 'a(n)' in the case of d-existentials, or the numeral in the case of d-numerals. The crucial empirical difference between the two subtypes is that the contexts that license d-numerals are a strict subset of those that license d-existentials. In presenting the distributional patterns of d-indefinites in Hungarian, we first consider contexts that do not distinguish between d-existentials and d-numerals and then turn to those that do.

Parallels between d-existentials and d-numerals

1. D-indefinites may occur within the scope of a quantifier binding an individual-level variable, as exemplified in (7) and (8).

    (7)   Minden gyerek hozott   egy-egy/két-két könyvet.
          every   child   brought a-a/two-two   book.
          'Every child brought a/two book(s) each.'   Hungarian

    (8)   Minden olyan nap amikor Mari olvasott egy-egy/két-két verset, jól   érezte magat.
          every   such day when Mari read   a-a/two-two   poem well felt   herself.
          'Every day that Mari read a book/two poems, she felt good.'   Hungarian

    In (7) and (8), the d-indefinite must be interpreted within the scope of the universal, which renders possible variation of books across children or days.[7]

2. D-indefinites may occur in sentences involving distributive predication, in which case they must occur within the distributive share, as exemplified in (2) above.

3. Example (9) illustrates the fact that d-indefinites cannot function as the *sortal key* of a distributive predication.

    (9)   *Egy-egy/Két-két gyerek énekelt.
          a-a/two-two   child   sang.
          'A-a/Two-two child(ren) sang.'   Hungarian

    These sentences cannot be interpreted as claiming that each child (or each couple of children) in a contextually given group sang.

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[7]I leave open here the issue of whether the d-indefinite requires only the possibility of variation in value or whether actual variation is imposed. Note that a speaker who knows that the same book/pair of books was involved across all bringing or reading events would not use a d-indefinite in (7) and (8).

4. D-indefinites are not licensed by modals, negation or the interrogative operator:

   (10) *Mari kell   találkozzon egy-egy/két-két matematika tanárral.
         Mari must met   a-a/two-two   mathematics professor.
         'Mari must meet with a-a/two-two mathematics professor(s).'   Hungarian

   (11) *Mari nem találkozott egy-egy/két-két matematika tanárral se.
         Mari not   met   a-a/two-two   mathematics professor Neg.
         'Mari didn't meet a/two mathematics professors.'   Hungarian

   (12) *Mari találkozott egy-egy/két-két matematika   tanárral?
         Mari met   a-a/two-two   mathematics professor
         'Did Mari meet a/two mathematics professors?'   Hungarian

<u>Contrasts between d-existentials and d-numerals</u>

1. According to Farkas (1997) d-numerals differ from d-existentials in that they are not licensed
   by an overt adverb of quantification binding events or temporal/spatial traces thereof:

   (13) Olykor,   mikor egy-egy/*két-két olyan könyvet olvasok, ami a   szívemhez
         sometimes when a-a/two-two   such book   I-read   that the heart.to.my
         szól,   jól   érzem magam.
         speaks, well I-feel myself.
         'Sometimes, when I read a-a/*two-two book(s) that speak(s) to my heart,
         I feel well.'   Hungarian

   (14) Ahányszor egy-egy/*két-két híres   személy meglátogatta a   várost, elvitték   a
         always   a-a/two-two   famous person visited   the city   they.took the
         kastélyba.
         castle.to.
         'Whenever a/two famous person(s) visited the town they took him/them to the cas-
         tle.'   Hungarian

   (15) A   politikus néha/mindig   megtapsolt egy-egy/*két-két ellenzéki
         the politician sometimes/always applauded a-a/*two-two   opposition
         hozzászólást.
         comment.
         'The politician sometimes/always applauded a/two comment(s)
         from the opposition.'   Hungarian

   (16) Helyenként   egy-egy/*két-két rendőr leállított.
         occasionally a-a/two-two   police stopped.me.
         'Occasionally a-a/*two-two policeman/policemen stopped me.'   Hungarian

   As expected, in (13) - (16), the d-existential is always interpreted as possibly co-varying with
   the values of the variable bound by the adverb of quantification. Note that, as exemplified in
   (8), a quantificational adjunct binding a temporal or spatial **entity** licenses both d-existentials
   and d-numerals, as long as the nominal is within the scope of the quantificational adjunct.

2. D-existentials but not d-numerals may occur in sentences interpreted as if they involved an implicit existential adverb of quantification. Such d-existentials are said to be 'auto-licensed'. Auto-licensing in Hungarian is exemplified in (17), which is felicitous in a context in which we are discussing how things are in the department generally.

(17)   Egy-egy/*két-két diák   megbukik de ez ritkán fordul elő.
        a-a/*two-two   student fails   but this seldom comes up.
        'Occasionally, a/*two student(s) fail(s) but this happens rarely.'   Hungarian

Example (17) is interpreted as involving multiple events of failure, with students possibly co-varying with these events. Example (18) is a paraphrase of (17) using an explicit adverb of quantification.

(18)   Időnként   egy-egy/*két-két diák   megbukik de ez ritkán fordul elő.
        occasionally a-a/*two-two   student fails   but this seldom comes up.
        'Occasionally, a/*two student(s) fail(s) but this happens rarely.'   Hungarian

3. D-existentials but not d-numerals may be licensed by a pluractional aspect marker, i.e., a morphological marker on the verb that signals a multiplicity of events. In Hungarian, pluractionality can be marked either by the repetitive aspect marker *-gat/-get* or the reduplication of the pre-verbal particle. The latter is illustrated below. For simplicity's sake the morpheme-by-morpheme gloss has been omitted. (This is an example found at http://konczei.transindex.ro/?cikk=970.)

(19)   Ebben az ügyben az én személyes hozzájárulásom annyi, hogy mielött **fel-fel**tenne
        blogjára **egy-egy** szöveget, ... általában konzultál velem.
        'In this affair my personal contribution is that before [he] occasionally puts up on his
        blog a-a text, ... [he] usually consults with me.'
        Interpretation: In this affair, my personal contribution is that before he would put
        on his blog a text, he usually consults with me.   Hungarian

The reduplicated preverbal particle *fel* 'up' signals multiple events of posting. The referent of the d-existential co-varies with these events.

In recent work, Wohlmuth (2019) argued that the condition on d-numerals proposed in Farkas (1997) is too restrictive: in appropriate contexts, d-numerals appear to be licensed by *néha* 'sometimes', as in (20).

(20)   Még a   közönség fejé   fölé is kilőnek néha   két-két rakétát.
        even the audience head.Poss above too fire.Pl sometimes two-two rocket
        Sometimes they fire two rockets [fireworks] above the audience. (Wolhmuth's example (26),
        p. 143)   Hungarian

Note also that examples of d-numerals in Romanian in contexts that violate the restriction in Farkas (1997) are given in Panaitescu (2018). At this point, however, it would be premature to conclude either that these languages have only d-numerals and no d-existentials, or that there are no distributional contrasts between d-numerals and d-indefinites in Hungarian or Romanian. Intuitively, in (13), the d-indefinite is interpreted existentially rather than as a cardinal. The existential interpretation of *egy* 'a(n)' can be distinguished from its cardinal interpretation by

attempted modification with the adverb *pontosan*, 'exactly', which selects the cardinal reading. Note that adding *pontosan* 'exactly' to (13) results in unacceptability, while adding this adverb to the non-reduplicated version of the determiner does not affect accessibility.

(21) *Olykor,   mikor pontosan egy-egy/két-két olyan könyvet olvasok, ami a   szívemhez
      sometimes when exactly a-a/two-two   such book   I-read   that the heart.to.my
      szól,   jól   érzem magam.
      speaks, well I-feel myself.
      'Sometimes, when I read exactly a-a/*two-two book(s) that speak(s) to my heart,
      I feel well.'   Hungarian

(22) Olykor,   mikor pontosan egy/két olyan könyvet olvasok, ami a   szívemhez   szól,
      sometimes when exactly   one/two such book   I-read   that the heart.to.my speaks,
      jól   érzem magam.
      well I-feel myself.
      'Sometimes, when I read exactly one/two book(s) that speak(s) to my heart,
      I feel well.'   Hungarian

Finally, note that d-existentials in these languages cannot be identified with so-called epistemic indefinites such as *algún* in Spanish, or *vreun* in Romanian because their licensing conditions, though overlapping, are not identical. Epistemic indefinites are licensed by an interrogative operator, for instance, while, as mentioned above, d-indefinites are not. This is exemplified in (23) with Romanian, which has both d-indefinites and epistemic indefinites. As mentioned above, d-indefinites in this language are marked by the morpheme *câte* preceding the indefinite determiner; the epistemic indefinite is marked by the special indefinite article, *vreun*:

(23) Ai   vreun/*câte   un prieten în Timişoara?
      have.IIp. a/vreun/d-indef a   friend in Timişoara
      Do you have a friend in Timişoara?   Romanian

For now, one can conclude that there are languages, such as Hungarian and Romanian, that differentiate between d-existentials, and d-numerals and that the details of the constraints on the licensing of d-numerals in these languages needs further clarification.

The scope puzzle: dependent existentials vs. narrow scope unmarked indefinites
Henderson (2014) makes an important observation for Kaqchikel that holds in Hungarian as well, namely that d-indefinites cannot be reduced to narrow scope ordinary indefinites. This is so because there are contexts that license the former but not the latter. In auto-licensing cases such as (17), as well as in cases where pluractionality is marked on the verb, replacing the d-indefinite by a simple indefinite results in a wide scope reading of the latter. To exemplify, (24), is interpreted as Mari repeatedly lifting the same child.

(24) A délután   folyamán, Mari fel-fel-emelt egy gyereket.
      the afternoon during,   Mari up-up-lifted a   child
      In the course of the afternoon, Mari repeatedly lifted a child.   Hungarian

The facts are parallel in Kaqchikel.[8]
    The facts reviewed above are some of the data that a theory of d-indefinites has to account for.

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[8]Since d-numerals in Hungarian do not occur in the contexts relevant to the scope puzzle, they cannot be used to exemplify it.

2.2 D-numerals in Telugu and Kaqchikel

D-numerals in Telugu

The data below comes from Balusu (2006). The example number from Balusu's paper is given in parentheses. Balusu notes that Telugu, as well as other Dravidian languages, have d-numerals, marked by reduplication. Unlike Hungarian however, Telugu does not have d-existentials. The distribution of d-numerals in Telugu parallels that of d-existentials in Hungarian. As shown in (25), a d-numeral can be licensed by a universally quantified DP, relative to which the numeral must take narrow scope.

(25) 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.' (monkeys (may) co-vary with kids)   Telugu, (13)

Balusu notes that this example has two further readings, one in which the two monkeys co-vary with time intervals, and one in which they co-vary with spatial location. The paraphrases of these readings are given in (26):

(26) a. Every kid saw two monkeys at each time interval.   Temporal key reading, (14b)
      b. Every kid saw two monkeys in each location.   Spatial key reading, (14c)

This shows that the licensor may be an implicit universal quantifier over temporal/spatial traces of events.[9]

Finally, d-numerals can be auto-licensed: a temporal/spatial licensor can be inferred in the absence of individual quantification, assuming that the relevant time intervals or locations are provided by the context.

(27) Raamu renDu renDu kootu-lu-ni   cuus-ee-Du
      Ram   two   two   monkey-Pl-Acc see-Past-3PSg
      'Ramu saw two monkeys at each location/at each time interval.'   Telugu, (9)

Though this is not overtly discussed, it appears that d-numerals are not licensed by either modal quantifiers or negation.[10]

D-numerals in Kaqchikel

Henderson (2014) and Henderson (2019) discuss d-numerals in Kaqchikel (Mayan), which are also marked by reduplication. Non-numeral reduplication in Kaqchikel exists but results in an ordinary plural interpretation, and therefore Kaqchikel is like Telugu in that it does not exhibit a d-existential/d-numeral split.

Just like in Telugu, distributional generalizations for dependent numerals in Kaqchikel are very close to what we find for d-existentials in Hungarian. We give below representative data, mostly taken from Henderson (2014). The number of the original example in Henderson (2014) is given in parentheses.[11]

In (28), we see a d-numeral licensed by overt quantification over individuals:

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[9]No examples are given with overt adverbs or repetitive/habitual aspect but presumably they are fine as well.

[10]For parallels between Telugu and Hungarian, see Szabolcsi (2010).

[11]The glossing conventions, taken from Henderson (2014:52), are the following: 1 = First Person, 2 = Second Person, 3 = Third Person, A = Absolutive, CP = Completive Aspect, DIR = Directional, E = Ergative, p = Plural Person, PL = Plural, RED = Reduplicant, and SS = Status Suffix.

(28) PK-onojel x-∅-ki-kano-j   ju-jun   wuj
     E3p-all   CP-A3s-E3p-search-SS one-one book
     'All of them looked for a book (and at least two books were looked for).'   Kaqchikel, (2)

In (29) we see that d-numerals can be licensed by distributive predication:

(29) **Rije'** x-∅-ki-chäp   el   ox-ox   kab'
     they   CP-A3s-E1p-handle DIR three-three candy
     'They took three candies each.'   Kaqchikel, (15)

In (30), the d-numeral is licensed by overt quantification over events:

(30) **Jantape'** e'   k'o   ox-ox   ixtan-i' ch-u-wäch r-ochoch   ajaw.
     always   A3p exist three-three girl-PL P-E3s-face E3s-house lord
     'There are always three (different) girls in front of the church.'   Kaqchikel, (14)

(The licensors of d-numerals in the examples above have been bold-faced.)
    Example (31) shows that d-numerals cannot be auto-licensed, unlike d-numerals in Telugu or d-existentials in Hungarian.

(31) *X-e'-in-tz'ët   ox-ox   b'atz'.
     CP-A3p-E1s-see three-three monkey
     Attempted interpretations:
     'I saw three monkeys in each place.' or 'I saw three monkeys each time.' Kaqchikel, (21)

In (32), the d-numeral is licensed by the pluractional morpheme -la' that distributes over the theme argument of the predicate.

(32) X-∅-in-kan-*ala'*   *ju-jun* wuj.
     CP-A3s-E1s-search-la' one-one book
     'I looked for a book in each location or at each time,
     with books varying with location/time.'   Kaqchikel, (8)

Finally, the next two examples show that d-numerals are not licensed by modal quantifiers:

(33) *Ri achin k'o chi n-k'ule'   rik'in ju-jun   ixoq.
     the man   must   INFL-marry with one-one woman
     Attempted reading:
     The man must marry some woman or other.   Kaqchikel, Henderson, p.c.

(34) *Ri xta Mariy nr-ajo'   nu-b'ixaj ka-ka   b'ix.
     The lady Mary INFL-want INFL-sing two-two songs
     Attempted reading:
     Mary wants to sing two songs (it doesn't matter which).   Kaqchikel, Henderson, p.c.

The only apparent difference between d-existentials in Hungarian on the one hand, and d-numerals in Kaqchikel and Telugu on the other, concerns the fact that Kaqchikel d-numerals are not found in 'auto-licensing' environments, i.e., examples where the pluractional nature of the predicate is not overtly marked by an adverb of quantification or a pluractional marker on the verb.[12] Telugu d-numerals are licensed in such situations, with context presumably providing the domain of

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[12]Auto-licensing is not possible in Basque or Albanian either – see Cabredo Hofherr and Etxeberria (2017) for Basque and Rushiti (2015) for Albanian.

quantification. Hungarian d-existentials are similar to Telugu d-numerals in this respect. More empirical work is needed to clarify what type of contextual help auto-licensed d-indefinites require in languages that license them, as well as how strict the ban on auto-licensing is in languages that do not. For now, accounting for this difference, remains an open problem for all approaches.

The table below summarizes the data on d-indefinites in Hungarian (H), Kaqchikel (K) and Telugu (T) discussed above, adding, for the sake of comparison, the distributional properties of *nibud'*-marked indefinites in Russian (R). These indefinites have been included in the table because they are discussed in Henderson (2014). For the Russian data, see Pereltsvaig (2008) and Yanovich (2005).

		Type of licensor				
		Modal	Quant	Adv of Q	Dist Pred	Auto-licence
Type of d-indef	d-∃ (H)	∗	✓	✓	✓	✓
	d-num (H)	∗	✓	∗	✓	∗
	d-num (K)	∗	✓	✓	✓	∗
	d-num (T)	∗	✓	✓	✓	✓
	nibud'- (R)	✓	✓	✓	∗	∗

What we see above is that d-numerals in Telugu and d-existentials in Hungarian have the same profile. The crucial difference with respect to Kaqchikel involves auto-licensing. D-numerals in Hungarian, on the other hand, appear to obey special restrictions. Finally, *nibud'*-marked indefinites have a special profile, which might warrant excluding them from the class of d-indefinites altogether.

Henderson (2014) draws a distinction between three types of d-indefinites, based on their licensing properties: (i) d-indefinites subject to *strong* licensing conditions, exemplified in his typology by *nibud'*- marked indefinites; (ii) d-indefinites subject to *weak* licensing conditions, exemplified by reduplicated numerals in Telugu; (iii) d-indefinites subject to *middle*-strength licensing conditions, exemplified by reduplicated numerals in Kaqchikel. Under this classification, d-existentials in Hungarian are subject to weak licensing conditions, while d-numerals do not fit into any of these three categories.

The parameters of the classification of d-indefinites cross-linguistically is still an open issue. The obvious conclusions that can be drawn is that even if one's attention is restricted to a small group of languages, as above, one finds subtle cross-linguistic differences and fine-grained distinctions that have to be accounted for.

Desiderata

Before turning to a brief discussion of three approaches to d-indefinites, we formulate some desiderata the above discussion inspires.

First, the account one gives should be able to differentiate between d-existentials and d-numerals in Hungarian, as well as in other languages that have such a distinction. In a similar vein, the proper treatment of d-existentials in Hungarian and that of d-numerals in Telugu and Kaqchikel should shed light on the similarities and differences in their interpretation.

Second, the 'scope puzzle' identified by Henderson has to be accounted for. This means that one has to explain why d-indefinites are licensed in some environments where ordinary indefinites cannot be interpreted as having narrow scope. The solution to this puzzle will involve a better

understanding of the constraints on the possibility of a narrow scope interpretation of an ordinary indefinite and why d-indefinites can circumvent them.

Third, as is clear from the discussion above, the morphological marking on d-indefinites is connected to ordinary plural marking in some, though by no means all, languages. The fact that reduplication is a common morphological marking of d-indefinites, as well as of ordinary plurals, sometimes in the same language, as in Kaqchikel, supports this intuition. Capturing this connection is an important theoretical desideratum.

Fourth, equally important is capturing the connection between d-indefinites with distributivity. Recall that distributive predication is a cross-linguistically stable licensing environment. Also common across languages is licensing by quantification over individuals. The theoretical issue that arises is how best to capture these connections.

Finally, a more ambitious and more distant goal is to understand what place d-indefinites occupy in a general typology of marked indefinites.

These desiderata guide the discussion that follows, and, we hope, will guide further research into this topic. Below we briefly discuss three approaches to d-indefinites, none of which fully meets all the desiderata above.

3   Dependent variable account

This section presents a slightly updated version of the dependent variable account of d-indefinites in Hungarian in Farkas (1997), and discusses how it could extend to data from Kaqchikel and Telugu. It also introduces theoretical notions that are used in the accounts discussed in Sections 4 and 5.

The dependent variable account assumes that non-predicative DPs introduce discourse referents, or variables, that are evaluated by assignment functions. A further assumption, articulated in Farkas (2002), is that morpho-syntactic markers within DPs may impose conditions on the variable the DP introduces. The type of condition relevant here is called 'evaluation condition' in Farkas (2002) because it targets the properties of the functions that give values to the relevant variable.

Farkas (2002) further proposes that the conditions DPs impose on the variable they introduce may target the input context (in the form of presuppositions) or the output context, in the form of 'output context conditions', called 'post-suppositions' in Brasoveanu (2012). Conditions imposed by partitivity or definiteness marking are presuppositions because they impose requirements on the input context. Conditions involving variation or sameness of values across assignments are post-suppositions because in order to see whether they are met one has to consider the properties of the context that results after the input context has been affected by the interpretation of the sentence in which the d-indefinite occurs.[13]

In this account, d-indefinites are subject to an evaluation condition that targets the set H of assignment functions that assigns values to y, the variable introduced by the d-indefinite. The gist of the requirement is that the values assigned to the dependent variable y must (possibly) vary across the functions in H (and therefore H cannot be a singleton). Moreover, the context must allow the values assigned to y to co-vary with varying values assigned to another variable, x, called the 'domain variable'. The d-indefinite is said to be 'referentially dependent' on the variable it may co-vary with.(See Farkas (1997), example (39) and (27) and Brasoveanu and Farkas (2011) and references therein for discussion.)

To exemplify, consider (35), under the assumption that the subject introduces the variable x and the indefinite introduces the variable y.

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[13]For details, see Henderson (2014).

(35)   Every$_x$ politician read a$_y$ statement.

Under the narrow scope reading of the indefinite in (35), the values of y may co-vary with x: the values of y may vary relative to varying values assigned to x. In the terminology of Farkas (1997), y is 'dependent' on x, and x is the 'domain variable' for y. From a typological perspective, d-indefinites in this view are *pro-variation* nominals in the sense of Farkas and Brasoveanu (2018).[14] Under this approach, scopal restrictions on a nominal follow from the nature of the evaluation constraints imposed by the nominal in question

The dependent variable account of d-indefinites in Hungarian aims to capture both what is common across d-indefinites in this language and what differentiates d-existentials from d-numerals. In brief, common to both types of d-indefinites is the co-variation condition. According to Farkas (1997), they are further differentiated by requirements imposed on the nature of the domain variable.

More concretely, in this account, d-indefinites must meet the conditions below:

1. The values of the dependent variable y must be assigned values by a non-singleton set of functions H.

2. H must update in a pointwise fashion another set of functions G_x that make x, the *domain variable*, range exhaustively over its domain.

3. The variable y receives (possibly) non-constant values relative to x.

The essence of the account is formulated in (36):

(36)   *Evaluation constraint on d-indefinites*
         D-indefinites introduce a variable subject to an evaluation constraint that requires it to possibly co-vary relative to a domain variable.

As mentioned above, (36) has to be a post-supposition.

The question that arises is whether making reference to the domain variable is necessary. In this approach, domain variables are used to explain various distributional restrictions on d-indefinites in general, and on d-numerals in Hungarian in particular.

Starting with the former, d-indefinites are predicted not to occur within the scope of negation or in the sortal key of a distributive predication because these environments do not provide a domain variable for the d-indefinite to co-vary with.

In order to rule out modals from licensing d-indefinites in Hungarian, Farkas (1997) posits a constraint along the lines of (37):

(37)   *Extensional dependency condition*
         The domain variable of d-indefinites must be extensional. (see Farkas (1997), ex. (42))

D-indefinites in Telugu and Kaqchikel are also subject to this constraint, while *nibud'*-indefinites in Russian are not.

Ideally, the condition in (37) should be derived rather than stipulated. An observation that points towards its non-primitive nature involves a parallel with plurality. Note that narrow scope singular indefinites within the scope of non-intensional operators license a plural discourse pronoun while such an indefinite within the scope of a modal does not:

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[14]Other pro-variation indefinites discussed in Farkas (2002) are so-called epistemic indefinites and English singular *some*. Examples of anti-variation special nominals are definite DPs, partitives, as well as *a certain* indefinite in English and its many cross-linguistic relatives.

(38) a. Every$_x$ girl received a$_y$ bracelet. They$_x$ wore them$_y$ at the party.
b. Mary must read a book about Spain and then write a report about it/*them.

Thus, it appears that pluralities have to be extensional, i.e., the sets that plurals refer to must be made up of atoms inhabiting the same world. Given this constraint, (37) can be reduced to the requirement that the sum of values assigned to the variable introduced by those d-indefinites that obey it must be the same type of object as the denotation of a regular plural DP.

In Farkas (1997), domain variables play a crucial role in distinguishing between d-existentials and d-numerals in Hungarian. The proposal is that d-numerals are further subject to the constraint below:

(39) *Individual variable dependency condition*
The domain variable of d-numerals in Hungarian must be a variable over individuals.

This constraint predicts that d-numerals cannot be licensed by explicit or implicit adverbs of quantification or pluractionals but are fine in the scope of distributive predication over individuals or in the scope of quantificational DPs. As has been noted above, however, the constraint appears too restrictive. How to differentiate d-existentials from d-numerals in Hungarian remains an open problem.

Note that the account of d-indefinites in terms of co-variation captures the connection of this type of indefinites with plurality. This is so because the variation condition ensures that the dependent variable y is evaluated by a non-singleton set of functions H, and its values across the elements of H are possibly not constant. Thus, d-indefinites are evaluation plural in the sense of Brasoveanu (2007) and Brasoveanu (2008). An informal definition of evaluation plurality is given in (40):

(40) *Evaluation plurality*
A variable x is evaluation plural iff it is assigned values by a set of functions, and the values x is assigned across these functions are not required to be constant.

Under this account, in addition to being evaluation plural, d-indefinites must be dependent on a domain variable, and may be subject to further restrictions concerning that variable. To illustrate the distinction between evaluation plural variables and dependent ones, note that in (41) both x, the variable bound by the distributive quantifier, and y, the variable introduced by the existential in its scope, are evaluation plural, but only the latter can be dependent.

(41) Every$_x$ girl received a$_y$ bracelet. They$_x$ wore them$_y$ at the party.

The discussion above follows Brasoveanu (2007) in assuming that there are two notions of plurality when it comes to nominals, DOMAIN plurality and EVALUATION plurality. A nominal and the variable it introduces are domain plural if the domain from which the variable is assigned values includes non-singleton sets. A nominal and the variable it introduces are evaluation plural if the constraint in (40) is met. In Hungarian, domain plurality in nominals is marked by a plural morpheme, while determiner reduplication marks a subtype of evaluation plurality.

When it comes to differences between unmarked singular indefinites and d-indefinites, in this approach, unmarked singular nominals are formally unmarked for number. One can assume that they are domain singular by default and may be evaluation plural in the right environment, i.e., when the right kind of operator scopes over them. In the dependent variable account, d-indefinites are associated with a special co-variation condition that entails evaluation plurality.

Turning now to the scope puzzle, note first that though the issue is not discussed in Farkas

(1997), the dependent variable account makes no prediction with respect to the relationship between environments that license d-indefinites and those that allow narrow scope readings for ordinary indefinites. What this relationship is depends on details about how the requirements imposed by d-indefinites can be met, as well as on details about how different types of DPs may be interpreted as being within the semantic scope of various types of operators.

In order to meet the requirement imposed by a d-indefinite, the interpretation of the sentence in which the d-indefinite occurs must provide a domain variable with which the d-indefinite co-varies. Being in the semantic scope of a clause-mate quantifier binding a variable of the appropriate kind, or being within the share of distributive predication are environments that allow co-variation. These are also environments where ordinary indefinites may have narrow scope. These, then are sufficient conditions for the licensing of d-indefinites to be possible, but not necessary ones.

Details of how distributive predication arises and the role of a d-indefinite in forcing distributive readings may explain why d-indefinites may be licensed even in environments where ordinary indefinites do not receive co-varying readings. A possible way of explaining the scope puzzle is to exploit the connection between dependency, distributivity, and the marked nature of d-indefinites. The formally marked nature of d-indefinites could be seen as allowing them to induce a special event-based type of distributivity as proposed in Henderson (2014). Working out an account along these lines, is, however, beyond the scope of this paper.

Turning to extending the account to d-numerals in Telugu and Kaqchikel, recall that d-numerals in Telugu have the same distribution as d-existentials in Hungarian, and therefore the account of the latter extends to the former. As to d-numerals in Kaqchikel, Albanian and Basque, the challenge is to explain why they do not occur in auto-licensing environments, a problem that remains open in all accounts.

In the dependent variable account, dependent indefinites are always evaluation plural, and they can always be seen as interpreted in the distributive share, though neither property is a defining one. Each of the accounts we survey next takes one of these aspects as essential. They crucially differ from the approach sketched above in not having recourse to domain variables.[15]

4   Distributivity-based account

We present here the account of d-numerals in Telugu given in Balusu (2006).[16] In this approach, the essence of d-indefinites is their connection with distributivity. The account starts from considering the example in (42):[17]

(42)   **renDu renDu** kootu-lu   egir-i-niyyi
        two two   monkey-Pl jump-Past-3PPl
        Interpretation:
        Two monkeys jumped on every occasion/in every location; not always
        the same two monkeys   Telugu, (7)

The main proposal is summarised in (43):

(43)   *Contribution of dependent numerals*

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[15]See Kuhn (2017) for an account of d-indefinites with special attention to sign language, in which dependent indefinites introduce pluralities whose subparts co-vary with the atoms of a licensor. The approach combines insights from both the dependent variable account and the account based on distributivity.

[16]For an extension of a distributivity based account of d-numerals, see Cable (2014).

[17]All examples and their formatting are taken from Balusu (2006).

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a. a distributive operator whose sorting key is a partition of the event denoted by the predicate the numeral is an argument of
b. a plurality condition on NumP parallel to that of dependent plurals

The effects of the partition and plurality conditions in (43) are given below:

(44) a. Partition Condition: $\exists e \exists \pi(e) \ [\forall e' \in \pi(e) \exists X[\text{two-monkeys}(X) \wedge \text{jumped}(X, e')]]$
      b. Cardinality Condition: $| \ \{X: \text{two-monkeys}(X) \wedge \text{jumped}(X,e)\} \ | > 1$

Here $\pi(e)$ is a partition of an event e into subevents. The Partition Condition ensures that the dependent numeral distributes over the subevents of e. The Cardinality Condition requires there to be more than one group of two monkeys in e; it ensures therefore that there will be variation of monkey pairs across the subevents of e, thus deriving the variation condition discussed in the previous section.

Immediate positive consequences of this proposal are the following. First, it accounts straightforwardly for d-indefinites licensed by pluractionality as well as for such indefinites in auto-licensing environments. Second, it accounts for the fact that d-indefinites cannot play the role of sortal keys.

An immediate question that arises is how to account for the fact that d-numerals in Telugu, as well as d-indefinite elsewhere, occur in cases of 'participant' key readings, i.e., in situations where the d-indefinite co-varies with an argument rather than an event. This situation arises when the dependent numeral is interpreted as co-varying with the kids, in an example such as (45):

(45) Prati pillavaaDu **renDu renDu** kootu-lu-ni cuus-ee-Du.
      'Every kid two two monkey-Pl-Acc see-Past-3PSg'
      Possible interpretation
      Every kid saw two monkeys, where monkeys (may) co-vary with kids   Telugu (13)

Balusu's answer to this question is that in such cases $\pi(e)$ is trivial. As a result, the only way in which the condition in (44-b) can be met is if pairs of monkeys vary across kids. In this account, then, 'participant' key readings are an illusion created by the Cardinality Condition in case the partition over e happens to be trivial.

Szabolcsi (2010), Chapter 8, extends this account to d-numerals in Hungarian. Under this proposal, Hungarian d-numerals are just like those in Telugu except they involve an extra condition requiring $\pi(e)$ to be trivial, resulting in d-numerals always having a participant key, thus accounting for the fact that Hungarian d-numerals cannot occur in auto-licensing environments, nor can they be licensed by pluractionals.

A potential empirical problem is that the account does not rule out d-numerals licensed by explicit adverbs of quantification, as in (46):

(46) *Mari időnként   két-két kérdést tesz   fel.
       Mari occasionally two-two question brings up.
       Attempted interpretation
       Mary occasionally raises two questions that vary with occasions of asking.   Hungarian

Example (47) shows that quantification over temporal entities licenses d-numerals:

(47) Minden órán, Mari két-két kérdést tesz   fel.
      Every   class, Mari two-two question brings up.
      'Every class, Mari brings up two questions (with possibly different questions).' Hungarian

A potential conceptual problem with the distributivity-based account, noted by Henderson (2014),

is that requiring a trivial sortal key amounts to requiring a trivial domain of quantification, an unusual condition to impose, particularly because cases of trivial domains of quantification elsewhere result in infelicity.

The essential difference between the distributivity based account and the dependent variable account is that the latter takes dependency on a domain variable to be the heart of the matter, while the former takes distributivity over subevents to be the core phenomenon. The two approaches overlap, however, in that the dependent variable account allows d-indefinites to occur in the distributive share over event keys, in the spirit of the distributivity based account. For the latter, this is the crucial and constant property of d-indefinites, and 'participant key' cases are treated as special. Finally, note that it is not quite clear how modal licensors are ruled out in a distributivity account. The problem is that a sentence such as (48), with a narrow scope interpretation of the indefinite can be argued to involve the modal contributing the set of accessible worlds as a distributive key while the interpretation of the rest of the sentence plays the role of distributive share.

(48)   John must marry some woman from Norway

5   Evaluation plurality based account

Balusu (2006) focuses on the connection of d-indefinites with distributivity. Henderson (2014), on the other hand, develops an account of d-numerals in Kaqchikel which focuses on the connection with plurality. In addition, Henderson aims at accounting for the interpretive difference between d-indefinites and ordinary indefinites, which we have dubbed the scope puzzle here.

The gist of Henderson (2014) are the following claims:

1. Simple numerals in Kaqchikel are marked for evaluation singularity: if they are interpreted by a set of assignment functions, their values are constant across this set.

2. D-numerals in general are marked for evaluation plurality: they must be interpreted by a set of assignment functions across which their value varies.

3. The evaluation plurality requirement is a post-supposition.

4. D-numerals may combine with predicates in a distributive fashion because they are marked as evaluation plural, while ordinary indefinites may not.

The essential differences between the dependent variable account and the evaluation plural approach concern the first two claims. The dependent variable account makes reference to domain variables while the evaluation plurality account does not. Second, the evaluation plurality account marks unreduplicated numerals as evaluation singular, and d-numerals as evaluation plural, while the dependent variable account treats only d-indefinites as specially marked. Below we concentrate on these issues.

First, note that from a larger cross-linguistic perspective, the evaluation plurality approach to d-indefinites accounts for licensing by pluractionality, for the scope puzzle and, obviously, for the connection with plurality. Its empirical challenges are connected with capturing contrasts across d-indefinites where domain variables were used in the dependent variable approach. Recall that domain variables played a role in ruling out intensional licensors, ruling out d-indefinites occuring as sortal keys in distributive predication, and in accounting for the difference between d-existentials and d-numerals in Hungarian.

Ruling out intensional licensors in Hungarian, Telugu and Kaqchikel may be achieved by narrowing down the definition of evaluation plurality, a move that, as mentioned above, is independently needed to explain why singular nominals within the scope of intensional operators do not license plural anaphora. How to meet the other two empirical challenges remains an open issue.

Finally, note that in the evaluation plurality account in Henderson (2014) both evaluation singular and evaluation plural number is marked on some nominals. In the dependent variable account, d-indefinite marking is treated as entailing evaluation plurality but not as marking it. An open issue for further research with respect to evaluation plurality is therefore the question of whether there are languages that systematically mark nominals for it, in the way many languages mark nominals for domain plurality. Another open question is whether one has to treat number marking, whether at the domain or evaluation level, as an equipollent feature (with both values marked) or whether a privative account can be given, in which only the plural value is overtly marked. If an equipollent approach is taken, one has to explain why the 'singular' value (for both domain and evaluation number) remains unmarked in many languages.

6 Conclusion

We return now briefly to the desiderata given at the end of Section 2. Differentiating between various subtypes of d-indefinites is achieved in the dependent variable approach by stipulating constraints on the domain variable. In the distributivity approach some differences can be captured by imposing further requirements on the Cardinality Condition associated with d-numerals. The evaluation plurality account does not address the issue, which does not mean that it could not be extended to do so. The scope puzzle is addressed in the evaluation plural account of Henderson (2014) though the challenge it poses to the other two approaches discussed above is not insurmountable. All three accounts capture the connection with plurality since in all of them d-indefinites are evaluation plural. The connection with distributivity and multiplicity of events is captured as well, most directly, in the distributivity account. Finally, with respect to how to fit d-indefinites in the larger typology of indefinites, note that in both the dependent variable account and in the distributivity account, d-indefinites come with special requirements on the interpretation of the DP and therefore both accounts explain why these DPs involve a special morpho-syntactic marking. In the particular account in Henderson (2014), evaluation singular marking is treated on a par with evaluation plural marking, and therefore there is no immediate explanation for why the latter is overtly marked while the former is not. The question of how to fit d-indefinites into a larger typology of nominals is far from being answered, which gives us all the more reason to persist in asking it. This connection has two sides: understanding what role special markings on indefinites can have may help us better understand d-indefinites, and conversely, better understanding d-indefinites may shed light on what the relevant typological parameters are.

Focusing on d-indefinites, the overall challenges going forward are both empirical and theoretical. On the empirical side, more work is needed to widen the cross-linguistic scope of the inquiry into d-indefinites, as well as to find the distributional parameters along which subtypes of d-indefinites vary within a language or across languages. On the theoretical side, accounts must be found which not only explain the details of the behavior of particular d-indefinites in a particular language but are also well-suited to capture the cross-linguistic patterns.

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