Chapter 1

Definiteness, partitivity, and domain restriction: a fresh look at definite reduplication

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We propose that the phenomenon of definite reduplication in Greek involves use of the definite determiner D as domain restrictor in the sense of Etxeberria & Giannakidou (2009). The use of D as a domain restricting function with quantifiers has been well documented for European languages such as Greek, Basque, Bulgarian and Hungarian and typically results in a partitive-like interpretation of the QP. We propose a unifying analysis that treats domain restriction and D-reduplication as the same phenomenon; and in our analysis, D-reduplication emerges semantically as similar to a partitive structure, a result resonating with earlier claims to this end by Kolliakou (2004). None of the existing accounts of definites can capture the correlations in the use of D with quantifiers and in reduplication that we establish here.

1 Quantifiers, domain restriction, and D

One of the most fruitful ideas in the formal semantics tradition has been the thesis that quantifier phrases (QPs) denote generalized quantifiers (GQs; see Montague 1974; Barwise & Cooper 1981; Westerståhl 1984; Partee 1987; Zwarts 1986; Keenan 1987; 1996; Keenan & Westerstahl 1987 among many others). Classical GQ theory posits that there is a natural class of expressions in language, called quantificational determiners (Qs), which combine

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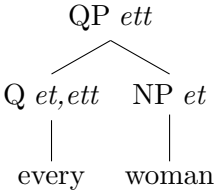
with a nominal constituent (an NP of type *et*, a first order predicate) to form a quantifier nominal (QP). This QP denotes a GQ, a set of sets. In a language like English, the syntax of a QP like *every woman* is as follows:

(1) a. $[\![every\ woman]\!] = \lambda Q.\ \forall x.\ woman(x) \rightarrow Q(x)$

b. $[\![every]\!] = \lambda P.\ \lambda Q.\ \forall x.\ P(x) \rightarrow Q(x)$

c.



The Q *every* combines first with the NP argument *woman*, and this is what we have come to think of as the "standard" QP-internal syntax. The NP argument provides the domain of the Q, and the Q expresses a relation between this domain and the set denoted by the VP. Qs like *every, most,* etc. are known as "strong", and they contrast with the so-called "weak" quantifiers like e.g. *some, few, three, many* (Milsark 1977).

It has also long been noted that the domain of strong quantifiers is contextually (explicitely or implicitely) restricted (see *inter alia* Reuland & Meulen 1989). Contemporary work agrees that we need to encode contextual restriction in the QP, but opinions vary as to whether contextual restriction is part of the syntax/semantics (Partee 1987; Fintel 1994; 1998; Stanley & Szabó 2000; Stanley 2002; Matthewson 2001; Martí 2003; Giannakidou 2004; Etxeberria 2005; 2008; 2009; Gillon 2006; 2009; Etxeberria & Giannakidou 2009; 2014; Giannakidou & Rathert 2009), or not (Recanati 1996; 2004; 2007 and others in the strong contextualism tradition). In the syntax-semantics approach, it is assumed that the domains of Qs are contextually restricted by covert domain variables at LF (which are usually free, but can also be bound, and they can be either atomic, e.g. *C*, or complex of the form *f(x)*, corresponding to selection functions; see Fintel 1998, Stanley 2002, Martí 2003). Below, we employ C:

(2) Many people came to the concert last night; every student got drunk.

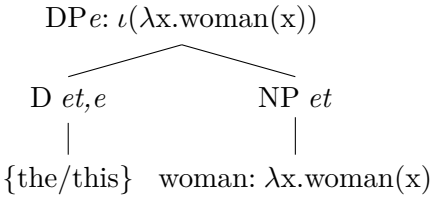
(3) $\forall x\ [\ student\ (x) \cap C(x)\ ] \rightarrow got\ drunk\ (x).$

Here, the nominal argument of the universal quantifier *every*, i.e. *student*, is the set of students who came to the concert last night, not the students

in the whole world. This is achieved by the domain variable C, which is an anaphor and will look back in the discourse for a salient property, in this case the set of people who came to the concert last night. *Every student* then will draw values from the intersection of *student* with C.

Another element that combines with a domain to give a nominal argument is the definite determiner, i.e., the English *the* and its equivalents (including demonstratives), designated as D (Abney 1987; see Alexiadou, Haegeman & Stavrou 2008 for an extensive overview). The demonstrative is generated in English under the same head (thus **this the book*). The DP has a structure parallel to (1c), only we have D, and the constituent is called DP (though some authors call the Q uniformly D; see Matthewson 1998; Gillon 2009). As indicated below, the DP produces a referential expression, a (maximal or unique) individual, indicated here with *iota*:

(4)



(5) a. the/this woman = ι (λx.woman (x))
b. the/these women = max (λx.woman (x))

The DP produces the most basic argument e which can be lifted up to the GQ type when necessary. Both D and Q are functions that need a domain, and it is the NP that provides this domain. Contextual presuppositions are indicated above in the indexing with C. The DP denotes the unique or maximal individual presupposed to exist in the common ground. Coppock & Beaver (2015) use θ-notation to capture the presupposition of uniqueness as the argument of the θ operator:

(6) Lexical entry: *the*
the $\rightarrow$ λP.λx [θ(|P| $\leq$ 1) $\wedge$ P(x)]

Notice that, contrary to all other approaches, for Coppock & Beaver (2015) *the* is a non-saturated constituent in the referential use. We come back to this assumption later. We take it here that the use of D creates a morphologically definite argument, it is thus the core of what can be understood as "definiteness".

DP has been argued to exhibit different types of referentiality. For one thing, a DP can be generic and refer to a kind which is itself a very different "object" than a concrete unique entity in the world. Observe, in addition, the following:

(7) a. John got these data from the student of a linguist.
b. John went to the store.
c. I read the newspaper every day.
d. I raised my hand.

In the examples here the DPs do not make reference to unique entities: the linguist in (7a) possibly has more than one student; in (7b) the particular identity of the store to which John has gone is not important, and the store is certainly not unique; (7c) can be used in a context in which no newspaper has been mentioned or in which multiple newspapers are read; in (7d) *my hand* is used to make reference to one of my two hands. Poesio (1994) introduced the term "weak definite" to refer to such "non-uniquely referential" uses of D (see among others Carlson & Sussman 2005; Schwarz 2009; Aguilar-Guevara & Zwarts 2010; Corblin 2013). More recent relevant work identifies "sloppy" identity, narrow scope interpretation, lexical restrictions (*John took the bus* vs #*John took the coach*), restrictions on modification, number restrictions, and meaning enrichment (*John went to the store* means that John went to a store to do some shopping) for such non-unique DPs (see Carlson & Sussman 2005; Aguilar-Guevara, Bruyn & Zwarts 2014).

In some languages, the referential strength of DP is reflected in a difference between weak and strong forms of D itself (Cieschinger 2006; Puig-Waldmüller 2008; Schwarz 2009). In standard German, for example, a preposition and the definite article can be contracted (*zum* vs. *zu dem*). Schwarz (2009) proposes that the strong/non-contracted D is used when the noun phrase is anaphoric (a pragmatic definite) and it picks up a unique/given referent from the discourse; the weak/contracted article is used when the noun phrase has unique reference on the basis of its own description.

In the present paper, we discuss two puzzles of D in Greek and Basque that cannot be described by the existing approaches in terms of non-uniqueness or weak/strong D. The D in the case we focus on appears in a non-canonical position: (a) on a quantificational determiner; and (b) multiple D structures. Let us illustrate the first, which holds also in Salish languages, Hun-

garian and Bulgarian. D can be an independent head (Greek, St'át'imcets),[1] or suffixal D (Basque, Bulgarian):

(8) Greek (Giannakidou 2004: (32b))
  a. *o kathe fititis.*
  DET.SG every student
  'each student'
  b. **kathe o fititis.*
  every DET.SG student

(9) Basque (Etxeberria 2005: (37))
  a. *mutil guzti-ak.*
  boy all-DET.PL
  b. *mutil bakoitz-a.*
  boy each-DET.SG
  c. **mutil guzti* / **mutil bakoitz*
  boy all / boy each
  d. **mutil-ak guzti*
  boy-DET.PL all
  e. **mutil-a bakoitz*
  boy-DET.SG each

(10) St'át'imcets (Matthewson 1999; 2001)
  a. *i tákem-a sm'ulhats*
  DET.PL all-DET woman
  'all of the women'
  b. *i zí7zeg'-a sk'wemk'úk'wm'it*
  DET.PL each-DET child(PL)
  'each of the children'

(11) Hungarian (Szabolcsi 2010)
  a. *minden diák*
  every student

[1] The St'át'imcets D has a proclitic part (*ti* for singulars; *i* for plurals) encoding deictic and number morphology, and an enclitic part *a* adding to the first lexical item in the DP (Matthewson 1998).

b. *az összes diák*
the all student

c. **összes az diák*
all the student

(12) Bulgarian (Schürcks, Giannakidou & Etxeberria 2014)

a. *vsjako momce*
every boy

b. *vsicki-te momceta*
every-DET.PL boy.PL

These data, where the D combines with a Q are unexpected under the standard analysis of DP because D combines with a Q and not an NP. Hence D above does not have the proper input *et*, and instead combines with the wrong type, a Q (type *et,ett*). That should be ruled out, as it indeed happens in English **the every boy.* In Greek, Basque, St'át'imcets, Hungarian, or Bulgarian the mismatch is "salvaged", we argued in earlier work, by the ability of D to function as a domain restrictor (Giannakidou 2004; Etxeberria 2005; Etxeberria & Giannakidou 2009; 2014).

In the present paper, we will argue that the domain restriction function of D is key to understand the phenomenon of definite reduplication in Greek. This phenomenon includes multiple occurrences of D within the same DP:

(13) a. *to kalo to paidi*
the good the child

b. *to kalo paidi*
the good child
'the good child'

The D-reduplicated structure is puzzling because there is only one referent (just like with the simple definite *to kalo paidi* 'the good child'); and, just like with D on Q, one of the two Ds combines with an adjective, a *prima facie* non-canonical combination. Definite reduplication occurs in other languages, e.g. Swedish (but not in Danish, a related language), although in this paper we will only concentrate on Greek D-reduplication:

(14) *den gamla mus-en* (Swedish)
the old mouse-DEF
'The old mouse'

Although Greek definite reduplications, or polydefinites, as Kolliakou (2004) calls them, have received lots of attention in the literature (see Alexiadou & Wilder 1998; Campos & Stavrou 2004; Kolliakou 2004; Ioannidou & Dikken 2006; Lekakou & Szendroi 2007), there is no consensus on what exactly the proper treatment is, with accounts ranging from vacuity of D to close apposition. In addition, polydefinites have never been linked to the use of D with quantifiers.

In our paper, we will connect the two phenomena and argue that they are both manifestations of the function of D as domain restriction. The only difference between the two is that in one case D applies on Q, but with polydefinites D applies on a predicate. At the same time, it is important to note that neither of the two phenomena can be captured by the concepts of "weak definiteness" or "determinacy" (Coppock & Beaver 2015) used in the literature. Importantly, our analysis of the two phenomena renders them akin to partitives semantically, and from this it follows that partitive structures, domain restriction, and definite reduplication are different, but related strategies for partitivity.

The discussion proceeds as follows. We illustrate first, in section 2, the theory of D as domain restrictor developed in our earlier work, specifically when D applies to Q. In section 3, we present the option of D as domain restriction on the NP, an option observed in Salish languages. We point out that this option is a direct equivalent to a partitive semantically, and then focus on multiple definites (section 4). We suggest here that multiple definites are the Greek equivalent to the Salish strategy. Our analysis is most related to Kolliakou (2004), and predicts a number of behaviors consistent with partitivity.

Our overall conclusion is that "definiteness" is a family of phenomena revealing the following functions of D:

(15) **Types for D**
- **Saturating:**
  - et → e (*iota*); intensionalized version (generic)
- **Non-saturating:**
  - et,ett → et,ett (D_{DR} on Q)
  - et → et (D_{DR} on NP or AP)

"Weak definiteness" D, in contrast to domain restriction, is a saturating function, and determinacy (Coppock & Beaver 2015) only relates to the b-version of non-saturating D.

2 D as a domain restrictor

In recent work, Giannakidou (2004), Etxeberria (2005), and Etxeberria & Giannakidou (2009; 2014) proposed that supplying C is a function that D heads can perform crosslinguistically. We based this idea on Westerståhl (1984; 1987), who argued that the definite article supplies a context set C; our proposal was that supplying C actually happens as an overt syntactic strategy in some languages. Domain restricting D is a non-saturating, type-preserving (i.e. modifier) function that applies to the Q and adds the C variable to the nominal argument of Q. This is akin to property anaphora, since C is anaphoric to a property present in the context, as we said earlier. Domain restricting D comes in two forms: as a Q modifier or as a predicate modifier, found in St'át'imcets and similar languages (Matthewson 2001; Gillon 2006; 2009). Definite reduplication, we will argue, is the manifestation of the predicate modifier strategy in Greek.

2.1 D on Q and property anaphora

Recall the examples mentioned in the introduction. We repeat here only the Greek and Basque data for simplicity. Etxeberria & Giannakidou (2009; 2014) propose that D here is a modifier function D_{DR}, defined it as in (18):

(16) Greek (Giannakidou 2004: (32b))

a. *o* *kathe fititis*
DET.SG every student
each student

b. **kathe o* *fititis*
every DET.SG student

(17) Basque (Etxeberria 2005: (37))

a. *mutil guzti-ak* // *mutil bakoitz-a*
boy all-DET.PL // boy each-DET.SG

b. **mutil guzti/bakoitz*; **mutil-ak* *guzti*; **mutil-a* *bakoitz*
boy all/each boy-DET.PL all boy-DET.SG each

(18) D to D_{DR} type-shifting:

1. D_{DR} rule: When D composes with Q, use D_{DR}.
2. $D_{DR} = \lambda Z_{et,ett}\ \lambda P_{et}\ \lambda Q_{et}\ Z\ (P \cap C)\ (Q)$;
Z is the relation denoted by Q

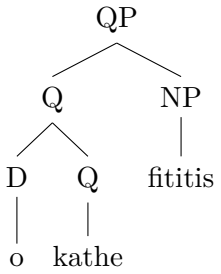
D_{DR} is a non-saturating function that definite heads can type-shift to. Above, we formulate it as a combinatorial rule D_{DR}. When D functions as D_{DR} it introduces the context set variable C. D_{DR} does not create a referential expression, but is simply a modifier of Q, apparently emerging to fix the mismatch since D is fed the wrong type of argument. By supplying C, which is an anaphor, D_{DR} triggers the presupposition that the common ground contains a property to be picked as the value for C. Application of D_{DR}, in other words, creates a presuppositional, anaphoric domain for Q, necessitating a discourse familiar property to be anchored to. This renders the interpretation of the QP akin to a partitive, although it is not morphologically a partitive (for more details, see Etxeberria & Giannakidou 2009; 2014).

Syntactically, we assume that D attaches to Q, so the result is a QP with the following structure:

(19) a. $[_{QP}$ o$_D$ + kathe$_Q$ $[_{NP}$ fititis$_N]]$

b. *o kathe fititis* = [(C) kathe] (student) 'each student'

(20) a.



b. Greek: *o kathe fititis* = [(C) kathe] (fititis)

c. Basque: *ikasle guzti-ak* = (ikasle) [guzti (C)]

d. $[\![Q]\!] = \lambda P \lambda R.\ \forall x\ P(x) \rightarrow R(x)$

e. $[\![D]\!] = \lambda Z_{et,ett}\ \lambda P_{et}\ \lambda R_{et}\ Z\ (P \cap C)\ (R)$;
Z is the relation denoted by Q

f. $[\![D(Q)]\!] = \lambda P \lambda R.\ \forall x\ (P(x) \cap C(x)) \rightarrow R(x)$

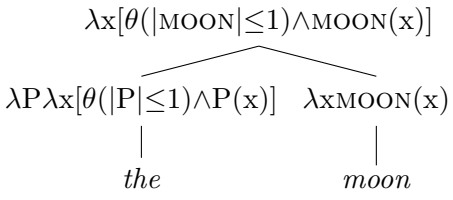
O kathe 'each' and *guzti-ak* 'all' end up being presuppositional Qs since their domain will always be anaphoric to C, as a consequence of them being D-restricted. Crucially, Etxeberria and Giannakidou argue that the composition of *each* (and similar D-universals crosslinguistically) involves a structure parallel to the Greek/Basque: [D-every]; only, in contrast to

Greek/Basque, with *each*, D is covert. Typologically, D with Qs in Greek, Basque, Hungarian, Bulgarian, and St'át'imcents shifts to D_{DR}, but English *the* does not, so whether D can function as D_{DR} in a given language is subject to parametrization.[2] In a language lacking a definite article, the shift to D_{DR} will be done by the closest approximant of definiteness, e.g. Chinese *dou* (Cheng 2009), and Korean *ku* which is a morphological demonstrative (Kang 2015).

In introducing D_{DR}, we enrich definiteness to include this possibility of D not saturating its argument. NPs preceded by the definite article (definite descriptions) are referential expressions, which, since the classical treatments of Russell (1905), Strawon (1952), and Heim (1982) are known to denote familiar unique entities. In many accounts, reference and familiarity are considered the core properties of a definite description, while uniqueness is a derived one (informational uniqueness in Roberts 2003; see also Birner & Ward 1994, Elbourne 2005, Elbourne 2007 for counterexamples to uniqueness, and Schwarz 2009 suggesting that in German familiarity and uniqueness can be distinguished). In other theories, uniqueness is the core, as in the account by Coppock & Beaver (2015) account who argue that "definiteness is a morphological category which, in English, marks a (weak) uniqueness presupposition, while determinacy consists in denoting an individual." (Coppock & Beaver 2015: 377).

Like us, Coppock & Beaver (2015) propose a non-saturating denotation for *the*, with the uniqueness presupposition designated by the θ operator:

(21) Lexical entry: *the*
$the \rightarrow \lambda P.\lambda x\ [\theta(|P| \leq 1) \wedge P(x)]$

(22)


[2] But why do we have this contrast in the ability of D to perform D_{DR}? Could it be a random fact about Ds across languages? Could it relate to availability of repair strategies more generally? Clearly, whether a D can perform D_{DR} cannot be due to the morphological status of D since, as shown earlier, Greek *o* and English *the* are similar, independent heads and monosyllabic. Greek *o*, however, is phonologically weaker than English *the*, so perhaps phonological weakness is a factor. Suffixal Ds like the Basque D are phonologically weaker too, clitic-like Ds.

"The moon" denotes the property of being a moon, defined only if there is no more than one moon. This analysis, like our D_{DR}, does not saturate the NP argument, and referential closure happens on top of that, by a covert type shifter. This amounts to saying that D itself is not referential in this basic use. Our D plus Q data remain mysterious under this analysis. (Also mysterious remain weak definite data where uniqueness appears to be systematically violated). Roberts's theory of definiteness, on the other hand, seems to provide a more appropriate frame for domain restriction.

Roberts (2003) argues that definites conventionally trigger two presuppositions: one of weak familiarity, and a second one called informational uniqueness. These are the informational counterparts of Russellian existence and uniqueness, respectively.

Roberts (2004) argues that the same presuppositions characterize the meaning of pronouns and demonstratives (Roberts 2002). In more recent work (Roberts 2010) a Gricean view is developed which permits a simplification of her earlier theory in that the uniqueness effect observed in certain contexts follows from retrievability, with no need to stipulate even informational uniqueness. The resulting theory stands in contrast to a number of other recent treatments of definites (Neale 1990, as well as those that treat definites as E-type or D-type implicit descriptions Heim 1990, Elbourne 2005, inter alia; Coppock & Beaver 2015, see also Fara 2001). For the purposes of this paper, it is not necessary to dwell in the details of this discussion; we will concentrate on the main theses of Roberts's theory that are essential to our analysis of D_{DR}:

(23) a. **English Definite NPs:** definite descriptions, personal pronouns, demonstrative descriptions and pronouns, proper names.

b. **Semantic Definiteness:** A DP is definite if it carries an anaphoric presupposition of weak familiarity.

c. **Weak familiarity:** Weak familiarity requires that the existence of the relevant entity be entailed in the common ground. Existence entailments alone are sufficient to license introduction of a discourse referent into the context. Weak familiarity does not mean previous mention. Previous mention is strong familiarity.

d. The antecedent of an anaphoric expression is the discourse referent which satisfies its anaphoric presupposition.

e. Anaphora and weak familiarity do not presuppose a linguistic antecedent.

f. Pronouns, unlike definite descriptions, carry the additional presupposition that the discourse referent which satisfies their presupposition is maximally salient at that point in the discourse. This explains why uniqueness effects do not arise with pronouns.

In other words,

> "The notion of familiarity involved [in definites] is not that more commonly assumed, which I will call strong familiarity, where this usually involves explicit previous mention of the entity in question. Rather, I define a new notion, that of weak familiarity wherein the existence of the entity in question need only be entailed by the (local) context of interpretation. [...] Gricean principles and the epistemic features of particular types of context are invoked to explain the uniqueness effects observed by Russell and others." (Roberts 2003: 288)

The notions of hearer old versus discourse old have also been used (Prince 1982; Birner & Ward 1994) to distinguish different "shades" of familiarity.

The definiteness criterion is thus the anaphoric presupposition of weak familiarity, and some definites will further need prior mention (strong familiarity). Our idea that D in D_{DR} supplies a context set C, renders D_{DR} a case of property anaphora, since C targets a familiar property in the common ground. In D_{DR}, D is a signal that such a property exists in the common ground. This renders the D-restricted QP similar to a partitive (*everyone of the students*), since this is the typical structure where the NP domain is presupposed.

We move on now to provide some syntactic arguments for our direct composition of D with Q.

2.2 D_{DR} does not produce a syntactic DP

The application of D_{DR}, as we envision it, is a type shifting rule; but we could also think of it as a lexical modification of Q. In either case, a type shifting or lexical rule would not make us expect that the product will alter the category of Q: we have a QP and not a DP. However, one could ask: how do we know that Greek *o kathe* or Basque *guzti-ak* (and the rest of Basque strong Qs that can be modified by D; Etxeberria 2005; 2009) do not create DPs? These are certainly attested structures:

(24) a. Greek:
[*I* [*tris fitites pu irthan sto parti*]], *itan endelos*
[the [three students that came to.the party]] were completely
methismeni.
drunk.

b. Basque:
[*Festara etorri ziren hiru ikasle*]*-ak*]] *erabat*
[to.the.party came AUX.PL three student]-DET.PL] completely
mozkortuta zeuden.
drunk were
'The three students that came to the party were completely drunk.'

These are referential DPs. The output is of type *e*, and not a GQ, which is the output of the D_{DR} structure, as we argued. What are the arguments that our D_{DR} structure is not a DP of this kind? Etxeberria & Giannakidou (2014) offer a number of arguments which we summarize here.[3]

Apart from the obvious fact that *to kathe agori* 'each boy' is a quantificational expression, evidence that D in *o-kathe* does not create a DP comes from two facts. First, [o-kathe NP] cannot co-occur with the demonstrative pronoun (*aftos* 'this', *ekinos* 'that') which in Greek, like in many other languages, must embed DPs (Stavrou 1983; Stavrou & Horrock 1989; Alexiadou, Haegeman & Stavrou 2008):[4]

[3] Etxeberria (2005; 2009) excludes the hypothesis that Basque Qs that combine with the D are adjectives. The reader is referred to these works for extensive discussion on this point.

[4] The Greek test on the impossibility of demonstratives and the D-restricted *o kathe* Greek cannot be used in Basque because the D and the demonstratives appear in the same syntactic position D (we exemplify here only with the singular).

(i) a. *ikasle-a*
student-DET.SG

b. *ikasle hau/hori/hura*
student DEM.SG.PROXIMAL/MEDIAL/DISTAL

c. **ikasle-a hau/hori/hura*
student-DET.SG DEM.SG.PROXIMAL/MEDIAL/DISTAL

(25) a. *aftos* *(*o*) *fititis*
this the student
'this student'

b. *ekinos* *(*o*) *fititis*
that the student
'that student'

(26) a. *afti/ekini i tris fitites*
these/those the three students

b. *aftos/ekinos o enas fititis*
this/that the one student

(27) **aftos/*ekinos o kathe fititis*
this/that the every student

The demonstratives *aftos/ekinos* are not D heads in Greek, but phrases in [Spec, DP] (Stavrou & Horrock 1989). Since the demonstrative cannot occur with *o kathe*, we must conclude that the phrase headed by the D-*kathe* is not a DP.

The second piece of evidence that *o kathe NP* does not behave syntactically as a DP comes from the fact that it cannot reduplicate. Polydefinites, as we mentioned in section 1, are pervasive in Greek (see Alexiadou & Wilder 1998; Campos & Stavrou 2004; Kolliakou 2004; Ioannidou & Dikken 2006; Lekakou & Szendroi 2007):

(28) *o kokinos o tixos*
the red.NOM the wall.NOM
'the wall that is red'

Reduplication is not possible with *o kathe*, but it is with a numeral:

(29) a. **o kathe o fititis*
the each the student

b. *o enas o fititis*
the one the student

c. *i tris i fitites*
the three the students

These are, in fact, equivalent semantically to partitives, a point to which we return:

(30) a. *enas apo tus fitites*
one of the students

b. *tris apo tous fitites*
three of the students

In a language where DPs duplicate easily, the impossibility of reduplication with *o kathe* suggests again that *o kathe* is not a DP.

A third argument against the DP analysis comes from Basque, where it is possible to conjoin two NPs or two APs under the same single D, as shown below. (In Greek this is not possible, so we cannot apply this test).

(31) **NP conjunction**
[DP [NP *Ikasle*] *eta* [NP *irakasle*]-*ak*] *azterket-a garai-a-n*
[[student] and [teacher]-D.PL.ABS] exam-D.SG period-D.SG-IN
daude.
AUX.PL
'The students and teachers are in exams period.'

(32) **AdjP conjunction**
Maiak [DP [AdjP *zaldi haundi*] *eta* [AdjP *elefante*
Maia.erg [[horse big] and [elephant
txiki]-*ak*] *ikusi ditu.*
small]-DET.PL.ABS] see AUX.PL
'Maia has seen the big horses and small elephants.'

If Basque strong Qs created DPs, we predict that we should be able to conjoin two strong Qs under the same D; but this is impossible as shown by the following examples:

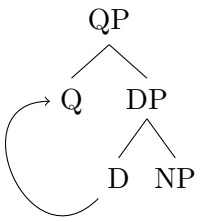
(33) a. *[DP [QP *Ikasle gehien*] *eta* [QP *irakasle guzti*]-*ak*] *goiz*
[[student most] and [teacher all]-DET.PL.ABS] early
iritsi ziren.
arrive AUX.PL
'Intented: Most of the students and all of the teachers arrived early.'

b. *[DP [QP *Neska bakoitz*] *eta* [QP *mutil guzti*]-*ek*] *sari*
[[girl each] and [boy all]-DET.PL.ERG] prize
bat irabazi zuten.
one win AUX.PL
'Intended: Each girl and all of the boys won a prize.'

These sentences show that Basque strong Qs create QPs and not DPs headed by D (see Etxeberria 2005; 2009 for extensive discussion; for Greek *o-kathe*, more recent discussions are found in Lazaridou-Chatzigoga 2012, Margariti 2014).

We thus conclude that D-restricted Qs do not create referential DPs, unlike the combination of D with a weak numeral. Since D in D_{DR} is a modifier and a head, the simplest thing to assume is, as we do, that D adjoins to Q. Recall that, as we said, we can envision this as a lexical or morphological operation. Another option would be to move D from a lower position and adjoin it to Q in a structure like [QP[DP[NP]]]:

(34)



In this case, we get again a QP since Q would be in a structurally higher position; hence both movement of D from a lower to a higher position, and our direct adjunction analysis allow D to function as a Q-modifier. In definite reduplication, as we shall see, we clearly observe instances of D in lower position. In this analysis, therefore, a structural parallelism with partitivity is more observable. Given that the lower D position is indeed for D_{DR} in Greek, as we will argue next, it seems reasonable to keep it as an analytical option.

We move on now to the St'át'imcets Salish data which illustrate the other incarnation of D_{DR} applying to a predicate. This is a lower D, and will be the variant needed for Greek D reduplication, we will argue.

3 D_{DR} on the NP: partitive meaning

St'át'imcets Salish does not have a definite article, but possesses a morphologically deictic D (Matthewson 1998; 2008; see Gillon 2006; 2009 for Squamish, another Salish language). This D, Etxeberria & Giannakidou (2009; 2014) argue, functions as the Greek and Basque D in D_{DR}, but can

also function as D_{DR} when applied to the NP argument. The result is again introducing the anaphoric variable C, yielding a contextually salient set of individuals characterized by the [NP∩C] property:

(35) D to D_{DR} type-shifting:
1. D_{DR} rule: When D composes with NP under Q, use D_{DR}.
2. $[\![DDR]\!] = \lambda P_{et}\ \lambda x\ (P(x) \cap C(x))$

(36) *i...a* in D_{DR}
$[\![i...a]\!] = \lambda P_{et}\ \lambda x\ (P(x) \cap C(x))$

As noted in Giannakidou (2004), D_{DR} works in this case like Chung & Ladusaw (2003)'s Restrict: it does not saturate the NP argument (i.e. it does not close it under *iota*), but only restricts it via C. It works like a modifier, as in D_{DR} on the Q. :

(37) a. *Léxlex* [*tákem-a i* *smelhmúlhats-a*].
intelligent [all DET.PL woman.PL-DET]
'All of the women are intelligent.'
b. **Léxlex* [*tákem-a smelhmúlhats*].
intelligent [all woman.PL]
c. *every the woman ; *kathe i gynaika

Having D_{DR} as an NP modifier is consistent with the idea of a lower DP layer, as we mentioned earlier (see Szabolcsi 1987, Szabolcsi 2010, and works cited in Alexiadou, Haegeman & Stavrou 2008). If St'át'imcets D is D_{DR}, the Salish structures are not as peculiar as initially appearing, but illustrate a systematic grammaticalization of domain restriction via D. However, D on NP is generally not allowed in English, Greek and Basque:

(38) a. *every the boy ťťťť,..mlkjknbnn
b. *most the boys
c. *many the boys
d. *three the boys

(39) a. **kathe to aghori*
every the boy
b. **merika ta aghoria*
several the boys

c. **tria ta aghoria*
three the boys

When D is fed an NP, it functions referentially in European languages; hence the need for the partitive preposition (Greek *apo*, Basque ablative *-tik*, etc.) to give back the right input (*et*) for composition with Q, e.g. *ikasle-eta-tik asko* 'lit.: students-D-of many; many of the students':

(40) a. *merika apo ta aghoria*
several of the boys
b. *tria apo ta aghoria*
three of the boys

As Matthewson notes, the Salish DP structures are equivalent to the partitives PPs semantically. In Greek (and Basque) then, the morphological partitive is the way to do domain restriction on the NP argument (inside quantificational phrases); and we correlated this in our earlier work with the observation that St'át'imcets lacks partitive constructions. In European languages, we argued, the partitive is the analogue of the St'át'imcets Q with the D_{DR} restricted NP. This correlation between partitivity and D_{DR} is key, as we show in the next section, to understanding the nature of multiple definites.

We close this section with a few typological remarks. We have added D_{DR} as a possible functions of definites. "Definiteness" thus emerges as a family of functions of D:

(41) **Types for D**
- **Saturating:**
  - et → e (iota); intensionalized version (generic)
- **Non-saturating:**
  - et,ett → et,ett (D_{DR} on Q)
  - et → et (D_{DR} on NP or AP)

The main division is between saturating (referential) and non-saturating types. D_{DR} belongs to the later, as shown. "Weak definites" discussed in the literature are saturated thus referential, and determinacy, as understood in Coppock & Beaver (2015) only relates to the b-version of non-saturating D. Our point about D_{DR} is that D functions as a generalized modifier, applying not to just nouns but also quantifiers and, as we will show with D reduplication, adjectives.

Finally, it is not even necessary in our analysis that D_{DR} be performed strictly speaking by the definite article. Greek, Basque, Bulgarian, Hungarian, are all languages that have a definite article, and employ it for D_{DR}. Why the definite article and not a demonstrative? Because the definite article is phonologically weak (a suffix in Basque and Bulgarian, and monosyllabic in Greek, Hungarian), whereas the demonstrative is typically a strong head (it is heavier lexically, it can stand alone as a phrase, compare *the* and *this*: **read the* versus *read this*). In languages like St'át'imcets and Korean (Kang 2015) that have deictic D but no article distinction, the demonstrative performs D_{DR} (see more arguments in Etxeberria & Giannakidou 2014 that St'át'imcets D is deictic). In case, finally, that a language lacks D altogether, if there is some element that encodes familiarity, that element will function as D_{DR}. The data reported in Cheng (2009) about Chinese *dou* confirm this prediction: *dou* is not a D, but according to Cheng it functions as D_{DR}, while also functioning as the *iota* operator when used with free choice items (Giannakidou & Cheng 2006).

4 Definite reduplication as involving D_{DR}

4.1 Multiple Ds with single reference

The phenomenon of definite reduplication is pervasive in Greek (Alexiadou & Wilder 1998; Campos & Stavrou 2004; Kolliakou 2004; Ioannidou & Dikken 2006; Lekakou & Szendroi 2007):

(42) a. *to kalo paidi*
the good child
'the good child'

b. **to paidi kalo*
the child good

c. *to kalo to paidi*
the good the child
'the good child'

d. *to paidi to kalo*
the child the good
'the good child'

e. **paidi to kalo*
child the good

In the simple monadic definite, the adjective must precede the noun; this is the canonical structure. In the polydefinite construction, one D appears combined with the noun whereas a second D combines with the adjective. The order now is free, as we see. The major puzzle posed by these [DP+DP] structures is: why have them if they are equivalent to simple definites? We will argue here that they are not.

The polydefinite structures are sometimes thought to express a predication relation between the two DPs, and the sentence would be translated as something like "the child who/that is good" (Alexiadou & Wilder 1998; Campos & Stavrou 2004). But it has generally been quite difficult in the literature to disentangle the pragmatic differences between monadic and polydefinites.

The order of the elements inside these polydefinites is quite free as we saw, and observe further the following examples:

(43) a. *to palio to spiti to petrino*
the old the house the stone-made

b. *to palio to petrino to spiti*
the old the stone-made the house

c. *to spiti to palio to petrino*
the house the old the stone-made

'the old house made of stone'

The definite reduplication phenomenon only happens with D; the indefinite article results in ungrammaticality:

(44) a. **ena kalo ena paidi*
a good a child

b. **ena palio ena spiti ena petrino*
a old a stone-made a house

The D with the noun seems to form the referential core of the structure, i.e. the DP that refers to an object. The combinations of D with the additional adjectives are non-referring, and perform D_{DR}, we will claim. Crucially, the phenomenon cannot be reduced to weak definiteness as we know it from the literature.

4.2 Multi-D structures, partitives, and D_{DR}

Our analysis will be that the secondary, adjectival uses of D are applications of D_{DR} on a predicate, with the ensuing partitive interpretation. Kolliakou (2004), as far as we know, is the first to make a clear connection between definite reduplication and partitive interpretation:

> "Though in both *to kokino podilato* [the red bike] and *to kokino to podilato* [the red the bike] the same property 'red bike' is uniquely instantiable [in the resource situation], **only in the latter case is the index anchored to an entity that is a proper subset of a previously introduced set**." (Kolliakou 2004: 308, emphasis ours)

Kolliakou continues that:

> "The polydefinite *to kokino to podilato*, is, therefore, semantically identical to the monadic to kokino podilato, whereas **the special pragmatic import of the former originates from an additional contextual restriction on the anchoring of the index** that interacts with the common morphosyntactic and semantic basis." (Kolliakou 2004: 265, emphasis ours).

Our take of this idea is that one D is referential, the other(s) perform D_{DR}. While the D plus NP introduces a referent, the additional D combining with adjectives performs domain restriction, and the multi-D structure akin to a partitive.

To understand that the multi-D structure picks out a proper subset of a set introduced in discourse, consider a uniqueness context where there is only one bike and it is red. In this context, reduplication is odd:

(45) a. #*To kokkino to podhilato mou aresei poli*!
the red the bike me like.3SG much
'I like the red bike a lot!'

b. *To kokkino podhilato mou aresei poli*!
the red bike me like.3SG much
'I like the red bike a lot!'

Consider now maximal contexts where there is no subset:

(46) *Idame tis dilitiriodis (#tis) kobres.*
saw.1PL the poisonous the cobras
'We saw the poisonous cobras.' (Kolliakou 2004)

(47) *#Tous epikindinous tous kakopious prepi na tous apofevgeis.*
the dangerous the criminals must subj them avoid
'You must avoid the dangerous criminals.' (Campos & Stavrou 2004)

The polydefinites are odd because all cobras are poisonous and all criminals are dangerous. In both the unique and the maximal context partitive readings are impossible, and reduplication is impossible too.

Campos & Stavrou (2004) suggest that polydefinites only have intersective readings, see (48b). Compare them with regular DPs in (48a):

(48) a. *Gnorises tin orea tragoudistria?*
met.2SG the beautiful singer
'Did you meet the beautiful singer?'
√ the singer who sings beautifully
√ the singer who is beautiful

b. *Gnorises tin orea tin tragoudistria?*
met.2SG the beautiful the singer
'Did you meet the beautiful singer?'
* the singer who sings beautifully
√ the singer who is beautiful

This fact can be interpreted as further supporting the partitive interpretation because the non-intersective reading requires either intensionalization or quantification over events, in either case going beyond the set of physically beautiful singers.

Finally, consider that partitives with adjectives in Greek are generally quite odd. Compare the adjectival partitives with the numeral partitive (which we encountered before). It is fair to generalize that adjectival partitives are odd in English too:

(49) Context: in front of us there are red, blue and yellow bikes.
a. *dyo/merika apo ta podhilata einai gallika.*
two/several of the bikes are French

b. ??*Ta kokina apo ta podhilata einai gallika.*
??the red (ones) of the bikes are French.

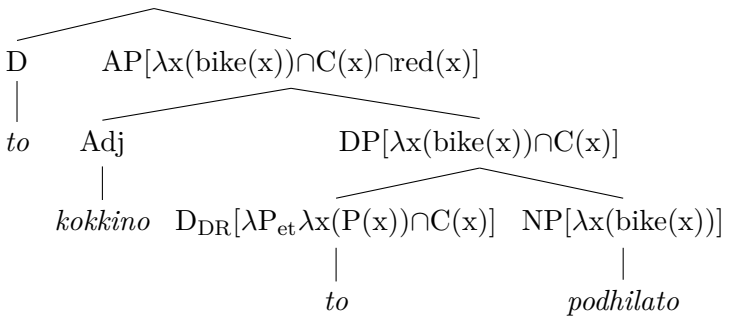
c. *Ta kokkina ta podhilata einai gallika.*
the red the bikes are French.

The definite reduplication looks like a strategy in Greek to try to form a partitive with an adjective, an option not available with the partitive preposition. The inability of (49b), which holds in English too, is in fact quite interesting, indicating that an adjective, unlike a numeral, is not a very good device to establish the part-of relation. Notice that Greek licenses nominal ellipsis with adjectives (*ta kokkina = the red ones*, see Giannakidou & Stavrou 1999, Giannakidou & Merchant 1997), and the *ones* version is still odd in English. Hence, the problem with potential adjectival partitives seems to be not with ellipsis or its equivalents; it is rather of semantic nature. An adjective is not a good device to participate in the partitive structure because it is not a quantity expression and therefore cannot designate a proper subset (as required by partitivity). Quantity expressions such as numerals and quantifiers are the best devices because they are indeed quantity expressions.

Our proposal is that definite reduplication involves the D_{DR} function on a predicate, just like in Salish. And given that with adjectives there is no partitive alternative, the structural parallel is exactly the same (recall the Salish lacks partitives). The structure is as follows:

(50) a. *to kokkino to podhilato*
the red the bike

b. $DP[\iota(\lambda x(bike(x))\cap C(x)\cap red(x))]$



As we see, the top D functions referentially, to saturate the predicate, now domain restricted via D_{DR} coming from below. Since the order permutates

syntactically, and since intersection is commutative, it doesn't matter which predicate (the adjective or the noun) undergoes D_{DR}. In fact, the free permutability of the structure can be seen as an argument in favour of the modifier analysis. The top D saturates, any lower Ds perform D_{DR}. If we have more than two DP layers (as in *to spiti to palio to petrino* 'the house the old the stone-made') we assume that there will be an identity relation between the Cs contributed by each application of D_{DR}. C, finally, as is typically the case, will have to refer to a non-singleton set, hence the partitivity effect.

The simple monadic definite, on the other hand, lacks C and there is no partitive effect.

(51) *to kokkino podhilato* (the red bike) = ι (red(x) $\cap$ bike (x)).

The partitive effect can be reinforced by focus as discussed further in Kolliakou (2004), e.g. in contrastive contexts: *to kokkino to podhilato, oxi to ble* 'the red bike not the blue one'.

What we are suggesting here, namely application of D_{DR} at the lower level(s), renders, as we said, the reduplication structure of Greek akin to the Salish DP strategy. Crucially, as in Salish, the structure of reduplication is not that of a partitive, i.e. it does not involve a PP, just like in Salish. There must be agreement in case and number, just like with all nominal in Greek (we thank a reviewer for asking this question).

D_{DR} has been suggested further for certain D+adjective combinations found in Slavic (Schürcks, Giannakidou & Etxeberria 2014, Marusic & Zaucer 2014). In Slavic languages, so-called long-adjectives are usually interpreted as definites with D *i* combining only with the adjective, not the noun:

(52) Serbian

a. *lep* *grad*
beautiful town
'A beautiful town.'

b. *lep* *-i-* *grad*
beautiful -def town
'The beautiful town.'

c. **lep* *grad-i*
beautiful town-def

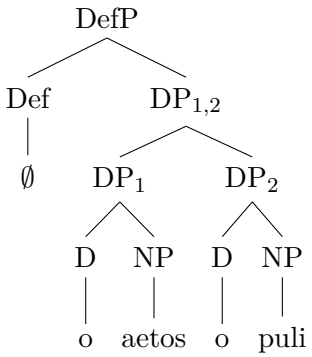
In Slovenian, there are similar phenomena. We will not delve into more detail here, but simply want to note that the strategy of D_{DR} on the adjective is possible in other Balkan Sprachbund languages.

4.3 Comparison with other approaches

The D_{DR} analysis we proposed seems to be an adequate and simple enough analysis of the polydefinite structure. Other alternatives such as for instance the close apposition analysis proposed by Lekakou & Szendroi (2007) cannot capture some of the key properties of the structure:

(53) a. *o aetos o puli*
the eagle the bird

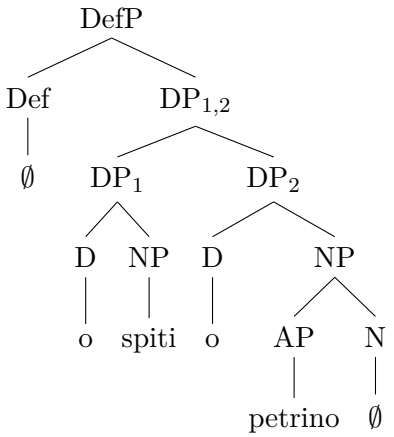
b.



Reduplication as close apposition:

(54) a. *o spiti to petrino*
the house the stone

b.



For this analysis to work, a number of assumptions must be made. First, we need to assume definiteness "concord" (à la Zeijlstra 2004); but there is no explanation why reduplication is optional whereas concord is obligatory. And a concord analysis would render the difference between a monadic and a polydefinite vacuous semantically, missing the partitive and anti-uniqueness effects observed, as well as the correlation with the impossibility of the partitive with adjectives that we noted. The concord/apposition account, finally, fails to unify reduplication with the D on Q.

Our analysis does precisely that. It unifies definite reduplication with the D_{DR} strategy on a predicate and says that polydefinites fall under the phenomenon of domain restriction, which involves a modifier function of D. In turns out, then, very interestingly, that Greek has both options of D_{DR}. Two open questions are: (a) why Basque doesn't exhibit the D-reduplication strategy, and (b) whether our D_{DR} analysis can extend to capture D-reduplication in other languages (e.g. in Swedish, noted earlier). We will leave the latter as a prediction of our theory, to be tested in future research.

5 Conclusions

As a summary of our discussion, we proposed here a modifier analysis D_{DR} of D heads crosslinguistically that includes the following two options:

(55) D to D_{DR} type-shifting:
1. D_{DR} rule: When D composes with Q, use D_{DR}.
2. $D_{DR} = \lambda Z_{et,ett}\ \lambda P_{et}\ \lambda Q_{et}\ Z\ (P \cap C)\ (Q)$;
   Z is the relation denoted by Q

The domain restricting function is a non-saturating use of D as a modifier (D_{DR}); and if our analysis of Greek definite reduplication is correct, Greek also has the option of D_{DR} on the predicate, just like Salish.

Clearly, given the data from Greek, Basque and Salish languages versus English, a fair question to ask is what determines, in each language, whether the available D will have the option to function as a modifier or not. As we suggested already, the difference doesn't follow from the morphological status of D since Greek *o* and English *the* are both independent heads and monosyllabic. Greek *o*, however, is phonologically weaker than *the*, therefore phonological weakness may be a factor, as we noted earlier. Suffixal Ds are phonologically weaker too since they are clitic Ds; hence, if

phonological weakness is a decisive factor, we expect to find more D_{DR} in languages with suffixal Ds.

Finally, our analysis of D reduplication as D_{DR} strengthens our initial link between D_{DR} and partitivity, and suggests that it is actually quite general. By introducing C, D_{DR} creates partitivity in all cases, since NP intersected with C will be as subset of NP. The domain after D_{DR} is therefore always a subset of a larger domain. Hence, partitivity is present even in the case of application of D_{DR} to Q.

Acknowledgements

We thank Alda Mari and Marika Lekakou for her comments on earlier material related to this paper. We also want to thank Klaus von Heusinger for his insightful comments, most of which we will continue thinking about. Thanks also to the audiences of *New Ideas in Semantics and Modeling* (NISM) 2016 as well as the *Linguistics Seminar* of the University of Hamburg. We would also like to thank the two anonymous reviewers for all their insightful comments. And last, but not least, thanks a lot to Ana Aguilar-Guevara, Julia Pozas Loyo, and Violeta Vázquez Rojas Maldonado for their careful comments, and for their patience through the writing process. This piece of research is supported by the *Humanities Visiting Committee* at The University of Chicago, and by the following grants: IT769-13 (Basque Government), EC FP7/SSH-2013-1 AThEME 613465 (European Commission), FFI2014-51878-P and FFI2014-52015-P (Spanish MINECO).

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