Indexed definiteness

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Abstract This paper posits a distinction between plain definite DPs and indexed definite DPs: only the latter have a syntactically represented referential index, an *idx*P, in [Spec, DP]. After sketching a theory of *idx* as a cross-categorial feature of pro-forms, the paper argues that anaphoric definites, complex demonstratives (e.g. *that linguist*), and pronominal definites (e.g. *we linguists*) have *idx*P specifiers in [Spec, DP]. The second part of the paper presents a case study from anaphoric definite DPs in Marka-Dafing (Mande) which provides evidence for this proposal. We examine a co-occurrence restriction between exophoric and anaphoric demonstratives in Marka-Dafing, concluding that this restriction provides additional support for a syntactically represented *idx*P in [Spec, DP], as well as motivating the *Single Index Constraint*, the idea that indexed definites can only make use of a single index to achieve reference.

Keywords: definiteness, DP, pronouns, demonstratives, indices, unique definite, anaphoric definite, Marka-Dafing

1 Introduction

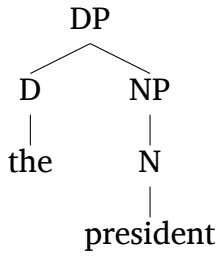
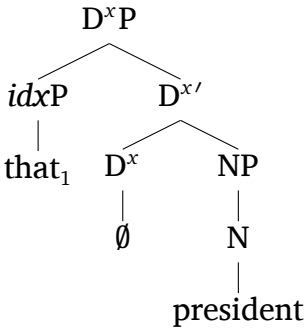
The status of referential indices in syntactic theory remains unclear. On one hand, theories of coreference and binding have been devised which avoid referential indices altogether (e.g. Safir 2004; Reuland 2011; Rooryck & Vanden Wyngaerd 2011). The development of these theories was motivated by the Inclusiveness Condition of Chomsky 1995 (p. 228), which posited that symbols such as indices could not be added to syntactic representations during the computational procedure.

On the other hand, the rigidly referential properties of some noun phrases suggests that they include a referential index which anchors them to a contextual referent. Simonenko (2014) and Roberts (2017) suggest that demonstratives generally serve this function, and Schwarz (2009) argues that anaphoric definites differ from unique definites in the presence of such

an index. Syntactically represented indices have also proven useful for analyzing a number of phenomena outside of the domain of classical binding theory. One example is switch-reference morphology, which has been successfully analyzed as index-sensitive agreement in Washo (Arregi & Hanink 2018) and Amahuaca (Clem 2019a; b; To appear). Another phenomenon where referential indices seem indispensable is in the distribution of pronouns in Mayan languages such as Popti' (Aissen 2000) and Chuj (Royer 2021): outside of c-command environments, two overt third person pronouns in the same clause have disjoint reference; if one of these pronouns is null, it must be coreferential with the other. Royer (2021) argues that this effect arises at PF, requiring the second of two coindexed DPs to be elided, entailing that indices must be syntactically represented.

The only way to include referential indices in the syntactic representation without violating inclusiveness is to provide them with a featural counterpart from the start. As is the case with any feature, the featural counterpart of indices would be expected to be part of some but not all syntactic expressions. Drawing on the above work, this paper presents a theory where indices have a featural counterpart, and attempts to show that this theory illuminates the syntactic and semantic differences between unique definite descriptions on one hand and a class of expressions which are labeled indexed definites. Indexed definites, or D^{x}Ps, are proposed as a natural class of rigidly referential expressions which include demonstratives, anaphoric definites, and pronominal definites (such as *we linguists*). The main idea is that pronouns, anaphoric indices, and demonstratives share a syntactic feature *idx*, interpreted as a variable. *idx*Ps are proposed to occupy [Spec, D^{x}P], but plain unique definite DPs lack such a specifier. This contrast is illustrated in Figure 1, where *the president* is a unique definite DP while *that president* is D^{x}P. In this example it is the demonstrative determiner *that* which is the realization of *idx* in [Spec, D^{x}P].

Figure 1: Plain versus indexed definiteness.

	Plain/unique definite	*Indexed definite*
Syntax		
Semantics	$[\![\text{DP}]\!]^g = \iota x.[\text{Pres}(x,s)]$	$[\![\text{D}^x\text{P}]\!]^g = \iota x.[\text{Pres}(x,s) \wedge x = g(1)]$

Semantically, plain or unique definites DPs are headed by definite determiner interpreted as an ι operator. Once composed with the NP complement of D, plain defintie DPs denotes the unique individual or maximal plurality with property P in situation s. Indexed definite DPs, on the other hand, are headed by an indexed D head, D^x for short, which denotes the unique individual or maximal plurality with property P in situation s who is identical to some discourse referent $g(x)$. In other words, the unique definite says 'the unique P' whereas the indexed definite says 'the unique P who is i,' where i is some contextually salient individual. So *idx*Ps are interpreted as indices,

The syntax and semantics above is not novel; different versions of it have been adopted in some form in much work on DP syntax (Giusti 2002; 2015), anaphoric definiteness (Elbourne 2008; Schwarz 2009; Jenks 2015; 2018), demonstratives (Šimik 2016; To appear; Ahn 2019), and strong or demonstrative pronouns (Patel-Grosz & Grosz 2017; Clem 2017; Bi & Jenks 2019). An alternative perspective on syntactic indices is pursued by Simonenko (2014) and Hanink (2018; 2021), in which an equivalent of *idx*P lives below DP; this paper will argue that the structure in Figure 1 is the correct one for cases where *idx*P is associated with a DP.

The first part of this paper motivates and sets out the distinction between unique vs. indexed definites. Section 2 establishes that plain definites are characterized only by uniqueness, and shows how this accounts for the ability of plain definites to function predicationally and to covary based on situations even when arguments. Section 3 sketches a theory of syntac-

tic indices, in particular the idea that there is a general-purpose syntactic *idx* feature, realized as what linguists usually call pronouns and demonstratives, which is interpreted as an individual, a discourse referent. Section 4 argues for the existence of a dedicated syntax and semantics for indexed definites. The argument for the proposed syntax, drawing on much earlier literature, is based on the phrasal status of demonstratives and pronouns, and their ability to co-occur with definite articles in many languages. The argument for the proposed semantics is the fact that a trio of interpretations are shared among pronouns, demonstratives, and indexed definites: direct reference, anaphoric reference, and covariation via dynamic binding.

The second part of the paper (Section 5) builds further support for the proposal with a case-study of Marka-Dafing, a Mande language spoken in Burkina Faso. Like many Mande languages, Marka-Dafing has an enclitic definite article, shown in (1a). We show that this enclitic is a plain or unique definite marker. However, Marka-Dafing has a dedicated construction for anaphoric definites which includes an additional syntactic marker, the prenominal element *wó*, glossed *idx* in (1b).

(1) a. músó$^{!}$ =ó
woman DEF
'the woman'
b. wó$^{!}$ músó$^{!}$ =ó
idx woman DEF
'the woman (that we were talking about)'

The distribution and interpretation of *wó* in (1b) and elsewhere provides direct support for the analysis of anaphoric definites proposed by Schwarz (2009), now situated as a special case of indexed definiteness. In Marka-Dafing, *wó* is shown to be in complementary distribution with possessors, both of which are in [Spec, DP].

Section 6 focuses on the observation that *wó* is incompatible with the exophoric demonstrative in Marka-Dafing, despite the fact that they occupy syntactically distinct positions. The proposed explanation is the following general constraint:

(2) THE SINGLE INDEX CONSTRAINT: Indexed definites and deictic pronouns can only rely on a single referential index to refer.

This constraint follows if the proposed structure for indexed definiteness is a general property of human language, i.e., if indexed DPs more generally only rely on a single index to refer.

2 Plain definiteness is unique definiteness

Many languages make use of a morphosyntactic feature [±DEFINITE], typically associated with a functional element within DPs (Lyons 1999: p. 16). In this section I review existing arguments which show that uniqueness/maximality is both necessary and sufficient to account for the distribution of [+DEFINITE], and hence to characterize the distribution of plain definite DPs. One consequence of this claim is that semantic functions such as referentiality which have often been associated with definite articles are not necessarily associated with definiteness as a notional category pre se, though they might be bundled with the definite article in many of its occurrences in argument position (cf. Coppock & Beaver 2012).

One compelling argument that definiteness can be reduced to uniqueness/maximality is made by Coppock & Beaver (2012; 2015), who point out that in some predicative uses of the definite article, particularly under negation, the existence presuppositions which are textbook properties of definite articles fail to surface (Coppock & Beaver 2015: p. 380). Such contexts are illustrated below:

(3) a. Scott is the (only) author of *Waverly*.
b. Scott is not the only author of *Waverly*.

In the positive example in (3a), the definite article contributes the inference that there is just a single author of *Waverly*. This same uniqueness inference holds in (3b) as well, but the sentence explicitly negates the existence of such an author, so the existence of a unique author of *Waverly* cannot be presupposed.

More generally, definite articles are freely available in predicative contexts where uniqueness holds but there is no reference, for example with superlatives like *Fido is the biggest dog in the pound*, including cases without a real-world denotation such as *the largest real number*. Such uses are unique, but they are not referential and in the latter case cannot be said to presuppose existence.

Coppock and Beaver propose that in predicative contexts, *the* is interpreted as an identity function which checks for uniqueness.

(4) $\lambda P : |P| \leq 1.P$

Coppock & Beaver (2015) propose that the existence presuppositions characteristic of argumental uses of definites arise due to an additional ι typeshift (Partee 1987; Chierchia 1998; Dayal 2004). However, the only con-

sistent semantic notion associated with [+DEFINITE] in predicative and argumental contexts is uniqueness.

Another central argument for purely uniqueness-based accounts of definiteness come from cases of situation-based covariation, i.e., contexts where a definite is not referential but covaries due to quantification over situations:

(5) Every Thanksgiving in the United States, the president pardons a turkey.

What is important about this sentence is that different presidents pardon turkeys on different Thanksgivings, so the definite description *the president* fails to denote a single individual, though here it functions as an argument.

Elbourne (2005; 2013) shows how cases like (5) follow from a theory where the uniqueness presupposition characteristic of definiteness is relatived to a *situation* s, part of the semantic metalanguage. Given a predicate P and a situation s, predicative uses of the definite article simply returns the set of individuals for whom P is true in the situation s:

(6) $[\![\text{the}/\iota]\!] = \lambda s.\lambda P_{\langle e,\langle s,t\rangle\rangle} : |P(s)| = 1.\iota x.P(x,s)$

In (5), the situation variable of the definite is bound by the quantifier *every Thanksgiving*, deriving covarying readings of presidents with Thanksgivings (cf. Berman 1987; Kadmon 1987; Heim 1990). Informally, the situation-dependent denotation of *the president* can be paraphrased as 'the unique president in s'', where s' is a situation variable bound by the quantificational topic, which can be paraphrased 'Every s' which is a Thanksgiving in the United States.'

The main alternative to uniqueness-based views of definiteness comes from discourse-oriented approaches to meaning, where definite NPs are associated with familiar discourse referents (Heim 1982; Kamp & Reyle 1993; Kamp et al. 2011; Roberts 2002). However, some of the most striking evidence that definiteness should be characterized primarily by uniqueness rather than discourse familiarity comes from languages with a morphosyntactic contrast between unique and anaphoric definiteness (Schwarz 2013). Such contrasts have been described in some detail in at least German and Fering (Schwarz 2009), Icelandic (Ingason 2016), Swedish (Simonenko 2014), Akan (Arkoh & Matthewson 2013),[1], Thai (Jenks 2015), Korean (Ahn 2017), Mandarin (Jenks 2018), Lithuanian (Šereikaitė 2019), Cuevas Mix-

[1] Though see Bombi (2018) for a reassessment.

tec (Cisneros 2019), ASL (Irani 2019), and Chuj (Royer 2019; To appear).[2] If anaphoric definites are distinct from plain definites in these languages, then plain definites must introduce a requirement distinct from anaphoricity; uniqueness is the only plausible option. As predicted, the simpler plain definites in such languages are always those which mark uniqueness and occur in situation-dependent covarying readings (e.g. Schwarz 2009; Jenks 2018), while the more complex expressions are are directly referential and anaphoric (Schwarz 2009; Simonenko 2014; Jenks 2018).

3 The syntactic representation of indices

If plain definites only presuppose uniqueness, we can then ask why expressions such as demonstratives and pronouns can be used in non-unique contexts to refer, either to contextually salient individuals in the immediate context or to a discourse referent, and moreover, why they must refer. Suppose there is a syntactic feature for a class of syntactic heads that introduce a referential index, *idx* (cf. Simonenko 2014; Hanink 2018; Ahn 2019). This feature would be part of the featural makeup of demonstratives and pronouns, expressions whose commonalities have long been recognized in the semantics literature (Kaplan 1977; Nunberg 1993). Striking evidence for this common feature from Washo (Isolate; Lake Tahoe, California), where third person pronouns and demonstratives share a common morpheme *gi* (Hanink 2018; 2021: p. 506):

(7) a. [$_{DP}$ gí:] pélew ʔ-íʔiw-i
GI jackrabbit 3/3-eat-IND
'He's eating the jackrabbit.'

b. [$_{DP}$ hádi-gi pélew] M-úːbiʔ-i
DIST-GI jackrabbit 3.run-IND
'That jackrabbit ran.'

Hanink builds an analysis of relative clauses and that *gi* is in fact lexical realization of an Idx feature.[3]

[2] See also Ahn (2019); Maroney (To appear) for recent refinements of this typology, as well as discussion of bare noun languages which do not make such a distinction.

[3] For Hanink, *idx* is a functional projection of the noun phrase, appearing between NP and DP:

(i) [$_{DP}$ D [$_{idx}$P *idx* [$_{NP}$ N]]] One question about such an analysis is whether it can account for the ability of demonstratives to occur with adjectives or adverbs:

Because *idx* is not itself a category feature, we suggest it should be able to freely combines with any lexical or functional category, resulting in an indexed counterpart of that category. The resulting complex head, [Idx, F], F a category feature, would be a phrasal category with the distribution of F. This accounts for the fact that *pro*-forms are generally distributed across various categories in natural languages. For example, the *idx* counterparts of various categories are suggested below for English:

(8)
a. [IDX,D] = *this, that,* other pronouns
b. [IDX,N] = *one*
c. [IDX,V] = *so*, *that* (as in *do so* or *do that*)
d. [IDX,P] = *here*, *there*
e. [IDX,DEG] = *so*, *that* (as in *so tall* or *that tall*)
f. [IDX,ADV] = *so*, *thus*
g. [IDX,C] = *so*, *that* (as in *say so* or *say that*)

English demonstratives *this, that* are underspecified for category, explaining their ability to occur as anaphora for a wide range of categories, including for predicates Partee (1986; 1987).[4]

(9)
a. [*idx*] ⟷ THAT
b. [IDX, + PROX] ⟷ THIS

The observation that *this* and *that* have a largely category neutral distribution provides an independent argument for the existence of a category-neutral feature like *idx*. More specifically, if lexical items are the realization of abstract bundles of syntactic features, then there must be some feature like *idx* which serves as a shared feature in the category neutral realization of functional morphemes like English *so*, *this*, or *that*.[5] When IdxPs are asso-

(ii)
a. Mary is that tall.
b. Mary walked this slowly. Generally, functional categories such as Num, T, or Asp restricted to the extended projection of a particular lexical category. Such a restriction does not seem to apply for *idx*, at least not in examples such as those in (ii).

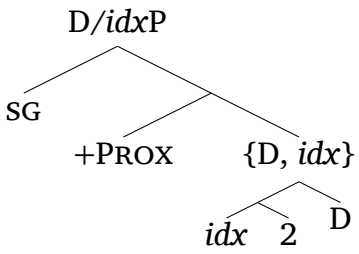
[4] To simplify some of the discussion below we will assume that English *that* is unmarked for [±prox], and achieves its distal effect pragmatically, by competition with *this*.

[5] A connection can be made between the category-neutral distribution of *idx* features and discourse-oriented features such as [Topic], [Focus], and [Wh]. These A′-features essentially cross-cut syntactic categories, allowing for the category neutral distribution of A′-movement more generally, for example (e.g. Cable 2010). We will see below *idx* is discourse- and context-oriented, particularly in its anaphoric use. However, *idx* and A′ features are distinct; *wh*-phrases and topics can be pronouns, indicating that A′ features

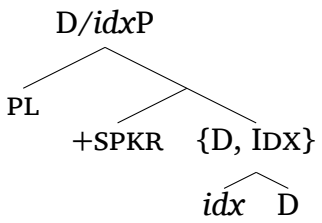
ciated with a particular category F we will label the resulting phrase F/IdxP; in this paper the only instance of this will be D/IdxP.

D/IdxPs are internally complex. This complexity includes ϕ-features and features indicating spatial deixis. These features serve as part of the articulated superstructure of *idx*, and are restricted to occur with *idx* features at least in part by their semantics, as specified below.

(10) a. Structure of *this*$_2$:



b. Structure of *we*$_7$:



The idea that pronouns are featurally different from other noun phrases has been pursued extensively elsewhere (Bejar 2003; Harley & Ritter 2002; Harbour 2016; Sichel & Wiltschko 2021; Sichel & Toosarvandani To appear), including the idea that they bear an index feature which restricts their binding behavior (Rezac 2004; Adger & Ramchand 2005). So we will adopt the idea that D/*idx*P is interpreted as an individual variable, type e, which I assume with Ahn (2019) is introduced as an n (numeral) argument of *idx*.

Now suppose that the features associated with an index—e.g. gender, number, or place—are identity functions on the variable (of type $\langle e, e \rangle$) which 'add in' presuppositional content (Cooper 1979; Heim & Kratzer 1998; Sauerland 2009: cf.). First and second person features, for example, would anchor variables to the contextually supplied speaker or hearer, whereas spatial demonstratives might anchor the variable to a location.[6]

may in fact be sub-features of *idx*. We will leave to future work exactly how *idx* is related to A′-features more generally.

[6] The system here and below builds is similar in many ways to Ahn (2019), especially in treating the variable as an argument of the Idx in treating IdxP as a specifier of DP. There are differences as well: Ahn does not analyze pronouns as *idx*Ps, and ϕ-features for her are located between DP and NP. Ahn's proposals are angled towards understanding how competition between different anaphoric forms are resolved; it is not always clear, for

(11)
a. $[\![\text{D, } idx]\!]^{g,c} = \lambda n : g(n) \in D_e . g(n)$, else undefined.
b. $[\![\text{D, } idx_2]\!]^{g,c} = g(2)$, if $g(2) \in D_e$, else undefined.
c. $[\![\text{SG}]\!]^{g,c} = \lambda x . x$, if $|x| = 1$, else undefined.
d. $[\![\text{PL}]\!]^{g,c} = \lambda x . x$, if $|x| \neq 1$, else undefined.
e. $[\![\text{+SPKR}]\!]^{g,c} = \lambda x . x$, if $\text{speaker}_c \in x$, else undefined.
f. $[\![\text{−PROX}]\!]^{g,c} = \lambda x . x$, if x is at δ (a demonstration) not near the speaker in c, else undefined.
g. $[\![\text{+PROX}]\!]^{g,c} = \lambda x . x$, if x is at δ (a demonstration) near the speaker in c, else undefined.
h. $[\![\text{+ANAPH}]\!]^{g,c} = \lambda x . x$, if x is an established discourse referent, else undefined.
i. $[\![\text{this}_2]\!]^{g,c} = g(2)$, if $g(2) \in D_e$, if $|g(7)| = 1$, if $g(2)$ is at δ near the speaker in c, else undefined.
j. $[\![\text{we}_7]\!]^{g,c} = g(7)$, if $g(7) \in D_e$, if $|g(7)| \neq 1$, if $\text{speaker}_c \in g(7)$, else undefined.[7]

The variable introduced by IdxP should not be seen as an ordinary metalanguage variable, but rather what Groenendijk & Stokhof (1990) call a *discourse marker*, i.e., a variable x in the domain of a contextually supplied assignment function g such that $g(x)$ is a discourse referent. The idea that discourse markers constitute a distinct set of variables from regular metalanguage variables has been used to account for a variety of phenomena including donkey anaphora (Groenendijk & Stokhof 1990; Chierchia 1995), the distinction between null and overt pronouns (Kurafuji 1998), and the semantic behavior of anaphoric definites (Schwarz 2009), and recently, weak crossover (Chierchia 2020).

A well-known problem for the idea that pronouns are (always) interpreted as variables is the availability of descriptive uses of pronouns, also called E-type pronouns, pronouns of laziness, paycheck pronouns, or neon-

example, what components of nominal content are presupposed versus at-issue. A central difference, discussed further below, is that for Ahn, *idx*P itself is of type $\langle e, e \rangle$, and is hence able to combine with any referential noun phrase.

[7] These lexical entries are simplified, and ignore for example the extent to which these features should be seen as binary or privative (Bobaljik 2008; Harbour 2016), whether the referent of the index has a contextually supplied relation to the DP referent (Elbourne 2008; Šimik 2016), and whether all of the relevant presuppositions, for example of person and gender, are of the same kind (Sudo et al. 2012).

tological pronouns, depending on the particular instance being referred to.[8]. The following example based on Cooper (1979) illustrates the problem:

(12) This year the president is a Republican. Next year, he will be a Democrat.

In the most natural reading of this sentence, *the president* and *he* are two different people, the latter perhaps the president-elect who we know to be male. Such data pose problems for the idea that pronouns are variables over discourse referents, because the pronoun *he* should pick up its discourse antecedent, which would be the current president. This reading is available if we imagine a context where the current president changes parties, but it is not the only reading.

The widely adopted solution to this problem is to view *he* in (12) as a unique definite description whose referent can covary by situation. As such, a plausible analysis of descriptive pronouns is as concealed plain definite descriptions, derived by ellipsis or a transformational rule (Karttunen 1969; Partee 1970; Heim 1990; Elbourne 2001; 2005). For example, Elbourne (2001; 2005) argues that English pronouns are definite articles with an obligatorily deleted NP complement. If this proposal is correct, the pronoun itself could not bear a D/*idx* feature, as the index is introduced by the deleted NP[9]

However, there is a way of reconciling an ellipsis-based analyses of descriptive pronouns with the idea that pronouns always are the morphological realization of D/*idx*. Suppose that ellipsis is licensed by an 'E' feature, as proposed by Merchant (e.g. 2008). Now let E be a [+ANAPH] feature

[8] Some citations include Geach 1962; Karttunen 1969; Partee 1970; 1975; Evans 1977; Chierchia 1995; Elbourne 2001; 2005 and Recanati 2005. The term descriptive is use by (at least) Recanati.

[9] An alternative analysis of descriptive pronouns is as hidden functions or relations, pragmatically supplied, that derive descriptive behaviors Cooper (1979); Engdahl (1986); Chierchia (1995); Jacobson (2000; 2012). Under such a view, *it* in (12) might be analyzed as a variable with a concealed 'president' function from situations to unique presidents, of type $\langle s, e\rangle$; Recanati (2005) argues that in cases similar to (12), deixis is to a particular contextually salient 'role.' an example of such an analysis is given below:

(i) $[[he_4]]^{g,c} = \lambda s.R_4(s)$, where $g(R_4) = \lambda s'.\iota x.\text{President}(x, s')'$

If this approach were adopted, the idea that pronouns are always individual variables could be maintained. The difference between the two theories, the one based on NP ellipsis and the relational variable view, become very similar in particular if an LF-copying theory of ellipsis is adopted, as advocated in some recent work (Saito 2007; Željko Bošković 2018; Sakamoto 2017).

on *idx*. This is a natural move, as ellipsis sites are anaphoric and requires an explicit discourse antecedent (Hankamer & Sag 1976). Descriptive pronouns such as *it* in (12) would then be cases of a plain definite D (ι) which occur with complements containing [N, IDX, +ANAPH]:

(13) $[_{\text{DP}}\ \text{D}_{\iota}\ [_{\text{N/IDXP}}\ +\text{ANAPH}, (\phi), \text{N/IDX}_2\ ]]$

The [+ANAPH] feature requires that the property anaphor of N/IdxP be an established discourse referent. Now suppose that third person pronouns in English have lexical entries like the following one:

(14) [D, *idx*, ϕ] $\leftrightarrow$ *he*, *she*, *they*, etc.

These lexical entries could either realize a D/*idx*P with ϕ-feature restrictions or a plain definite DP with an N/IdxP complement. Such an approach could explain why third person pronouns do not allow overt NP complements in standardized English: if N were overt, there is no *idx* to be picked up by the pronoun. So third person pronouns would be realizationS of something like 'the one', where 'one' is N/IDX, though they could also realize 'pure' ϕ-restricted discourse referents as D/*idx*P.

Many languages, however have distinctions between phonologically strong pronouns, which are referential, and phonologically weak or null pronouns. Typically only weak or null pronouns allow descriptive or sloppy readings (e.g. Kurafuji 1998; 1999; Oku 1998; Saito et al. 2008; Sakamoto 2017; Patel-Grosz & Grosz 2017; Barbosa 2019; Željko Bošković 2018; Bi & Jenks 2019). The consensus view in this literature is that weak or null pronouns realize NP anaphora of some kind (see especially Tomioka 2003), basically N/Idx. Strong pronouns would be the realization of 'true' D/*idx*Ps, interpreted as discourse referents.

4 Indexed definites

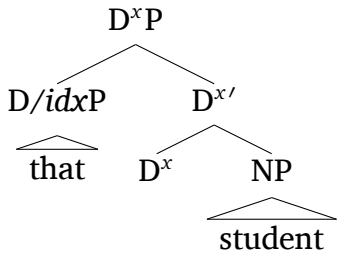
An indexed definite DP is a DP with an D/*idx*P in its specifier position. In support of this theory, this section presents evidence that adnominal pronouns and demonstratives occupy [Spec, DP] in many languages. We will then examine the semantic effects of the D/*idx*P specifier in indexed definites: the unavailability of situation-based covariation, and three semantic functions which are shared with strong pronouns: exophoric uses, anaphoric uses, and dynamically bound uses.

4.1 The syntax of indexed definites

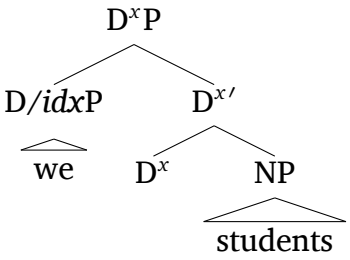
This section first reviews several arguments that adnominal pronouns and demonstratives are phrasal and occupy [Spec, DP]. It then argues that in languages where demonstratives are D heads they do so as indexed definite D heads (D^x).

Schwarz (2009) demonstrated that there are two morphologically distinct definite articles in German, 'weak' definite articles, plain definite D heads, and 'strong' definite articles, which function as anaphoric definites in German. It seems natural to think of anaphoric definites as just one realization of a more general category of indexed definite heads, D^x. In English, adnominal pronouns and demonstratives are both overt realizations of D/*idx*P, with the same structure as German strong or anaphoric definites.

(15) a.



b.



The idea that adnominal pronouns and demonstratives have phrasal syntax and occur in [Spec, DP] has been argued for extensively by Giusti (2002; 2015) and is supported by work on the typology of these elements (e.g. Choi 2014; Roberts 2017). In contrast, many analyses of adnominal pronouns and demonstratives in the semantics literature treat them as heads (Elbourne 2001; 2005; 2008; Wolter 2006). This section will review some of the evidence that these categories are phrasal in many cases in support of the view that they occupy a specifier position.

The most basic argument that demonstratives and pronouns are phrasal is that they also function as pronouns, that is, as stand-ins for entire DPs. If demonstratives and pronouns were heads, it would be somewhat surprising for them to license ellipsis of their complement as proposed by Elbourne (2001), as ellipsis in English is typically licensed by heads with a filled specifier (Lobeck 1995). As phrases, demonstratives and pronouns necessarily occupy a specifier position rather than a head position.

Another convincing arguments that demonstratives and adnominal pronouns can be phrasal comes from locative reinforcers, such as in Southern US English *these here books*, where the demonstrative and reinforcer form a phrasal constituent (Bernstein 1997; Leu 2006; Giusti 2015; Leu 2015).

In Southern US English, locative reinforcers can also intervene between adnominal pronouns and the noun:

(16) a. *Them there fellows* come through here, stealing horses and things.[10]
b. …since *we here men* are pretty gosh-darn different, we would be mighty proud to go 'bout introducin' ourselves.[11]

To the extent that the demonstrative/pronoun and reinforcer form a constituent, they cannot be D heads, so they must be adjuncts or specifiers. As English and other Germanic languages are generally sensitive to a Doubly-Filled D filter, banning both both D and its specifier being pronounced, the absence of an overt definite article in such examples falls into place if demonstratives and adnominal pronouns are in [Spec, DP] (Giusti 2002; 2015; Alexiadou et al. 2007).[12]

More evidence that demonstratives and pronouns are specifiers comes from the fact that the must co-occur with overt definite articles in many languages (Alexiadou et al. 2007; Giusti 2002; 2015; Roberts 2017). For example, in Greek (17) and Akan (18):

(17) a. Emis *(i) glossologi imaste exypni.
we the lingusits be.1PL.PRES smart
'We linguists are smart.' (Choi 2014: 14)
b. afto to vivlio
this the book
'this the book' (Alexiadou et al. 2007: p. 122)

(18) Mè-pɛ̀ sàá àtàádɛ́ɛ́ nó
1SG-like DEM dress DEF
'I like that dress [pointing at Amma's dress].' (Bombi 2018: p. 151)

[10] From http://artsandsciences.sc.edu/appalachianenglish/node/796, accessed February 14, 2021.

[11] From https://social.shorthand.com/SCSYXL/nyS4prnNJ3/texas-secession-2020, accessed February 14, 2021.

[12] A reviewer raises the availability of expressions like *this man here* or *we children here* in many varieties of English as problematic, including in standardized varieties of English. I assume that such cases involve obligatory extraposition of the locative PP reinforcer, which underlyingly forms a constituent with the demonstrative pronoun. This idea is appealing as extraposition of phrasal modifiers is obligatory in such varieties. Simple evidence for this claim comes from the independent availability of *this here* ('This here is cool!') and 'we here' ('We here are hungry!').

Royer (2019; To appear) analyzes a similar case in Chuj, where demonstratives, which mark anaphoric definiteness, occur with noun classifiers, which mark unique definiteness. The Marka-Dafing case study below provides another example with a dedicated anaphoric demonstrative which co-occurs with a definite article. The position of demonstratives in both languages are consistent with their being in [Spec, DP].

Additionally, in Romance and Greek, demonstratives alternate between a few different positions in the DP, typically analyzed as phrasal movement of the demonstrative from a lower position in DP to [Spec, DP] (Bernstein 1997; Alexiadou et al. 2007; Giusti 2002; 2015; Roberts 2017). The same analysis for adnominal pronouns is proposed by Choi (2014), reinforcing the idea that both demonstratives and pronouns are phrases.

The fact that demonstratives co-occur with definite articles might be taken as supporting the idea that demonstratives should be associated with a functional projection above DP. However, at least in Greek, reinforced demonstratives can co-occur with the definite article, as would be expected if they were phrasal elements in [Spec, D^{x}P] (Alexiadou et al. 2007: p. 103):

(19) a. afto-edho to praghma
this-here the thing
b. afto-eci to praghma
this that the thing

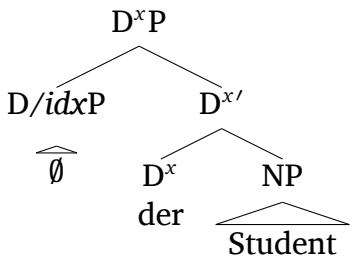
Furthermore, when they co-occur, demonstratives typically occur outside of definite articles (Choi 2014; Höhn 2017; Hsu & Syed 2020).[13] This observation is a challenge for the proposal that *idx*P is generally located below DP (Hanink 2018; Simonenko 2014), though they may move from such a low position, as discussed above. Another analysis compatible with the proposal here is that there is an additional functional projection above D which hosts D/*idx*P in its specifier (e.g. Patel-Grosz & Grosz 2017; Šimik 2016; Hsu & Syed 2020).

While there is good evidence that overt demonstratives and pronouns are often in [Spec, DP], there do seem to be languages where indexed definiteness can be realized with a morphologically distinct D^{x} head, which can also be a demonstrative. For example, German and Lakhota make a distinction between strong (anaphoric) and weak (unique) definite articles (discussed in Schwarz 2009; 2013), and in Thai and Mandarin, demonstra-

[13] Roberts (2017) discusses several languages where demonstratives do not raise to [Spec, DP]. Whether demonstratives are compatible with the ideas presented here is unclear.

tives mark anaphoric definites and have been analyzed as D^x heads (Jenks 2015; 2018). In such languages, the D/*idx*P in specifier position can be null.

(20)



German strong or anaphoric definite articles are characterized by the inability of definite articles to contract with preceding prepositions. Schwarz (2009) proposes that it is the presence of the index between D and P which blocks contraction.[14]

(21) a. Plain definite: *von dem Student* → *vom Student*
b. Anaphoric definite: *von D/*idx*P dem Student* → contraction impossible, blocked by *idx*P

If P-D contraction occurs at PF, as an instance of Lowering, restricted to directly adjacent heads (Embick & Noyer 2001), the German facts provide a direct argument that *idx*P must be present in the syntax to block adjacency.[15]

The observation that demonstratives function as D heads in some languages can help make sense of the fact that in Kayardild (22) and Mandarin (23), adnominal pronouns co-occur with demonstratives:

(22) PRONOUN + DEMONSTRATIVE IN KAYARDILD (Evans 1995: 251, (6-37)) (as cited in Höhn 2017)
niya dathin-a danka-a kamarri-ja thalardin-d
3SG.NOM that-NOM man-NOM ask-IMP old.man-NOM
'Ask him, that man, the old man!'

(23) PRONOUN + DEMONSTRATIVE IN MANDARIN (Huang et al. 2009: 298)

[14] See Hanink 2018 for a detailed analysis of contraction blocking which is consistent with the proposal that the index is below DP.

[15] The availability of a null D/*idx*P might also provide an account of the apparent ambiguity of English definite articles between plain and anaphoric uses. Another perspective would be to simply claim that English lacks an anaphoric definite altogether, and that uniqueness suffices in some anaphoric contexts because of the lack of any pragmatic motivation for using a demonstrative. See Ahn (2019) for a theory of competition between anaphoric forms with this general shape.

a. wo xihuan [**nimen** zhe-xie guai haizi].
I like you.PL these good children
'I like you good kids.'
b. wo dui [**tamen** naxie liulanghan] meiyou yinxiang.
I to they those vagrant not-have impression
'I do not have impressions of them/those vagrants.'

In both languages, the pronoun occurs before the demonstrative; this is the general cross-linguistic pattern (Höhn 2017; Hsu & Syed 2020). In Jenks (2018); Bi & Jenks (2019), it was proposed that Mandarin *na* 'that' was a D^x head, and the overt pronoun before the demonstrative is an D/*idx*P. A similar analysis could be extended to Kayardild, which shares several similarities with Mandarin: it lacks a definite article, bare nouns can be interpreted as definite or indefinite (Evans 1995: p. 239), and distal demonstratives are used for anaphoric definites (Evans 1995: p. 209).

In summary, there seems to be good syntactic evidence for a phrasal category consistent with D/*idx*P which occurs in [Spec, DP] in many languages. We also saw that demonstratives realize D^x heads in Mandarin and Kayardild. From a historical perspective, the claim that demonstratives occur in both positions is unsurprising: the most common historical source of definite articles across languages is as demonstratives (Greenberg 1978; Heine & Kuteva 2002), and specifier-to-head reanalysis is an established grammaticalization pathway (e.g. van Geldereen 2004).

4.2 The semantics of indexed definiteness

This section begins by laying out the semantics for indexed definiteness. It then illustrates how this semantics derives the requirement that demonstratives must be referential, blocking predicative or situation-based covarying uses. Pronominal definites are then examined and shown to display similar restrictions.

Definite articles are typically analyzed as functions from predicates to individuals of type $\langle\langle e,t\rangle,e\rangle$. Indexed definite articles (D^x) are of type $\langle\langle e,t\rangle,\langle e,e\rangle\rangle$.

(24) a. PLAIN DEFINITE ARTICLE:
$[\![\text{the}]\!] = \lambda P_{\langle e,t\rangle}. : |P| \leq 1.\iota x.P(x)$
b. INDEXED DEFINITE ARTICLE:
$[\![\text{D}^x]\!] = \lambda P_{\langle e,t\rangle}.\lambda y_e.\iota x.[P(x) \wedge R_c(x,y)]$.

The first argument of D^x is its NP complement, of type $\langle e, t\rangle$. The second argument of D^x is a type e variable, the interpretation of D/*idx*P. This basic semantics was proposed for anaphoric/strong definite articles in German Schwarz (2009) and has been extended to anaphoric definites in Thai (Jenks 2015) and Mandarin (Jenks 2018), demonstrative pronouns in German Patel-Grosz & Grosz (2017), strong pronouns in Tswefap (Grassfields Bantu; Cameroon) (Clem 2017), and overt pronouns in Mandarin Bi & Jenks (2019).

The lexical entry in (24b) is a bit different from earlier analyses as the denotation of *idx*P is related to the unique definite by a contextually supplied relation R_c. It seems that the default interpretation of R_c is identity, i.e., $R(x, y)$ in (24b) would simply be $x = y$, which is the lexical entry assumed in most of the work above. However, other contextually supplied relations are necessary and available, such as a 'depiction' relation when referring to someone by pointing at their picture, or cases of deferred ostention, such as pointing at someone's office door to refer to them (see Nunberg 1993; Elbourne 2008; Šimik 2016 for discussion). We will stick to the case of identity for simplicity.

An alternative semantics for anaphoric definites is adopted by Ahn (2019: p. 55) and Royer (To appear), where equivalents of D/*idx*Ps are identity functions of type $\langle e, e\rangle$ which check that definite descriptions are identical to some discourse referent. In this view, unrestricted Idx features would have the following denotation:

(25) $\lambda n.\lambda x : x = g(n).x$

This proposal has the advantage of not treating definite articles as systematically ambiguous, a desirable result languages like Chuj, Greek, or Marka-Dafing where the same definite article occurs in plain and indexed definites. However, it is somewhat surprising under this analysis that languages such as German or Lakhota exist, where such a distinction is arguably made on D, and it is also unclear how pronoun-demonstrative combinations in Mandarin or Kayardild could be analyzed, demonstratives seem to the realization of D^x.

Additionally, the analysis in (25) would require demonstratives to always compose with a referential expression, entailing ellipsis in their pronominal uses. Alternatively, D/IdxPs might be ambiguous between type e interpretations as variables, which they would receive in their pronominal uses, and the functional interpretation in (25). We leave these questions for future work.

Adopting the semantics in (24b), we get meanings like the following, here assuming that R_c(x,y) is identity ($x = y$):

(26) a. $[[\text{we}_7\ D_x\ \text{students}]]^{g,c} = \iota x[\text{Student}(x) \wedge x = g(7)]$, if $g(7) \in D_e$, if $|g(7)| \neq 1$, if $\text{speaker}_c \in g(7)$, else undefined.
b. $[[\text{this}_2\ D_x\ \text{student}]]^{g,c} = \iota x[\text{Student}(x) \wedge x = g(2)]$, if $g(2) \in D_e$, if $|g(7)| = 1$, if $g(2)$ is at δ near the speaker in c, else undefined.

So in (26a), *this*$_2$ *student* picks out the unique student who is known to be identical to the individual $g(2)$, not near from the speaker. Similarly, *we linguists* picks out the maximal plurality of linguists (using the σ operator from Link 1983), identical to a plurality containing the speaker.

As indexed definites have a pronominal component, they should share functions with pronouns, and indeed they do: pronouns and complex demonstratives are alike in occurring in exophoric, anaphoric, and donkey anaphoric contexts (cf. Nunberg 1993: p. 3).[16]. These similarities are most clearly illustrated with demonstratives, where we see parallel behavior in English and Mandarin (the Mandarin data are from Bi & Jenks 2019).

(27) *Exophoric reading*
a. That lady/she is pretty smart. (pointing)
b. {Na$_1$-ge ren / ta$_1$} hen congming. (pointing)
that-CLF person / 3SG very smart.
'That$_1$ person/ she$_1$ is pretty smart'

(28) *Narrative sequence*
a. [One student]$_1$ likes Mary. But Mary doesn't like that$_1$ student/her$_1$.
b. [Yi-ge xuesheng]$_1$ xihuan Lisi. Dan Lisi taoyan {na$_1$-ge
One-CLF student like Lisi. But Lisi dislikes that-CLF
xuesheng / ta$_1$}.
student / 3SG.
'One student likes Lisi. But Lisi dislikes that student/her.'

(29) *Covarying reading (Donkey anaphoric)*
a. Every farmer who owns a donkey beats that donkey/it.

[16] Not all pronouns have all three uses. English *it*, for example, cannot be used exophorically. 'It', then, must be a weak pronoun in English, licensed by ellipsis, as in the discussion in Section 3, consistent with its felicity as a descriptive pronoun.

b. Mei-ge [you [yi-ge lüzi]$_1$ de] nongfu dou hui da
Every-CLF have one-CLF donkey MOD farmer all will beat
{na$_1$-zhi lüzi / ta$_1$}.
that-CLF donkey / 3SG
'Every farmer who owns a donkey will beat that donkey/it.

In each of these expressions, the complex demonstrative is interpreted as 'the unique x such that $P(x)$ and identical to $g(1)$'. Because demonstratives might the most underspecified realizations of *idx* (Section 3), the contextual restriction is relatively free. When the speaker is pointing, as in (27), the context will include a pointing demonstration and this demonstration suffices to help the listener identify the value of $g(1)$ (Nunberg 1993; Elbourne 2008; Šimik 2016). In ((28)), the variable picks out a salient discourse referent, and in (29) the variable is dynamically bound by the existential quantifier in the preceding relative clause. Further evidence for the parallel of exophoric uses of pronouns and demonstratives in particular is provided by Ahn & Davidson (2018), who show that speakers treat demonstratives and pronouns alike in both exophoric and anaphoric contexts.

The second piece of evidence for the semantics for indexed definites in (24b) comes from the observation that demonstratives are infelicitous in non-referential definite contexts. In particular, they are impossible in the intensional contexts which generally depend on situation-based covariation for plain definites. This is illustrated for English below;

(30) a. #Scott is **that** (only) author of *Waverly*.
b. #Scott is not **that** only author of *Waverly*.
c. #Every Thanksgiving in the United States, **that** president pardons a turkey.

The complex demonstratives in these examples must pick out a particular individual and do not allow predicative readings or situation-based covariation, in contrast with the plain definite descriptions discussed in Section 2. The rigidity of these expressions follows if the demonstrative is always identifying the individual who satisfies the definite description with a discourse referent.

Jenks (2018) provided evidence for the same effect in Mandarin: while the bare noun allows situation-based covariation as in (31b), the presence of a demonstrative, also used to mark anaphoric definiteness, blocks this reading (31c):

(31) a. jīn nián zǒngtǒng lái zì PFP
this year president come from PFP
'This year [the president]$_i$ comes from the PFP.'
b. míng nián zǒngtǒng jiāng shì DPP de dǎng yuán
next year president will be DPP REL party member
'But next year [the president]$_{??i/j}$ will be from the DPP.'
c. míng nián zhè wèi zǒngtǒng jiāng shì DPP de dǎng yuán
next year this CLF president will be DPP REL party member
'But next year [the president]$_i$ will be from the DPP.' (Odd, only allows a 'changing party' reading).

While (31b) allows the president this year and last to be two different people, plausibly so as they are from different political parties, this reading is not available for the demonstrative phrase in (31c). This restriction is explained by a semantics where the president referred to by the demonstrative in (31c) is identified with a discourse referent, necessarily the same individual identified in (31a).

Pronominal definites such as *you linguists* seem to share many of the same semantic properties with anaphoric and demonstrative noun phrases. The fact that pronouns might be specifiers rather than heads goes against a widely adopted analysis of such pronouns are D heads (Postal 1969; Elbourne 2001). Yet pronouns in pronominal definites again are more plausibly in [Spec, DP] (Giusti 2002; 2015), where they introduce a referential index. This claim is supported by the fact that pronominal definites, like complex demonstratives, readily support exophoric uses, which are marginal with plain definites in English:

(32) You linguists are pretty smart. (pointing)

This sentence is compatible with any context where the speaker is talking to more than one linguists. In such contexts, *you linguists* pick out the maximal set of linguists. This follows from the rough semantics provided for indexed definites above:

(33) $[\![\text{you}_2\ \iota^x\ \text{linguists}]\!]^{g,c} = \sigma x[\text{linguists}(x) \wedge x = g(2)]$, if $|g(2)| \neq 1$, if $\text{hearer}_c \in g(2)$, else undefined.

What is not required is that every hearer be in the set of linguists. Instead, the totality of linguists is equated with some contextually salient plurality which includes at least one addressee. *You linguists* cannot be used to

pick out a subset of the linguists present, and this follows from the definite/maximal component of its meaning.

On the other hand, pronominal definites cannot occur in the non-referential definite contexts described above; for example they are impossible as the predicate of a predicative copular clause:

(34) Gladys and I are #us/the authors of this article.

The problem is specifically that pronominal definites cannot be predicates. For example, inverse or specificational copular clauses, where the subject is a predicate and the object a referential argument (Mikkelsen 2005), allow a pronominal description to follow a copula:[17]

(35) The problem is us linguists.

So it seems that pronominal definites must be directly referential, i.e., they denote a contextually salient real-world entity.

A final argument that pronominal definites are indexed definiteness is based on Simonenko (2014), who observes that complex demonstratives are always DP islands for *wh*-subextraction (compare (36a-b)). In (36c) we see that pronominal definites pattern with complex demonstratives in this regard.

(36) a. Which classes did Mary criticize the instructors of?
b. *Which classes did Mary criticize those instructors of?
c. *Which classes did Mary criticize you instructors of?

Simonenko (2014; 2015) shows that this contrast is also found in weak vs. strong articles in Austro-Bavarian German, the latter of which are anaphoric, hence indexed, definites Schwarz (2009). Simonenko's explanation for why indexed definites are DP islands is that questions are only felicitous in a context where their answer is unknown. Because indexed definites already identify their referent with a particular contextually supplied individual, any *wh*-question originating from within an indexed definite will necessarily be used in a context in which its answer is already entailed. This test has not been replicated in very many languages, but the prediction is clearly that indexed definites should generally serve as *wh*-islands.

In conclusion, the fact that local pronouns seem to function as an overt D/*idx*P provides an argument for indexed definiteness independent of demonstratives and anaphoric definites. While pronouns can have type e meaning

[17] Thanks to an anonymous reviewer for pointing this out.

on their own, they must have some way of combining with the meaning of the NP, particularly in languages like Greek, where we saw the definite article and pronoun co-occur (17). Treating pronominal definites as indexed definites resolves this puzzle.

5 Anaphoric definites in Dafing as indexed definites

This section turns to a case-study on the distinction between plain and anaphoric definiteness in Marka-Dafing, which provides empirical support for the conception of indexed definites described above. In Marka-Dafing, anaphoric definites are shown to require an overt anaphoric index, which also functions as a pronoun, this anaphoric index can be clearly shown to occupy [Spec, DP] a position distinct from the definite article. Furthermore, the expected semantic contrasts between plain and indexed definiteness arise when this element is present.

5.1 Background on Marka-Dafing

Marka-Dafing ([Glottocode: mark1256]), called either Marka or Dafing,[18] is a Mande language spoken by approximately 200,000 people in northwestern Burkina Faso (Harrison & Harrison 2002). Marka-Dafing is closely related to Bambara, the national language of Mali, as well as to Dyula (or Jula, [Glottocode: dyu1238]), a major trade language spoken widely to the south. Prior descriptions of Marka-Dafing exist, and their descriptions are consistent with the data described below, although they focus on different dialects (Prost 1977; Diallo 1988; Traore 1998). The data in this paper represents the Safané dialect of Marka-Dafing, the southernmost variety.[19]

Mande languages are typologically notable for their S-Aux-O-V word order at the clausal level (Koopman 1984; 1992; Creissels 2005; Nikitina

[18] The names Marka and Dafing reflect distinct ethnic identities within the Marka-Dafing speaking community.

[19] The data in this paper represent the speech and intuitions of the second author, working collaboratively with the first author for a five-year period from 2016-2021. Marka-Dafing is the second author's primary language, and is spoken at home with her family, along with Dyula. Marka-Dafing is also the language of her ancestral village which she visits regularly. The second author was actively using this language in Burkina Faso during various stages of the collaboration. Nevertheless, it is an acknowledged limitation of these data that they are primarily based on the judgments of a single native speaker.

2011; Sande et al. 2019). The Aux position consists of a complex head marking tense, aspect, negation, and finiteness; it is preceded by the subject. All other VP adjuncts and arguments, including PPs and CPs, follow the verb. A simple clause is given below.

(37) è ní wúrú=ˈú jè
2SG PAST dog=DEF see
'You saw the dog.'

Basic clause structure in Mande has been analyzed elsewhere (Koopman 1992; Nikitina 2011; Sande et al. 2019). Three general observations about the syntax of Mande languages will be relevant below. First, subjects, and, hence, specifiers, occur to the left of their head. Second, with the notable exception of TP, headed by the past auxiliary in (37), heads typically go on the right in Mande. Third, Mande languages are not pro-drop languages; pronouns are obligatory in all contexts.

5.2 The definite article in Marka-Dafing

Dafing has a definite article *=ú*, which occurs as an DP enclitic. The surface realization of the article depends on the final vowel of the word to which it attaches, as illustrated in Table 1. Words that end in /a/ have their final vowel changed to [ɔ] (e-f). In low-tone roots, the definite article lengthens the final vowel of its host and inserts H tone, which spreads back to the adjacent root vowel (a-b). On the other hand, the H on the article is realized as a downstep if the word already ends in a H (c-d).

Table 1: Phonological realization of the Marka-Dafing definite article.

	N		N=DEF	
a.	jɛ̀	'fish'	jɛ́=ɛ́	'the fish'
b.	lù	'house'	lú=ú	'the house'
c.	ljɛ́	'pig'	ljɛ́=ˈɛ́	'the pig'
d.	só	'horse'	só=ˈó	'the horse'
e.	sámá	'elephant'	sámɔ́=ˈɔ́	'the elephant'
f.	sá	'sheep/goat'	sɔ́=ˈɔ́	'the sheep/goat'

The definite article below appears at the right edge of the DP, after adjectives (38) and numerals (39).

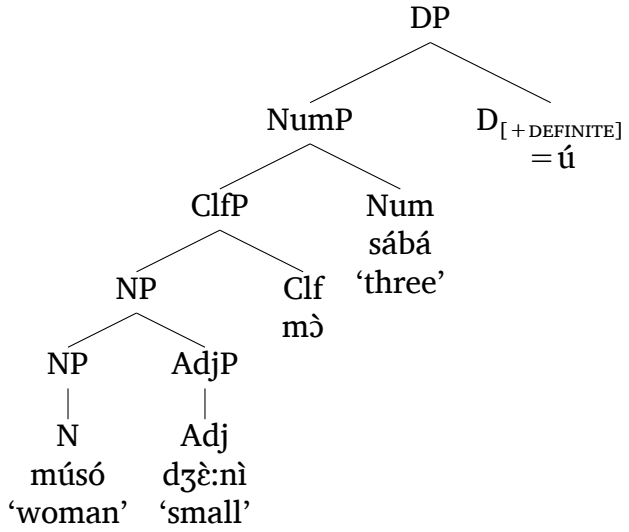
(38) a. sàmà dʒɛ̀:nì
elephant small
'a small elephant'
b. sàmà dʒɛ̀:ní =í
elephant small =DEF
'the small elephant'

(39) a. músó mɔ̀ sábá
woman CLF 3
'three women'
b. músó mɔ̀ sábɔ =ꜜɔ́
woman CLF 3 =DEF
'the three women'

The definite article is in complementary distribution with a small class of determiners, including the exophoric demonstrative *mín* 'this, that'—which will be important below—, an indefinite determiner *dɔ̀* 'some', and *vjɛ̀* 'every.' All but the last of these determiners can take a plural suffix as well, a point we set aside as it is orthogonal to the realization of definiteness.

The left-branching structure below accounts for the major properties of Marka-Dafing DPs. As adjectives precede numerals and classifiers, they can be analyzed as rightward adjuncts on NP.

(40)



This structure captures the distribution observed above for the definite article; D will follow whatever elements are in the DP.

Definite articles in Marka-Dafing are obligatory in all contexts licensed just by uniqueness. First, in the terminology of Hawkins (1978), definite

articles must occur in ‘larger situation’ definites such as ‘the sun’ or ‘the chief.’

(41) té =#(ˡé), káŋ fàrì
sun =DEF BE intense
‘The sun is intense.’

(42) víí, zúʃˡí #(=í) zúsó ˡkáŋ ʃì
today chief =DEF heart BE good
‘Today the chief is happy.’

Second, the Marka-Dafing definite article is required in ‘immediate situation’ definites, where only context licenses uniqueness in the absence of prior mention:

(43) à:ká: dé =#(é) kùnùn wà
NEG.IMP child =DEF wake.up NEG
‘Don’t wake up the baby!’

Similarly, in a procedural narrative about making pottery, the definite article could be used to introduce contextually unique discourse referents such as ‘the clay’ at their first mention:

(44) S1 nì è=é bɛ́ è ká dá: bɔ̀ …
if 2SG=PRES want 2SG INF pot throw
‘If you want to make a pot…
S2 è jì =à dámná ní bɔ́=ˡɔ́ jè
2SG HAB 3SG start with clay=DEF DAT
‘you start with the clay.’

Bridging contexts, discussed extensively in Schwarz (2009; 2013), were not systematically tested, but the examples above suffice to establish that prior mention is not a necessary criterion to use the definite article in Marka-Dafing, hence it is a plain definite.

5.3 Anaphoric definites in Marka-Dafing as indexed definites

Definite DPs can occur with an element *wó*, which must occur at the left edge of the DP.

(45) wóˡ músóˡ =ó
IDX:ANA woman DEF
‘the woman (that we were talking about)’

There is a salient intuition for native speakers of Marka-Dafing that *wó* must refer to an individual mentioned earlier in the conversation. In other words, the presence of *wó* turns a plain definite into an anaphoric definite. Historically, *wò* was a distal demonstrative (Valentin Vydrin, p.c., cf. Zribi-Hertz & Hanne 1995 for Bambara), and in other closely related Mande languages this demonstrative allows exophoric uses. However, in Marka-Dafing, *wó* cannot be accompanied by a pointing gesture, but can only be anaphoric.[20]

This section presents evidence that *wó* is the D/*idx*P argument for an indexed definite in Marka-Dafing. Rather than carrying ϕ-features or spatial restriction, however, *wó* restricts variables to 'established discourse referents', making it a 'pure' anaphoric definite. We will adopt the idea below that *wó* is the realization of the features [D,*idx*, + ANAPH], with the following interpretation:

(46) $[[\text{wo}_1]]^{g,c} = g(1)$, if $g(1)$ is an established discourse referent, else undefined.

Beyond intuitions about prior mention, the semantic distribution of *wó* clearly shows that it is an anaphorically indexed definite, requiring prior mention and denoting a particular individual when free.

First, *wó* cannot occur in unique definite contexts, like (41) and (42), whose context precluded prior mention.[21]

Second, *wó* is preferred in narrative sequences, although plain definites are possible in such contexts:

(47) a. kúnúŋ músó dò dó-ná m̀m̀ lú kɔ̀ŋ
yesterday woman some enter-PST my house IN
'Yesterday, some woman walked into my house.'

b. ň tí má ?(wó) músó =ó ye a-ye wa
1SG PFV NEG IDX:ANA woman =DEF see before NEG
'I'd never seen that woman before.'

[20] Diallo (1988: p. 151-153) notes that there is a demonstrative *ó* in the Zaba dialect of Marka-Daing, with the same distribution as Safané *wó*, and which contrasts with an exophoric *ɲí*, equivalent to Safané mín. Diallo focuses on the syntactic distribution and phonological behaviour of *ó*, rather than its semantics.

[21] Bombi (2018) reports very similar observations for the demonstrative + article combination in Akan from example (18), showing that the article previously claimed by Arkoh & Matthewson (2013) to be an anaphoric definite article may in fact be a plain definite (in the terms of this paper). Interestingly, Akan is a language where there is an additional alternation between a plain definite article and the possibility of a bare noun, which is impossible in Marka-Dafing.

The availability of *wó* in narrative sequences is consistent with the idea that *wó* refers to an established discourse referent.

Finally, *wó* is incompatible with situation-based covariation, shown in Schwarz (2009) and Jenks (2018) to semantically require a unique definite, as the choice of unique individual, here the choice of chiefs, is able to vary with the situation:

(48) *Context*: It is well known that chiefs are mean and grumpy people.
   a. zúù vjè sɔ̀ zúʃí =ˡí kò-màŋ-ʒí mɔ́ =ˡù
   village-PL every in chief =DEF not.like people =DEF.PL
   yè wà
   with NEG
   'In all the villages, the people don't like the chief.'
   b. In every s', x, s' a situation in some village x, the people in s' don't like the chief in s'.

Because it forces reference to a particular individual, *wó* is impossible in these contexts. When it is present, it forces reference to a particular chief who has been mentioned previously:

(49) *Context*: There is a chief, Musaa, who is mean to everybody; nobody anywhere likes him.
   a. zú=ù vjè sɔ̀ wó$_2$ zúʃí=ˡí kò-màŋ-ʒí mɔ́ =ˡú
   village=PL every in IDX:ANA chief =DEF not.like people
   yè wà
   =DEF.PL with NEG
   'In all the villages, the people don't like that particular chief.'
   b. In every s', x, s' a situation in some village x, the people in s' don't like the chief in s' identical to the established discourse referent $g(2)$.

Additionally, *wo* can be used as a donkey anaphor, though the plain definite can be used in this context as well:

(50) [ní tʃé ˡní péỳ dò sàŋ] ɛ́ɛ̀ (wó) pé=ˡí
   If man PAST donkey some buy 3SG.PRES IDX:ANA donkey=DEF
   sèŋ
   hit
   'If a man buys some donkey, he hits that donkey.'

While *wó* allows covarying readings, its presence also brings to mind readings where *wó pé*=ˡ*í* refers to some specific donkey, say Bob, who gets hit any time any farmer buys any other donkey. In such a case, Bob would be an established discourse referent.

However, covarying readings with *wó* are clause bound, whereas situation-dependent covariation is possible even across clause boundaries:[22]

(51) *Context*: Suppose chiefs are selected each year in an election, but that chiefs quickly become unpopular after they are elected.

a. zú=ù vjè sɔ̀, mɔ́-ˡú zúʃi bɔ́.
village=PL every in people-DEF.PL chief.INDEF pick
'In every village, the people pick a chief.'

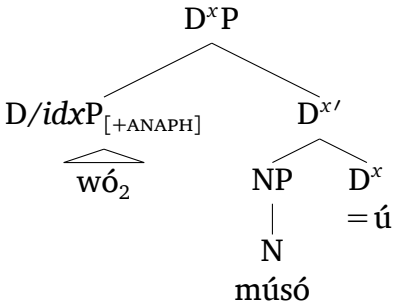
b. #kárú tʃén kɔ́bɛ́, wó$_2$ zúʃí =ˡí kùò-màŋ-ʒí mɔ́ tʃèn
month one after IDX:ANA chief =DEF not.like person one
yè wà
with NEG
'After one month, nobody likes the/that chief.'

c. *Comment*: If you use *wo* in the second sentence it doesn't make sense, as the first sentence doesn't specify a chief. People would probably reply, "What chief are you referring to?"

The contrast above shows clearly that *wó* picks out a particular individual unless it is clause-internally bound as as donkey anaphor.[23]

The meanings above are those expected of if *wó* realizes the D*idx*P of a D^{x}P:

(52) a. Structure of (45)



b. $[\![(52a)]\!] = \iota x[\text{woman}(x) \wedge x = g(2)]$, if $g(2)$ is an established discourse referent, else undefined.

[22] Thanks to an anonymous reviewer for suggesting this additional test.

[23] This is essentially an attempt to use *wó* in a context similar to what was labeled *telescoping* by Roberts (1987). See Neale (1990) for an analysis of such cases as unique definites; unsuprisingly such cases are incompatible with anaphoric definiteness.

So Marka-Dafing definite articles must be ambiguous between a plain definite D and D^x. In other words, the definite enclitic is just an exponent of the features [D, +DEFINITE]; the distinction between plain and indexed definiteness on D is not expressed morphologically in Marka-Dafing.

A number of facts support the idea first that *wó* is in [Spec, DP] and second that *wó* is essentially a pronoun. First, the structure in (52) accounts for the word order facts: =*u* is a phrase-final head while *wó* occurs on the left edge of the DP, the position that specifiers (such as subjects) typically occupy in Mande lanuages; adjuncts and heads occur to the right.

Second, *wó* cannot occur on indefinite DPs; this follows if it is an argument of the definite article:

(53) a. *wó músó
IDX:ANA woman
b. *wó músó dò
IDX:ANA woman some

Third, *wó* is in complementary distribution with other phrasal specifiers in the noun phrase, namely possessors. in (54) we see instances of a pronominal possessor and a phrasal possessor, both of which are possessive. This illustrates that the leftmost position is phrasal.

(54) a. m̀mḿ bɔ́ =ǃɔ́
1SG.POSS sheep =DEF
'my sheep'
b. Mùsá káǃá bɔ́ =ǃɔ́
Musa POSS sheep =DEF
'Musa's sheep'

However, *wó* cannot co-occur with such possessors, suggesting it is a phrase.

(55) a. *wó m̀mḿ bɔ́ =ǃɔ́
IDX:ANA 1SG.POSS sheep =DEF
b. *wó Mùsá káǃá bɔ́ =ǃɔ́
IDX:ANA Musa POSS sheep =DEF

There is no obvious semantic explanation for the ungrammaticality of (55). It is simple to write a semantics which both encodes possession and includes an identity to a discourse referent:

(56) $\iota x[\text{sheep}(x) \wedge \text{Poss}(\text{m},x) \wedge x = g(1)$ (hypothesized meaning for (55b))

This could be the interpretation of an English noun phrase like *that sheep of Musa's*. So the ungrammaticality of (55) must be syntactic. We can account for its ungrammaticality if both possessives and *wó* are competing for [Spec, DP], the position assumed by standard DP analyses of possessives (Abney 1987; Szabolcsi 1994).

As D/*idx* is essentially a pronoun, it is important to note that *wó* also has a pronominal function, where it retains its anaphoric properties.

(57) *Context*: In Ghana, nobody likes the president(s) who died.

a. ǹ nó=ó (/ní wó/) kùŋbè
1SG PAST=IDX:ANA meet
'I met him.'

b. ǹ nó=órú (/ní wórú/) kùŋbè
1SG PAST=IDX:ANA.PL meet
'I met them.'

Additionally, *wó* can occur as an anaphoric possessive pronoun:

(58) wó ká$^{!}$á músó=$^{!}$ó kó-káŋ-ʒì vyɛ̀ yè
IDX:ANA POSS wife=DEF pleases everybody be
'Everybody likes his (=that president's) wife.'

Finally, *wó* has similar binding behavior to demonstrative pronouns in German (Wiltschko 1998) and strong pronouns in Tswefap (Clem 2017)[24], in that it resists bound variable readings under c-command:

(59) a. mɔ́ tʃèn mà-fɔ̀ k-á káŋzàŋ wà
person one NEG-say COMP-3SG full NEG
'Nobody$_1$ said they$_{1/2}$ are full'

b. mɔ́ tʃèn mà-fɔ̀ k-ó káŋzàŋ wà
person one NEG-say COMP-IDX:ANA.SG full NEG
'Nobody$_1$ said they$_{*1/2}$ are full'

Whereas the weak pronoun *á* in (59a) allows a bound variable reading, a bound reading is not available for *wó* in (59b). The inability of *wó* to be bound might arise because of the contextual restriction on *wó*: because it is restricted to established discourse referents, it presumably prefers extrasentential reference. This restriction does not apply to the third person personal pronoun *à*, an unrestricted variable, which can be bound.

[24] This kind of contrast holds for null versus overt pronouns in many Romance languages as well Montalbetti (1984), where only null subjects can function as bound variables.

In summary, then, there is evidence that *wó* is a pronoun in [Spec, DP] which restricts the denotation of the DP to a particular contextually salient individual. This makes anaphoric DPs in Marka-Dafing indexed DPs in support of the general proposal advanced above.

6 The Single Index Constraint

We will zoom back out now to try and understand the kinds of referential indices in indexed definites in a more general sense. We have seen evidence for the following three kinds of restrictions provided by *idx*Ps:

(60) a. Local personal pronouns identify sets containing the speaker or hearer
b. Demonstrative pronouns identify individuals in space
c. Anaphoric pronouns identify individuals in the discourse

All three restrictions point to some element of the context. Local personal pronouns point directly to the speaker or hearer in a particular context (Sudo et al. 2012), and in this very general sense can be seen as deictic. Demonstrative and anaphoric pronouns point directly to their referent as well, but they utilize different parts of the context, location, in the case of spatial demonstratives, and reference in time in the case of anaphoric demonstratives.[25]

When we try to combine these restrictions, we find that it is impossible. Instead, languages must select only one kind of deictic restriction per indexed definite, even when there is good reason to think that multiple kinds of deixis should be possible. More generally, this section suggests that there evidence for the following generalization:

(61) THE SINGLE INDEX CONSTRAINT: Indexed definites and deictic pronouns can only rely on a single referential index to refer.

This principle can be derived from the requirement that indexed definite DPs have only a single D/*idx*P specifier, and each D/*idx*P is always restricted along a single deictic dimension, whether by referring directly to the conversational participants, to the location of an individual in space, or in time. This constraint accounts for the generalization by Hsu & Syed

[25] The possible semantic content of demonstratives across languages is quite rich. For example, Malagasy demonstratives encode a visibility distinction (Paul 2009). Such demonstrative content could be encoded as additional presuppositions on the denotation of the index as proposed above.

(2020) that markers of identifiability (roughly, anaphoric definiteness) and deixis (roughly, exophoric demonstratives) never seem to co-occur in the same DP. We will review several cases below where this constraint is in effect.This constraint does not apply to cases where both DP and NP contain separate indices, for example in expressions such as *that*$_2$ *one*$_3$, where *one*$_3$ is discourse anaphoric to an NP antecedent.

First, regarding the co-occurrence of local pronominal D/*idx*Ps and demonstrative D/*idx*Ps, there simply do not seem to be any such cases, which would look like the following:

(62) a. *we these students
b. *you those students

Apparent counterexamples come from the apparent cases of demonstrative-pronoun co-occurrence in (22) and (23). But if the demonstratives in such cases are D heads, then there is only one D/*idx*P, which is the pronoun.

The evidence for the incompatibility of exophoric and anaphoric reference is clearer, particularly when we look at Marka-Dafing. In exophoric contexts, Marka-Dafing makes use of a distinct demonstrative determiner *míi* which occurs in the DP-final head position and is restricted to pointing, or exophoric, reference:

(63) wúrú ꜜmíi
dog D:EXO
'this/that dog' (pointing)

There is good evidence that *míi* is a D head, as not only is it DP-final but it is in complementary distribution with definite =ú:

(64) *wúrú=ꜜú ꜜmíi
dog=THE ART:EXO

The puzzle is just that, despite occurring in different syntactic positions, deictic *míi* and anaphoric wó cannot co-occur:

(65) *wó wúrú ꜜmíi
IDX:ANA dog ART:EXO

Simple syntactic and semantic explanations for the ungrammaticality of (65) fail. Syntactically, *wó* and *míi* occupy different positions: *wó* is in [Spec, DP], while *míi* is a D head. In both a general pragmatic as well as in purely logical terms, the meanings of the two demonstrative elements are compat-

ible: there is no reason that a speaker could not be pointing at some dog, satisfying the exophoric requirement of *míi*, and that the same dog could also be an established discourse referent, satisfying the anaphoric requirement of *wó*.

The simple theory of indexed definiteness described above, however, provides a natural account for this restriction. Suppose exophoric indexed definite *míi* always contains a phonologically null *idx*P in its specifier position, restricted to the individual being pointed at by the speaker. Call this specifier IDX:EXO. Because indexed definites only have a single specifier, *wó* is blocked by IDX:EXO, which is required in the context of *míi*.

Other languages in the literature where exophoric and anaphoric demonstratives both exist show the same restriction. For example, in Limbum (Grassfields Bantu, Becker 2018, which has an anaphoric article and an exophoric demonstrative pronoun (the opposite of Dafing), the two elements also cannot co-occur:

(66) wè rīŋ [ndíŋwɛ̌ cà / *fɔ̄ ā
2SG know woman DEM:DIST ART:ANA] Q
'Do you know that woman over there? (pointing)' Becker (2018: p. 49)

Another illustration of the Single Index Constraint comes from Korean. Korean has three demonstrative determiners, two of which are strictly exophoric and one of which is strictly anaphoric Ahn (2017). Unlike in Marka-Dafing and Limbum, such demonstratives are in paradigmatic opposition as D heads (Chang 2009), and again are blocked from co-occurring.[26]

It is actually possible demonstrate the effect of the Single Index Constraint in English, lending support to the idea that it is a universal constraint. However, its effect is apparent not in terms of the incompatibility of distinct demonstratives, but rather in restricting *that*, which generally is capable of both anaphoric and exophoric reference, to pick just one of these deictic restrictions. to see this restriction hold, one needs to set up an instance of anaphoric reference, and then to point what might seem to be the intended referent; which then fails to refer anaphorically. This kind of setup is illustrated in the following example, adapted from Wolter (2007: ex. 11, p. 612):

[26] These could also be D/*idx*Ps; Chang's main argument comes from the compatibility of these demonstrative determiners with possessives, which are taken to occupy [Spec, DP]. But possessives co-occur with demonstratives in many languages, and there is no clear relationship between possession and definiteness across languages (Haspelmath 1999; Alexiadou 2005).

(67) [You are telling me about Mary.] "Mary has been telling me that she thinks that there has been a dog digging up her flower beds." [Then Barky the dog wanders in.] "In fact, she thinks that *that dog* [pointing at Barky] ruined her garden."

In this discourse the two dogs—Barky and the one Mary believes to have ruined her garden—cannot be the same, although context would seem to strongly prefer such an interpretation. Somehow the final sentence still feels like a *non sequitur*; to get the intended interpretation, the presupposition cleft *that is the dog that ruined her garden* would be necessary. The restriction observed above follows from the Single Index Constraint, exactly as in Marka-Dafing: the exophoric use of the demonstrative in the final sentence blocks an anaphoric interpretation..[27]

We see one more example below, somewhat more simplified, where the restriction is perhaps even clearer:

(68) *Context*: A couple minutes ago, a creepy guy walks into the room and hides behind a large potted plant. You walk in, and I tell you in confidence:

a. Watch out! [A creepy dude]$_1$ walked into the room a couple minutes ago.
b. [That man/he]$_1$ is [that man]$_2$ (pointing).
c. *[That man]$_{1,2}$ (pointing) is really creepy.

(68a) can felicitously be followed by (68b), where the subject is an anaphoric definite and the object is exophoric, each making use of separate (restrictions on) indices. The demonstrative subject of (68c) attempts to utilize simultaneous anaphoric and exophoric reference, but as long as the speaker is pointing to the man behind the pot, the sentence again feels *non sequitur* in the context of (68a): there must be two creepy men in the room. This effect follows in English if simultaneous anaphoric and exophoric features indices are not allowed. This restriction likely follows because exophoric indices serve to establish reference, hence are new, whereas anaphoric indices must be part of the context. But crucially, only one index is allowed per DP.

[27] Wolter's paper is a response to King (2001), who argues for a quantificational analysis of demonstratives. Wolter's proposal relates to the the situation variable which restricts the domain of the demonstrative, which Wolter claims must take sentence-level scope. In the theory outlined in this paper, following Nunberg (1993); Elbourne (2008), sentence-level scope follows from the index itself, which forces a (discourse) referential interpretation at the sentence level.

7 Conclusion

The central claim of this paper is that there is a syntactic category *idx*, interpreted as a variable, which define a class of pronominal elements, including demonstratives, which can occur in [Spec, DP]. Plain definiteness in contrast only convey uniqueness, and need not be referential, allowing covariation by situation as well as predicative readings.

It seems relatively clear that something like deixis or indexed definiteness occurs in every language, presumably because natural languages and humans more generally has the capacity to refer via whatever the neural correlate of indices are. It is not at all clear if plain definiteness is universal, that is, if all languages have ways of marking uniqueness. This is particularly clear for languages where putative definiteness correspond to bare nouns, such as Russian, Thai, and Mandarin. Recently, Šimík & Demian (2020) have shown that uniqueness and maximality effects are not detectable in Russian. In addition, indices might also be extended to referential uses of demonstratives in some indefinite contexts (Ionin 2006; Šimik 2016). So the class of referential expressions this paper has attempted to characterize might actually just be that of indexed noun phrases more generally, which stand in opposition to a larger class of non-indexed noun phrases, which include plain definites as well as bare nouns, whatever their interpretation may actually turn out to be.

Finally, returning to the theme of the introduction, it does seem clear that something like a referential index plays a role in the structure and meaning of certain noun phrases. However, the fact that indices occur only some of the time, and in particular that they seem to be absent on plain definites, indicates that the standard generative approach to indexing all potentially referential noun phrases is likely not the right model of language. Yet it remains to be seen what role, if any, indices may play in the traditional domain of (co-)indexation and binding.

Abbreviations

1 = first person, 2 = second person, 3 = third person, ANA = anaphoric, ART = article, CLF = numeral classifier, DEF = definite, DEM = demonstrative, EXO = exophoric, DIST = distal, *idx* = index, IMP = imperative, INF = infinitive, MOD = modification marker, NEG = negation, NOM = nominative case, PL = plural, PFV = perfective, POSS = possessive, PRES = present tense, Q = question SG = singular

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The authors have no competing interests to declare.

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