

Basaá and the lexical semantics of property concept nouns *

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Abstract

This paper examines the link between syntactic category and lexical semantics through an examination of the consequences of variation in the lexical category of Dixon's (1982) property concepts (PCs; notions lexicalized as adjectives in languages with that category). Francez and Koontz-Garboden (2013b) conjecture that nominal encoding of PCs entails a mass-type denotation: nominal encoded PCs denote ordered sets of portions of substance, in the spirit of Link (1983). Taking as a point of departure, Francez and Koontz-Garboden's claim that possession in predication (e.g., *Kim has beauty/#Kim is beauty*) is diagnostic of a substance denotation with PC nominals, we show through a detailed investigation of two classes of PC nominals in Basaá (Bantu; Cameroon), that this claim is false. While a class we call *property nouns* trigger possession in predication, a class we call *adjectival nouns* do not. Additional diagnostics confirm the substance denotation for the property nouns, and a normal predicative denotation for the adjectival nouns. Further evidence from comparative subdeletion, equatives, and degree morphology, however, reveals that the meanings of the two classes are closer than they initially seem. We argue that adjectival nouns denote relations between individuals and possessed portions of substance, as in a verb phrase like 'have strength.' We extend this analysis to account for the distinct distribution of the two classes in noun-phrase internal attributive environments. More broadly, the results confirm a link between nominal encoding of PCs and a particular kind of lexical semantics—nominal encoding entails a semantics of substances.

Keywords: lexical categories; semantic variation; adjectives; property concepts; predication; modification; gradability; degrees; mass nouns

1 Introduction: The meaning of lexical categoryhood

As many have discussed at length (Givón 1984; Croft 1991; Hengeveld 1992; Bhat 1994; Wetzer 1996; Stassen 1997; Croft 2001; Beck 2002; Baker 2003), the nature of lexical categoryhood is at once one of the most important and most vexed issues in linguistics. Baker (2003: 1-2) articulates the current state of affairs particularly clearly and dramatically:

The division of words into distinct categories . . . is one of the oldest linguistic discoveries, with a continuous tradition going back at least to the *Téchnē*

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grammatikē of Dionysius Thrax (c. 100 BC) (Robins 1989: 39)...often when students enter their first linguistics class, one of the few things they know about grammar is that some words are nouns, others are verbs, and others are adjectives. Linguistics classes teach them many fascinating things that go far beyond these basic category distinctions. But when those classes are all over, students often know little more about what it means to be a noun, verb, or adjective than they did at first, or indeed than Dionysius did. (Baker 2003: 1–2)

One central question in this area is whether there are semantic generalizations to be made about lexical categoryhood. It is commonly believed, both traditionally and more recently in the functional-typological and cognitive literatures, that there are. For example, Givón (1984) claims that there is a link between lexical categoryhood and “time stability”, the idea being that verbs (prototypically) name (transient) actions, nouns (time-stable) name things, while adjectives represent some mid-way point between the two. Langacker (1987) argues, in cognitive linguistic terms, that “*all* members of the noun class (not just central members) instantiate an abstract noun schema, while all verbs elaborate an abstract verb schema” (Langacker 1987: 54, emphasis his). Croft (1991, 2001) lays out a theory wherein the terms “NOUN, ADJECTIVE, and VERB ... may be used to describe these typological prototypes (Croft 1991): noun = reference to an object; adjective = modification by a property; verb = predication of an action” (Croft 2001: 89). Similar sorts of claims are commonly found elsewhere in this literature as well (e.g., Hopper and Thompson 1984; Hengeveld 1992; Bhat 1994; Beck 2002; Schachter and Shopen 2007).¹

Proposals like these, that make a link between lexical category and meaning, have often come under criticism, however (e.g., Newmeyer 1998: Chapter 4; Baker 2003: Chapter 1), in large measure due to lack of formal articulation of key notions, which have been argued to make such ideas difficult to test. It might be imagined that this is a kind of problem that might be solved by articulation of the semantic claims in model-theoretic terms, given that one of the motivating principles of this approach to the study of meaning is formal rigor, with the goal of clarifying the predictions of articulated theories. There is very little, however, in the model-theoretic literature on the semantic typology of lexical categories. What there is, amounts to at best promissory notes that there might be something to be said about the link between syntactic category and type-theoretic meaning (Bach et al. 1995, Kaufman 2009: 32, Koch and Matthewson 2009: 129, Koontz-Garboden 2012, and Francez and Koontz-Garboden 2013b) or alternatively pessimism that there is anything to be said at all (von Stechow and Matthewson 2008: 152-153). Whichever view one takes as a starting point, it seems clear that it is very much an open question whether there is anything to be said. At the same time, however, the persistence with which claims of a link between category and meaning reappear over the years suggests that it would be premature to dismiss the idea outright, and that articulation model-theoretically, at a minimum, could help to clarify exactly what the issues are, if not vindicate the idea that there is a link.

With this in mind, the broad question we aim to address in this paper is: how much variation do we find in the denotations (type-theoretically speaking) of words in the major lexical categories, and what restrictions, if any, are there on these denotations (cf.

¹See Baker (2003: Chapter 1) for a more comprehensive overview than can or need be offered in the context of this paper.

Koontz-Garboden 2012; Francez and Koontz-Garboden 2013b)? We focus our attention on what Dixon (1982) calls property concepts (PC), notions which are lexicalized by adjectives in languages with that category and by nouns or verbs in many others. Dixon documents seven classes of property concepts, given in (1) alongside examples of English words naming PCs in each of the classes.

- (1) *Property concepts*: notions expressed by adjectives in languages that have them.
- | | |
|-------------------------|--|
| dimension | big, small, long, tall, short, wide, deep, etc. |
| age | new, young, old, etc. |
| value | good, bad, lovely, atrocious, perfect, proper, etc. |
| color | black, white, red, etc. |
| physical | hard, soft, heavy, wet, rough, strong, hot, sour, etc. |
| speed | fast, quick, slow, etc. |
| human propensity | jealous, happy, kind, clever, generous, cruel, proud, etc. |

Property concepts are an ideal testing ground for questions about whether there is a link between lexical category and lexical semantics, precisely because words introducing them vary in their lexical category crosslinguistically. The broad goal which we make a modest contribution toward in this paper is to determine what kinds of lexical semantic correlates, if any, the variation in lexical category has. More explicitly, we ask whether there are differences in the denotations of words introducing property concepts that are tied to differences in their lexical category.

The point of departure is the broad classification based on behavior in predication pointed to by Francez and Koontz-Garboden (2013b). They observe that there are PC words that require possessive morphosyntax in predication (possessive-predicating PC words) and those that do not (non-possessive predicating PC words), as illustrated for Spanish in (2), where (2b) to the extent it is acceptable at all, does not have the meaning of (2a), and (3) respectively.

- (2) possessive predicating
- a. *Juan tiene miedo.*
Juan has fear
'Juan is scared.'
 - b. #*Juan es/está miedo.*
Juan is fear
- (3) non-possessive predicating
- a. *Juan es alto.*
Juan is tall
'Juan is tall.'
 - b. **Juan tiene alto.*
Juan has tall

Following Francez and Koontz-Garboden (2013b), we take this contrast as diagnostic of a difference in the kind of meaning the PC words in the two classes of construction have: (i) those which characterize properties (*substance*-type meanings, following Link 1983), and (ii) those which characterize individuals—specifically, those individuals that *have* the property in question. The intuition underlying the difference in meaning is that a substance is not something that one *is*, but something one *has*. As a consequence, substances are predicated of individuals with possessive morphosyntax, which is re-

sponsible for introducing the right kind of relation (the possessive relation) between the substance and the individual it is meant to be predicated of. The situation is different with individual-characterizing property concept words, which denote (contextually restricted) sets of individuals, and as a consequence invoke the canonical morphosyntax of non-verbal predication.

In the sample of languages that Francez and Koontz-Garboden (2013b) examined, there was a link between lexical category and possession in predication. And given their hypothesis about what is responsible for possession in predication, they conjectured that there was as a consequence a link between lexical category and lexical semantics. Specifically, in the languages they examined, nominally encoded PCs always triggered possessive morphosyntax in predication, which suggested to them a link between nominal encoding of PCs and a substance-type denotation for PC words. This conjecture is stated explicitly in (4).

(4) If a property concept is lexicalized by a noun N , N is substance-denoting.

In this paper we show, based on a detailed case study of Basaá (Bantu; Cameroon) that, strictly speaking, (4) is falsified, and that nominally encoded PCs do not uniformly have substance-type denotations. What we call *adjectival nouns* (ANs) in Basaá are PC words that are syntactically nominal yet are copular-predicating, as illustrated by (5), and which we show characterize sets of individuals (in a contextually sensitive way, which we discuss).²

(5) *hí-nuní híí hí yé li-múgê*
 19-bird 19.that 19.SUB be 5-quiet
 ‘That bird is quiet.’

On the surface, this seems to suggest that there is no link between nominal encoding and a semantics of substance possession, contrary to the conjecture of Francez and Koontz-Garboden (2013b). In this paper we demonstrate that the facts are more complicated, and that there is in fact such a link.

It turns out that Basaá has not only a set of individual-characterizing nominals, the ANs, but also a set of substance-denoting nominals, called *property nouns* (PNs). These PC nominals do trigger possession in predication, as illustrated by (6).

(6) *a gweé ma-sódá*
 1.AGR have 6-luck
 ‘(S)he is lucky.’

Through comparison of Basaá ANs and PNs to one another, and to English possessive-predicating PC nominals and adjectives, we demonstrate that although Basaá ANs do characterize sets of individuals, they do so in a way demonstrably different from the way English adjectives characterize sets of individuals. The evidence for this position comes from the lack of a semantic distinction between *have-PN* predicates as in (5) and the *be-AN* predicates in (6) in a variety of degree expressions: comparatives, equatives, degree questions, and degree modification.

²The class of PC words that we call ANs are what Hyman et al. (2012) call *nominal adjectives*. We eschew their terminology in this paper in light of the fact that the class in question is, both according to them and our own diagnostics that we discuss below, nominal and not adjectival in category.

Based on this evidence, we claim, informally speaking, that Basaá ANs have the same denotation as the syntactically complex string *have PN*. Thus, we argue that the literal meaning of (5) is ‘The bird is quietness-having.’ More formally, we adopt a slightly modified version of Francez and Koontz-Garboden’s (2013b) characterization of substance possession whereby the *have PN* construct denotes a relation between portions of substance and individuals, and show that ANs have precisely this kind of denotation. In so doing, they too are built on a semantics of substance possession, suggesting that there is, in fact, a link between nominal encoding of property concepts and lexical semantics: nominal encoding entails having a semantics built on substances.

We begin by giving three arguments for the nominality of the relevant class of PC words. We then show that these PC words rather than characterizing portions of substance, as would be predicted by Francez and Koontz-Garboden’s conjecture about nominal encoding and lexical semantics, instead characterize sets of individuals. We then turn to a more detailed investigation of their denotations, showing that although they characterize sets of individuals, they do so in a different way to the manner in which English adjectives characterize sets of individuals. We conclude with discussion of the consequences of our observations for the understanding of the link between lexical category and lexical semantics.

2 Possessive-predicating PC nominals and their substance denotations

As mentioned at the outset, Francez and Koontz-Garboden (2013b) observe for their sample of languages that nominal encoding of property concept words entails possession in predication. Although we will argue below that there is a class of PC words in Basaá that falsify this generalization, there is also a significant class of PC words in the language that do conform with it. We call this class of words *property nouns* (PNs), in view of the fact that their translational equivalents in English name what seem accurately described as properties, in a non-technical sense of that word. Some of the PC words in question are listed in (7).

- (7) Some possessive predicating PC words in Basaá
mbom ‘luck’; *nguy* ‘strength’; *másódá* ‘luck’; *ɲém* ‘courage’; *hêmlɛ* ‘hope/faith’

That such words are nominal in Basaá is entirely uncontroversial, particularly given the fact that they are lexically associated with a noun class rather than agreeing with other nouns, fail to attributively modify nominals, can be used as the arguments of verbs, and have mass noun properties. We do not belabor the point with this particular class here (though see §3.3.1 for discussion of their mass properties and Hyman 2003 for some general discussion).

The key point of interest with PNs is that they do not behave like common nouns in predicational contexts, as predicted by Francez and Koontz-Garboden (2013b). Predication of a normal Basaá count noun (details of which are discussed further in §3) is copular, as shown in (8).

- (8) *a ye m-alêt.*
 1.AGR COP 1-teacher
 ‘He is a teacher.’ (Hyman et al. 2012:8)

We show below in §3 that copular predication is used for ANs. Unlike normal count nouns and ANs, however, predication with PNs invokes the morphosyntax of possession. That is, the same morphosyntax—the verb *gweé* ‘have’—which is required to attribute the possession of some entity to another, whether inalienably (9a) or alienably (9b), is used to attribute the notion named by a PN to an individual, as shown in (10).³

- (9) a. *í tēble íní í gweé!é ma-koo mánâ*
 AUG 7.table DEM AGR have 4-feet four
 ‘This table has four feet.’
 b. *Kim a gweé !n-dáp*
 Kim AGR has 9-house
 ‘Kim has a house.’
- (10) *a gweé ma-sódá*
 1.AGR have 6-luck
 ‘(S)he is lucky.’

Koontz-Garboden and Francez (2010); Francez and Koontz-Garboden (2013a,b); Koontz-Garboden (2012, To appear), on the basis of investigation of similar behavior in a range of other languages, argue that possession in predication with property concept words is linked to the denotation of the property concept words in question. Drawing on the mereological approach to mass terms in Link (1983), Francez and Koontz-Garboden (2013b) treat the denotations of possessive-predicating PC words as related to the denotations of familiar substance mass terms such as *gold* and *sand*.⁴ On this view, which we adopt here, the model includes a domain of portions of abstract matter \mathcal{A} . *Substances*, the denotations of possessive-predicating PC words, are subsets of this domain with the structure of a join semilattice with the join operation \sqcup (an associative, commutative, and idempotent binary operation). The join operation induces the ordering relation \sqsubseteq on substances, intuitively thought of as the (mereological) ‘part of’ relation (which is transitive, antisymmetric, and reflexive) (Francez and Koontz-Garboden 2013b).

We assume, again following Francez and Koontz-Garboden (2013b), an additional ordering on substances, \leq , that can intuitively be thought of as the ‘smaller than’ relation, and which preserves the mereological part-of relation, so that if a portion p is part of a portion q , then p is smaller than q . These intuitions are captured by the two axioms P1 and P2 (Francez and Koontz-Garboden 2013b).

P1 Any substance $S \subset \mathcal{A}$ is ordered by a total preorder \leq .

P2 The preorder \leq preserves the mereological part-of relation \sqsubseteq , so that given a substance S , and two portions $p, q \in S$: $p \sqsubseteq q \rightarrow p \leq q$.

The total preorder \leq is key in capturing facts surrounding gradability and comparison, while the mereological part-of ordering is crucial in capturing intuitions tied to the

³In Basaá, ‘have’ is morphologically complex, literally ‘be-with’, and has the paradigm in (i).

(i) TENSE PARADIGM FOR *bá-nâ* ‘HAVE’

INFIN	PAST3	PAST2	PAST1	PRES	FUT1	FUT2	FUT3
<i>bánâ</i>	<i>báná</i>	<i>béena</i>	<i>bákná</i>	<i>gweé</i>	<i>m⁺báná</i>	<i>gá⁺báná</i>	<i>abáná</i>

Note that the present tense form of ‘have’ is suppletive, the form we will mostly use below.

⁴See Koontz-Garboden and Francez (2010) for an inferior analysis in terms of Chierchia and Turner’s (1988) property theory.

semantics of mass nouns, none of which will be discussed here (though see Francez and Koontz-Garboden 2013a,b for discussion and motivation).

The heart of our analysis of Basaá property concept words lies in the claim that PNs, like Francez and Koontz-Garboden’s possessive predicating PC words generally, denote substances in the sense defined above. For example, on our theory, *ɲguy* ‘strength’ has such a denotation, as shown in (11), where p is a variable over portions of abstract matter, and *strength'* is a constant naming the substance of strength in the model (i.e., the set of all strength portions).

$$(11) \quad \llbracket \text{ɲguy} \rrbracket = \lambda p[\textit{strength}'(p)]$$

Evidence that PNs have a mass-type semantics is offered in §3.3.1.

In the remainder of this section we highlight what denotations like in (11) predict about the behavior of PNs in predication. Substances, as Francez and Koontz-Garboden discuss, cannot be predicated of individuals using a copula with anything like the meaning that arises through predication of copular predicating nominals and adjectives. This is because substances are sets of abstract portions, not sets of individuals. As such, to the extent that any meaning is generated in ordinary copular predication with substance-denoting words, it is an odd or metaphorical one,⁵ a fact illustrated by (2b) and (3b) for Spanish and (12) for English.

- (12) a. Kim is strength. \neq Kim is strong.
 b. Kim has strength. = Kim is strong.

Our hypothesis, following the treatment of similar examples in other languages in Francez and Koontz-Garboden (2013b), is that the use of possessive morphosyntax with such PC nominals in predication is semantically meaningful, being the morphosyntactic realization of what Francez and Koontz-Garboden call a ‘possessive strategy of predication.’ The idea is that because a substance-denoting PC word does not characterize a set of individuals, a relation has to be introduced to relate substances to individuals in order to attribute the property named by a substance-denoting PC word to an individual. Francez and Koontz-Garboden call the general idea that a substance can be related to an individual with the semantics of possession *substance possession*, defining it as in (13).

- (13) **Substance possession:**
 For any individual a and substance P , a has P iff
 $\exists p[P(p) \ \& \ \pi(a, p)]$

The idea, in short, is that the morphosyntax of possession in possessive strategies of predication reflects an underlying semantics of substance possession.

With this as background, we can make compositional sense of possessive-predicating PC constructions with Basaá PNs, as illustrated in (10) and repeated in (14).

- (14) a *gweé ma-sódá*
 1.AGR have 6-luck
 ‘(S)he is lucky.’

⁵This was illustrated for Spanish in (2b). In Basaá, copular predication is allowed with some PNs, with the expected metaphorical meaning in emphatic contexts. See fn. 34 for discussion.

On this theory, PNs like *ma-sódá* denote substances—sets of portions, in this case of luck—as in (15).

$$(15) \quad \llbracket \text{ma-sódá} \rrbracket = \lambda p[luck'(p)]$$

Basaá *gweé* ‘have’ denotes a function from substances to relations between individuals and portions of substance standing in the possessive relation to one another, as made explicit in (16).

$$(16) \quad \llbracket \text{gweé} \rrbracket = \lambda P \lambda x \lambda z [P(z) \ \& \ \pi(x, z)]$$

The composition of *gweé* with a substance like that denoted by *ma-sódá* yields a relation between individuals and portions of luck substances, as shown in (17).

$$(17) \quad \llbracket \text{gweé ma-sódá} \rrbracket = \lambda x \lambda z [luck'(z) \ \& \ \pi(x, z)]$$

This relation composes with the denotations of degree morphology, as illustrated for the comparative and intensive in §4. Similar to the degree-based literature (Cresswell 1977; von Stechow 1984; Kennedy 2007b), we assume that in the “positive form”, exemplified by (14), a type shift applies saturating the portion argument, thereby creating a (context-sensitive) predicate of individuals.⁶ The type shift takes a relational meaning like that in (17) and existentially quantifies the portion argument. Following Francez and Koontz-Garboden (2013b), this quantification (like much other quantification) is assumed to have a domain which is contextually restricted. This is how we capture the well-known context-sensitivity of the positive form (see e.g., Klein 1991 for overview discussion). The domain of the existential quantification is restricted to those portions of substance that stand out in the context in question, i.e., are “big enough” in the ranking given by the pre-order \leq .⁷

$$(18) \quad \llbracket \text{pos} \rrbracket = \lambda Q_{(e(p,t))} \lambda x \exists z [Q(x)(z)]$$

Type-shifting the meaning in (17) in this way allows for predication of an individual (or indeed composition with a generalized quantifier type meaning) in normal positive form sentences, yielding for a sentence like (10) (ignoring assignment of value to variable) the meaning in (19), which will be true just in case the individual referred to by the pronoun has a portion of luck big enough to stand out in the context in question.

$$(19) \quad \llbracket (10) \rrbracket = \exists z [luck'(z) \ \& \ \pi(\text{she}_1, z)]$$

To conclude, we have proposed that PC nominals can have substance-based denotations, and that these denotations force possession in predication; individuals are not

⁶In this way, we depart from the analysis in Francez and Koontz-Garboden (2013b), where a *have* verb like *gweé* creates a (context-sensitive) predicate of individuals directly on composition with a substance. The reasons for this have to do with the analysis of comparative subdeletion below in §4.1, for which access to the substance is required in comparative constructions. On Francez and Koontz-Garboden’s analysis, this is not possible, leading to the apparent prediction that comparative subdeletion is not possible with possessive-predicating PC comparatives. We are unclear on the full extent to which this prediction is borne out for the languages discussed by Francez and Koontz-Garboden (2013b), but as the data in §4.1 show, the prediction is false for Basaá possessive-predicating PC constructions.

⁷This is identical to Francez and Koontz-Garboden’s treatment of positive form predicates, save for the fact that the context-sensitive existential quantification of the portion argument is built into the meaning of *have* verbs for them, whereas here, we accomplish this through a type-shift, for the reasons discussed in fn. 6. See Francez and Koontz-Garboden (2013b) for detailed discussion of the formal details.

portions of substance, and so cannot be the arguments of PC nominals, which are predicates of substances. They can, however, stand in the possessive relation to these portions of substance, which is why possession is used in the predication of such notions. As discussed in the introduction, it is a well-known fact that property concepts vary in their lexical category. The main question under discussion in this paper is whether such variation entails any difference in lexical semantics, specifically, whether nominal encoding entails a particular type of denotation for that noun. Francez and Koontz-Garboden (2013b) hypothesize that there is indeed a unidirectional implication from nominal encoding of property concepts to a substance-denotation. The remainder of the paper is focused on falsifying this hypothesis, at least in the strict sense in which it was suggested by Francez and Koontz-Garboden.

3 Non-possessive predicating PC nominals: Basaá adjectival nouns

The second class of PC words in Basaá that are of interest in the context of Francez and Koontz-Garboden's conjecture about nominality and substance denotation are what Hyman et al. (2012) call *nominal adjectives* and which we call here *adjectival nouns* (ANs), in view of the fact that they are nouns, following Hyman (2003).⁸ Below we demonstrate that while ANs form a class of PC words that are demonstrably nominal in lexical category, there is strong evidence suggesting that ANs are not substance denoting.

We begin by demonstrating that ANs are nominal, and then present evidence that they are not substance-denoting, but rather, at some level, characterize sets of individuals. §4 goes on to show that ANs do not have the denotation of adjectives in familiar languages, arguing that they are ultimately built on a semantics of substances, in denoting relations between individuals and portions.

3.1 The nominality of Basaá ANs

Like most Niger-Congo languages, Basaá nominals are distributed into a rich set of noun classes. Which noun class a particular noun belongs to can be determined based on the initial prefix of the noun as well as subject agreement and DP-internal concord. Members of each of these classes are provided below, drawn from Hyman (2003: 263) with some simplifications in the representation of prefixal morphology:

⁸Our ANs are not to be confused with Hyman et al.'s adjectival nouns, which correspond to our property nouns (PNs). Terminologically speaking, our adjectival nouns are their nominal adjectives, and our property nouns are their adjectival nouns.

(20) NOUN CLASSES IN BASAÁ

Class	Singular	Plural	
1/2	<i>mudaá</i>	<i>bodaá</i>	‘woman’
	<i>mut</i>	<i>bot</i>	‘man’
3/4	<i>m-pék</i>	<i>mim-pék</i>	‘bag’
	<i>n-tómbá</i>	<i>min-tómbá</i>	‘sheep’
3a/6	<i>nyɔ</i>	<i>ma-nyɔ</i>	‘mouth’
	<i>wɔɔ</i>	<i>mɔɔ</i>	‘hand’
5/6	<i>li-pan</i>	<i>ma-pan</i>	‘forest’
	<i>j-alá</i>	<i>m-alá</i>	‘crab’
7/8	<i>tɔŋ</i>	<i>bi-tɔŋ</i>	‘horn’
	<i>y-oó</i>	<i>gw-oó</i>	‘yam’
9/10	<i>pén</i>	<i>pén</i>	‘arrow’
	<i>ŋ-gwó</i>	<i>ŋ-gwó</i>	‘dog’
9/6	<i>kíŋ</i>	<i>ma-kíŋ</i>	‘neck, voice’
	<i>n-dáp</i>	<i>man-dáp</i>	‘house’
19/13	<i>hi-tám</i>	<i>di-tám</i>	‘kidney’
	<i>hi-nuní</i>	<i>di-nuní</i>	‘bird’

The numerals in the left column refer to the numbering system for Bantu noun classes standard since Meinhof (1906). These numerals label each combination of number and gender a separate class. As in all Bantu languages, the 1/2 class is populated with mostly human nouns.

Hyman (2003) discusses the phonological and morphological traits of the prefixal morphology in detail, and also provides detailed paradigms for DP-internal concord and subject agreement. The example below illustrates both DP-internal concord and subject agreement—the verb and DP internal modifiers agree with the head noun *nuní* ‘bird’ in noun class.

- (21) *dí-nuní dí-tân díí dí n⁺tóp hémbí*
 13-bird 13.five 13.those 13.SBJ sing 19.song
 ‘Those five birds are singing a song.’

In addition to illustrating agreement, this example shows that Basaá clauses are SVO, and that adnominal modifiers in Basaá follow the noun. The only exceptions to this generalization are demonstratives and possessive pronouns, which can precede the noun when focused (Hyman 2003; Makasso 2010; Jenks et al. 2012). We consider the lexically determined membership in one of the noun classes in (20), and the ability to control agreement within the DP and on verbs as in (21), to be definitional criteria for nounhood in Basaá.

All earlier descriptions, including Dimmendaal (1988); Hyman (2003); Hyman et al. (2012), agree that these PCs are nouns. Evidence for their nominal categorization comes from the fact that they have lexically determined inherent noun class (22b) (from Hyman et al. 2012), just like normal nouns and PNs, as described above. When they occur DP-internally, ANs subordinate the noun they modify via a connective particle, reminiscent of English *of*, and control agreement on higher adnominal modifiers (22a). The connective particle itself also agrees with the AN, as shown by the table in (23); note that the connective which appears in this construction can be purely tonal, a low tone in

class 1 and 9, and a high tone in class 3 and 7 (Hyman et al. 2012: ex. (10)):

- (22) a. *lí-múgê* ⁴*lí* *hí-nuní líí* *lí* *ń⁴tóp hémbí*
 5-quiet 5.CON 19-bird 5-that 5.SBJ sing 19.song
 ‘That quiet bird is singing.’
 b. *má-múgê* ⁴*má* *dí-nuní máá* *má* *ń⁴tóp hémbí*
 6-quiet 6.CON 13-birds 6-that 6.SBJ sing 19.song
 ‘Those quiet birds are singing.’

(23) AGREEMENT OF THE CONNECTIVE WITH ANs

Class	AN	of	A	
1	<i>n-lám</i>		<i>hí-nuní</i>	‘beautiful bird’
2	<i>ba-lám</i>	<i>ba</i>	<i>dí-nuní</i>	‘beautiful birds’
3	<i>n-laygá</i>		<i>hí-nuní</i>	‘black bird’
4	<i>min-laygá</i>	<i>mí</i>	<i>dí-nuní</i>	‘black birds’
5	<i>lí-múgê</i>	⁴ <i>lí</i>	<i>hí-nuní</i>	‘quiet bird’
6	<i>ma-múgê</i>	⁴ <i>má</i>	<i>dí-nuní</i>	‘quiet birds’
7	<i>lóngê</i>		<i>hí-nuní</i>	‘good bird’
8	<i>bi-lóngê</i>	⁴ <i>bí</i>	<i>dí-nuní</i>	‘good birds’
9	<i>mbóm</i>		<i>hí-nuní</i>	‘big bird’
10	<i>mbóm</i>	<i>í</i>	<i>dí-nuní</i>	‘big birds’
19	<i>hí-peda</i>	<i>hí</i>	<i>hí-nuní</i>	‘small bird’
13	<i>dí-peda</i>	<i>dí</i>	<i>dí-nuní</i>	‘small birds’

ANs constitute a large and open class of PC words in Basaá, with over 100 members. The structures in (22a,b) can recur, with each new AN subordinating the following one (Hyman et al. 2012: ex. (8)).

Perhaps the strongest evidence that Basaá ANs are nouns is the independent existence of a small, closed class of genuine adjectives which have obviously adjectival syntax, adjoining to the right of the noun and agreeing with it. Thus, the adjective *kéjǐ* ‘big’ below does not control agreement on the noun or subject auxiliary, but transparently reflects the noun class of its modificand.

- (24) *hí-nuní hí-kéjǐ híí* *hí* *ń⁴tóp hémbí*
 19-bird 19-big 19-that 19.SBJ sing 19.song
 ‘That big bird is singing.’

See Hyman et al. (2012) for more discussion of this class of genuine adjectival PC terms. The semantic distribution of these adjectives is identical to the semantic distribution of ANs demonstrated in §4. Thus, all that distinguishes adjectives from ANs is their syntactic category: ANs are nouns, while adjectives are adjectives.

Having demonstrated the nominality of ANs, the question of interest to us in the remainder of the discussion is their semantics. We discuss this issue in the sections that follow, showing that unlike PC nominals that have been documented in other languages, ANs are not substance-denoting.

3.2 Basaá ANs are non-possessive predicating

Given the discussion above, an obvious starting point in discerning the denotation of ANs is asking how they behave in predication. Here, we find behavior different from that observed with nominally encoded PCs elsewhere, both from PNs in Basaá, discussed above, and the nominal PC terms from other languages discussed in Francez and Koontz-Garboden (2013b). Unlike those cases, ANs do not trigger possession in predication, as shown by the data discussed in this section.

Basaá has a copula *bá* which occurs as the main verb in a variety of predicational copular sentences.⁹ Predicate nominals (25a), locatives (25b), adjectives (25c), and ANs (25d) are all ‘be’-predicating:

- (25) a. *Victor a ye m-alêt*
Victor 1.SUB be 1-teacher
‘Victor is a teacher.’
- b. *hí-nuní híí hí yé í kedé !é*
19-bird 19.that 19.SUB be LOC inside tree
‘That bird is inside the tree.’ (e.g. in a hole)
- c. *hí-nuní híí hí yé hi-kéŋí*
19-bird 19.that 19.SUB be 19-big
‘That bird is big.’
- d. *hí-nuní híí hí yé lí-mugê*
19-bird 19.that 19.SUB be 5-quiet
‘That bird is quiet.’

We assume that *be* predication is a transparent indication that the following predicate characterizes a set of ordinary individuals. Thus, the fact that adjectives and ANs take it, like nominal and locative predicates, is a transparent indication that adjectives and AN are also predicates of ordinary individuals (if context-sensitive ones).

In predicational environments, PNs are primarily predicated by ‘have’, as discussed in §2, and shown again by the data in (26), for comparative purposes.¹⁰

- (26) a. *Victor a gweé mí-yaó*
Victor 1.SUB have 4-charm
‘Victor is likeable.’
- b. *hí-nuní híí hí gwé!é lí-han*
19-bird 19.that 19.SUB have 5-meanness
‘That bird is mean.’

So while purely morphosyntactic diagnostics indicate that adjectives are distinct from ANs and PNs, which are categorically nouns, predicational environments demonstrate

⁹Like ‘have’ (fn. 3), the tense paradigm for *bá* ‘be’ is characterized by extensive suppletion, as shown in (i). This paper will primarily include the present tense form.

(i) Tense paradigm for *bá* ‘be’

Infin	Past3	Past2	Past1	Pres	Fut1	Fut2	Fut3
<i>bá</i>	<i>bá</i>	<i>bée</i>	<i>bák</i>	<i>ye</i>	<i>m’bá</i>	<i>gá’bá</i>	<i>abá</i>

¹⁰PNs can, in fact, be predicated by ‘be’, but when they occur in these environments they have an emphatic reading. In addition, there is a class of PNs that alternate in their have/be predicational behavior and a class of PNs which prefer to be predicated with ‘be.’ See §5 for discussion.

that adjectives and ANs are distinct from PNs. While adjectives and ANs are copular predicating, PNs are possessive-predicating. This makes it clear that PNs are like the possessive-predicating PC nominals discussed extensively in Francez and Koontz-Garboden (2013b), as argued above, while ANs are a distinct and typologically novel class of copular-predicating PC nominals.

The fact that ANs are copular-predicating suggests that they do not have substance-denotations, unlike their PN counterparts, and unlike other nominally encoded PCs across other languages. Instead, because ANs can be directly predicated of an individual with a copula, ANs must characterize sets of individuals—those of whom the property concept introduced by the AN holds (generally, to some contextually salient standard).¹¹ Of course, to be certain that this is really the case, and that there is not instead something mysterious going on with predication leading us down the garden path, we should seek out converging evidence for the individual-characterizing denotation of words in this class from other constructions. We do this in the next section, giving an additional three arguments which show beyond doubt that ANs really do not characterize sets of portions of substance, but rather sets of individuals (again, informally speaking, with the formal details to be articulated in §4).

3.3 Additional arguments for an individual-characterizing meaning for ANs

3.3.1 Atomicity

To this point, we have established that ANs and PNs are both nouns, but that ANs are copular-predicating while PNs are possessive-predicating. In this section we illustrate that ANs and PNs are also distinct in terms of atomicity: while ANs are count nouns, PNs, as expected given the semantics assigned by our analysis to them above, are mass nouns. This can be shown via three related diagnostics. First, and most simply, ANs reflect a singular/plural distinction while PNs, like concrete mass nouns in Basaá, are invariant. Relatedly, in predicational environments, ANs can agree with the subject in number while PNs do not. And third, ANs can be modified by numerals while PNs cannot.

The simplest evidence that ANs are count nouns while PNs are mass nouns comes from the the number invariance of PNs. In §3.1, it was shown that ANs reflect the number of the noun they modify in the AN-of-N construction. Thus, a distinction exists between *nláám* ‘beautiful’ and *baláám* ‘beautiful’ depending on whether the noun is singular or plural in (23). In contrast, PNs do not inflect for number at all. This can be seen in both adnominal modifying and predicative environments. Beginning with attributive environments, the examples below demonstrate that like ANs, nominal modification with PNs requires a connective. But while ANs precede the connective,

¹¹As already mentioned above, and as argued in more detail below, we do not actually argue that ANs are lexically individual-characterizing, but rather that they denote relations between portions and individuals. It is rather the *pos* type-shifted form of an AN, like the *pos* shifted form of the *have PN* construct, that characterizes a contextually-sensitive set of individuals, namely those individuals that have a portion of substance big enough to stand out in the context in question. Because our point in this section is to show that ANs are not substance-denoting, and because the diagnostic constructions are ones in which normal count nouns occur, and take a *pos*-shifted form of the AN, we think this terminology is more useful than harmful in this section, bearing in mind that the ANs are not *lexically* individual-characterizing, but that it is the *pos* shifted form that is.

controlling agreement on higher modifiers (22), PNs follow the connective, and the modified noun controls agreement. What is crucial for our current purposes is that unlike ANs, PNs do not reflect the number of the noun which they modify. So in the following example, the PN *ɲgûy* ‘strength’ is invariant regardless of whether it is modifying a singular or plural noun:

- (27) a. *hi-nuní hí ɲgûy hí ń⁺tóp hémbí*
 19-bird 19.CON 9.strength 19.SBJ sing 19.song
 ‘The strong bird is singing’
 b. *di-nuní dí ɲgûy dí ń⁺tóp hémbí*
 13-birds 13.CON 9.strength 13.SBJ sing 19.song
 ‘The strong birds are singing’

Furthermore, while each lexical PN can be morphologically singular or plural, each individual PN is number-invariant, occurring in either a singular or plural noun class:

(28) PROPERTY NOUNS (PNs) IN BASAÁ

Class	N	of	PN	
1	<i>hi-nuní</i>	<i>hí</i>	<i>máangé</i>	‘baby bird’ (bird of child)
3	<i>hi-nuní</i>	<i>hí</i>	<i>ń-saɲ</i>	‘peaceful bird’ (bird of peace)
4	<i>hi-nuní</i>	<i>hí</i>	<i>mí-yaó</i>	‘likable bird’ (bird of charm)
5	<i>hi-nuní</i>	<i>hí</i>	<i>lí-han</i>	‘mean bird’ (bird of meanness)
6	<i>hi-nuní</i>	<i>hí</i>	<i>má-sóda</i>	‘lucky bird’ (bird of chance)
7	<i>hi-nuní</i>	<i>hí</i>	<i>ságlá</i>	‘annoying bird’ (bird of annoyance)
8	<i>hi-nuní</i>	<i>hí</i>	<i>bí-sagda</i>	‘unsteady bird’ (bird of confusion)
9	<i>hi-nuní</i>	<i>hí</i>	<i>ɲgûy</i>	‘strong bird’ (bird of strength)

Thus, the singular class 3 *ńsaɲ* ‘peace’ has no class 4 plural counterpart **mísaɲ*. Likewise, the plural class 4 *míyaó* ‘charm’ has no singular class 3 counterpart **nyáo*. The difference between ANs and PNs in the ability to mark number is thus directly manifested in DP-internal environments: while ANs reflect the number of the noun they modify, PNs are invariant.

The number invariance of PNs also contrasts with ANs in predicational environments. Like adjectives and predicate nominals, ANs typically reflect the number of the subject:

- (29) *dí-nuní díí dí yé ma-múgê*
 13-bird 13.that 13.SUB be 6-quiet
 ‘Those birds are quiet.’

The subject in (29) is plural, thereby triggering the use of class 6 on the AN in this position.¹² In contrast, PNs do not exhibit number agree with the subject of ‘have’ in predicational environments, a fact shown by the data in (30) and (31).

- (30) a. *a gweé *n-yáo / mi-yáo*
 1.AGR have 3(SG)-charm 4(PL)-charm

¹²Number agreement in the copular construction is not obligatory when the subject is plural. As discussed in Hyman et al. (2012), with predicates that allow collective readings, singular predicates overtly indicate a collective reading while plural predicates occur with distributive readings.

- ‘(S)he is likable.’
- b. *bá gwé!é *n-yáo / mi-yáo*
 2.AGR have 3(SG)-charm 4(PL)-charm
 ‘They are likable.’
- (31) a. *a gweé li-han / *ma-han*
 1.AGR have 5(SG)-meanness 6(PL)-meanness
 ‘(S)he is mean.’
- b. *bá gwé!é li-han / *ma-han*
 2.AGR have 5(sg)-meanness/ 6(PL)-meanness
 ‘They are mean.’

Thus, a corollary of the general number-invariance of PNs is their inability to agree with nouns in number in both attributive and predicational environments. We take the number-invariance of PNs to be due to their status as mass nouns, in contrast with ANs, which are count nouns.

A more direct diagnostic for this distinction comes from numerals: while numerals can combine with ANs, they cannot with PNs, as shown by (32) and (33) respectively.¹³

- (32) *ma-múgέ ʹmá dí-nuní mátân*
 6-quiet 6.6.CON 13-bird 6.five
 ‘five quiet birds’
- (33) **miyáo (míntân) mí hí-nuní (míntân)*
 4-charm (4.five) 4.CON 13-bird (4.five)
 (intended: *‘five charms of the bird’)

In (32), *mátân* ‘five’ agrees with the AN *ma-múgέ* ‘quiet’, and as such the AN must preserve or share the count-status of the head noun it modifies. In contrast, (33) illustrates that PNs cannot combine with numerals when they serve as the head of the noun phrase. As countability is a standard diagnostic for count versus mass nouns (e.g. Rothstein 2010), we take the distribution of numerals to confirm that ANs are count nouns while PNs are mass nouns.

To conclude, ANs inflect for number, marking a singular/plural distinction in both attributive and predicative environments, while PNs never mark this distinction. In addition, ANs can be modified by numerals, while PNs cannot. These facts follow from the claim that ANs are count nouns while PNs are mass nouns. This contrast is consistent with the observations made above regarding their meanings. Count nouns characterize sets of atomic individuals, and as such, are expected to be attributable to such individuals with a standard predication construction, as is the case for ANs. Mass nouns, by contrast, are assumed to have denotations that characterize non-atomic portions of substance that stand in a mereological relationship to one another, as proposed by Link (1983) and as suggested above for PNs. Because they do not characterize the individuals that have these portions, predication with PNs invokes possession, as described above.

¹³That the numeral is modifying the AN in (32) and the PN in (33) is shown by agreement—the numeral agrees in noun class with the AN in (32) and the PN in (33), as is typical for adnominal numeral modifiers in the language generally.

3.3.2 Weak quantifiers

Further circumstantial evidence for the individual-characterizing denotation for ANs comes from the syntactic behavior of various quantifiers in Basaá. Landman (2003) argues that while strong determiners denote relations between sets (Montague 1973; Barwise and Cooper 1981) indefinite determiners denote sets of individuals. The basic observation in this section is that weak quantifiers, by contrast with strong quantifiers, pattern like ANs in several ways. This behavior, we argue, makes sense if weak quantifiers and ANs both characterize sets of individuals. The former is consistent with Landman's claims, the latter with the observations made about ANs more generally.

NP-internally, weak quantifiers pattern just like ANs. This is demonstrated by the data in (34), which shows that such quantifiers head the NPs they determine, triggering use of a linker particle the noun class agreement of which they control.

- (34)
- a. *ɲgandak í dínuní í yé mɪnlaŋgá*
3.many 3 19.birds 3.AGR be 4.black
'Many birds are black.'
 - b. *ndek dínuní í yé mɪnlaŋgá*
3.few (3)-19.birds 3.AGR be 4.black
'Few birds are black.'
 - c. *joga lí dínuní lí yé mɪnlaŋgá*
5.several 5 19.birds 5.AGR be 4.black
'Several birds are black.'
 - d. *pɛs í dínuní í yé mɪnlaŋgá*
3.half 3 19.birds be 4.black
'Half the birds are black.'

Unlike weak quantifiers, strong quantifiers do not pattern as ANs. The actual behavior of strong quantifiers is heterogeneous, as evidenced by the data in (35), where *hígíí* 'every' appears prenominally and *códísó* 'all' appears postnominally.

- (35)
- a. *hígíí hinuní hí yé nlaŋgá*
19.every 19.bird 19.AGR be 3.black
'Every bird is black.'
 - b. *dínuní kódísó !dí yé mɪnlaŋgá*
AUG-13.BIRDS all 13.AGR be 4.black
'All birds are black.'

In both cases, however, the quantifiers behave distinctly to the weak quantifiers in (34), in that neither of them heads the NP they determine or controls agreements. This is shown in (35a) by the lack of a linker particle and by the fact that *hígíí* 'every' agrees with the head noun 'bird'. The quantifier *códísó* 'all' in (35b) simply does not agree, nor is there any question about it being in head position, as it is postnominal. This contrast in the behavior of weak and strong quantifiers makes sense if weak quantifiers and ANs are in the same semantic class (at some level), and if this class is individual-characterizing (as Landman independently argues for most weak quantifiers), the idea being that the head noun (whether AN or weak quantifier) composes with the post-linker noun through some form of predicate modification (as argued for weak quantifiers by Landman 2003: 2).

We have already seen above that ANs are copular-predicating, as expected for words

that characterize sets of individuals. The same is expected of weak quantifiers on Landman's theory. This prediction is borne out by the Basaá data we have collected, as shown by (36).¹⁴

- (36) a. *dínuní t́ńí dí yé ḡgandak*
 birds these agr be a.lot
 'These birds are many.'
 b. *dínuní t́ńí dí yé ndek*
 birds these AGR be few
 'These birds are few.'
 c. *dínuní t́ńí dí yé joga*
 birds these agr be several
 'These birds are several.'
 d. *dínuní t́ńí dí yé pɛs*
 birds these agr be half
 'These birds are half.'

Further, as expected if strong quantifiers are not individual characterizing, but rather have some other kind of non-predicative denotation (for example relations between sets, as Landman argues), then we expect strong quantifiers to be impossible in predicative environments, unlike weak quantifiers. This contrast is borne out, as evidenced by the data in (37).

- (37) a. **dínuní t́ńí dí yé hígií*
 birds these AGR be every
 *'These birds are every.'
 b. **dínuní t́ńí dí yé códíso*
 birds these AGR be all
 *'These birds are all.'

To reiterate, the basic observation is that weak quantifiers and ANs pattern together in some key ways. This behavior makes sense if they have the same kind of denotation, and if that denotation is an individual-characterizing one, as Landman argues for weak quantifiers on independent grounds.

3.3.3 Pronominal anaphora

A final argument for our claim that ANs do not characterize portions of substance, but rather individuals (in a way to be clarified below) comes from pronominal anaphora. The observation is simply that there is a pronominal anaphor in the language that is anaphoric to substances, but not to sets of individuals. As predicted, this pronoun can be anaphoric to PNs, but not to ANs, adjectives, or normal count nouns.

The particle in question is *wɛé*. The data in (38) show that it can be anaphoric to substance-denoting PNs.

- (38) *líhat, wɛé Paul*
 rich WEE Paul

¹⁴There are two exceptions to this, *ḡgim* 'some' and *tɔ* 'no'. In the case of quantifiers like the latter, Landman (2003: 12) argues for a special treatment on independent grounds. An explanation for the behavior of Basaá *ḡgim* 'some' requires further investigation.

‘Rich, that’s Paul.’

By contrast, *wɛɛ* cannot be anaphoric to ANs, as shown in (39), to adjectives, as shown in (40), or to normal count nouns, as shown in (41).

(39) #*nlám*, *wɛɛ* *Paul*
pretty WEE Paul
‘Pretty, that’s Paul.’

(40) #*ɲkɛɲí*, *wɛɛ* *Paul*
important WEE Paul
‘Important, that’s Paul.’

(41) #*malêt* *wɛɛ* *Paul*.
teacher WEE Paul
‘Teacher, that’s Paul.’

This behavior makes sense if *wɛɛ* is a pronoun anaphoric to substance denotations but not individual-characterizing ones.¹⁵ The key fact for the purposes of the discussion here is that ANs cannot be the antecedent of *wɛɛ*, by contrast with PNs, consistent with the former’s lacking a substance-denotation and the latter’s having precisely such a denotation, as also suggested by the other arguments detailed above.

4 Nominally encoded PCs make reference to substances

The data above show clearly that (i) ANs are nouns, and (ii) they do not characterize sets of portions of substance. The question we broach in this section is what their denotation is more precisely. Thus far, the data give little reason to believe that they have denotations any different to adjectives in more familiar languages like English. And additional data bear out the suspicion that their lexical semantics should simply be treated on a par with that of English adjectives. For example, as shown by the data in (42), ANs appear in an explicit comparative construction (as opposed to an implicit one, which might suggest a lack of degree-like objects in the ontology; Kennedy 2007a; Beck et al. 2010; Bochnak 2012).

(42) *hí.ní hi-nuní hi yé hi-láám lél hí-í.*
19-this 19-bird 19.AGR is 19-nice surpass 19-that.one
‘This bird is nicer than that one.’

ANs can also be modified by gradable modifiers like *ɲgandak* ‘very, many’ and *ndek* ‘few, a little’ (Hyman et al. 2012: 4), as shown by (43).

(43) *di-nuní dí yé min-laɲgá ɲgandak.*
13-birds 13.AGR COP 4-black very
‘The birds are very black.’

¹⁵The proposed contrast is similar in spirit (if different in details) to the ability of *it* and *that* in English to have predicative (but not individual-denoting) antecedents, as discussed e.g., by Mikkelsen (2005), and shown by the data in (i).

(i) a. The tallest girl in the class, that/it’s Molly.
b. The tallest girl in the class, she/*it/*that’s Swedish. (Mikkelsen 2005: 64)

And, in at least some cases, measure phrases are possible, as shown by (44).

- (44) a. *η-koo ú yé n-tendéé méda mí-tân*
 3-rope AGR be 4-long 4.meter 4-five
 ‘The rope is five meters long.’
 b. *Paul a ye mmáj ηwii ímâ.*
 Paul AGR is old year two
 ‘Paul is two years old.’

These are all properties that ANs share with adjectives in languages like English (see e.g., von Stechow 1984), facts which, combined with the observations above, suggest that ANs might have the same kind of denotation as adjectives in familiar languages.

In this section, we argue that contrary to initial appearances, Basaá ANs actually have a lexical semantics distinct from their English adjectival counterparts. We argue that the similarities pointed to above between ANs and adjectives in familiar languages are superficial; at a deeper level, there are profound differences. More specifically, we argue that ANs mean in one word what the string ‘*have PN*’ means. On the theory laid out above, the Basaá VP *gweé ma-sódá* ‘have luck’, for example denotes a relation between individuals and portions of luck, as shown in (45).

$$(45) \quad \llbracket \text{gweé ma-sódá} \rrbracket = \lambda x \lambda z [\text{luck}'(z) \ \& \ \pi(x, z)]$$

We argue that ANs too denote relations between individuals and portions of substance they stand in the possessive relation to, so that the AN *Nlangá* ‘black’, for example, has the denotation in (46)—it denotes a relation between individuals and abstract portions of blackness that they possess.

$$(46) \quad \llbracket \text{minlangá} \rrbracket = \lambda x \lambda z [\text{blackness}'(z) \ \& \ \pi(x, z)]$$

Our argument for a semantics like that in (46) for ANs generally is based on comparison with English adjectives. We take as settled at this point, for both English and Basaá, that possessive predicating PC nominals are built on a semantics of substances, and that predication with them invokes a semantics of substance possession, as detailed in §2. With this as background, we compare English adjectives and Basaá ANs in three different kinds of contexts in order to consider whether they have the same or different kinds of denotation: comparative subdeletion, equatives, and degree modifiers, showing that while Basaá ANs pattern with *have PN* constructs, in English, the adjectives do not pattern with *have PC nominal* constructs.

Two conclusions are forced upon us by these facts. First, contrary to initial appearances, Basaá ANs and English adjectives have different kinds of denotations. Secondly, Basaá ANs are built on a semantics of substance possession. These two conclusions together entail that English adjectives are not built on a semantics of substance possession, but rather have one of the meanings proposed in the extensive literature on English adjectives, whatever the right analysis ultimately may be, an issue that nothing below hinges upon. The significance of these conclusions is that the meanings of both Basaá ANs and PNs are built on a semantics of substances. While ANs have possessive semantics built into their lexical semantics, predication with with PNs requires that possessive semantics be introduced syntactically, with *gweé* ‘have’. The conclusion that ANs are built on a semantics of substances suggests that there is indeed a link between lexical category encoding of property concepts and the type of meaning that they have.

Nominal encoding of PC terms entails a semantics of substances, whether through denotation of substances directly, as in the cases discussed by Francez and Koontz-Garboden (2013b), or in denoting relations between individuals and substances, as in Basaá ANs.

4.1 Comparative subdeletion

The first argument for a semantics of substance possession in ANs comes from comparative subdeletion, in the words of Kennedy (1997: 45) a construction “of the form *x is more A1 than A2*, where *A1* and *A2* are lexically distinct.” The data in (47) illustrate the construction for English.

(47) The desk is higher than the door is wide.

Comparative subdeletion is taken in the literature on gradability and comparison as indicative of quantification over degree-like objects (see e.g., von Stechow 1984: 50), whether these are basic (as in e.g., Cresswell 1977; von Stechow 1984; Kennedy 2007b) or derivative ontological objects (as in e.g., Klein 1980). For example, Heim (1985: 4) treats the interpretation of (47) as (48) (where *x* and *y* range over degrees).

(48) $\exists y[y > \iota x[\text{the door is } x\text{-wide}]\& [\text{the desk is } y\text{-high}]]$

The intuition about (47) captured by (48) is that a comparative subdeletion construction compares the degree to which one entity has some property *P1* to the degree that it (or another entity) has a different property *P2*.

One feature of comparative subdeletion in English, as yet un-noted in the literature (as far as we can tell), is that the properties must be introduced by PC words of identical type, predicationally speaking. That is, while both can be copular-predicating adjectives as in (49a), and both can be possessive predicating PC nominals, as in (49b), it is not possible to have a comparative subdeletion construction in which one comparative argument is a copular predicating PC word and the other is a possessive predicating PC word, as shown by the data in (49c,d).

- (49) a. Joe is more beautiful than he is strong.
 b. Joe has more beauty than he has strength.
 c. #Joe is more beautiful than he has strength.
 d. #Joe has more beauty than he is strong.

Comparative subdeletion is also licit in Basaá, as illustrated by the data in (50), which compares the degree to which Kim has two different properties, both of which are introduced by words in the AN category.

(50) *Kim a ye mbóm lɔɔ kíí a ye nlám*
 Kim AGR be big pass as he be beautiful
 ‘Kim is bigger than he is beautiful.’

As the data in (51) show, it is also possible when both properties are introduced by PNs.

(51) *Kim a gweé masódá lɔɔ kíí a gweé ŋguy.*
 Kim AGR have luck pass as he has strength
 ‘Kim has more luck than he has strength.’

However, while English copular-predicating and possessive predicating PC words cannot be mixed in comparative subdeletion as shown by (49c) and (49d), these two classes of PC words can be freely mixed in cases of comparative subdeletion in Basaá. The data in (52) illustrate this fact, showing more specifically that comparative subdeletion is licit in cases where one property is introduced by a copular-predicating AN and the other is introduced by a possessive-predicating PN.¹⁶

- (52) a. *Kim a ye nláám lɔɔ kii a gweé nguy.*
 Kim AGR is beautiful pass as she has strength
 ‘Kim is more beautiful than she is strong.’
 b. *Kim a ye nhát lɔɔ kii a gweé nguy.*
 Kim AGR is rich pass as she has strength
 ‘Kim is richer than she is strong.’

What accounts for this contrast between Basaá and English in the ability to have these mixed comparative subdeletion constructions?

Taking as already established, as per above, the idea that both English PC nominals and Basaá PNs have substance denotations, we believe that the answer to this question lies in a contrast between the lexical semantics of English adjectives and Basaá ANs. Specifically, Basaá ANs, by contrast with English adjectives, denote sets of pairs of individuals and portions of substance that stand in the possessive relation. I.e., as previewed above, they *lexically* have the type of denotation that the string *have PN* has, giving an AN like *nláám* ‘beautiful’ the denotation in (53); specifically it denotes a relation between individuals and possessed portions of beauty.

$$(53) \quad \llbracket \text{nláám} \rrbracket = \lambda x \lambda z [\text{beauty}'(z) \ \& \ \pi(x, z)]$$

In this way, both ANs and possessive-predicating PC nominals make reference to substances, which allows for comparison between them in comparative subdeletion constructions. To see how this works, we lay out the minimal formal assumptions required to show this compositionally.

Our starting point is the semantics of substance possession already laid out in §2. To this we add the uncontroversial assumption that the copula denotes the identity relation on predicates (e.g., Partee 2002), and that the denotation for an AN like *nláám* ‘beautiful’ is that in (53), as already discussed. Given these assumptions, the first clause of a comparative subdeletion construction like (52a) denotes a substance, i.e., a set of portions as shown in (54).¹⁷

$$(54) \quad \llbracket \text{Kim a ye nláám} \rrbracket = \lambda z [\text{beauty}'(z) \ \& \ \pi(\text{Kim}, z)]$$

¹⁶The order of the copular-predicating constituent and the possessive-predicating one does not matter for acceptability. I.e., alongside (52a), (i) is also licit (albeit with a different meaning):

- (i) *Kim a gweé nguy lɔɔ kii a ye nláám.*
 Kim AGR has strength pass as she is beautiful
 ‘Kim is stronger than she is beautiful.’

¹⁷It is worth noting that the *pos* type shift does not apply here, as generally assumed for comparatives on approaches that adopt the *pos* type shifting operation. The *pos* type shift, as noted above, applies only in the positive construction. If it were to apply here, composition would fail, as the reader can verify for herself.

Given the theory of possessive strategies of predication laid out in §2, this is precisely the same type of denotation as that of the second clause of (52a). The PN, on this theory, is substance denoting, as shown in (55a), repeated from (11). The PN composes with *gweé* ‘have’ in order to relate the substance to individuals, creating a relation between individuals and portions of substance, as shown in (55b), analogous to the denotation of the AN in (53). The subject argument of the clause then saturates the individual argument to create a substance-denotation, specifically, the set of strength portions that the particular individual stands in the possessive relation to, as shown in (55c).

- (55) a. $\llbracket \eta\text{guy} \rrbracket = \lambda p[\textit{strength}'(p)]$
 b. $\llbracket \textit{gweé} \eta\text{guy} \rrbracket = \lambda x \lambda z[\textit{strength}'(z) \ \& \ \pi(x, z)]$
 c. $\llbracket \textit{pro} \textit{gweé} \eta\text{guy} \rrbracket = \lambda z[\textit{strength}'(z) \ \& \ \pi(\textit{he}_1, z)]$

The two clauses of the comparative construction, then, are sets of portions that a particular individual possesses. Given the lattice-theoretic structure of substances laid out in §2, this means that each of these substances will include all of the portions that an individual possesses, i.e., a biggest portion (the supremum) and all portions that are a part of this portion. This captures the intuition, for example, that if Kim is five feet tall, she is also four feet 11 inches, four feet 10 inches, etc.

We assume that the function of the comparative forming verb *lɔɔ* is to introduce a relation between substances, comparing the position of the supremum of one to the position of the supremum of the other in the preordering of portions \leq , so that *A* is *Per* than *B* iff *A*’s maximal portion of *P* outranks *B*’s. A denotation that does precisely this for the comparative forming verb is given in (56) (where *sup* is a function that takes a substance as an argument and picks out its supremum).

- (56) $\llbracket \textit{lɔɔ} \rrbracket = \lambda P_{(p,t)} \lambda Q_{(p,t)}[\textit{sup}(Q) > \textit{sup}(P)]$

This denotation will equally work for comparatives when the properties that *A* and *B* have are the same, as in normal cases of comparatives such as (42), or different, as in the cases of comparative subdeletion that concern us here.¹⁸ Given this denotation for *lɔɔ*, the meanings of the clauses in (54) and (55c), the analysis generates the plausible meaning for (52a) in (57).

- (57) $\llbracket (52a) \rrbracket = \textit{sup}(\lambda z[\textit{beauty}'(z) \ \& \ \pi(\textit{Kim}, z)]) > \textit{sup}(\lambda z[\textit{strength}'(z) \ \& \ \pi(\textit{Kim}, z)]) =$
 true iff the supremum of the set of Kim’s portions of beauty is bigger than the supremum of the set of Kim’s portions of strength

To recap, our claim is that ANs lexically denote what the syntactically complex *have+PN* constituent denotes: a relation between individuals and portions of abstract matter. Because ANs denote such a relation, the mixed comparative subdeletion constructions are possible in Basaá. The comparison introduced by the verb *lɔɔ* (and by any comparative morphosyntax in any language we presume) requires that the target of comparison be of the same type, type-theoretically speaking, as the standard. Even though the AN and the *have+PN* construct are syntactically different, type-theoretically

¹⁸It does follow from this analysis that in order for a comparison between portions of substance to be defined, as in cases of comparative subdeletion, that the two portions are ordered with respect to one another by the preorder \leq . We assume that some pairs of substances are such that their portions are indeed ordered with respect to one another, while others simply are not, as evidenced by facts of incommensurability in comparative subdeletion (on which see e.g., Kennedy 1999: 57–60 for overview).

they are identical, and after composing with their subject, both denote the set of portions of substance that the subject has, and thus can be compared by $l\circ\circ$. Phrased more technically, because both clauses denote sets of portions, and because portions are ordered with respect to one another by the total preorder \leq , the statement that the suprema of each stand in the $>$ relation to one another is defined and can be judged true or false relative to a model.

By contrast, in English, we believe that it is because adjectives *do not* lexically have the denotation of the syntactically complex *have+PC nominal* string that mixed comparative subdeletion is impossible. Consider, for example, the unacceptable mixed comparative subdeletion construction in (58).

(58) #Joe has more strength than he is beautiful.

Based on the theory of substance possession laid out in §2, we assume that *has strength* has the same denotation as *gweé ηguy* in (55b), namely a relation between individuals and possessed strength portions. This is generated on the basis of a substance denotation for *strength*, as in (59a), and a denotation for *have* that takes such a denotation and creates a relation between individuals and portions of substance, as shown in (59b), giving the denotation for *has strength* in (59c).

- (59)
- a. $\llbracket \text{strength} \rrbracket = \lambda p[\text{strength}'(p)]$
 - b. $\llbracket \text{have} \rrbracket = \lambda P_{(pt)}\lambda x\lambda z[P(z) \ \& \ \pi(x, z)]$
 - c. $\llbracket \text{has strength} \rrbracket = \lambda x\lambda z[\text{strength}'(z) \ \& \ \pi(x, z)]$

As for the second clause in (58), what exactly the denotation of English adjectives is is a matter of controversy in the literature. While some claim that they denote some kind of vague predicate (Kamp 1975; Klein 1980; van Rooij 2011), others claim they denote relations between abstract degrees and individuals (Cresswell 1977; von Stechow 1984) or measure functions (Kennedy 2007b). We do not wish to take a position on this issue. What is important is simply that English adjectives do not have the same denotation as the *have+PC nominal* construct.¹⁹ At the same time, for expository purposes, it will be useful to illustrate with a concrete proposal. We assume for the purposes of discussion, then, a degree-based theory of English adjectival meaning, following Cresswell (1977), wherein adjectives denote relations between degrees and individuals, as for *beautiful* in (60).

(60) $\llbracket \text{beautiful} \rrbracket = \lambda d\lambda x[\text{beautiful}'(x, d)]$

Abstracting away from the particular details of the denotation of English comparative morphosyntax, its key feature on a degree-based theory is that in some form or another,

¹⁹Such an analysis, so far as we are aware, has never been directly argued for in English. However, it might be possible to read Moltmann (2009) in this light. Her focus, however, is on higher level issues, rather than compositional details, and we are uncertain whether her analysis should be read in this way or not, and whether what she says actually would entail such an analysis. To the extent it does, our observations might be taken as counterevidence to her theory as applied to English, but support for it as applied to Basaá. More recently, drawing on data from Malayalam, Menon and Pancheva (2013) have argued that adjectives universally, including in English, are derived from substance-denoting roots via possession in a manner like that proposed by Francez and Koontz-Garboden (2013b) for Ulwa. Without laying claim to what the proper analysis of Malayalam is, we believe the facts discussed here argue for crosslinguistic variation, and more specifically for English, that its adjectival semantics is not built on a semantics of substances.

it says that one degree is greater than another, as, for example, in the meaning assigned to the comparative by Heim in (48). Degrees and portions, however, are different kinds of ontological objects (see Francez and Koontz-Garboden 2013b for an overview).²⁰ While degrees are ordered with respect to one another and portions are ordered with respect to one another, degrees and portions are not ordered with respect to each other. As such, a comparison between degrees and portions will not be defined. To take as an example Heim’s denotation for the comparative operator in (48), $>$ will not be defined for a degree and a portion, since the two are not ordered with respect to one another. Comparison between a degree-based expression and a portion-based expression will be similarly undefined on any theory of English adjectives, save for a theory wherein adjectives have the same kind of denotation as the *have+PC nominal* expression.

It is our contention that the comparative subdeletion facts and additional facts discussed below provide evidence against such an analysis of English adjectives. If English adjectives had the same meaning of Basaá ANs, we would expect that they should be comparable in comparative subdeletion with possessive predicating PC nominals, contrary to fact. However, we do find such constructions in Basaá, which does have ANs with this meaning, by hypothesis. In the sections that follow, we give additional arguments for the claim that Basaá ANs have the meaning of the *have+PN* construction, while their English adjectival counterparts do not have the meanings of English *have PC nominal* constructs. The overarching observation, both with comparative subdeletion and with the arguments that follow, is that the grammar of Basaá groups ANs and PNs together in a way consistent with both classes of PC terms being built on a semantics of substances. This is not the case, by contrast, with English adjectives and PC nominals.

4.2 Equatives

The same kind of contrast between English and Basaá seen in comparative subdeletion is seen in equatives. In English, much like with comparative subdeletion, equative constructions in which the degree to which two different properties are compared (and declared at least equal) are possible, as shown by the data in (61).

(61) Kim is as beautiful as he is strong.

Although in (61) each of the properties is introduced by an adjective, it is also possible in English for them to be introduced by possessive-predicating PC nominals, as shown by (62).

(62) Kim has as much beauty as she has strength.

Just as in comparative subdeletion, however, it is not possible in equatives to introduce one property with a copular-predicating adjective and the other with a possessive-predicating PC nominal, as shown by the data in (63).

²⁰In particular, while degrees are totally ordered, portions are pre-ordered, the key difference being that the totally ordered relation is antisymmetric while the latter is not. The consequence of this difference, as Francez and Koontz-Garboden (2013b) discuss in detail, is that two portions can occupy the same position, meaning, for example, that Kim’s beauty and Sandy’s beauty can be of the same measure, while still being different objects (with the source of beauty being different in each case). This is not possible, by contrast, with degrees.

- (63) a. #Kim is as beautiful as he has strength.
 b. #Kim has as much beauty as he is strong.

In Basaá, equatives are constructed with the particle *nlelem* ‘same’, which takes two clauses, much like the comparative forming *lél*. And just like the comparative, the equative allows for clauses to be introduced by two PC words that match in their predicational strategy, as in (64a) for two ANs and (64b) for two PNs.

- (64) a. *Kim a ye mbóm nlelem kíí a ye nláám.*
 Kim AGR is big same as AGR is beautiful.
 ‘Kim is as big as he is beautiful.’
 b. *Kim a gweé ñém nlelem kíí a gweé ñguy.*
 Kim AGR has courage same as AGR has strength
 ‘Kim has as much courage as he has strength.’

Also like the comparative, the equative in Basaá allows for the equation of clauses whose main predicates do not match in their type of predication. This is shown by (66), in which the first property is introduced by an AN, while the second is introduced by a PN.

- (65) *Kim a ye nláám nlelem kíí a gweé ñguy.*
 Kim AGR is beautiful same as he has strength
 ‘Kim is as beautiful as he is strong.’

The explanation for this contrast between English and Basaá, we contend, is the same as the explanation for the contrast in comparative subdeletion—while in English there is a type-theoretic mismatch, owing to the fact that adjectives are not built on a semantics of substances, in Basaá there is not, owing to the fact that ANs *are* built on a semantics of substances. As a consequence, an equative with an AN and a PN is licit in Basaá, since the denotations of both are built on an underlying semantics of substances, giving rise to clauses which both denote substances (after composition with the subject argument). Because of this, portions in the denotations of each can be compared, or in this case, equated to one another. The formal details of the analysis of Basaá equatives are different to those of comparatives only trivially, and so we do not give full derivations here. The key difference is simply in the denotation of the equative forming particle, *nlelem*, for which we assume the denotation in (66).²¹

$$(66) \quad \llbracket nlelem \rrbracket = \lambda P_{(p,t)} \lambda Q_{(p,t)} [sup(Q) \geq sup(P)]$$

With (66) in place, composition of Basaá equatives, whether with two AN-headed clauses, two PN-headed clauses, or mixed clauses, proceeds identically to composition with comparatives, as discussed in §4.1.

English differs from Basaá, however, precisely in the manner proposed above—in English only PC nominals are built on a semantics of substances, while adjectives are

²¹This meaning is the counterpart on the substance-based theory to that proposed in the degree-based literature for the English equative forming particle *as*. On that theory, $\llbracket as \rrbracket$ picks out two sets of degrees and returns true iff the maximal degree in one set is greater than or equal to the maximal degree in the other. The difference between the comparative and the equative, both on the degree-based theory, and on that proposed here, is simply in whether the one maximal degree/supremum is necessarily ranked higher than the other, or possibly occupies the same place in the ordering, as can be the case in equatives. See Rett (2013: 6ff) for additional formal details of the degree-based theory, useful discussion, and references.

not. As a consequence, it is not possible to compare, or in this case equate them, since there are no elements that both make reference to that are ordered with respect to one another.

4.3 Degree morphology in English and Basaá

In our analyses of comparative subdeletion and equatives, we have assumed that English PC nominals and Basaá PNs have the same kind of denotation: both denote substances, and it is for this reason that they trigger possession in predication. English adjectives and Basaá ANs contrast in the type of meaning they have. While the latter have a semantics identical to the semantics of *have+PN* counterparts, the former do not have the semantics of *have+PC nominal*. What exactly English adjectives denote, as noted above, is a matter of controversy. However, any analysis of English adjectives will allow them to compose directly with degree morphology such as degree question words (67a) or degree modifiers (67b).

- (67) a. **How beautiful** is Kim?
b. Kim is **very/so/too beautiful**.

The situation with PC nominals in English is different—these cannot be used directly with degree morphology, as shown by (68).

- (68) a. #How beauty does Kim have?
b. #Kim has very/too/so beauty.

Rather, the modifier *much* appears between the degree word and the PC nominal.

- (69) a. **How much beauty** does Kim have?
b. Kim has **very/too/so much beauty**.

With adjectives, by contrast, *much* never intervenes in this position, as shown by (70).²²

- (70) a. #How much beautiful is Kim?
b. #Kim is very/too/so much beautiful.

In English, then, adjectives and PC nominals contrast in their ability to compose directly with degree morphology. This contrast makes sense in light of the differences in meaning between English adjectives and PC nominals proposed here. Assuming for clarity

²²It has been claimed, e.g., by Bresnan (1973), that in constructions like those in (67), there is in fact a phonologically null *much*. Such a view has been argued against by Jackendoff (1977) and is rejected outright by Bhatt and Pancheva (2004). Although Cresswell (1977) does provide a semantics that would unify a covert adjectival *much* and an overt nominal *much*, it is based on a semantics for plurals and mass nouns wherein these have a degree argument, like adjectives. Such an analysis of mass nouns and plurals, however, is out of step with current views on their meanings, and it is difficult to see that it could stand up to scrutiny (though we are aware of no explicit deconstruction of this view). The standard position in the literature on mass and plural nouns is by now that they denote structured sets in the spirit of Link (1983), and as outlined in §2.3. Any unified analysis of nominal/adjectival degree morphology committed to a covert adjectival *much* that adopted such an analysis would have to posit two different *muchs*, since the type of meaning argued for adjectives is different to the type argued for mass nouns and plurals. The basic point then, is that even if one were to accept a covert *much* in constructions like (67), it would need to be a different *much*, leaving intact the basic empirical observation that degree heads with adjectives and PC nominals in English are treated differently to one another.

that adjectives denote relations between degrees and individuals, degree morphology takes such a meaning as an argument, saturates the degree argument, and imposes restrictions on the nature of the degree itself.²³ To illustrate, consider the denotation for *very* in (71), where A is a variable over adjectival-type meanings and $standard_{very}$ is a function from adjectival meanings to the degree (on the scale lexicalized by the adjective) required to stand out (in the sense of Kennedy 2007b) in a context in which the positive form predicate is true (more technically, $standard_{very}$ given an adjective A returns the minimum degree required to stand out in a context where all of the individuals under consideration have a degree of at least $standard(A)$).²⁴

$$(71) \quad \llbracket \text{very} \rrbracket = \lambda A_{(d,(e,t))} \lambda x \exists d [A(d, x) \ \& \ d > standard_{very}(A)]$$

Degree morphology like this composes directly with an adjective, to create a predicate of individuals, as illustrated for *very beautiful* by the derivation in (72).

$$(72) \quad \llbracket \text{very beautiful} \rrbracket = \llbracket \text{very} \rrbracket (\llbracket \text{beautiful} \rrbracket) = \\ \lambda A_{(d,(e,t))} \lambda x \exists d [A(d, x) \ \& \ d > standard_{very}(A)] (\lambda d \lambda x [beautiful'(d, x)]) = \\ \lambda x \exists d [beautiful'(d, x) \ \& \ d > standard_{very}(\lambda d \lambda x [beautiful'(d, x)])]$$

If PC nominals denote portions of substances, it follows that they do not have the right kind of meaning to compose with degree morphology like *very*. It is our contention, following the spirit of the analysis in Wellwood et al. (2012: 212), that the purpose of *much* in constructions like those in (69) is to bridge this gap, creating a relation between degrees and individuals from a mass (or plural) type meaning (i.e., a meaning ranging over a set of mereologically structured individuals, as in Link 1983).²⁵ The denotation in (73) makes this intuition explicit. Here, the $P_{mass/pl}$ variable ranges over plural/mass noun meanings, and μ is a measure function, taking a portion/plurality, measuring it, and returning a degree.

$$(73) \quad \llbracket \text{much} \rrbracket = \lambda P_{mass/pl} \lambda d \lambda x [\mu(x) = d \ \& \ P_{mass/pl}(x)]$$

In essence, *much* creates an adjective-type meaning from a plural or mass noun, allowing the *much N* constituent to appear with degree morphology, as shown in (69). The observation that PC nominals require *much* with degree expressions follows from the claim that their meanings differ from those of adjectives. If the *have+PC nominal* constituent already had the meaning of English adjectives, there would be no need for *much* in the presence of degree expressions with a PC nominal.²⁶

²³Details vary from analysis to analysis, but the key fact is that degree morphology composes with an adjectival type of meaning.

²⁴The intuition behind this denotation for *very* is the one in Wheeler (1972); Klein (1980); von Stechow (1984), that *very* restricts the denotation of the adjective to a subset of the entities for which the positive form predicate is true (so that e.g., the very tall are a subset of those considered tall, in any given context). This will be the case given the denotation in (71), on the assumption that adjectives in the positive form undergo a type shift which introduces a contextual standard (via the *standard* function), as widely assumed in the degree-based literature (Cresswell 1977; von Stechow 1984; Kennedy 1999, 2007b).

²⁵The denotation for *much* given in (73) differs from that in Wellwood et al. (2012: 212) only in compositional details that are not of concern here. See Grove (2013) for a proposal for the lexical semantics of *much* also similar in spirit to that proposed here.

²⁶An apparent alternative analysis of the distribution of English *very* and *much* would be to analyze the distribution of *very* as syntactically restricted to attaching to constituents of category A, as in traditional analyses. Then, the function of *much* would be to convert nouns into adjectival expressions. This analysis is perfectly compatible with ours, as we assume that nouns, including nominal PC terms, and adjectives

For Basaá, we have proposed that there is no contrast in the type of meaning that the AN and *have+PN* construct have. The prediction, then, is that there should be no contrast in the ability to take degree morphology of the kinds illustrated above. This prediction is borne out. For degree question formation, for example, ANs and PNs use the same *wh* expression—*kií !kíí*—to question the degree to which the property named by the PC word in question holds, as shown by the data in (74), with no apparent trace of anything like *much* in either case.²⁷

- (74) a. *kim a ye nláám kií !kíí?*
 Kim AGR is beautiful like what
 ‘How beautiful is Kim?’ (AN)
- b. *kim gweé nguy kií !kíí?*
 kim has strength like what
 ‘How much strength does Kim have?’ (PN)

The exact analysis of Basaá degree questions would take us beyond the scope of this paper. What is important is simply that if ANs and the *have+PN* construct have the same denotation, then there is no reason to expect that they should behave differently relative to degree questions. The fact that they do not behave differently, by contrast with English adjectives and PC nominals, lends additional support to the claim that ANs denote what the *have+PN* construct denotes.

Similarly, Basaá contrasts with English in the predicted way in the domain of degree modifiers, as the same modifier occurs in both classes. Whether with ANs (75) or possessively predicated PNs (76), there is a modifier *ngandak* that is used to intensify the property named by the PC word under consideration. This modifier occurs after the modified constituent, the typical position of adjuncts in Basaá, as shown in (75) for ANs and (76) for PNs.²⁸

in English have distinct semantics which correspond to their syntactic category. Thus, the question of whether the distribution of *very* is syntactically or semantically restricted is unanswerable outside of specific assumptions about the architecture of the grammar (e.g. “syntax always produces interpretable structures”).

Nevertheless, if one wanted to assume a purely syntactic explanation, the prediction about the behavior of degree morphology is then simply that there should be a correlation between the availability of mixed comparative subdeletion, mixed equatives, and a lack of degree morphology specialized exclusively for copular predicating or possessive predicating PC words. For languages like English that disallow mixed comparative subdeletion and equatives, there would then be no prediction, since degree morphology could in principle be sensitive to either semantics or syntax. If one were to find a language like Basaá, call it Basaá-prime, that lacked mixed comparative subdeletion and equatives, but that had two nominal classes of PC word, one copular and one possessive predicating, even on a syntactic analysis of English, there is still a prediction—there *should* be specialized degree morphology. And since such a language has no contrast in lexical category between the two classes, the explanation for this contrast could only be due to a contrast in the lexical semantics of the two classes, much as the lack of a contrast in Basaá, as illustrated below, can only be due to a common semantics, given the lack of a categorial contrast.

²⁷This *wh*-expression also combines with Basaá adjectives, which can also appear in comparative subdeletion constructions, just like ANs. We leave these to the side.

²⁸An obvious question, given the distribution of *ngandak* across these two classes is whether it is really sensitive to the presence of portions in the lexical semantics of the words it modifies, or whether it has a broader lexical semantics like that of a slack regulator (Lasersohn 1999), as has been argued for a number of intensifiers, by contrast with degree-sensitive English *very*, in a number of languages recently (McNabb 2012; Beltrama and Bochnak 2013). The data in (i) suggest we are correct in concluding that *ngandak*, at least in its intensifier guise, is indeed a gradable modifier rather than e.g., a slack regulator, given that it is not used in slack regulator type contexts in which the modified predicate is not gradable:

- (75) *kim a ye nláám ḡgandak.*
 kim AGR is beautiful very
 ‘Kim is very beautiful.’
- (76) *kim a gweé ḡguy ḡgandak*
 kim AGR has strength very
 ‘Kim is very strong.’

As with the data observed in the preceding sections, this behavior makes sense if ANs have the same type of meaning as the *have+PC nominal* construct.

We propose that *ḡgandak* in (75)-(76) has a similar meaning to English *very*, as described above: it existentially quantifies over the portion argument and restricts the domain to those portions of substance that “stand out” (in the sense of Kennedy 2007b) in contexts including only those portions that are already big enough to stand out. Call this (contextually supplied) domain of portions D_{very} ; the denotation for *ḡgandak* is then:

$$(77) \quad \llbracket \text{ḡgandak} \rrbracket = \lambda \mathcal{P}_{\langle e, \langle p, t \rangle \rangle} \lambda x \exists^{D_{very}} z [\mathcal{P}(x)(z)]$$

The meaning in (77) takes as an argument a relation between individuals and portions. On the proposal laid out above, this is the lexical type of ANs and the type of the VP in *have+PN* constructs. In the former case *ḡgandak* can compose directly with the AN (78a), while in the latter case it composes with the VP (78b):

- (78) a. $\llbracket \text{nlam ḡgandak} \rrbracket = \lambda x \exists^{D_{very}} z [\text{beauty}'(z) \ \& \ \pi(x, z)]$
 b. $\llbracket \text{gweé ḡguy ḡgandak} \rrbracket = \lambda x \exists^{D_{very}} z [\text{strength}'(z) \ \& \ \pi(x, z)]$

In both contexts, use of *ḡgandak* precludes the need for the positive operator type shift (18), and allows the predicate to combine directly with the subject, returning a truth value.²⁹

- (i) a. *mè ñsóm̄b yágá/#ḡgandak ndáp*
 I buy really/very house
 ‘I really bought the house.’
 b. *hìnùnì yágá/#ḡgandak hî.*
 bird really/very that
 ‘That really is a bird.’

²⁹The intensifying use of *ḡgandak* in (75)-(76) contrasts with the purely quantificational use equivalent to English ‘many, a lot’ (repeated from (34a)):

- (i) *ḡgandak í dínuní í yé minlangá*
 3.many 3 19.birds 3.AGR be 4.black
 ‘Many birds are black.’

This quantificational meaning of *ḡgandak* corresponds with its syntactic distribution as a noun, in the same position which ANs occupy, before its nominal restriction. Thus, the intensifying versus quantificational meanings of *ḡgandak* are clearly identifiable with two distinct syntactic distributions: intensifying *ḡgandak* attaches to the right of the constituent it modifies and receives the interpretation of an intensifying degree modifier, while quantifying *ḡgandak* occurs to the left of the element it modifies and receives the interpretation of a weak quantifier.

The contrast between the two uses (which are reminiscent of the northern Californian slang terms *hella* and *hecka* (Bucholtz 2006), which also have both of these uses) may be implicated in two distributional contrasts observed by Hyman et al. (2012): *ḡgandak* cannot modify a DP constituted by an AN modifying a common noun (ii), and that it cannot precede an AN in predicative position to modify it (iii), by contrast with PNs, which do allow this (iv).

This section began with the observation that the distribution of Basaá ANs was similar to English adjectives, raising the question whether the AN meanings could be given a treatment similar to the meanings of English adjectives. However, the data in this section demonstrated that Basaá ANs have a meaning which is substantially different from English adjectives. Specifically, the meaning of Basaá ANs is built on a semantics of substance possession, sharing its denotation with the syntactically formed *have PN* construct. This proposal that ANs and *have PN* constituents have the same type of meaning is supported by the fact that they are treated identically by a range of semantic operations in the language, including comparative subdeletion, equatives, and degree expressions. More to the point, ANs, just like *have PN* constructs, are built on a semantics of substance possession, and make reference in their meaning to a semantics of substances. In the next section we extend this analysis to account for the use of both classes of Basaá PC nominals in attributive environments.

5 Attributive uses of PC nominals

Recall from the discussion in §3 that in attributive environments, ANs serve as the head of their noun phrase, where they subordinate the modified noun with a connective (79). In contrast, PNs are subordinated by a connective while the modified noun serves as the head, as shown in (80):

(79) AN-OF-N CONSTRUCTION

- a. *lí-múgέ ʰlí hí-nuní lí nʰtóp hémbí*
 5-quiet 5.CON 19-bird 5.SBJ sing 19.song
 ‘The quiet bird is singing.’
- b. *má-múgέ ʰmá dí-nuní má nʰtóp hémbí*
 6-quiet 6.CON 13-birds 6.SBJ sing 19.song
 ‘The quiet birds are singing.’

(80) N-OF-PN CONSTRUCTION

- a. *hí-nuní hí ηgûy hí nʰtóp hémbí*
 19-bird 19.CON 9.strength 19.SBJ sing 19.song
 ‘The strong bird is singing’
- b. *dí-nuní dí ηgûy dí nʰtóp hémbí*
 13-birds 13.CON 9.strength 13.SBJ sing 19.song
 ‘The strong birds are singing’

In this section we extend our analysis of nominal PC terms to account for their attributive, DP-internal uses. The main point of the section is that both ANs and PNs will

(ii) *min-laygá (*ηgandak) mí dí-nuní (*ηgandak)*
 4-black very 4.CON 13-bird very

(iii) **kim a ye ηgandak nlám.*
 kim AGR is a lot beautiful

(iv) *kim a gweé ηgandak ηguy*
 kim AGR has a lot strength
 ‘Kim has a lot of strength.’

We leave exploration of these matters for future research.

compose with the noun they modify via Predicate Modification, but the attributive uses of PNs must involve a HAVE type shift. The existence of such an type shift finds support from an otherwise mysterious fact: a significant class of PNs, typically possessive-predicating PC terms, can also occur with copular predication, where exactly the same type shift is motivated.

In our analysis of the constructions in (79) and (80), the connective preposition is assumed to be semantically empty, its presence due to some syntactic requirement. Of course, analyses which assume that English *of* is semantically empty are standard (e.g. Matthewson 2001; Partee and Borschev 2003), and typically attribute its distribution to syntactic factors, for example the inability of nouns to assign abstract case (Stowell 1981). With this as background, there are other language-internal reasons for analyzing the Basaá connective preposition in (79) and (80) as semantically empty.

First, while connectives do occur in possessive contexts, the connective occurring in (79) and (80) is morphologically distinct from the connective which occurs in true possessives (Hyman et al. 2012: ex. 10). This distinction is only visible in noun classes 1, 3, 7, and 9. In these noun classes, connective prepositions are associated with overt segmental content in possessives. On the other hand, in the attributive environments in (79) and (80), as well with relational nouns and compounds, connective prepositions are only associated with a tone, a high tone in classes 3 and 7 and low in classes 1 and 9. The examples below illustrate this distinction with the Class 1 connective: *nú* in possessive contexts ((81a), glossed CON1), but a low tone in contexts triggering the reduced form ((81b-d), glossed CON2):

- (81) a. *mut nú Victor*
 person CON1 Victor
 ‘Victor’s person’
- b. *ŋɔɔ Victor*
 enemy CON2.Victor
 ‘Victor’s enemy’
- c. *mut wĩm*
 person CON2.theft
 ‘a thief’
- d. *nláám mut*
 beautiful CON2.person
 ‘beautiful person’
- e. *mut ŋgúy*
 person CON2.strength
 ‘strong person’

The heterogeneity of contexts where the reduced connective is found represents a compelling argument for its semantic vacuity. Even more, compounds and relational nouns represent contexts where no semantic contribution can be found for the connective. If the connective is semantically empty in these contexts, then attributing any semantics to the connective with the attributive uses of ANs or PNs would represent a departure from the null hypothesis, which is that the reduced connective has a uniform, empty semantics. Given this conclusion, we assume that the connective must be present in these contexts for syntactic reasons.³⁰

³⁰There are three possible explanations for the requirement that a connective occur in these contexts. The common denominator between them is that the connective must occur wherever two nouns are in

Having established the semantic emptiness of the connective, we explain the compositional semantics of the AN-of-N construction in (79) in light of the kind of denotation we have proposed for ANs above. We concluded above that ANs lexically denote a relation between individuals and substances, as in (82b) for *lí-múgé*. However, we presented a number of arguments in §3.3 that ANs are individual-characterizing, including arguments from attributive uses of ANs. In order to go from the relational meaning of ANs to the individual-characterizing meaning, we assume, as discussed in §2, that ANs in attributive environments must undergo the positive type shift (POS) (18), which saturates the substance argument, resulting in a context-sensitive predicate of individuals, as shown in (82c). After POS has applied, ANs can be composed with the noun they modify, (82d) in the case of (82a), via Predicate Modification, as shown in (82e):³¹

- (82) a. *lí-múgé* ⁴*lí* *hí-nuní*
 5-quiet 5.CON 19-bird
 ‘that quiet bird’
 b. $\llbracket \text{lí-múgé} \rrbracket = \lambda x \lambda z [\text{quietness}'(z) \ \& \ \pi(x, z)]$
 c. $\llbracket \text{POS}(\text{lí-múgé}) \rrbracket = \lambda x. \exists z [\text{quietness}'(z) \ \& \ \pi(x, z)]$
 d. $\llbracket \text{hí-nuní} \rrbracket = \lambda x. [\text{bird}'(x)]$
 e. $\llbracket \text{POS}(\text{lí-múgé})^4 \text{lí hí-nuní} \rrbracket = \lambda x. \exists z [\text{bird}'(x) \ \& \ \text{quietness}'(z) \ \& \ \pi(x, z)]$
 (by *Predicate Modification*)

As proposed above, the connective makes no semantic contribution.³²

Moving on to DP-internal PNs, while ANs have a built-in semantics for substance possession, PNs simply denote portions of substances (§2). However, the attributive use of PNs in (80) presents a potential problem for this view. First, attributive uses of PNs are not genuine possessive constructions, because they do not make use of the full connective which occurs in possessives (81). Second, even if the connective did encode a possessive relationship, possession seems to go the wrong way; the head noun is in the position of the possessee, but it must be interpreted as the possessor of the substance denoted by the PN, so at a minimum, a different denotation would be needed for possessive morphology on such an analysis.

In light of these observations, and the assumed meaninglessness of the connective more generally, we do not believe that possession is morphosyntactically encoded in the

a head-complement relationship, a requirement which is directly encoded in the HPSG-based analysis of Crysmann (2011) of a similar alternation in Hausa. Alternately, the connective might be present in order to allow predicate inversion, as in Hyman et al. (2012). Finally, the connective may be present to assign Case, as has been claimed for English *of*. See Baker and Collins (2006) for a case-based analysis of a ‘linker’ occurring in the Kinande double-object construction, which is observed to be similar to the connective in several respects.

³¹We assume the standard rule of Predicate Modification (e.g. Heim and Kratzer 1998: 65) in (i):

- (i) Predicate Modification:
 $\lambda P_{\langle e, t \rangle} \lambda Q_{\langle e, t \rangle} \lambda x [P(x) \ \& \ Q(x)]$

³²An appealing analysis of the connective in the context of this analysis would be as the overt correlate of Predicate Modification. However, the data offered earlier in this section render such an analysis ad hoc. In short, because Predicate Modification does not occur in all uses of the connective, such as with relational nouns, there is little reason to propose that it has that meaning here. Moreover, true adjectives, which compose with head nouns in exactly the same way as ANs (semantically speaking), do not require the use of a connective. In short, the application of Predicate Modification is neither a necessary nor sufficient condition for the use of a connective.

N-of-PN construction, despite possible initial appearances that that may be the case. Instead, we postulate the existence of a HAVE type shift that derives an AN-type meaning from a PN; the semantics of HAVE are identical to overt *gweé* ‘have’ (16), and need no special comment. We assume that HAVE applies directly to the PN, followed by POS. The resultant meaning is then suitable to compose with the head noun by Predicate Modification. This is all illustrated by the derivation of the meaning of the DP in (83a) given in (83b–f):

- (83) a. *hi-nuní hí ngûy*
 19-bird 19.CON 9.strength
 ‘the strong bird’
 b. $\llbracket \text{ngûy} \rrbracket = \lambda p[\text{strength}'(p)]$
 c. $\llbracket \text{HAVE}(\text{ngûy}) \rrbracket = \lambda x \lambda z[\text{strength}'(z) \ \& \ \pi(x, z)]$
 d. $\llbracket \text{POS}(\text{HAVE}(\text{ngûy})) \rrbracket = \lambda x \exists z[\text{strength}'(z) \ \& \ \pi(x, z)]$
 e. $\llbracket \text{hínuní} \rrbracket = \lambda x. [\text{bird}'(x)]$
 f. $\llbracket \text{hi-nuní hí POS}(\text{HAVE}(\text{ngûy})) \rrbracket = \lambda x. \exists z[\text{bird}'(x) \ \& \ \text{strength}'(z) \ \& \ \pi(x, z)]$
 (by *Predicate Modification*)

So in the end the truth conditions of the attributive uses of ANs and PNs are identical: both denote sets of individuals who possess some portion of the relevant abstract property.

This analysis has little to say about why ANs occur as nominal heads while PNs are subordinated. In fact, PNs can also serve as the head of a noun phrase, but the resultant DP then must refer to the actual substance which the PN characterizes:

- (84) *nguy i hi-nuní*
 9.strength 9.Con1 19-bird
 ‘the strength of the bird’

Thus, HAVE may be blocked in contexts where its target can function as the head of a referential DP, otherwise the example in (84) would be expected to allow ‘strong bird’ as a possible interpretation. One outstanding question is why the AN-of-N construction is not actually N-of-AN, by parallel with the attributive use of PNs. Although we do not offer a worked out explanation, neither do we believe it is surprising. We conjecture that despite the fact that ANs are nominal, an observation supported by the range of evidence amassed in §3, they do not occupy the same position in the nominal extended projection as ordinary nouns. This, we think, is not surprising given that like adjectives in familiar languages on any analysis, ANs do not actually have the kind of denotation of ordinary nouns (whether mass or count) and (as a consequence) typically do not form the referential core of noun phrases. We assume that perhaps as a consequence of these facts, ANs typically occur higher in the functional structure than common nouns do. In the theory of Extended Projection of Grimshaw (2005), this would correspond to ANs having a higher F(unctional)-value than common nouns, a fact which, in Grimshaw’s theory, means they must c-command nouns. In contrast, PNs themselves much more easily can head noun phrases, perhaps in part as a consequence of the mass-noun type denotation they have. Thus, we might expect the N-of-AN construction to be prohibited because ANs can be taken to be a functional projection of the noun, in some abstract

sense.³³

Another natural question to ask is what empirical consequences, if any, arise from the existence of the covert HAVE operator in Basaá. In fact, there is independent motivation for this type-shift from predicative environments, where it turns out that a subclass of *have*-predicating PC nominals (PNs) can also be predicated with *be*:

- (85) a. *a gweé li-kéγγé*
1.SUB have 5-intelligence
'She has intelligence.'
b. *a ye li-kéγγé*
1.SUB be 5-intelligence
'She is intelligent.'

This alternation is common. In fact, mass-like nominal PC terms fall into three classes, one group which is always 'have'-predicating, another which is always 'be'-predicating, and a third group which allows the alternation in (85).³⁴ All three groups are large, and no clear semantic generalizations are discernible. Without explaining why this alternation is only sometimes possible, the analysis developed independently above for DP-internal contexts affords a clear analysis of it: Basaá permits the use of the HAVE type-shift with a restricted subset of PC terms in predicative environments. Thus, while (85a) is interpreted directly, (85b) must make use of HAVE. This alternation in predicative environments thus provides independent evidence for the existence of the HAVE type shift in Basaá, lending to the plausibility of its occurrence in attributive environments, as claimed above. Moreover, the close relationship between the two forms of predication are unsurprising in our proposal, where ANs and PNs have closely related meanings. In the next section we offer concluding remarks, considering the consequences of this observation for the question we began with—how lexical category restricts the meaning that a property concept word has.

6 Concluding remarks: Nominally encoded PCs have an argument in domain of substance

The starting point for the discussion above has been the observation that words naming Dixon's property concept notions vary in their lexical category. The question we have asked is whether this variation is semantically consequential, taking as our point of departure Francez and Koontz-Garboden's conjecture that it is, and more specifically, that nominal encoding of property concepts entails a substance-denotation for them. We showed for the Bantu language Basaá, that while the class we called *property nouns* (PNs) are consistent with this claim, adjectival nouns (ANs) falsify it—ANs are demonstrably nominal, yet do not denote sets of portions of abstract substance. We went on to show, however, that neither is their meaning of the kind familiar from the extensive

³³This idea is analogous to other similar cases of hybrids between functional categories and nominal heads, for example, of numeral classifiers and pseudopartitives. See, e.g., Aarts (1998); Hankamer and Mikkelsen (2008), and the papers in Corver and Van Riemsdijk (2001).

³⁴In fact, there is a fourth class of nominal PC terms, a group of 'have'-predicating PC nominals which allows 'be'-predication, but only in emphatic contexts. We take these latter cases to be direct 'be'-predication of a PN, equivalent to English expressions like *Kim IS beauty (incarnate)*, where the substance is predicated directly of the subject, meaning that Kim is literally a portion of beauty.

literature on English adjectives. While in English, adjectives and PC nominals are built on demonstrably different underlying semantics, this is not true for Basaá ANs and PNs. Rather, we argued on the basis of a series of diagnostics tied to gradability and comparison that the denotation of ANs is the same as the denotation of the syntactically complex *have+PN* construct. Specifically, both ANs and *have+PN* strings denote relations between individuals and portions of substance.

In this way, although ANs are not substance-denoting, they *are* built on a semantics of substances. This suggests to us that although Francez and Koontz-Garboden's conjecture is strictly speaking false, there is still a sense in which nominal encoding of property concept words entails a particular kind of lexical semantics, at least in the set of languages that has been investigated thus far. Specifically, nominal encoding of property concepts entails a semantics of substance possession. That is, thus far, there are two kinds of denotation that PC nominals can have:

- (mereologically ordered) sets of portions of substance (Basaá PNs, the collections of PC nominals in various languages identified by Francez and Koontz-Garboden 2013b)
- functions from individuals to sets of portions of substance (Basaá ANs)

What the two kinds of denotation share in common is, of course, the semantics of substances underlying them. With both classes of word, predication entails relating the substance to an individual via the possessive relation. In the majority of cases we are aware of, this is accomplished syntactically, as with Basaá PNs and the PC words discussed in Francez and Koontz-Garboden (2013b). Basaá ANs are unique in that this is already built into the lexical semantics of the PC word itself. The unifying features, however, are (i) lexical category, and (ii) the semantics of substances. These findings suggest that at least in the domain of property concepts, nominal encoding does entail a particular kind of semantics. There is, then, a link between lexical category and lexical semantics. This raises the question what exactly the link is between substances and nounhood, and more to the point, why it should hold. Exploration of this question will have to await future work.

The larger context for this paper has been the question whether there are any semantic generalizations to be made about lexical categoryhood. Although this is a question much-explored from a functional-typological perspective, it is very little explored from the perspective of model-theoretic semantics. Our findings suggest that exploring the question from this perspective is a fruitful way of pushing this ancient area of inquiry forward. We suspect there is much more to be uncovered, and believe it should be on the agenda for work in the area of lexical categoryhood going forward.

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