Property concepts in Basaá and the ontology of gradability across category

Introduction. Theories of gradability and comparison (e.g., Kamp 1975 and many following) have largely been developed with data from familiar languages like English with **adjectives** at their core, e.g., those in (1) and (2) (see p. 3 for all examples). In many languages, however, the main predicate in translationally equivalent constructions – henceforth the *property concept* (PC) (cf. Dixon 1982) – is of a **different category**. For example, Francez & Koontz-Garboden (2017; FKG) examine constructions in several languages with **nominal PCs**, with the cross-linguistically robust finding that predicative and comparative constructions in these languages likewise make use of a different morphosyntax: **possession**. Take e.g., Hausa, where equivalents of predicative sentences such as (1) use nominal PCs (3) and are encoded just like canonical possessives (4).

FKG argue that this morphosyntax is conditioned by the denotation of the PC noun: While adjectives denote sets of ordinary individuals, PC nouns denote *qualities*, i.e., mass-type denotations (in the sense of Link 1983) with an additional size-ordering (to capture gradability), so that e.g., *ƙarfī* in (3) denotes a mereologically and size-ordered set of portions of strength; such a meaning can be related to an entity by possession but *not* predication (viz the oddness of *Kim is strength* in English).

Problem. While the compositional semantics of sentences such as (1) (and their comparative counterparts, (2)) are well-studied, truth-conditionally equivalent ones with nominal PCs such as (3) – and the lexical semantics of the property concept nouns that underpin them – are much less understood. Though there are various proposals for the semantics of adjectives, from degree-based (Cresswell 1976) to delineation-based (Kamp 1975; Klein 1980) accounts, no analysis has their lexical semantics built on objects that are natural for the denotations of PC nouns like *wisdom* (6), which however receive a straightforward treatment as mereologically and size-ordered sets of abstract portions, a treatment that keeps with their exhibition of mass noun behavior (FKG: Ch. 6).

This contrast between the treatment of PC adjectives and nouns leads to minimal pairs such as *wise* and *have wisdom*, as in (5-6), with truth-conditionally equivalent sentences restricting the model in different ways. Such a state of affairs, while perhaps not the null hypothesis, is also not unknown. Languages routinely express the same meaning in model-theoretically different ways, e.g., the way to say that *Kim is evil* in Ulwa is to attribute blackness to Kim's liver (FKG: Ch. 1).

In this talk however, drawing on data from (i) degree modification and (ii) degree questions in Basaá (Bantu; Cameroon), **we argue that the truth-conditional identity of sentences like (5-6)** *must* **be captured model-theoretically**, i.e., adjectives like *wise do* have the same type-theoretic denotation as have+PC nominals like *have wisdom* (an intuition suggested by Menon and Pancheva (2014), and one which we make explicit semantic arguments for). Further, we argue that PC nouns **and adjectives** are best accounted for by an analysis of gradability that makes reference to qualities (rather than to degrees), which we show can capture the truth-conditional equivalence of (5-6).

Property concept lexemes in Basaá fall into three types (Hyman et al. 2012; Jenks et al. 2018), two of which are of concern here: i) a small set of genuine adjectives, identified based on their ability to be adnominal modifiers and the use of a copula in predication, and ii) a class of 'quality' nouns like English *wisdom*, which on the other hand cannot be adnominal modifiers and which moreover require possessive morphosyntax in the equivalent of predication. We show below that the adjectives and the have+PC nominal construct systematically behave the same within two key constructions in Basaá, thereby supporting the claim that they are type-theoretically identical.

Degree modification and degree questions in English treat adjectives and nouns, including PC nominals, differently: nouns require *much*-support in both contexts; adjectives (at least overtly) do

not (7-8). Whether this is due to the morphosyntactic properties of comparatives, as Bresnan (1973) and subsequent syntactic work claims, or to a semantic difference between nouns and adjectives, as Bochnak (2015) hints at, is open to debate. What *is* clear is that the contrast is not universal, as it fails to materialize in all languages. In Basaá for example, **the gradable modifier** *ŋgandak* **'very'** – which has the syntax of a VP adverbial – **modifies both predicative adjective VPs and have+PC nominal VPs in precisely the same way** (9-10). Importantly moreover, ordinary mass nouns cannot be followed by *ŋgandak* (11). Taken together, these facts suggest that both predicative adjective VPs and have+PC nominal VPs should be assigned the same type-theoretic meaning.

A quality analysis. A unified analysis of the semantics of *ŋgandak* modification is possible if Basaá adjectives and have+PC nominals have the same semantic type, and **relate individuals to portions of qualities**. We follow FKG (pp. 44-45) in treating nouns like *ŋguy* 'strength' as denoting qualities, as in (14a) (with bold metalanguage predicates having the type of qualities, and p ranging over portions). The verb *gweé* 'have' then takes a quality as an argument and returns a relation, as in (14b), between individuals and left-bounded intervals of a quality (i), i.e., subsets of that quality that contain those portions at or above a cut off point in the size-ordering defined to mark the point in the ordering above which all portions 'stand out' contextually (in the sense of Kennedy (2007)). In this way, e.g., *Kim à gweé ŋguy* 'Kim is strong' is true iff Kim's portion of strength is in such an interval, thereby capturing the context-sensitivity of positive degree constructions (see FKG pp. 47ff for extension to the comparative). We assume that adjectives such as *ŋkéŋí* 'big' in (14c) have precisely the same kind of denotation as VPs like *gweé ŋguy*, varying only in the quality possessed. Both therefore predicate of individuals identically.

The denotation for *ŋgandak* as in (15) is then also able to modify both in precisely the same way, taking the have+PC noun VP as an argument in sentences like (10) or the be+adjective VP (where *be* denotes the identity function) as an argument in sentences like (9). It does this, as in (16), by restricting the interval in which an individual's quality portion can be found to just those portions in an interval returned by the context-sensitive function VERY, a function which takes a set of intervals as an argument and returns the left-bounded interval, in which can be found only those portions that stand out in a set of portions that themselves stand out (in the spirit of the treatment of *very* in Wheeler 1972; Klein 1980; von Stechow 1984), i.e., an interval with a contextually very high lowest portion. In this way, a unified analysis of *ŋgandak* modification is achieved.

Predictions. Crucially, this analysis predicts that other constructions involving gradability should likewise treat the different types of property concept lexemes identically. This prediction is borne out: **degree questions from both classes are also formed in the same way** (12-13), without anything like the intervention of *much* in the case of PC nominals. These facts can be straightforwardly accounted for under a standard semantic theory of degree questions (Rullman 1995) if the *wh*-operator 'how' simply binds a variable ranging over portions, rather than over degrees.

Conclusion. The behavior of property concept lexemes in Basaá reveals that adjectives and the have+PC noun construction must be type-theoretically identical to each other: While the source of the difference between English adjectival and nominal intensification and degree questions (7-8) might plausibly be syntactic or semantic, identity like that seen in Basaá entails semantic – specifically model-theoretic – equivalence. These two constructions treat the two classes identically; this demands a uniform treatment, which is available only if Basaá adjectives are type-theoretically identical to the have+PC nominal VP, at least if a uniform semantic analysis of intensive modification with *ŋgandak* and degree question formation with *kií !kíí* is to be provided.

(1) We are strong.

(2) We are stronger than them.

(3) *Mun**à** d**à** ƙarfī.*
we.CONT with strength
'We are strong.'   (Newman 2000:224)

(4) *Yārinyà tan**à** d**à** zōbě.*
girl   she.CONT with ring
'The girl has a ring.' (Newman 2000:222)

(5) Kim is **wise**.

(6) Kim **has wisdom**.

(7) a. Kim has **very much** wisdom.
b. **How much** wisdom does Kim have?

(8) a. Kim is **very** tall.
b. **How** tall is Sandy?

(9) *hínuní híí hí yé hikɛ́ŋí **ŋgandak**.*
bird   DEM AGR be big   very
'That bird is very big.' (Adj)

(10) *Kim à gweé ŋguy **ŋgandak**.*
Kim AGR has   strength very
'Kim is very strong.' (PC nominal)

(11) **í   !ɓɛ́ɛ́ î   í   gwé!é moó **ŋgandak***
DEM well DEM AGR has   oil   very

(12) *kim a   ye ŋkɛ́ŋí **kií !kíí**?*
kim AGR be big   how what
'How big is Kim?' (Adj)

(13) *kim gweé ŋguy **kií !kíí**?*
kim has   strength how what
'How strong is Kim?' (PC nominal)

(14) a. [[*ŋguy*]]: $\lambda p.\mathbf{strength}(p)$ 'strength'
b. [[*gweé ŋguy*]]: $\lambda x\lambda i \subset \mathbf{strength}.\exists^i z[\pi(x,z)]$ 'have strength'
c. [[*ŋkɛ́ŋí*]]: $\lambda x\lambda i \subset \mathbf{bigness}.\exists^i z[\pi(x,z)]$ 'big'

(15) [[*ŋgandak*]]: $\lambda Q_{(e,(i,t))}\lambda x.\exists^i z[Q(x)(i) \ \wedge \ VERY(\lambda i'\exists x'[Q(x')(i')]) = i]$

(16) a. [[*yé hikɛ́ŋí ŋgandak*]]:   'be very big'
$\lambda x.\exists^{i\subset\mathbf{bigness}}z[\pi(x,z) \ \wedge \ VERY(\lambda i'\exists x'\exists^{i'\subset\mathbf{bigness}}z'[\pi(x',z')]) = i]$

b. [[*gweé ŋguy ŋgandak*]]:   'have much strength'
$\lambda x.\exists^{i\subset\mathbf{strength}}z[\pi(x,z) \ \wedge \ VERY(\lambda i'\exists x'\exists^{i'\subset\mathbf{strength}}z'[\pi(x',z')]) = i]$

Selected references: Bochnak, MR. 2015. The degree semantics parameter and cross-linguistic variation. *Semantics & Pragmatics*. ● Dixon, RMW. 1985. Where have all the adjectives gone? *Mouton*. ● Francez, I. & Koontz-Garboden, A. 2017. Semantics and morphosyntactic variation: Qualities and the grammar of property concepts. *Oxford University Press*. ● Hyman, L. et al. 2012. Adjectives as nominal heads in Basaá. *ACAL*. ● Jenks, P. et al. 2018. Accessibility and demonstratives in Basaá relative clauses. *de Gruyter*. ● Menon, M. and R. Pancheva. 2013. The grammatical life of property concept roots in Malayalam. *Sinn und Bedeutung*. ● Newman, P. 2002. The Hausa language: An encyclopedic reference grammar. *Yale University Press*.

Additional submissions: A version of this abstract has been submitted to GLOW 42. The GLOW version looks also at subcomparatives, and is generally at a higher level, in that it does not actually assume any particular analysis for property concept lexemes in Basaa, but rather argues simply that adjectives and have+PC nominal have the identical type, whatever that type might be. In the SALT version, we have assumed an explicit semantics instead, focusing in detail on the analysis of *ŋgandak*, and to a lesser extent on degree questions.