Interactions of Degree and Quantification

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Quantification, Degrees, and *Beyond* in Navajo

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1 Introduction

Intuitively, the comparison of objects along a gradient dimension seems like a cognitively basic ability that should be universally available and communicable (Sapir 1944).[1] However, we also find great diversity in the kinds of structures that individual languages use to express these meanings (Stassen 1985). Recent crosslinguistic investigation has found that even in languages that use rather similar morphosyntactic strategies to express comparison and related meaning, the semantics and syntax of structures in individual languages diverge in subtle, but still perceptible, ways (see, for example, Beck, Oda & Sugisaki 2004, Beck et al. 2009, Kennedy 2007, Bochnak 2015, and Rett's contribution to this volume).

A particularly rich line of investigation has probed the syntax of standards of comparison and its interplay with the semantics of the comparative marker (Hoeksema 1983, Heim 1985, Kennedy 1997, Lechner 2004, Pancheva 2006, Bhatt & Takahashi 2011, Beck, Hohaus & Tiemann 2012). In terms of syntax, the key question is whether the standard of comparison contains elided clausal structure in cases where it is not visible. Since Bresnan 1973, it has been usual to analyze sentences like (1) as containing an unpronounced instance of the adjective in the main clause.

(1)   Alice is taller than [$_{CP}$ Ben is ~~tall~~].

This kind of syntax is generally paired with a semantic analysis that treats comparative morphemes like *-er* as quantificational expressions on par with *every*.

Both compose with two predicate-type expressions, but where *every* composes with two sets of entities (2), *-er* instead composes with sets of degrees (3) (von Stechow 1984, Heim 2001, Beck 2011, among many others).

(2) *every* ⤳ $\lambda P_{\langle e,t\rangle}$. $\lambda Q_{\langle e,t\rangle}$. $\forall x$. $P(x) \rightarrow Q(x)$ $\langle\langle e,t\rangle,\langle\langle e,t\rangle,t\rangle\rangle$

(3) *-er* ⤳ $\lambda D_{\langle d,t\rangle}$. $\lambda D'_{\langle d,t\rangle}$. $\text{MAX}(D') > \text{MAX}(D)$ $\langle\langle d,t\rangle,\langle\langle d,t\rangle,t\rangle\rangle$

Applied to (1), the two sets of degrees (D, D') taken as arguments by *more/-er* correspond respectively to the degrees to which Ben is tall, and the degrees to which Alice is tall.

In a sentence like (4), by contrast, the standard lacks any overt clausal material. While there is debate as to the analysis of such strings (Lechner 2004, Bhatt & Takahashi 2011), one strategy is to treat the standard of comparison as denoting an entity rather than a set of degrees, without hidden clausal structure (Hoeksema 1983, Heim 1985, Kennedy 1997).

(4) Alice is taller than [$_{DP}$ Ben].

More recent crosslinguistic investigation has argued that this 'phrasal' analysis alone is available for standards of comparison in Mandarin, Japanese, Turkish, Hindi-Urdu, and Luganda (Xiang 2005, Kennedy 2007, Pancheva 2006, Hofstetter 2009, Bhatt & Takahashi 2011, Beck, Hohaus & Tiemann 2012).

A phrasal syntax for the standard of comparison is most often paired with a semantic analysis which does not treat *more/-er* and its reflexes in other languages as a quantifier. Instead, it composes directly with two entities (x, y) and a gradable predicate (g) determined by the adjective in the main clause. While the sentence in (4) would have the same truth conditions as its clausal counterpart in (1), these truth conditions would be derived differently.[2]

(5) *-er* ⤳ λy_e . $\lambda g_{\langle d,et\rangle}$. λx_e . $\text{MAX}(\lambda d . g(d, x)) > \text{MAX}(\lambda d . g(d, y))$

(Heim 1985)

$\langle e, \langle\langle d, \langle e, t\rangle, \langle e, t\rangle\rangle\rangle$

This paper considers data from Navajo degree constructions like those in (6) which challenge this pairing of syntactic and semantic analyses. While Navajo

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2 While these analyses have been widely adopted and will be the focus of our paper, they are by no means the only analyses that have proposed for comparatives; see in particular Bale (this volume) and Schwarzschild (this volume) for two recent alternative proposals.

seems to be a clear case of a language with syntactically phrasal standards of comparison, we argue that it is nevertheless a language for which a quantificational semantics for comparative morphemes (or, as in Navajo, standard markers) is motivated.

(6) a. *Alice Ben yi-lááh   'áníłnééz.*
         Alice Ben 3-beyond 3.tall
         'Alice is taller than Ben.'

     b. *Alice 'a-lááh   'áníłnééź.*
        Alice UNSPEC-beyond 3.tall
        'Alice is tallest, Alice is taller than anyone.'

While a non-quantificational meaning for the comparative standard marker *-lááh* 'beyond' would suffice in (6a), the meaning of (6b) motivates us to posit (only) a quantificational meaning for *-lááh*. Superlative prompts are translated in Navajo by combination of the standard marker with the 'unspecified' object marker *'a-*. This type of strategy for expressing superlative meaning is crosslinguistically quite rare (Gorshenin 2012). We demonstrate that unless *-lááh* is given a quantificational meaning, we predict *'a-* to have scope over the comparative relation, giving rise to an unattested interpretation in which Alice need only be taller than a particular individual.

This paper addresses the interaction of quantification and degree in three ways. First, it provides evidence from a structure with a quantificational standard of comparison (*'a-* in (6b)) for a quantificational meaning for Navajo standard markers. Second, it considers how a phrasal syntax can be reconciled with a quantificational entry for comparative morphemes. We accomplish this by invoking application of a measurement operator to the standard. Third, it presents evidence that the Navajo lexicon includes expressions of quantificational determiner type $\langle\langle\tau, t\rangle, \langle\langle\tau, t\rangle, t\rangle\rangle$, in the domain of degrees. Navajo has generally been viewed as a language without meanings of this type (Faltz 1995, Faltz 2000, Speas & Parsons-Yazzie 1996). We suggest that Navajo allows this type of meaning in the domain of degrees because, unlike entity arguments of verbs more generally, the degree arguments of gradable expressions are not saturated by morphology on the verb itself, thus leaving property-type expressions available to compose with quantifiers.

2   Background

Navajo expresses gradable properties using verbs. While somewhat less morphologically complex than event-denoting verbs in Navajo, adjectival verbs such as those below still bear key morphological components otherwise associated with verbs, including a stem and a subject prefix.[3]

(7)   a. *’áníłnééz*   3.tall
       b. *’anísnééz*   1SG.tall
       c. *nineez*   3.tall
       d. *deesdoi*   3.hot
       e. *nohzhóní*   2PL.pretty

All Navajo verbs obligatorily bear prefixes to mark core nominal participants (subject, object). Adjectival verbs bear only a subject marker. As with all verbs, when the subject (or object, where relevant) is third person, a verb-external nominal expression can be optionally included.

(8)   (*Alice*) *nineez.*
       Alice   3.tall
       'Alice (he, she, it) is tall.'

Bogal-Allbritten (2013, 2016) discusses at length differences in degree constructions that correlate with the morphological marking borne by adjectival verbs, for example *’áníłnééz* vs. *nineez* in (7). We follow Bogal-Allbritten in taking these differences to have syntactic, rather than semantic, sources. These differences will largely not be important for our purposes here and will only be mentioned when they are salient or useful to note.

Following proposals by Bogal-Allbritten (2013, 2016), we treat all adjectival verbs in Navajo as denoting, at an abstract level, relations between entities and degrees, as is familiar from analyses of gradable predicates in English (Cresswell 1976, von Stechow 1984, Heim 1985, Heim 2001, Kennedy & McNally 2005, and many others). The lexically-encoded semantic core of an adjectival verb is the measure function (e.g., height), which associates an entity with a degree along some scale. Scales can be defined by three parameters: a set of degrees, a dimension, and an ordering relation (Bartsch & Vennemann 1972, Bierwisch 1989, Kennedy 1997).[4]

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3   For much more detail on the topics discussed here, see Bogal-Allbritten 2013, 2016.
4   It is more common to treat adjectives as denoting $\langle d, \langle e, t \rangle \rangle$ expressions. We reverse the entity

(9) $tall \leadsto \lambda x_e$. λd_d . $\mathsf{height}(x) \geq d$ $\equiv \lambda x$. λd . $\mathsf{tall}(d, x)$

Navajo verbs cannot appear without prefixes for all nominal arguments in place (Young & Morgan 1980, Faltz 1998). We therefore suggest that the denotation in (9) does not actually correspond to a verb form that can be pronounced in the language.[5] The verb's entity argument is saturated by the third-person pronominal subject prefix, which we treat as a pronoun, indicated with subscript i, translated as a variable with the same index (v_i). An adjectival verb as a whole denotes an expression of type $\langle d, t \rangle$.[6]

(10) 'áníłnééz$_i$ $\leadsto \lambda d$. $\mathsf{height}(v_i) \geq d$ $\equiv \lambda d$. $\mathsf{tall}(d, v_i)$
       3_i.tall

This view of Navajo verbs is consistent with analyses that take it to be a Pronominal Argument language, in which all nominal arguments of the verb are pronouns realized as morphologically dependent affixes on the verb (Jelinek 1984, Baker 1996, Willie & Jelinek 2000, Hale 2001). Verb-external nominal expressions do not themselves saturate the verb's argument positions but instead come to corefer with the pronominal prefixes through a binding process that we might think of as similar to clitic left dislocation in Romance (Baker 1996). The details of this process will not be critical to us. What is important is that typical verbs like in (11) do not denote relations of type $\langle e, t \rangle$ or $\langle e, \langle e, t \rangle \rangle$ but are instead treated like complete clauses would be (type t).

(11) *Yiyííyą́ą́'*
       3.3.eat.PFV
       'S/he/it ate it.'

We propose here that the key difference between ordinary verbs and adjectival verbs is that while the first express sentential meanings once fully inflected,

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and degree arguments since we assume here the entity argument is obligatorily saturated first by verb-internal morphology in Navajo. The treatment in (9) is furthermore consistent with independent proposals for adjectival meaning in other languages, in particular Schwarzschild 2005 (Jessica Rett, p.c.).

5   Bogal-Allbritten (2016) suggests this to be the entry for the adjectival verb stems, which is the rightmost morpheme in the verb.

6   We place the index for the third-person subject prefix at the right edge of the verb in (10) as we are not showing the full morphological breakdown for these verbs here. The actual prefix would come towards the middle of the verb word.

adjectival verbs denote functions of type $\langle d, t \rangle$ since there does not exist an equivalent to subject and object prefixes in the domain of degrees.

We will be concerned with the semantics of elements found in Navajo degree constructions. In contrast with English, Navajo does not have both degree morphemes (e.g., *more/-er*, *less*, *as*) and standard markers (e.g., *than*, *as*). Instead, Navajo only uses standard markers to express comparative meaning. The standard markers are shown in bold below.[7] The comparative standard marker *-lááh* is the primary focus of discussion below, although all claims should be extendible to the other standard markers shown.

(12) *Alice (Ben) yi-lááh   'ánítnééz.*
      Alice Ben   3-**beyond** 3.tall
      'Alice is taller than Ben/him/her/it.'   [Comparison of superiority]

(13) *Alice shi-'oh   'ánítnééz.*
      Alice 1-**short_of** 3.tall
      'Alice is less tall than me.'   [Comparison of inferiority]

(14) *Alice (Ben) y-ee-nítnééz.*
      Alice Ben   3-**with**-3.tall
      'Alice is as tall as Ben/him/her/it.'   [Equative, postpositional]

(15) *Alice Ben-gi   'ánítnééz.*
      Alice Ben-LOC 3.tall
      'Alice is as tall as Ben.'   [Equative, enclitic]

The Navajo standard markers shown above belong to two different morphosyntactic categories. Postpositions function as the comparative morphemes in comparisons of superiority (12), comparisons of inferiority (13), and the equative structure shown in (14). Postpositions in Navajo obligatorily bear object markers which indicate the person features of the object of the postposition (e.g., *yi-* in (12) and (14), and *shi-* in (13)). The standard marker in the equative construction in (15) is a locative enclitic which attaches to the independent nominal expression serving as the standard of comparison. Regardless of the category of the standard marker, the standard of comparison can never be omitted:

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7 There are other degree constructions in Navajo which will not concern us here. See Bogal-Allbritten (2013, 2016) for discussion.

(16) a. *Alice lááh 'ánítnééz.
Alice beyond 3.tall
(Intended: 'Alice is taller, Alice is taller than that.')

b. *Alice gi 'áníłnééz.
Alice LOC 3.tall
(Intended: 'Alice is as tall, Alice is as tall as that.')

While all postpositional standard markers necessarily bear pronominal object marking, an additional expression can be added to provide more information about third-person standards of comparison. This additional expression can be a proper name as in the examples above. It can also be a measure phrase:

(17) a. Alice hastą́ą-di 'adées'eez yi-lááh 'áníłnééz.
Alice six-LOC feet 3-beyond 3.tall
'Alice is taller than six feet.'

b. Díí ńdíshchíí' hastą́ą-di 'adées'eez-gi 'áníłnééz.
this pine.tree six-LOC feet-LOC 3.tall
'This pine tree is six feet tall.'

In addition, Navajo has a subcomparative construction in which the standard of comparison contains clausal material. In structures like (18), the clausal material in the standard is obligatorily marked by the nominalizer -ígíí, which is also found in internally-headed relative clauses in the language (Platero 1974, Willie 1989, Grosu 2012). We return to the analysis of subcomparatives in section 5.2.

(18) Ch'é'étiin bikáá'adání 'áníłnééz-ígíí yi-lááh 'áníłtéél.
door table 3.tall-NMLZ 3-beyond 3.wide
'The door is wider than the table is tall.'

Finally, it should be noted that the glosses given to each standard marker reflect the fact that none is only found in degree constructions. Their glosses reflect their meaning elsewhere in the language. For instance, -lááh can describe motion or position beyond some point in space, named by the object of the postposition. In these 'literal' uses, postpositions are frequently accompanied by additional locative markers such as -di in (19a), but this is not obligatory (19b).[8]

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8 The marker -go (SUB) seen in (19b) is a subordinator or adverbializer whose distribution and

(19) a. *Tooh ńlín-ígíí   bi-**láah**-di   shi-ghan   si'ą́.*
      water 3.extend-NMLZ 3-beyond-LOC 1POSS-hogan 3.sit
      'My place is over beyond the river.' (Young & Morgan 1987, 222)

   b. *Kǫ'yee naagháhí dził   bi-**láah**-go   sh-ił   dah diildo.*
      balloon   mountain 3-beyond-SUB 1-with up   3.fly.PFV
      'My balloon went flying up with me beyond the mountains.' (Young &
      Morgan 1987, 342)

This paper will not discuss how one might reconcile the entries that we give
for standard markers with the use of the same expressions to convey various
other types of meaning. For discussion of connections between comparative
and locative meaning more generally, we refer the reader to Hohaus 2012. For
discussion of this issue with particular respect to Navajo, see Schwarzschild
2013, 2014.

3   Clausal and Phrasal Analyses of Comparatives

3.1   *Overview*
There are two major approaches to a sentence with the shape in (20), both for
English and for its counterparts in other languages. The key feature of (20) is
that the standard appears to consist only of the DP *Ben*.

(20) Alice is taller than Ben.

One analysis of sentences like (20) is that the standard of comparison contains
a clause which has been largely elided (Bresnan 1973, von Stechow 1984, Hackl
2000, Lechner 2004, Bhatt & Takahashi 2011), as in (21).

(21) Alice is taller than [$_{CP}$ Ben ~~is tall~~].

This is the same kind of syntax as is given to standards with overt clausal struc-
ture:

(22) a. The door is wider than [$_{CP}$ the table is tall].
   b. Alice is taller than [$_{CP}$ Ben is ~~tall~~].

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function will not be of interest to us here. For discussion, see Bogal-Allbritten 2013, Bogal-
Allbritten 2016, and Schauber 1979.

A clausal syntax for the standard is most commonly paired with a semantic analysis of comparative and other degree morphemes as quantifiers over degrees (type $\langle\langle d, t\rangle, \langle\langle d, t\rangle, t\rangle\rangle$). The entry in (23) for *more/-er* is based on proposals by Cresswell (1976). The two properties of degrees taken as argument are both maximalized by the comparative morpheme such that comparison is ultimately between the maximal degrees in each set. Motivation for addition of maximalization can be found in von Stechow 1984 and Rullmann 1995.[9]

(23) $-er_{clausal} \rightsquigarrow \lambda D_{\langle d,t\rangle} \ . \ \lambda D'_{\langle d,t\rangle} \ . \ \text{MAX}(D') > \text{MAX}(D)$
      where $\text{MAX}(D) \rightsquigarrow \lambda D_{\langle d,t\rangle} \ . \ \iota d \ . \ D(d) \ \& \ \forall d' [D(d') \rightarrow d' \leq d]$

The comparative morpheme takes as argument two sets of degrees: one contributed by the standard phrase and the other contributed by the main clause. The following LF is based on von Stechow 1984 as presented in Beck, Hohaus & Tiemann 2012.[10]

(24) $[[-er_{clausal} \ [\text{than} \ [\lambda d_1 \ [\text{Ben is } d_1 \text{ tall}]]]] \ \lambda d_2 \ [\text{Alice is } d_2 \text{ tall }]]]$

As an aside, the proposals above have been criticized for English because all semantic work is done by *more/-er* while *than* is vacuous. Von Stechow (1984) and Rullmann (1995) suggest an alternative in which maximalization over the standard of comparison is accomplished by *than*, so that the comparative morpheme instead composes with a single degree followed by a property of degrees. Other approaches in this vein assign maximalization to a *wh*-operator and treat the standard as a free relative of degrees in the manner of Partee 1987 and Jacobson 1995.

(25) a. $-er_{clausal} \rightsquigarrow \lambda d_d \ . \ \lambda D_{\langle d,t\rangle} \ . \ \text{MAX}(D) > d$
      b. *than* $\rightsquigarrow \lambda D_{\langle d,t\rangle} \ . \ \text{MAX}(D)$

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9   Alternative entries that are also of quantifier type include the following:
     (i) a. $-er_{clausal} \rightsquigarrow \lambda D_{\langle d,t\rangle} \ . \ \lambda D'_{\langle d,t\rangle} \ . \ \exists d \ . \ D'(d) \wedge \neg D(d)$
        b. $-er_{clausal} \rightsquigarrow \lambda D_{\langle d,t\rangle} \ . \ \lambda D'_{\langle d,t\rangle} \ . \ D \subset D'$
     Nothing about the claims made in the rest of this paper should change if either of these denotations is substituted for any instance of a comparative morpheme with the denotation in (23).
10   Abstraction over degree arguments in each clause is necessitated by the assumption that gradable predicates in English are expressions of type $\langle d, \langle e, t\rangle\rangle$. The LF will be simpler in Navajo since we take inflected adjectival verbs to already denote expressions of type $\langle d, t\rangle$.

While entries like (25) may be a good fit for a language like English, Navajo does not have separate comparative morphemes and standard markers. There is no overt element in Navajo which we might wish to treat as a separate maximality operator. Thus, when we consider the analysis of Navajo, we will focus on entries like (23)/(26) in which all meaning is contributed by a single morpheme, and where two sets of degrees are taken as argument.

(26) $-lááh_{clausal} \leadsto \lambda D_{\langle d,t \rangle} \; . \; \lambda D'_{\langle d,t \rangle} \; . \; \text{MAX}(D') > \text{MAX}(D)$

Precedent for an entry like (26) for a standard marker comes from Alrenga, Kennedy & Merchant (2012), who observe that it is very common to find languages using only a standard marker to express comparative meanings.

The second major approach to the string in (20) treats the standard not as a reduced clause but instead as just a DP.

(27) Alice is taller than [$_{DP}$ Ben].

While this syntactic analysis has been long debated for English (Heim 1985, Kennedy 1997, Lechner 2004, Bhatt & Takahashi 2011), it has also been put forth for several other languages; see Xiang 2005 for Mandarin, Kennedy 2007 for Japanese (cf. Shimoyama 2012), Hofstetter 2009 for Turkish, Bhatt & Takahashi 2011 for Hindi-Urdu, and Bochnak 2013 for Luganda.

The syntax in (27) is compatible with the following denotation for *-er*. This entry is taken from Heim 1985; see Beck, Hohaus & Tiemann 2012 for comparison of it with an alternative from Kennedy 1997.

(28) $-er_{phrasal} \leadsto \lambda y_e \; . \; \lambda g_{\langle d,et \rangle} \; . \; \lambda x_e \; . \; \text{MAX}(\lambda d \; . \; g(d,x)) >$
      $\text{MAX}(\lambda d \; . \; g(d,y))$

Under this account, the comparative morpheme (type $\langle e, \langle \langle d, \langle e, t \rangle \rangle, \langle e, t \rangle \rangle \rangle$) does not take as argument two sets of degrees, but instead composes with two entities (or one entity and one degree) and a gradable predicate. As formulated here, the comparative relation still holds between the maximal degrees in two sets of degrees, but the sets of degrees are derived directly by *more/-er*.

As before, an account of Navajo on these lines would assign the meaning of *more/-er_{phrasal}* to the standard marker *-lááh*. An entry of this kind is attributed to standard markers by Bhatt & Takahashi (2011) in their analysis of Hindi-Urdu.

(29) $-lááh_{phrasal} \leadsto \lambda y_e \; . \; \lambda g_{\langle d,et \rangle} \; . \; \lambda x_e \; . \; \text{MAX}(\lambda d \; . \; g(d,x)) >$
      $\text{MAX}(\lambda d \; . \; g(d,y))$

Not all analyses correspond fully to either of the two pairings described above. Of particular note for us is Pancheva's (2006) treatment of Slavic standards of the shape in (30), where the standard bears fixed (genitive) case and lacks an overt *wh*-operator. Pancheva argues that such standards neither originate as DPs nor derived from full clauses, but are instead derived from reduced small clauses (31).[11]

(30) *Germann   byl sil'nee   [*SC* svoego protivnika*]
     Germann.NOM was stronger   [own   adversary].GEN
     'Germann was stronger than his adversary.' (Pancheva 2006, (10b))

(31) a. Alice is taller than [*SC* Ben *d-tall*]
     b. than [*SC* Ben Δ]

Standards of this shape can be contrasted with those of the shape in (32), which Pancheva argues are derived from full clauses that have undergone reduction.

(32) *Germann   byl sil'nee   [*CP* čem   (byl) ego protivnik*]
     Germann.NOM was stronger   what.INS was his adversary.NOM
     'Germann was stronger than his adversary.' (Pancheva 2006, (10a))

While a small clause account still treats standards as truly clausal structures, albeit of a smaller size, Pancheva suggests that it can explain certain differences between (30) and (32) while making it possible to maintain a single quantificational entry (23) for Slavic comparative markers.

In section 4, we consider the syntactic and semantic analysis of Navajo standards of comparison. To preview, we argue that by syntactic diagnostics, Navajo standards do not have reduced full clauses as their syntactic source. At the same time, we present evidence from quantificational standards that Navajo standard markers are quantificational expressions that take sets of degrees, rather than entities, as argument. The kind of narrative that this suggests for Navajo is thus quite similar to the narrative that Pancheva explores for Slavic, namely how to reconcile quantificational comparative morphemes with standards that are not derived from full clauses. Nevertheless, a small clause account is a non-

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11   Further precedent for a small clause treatment of comparative standards comes from
      Lechner 2004. See also Pancheva 2010 for subsequent development of the account given
      in Pancheva 2006.

starter for Navajo. In contrast with Slavic and many other languages, there is no evidence that small clause structures exist in Navajo: All Navajo clauses consist of the same minimal element, namely a fully inflected verb marked for all nominal arguments and temporal information. Appealing to a small clause structure in only Navajo comparatives seems very stipulative. Thus, our focus as we develop an analysis in section 5.1 will be whether we can maintain a quantificational entry for comparative (standard) markers while not appealing to any clausal structure in the standard.

3.2   *Diagnostics*

There exist a number of structures that have been taken to support a phrasal analysis (syntax and semantics) over a clausal one, and vice versa. While some of these diagnostics were originally discussed for English (Hankamer 1973, Heim 1985, Kennedy 1997), we will illustrate them as applied to Hindi-Urdu by Bhatt & Takahashi (2011), who argue that only a phrasal analysis is appropriate for Hindi-Urdu. Hindi-Urdu comparatives are at least superficially similar to Navajo comparatives, making their comparison potentially instructive.[12] Like Navajo, Hindi-Urdu forms comparatives by marking a nominal standard of comparison with a postposition. The postposition *-se* is also used outside of comparative constructions to express temporal and locative notions of 'from' (Bhatt & Takahashi 2011, 591).[13]

(33) *John* [$_{DP}$ *Bill*]*-se*   (*zyaadaa*) *lambaa   hai*
     John   Bill-than more   tall.M.SG be.PRES.SG
     'John is taller than Bill.'

The first diagnostic concerns the acceptability of multiple phrases within the standard of comparison. Hindi-Urdu does not permit the standard to contain any expression in addition to the DP. In the following example, a temporal adverb is permitted in the main clause but rejected in the standard:

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12   A class of diagnostics that we do not consider here looks at the case of nominal expressions in the standard. Certain case markers have been taken to indicate the presence or absence of reduced full clausal structure (Heim 1985, Pancheva 2006). Since Navajo does not have nominal case, however, these diagnostics will not be instructive.

13   Unlike Navajo, Hindi-Urdu sentences like (33) can optionally contain the morpheme *zyaadaa* glossed here as a comparative marker 'more'. This morpheme becomes obligatory in certain comparative constructions, including comparisons of quantity. See discussion of its possible semantic function in Schwarzschild 2012.

(34) *Tina-ne   aaj   Pim kal-se   zyaadaa kitaabẽ paRh-ĩ:
       Tina-ERG today Pim yesterday-than more   books.F read-PFV.F.PL
       (Intended: 'Tina read more books today than Pim yesterday.')

The English translation shows that English, by contrast, permits multiple phrases in the standard of comparison. We expect the English sentence to be acceptable if the English standard derives from reduction of a full clause, which Bhatt & Takahashi (2011) argue it does. The absence of full clausal structure from Hindi-Urdu standards means that we correctly predict adverbs to be ungrammatical.[14]

The second diagnostic concerns the availability of reflexive standards of comparison. Hankamer (1973), Hoeksema (1983), and Napoli (1983) observe for English that a reflexive bound by the subject cannot function as the standard in clear cases of clausal comparison (35a). Reflexives become grammatical if the standard lacks any verbal material (35b).

(35) a. *No girl is taller than herself is.
     b. No girl is taller than herself.

Examples like these have been taken to suggest that English standards like (35b) are phrasal and do not derive from the reduction of a full clausal standard. If the standard is a full clause as in (35a), *herself* will not be locally bound and thus is correctly predicted to be ungrammatical. A phrasal syntactic analysis of (35b), on the other hand, puts *herself* in the same clause as the coreferential subject, making the reflexive not only licensed but obligatory on usual binding-theoretic assumptions (Chomsky 1981).

In Hindi-Urdu, by contrast, the standard in a *se*-phrase can, and indeed must, be a reflexive form when it is coindexed with the subject of the gradable predicate. This configuration suggests that Hindi-Urdu standards do not involve the reduction of full clausal standards.[15]

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14   The Hindi-Urdu facts may also have an explanation on a small clause account of standards (Pancheva 2006, Pancheva 2010). Temporal adverbs would be blocked because of the absence of tense from small clauses. However, small clauses can contain other kinds of modifying phrases, for example *I consider her unattractive drunk* (Harley & Jung 2015). In contrast with Navajo, Hindi-Urdu has been independently claimed to possess small clauses (Shah 1995); if the Hindi-Urdu counterpart to, for example *Even when she's sober, Tina is louder than Pim drunk* is grammatical, this would suggest a small clause treatment might be appropriate for the language.

15   We note that Pancheva (2006) suggests that a small clause analysis is also consistent with these data: Reflexives seem to be licensed in small clauses, as in *I consider myself lucky*. If

(36) *koi-bhii$_i$ apne*   [$_{DP}$ *aap*]-*se$_i$*   / [$_{DP}$ *us*]-*se$_{j/*i}$* *lambaa nahĩ: ho*
     anyone REFL.POSS   REFL-than   him-than   tall   NEG be
     sak-taa
     can-HABITUAL.M.SG
     'No one$_i$ can be taller than himself$_i$/him$_{j/*i}$.'

The final diagnostic we highlight concerns quantifier scope in standards. Bhatt
& Takahashi (2011) show that in an English sentence like (37), the universal
quantifier is permitted to take scope within the standard of comparison.[16]

(37) More students read every syntax paper than (read) every semantics paper.
     ≈ The number of students who read every syntax paper exceeds the num-
     ber of students who read every semantics paper.

This reading would arise from the following LF, as given in Beck et al. 2012:

(38) [[-er$_{clausal}$ [than [λd . d-many students read every semantics paper]]]
     [λd . d-many students read every syntax paper]]

Bhatt & Takahashi (2011) give the following translation into Hindi-Urdu for sen-
tence (37).

(39) [*har syntax paper*] [*har   semantics paper*]-*se   zyaadaa*
     every syntax paper   every semantics paper-than more
     logõ-ne   paRh-aa
     people-ERG read-PFV
     ≈ For every pair ⟨x, y⟩ of a syntax paper x and a semantics paper y, more
     people read x than y. (The least-read syntax paper was read by more peo-
     ple than any semantics paper) (paraphrase from Beck et al. 2012)

In contrast with the English sentence, however, (39) only has a reading in which
the universal quantifier is interpreted with scope above the comparative rela-
tion. This meaning can be paraphrased in terms of 'pairwise comparison' as
shown above. This reading corresponds to the following LF (Beck et al. 2012):

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        so, then these Hindi-Urdu facts may be consistent with a treatment of standards either as
        simple DPs or as reduced small clauses.
16   Much has been written about quantifiers in English that appear to obligatorily scope out-
        side of comparatives (Gajewski 2008, Larson 1988, Schwarzschild & Wilkinson 2002, Heim
        2006, Alrenga & Kennedy 2014, Fleisher 2016).

(40) [every syntax paper λx [every semantics paper
     λy [x [[-er$_{phrasal}$ than y] [λd . λz . d-many people read z]]]]]]

This difference between English and Hindi-Urdu is expected if English permits clausal standards while Hindi-Urdu does not. In English, the quantificational phrase *every semantics paper* ($\langle\langle e, t\rangle, t\rangle$) must undergo Quantifier Raising, leaving behind a trace of appropriate type (e) to compose with the unpronounced verb in the standard of comparison. Because QR can occur within the confines of the clausal standard of comparison, the quantificational phrase can take low scope with respect to the comparative operator. In Hindi-Urdu, by contrast, quantificational phrases cannot take scope within the standard of comparison. This makes sense if Hindi-Urdu has phrasal standards of comparison and the standard marker *-se* seeks a type e argument: *Every semantics paper* must QR out of the standard of comparison in order to resolve the type mismatch.[17]

4   Applying the Tests to Navajo

4.1   *First Impressions*
This section considers evidence for, and against, possible analyses of Navajo standards. We will not consider a small clause analysis along the lines of Pancheva 2006 since, as already noted, small clauses are not a structure for which there is independent motivation in Navajo grammar. This leaves us with two options: a phrasal analysis and a reduced (full) clausal analysis. A phrasal analysis of Navajo standards immediately suggests itself when we consider simple degree constructions like those below. The standard marker *-lááh* obligatorily bears pronominal marking corresponding to the standard of comparison. On verbs we treated prefixes for objects and subjects as saturating argument positions of their host: Why not say that *shi-* in (41) saturates the first argument of *-lááh*$_{phrasal}$?

(41) *Alice   shi-lááh   ’áníłnééz.*
     Alice   1-beyond   3.tall
     'Alice is taller than me.'

---

17   Hindi combines a universal quantifier *sab* with standard marker *-se* to translate superlatives prompts, as well. As expected, *sab* can only take high scope.
      (i) *Atif   sab-se   lambaa   hai*
          Atif   all-ABL   tall   be.PRES.SG
          'Atif is the tallest.' (*Lit:* Atif is taller than everyone)

Despite the initial appeal of a phrasal syntactic analysis, subcomparative-like structures like (42) have been previously used to motivate a clausal analysis for Navajo standards of comparison. Bogal-Allbritten (2013, 2016) treats all Navajo standards as underlyingly clausal, extrapolating from complex structures like (42) to simple cases like (41).

(42) *Ch'é'étiin bikáá'adání 'áníłnééz-ígíí yi-lááh   'áníłtéél.*
      door   table   3.tall-NMLZ   3-beyond   3.wide
      'The door is wider than the table is tall.'

As we will see next, however, despite the apparent existence of subcomparatives other diagnostics point away from a clausal analysis of the standard.

4.2   *Evidence for Syntactically Phrasal Standards*
With respect to the majority of diagnostics applied by Bhatt & Takahashi (2011) to Hindi-Urdu, Navajo seems to pattern like a clear example of a language with phrasal standards of comparison. First, like Hindi-Urdu—and unlike English—Navajo disallows multiple phrases in the standard of comparison.

(43) **'Ahbínídą́ą́'* Alice 'atní'ní'ą́ądóo Ben yi-lááh-go   bááh łikaní*
      morning   Alice afternoon   Ben 3-beyond-SUB   cookie
      yiyííyą́ą́'.
      3.3.eat.PFV
      Context: Alice ate 4 cookies this morning. Ben ate 2 cookies this afternoon. I tell you: Alice ate more cookies this morning than Ben ate this afternoon.

(43) is not ungrammatical because it compares quantities. Quantities can be compared as in (44), which differs from (43) only in the lack of adverbs.

(44) *Alice Ben yi-lááh-go   bááh łikaní yiyííyą́ą́'.*
      Alice Ben 3-beyond-SUB   cookie   3.3.eat.PFV
      'Alice ate more cookies than Ben did.'

We can conclude that (43) must be ungrammatical because of the temporal adverb *'atní'ní'ą́ądóo* 'afternoon' in the standard of comparison. The sentence again becomes grammatical if this adverb is removed:

(45) *'Ahbínídą́ą́' Alice Ben yi-lááh-go   bááh łikaní yiyííyą́ą́'.*
      morning   Alice Ben 3-beyond-SUB   cookie   3.3.eat.PFV
      'Alice ate more cookies this morning than Ben did.'

Second, Navajo postpositional standard markers can bear the reciprocal object marker *'ahi-*. We illustrate with the comparative standard marker *-lááh* as well as the equative standard marker *-ee*.[18],[19]

(46) *Alice dóó Mary doo ahi-lááh   'ánítnééz da.*
     Alice and Mary NEG RECP-beyond 3.tall   NEG
     'Alice and Mary are not taller than each other.' (i.e. they are the same height)

(47) *'Ah-ee-núilnééz.*
     RECP-with-1PL.tall
     'We are equally tall.'
     Lit. 'We are as tall as each other.' (Young & Morgan 1987, 54)

Reflexive and reciprocal object markers are obligatorily locally bound by an appropriate (i.e. non-singular) subject in Navajo (Willie 1991). The reciprocal marker in the following sentence cannot be replaced with a third-person marker without changing the meaning (i.e. 'We are painting some third person(s).').

(48) *'Ahiidleesh.*
     RECP.1DU.paint.IPFV
     'We are painting each other.' (Willie 1991, 34)

Thus, the grammaticality of reciprocal markers as standards of comparison suggests strongly that the standard of comparison should not be analyzed as a full clause, of which the standard is the subject.

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18   We do not find examples of structures in which the standard marker *-gi* combines with a reciprocal object marker. Such structures seem to be ruled out for independent reasons, namely that Navajo lacks a non-affixal reciprocal pronoun (Willie 1991), which would be what *-gi* would need to attach to.

19   It is also possible to find the reflexive object marker *'ádi-* with standard markers. However, the meanings here were a bit odd, as shown in (i) (Young & Morgan 1987, 61). Further work is needed to determine how the meaning of (i) arises from its components.
     (i) *Díí   tsin   'ał-'oh   neel'á.*
         this stick REFL-short_of 3.extend
         'These sticks aren't the same length.' *Lit:* These sticks extend short of each other.

4.3   *Evidence from the Scope of a Quantificational Standard*

A phrasal treatment of Navajo standards is challenged, however, by comparatives with indefinite standards, used to express superlative meaning. Navajo lacks a single superlative marker comparable to English *-est* but instead translates superlative prompts by combining the comparative standard marker *-lááh* seen above with an object prefix of the shape *'a*. Superlative meaning arises regardless of the morphological form of the adjectival verb (e.g., *'áníłnééz* vs. *nineez*).[20] Crucially, this sentence only has one meaning: Alice is taller than anyone else is. It cannot mean that there is someone whom Alice is taller than.

(49) a. *Alice 'a-lááh   'áníłnééz.*
   Alice UNSPEC-beyond 3.tall
   'Alice is tallest, Alice is taller than anyone.'

  b. *Alice 'a-láah-go   nineez.*
   Alice UNSPEC-beyond-SUB 3.tall
   'Alice is tallest, Alice is taller than anyone.'

The *'a-* object marker can also be borne by the postpositional standard marker used in comparisons of inferiority, *-'oh*. The meaning here is identical to (49) except that the meaning is that Alice is shorter (less tall) than anyone else in the context.

(50) *Alice 'a-'oh   'áníłnééz.*
  Alice UNSPEC-short_of 3.tall
  'Alice is shortest.'
  Lit: Alice is tall short of anyone.

Young & Morgan (1987) refer to the *'a-* prefix as the 'unspecified' or 'indefinite' object marker. Reflexes of *'a-* with the same characteristics are found in other Athabaskan (Dene) languages. In Navajo, *'a-* occupies the same position in the morphological template otherwise associated with the kind of object markers

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20 This sentence has a true superlative interpretation in the sense that it means that the subject bears the property in question to a unique degree among all relevant competitors. That is, (49) does not merely express that Alice is tall to a high degree, but rather that she is taller than anyone else under comparison. This sentence was rejected in a context in which Alice and Ben were both exceptionally tall individuals but the same height as each other.

we have already seen (Young & Morgan 1987). As such, it is not possible for a verb to bear both *'a* and a 'normal' object marker.

The *'a-* prefix is by no means restricted to superlative constructions. Minimal pairs of verbs with unspecified objects ((a)-sentences) and third-person objects ((b)-sentences) are given below.[21]

(51) a. *Na'niłkaad.*
       UNSPEC.3.herd.IPFV
       'S/he is herding (something).'

   b. *Neiniłkaad.*
       3.3.herd.IPFV
       'S/he is herding it/them.'

(52) a. *'Asts'ééh.*
       UNSPEC.1SG.eat_mush.IPFV
       'I am eating (something).'

   b. *Yists'ééh.*
       3.1SG.eat_mush.IPFV
       'I am eating it.'

The *'a-* object marker is also found on postpositions outside of those used in superlative constructions.[22]

(53) a. *Shi-zhéé   '-ee   nástaaz.*
       1POSS-father UNSPEC-with 3.wrap_up.PFV
       'My father was wrapped up (in something).'

   b. *Shi-chee   y-ee   nástaaz.*
       1POSS-grandfather 3-with 3.wrap_up.PFV
       'My grandfather was wrapped up in it.' (Young & Morgan 1987, 569)

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21   As the translations suggest, the verb stem may impose particular kinds of physical attributes on both regular and unspecified objects to have particular physical attributes. For example, the verb stem *tsééh* requires that the patient of the verb be mushy matter; thus, the unspecified object in (52a) must be mushy even though it does not refer to any particular mushy matter in particular as the object marker in (52b) does. See Fernald & Willie 2001 for discussion.

22   The *'a-* prefix surfaces as a glottal stop here.

Replacing a regular object marker with *'a-* has two concrete effects. First, the use of *'a-* blocks the use of verb-external nominal expressions, which are unremarkable with regular object markers.

(54) a. *'Ashkii* (**dibé*) *na'niłkaad.*
      boy   sheep   UNSPEC.3.herd.IPFV
      'The boy is herding.'

   b. *'Ashkii dibé   neiniłkaad.*
      boy   sheep   3.3.herd.IPFV
      'The boy is herding sheep.'

Second, if a verb bears the *'a-* object prefix, a subsequent verb bearing a regular object prefix cannot refer back to the object involved in the event described by the first verb (Fernald et al. 2000).

(55) *'Ashkii léi'   na'niłkaad.   #'Éí   táididoogish.*
     boy   INDF UNSPEC.3.herd.IPFV   that.one 3.3.shear.FUT
     'A boy is herding. He will shear it/them.'

On the basis of these two behaviors, Fernald et al. (2000) and Fernald & Perkins (2018) treat *'a-* as a valency-reducing affix rather than a referential pronoun of the kind denoted by other subject and object prefixes in the language. We give *'a-* the following general and type-flexible meaning (compare Dowty's (1978) rule for Unspecified Object Deletion); *'a-* reduces the valency of the predicate to which it applies through existential closure.[23]

(56) Given predicate P and arguments $\alpha, \beta, \dots \gamma \rightsquigarrow \lambda\alpha \cdot \lambda\beta \dots \lambda\gamma \cdot P(\alpha, \beta, \dots \gamma)$,
     then $'a\text{-}P \rightsquigarrow \lambda\beta \dots \lambda\gamma \cdot \exists\alpha \cdot P(\alpha, \beta, \dots, \gamma)$

The prefix *'a-* seems to saturate only internal argument positions of verbs: object positions in the examples above, or subject arguments of unaccusative verbs (e.g., *arrive*). This distribution is consistent with *'a-* being a valency reducing morpheme of the relevant sort.[24] Example (57) illustrates composition

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23 This rule is type-flexible, such that the arguments of P can be of any type (entities, degrees, etc.). For simplicity, we show both subject and object arguments are part of the verb's basic meaning, rather than introduce the subject via a functional head (Hale 2000, Rice 2000). We also suppress situation arguments. Nothing hinges on this.

24 A different morphological passivization operation is used to remove subject arguments and promote object arguments (Fernald & Perkins 2018).

of *na'niłkaad* 's/he is herding (something)' through composition between the unspecified object marker *'a* and verb (or verb stem) followed by composition with the third-person pronominal subject.

(57) *na'niłkaad$_i$*   ↝ $\exists x$. herd(x, v_i)
     UNSPEC.3$_i$.herd.IPFV

With this in hand, we return to the superlative construction. We stated above that (49) cannot be used in a context in which there is a particular individual whom Alice is taller than. However, this is precisely the truth conditions that are generated if we assign *-lááh* the denotation associated above with phrasal standards.[25]

(58) a. *-lááh$_{phrasal}$* ↝ λy . $\lambda g_{\langle d,et \rangle}$. λx . MAX$(\lambda d$. $g(d,x)) >$ MAX$(\lambda d$. $g(d,y))$

   b. *'a-lááh* ↝ $\lambda g_{\langle d,et \rangle}$. λx . $\exists y$. MAX$(\lambda d$. $g(d,x)) >$ MAX$(\lambda d$. $g(d,y))$

   c. *Alice 'a-lááh 'ánítnééz* ↝
      $\exists y$. MAX$(\lambda d$. tall$(d, \text{Alice})) >$ MAX$(\lambda d$. tall$(d,y))$
      True iff there exists some *y*, such that Alice's maximal degree of height exceeds the maximal degree of height of *y*

If we instead permit Navajo to have clausal standards of comparison, we generate the right meaning. In the following derivation, *'a-* composes with the unpronounced copy of the gradable predicate in the standard of comparison and so has low scope.[26]

(59) a. *-lááh$_{clausal}$* ↝ $\lambda D_{\langle d,t \rangle}$. $\lambda D'_{\langle d,t \rangle}$. MAX$(D') >$ MAX(D)

   b. *Alice 'a-lááh 'ánítnééz* ↝
      MAX$(\lambda d$. tall$(d, \text{Alice})) >$ MAX$(\lambda d$. $\exists y$. tall$(d,y))$
      True iff Alice's maximal degree of height exceeds the maximal degree *d* such that for some *y*, *y* is tall to *d*

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25 The translation in (58c) is a simplification. Since we assume that pronominal prefixes saturate the argument positions of verbs, *'ánítnééz* would actually be translated as tall$(v_i)(d)$. The index *i* is associated with Alice via a binding process (Baker 1996).

26 As given, the truth conditions in (59b) are trivially false: Alice (a potential *y*) cannot be taller than herself. But verbs with *'a-* in place of a regular object prefix cannot generally describe the subject acting upon herself. Instead, the reflexive object marker (high tone, *'á-*) must be used, e.g., *'ádéshjoł* 'I am drying myself.' Thus, there seems to be a general requirement that the domain of entities quantified over by unspecified marker *'a-* be distinct from other actors in the sentence.

These results strongly suggest not only that Navajo can have a quantifica-
tional semantics for standard markers such as *-lááh*, but furthermore that it
must. Admitting a phrasal semantics for *-lááh* would predict a high scope indef-
inite reading to be available for sentences in which *'a-* functions as the standard
of comparison. Although *'a-* might seem like a prime candidate for a phrasal
semantics for the standard marker—as *'a* consists of a nominal affix and noth-
ing more—we never find *'a-* being interpreted with scope over the comparative
relation. However, this conclusion about the semantics of *-lááh* and, by exten-
sion, other standard markers is in apparent conflict with earlier evidence that
supported a phrasal syntax for the standard. The goal of the analysis will be to
resolve this conflict.

4.4 *Ruling Out an Alternative View of* 'a-

We motivated a quantificational semantics for the standard marker *-lááh* by
appealing to a particular analysis of the prefix *'a-* as a valency-reducing exis-
tential closure operation. Before considering how to reconcile the semantic
and syntactic claims made above, let us first briefly entertain an alternative
analysis of *'a-* which would be compatible with a phrasal entry for *-lááh*..[27]
The idea would be to treat *'a-* as ambiguous between a positive polarity item
with existential force and a negative polarity item with universal force. The PPI
form of *'a-* would be used in simple non-negated expressions like (60), repeated
from above. The existential quantifier *'a-* would presumably undergo Quantifier
Raising, leaving behind a type *e* trace. The resulting meaning would be identical
to what we obtained on our earlier analysis.

(60) *na'niłkaad$_i$*   ⤳ $\exists x$. $\mathsf{herd}(x, v_i)$
     UNSPEC.3$_i$.herd.IPFV

The NPI form of *'a-* would occur both in the scope of negation and in standards
of comparison, which is also a downward-entailing environment. As an NPI,
'a- would denote a universal quantifier; Shimoyama (2011) discusses Japanese
NPIs with universal force that obligatorily scope above licensing negation. Like
Japanese NPIs, Navajo NPI *'a-* would undergo Quantifier Raising and would be
interpreted with scope above the comparative relation:

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27   We thank Michael Yoshitaka Erlewine and Louise McNally for bringing this alternative
      view to our attention.

(61) *'a-lááh*   *'anítnééz$_i$*
    UNSPEC-beyond   3$_i$.tall
$$\rightsquigarrow \forall y \; . \; \text{MAX}(\lambda d \; . \; \text{tall}(d, v_i)) > \text{MAX}(\lambda d \; . \; \text{tall}(d, y))$$

The truth conditions in (61) ($\forall > \neg$) are equivalent to the truth conditions in (59) ($\neg > \exists$). But while treating *'a-* as an NPI would allow us to maintain a phrasal entry for *-lááh*, such an analysis faces challenges which we believe rule it out from further consideration. First, this analysis forces us to make certain stipulative assumptions about *'a-*: Not only must we posit ambiguity for *'a-*, but we have to allow *'a-* to undergo covert quantifier raising. While such a move may be unproblematic for a scrambling language like Japanese, Navajo is reported to have fixed scope (Fernald et al. 2000, Bogal-Allbritten & Moulton 2017). Furthermore, scope of verbal affixes is claimed to be particularly rigid across the entire Athabaskan family (Rice 2000). We would have to say that NPI *'a-* is unique among Navajo morphemes in its ability to undergo covert movement.

Second, the distribution of *'a-* seems to be limited to internal argument positions. While this restriction is unsurprising on an analysis that treats *'a-* as a valency-reducing morpheme, it has no explanation on an account of *'a-* as a polarity item. Maintaining a polarity item analysis of *'a-* would mean stipulating its distribution.

Finally, if we posit ambiguity for *'a-*, it is not clear how to restrict the distribution of PPI existential *'a-*. If movement of quantificational *'a-* is available, then why can a sentence like (61) not contain an instance of PPI existential *'a-* that has raised out of the scope of negation? Such a structure would have the truth conditions repeated in (62), which we have already established as unavailable.

(62) $\exists y \; . \; \text{MAX}(\lambda d \; . \; \text{tall}(d, \text{Alice})) > \text{MAX}(\lambda d \; . \; \text{tall}(d, y))$
    True iff there exists some y, such that Alice's maximal degree of height exceeds the maximal degree of height of y

With these considerations in hand, we set aside this alternative view of *'a-* and turn now to how we might reconcile syntactically phrasal standards with quantificational entries for standard markers in Navajo.

5   Quantificational Standard Markers, but Phrasal Standards

5.1   *Proposal*

We have seen evidence that suggests that Navajo standards are phrasal and part
of the same clause as the rest of the degree construction, rather than deriv-
ing from reduced clausal structure. Nevertheless, we have also seen two kinds
of evidence that challenge this view. First, subcomparatives; we will return to
their analysis in sec. 5.2, where we argue that they in fact do not challenge a
phrasal analysis. The second piece of evidence is the obligatory low scope of
the quantificational prefix *'a-* in Navajo superlative constructions. This latter
challenge is central to our main claim in this paper: Navajo standard markers
must have quantificational entries. (We represent the class of standard mark-
ers with *-láah*, but the proposals made here should be able to be generalized to
all postpositions and enclitics used in degree constructions.)

(63) *-lááh* $\rightsquigarrow \lambda D_{\langle d,t \rangle} \lambda D'_{\langle d,t \rangle}$. $\text{MAX}(D') > \text{MAX}(D)$

Nevertheless, we will maintain that Navajo standards are syntactically phrasal.

   In order to reconcile a quantificational semantics with a phrasal treatment
of standards, we will need to associate the entities denoted by standard phrases
with properties of degrees without adding actual clausal structure in the pro-
cess. We propose that composition between an entity-denoting standard and a
quantificational standard marker is mediated by MEAS, a null functional head.
We adopt the entry assigned to MEAS by Solt (2009); see Rett 2014 for an entry
that differs only in the order in which degrees and entities are taken as argu-
ment.

(64) MEAS $\rightsquigarrow \lambda x_e$. λd_d . $\mu(x) \geq d$ where μ is a variable over measure func-
      tions

                                                                            (Solt 2009, 105)

The measure function in MEAS associates an entity *x* with a scale (a set of
degrees ordered along some dimension). Unlike other adjectival verbs whose
measure functions are lexically determined (e.g., *tall*, height), however, the value
of the measure function in MEAS is not specified. In applications of MEAS
to phenomena in other languages, the measure function is determined both
by the material it combines with (e.g., noun, measure phrase) and by context
(Schwarzschild 2002, Solt 2009, Rett 2014). We return below to consider how
this valuation can happen in Navajo.

   There is significant precedent in the literature for measurement operators in
a variety of constructions, although proposals vary as to whether the meaning

of this operator is built into the meaning of nouns themselves or expressed by a separate head as we assume here (Cresswell 1976, Krifka 1989, Kayne 2005, Schwarzschild 2006, Svenonius & Kennedy 2006, Nakanishi 2007, Solt 2009, Rett 2014, Wellwood 2015, among others). Measurement operators are perhaps best known for being the semantic 'glue' which enables composition between nouns and measure phrases or numerals (e.g., *six cats*, *5 cm paperclips*), as well as between nouns and quantity adjectives (e.g., *many*) on analyses that treat them as relations between degrees and intervals (Rett 2008, Solt 2015).

In the Navajo degree constructions under discussion, MEAS mediates between an entity and a degree expression, in this case the standard marker *-lááh*. We illustrate the application of MEAS with the following simple sentence:

(65) *Alice yi-lááh   'áníłnééz.*
     Alice 3-beyond 3.tall
     'Alice is taller than him/her/it.'

The standard of comparison is the third-person pronominal prefix *yi-*. When *yi-* composes with the measurement operator MEAS, the referent of the pronominal prefix is mapped onto a scale (a set of degrees ordered along some dimension, to be determined).

(66) MEAS $yi_i \rightsquigarrow \lambda d \ . \ \mu(v_i) \geq d$

The set of degrees composes with the standard marker *-lááh*.

(67) *-lááh* [MEAS yi_i] $\rightsquigarrow \lambda D'_{\langle d,t \rangle} \ . \ \text{MAX}(D') > \text{MAX}(\lambda d \ . \ \mu(v_i) \geq d)$

The second set of degrees taken by *-lááh* is contributed by material from the main clause. The gradable predicate *'áníłnééz* bears a subject prefix which we have taken to saturate the entity argument position of the verb. We use the same simplification introduced earlier and show direct composition between the verb and *Alice*, the verb-external nominal expression which will ultimately come to value the subject pronominal prefix. The set of degrees to which Alice is tall is taken as argument by yi_1-*lááh* as it was defined in (67).

(68) *Alice yi_i-lááh 'áníłnééz* $\rightsquigarrow$
     $\text{MAX}(\lambda d \ . \ \text{height}(\text{Alice}) \geq d) > \text{MAX}(\lambda d \ . \ \mu(v_i) \geq d)$
     True iff the maximal degree to which Alice is tall exceeds the maximal degree associated with the referent of yi_i

The scale associated with MEAS is still unspecified in our truth conditions above, but it seems reasonable to assume that in a sentence like (65), the most accessible meaning is one in which μ is equated with the measure function from the main clause gradable predicate, namely height.

We now turn to the analysis of Navajo translations of superlative prompts, as repeated in (69):

(69) *Alice 'a-lááh   'áníłnééź.*
     Alice UNSPEC-beyond 3.tall
     'Alice is tallest, Alice is taller than anyone.'

The unspecified object prefix *'a-* composes first with MEAS. Composition returns the set of degrees d such that for any y, d is a degree associated with y on some scale whose dimension parameter remains to be determined.

(70) *'a* MEAS $\leadsto \lambda d$. $\exists y$. $\mu(y) \geq d$

This set of degrees is then taken as argument by the standard marker *-lááh*, just as before. The second set of degrees taken as argument by *-lááh* is determined by application of the main clause gradable predicate to the subject. Keeping the same notational simplifications from above in place, the final truth conditions are as follows. We once again assume that the measure function μ in MEAS is identified with the measure function, height, from the gradable predicate in the main clause.[28]

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28   Our analysis of Navajo expressions of superlative meaning suggests another reason to avoid an alternative analysis on which *-lááh* is not of quantificational determiner type but is instead type $\langle d, \langle \langle d, t \rangle, t \rangle \rangle$, where its first argument is obtained by prior application of an independent MAX operator to the standard of comparison (von Stechow 1984, Rullmann 1995, Heim 2001). Earlier, we suggested that while such an approach may make sense for languages in which we find a standard marker (and/or *wh*-operator) in addition to a comparative morpheme, it is not parsimonious for Navajo, where we seem to only have a comparative operator at our disposal: Why not put all meaning related to comparison in the entry of a quantificational *-lááh*, then, as we have done?

However, there is another kind of analysis that would be consistent with a type $\langle d, \langle \langle d, t \rangle, t \rangle \rangle$ meaning for *-lááh*. What if we instead define MEAS as a measure function ($\langle e, d \rangle$) as Wellwood (2015) does? This measure function would apply to entity-denoting standards and return the (maximal) degree associated with that entity on some scale. Thus, there would be no need to posit an extra MAX operator, which we found unappealing above. However, this alternative treatment of MEAS cannot be integrated with our analysis: Since we have defined *'a-* as an existential closure operation, it must compose with a set-type expression (i.e. the type ends in …t)). We see no coherent way to define *'a-*

(71) *Alice 'a-láah 'ánítnééź* ↝

$\text{MAX}(\lambda d \ . \ \text{height}(\text{Alice}) \geq d) > \text{MAX}(\lambda d \ . \ \exists y \ . \ \mu(y) \geq d)$

True iff the maximal degree to which Alice is tall exceeds the maximal degree to which some *y* is tall

We recognize there to be a slight mismatch in morphological and semantic bracketing here. Although the prefixes *yi-* and *'a-* are taken as argument by MEAS, they are nevertheless morphologically realized as prefixes to the standard marker *-láah*. A preference for matching the Logical Form with morphological bracketing might suggest that these two elements compose directly, as would be the case if *-láah* had a non-quantificational meaning. But while regular object markers like *yi-* could in principle compose directly with *-láah* so defined and still yield the right truth conditions, we have seen that the same is not true for *'a*. If *'a-* composes directly with *-láah*, only the unattested high scope reading for *'a-* is expected.[29] We assume that *yi-* and *'a-* are realized as prefixes on *-láah* despite composing first with MEAS because MEAS is not overt and therefore not an eligible host for prefixes.

Our account of Navajo is similar in spirit to the small clause account of certain Slavic comparatives developed by Pancheva (2006, 2010), who argues that it is possible to maintain a quantificational denotation for comparative markers without appealing to a full clausal syntax for standards of comparison. However, our analysis crucially differs from Pancheva's in that MEAS does not introduce (even small) clausal structure of the sort that might, for instance, license adverbs in the standard of comparison. As we noted already, it is not easy to see how a small clause account could be applied directly to Navajo, since there is no evidence that this is a structure in the language: All Navajo clauses consist of the same minimal element, namely a fully-inflected verb marked for all nominal arguments and temporal information. As such, we have developed an account that maintains quantificational entries for comparative (standard) markers while continuing to treat standards as syntactically phrasal.

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such that it can compose with a measure function-type MEAS. This is, then, another strike against a type $\langle d, \langle\langle d, t \rangle, t \rangle\rangle$ treatment of Navajo standard markers.

29 Crucially, the truth conditions are incorrect for *'a-láah* if we assume direct composition regardless of which entry we assign to *-láah*. We have already seen that this is true for the phrasal analysis in (58); (i) demonstrates that the truth conditions are still wrong if *-láah* is instead given a quantificational meaning but nevertheless composes with *'a-* directly:

(i) a. *-láah* ↝ $\lambda D_{\langle d,t\rangle} \ . \ \lambda D'_{\langle d,t\rangle} \ . \ \text{MAX}(D') > \text{MAX}(D)$

b. *'a-láah* ↝ $\lambda D'_{\langle d,t\rangle} \ . \ \exists D_{\langle d,t\rangle} \ . \ \text{MAX}(D') > \text{MAX}(D)$

c. *Alice 'a-láah 'ánítnééź* ↝ $\exists D_{\langle d,t\rangle} \ . \ \text{MAX}(\lambda d \ . \ \text{tall}(d, \text{Alice})) > \text{MAX}(D)$

'There exists a set of degrees D. Alice is taller than the maximal degree in this set.'

5.2 *Accounting for Subcomparatives*

Subcomparatives like (72) and (73) originally motivated Bogal-Allbritten (2013, 2016) to assume that Navajo must permit clausal standards.

(72) *Ch'é'étiin bikáá'adání 'áníłnééz-ígíí yi-lááh   'áníłtéél.*
     door   table   3.tall-NMLZ 3-beyond 3.wide
     'The door is wider than the table is tall.'

(73) *Ch'é'étiin bikáá'adání 'áníłnééz-í-gi   'áníłtéél.*
     door   table   3.tall-NMLZ-LOC 3.wide
     'The door is as wide as the table is tall.'

While Bogal-Allbritten did not assign any particular semantic function to *-ígíí*, it clearly plays some role in these sentences. If we remove *-ígíí* (or its morphological variant *-í* seen in (73)), the structure becomes ungrammatical:

(74) **Ch'é'étiin bikáá'adání 'áníłnééz yi-lááh   'áníłtéél.*
     door   table   3.tall   3-beyond 3.wide

The marker *-ígíí* is also found on structures previously analyzed as internally-headed relative clauses (Platero 1974, Willie 1989). It marks the right edge of the relative clause, shown in brackets:

(75) [*K'ad 'ashkii 'ałhą́ą́'*]   *-ígíí   yádooltih.*
     now boy   3.snore.IPFV -NMLZ 3.speak.FUT
     'The boy who is snoring right now will speak.' (adapt. Platero 1974)

While the bracketed structure above is clearly clausal, the addition of *-ígíí* allows it to occupy positions that can otherwise contain, for example, proper names as in *Alice yádooltih* 'Alice will speak'.

On our analysis of standards developed above, MEAS composed with an entity and returned a property of degrees. In sentences like (75), the *ígíí*-marked clause occupies an argument position where we would expect to find type *e* expressions. Why not, then, claim that the *ígíí*-marked clauses in subcomparatives also denote a simple type *d* expression? Under this view, we could treat *-ígíí* as either a choice function or iota operator, which would apply to a set of degrees (as would be denoted by a gradable predicate inflected for subject) and return a single degree. We illustrate with the iota operator.[30]

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30   Reason to prefer a choice function treatment of *ígíí*-marked clauses comes from cases in

(76) *Bikáa'adání 'áníłnééz-ígíí*
    table   3.tall-NMLZ
    ⤳ ιd . height(table) $\geq d$ $\equiv \iota d$. tall(d, table)

We have defined *-lááh* in such a way that it is not able to compose directly with a type d expression. However, we can obtain a property of degrees if we also permit MEAS to take a degree as first argument (77). Ambiguity between MEAS as defined in (77) and the original entry in (64) has precedent in Rett 2014.

(77) MEAS$_{\text{DEG}}$ ⤳ λd . $\lambda d'$. $\mu(d) \geq d'$

Application of MEAS to the length d of the table returns a set of degrees ordered along some dimension. This property of degrees would then go on to combine with *-lááh* and the rest of the clause in the familiar way. As before, we assume that the scale associated with MEAS is determined by the main clause gradable predicate. We illustrate below with the subcomparative structure from (72).

(78) *Ch'é'étiin bikáá'adání 'áníłnééz-ígíí yi-lááh 'áníłtééł* ⤳
    MAX(λd . width(door) $\geq d$) > MAX(λd . $\mu(\iota d$. tall(d, table)) $\geq d$)
    True iff the maximal degree to which the door is wide exceeds the maximal degree to which the table's height is wide.

It is a bit awkward to think about the *width* of a table's *height*, but this awkwardness seems to be a product of the paraphrase and not the original sentence. Just as is the case for the English translation, the Navajo sentence above is sensible because both *wide* and *tall* are associated with the dimension of linear extent (Kennedy 1997, Kennedy & McNally 2005). Of course, *wide* and *tall* are not synonymous, since the measure function that underlies each differs in whether a horizontal or vertical linear extent is measured. Nevertheless, because degrees of width and height are both degrees of linear extent, the degree correspond-

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which these expressions do not appear to have the semantic attributes of definite noun phrases, such as in (i) from Grosu 2012, attributed to Ellavina Perkins. We will, however, leave this issue open for the time being.
(i) *Bilasáana hazhó'ó tánágis-ígíí*   *nisin.*
    apple   carefully 3.be_washed-NMLZ   3.1SG.want/think
    'I want an apple that is well-washed.'

ing to the table's height can be placed on the same scale as the degree corresponding to the door's width, and the two degrees ordered with respect to each other.[31]

This same entry for MEAS could also be used in measure phrase comparatives like (79), if we take measure phrases to denote degrees.[32]

(79) *Alice   hastą́ą-di 'adées'eez yi-lááh   'áníłnééz.*
    Alice   six-LOC   feet   3-beyond 3.tall
    'Alice is taller than six feet.'

MEAS would apply to the measure phrase and return a set of degrees along some dimension. This set of degrees would then go on to compose with *-lááh* and the rest of the clause. This would be reminiscent of Hackl's (2000) analysis of measure phrase comparatives in English, which invokes an unpronounced quantity predicate in the standard of comparison. However, our account differs from Hackl's in that we do not invoke true clausal structure in Navajo standards of comparison.

5.3   *Valuation of the Scale Associated with MEAS*

To this point, we have only considered examples in which the main clause contains an overt gradable predicate. In our analysis of these structures, the measure function associated with MEAS was obligatorily identified with the measure function associated with the main clause gradable predicate. We have not found any evidence that a sentence like (80), for instance, can have a subcomparative interpretation, where the MEAS operator that composes

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31   The challenge will be to extend this view of *-ígíí* to its use in internally-headed relative clauses as in (75). When *-ígíí* is used in subcomparatives, it takes a property of degrees as argument. In the case of (75), however, it seems like *-ígíí* is combining with a complete clause rather than the type $\langle e, t \rangle$ expression that it seems we would need in order for the entire *ígíí*-marked expression to denote an entity. One possible direction is to take our analysis of *ígíí* as it occurs in subcomparatives as basic and reconsider Bogal-Allbritten & Moulton' 2017 analysis of Navajo internally-headed relative clauses as parallel to superficially similar structures in Japanese (Hoshi 1995, Shimoyama 1999). Instead, we might consider an account in which we abstract over one of the pronominal prefixes borne by the verb within the *ígíí*-marked clause. This process of abstraction would serve two functions: First, it would identify the head of the relative clause, and second it would create a property-type expression of the kind which *ígíí* can compose with. Precedent for this view of Navajo comes from Grosu 2012. However, we will leave resolution of this to future work.

32   If measure phrases instead denote intervals ($\langle d, t \rangle$) as in Schwarzschild & Wilkinson 2002 and others, they could compose directly with *-lááh*.

with the standard is associated with a different measure function than the main clause predicate.[33]

(80) *Ch'éétiin bikáá'adání yi-lááh   'áníłtéél.*
     door   table   3-beyond 3.wide
     Can only mean: 'The door is wider than the table.'
     Cannot mean: 'The door is wider than the table is tall.'   (viz. (72))

The apparent requirement that the scale associated with MEAS must match the scale associated with the overt main clause predicate strongly recalls the anaphoric predicate in Pancheva's (2006) small clause analysis of standards of comparison. Pancheva proposes that the anaphoric predicate is valued when the main clause predicate is copied at LF. A similar process could apply in Navajo to determine what measure function is associated with MEAS when the main clause contains a gradable predicate.[34]

At the same time, we expect that in the absence of a gradable predicate, the measure function associated with MEAS can be supplied by context, as is possible for MEAS in its other uses (Schwarzschild 2006, Solt 2009, Rett 2014). This expectation appears to be borne out. Ellavina Perkins volunteered the following sentence when asked about structures like (43), where the standard should contain a temporal adverb. In the context, it is clear that we are comparing quantities of cookies, and that is the interpretation that we get. There is no overt gradable predicate, however:

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33   Peter Alrenga (p.c.) suggests that this reading could be avoided if *-lááh* were redefined such that it takes the gradable predicate *g* as argument. The effect of this would essentially be to combine the standard marker with MEAS, where *g* would determine the scale. We see three challenges for such an approach. First, gradable predicates do not compose directly with comparative markers in Navajo; on our assumptions in section 2, obligatory composition with pronominal subject markers results in gradable predicates denoting sets of degrees at the point at which they compose with *-lááh*. Second, as we see in (81), there are at least some constructions where context, rather than a gradable predicate, appears to determine the scale. Finally, it is a challenge to define *-lááh* in such a way that it composes directly with the gradable predicate while also avoiding the undesirable high scope interpretation for existential *'a-*. One imaginable possibility is to define *-lááh* so that it composes directly with a quantifier (i). If we adopt (i), we will have to typeshift all standards other than *'a-* (i.e. pronominal prefixes) from type e to type $\langle\langle e, t\rangle, t\rangle$.
      (i) *-lááh* ⤳ $\lambda g_{\langle e,dt\rangle} \, . \, \lambda Q_{\langle et,t\rangle} \, . \, \lambda D_{\langle d,t\rangle} \, . \, \text{MAX}(D) > \text{MAX}(\lambda d \, . \, Q(\lambda x \, . \, g(x, d)))$
      Given these challenges and the absence of compelling independent reasons to pursue this alternative analysis, we set it aside here.
34   Pancheva (2006) does not provide more detail on this process; crucially, we do *not* mean a process by which clausal structure is copied at LF, but rather one which determines the measure function associated with MEAS.

(81)   *'Ahbínídą́ą́' Alice báah łikaní yiyííyą́ą́'-ígíí*   *Ben 'atní'ní'ą́ą́dóo*
       morning   Alice cookie   3.3.eat.PFV-NMLZ Ben afternoon
       yiyííyą́ą́'-ígíí   *t'áa bi-lááh.*
       3.3.eat.PFV-NMLZ just 3-beyond
       Lit. 'The cookies that Alice ate this morning are more than the cookies
       that Ben ate this afternoon.'
       Prompt: Alice ate 4 cookies this morning. Ben ate 2 cookies this afternoon.
       I tell you: Alice ate more cookies this morning than Ben ate this afternoon.

If we take each *ígíí*-marked clause to denote a plurality of cookies—which we treat here as type e for the sake of illustration—an instance of MEAS would have to apply to each to yield the sets of degrees to be taken as argument by *-lááh*. In the context given, it was clear that we were comparing quantities of cookies. It makes sense, then, if μ projects entities onto the quantity scale.

(82)   a.   MEAS$[\iota x \, . \, x$ is cookies that Alice ate this morning$]$ ⇝
           $\lambda d \, . \, \mu(\text{Alice-cookies}) \geq d$
      b.   MEAS$[\iota x \, . \, x$ is cookies that Ben ate this afternoon$]$ ⇝
           $\lambda d \, . \, \mu(\text{Ben-cookies}) \geq d$
      c.   *-lááh*$[\lambda d \, . \, \mu(\text{Ben-cookies}) \geq d][\lambda d \, . \, \mu(\text{Alice-cookies}) \geq d]$ ⇝
           MAX$(\lambda d \, . \, \mu(d, \text{Alice-cookies})) >$ MAX$(\lambda d \, . \, \mu(d, \text{Ben-cookies}))$

The potential flexibility of such examples remains underinvestigated, however. Future work must in particular ask if other measure functions or scales can be made sufficiently salient given an appropriate context. Our invocation of MEAS makes the prediction that while context may assist in determining the measure function of MEAS, only scales with monotonic dimensions will be available: Application of MEAS to other constructions demonstrates a general monotonicity restriction (Schwarzschild 2006, Solt 2009, Rett 2014). We leave further investigation of this point for Navajo to future work.

5.4   *Scope of Standard Phrases*

On our proposal, standard phrases in Navajo denote generalized quantifiers over degrees (type $\langle\langle d, t\rangle, t\rangle$).

(83)   *yi$_i$-lááh* ⇝ $\lambda D'_{\langle d,t\rangle} \, . \,$ MAX$(D') >$ MAX$(\lambda d \, . \, \mu(v_i) \geq d)$

As Heim (2001) discusses, Kennedy (1997) questions quantificational analyses of comparative structure given the absence of readings that we might expect if degree quantifiers could take scope with respect to other operators in the way

that quantifiers over entities can. However, Heim argues that the apparent lack of scope-taking behavior by comparative structures does not necessarily rule against a quantificational analysis. Instead, she argues that many of the missing expected ambiguities can be attributed to certain systematic equivalences in truth conditions of sentences which might mask different scope positions of degree quantifiers. As she writes, these cases are consistent with a theory in which degree quantifiers can take high scope, as well as a theory in which they never move past the first position where they can be interpreted.

Heim suggests that the clearest cases where true scope ambiguities can be detected are *exactly*-differentials, of the shape in (84):

(84) John is 4′ tall. Every girl is exactly 1″ taller than that.
   a. $\forall x$. girl$(x) \rightarrow$ MAX$(\lambda d$. tall$(d, x)) = 4′+1″$
      $\approx$ For every girl x, the maximum degree to which x is tall is 49″. Every girl is precisely 49″ tall.
   b. MAX$(\lambda d$. $\forall x$. girl$(x) \rightarrow$ tall$(d, x)) = 4′+1″$
      $\approx$ The maximal degree d to which every girl is (at least) d-tall is 49″. The shortest girl is exactly 49″ tall.

Such examples get quite difficult to construct in Navajo since differential measure phrases are expressed using additional postpositional phrases; we have not yet tested them systematically.

Meanwhile, however, we can offer a few thoughts on what we might say if we do, ultimately, find that Navajo standard phrases are interpreted with lowest possible scope. Following Heim (2001), we suggest that this would not rule against a quantificational account of standard markers but would instead suggest that other factors in Navajo grammar are limiting scope possibilities. One such factor comes immediately to mind. As Bogal-Allbritten (2013, 2016) discusses at length, adjectival verbs of a certain morphological form—the form used in most examples in this paper—impose tight locality restrictions on the position of the standard phrase. While the negation frame *doo ... da* typically occurs directly adjacent to the verb (Faltz 2000), we see in (85) that the equative standard phrase cannot be separated from the adjectival verb even by negation.

(85) a. **Alice Ben-gi   doo 'áníłnééz da.*
        Alice Ben-LOC NEG 3.tall   NEG
        (Intended: 'Alice is not as tall as Ben.')

   b. *Alice doo Ben-gi   'áníłnééz da.*
        Alice NEG Ben-LOC 3.tall   NEG
        'Alice is not as tall as Ben.'

This contrasts with the normal flexibility in word order found for most verb-external expressions, in particular locative phrases used with non-adjectival verbs:

(86) *Baa’* (*Kinłání-di*)   *bi-yáázh*   (*Kinłání-di*)   *naalnish.*
Bah Flagstaff-LOC 3POSS-son Flagstaff-LOC 3.work.IPFV
‘Bah’s son works in Flagstaff.’ (Faltz 2000, 38–39)

Navajo seems to exhibit rigid surface scope with respect to other elements that might be treated as scope-bearing, such as the indefinite expression *ła’* and negation as shown below (Bogal-Allbritten & Moulton 2017).

(87) a. *Ła’*   *t’áadoo yíyą́ą́’*   *da.*
       INDF NEG   3.3.eat.PFV NEG
       ‘There was something I didn’t eat.’

    b. *T’áadoo ła’*   *yíyą́ą́’*   *da.*
       NEG   INDF 3.3.eat.PFV NEG
       ‘I didn’t eat anything.’

Putting these pieces together, we may not find the kinds of ambiguities one might expect given quantificational meanings for standard phrases since Navajo both has rigid surface scope and imposes certain restrictions on the position of standard phrases. With respect to the search for scope ambiguities, the cases to focus on in the future will be those adjectival verbs that Bogal-Allbritten (2013, 2016) identifies as more permissive with respect to the position of standard phrases.

6   Conclusions and Looking Ahead: Quantification beyond Degrees?

Our primary claim is that despite having phrasal standards without reduced clausal structure, quantificational entries for Navajo standard markers are nonetheless appropriate given the scope of the existential prefix *’a-* in translations of superlative prompts. We can wed a phrasal syntax to quantificational entries like (88) if we allow a measurement operator MEAS to apply to type e (or d) standards and return a property of degrees.

(88) *-lááh$_{clausal}$* ⤳ $\lambda D_{\langle d,t \rangle}$. $\lambda D'_{\langle d,t \rangle}$. $\text{MAX}(D') > \text{MAX}(D)$

Our analysis of Navajo suggests a novel strategy that might be employed in natural language to maintain quantificational meanings for comparative morphemes (or standard markers) even when there is evidence that standards of comparison lack clausal structure.

Our proposal that Navajo has degree quantifiers of type $\langle\langle d, t\rangle, \langle\langle d, t\rangle, t\rangle\rangle$ is notable in light of prior claims that Navajo lacks true quantificational determiners. That is, it has been claimed that Navajo lacks expressions that form syntactic constituents with phrases that determine a property-type meaning that can serve as the restrictor to a quantificational determiner (Faltz 1995, Faltz 2000, Speas & Parsons-Yazzie 1996). Faltz observes, for instance, that the Navajo expression *t'áałá'í nítínígo* is sometimes translated into English as 'each'. In contrast with its English translation, however, this Navajo expression does not seem to form a constituent with the noun *'awéé'* 'baby' in the following sentences: The two expressions can be separated from each other by extraneous material, such as a temporal adverb.

(89) a. *'Awéé' 'adą́ą́dą́ą́' t'áałá'í nítínígo deiłzhozh.*
        baby   yesterday each   3PL.1SG.tickle.PFV
        'I tickled each baby yesterday.'

   b. *T'áałá'í nítínígo 'adą́ą́dą́ą́' 'awéé' deiłzhozh.*
       each   yesterday baby 3PL.1SG.tickle.PFV
       'I tickled each baby yesterday.' (Faltz 1995, 294)

Speas & Parsons-Yazzie (1996) also observe that *'ałtso*, often translated into English as 'every', can occur on its own without a nominal expression, in which case it is translated as an adverbial expression.

(90) (*'Ałk'ésdisíí*) *'ałtso yíyą́ą́'.*
      candy   all   3.1SG.eat.PFV
      'I ate it (the candy) all up.' (adapt. Speas & Parsons-Yazzie 1996: 44)

Examples like (90) were among the original cases that led Jelinek (1995) and other authors in the seminal Bach et al. 1995 volume on quantification to propose that some languages lack quantificational determiners (D-quantification), contra Barwise & Cooper's (1981) proposal that the kinds of structures and meanings involved in expressions like *every* or *every cat* are universally available.

One hypothesis for why Navajo lacks quantificational determiners could be that the Navajo language simply lacks the kinds of logical resources neces-

sary to express meanings of the right kind. For instance, we might hypothesize Navajo to be a language with access only to first-order logic. In such a language, we would not expect to find quantificational determiners, which denote relations between sets of individuals and would therefore require access to second-order logic.[35]

However, Faltz (1995, 2000) suggests that perhaps Navajo lacks quantificational determiners because of independent facts about its grammar. If we take seriously the idea that the argument positions of Navajo verbs are saturated by prefixes, a Navajo verb will never denote a type $\langle e, t \rangle$ expression at the point at which it becomes 'syntactically visible', as Faltz puts it. Thus we do not find quantificational determiners because the kind of property-type expressions they need to compose with in the syntax are simply not present.

Our findings suggest that Faltz (1995, 2000) was exactly right in his reason for why Navajo lacks quantificational determiners over entities. We have argued that Navajo does, in fact, have quantificational expressions that denote relations between two sets. However, this type may be limited to the domain of degrees. This is expected given the grammar of Navajo: There are no pronominal prefixes that saturate the degree arguments of gradable predicates, so the right kind of property-type meanings—and the quantificational meanings that depend on them—will only be available in the domain of degrees.

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35   As a reviewer observes, if Navajo only has the expressive power of first-order logic, we expect it to lack quantifiers that cannot be expressed using first-order logic, such as proportional *most* (Barwise & Cooper 1981). Indeed, Navajo, lacks a single dedicated lexical item comparable to English proportional *most*, instead using the paraphrase shown below.

(i) *K'asdą́ą́' bááh łikaní 'ałtso yíyą́ą́.*
    almost   cookie   all   3.3.eat.PFV
    'I almost ate all of the cookies.'

As Coppock, Bogal-Allbritten & Nouri-Hosseini (2019) demonstrate, languages which lack a lexical counterpart to proportional *most* far outnumber languages with such an expression; previous observations in this spirit can be found in Hackl 2009, Živanović 2007, Bošković & Gajewski 2008, Pancheva 2015, and Dobrovie-Sorin & Giurgea (2015). While the absence of proportional *most* could be due to a lack of higher order quantifiers, other explanations may be available (Coppock, Bogal-Allbritten & Nouri-Hosseini 2019). Thus, the absence of such an expression in Navajo does not necessarily tell us that the language only has the expressive power of first-order logic.

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