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Scale-sensitivity of comparatives and measure phrase interpretations in Gitksan

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Abstract

This paper demonstrates that in Gitksan, measure phrases (MPs) occurring with relative gradable adjectives (GAs) like *'wii 'nakw* 'tall' receive differential interpretations even in the absence of an overt comparative operator or an overt standard phrase, a pattern which has been only reported in Japanese (e.g., Snyder et al. 1995) and Korean (Oda 2008; contra Sawada and Grano 2011). In contrast, MPs occurring with minimum-standard GAs like *k'ak* 'open' receive absolute interpretations, as in many languages including Japanese (Sawada and Grano 2011). However, Gitksan differs from Japanese in two crucial ways. First, the distinction between relative and minimum-standard GAs is observed even without MPs: relative GAs can easily receive comparative interpretations on their own, while minimum-standard GAs cannot. Second, Gitksan has a morphologically free, overt morpheme *k'aa*, which can give rise to comparative readings with any GA and hence makes the possibility of a covert comparative operator less plausible. On a closer investigation, the comparative readings of relative GAs without *k'aa* show mixed behaviours of what have traditionally been called 'explicit' and 'implicit' comparatives (Kennedy 2007). I propose that these comparative readings arise from inherently context-sensitive denotations of relative GAs, building on Oda's (2008) analysis of Japanese. The latter half of the paper examines the semantics of *k'aa* and analyzes it as a superlative morpheme, and highlights the role of consideration of alternatives to the subject in comparative readings observed without *k'aa*.

Keywords: degree, measure phrases, Japanese, Gitksan, Tsimshianic

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1 Introduction

Languages differ with respect to whether measure phrases (MPs) can co-occur with bare[1] relative[2] gradable adjectives (GAs), and if yes, what interpretations arise. In languages like English, some relative GAs can co-occur with an MP in their bare forms, and the MP receives an absolute interpretation. In (1a), the MP *8m* measures the height of the pine tree itself, not in comparison with another entity. Other relative GAs, such as *heavy*, cannot co-occur an MP in the absence of an overt comparative morpheme (1b).

(1) a. The pine tree is 8m tall. ≈ The height of the pine tree is 8m.

b. *The suitcase is 20kg heavy.

English shares this phenomenon with languages such as German, Dutch, Italian, and French, although specific lexical items that can or cannot co-occur with MPs in their bare forms vary even between closely related languages (Schwarzschild 2005; Beck et al. 2009).

Then there are languages that never allow MPs to co-occur with bare relative GAs. For example, Spanish and Russian are reported to be of this type (Schwarzschild 2005; Beck et al. 2009; Sawada and Grano 2011).[3]

The third pattern, exemplified by Japanese, is that MPs co-occurring with relative GAs consistently receive differential interpretations (Snyder et al. 1995; Beck et al. 2004; Oda 2008; Beck et al. 2009; Hayashishita 2009; Kubota 2011; Sawada and Grano 2011; Watanabe 2013; Aonuki 2024c). In (2), the MP *8m* measures how much taller the pine tree is than another salient entity, in this case the maple tree.

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1. By 'bare,' I mean that there is no overt comparative morpheme, superlative morpheme, or standard phrase accompanying the adjective.

2. Relative and minimum-standard adjectives (see below) differ in the structure of an associated scale and the nature of the standard degree (Rotstein and Winter 2004; Kennedy and McNally 2005). In particular, the standard degree of a relative adjective varies by context, while that of a minimum-standard adjective does not. See Section 2 for details.

3. More languages of this type are reported in Beck et al. (2009). I have included Spanish and Russian because for these languages, there is explicit (negative) evidence provided by Sawada and Grano (2011) that MPs co-occurring with bare relative GAs are truly ungrammatical rather than lacking the intended absolute interpretations and patterning with Japanese (see below).

(2) Context: *The height of the maple tree is 7 m, and...*
Matsu-no ki-wa 8 m takai
pine-GEN tree-TOP 8 m tall
'The pine tree is 8 m taller.'

To my knowledge, Japanese and Korean are the only languages that have been reported to be of this type.[4][5]

Gitksan[6] patterns with Japanese with respect to MPs. In (3), which involves a relative GA *'wii 'nakw* 'long',[7] even though there is no overt comparative morpheme or overt standard, the MP *k'i'y=hl t'imk̲'aax* 'one arm span'[8] receives a differential interpretation, measuring how much longer 'this table' is than another table.

(3) Context: "That table is 4 feet long"...
K'i'y=hl t'imk̲'aax win 'wii 'nakw[-t]=hl ha'niitx̲ook̲xw t=un
one=CN arm.span COMP big long[-3.II]=CN table PN=DEM.PROX
'This table is one arm span longer.' (VG)[9]

On the other hand, MPs receive an absolute reading when a co-occurring bare GA is minimum-standard.[10] In (4), with a minimum-standard GA *k̲ak̲* 'open', the MP *k'i'y=hl hlek moos* 'one inch'[11] receives an absolute interpretation, measuring how wide the door is open.

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4. There are conflicting claims about Korean. Oda (2008) reports that Korean patterns with Japanese (i), but Sawada and Grano (2011) group it in the second type, along with Russian and Spanish (ii).

(i) John-un 2cm kuta
John-TOP 2cm tall
'John is taller by 2cm.' (Oda 2008: 292(38))

(ii) *i kenmwul-un sip mite khu-ta
this building-TOP 10 meter tall-DECL
(Sawada and Grano 2011:219(78))

Regardless of the empirical status of Korean, Gitksan data (see below) allow us to examine differential MP readings in a typologically and geographically distant language.

5. Another example of an MP receiving a differential reading without an overt comparative morpheme is found in conjoined comparatives produced by one of the consultants in Davis and Mellesmoen's (2019) description of ʔayʔaǰuθəm. However, the authors demonstrate that when the conjunct containing the MP is produced in isolation, the MP receives an absolute reading.

6. See Section 3 for language background.

7. Readers may suspect that the combination of *'wii* 'big' and *'nakw* 'long', may have an effect of intensification. That does not seem to be the case. *'Wii 'nakw* seems to be a highly lexicalized expression; in a context of describing height, neither *'wii* or *'nakw* can be used alone. HH rejects both *#'Wii=t Michael* and *#'Nakw=t Michael* as a translation of 'Michael is tall', remarking that the former is for being large both vertically and horizontally and only used for a baby or child and that the latter would be 'Michael is long.' Syntactically, *'wii* in *'wii 'nakw* is a preverbal (Henry Davis, p.c.), although it is often used as a prenominal (Davis 2026).

8. Hindle and Rigsby (1973) translate *t'imk̲'aax* as 'the whole arm, fathom.'

9. Unless otherwise noted, Gitksan examples are from my elicitation with Vincent Gogag (VG) and Hector Hill (HH). A parenthesis at the bottom right corner of a Gitksan example includes a speaker's initial. "-v." following the initial indicates that the sentence was volunteered by the speaker.
Glosses absent in the Leipzig rules mostly follow conventions in Rigsby (1986). ASSOC: associative; ATTR: attributive; AX: agent (transitive subject) extraction; CAUS: causative; CCNJ: clausal conjunction; CN: common noun connective; COMP: complementizer; DEM.DIST: distal demonstrative; DEM.PROX: proximal demonstrative; OBL: oblique; PCNJ: phrasal conjunction; PN: proper noun connective; PREP: preposition; SX: intransitive subject extraction; TR: transitive; WH: general purpose *wh*-word; I: series I clitic; II: series II suffix; III series III independent pronouns, =: clitic.

10. This pattern is shared by languages across the typology (Sawada and Grano 2011).

11. 'Inch' is also translated as *moos* 'thumb' by both VG and HH and as *g̲ats'uwild-i'm* 'our finger' by VG.

(4) (K'i'y=hl) hlek moos win k̲'ak̲[-t]=hl aats'ip
one=CN crook thumb COMP open[-3.II]=CN door
'The door is open by one inch.' (VG-v., HH-v.)

In Gitksan, the contrast between relative and minimum-standard GAs extends to constructions without MPs. Relative GAs can receive comparative readings even without an MP (5).[12]

(5) Context: "Which is taller, Michael or Lisa?"
'Wii 'nakw=t Michael (a[-t]=s Lisa)
big long=PN Michael PREP[-3.II]=PN Lisa
'Michael is taller (than Lisa).' (VG, HH)

The overt standard is optional in (5), meaning that the literal translation of *Michael is tall* can receive a comparative reading, 'Michael is taller.' On the other hand, bare minimum-standard GAs cannot receive a comparative reading, with or without an overt standard phrase (6).

(6) Context: There are only two doors, and both are open. You point to one that is open wider.
#K̲'ak̲=hl aats'ip t=un (a[-t]=hl aats'ip t=ust)
open=CN door PN=DEM.PROX PREP[-3.II]=CN door PN=DEM.DIST
intended: 'This door is more open (than that door).' (VG)

Gitksan differs from Japanese in this regard. In Japanese, the literal translation of *The pine tree is tall*, a version of (2) without the MP, does not have a comparative reading; it simply has a positive reading, and a comparative reading requires an additional morpheme (see Section 10).[13] Gitksan also differs from Japanese in having an overt, morphologically free morpheme, *k'aa*, which gives rise to comparative readings even with minimum-standard GAs.

(7) Context: As in (6).
K'aa k̲'ak̲=hl aats'ip t=un a[-t]=s=ust
k'aa open=CN door PN=DEM.PROX PREP[-3.II]=PN=DEM.DIST
'This door is more open than that door.' (VG, HH)

In summary, Gitksan shows two contrasts between relative and minimum-standard GAs that need to be explained. With respect to MPs, bare relative GAs give rise to differential interpretations, while bare minimum-standard GAs give rise to absolute interpretations. Without MPs, bare relative GAs can receive comparative interpretations, while minimum-standard GAs cannot. I will argue that these two contrasts between relative and minimum-standard GAs receive a unified explanation if the context-sensitivity of relative GAs is built into their lexical denotations. My analysis builds on Oda's (2008) analysis of differential MPs in Japanese, with some modifications for how the value of a context-sensitive standard degree is determined. In fact,

12. I am grateful to Henry Davis for suggesting that I investigate scale structure differences.
13. This observation is based on the Tokyo dialect, and there may be slight dialectal variations on this point (see f.n. 51).

the pattern in Gitksan is what is predicted by the inherently context-sensitive denotations of GAs. Thus Gitksan data both provide support for this approach and raise a question why other languages that have received similar analyses (Oda 2008 on Japanese; Breakstone 2012; Cariani et al. 2023, 2024; Wellwood 2024 on English) do not exhibit the predicted patterns. I will also argue that the presence of the morpheme *k'aa* makes implausible an alternative account of the differential MP readings involving a covert coercion operator for Gitksan, which has been proposed for Japanese by Sawada and Grano (2011) as a repair mechanism available due to the absence of an overt and free comparative morpheme in Japanese.

The remainder of the paper is structured as follows. Section 2 provides the necessary background on degree semantics, with focus on scale structures (2.1), where the context-sensitivity of GAs is located in the grammar (2.2), and different strategies by which natural language achieves comparison (2.3). After providing some background on Gitksan (Section 3), Section 4 presents Gitksan data that demonstrate the scale-structure differences in MP interpretations (4.1) and the availability of comparative readings without a comparative morpheme (4.2). An analysis of the Gitksan data is developed in Section 5. After reviewing Oda's analysis for Japanese (5.1), I argue for similar, inherently context-sensitive denotations of GAs (5.2), and provide an account of the scale-structure difference in MP interpretations (5.3). I then make a slight revision to the GA denotations to better predict when positive vs. comparative readings arise and spell out my account of scale-structure differences in availability of comparatives (5.4, 5.5). I will demonstrate that the analysis makes a correct prediction about another property of comparative readings without a comparative operator in Gitksan, namely compatibility with what are called 'crisp judgement' (Kennedy 2007a) contexts. In Section 6, I consider four possible alternative analyses and explain why they do not work for Gitksan. The latter half of the paper is dedicated to further descriptions of comparative and superlative constructions in Gitksan. Specifically, I investigate the semantics of the morpheme *k'aa*, which achieves comparative and superlative readings even with minimum-standard GAs (Section 7), and propose to analyze it as a superlative operator (Section 8). I also argue that the value of a context-sensitive standard degree of a relative GA is narrowed down by consideration of alternatives to the subject (Section 9). Finally, in Section 10, I revisit Japanese with respect to predictions of the inherently context-sensitive GA denotations (Oda 2008) and discuss what Gitksan tells us about this approach more broadly and the theoretical and empirical typologies of degree semantics and comparatives. Section 11 concludes.

2 Background on degree semantics

2.1 Scale structures

GAs are associated with a scale, a set of ordered degrees (Bierwisch 1989; Rotstein and Winter 2004; Kennedy and McNally 2005). Scales can have a minimum element, a maximum element, both, or neither, and these different scale structures can be diagnosed by compatibility with various modifiers (Rotstein and Winter 2004) as well

as entailment patterns between comparative and positive constructions (Kennedy and McNally 2005).

The structure of an associated scale constrains the standard degree ('standard of comparison' in Kennedy and McNally 2005). GAs associated with scales open on both ends are called *relative* GAs; in these GAs, the standard degree is context-dependent. For example, assume that John's height is 180cm. A positive construction in (8) may be judged true in the context in (8a), while it may be judged false in (8b). This difference in truth-value judgements comes from the difference in the 'comparison class' (Klein 1980),[14] which in turn determines the standard degree, or what counts as tall in the context. The standard degree of tallness computed given the comparison class of other grown men at the supermarket (8a) would be less than that computed against the comparison class of NBA players on the court (8b).

(8) John is tall.

a. Context: We are looking at John at a supermarket.

b. Context: John is an NBA player, and we are looking at him standing among his teammates on the court.

Another property of relative GAs is that comparatives do not entail positive constructions involving the associate or standard of comparison, nor their negation (9).

(9) John is taller than Bob $\not\models$ John/Bob is (not) tall.
(modelled on Kennedy and McNally 2005:360(44a))

This is because, while being involved in the comparison of tallness means that an individual has some degree of tallness, it is not guaranteed that that degree exceeds the context-dependent standard degree, nor that it does not.

Relative GAs contrast with *absolute* GAs, whose standard degree does not depend on the context. Among absolute GAs, *minimum-standard* GAs are those in which the standard degree always corresponds to the lower endpoint of a scale. For example, (10) is judged true as long as the door has some degree of openness, or in other words, it is not closed, regardless of whether other doors in the context are open and by how much.

(10) The door is open.

Comparatives with a minimum-standard GA entail positive constructions involving their standard and associate of comparison (11).

(11) The red door is more open than the white door. $\models$ The red/white door is open.
(modelled on Kennedy and McNally 2005:360(43a))

This is because, with the standard being the lower end point, any degree on the scale exceeds the standard and therefore satisfies the positive form.

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14. Klein (1980) attributes this term to Hare (1952).

2.2 Context-sensitivity

Where is the context-sensitivity of relative GAs located in the grammar? In one approach, called the 'delineation' approach (Klein 1980, 1982, 1991), GAs are treated as context-sensitive (partial) functions of type ⟨e,t⟩ (12): *tall* uttered in a context c maps its argument to true iff it counts as tall in c, or in particular, with respect to the comparison class $\mathscr{U}(c)$.[15]

(12) $[\![\text{tall}]\!]^c = \lambda x.$ x is tall with respect to $\mathscr{U}(c)$

With respect to English, subsequent works demonstrate the need to postulate degrees as semantic primitives in the denotations of GAs (e.g., von Stechow 1984; Kennedy 1999; Beck et al. 2009). For example, von Stechow (1984) and Beck et al. (2009) argue that differential MPs (13) diagnose the presence of degrees, as they require addition of degrees and cannot be captured by simply partitioning the domain of a GA.

(13) John is six inches taller than Mary. (von Stechow 1984:4(xiv))

Within the framework that postulates degrees as semantic primitives, despite the context-dependency of relative GAs observed above, a majority of accounts assign context-independent denotations to GAs themselves (Bartsch 1975; Cresswell 1976; von Stechow 1984; Kennedy 1999; Heim 2000). *Tall* (14) denotes a relation between degrees d and individuals x such that the tallness degree of x is no less than d.[16]

(14) $[\![\text{tall}]\!]^c = \lambda d.\ \lambda x.\ \text{Tall}(x) \geq d$

Context sensitivity of positive constructions is attributed to a covert degree operator *pos* (15), which asserts that the relevant degree significantly exceeds the contextual standard.[17] The STANDARD function returns the standard degree based on the GA and the comparison class, and $\succ_!$ indicates that the degree d 'significantly exceeds' the standard degree.[18]

(15) $[\![\text{pos}_C]\!]^c = \lambda G_{det}.\ \lambda x.\ \exists d[G(d)(x) \wedge d \succ_! \text{STANDARD}(G)(g_c(C))]$

The positive construction in (8) then receives the denotation in (16), which is true iff John's degree of tallness significantly exceeds the contextual standard.

(16) $[\![(8)]\!]^c = [\![\text{pos}_C]\!]^c([\![\text{tall}]\!]^c)(\text{John})$
$= \exists d[\text{Tall}(\text{John}) \geq d \wedge d \succ_! \text{STANDARD}([\![\text{tall}]\!]^c)(g_c(C))]$

15. In Klein's system, which follows Kamp (1975), in addition to the positive and negative extensions, an individual x could belong to the 'extension gap' of *tall* if x is neither definitely tall nor definitely not tall. My simplified denotation in (12) does not reflect this.
16. The idea of context independence is shared with an alternative view that takes GAs to denote measure functions of type ⟨e,d⟩ (e.g., Kennedy 1999).
17. See Rett (2007, 2008, 2014) for alternative frameworks that assign context-independent denotations to GAs but do away with *pos*.
18. In (15), the use of $\succ_!$ to explicitly encode the requirement of significantly exceeding the standard degree follows Graff (2000:74) and Kennedy (2011:10(14a)), while the treatment of GAs as denoting relations between degrees and individuals follows the *pos* denotation in Kennedy and McNally (2005:350(13)).

2.3 Comparatives

There are two different kinds of comparative constructions in English, exemplified in (17).

(17) a. Compared to Bob, John is tall.

b. John is taller than Bob.

Under the standard approach that assigns context-independent denotations to GAs and postulates *pos*, only (17a) includes *pos*. (17a) receives the denotation in (18), assuming that the *compared to* phrase narrows down the context to indirectly narrow down the comparison class, C (19).

(18) $[\![(17a)]\!]^c = 1$ iff in every context c′ that is just like c except that the domain of discourse includes just John and Bob, $[\![\text{John is tall}]\!]^{c'} = 1$, i.e.,
$\exists d[\text{Tall(John)} \geq d \wedge d \succ_! \textsc{standard}([\![\text{tall}]\!]^c)(g_c(C))]$

(19) [x is A compared to y] = 1 in context c iff [x is A] = 1 in every context c′ that is just like c except that the domain of discourse includes just x and y.
(Kennedy 2007b:18(29))

On the other hand, (17b) involves, instead of *pos*, an overt comparative operator *-er*, which compares two sets of degrees (20).

(20) $[\![\text{-er}]\!] = \lambda P_{dt}.\ \lambda Q_{dt}.\ \textsc{max}(Q) > \textsc{max}(P)$
where $\max(D_{dt}) = \iota d[D(d) \wedge \forall d'[D(d') \rightarrow d' \leq d]]$ (see Heim 2000:42(6))

(17b) receives the denotation in (21), which asserts that the maximum degree to which John is tall to is greater than the maximum degree that Bob is tall to (see e.g., Bhatt and Takahashi 2011 for the LF structure).

(21) $[\![(17b)]\!]^c = [\![[\text{-er than 7 Bob is } t_{d,7}]\ [3 \text{ John is } t_{d,3} \text{ tall}]]\!]^c$
$= \textsc{max}(\lambda d.\ \text{Tall(John)} \geq d) > \textsc{max}(\lambda d.\ \text{Tall(Bob)} \geq d)$

(17a) and (17b) are respectively called implicit comparison[19] (22a) and explicit comparison (22b).

(22) a. Implicit Comparison
Establish an ordering between objects *x* and *y* with respect to gradable property *g* using the positive form by manipulating the context in such a way that the positive form [is] true of *x* and false of *y*.

b. Explicit Comparison
Establish an ordering between objects *x* and *y* with respect to gradable property *g* using a morphosyntactic form whose conventional meaning has

19. Here and onward, my use of the term 'implicit comparison' follows the definition in (22a) and excludes what Pearson (2010; 2013) refers to as Weak Implicit Comparison, which involves an overt comparative morpheme.

the consequence that the degree to which x is g exceeds the degree to which y is g. (Kennedy 2007a:16(45)-(46))

The above analyses of implicit and explicit comparatives, or in particular, the presence of *pos* in the former and its absence in the latter, account for three relevant empirical differences between the two constructions. First, implicit comparatives (23a) and not explicit comparatives (23b) are incompatible with minimum-standard GAs.

(23) Context: Rod A and Rod B are both bent, with the latter bent to a greater extent.

a. ??Compared to A, B is bent.

b. B is more bent than A. (Kennedy 2007a:20(55,56))

This is because minimum-standard GAs have a context-independent standard corresponding to the lower end of the scale. Given that both rods are bent, manipulating the context by a *compared to* phrase does not make one rod considered bent and the other not. Formally, the STANDARD function inside the denotation of *pos* (15) is sensitive to the scale structure of the GA it combines with (Kennedy and McNally 2005), and it returns the lower endpoint on the scale in (23a), regardless of the context.

Second, a differential MP cannot occur in an implicit comparative (24a), while it can in an explicit comparative (24b).

(24) a. ??Compared to Lee, Kim is 10cm tall.

b. Kim is 10 cm taller than Lee. (Kennedy 2007a:20(58))

Formally, this is because, in addition to contributing context-sensitivity, *pos* existentially closes the degree argument of a GA. In other words, *pos* and an MP cannot co-occur because they manipulate the same degree argument.

Third, implicit comparison is incompatible with "crisp judgement" (Kennedy 2007a:18) contexts, in which the relevant difference between the two entities being compared is small (25a). Explicit comparison is felicitous in the same context (25b).

(25) Context: A 600-word essay and a 597-word essay.

a. #Compared to that essay, this one is long.

b. This essay is longer than that one. (Kennedy 2007a:19(52))

Kennedy takes the crisp judgement fact as evidence that *pos* requires that "the objects that the positive form is true of 'stand out' in the context of utterance" (2007b:17), or in other words, that their relevant degree 'significantly exceeds' the standard degree (2011:10). In (25), a 600-word essay does not stand out compared to a 597-word essay.

It will be demonstrated below that one of the constructions that receive a comparative interpretation in Gitksan exhibits mixed behaviours with respect to the three properties above. To account for them, I will propose context-sensitive denotations of relative GAs.

3 Language background and methodology

Gitksan is a Tsimshianic language spoken in northern British Columbia, Canada. It constitutes the Interior Tsimshianic branch along with a neighbouring language, Nisg̲a'a. There are approximately 255 fluent speakers as of 2022 (Gessner et al. 2022).

Unless otherwise noted, Gitksan data presented in this paper are from my fieldwork with two speakers, Vincent Gogag (VG) and Hector Hill (HH). Data were elicited using the standard methodologies in semantic fieldwork (Matthewson 2004; Bochnak and Matthewson 2015) including translation and acceptability judgement tasks, with discourse contexts established verbally and/or with visual aids.

This paper presents the first systematic documentation of and formal work on degree constructions in the language family. Apart from preliminary work in Aonuki (2023) and Aonuki (2024b), Bicevskis et al. (2017) describe amount comparatives and equatives (346-7); Rigsby's (1986) grammar includes degree questions (95-96); and Tarpent's (1987) grammar of Nisg̲a'a documents gradable nominals (244-6) and some comparative sentences (232, 306). See also Forbes (2012) for detailed discussions of adjectives as a syntactic category in Gitksan.

The word order in Gitksan is VSO. NPs are preceded by what are known in the Tsimshianic literature as *connectives*, *=hl*, *=s∼t*[20] and *dip* (Rigsby 1986; Tarpent 1987). Apart from the fact that *=hl* precedes common nouns while *=s∼t* precedes singular proper names and *dip* precedes plural or coordinated proper names, connectives are not sensitive to any other semantic properties, such as definiteness and specificity (Davis 2018).

An example of a positive construction is provided in (26) (see also f.n. 7).

(26) 'Wii 'nakw 'nit
big long 3SG.III
'She is tall.' (VG-v.)

Some adjectives have a distinct plural form. For example, *hi'niiluxw* is a plural form of *'nakw*.

(27) Hi'niiluxw dip Lisa g̲an=t Michael
tall.PL ASSOC Lisa PCNJ=PN Michael
'Lisa and Michael are tall.' (HH-v.)

20. ∼ here indicates alternation.

4 Comparatives and differential MPs without a comparative morpheme

4.1 Differential MPs with relative GAs

Without an overt comparative morpheme, an MP receives a differential reading when the GA is relative (28).[21,22]

(28) K'i'y=hl t'imk̲'aax win 'wii 'nakw[-t]=hl ha'niitx̲ook̲xw t=un
one=CN arm.span COMP big long[-3.II]=CN table PN=DEM.PROX
'This table is one arm span longer.' (VG)

a.# Context: There is one table, and it is one arm span long.

b. Context: "That table is 4 feet long"...
VG on (28) in (28b) after rejecting it in (28a): "Oh yes, now you're comparing."

I take the availability of differential MP readings as evidence that Gitksan has degrees as semantic primitives involved in GA denotations, following von Stechow (1984) and Beck et al. (2009).

A modifier *ts'uusx-im* 'a little' also receives a differential interpretation when the GA is relative. In (29), *ts'uusx-im* in the second clause modifies the difference in temperature between the two lakes.

(29) Context: There are two lakes. Both are too cold for swimming, but if you had to choose one, one is a bit warmer than the other.
Gwiineek̲xw=hl aks=hl gilbil t'ax̲ ii ts'uusx-im gamks[-t]=hl t'ax̲
cold=CN water=CN two lake CCNJ little-ATTR warm[-3.II]=CN lake
t=un
DEM=PROX
The water in the two lakes is cold, but this lake is a little warmer. (VG-v.)

Since the first clause asserts that both lakes are cold, the standard of warmth in the second clause cannot be what counts as warm in general, the kind of standard that would be contributed by *pos*. Moreover, based on the discussion in Section 2.3, the presence of an MP and *ts'uusx-im* 'little' in (28)-(29) suggests that there is no *pos* in these constructions.[23]

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21. There seems to be some variability between speakers and lexical items. HH accepts (28) with both differential and absolute MP readings. However, sentences like (28) are never volunteered as a translation of an English sentence with an absolute MP, and acceptance of the absolute MP reading is unstable. For example, while involving the same structure as (28), (i) is rejected with the intended absolute MP reading by both speakers.

(i) #Gwila'l si-se'e win la'y[-t]=hl aats'ip
three PL-foot COMP wide[-3.II]=CN door
intended: 'The door is three feet wide." (VG, HH)

What is consistent is that a differential MP reading is available when the GA is relative, even without an overt degree operator or an overt standard.

22. For a background on MPs in Gitksan and related languages, see Rigsby (1986), Bicevskis et al. (2017), and Aonuki (2023).

23. A reviewer asks if an MP can co-occur with a standard phrase. The answer is yes, both for MPs (i) and modifiers like *ts'uusx* 'little' (see (32) below).

When the GA is minimum-standard, MPs (30) and *ts'uusx-im* 'a little' (31) receive absolute interpretations in the absence of an overt degree operator.

(30) (K'i'y=hl) hlek moos win k̲'ak̲[-t]=hl aats'ip
one=CN crook thumb COMP open[-3.II]=CN door
'The door is open by one inch.' (VG-v., HH-v.)

(31) Ts'uusx-im k̲'ak̲=hl aats'ip
little-ATTR open=CN door
'The door is a little bit open.' (VG-v., HH)

4.1.1 Note on the complementizer *win*

Before moving on, the morpheme *win* (*wil* in the Eastern dialects) that appears with MPs is a complementizer, ruling out a possibility that it contributes any degree semantics. With *ts'uusx* 'little,' which appeared in (29) and (31), the minimal pair in (32) shows that the complementizer *win* is present if the attributive marker *-m*[24] is absent (see Forbes 2012 for properties of the attributive marker).

(32) a. Ts'uusx-im 'wii 'nakw=t Anne a[-t]=s Mary
little-ATTR big long=PN Anne PREP[-3.II]=PN Mary
'Anne is a little taller than Mary.' (VG-v.)

b. Ts'uusx **win** 'wii 'nakw=t Anne a[-t]=s Mary
little COMP big long=PN Anne PREP[-3.II]=PN Mary
'Anne is a little taller than Mary.' (HH-v.)

Use of *win* is also documented with numerals without a GA (33), as well as in some attitude complements (34) and *wh*-questions targeting adjuncts and oblique arguments (35) (Rigsby 1986; Tarpent 1987; Davis and Brown 2011; Forbes 2018; Brown to appear).

(33) Gilbil **win** ha'w-i'y a=hl k'i'y=hl k'uuhl
two COMP go.home-1SG.II PREP=CN one=CN year
'I go home twice a year' (Bicevskis et al. 2017:369(341a), VG)

(34) Wilaay-i-'y **win** nee dii wis.
know-TR-1SG.II COMP NEG FOC rain
'I know that it didn't rain.' (Brown to appear:11(33a), VG)

(i) Context: This year is a leap year.
K'i'y=hl sa win 'wii 'nakw k'uuhl t=un a=hl gi-k'uuhl
one=CN day COMP big long year DEM.PROX PREP=CN last-year
'This year is one day longer than last year.' (VG-v.)

24. ⟨i⟩ in the attributive ⟨-im⟩ (32a) is epenthetic.

(35) Naa **wi[n]**=ma gi'nam[-t]=hl majag̲alee?
who COMP=2.I give[-3.II]=CN flowers
'Who did you give flowers to?' (Forbes 2018:157(4), VG)

In the analysis below (Section 5.3), I suggest that an MP is base-generated in the sister of a GA and moves to the surface position, crossing a clausal boundary. I assume that *win* has no semantic contribution.

4.2 Comparative readings of relative GAs

The difference between relative and minimum-standard GAs is not limited to MP interpretations. Even without MPs, relative GAs can receive a comparative interpretation in the absence of an overt degree operator and a standard phrase, while minimum-standard GAs cannot. (36), which has a relative GA *'wii 'nakw*, receives a comparative reading both with and without the overt standard.

(36) Context: "Which is taller, Michael or Lisa?"
'Wii 'nakw=t Michael (a[-t]=s Lisa)
big long=PN Michael PREP[-3.II]=PN Lisa
'Michael is taller (than Lisa).' (VG, HH)

In (37), a relative GA *dulpxw* 'short' in the second conjunct receives a comparative reading.

(37) Hi'niiluxw dip Lisa g̲an[-t]=s Michael, ii dulpxw[-t]=s Lisa.
tall.PL ASSOC Lisa PCNJ[-3.II]=PN Michael CCNJ short[-3.II]=PN Lisa
'Lisa and Michael are both tall, but/and Lisa is shorter.' (VG-v.)

The comparative reading of the second clause is also verified by the first clause; if the second clause received a positive interpretation, it would contradict the first clause.[25]

On the other hand, with minimum-standard GAs like *k̲'ak̲* 'open' (38) and *siipxw* 'sick' (39), a comparative reading is unavailable, even with an overt standard.

(38) Context: There are only two doors, and both are open. You point to one that is opened wider.
#K̲'ak̲=hl aats'ip t=un (a[-t]=hl aats'ip t=ust)
open=CN door PN=DEM.PROX PREP[-3.II]=CN door PN=DEM.DIST
intended: 'This door is more open than that door.' (VG)

(39) Context: John and Mary are both sick, but John can't get out of bed, and Mary is only sneezing.
#Siipxw=t John a[-t]=s Mary
sick=PN John a[-3.II]=PN Mary
intended: 'John is sicker than Mary.' (HH)

25. The idea of conjoining a construction that receives a comparative reading with a construction with a positive reading to test the semantic properties of the former comes from Deal and Hohaus (2019: 352-3(17)-(18)).

The unavailability of comparative readings with minimum-standard GAs in (38)-(39) suggests that the comparative readings in the parallel constructions with relative GAs in (36)-(37) arise from the context-sensitivity of relative GAs rather than a covert comparative operator. However, we have established that differential comparison in (28)-(29) cannot be attributed to a covert morpheme *pos* because *pos* and MPs cannot co-occur (Section 2.3). In the next section, I will argue that comparative readings of relative GAs arise both with and without MPs because their denotations are inherently context-sensitive, contra their counterparts in English (14).

5 Analysis

5.1 Review of Oda (2008)

My analysis builds on Oda's (2008) analysis of Japanese. Recall that, in Japanese, just like in Gitksan, MPs receive differential readings when the co-occurring GA is a relative GA, even in the absence of an overt standard (40 repeated from 2).

(40) Context: *The height of the maple tree is 7 m, and...*
Matsu-no ki-wa 8 m takai
this tree-TOP 8 m tall
'The pine tree is 8 m taller.' *'..8 m tall.'

In Oda's account, there is no covert operator akin to *-er* or *pos* in (40). Instead, the differential interpretation of the MP *8m* in (40) arises from an inherently context-sensitive denotation of the relative GA *takai* 'tall' (41);[26] it denotes a relation between degrees d' and individuals x such that the tallness degree instantiated by x corresponds to the addition of d' to a contextually salient degree, d_c.

(41) $[\![takai]\!]^c = \lambda d'.\ \lambda x.\ \max(\lambda d.\text{tall}(d)(x)) = d_c + d'$
(adapted from Beck et al. 2004:342(e.n.15-ib))

(40) receives the denotation in (42). The MP, *8m*, which denotes a degree in Oda's analysis, corresponds to the difference between the height of the pine tree and the contextual standard d_c; the standard would be the height of the maple tree in the context in (40).

(42) $[\![(40)]\!]^c = \max(\lambda d.\text{tall}(d)(\text{the pine tree})) = d_c + 8\text{m}$

5.2 GA denotations

I will build on Oda's idea of context-sensitive and comparative denotations of GAs and propose a more explicit implementation of how the contextual standard d_c in (41) is obtained, borrowing insights from the literature on *pos*. In particular, I propose that GA denotations include the STANDARD function that appears in the denotation of *pos*

26. I refer to the GA as *takai* for simplicity because it is the citation form recognized by native speakers, but the adjective is *taka-*, and *-i* is a non-past tense.

(see Section 2.2). The denotation of *'wii 'nakw* 'tall' is provided in (43), where $C_{1,et}$ is an index over a comparison class, whose value is assigned by the context-sensitive assignment function g_c. *'Wii 'nakw* 'tall' denotes a function that takes a degree d and an individual x and returns true iff the height degree of x is no less than addition of the standard degree computed by the STANDARD function and the degree d. The degree d must be greater than zero in order to give rise to a comparative meaning (see Section 5.4); I omit this requirement from the denotation for legibility.

(43) $[\![\text{'wii 'nakw}_{C_1}]\!]^c = \lambda d.\ \lambda x.\ \text{Length}(x) \geq \text{STANDARD}(\text{Length})(g_c(C_1)) + d$ (tentative)

Just like the STANDARD function inside *pos* (Kennedy and McNally 2005), the STANDARD function in (43) is sensitive to the scale structure of the measure function that it takes as its first argument. In (43), because the GA is a relative GA, the output of the STANDARD function varies by the comparison class, $g_c(C_1)$. On the other hand, in a minimum-standard GA k'ak 'open', STANDARD(Open)($g_c(C_1)$) always corresponds to the lower end of the scale regardless of the value of ($g_c(C_1)$). Again, though omitted, there is a requirement that the degree d is greater than zero.

(44) $[\![\text{k'ak}_{C_1}]\!]^c = \lambda d.\ \lambda x.\ \text{Open}(x) \geq \text{STANDARD}(\text{Open})(g_c(C_1)) + d$ (tentative)

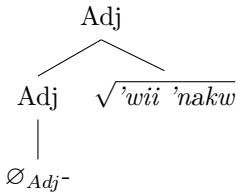
5.2.1 Note on morphology

There may be a worry that, while *pos* was the sole contributor of context-sensitivity in English, in the current proposal, every GA makes reference to the STANDARD function, with no explanation for the shared semantics among them. This does not have to be the case. It is possible that there are category-neutral 'property concept' roots (e.g., Dixon 1982; Koontz-Garboden and Francez 2010; Menon and Pancheva 2014), defined as a context-independent measure function in (45).

(45) a. $[\![\sqrt{\textit{'wii 'nakw}}]\!]^c = \lambda x.\ \text{Length}(x)$

Then, following Sudo (2015) on Japanese, a covert adjectivizing morpheme can be postulated (46a) as a counterpart of an overt nominalizer (see Aonuki (2023) for data on gradable nominals). In this framework, the adjectivizer would be the source of context-sensitivity and comparative semantics (46b).

(46) a.



b. $[\![\varnothing_{Adj\,C_1}]\!]^c = \lambda G_{ed}.\ \lambda d.\ \lambda x.\ G(x) \geq \text{STANDARD}(G)(g_c(C_1)) + d$

I will assume that (46) is the internal composition of GAs. The exact semantics of the adjectivizer must be modified slightly according to the changes to be made in Section 5.4.

5.3 Measure phrase interpretation

Recall that, as in Japanese, an MP receives a differential interpretation when the GA is relative, even without an overt comparative operator (47 repeated from 28).

(47) Context: "That table is 4 feet long"...
K'i'y=hl t'imk̲'aax win 'wii 'nakw[-t]=hl ha'niitx̲ook̲xw t=un
one=CN arm.span COMP big long[-3.II]=CN table PN=DEM.PROX
'This table is one arm span longer.' (VG)

Following Schwarzschild (2005), I analyze MPs as generalized quantifiers over degrees. Concretely, the denotation of *k'i'y=hl t'imk̲'aax* 'one arm span' is provided in (48); it takes a set of degrees and returns true iff the maximum degree in the set is no less than one arm span.

(48) $[\![\text{k'i'y=hl t'imk̲'aax}]\!]^c = \lambda D_{dt}.\ \textsc{max}(D) \geq$ one arm span

Syntactically, an MP is base-generated in a sister of the GA and undergoes an overt movement.[27] Semantically, the MP leaves a trace of type *d*, which will be bound by a lambda. For example, (47) receives the denotation in (49). It is true iff the maximum degree d such that the length of the table is the addition of the standard degree and d is 1 arm span. In the context in (47), the comparison class contains the two tables mentioned, and consequently the standard degree corresponds to the length of 'that table,' 4 feet.[28]

(49) $[\![(47)]\!]^c = [\![[\text{k'i'y=hl t'imk̲'aax}]\ 3\ [\text{ha'niitx̲ook̲xw t=un}]\ t_3\ \text{'wii 'nakw}_{C_1}]\!]^c = \textsc{max}(\lambda d.\ \text{Length(this table)} \geq \textsc{standard}(\text{Length})(g_c(C_1)) + d) \geq 1$ arm span (tentative)

a. $[\![t_3\ \text{'wii 'nakw}_{C_1}]\!]^c = \lambda x.\ \text{Length}(x) \geq \textsc{standard}(\text{Length})(g_c(C_1)) + g_c(d_3)$

b. $[\![[\text{ha'niitx̲ook̲xw t=un}]\ t_3\ \text{'wii 'nakw}_{C_1}]\!]^c = 1$ iff Length(this table) $\geq \textsc{standard}(\text{Length})(g_c(C_1)) + g_c(d_3)$

c. $[\![3\ [\text{ha'niitx̲ook̲xw t=un}]\ t_3\ \text{'wii 'nakw}_{C_1}]\!]^c = \lambda d.$ Length(this table) $\geq \textsc{standard}(\text{Length})(g_c(C_1)) + d$

On the other hand, in an analogous construction with a minimum-standard GA, an MP receives an absolute interpretation (50 repeated from 30).

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27. Postulating this movement explains the presence of the complementizer *win* (see Section 4.1.1). However, the available data are also consistent with an MP base-generated in its surface position. In particular, it should be noted that there is currently no independent evidence for abstraction over degrees in Gitksan (see also Aonuki (2023)).
28. See Section 9 for the pragmatic reasoning behind it.

(50) (K'i'y=hl) hlek moos win k̲'ak̲[-t]=hl aats'ip
one=CN crook thumb COMP open[-3.II]=CN door
'The door is open by one inch.' (VG-v., HH-v.)

This is because, given its scale-sensitivity, the STANDARD function will always return the zero degree when the GA is minimum-standard. In (51), the degree argument d ends up corresponding to the absolute degree of the door's openness.

(51) $[\![(50)]\!]^c = [\![$[k'i'y=hl hlek moos] 3 aats'ip t_3 k̲'ak̲$_{C_1}]\!]^c$
$=$ MAX(λd. Open(the door) $\geq$ STANDARD(Open)($g_c(C_1)$) + d) $\geq$ 1 inch
(tentative)

5.4 Comparative and positive readings with relative GAs

Recall that when the GA is relative, a construction without an overt comparative morpheme or standard can receive a comparative reading (52 repeated from 36).

(52) Context: "Which is taller, Michael or Lisa?"
'Wii 'nakw=t Michael (a[-t]=s Lisa)
big long=PN Michael PREP[-3.II]=PN Lisa
'Michael is taller (than Lisa).' (VG, HH)

In the denotation of (52) without the optional standard phrase in (54), C_1 is mapped to a comparison class containing only Michael and Lisa, the two salient individuals in the context c. As a result, STANDARD(Length)($g_c(C_1)$) is mapped to Lisa's height. In the absence of an overt MP, following Breakstone (2012) and Bogal-Allbritten (2013, 2014), I assume that there is a covert operator whose only contribution is existential closure (53).[29]

(53) $[\![\exists]\!]^c = \lambda P_{det}.\ \lambda x.\ \exists d[P(d)(x)]$ (Breakstone 2012:117(16a))

(54) $[\![(52)]\!]^c = [\![$Michael $\exists$ 'wii 'nakw$_{C_1}]\!]^c$
$= \exists d$[Length(Michael) $\geq$ STANDARD(Length)($g_c(C_1)$) + d] (tentative)

The idea here is that if there are salient individual(s) other than the subject that are suitable for comparison with the subject along the relevant dimension, the value of the comparison class ($g_c(C_1)$) is the set containing those individuals and the subject.

When there aren't salient individuals to be compared with the subject, the standard degree would be mapped to what is considered tall in general, just like the default uses of *pos*, giving rise to an evaluative inference that the subject is considered tall in general. For example, this is observed in the first conjunct of (55) (repeated from 37), where there aren't salient individuals other than the subject, Lisa and Michael, and consequently the standard degree corresponds to what is considered tall for adults in

29. An alternative strategy to achieve the same effect is Grano's (2012) type-shifting rule.

general.[30] In the second conjunct, where Lisa is the only subject, a comparison class consisting of Lisa and Michael is available, which results in a comparative reading.

(55) Hi'niiluxw dip Lisa gan[-t]=s Michael, ii dulpxw[-t]=s Lisa.
tall.PL ASSOC Lisa PCNJ[-3.II]=PN Michael CCNJ short[-3.II]=PN Lisa
'Lisa and Michael are both tall, but/and Lisa is shorter.' (VG-v.)

To better predict when positive and comparative readings arise, the denotations of GAs should be modified as in (56). The only change is that now the variable C_1 is of type ⟨e,et⟩ rather than ⟨e,t⟩. It is now a variable over a context-sensitive function that takes an individual denoted by the subject, x, and returns a comparison class for x in c.[31]

(56) $[\![\text{'wii 'nakw}_{C_1}]\!]^c = \lambda d.\ \lambda x.\ \text{Length}(x) \geq \text{STANDARD}(\text{Length})(\mathbf{g}_c\mathbf{(C}_1\mathbf{)(x)}) + d$ (final)

If c contains salient individuals that are appropriate for comparison with x along the given dimension (e.g., have a vertical length and are relevant in c), then the output comparison class, $g_c(C_1)(x)$, is the set consisting of those individuals and x. If, on the other hand, c does not contain such individuals, then the only information that helps narrow down the standard degree is x itself, and the output is the set of all individuals of the same kind as x in the general population. A comparative interpretation is only available in the former case.[32]

The idea that the subject contributes to the narrowing down of the comparison class is independently motivated. First, a subject NP can often determine a comparison class and consequently the standard degree (Bierwisch 1989; Ludlow 1989). Uttered out of the blue, (57b) invokes a higher standard of tallness than (57a) does.

(57) a. This boy is tall. ≈ tall for a boy his age
b. This NBA player is tall. ≈ tall for an NBA player

Second, when quantification is involved, the standard degree varies by individual (58).[33]

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30. See Ludlow (1989) for a similar observation concerning the implicit comparison class in a positive construction with a proper name subject in English.

31. The idea of postulating a higher-order variable over functions to capture the relevance of the subject in determining the comparison class is based on von Fintel's (1994) analysis of context-dependency in quantification (see also f.n. 33).

32. An anonymous reviewer asks whether other salient degrees can serve as a standard. One such example is that at least when there is an MP or 'a little,' an excessive interpretation is easily available without 'too,' where the standard degree seems to be the maximum degree allowed in the context (i).

(i) Context: You have to be 4 feet or shorter to play in a bouncy castle. Mary is 4 feet and 1 inch.
Ts'uusx-im 'wii 'nakw=t Mary
little-ATTR big long=PN Mary
'Mary is a little too tall.' (Lit: 'Mary is a little tall.') (HH-v.)

Excessive readings of relative GAs without an overt standard or comparative operator are also observed in Japanese (Hayashishita 2007, 2009; Kubota 2011). I acknowledge that future studies should include systematic investigations of which salient degrees can serve as the standard degree.

33. I am grateful to an anonymous reviewer for pointing out this issue and to Kai von Fintel for discussions on this topic. For existing work on implicit, context-dependent meaning components under quantification in general, see Partee (1989), von Fintel (1994), and Schwarz (2009). For similar observations about an implicit comparison class varying by subject, see Klein (1980) and Ludlow (1989).

(58) Every animal is small in the picture book of baby animals.
(p.c. Kai von Fintel)[34]

Finally, as for semantic contribution of an often optional PP that helps determine the contextual standard, such as *a⌈-t⌋=s Lisa* in (52), I suggest that it is an argument of a covert function FRAME, which restricts the situations under consideration. Assuming that the preposition is semantically vacuous, FRAME takes an individual x denoted by a PP, the intension of a GA, P (via Intensional Functional Application; Heim and Kratzer 1998), and returns a function that takes a degree d, an individual y, and a situation s, with a presupposition that s is a minimal situation that includes both x and y, and returns true iff P holds of s, d and x.

(59) a. $[\![\text{FRAME}]\!]^{s,c} = \lambda x.\ \lambda P_{sdet}.\ \lambda d.\ \lambda y.\ \lambda s\text{: MIN}(\lambda s'.\ x \subseteq s' \wedge y \subseteq s')(s).\ P(s)(d)(x)$

b. $\text{MIN} := \lambda p_{st}.\ \lambda s.\ p(s) \wedge \neg\exists s'[s' < s \wedge p(s')]$ (Hohaus 2015:68(130))

The idea of postulating a covert FRAME operator whose denotation relies on the notion of minimal situations follows Hohaus's (2015) analysis of *compared to* phrases and other 'frame adverbials' that help narrow down the value of a free variable. The exact semantics of the FRAME operator builds on Kennedy's (2007a; 2007b) proposal for *compared to* and Pearson's (2010) analysis of *mai* in Fijian.

A GA denotation that takes situations into account is provided in (60).

(60) $[\![\text{'wii 'nakw}_{C_{1,\langle e,set\rangle}}]\!]^{s,c} =$
$\lambda d.\ \lambda x.\ \text{Length}(x)(s) \geq \text{STANDARD}(\text{Length})(g_c(C_1)(x)(s)) + d$

Putting everything together, the denotation of (52) with the standard phrase (61) would be a proposition that is defined only for minimal situations that include Lisa and Michael, and if defined, is true iff there is a degree d such that Michael's height in the situation is no less than addition of d and the standard degree of height computed based on a comparison class in that situation.

(61) $[\![\text{Michael } \exists \text{ ['wii 'nakw}_{C_1} \text{ FRAME Lisa}]]\!]^{s,c} =$
$\lambda s\text{: MIN}(\lambda s'.\ \text{Lisa} \subseteq s' \wedge \text{Michael} \subseteq s')(s).\ \exists d[\text{Length}(\text{Michael})(s) \geq \text{STANDARD}(\text{Length})(g_c(C_1)(\text{Michael})(s)) + d]$

For additional data on the wide range of semantic types that can appear in a frame-setting PP accompanying sentences with comparative and superlative readings, see Aonuki (2023). These PPs are optional as long as the context is rich enough to determine the standard degree without them.[35] I will continue to mark such optionality where it has been explicitly tested, and set aside their contribution in my analysis from here onward.

34. For a similar example, see Stanley (2000:418(17)).

35. Given their optionality, these phrases are not an argument of the GA or a covert degree operator. Comparison with Nez Perce (Deal and Hohaus 2019) may be relevant here. Comparatives in Nez Perce may have an overt comparative morpheme and an overt standard phrase, and while they are optional, at least one of them must be overt. Deal and Hohaus (2019) argue that a standard phrase is selected by a Deg head, which can be filled by an overt or covert comparative morpheme, and at least the head or complement of a DegP must be overt. This analysis will not apply to Gitksan, as the standard phrase is optional even in the absence of an overt degree operator. Gitksan has an overt degree operator that gives rise to a comparative reading (see Section 7), but the optionality of a standard phrase does not depend on the presence of this operator.

5.5 Unavailability of comparative readings with minimum-standard GAs

Recall that when the GA is minimum-standard, a comparative reading is unavailable (62 repeated from 38).

(62) Context: There are only two doors, and both are open. You point to one that is opened wider.
#K'ak=hl aats'ip t=un (a[-t]=hl aats'ip t=ust)
open=CN door PN=DEM.PROX PREP[-3.II]=CN door PN=DEM.DIST
intended: 'This door is more open than that door.' (VG)

Due to the context-independent semantics of *k'ak* 'open,' the denotation of (62) in (63) only asserts that 'this door' is open to some degree.

(63) $[\![(62)]\!]^c$ = $[\![$aats'ip t=un ∃ k'ak$_{C_1}]\!]^c$ = ∃d[Open(this door) ≥ STANDARD(Open)($g_c(C_1)$(this door)) + d]

Narrowing down the comparison class with the standard phrase does not affect the standard degree, just like the *compared to* phrase does not in (64) (repeated from 23a), because the STANDARD function always outputs the zero degree when the GA is minimum-standard (Kennedy and McNally 2005).

(64) Context: Rod A and Rod B are both bent, with the latter bent to a greater extent.
??Compared to A, B is bent. (Kennedy 2007a:20(55,56))

5.6 Correct predictions about crisp judgements

We have seen that implicit comparatives in English, which arise from the context-sensitivity contributed by *pos*, are incompatible with crisp judgement contexts (65 repeated from 25a) (see Section 2.3).

(65) Context: A 600-word essay and a 597-word essay.
#Compared to that essay, this one is long. (Kennedy 2007a:19(52))

Under the *pos* account, the incompatibility with crisp judgement contexts is due to the requirement of *pos* that the relevant degree 'significantly exceeds' (Graff 2000; Kennedy 2011) the contextual standard.

However, in the current, context-sensitive denotations of relative GAs (66 repeated from 56), there is no such requirement.

(66) $[\![$'wii 'nakw$_{C_1}]\!]^c$ = λd. λx. Length(x) ≥ STANDARD(Length)($g_c(C_1)$(x)) + d

'Wii 'nakw 'tall' is true of an individual as long as there is some positive degree d, however small, that can be added to the contextual standard to derive the degree of

that individual. Therefore, it is predicted that comparative readings of relative GAs discussed above should be compatible with crisp judgement contexts.

This prediction is borne out. In (67), even though both John and Bob would considered tall in the general population, and the difference in height between them is only 1/4", a positive construction is felicitous. VG even volunteered a version without an overt standard.

(67) Context: John and Bob are both basketball players. John is 7'0" and Bob is 7'1/4". "Tell me about John and Bob's heights."
'Wii 'nakw=t Bob (a[-t]=s John)
big long=PN Bob PREP[-3.II]=PN John
'Bob is taller (than John).' (VG-v., HH)

Gitksan adds to the growing cross-linguistic evidence that the incompatibility with crisp judgement contexts observed in English (65) is not a defining property of comparative meanings that hinge on the context-sensitivity of relative GAs (Bowler 2016 on Walpiri; Deal and Hohaus 2019 on Nez Perce). Instead, it may indeed be specific to the 'standing out' requirement of *pos*.

6 Alternative analyses

In Section 5, I demonstrated that postulating inherently context-sensitive and comparative denotations of GAs similar to Oda's (2008) analysis of Japanese can provide a unified explanation for why, in the absence of an overt comparative morpheme, comparative interpretations and differential MP interpretations are available with a relative GA but not with a minimum-standard GA. In this section, I discuss four possible alternative analyses and why they do not account for the Gitksan data.

6.1 Covert *-er*

The first possibility to rule out is that when relative GAs are compatible with a comparative reading and when a co-occurring MP receives a differential interpretation, there is a covert degree operator akin to *-er*. For example, Pearson (2013) argues that Japanese has such a morpheme.[36] In her analysis, in a comparative with an overt standard marked by the post-position *yori* (68), there is a covert *-er* that takes a *pro* as an argument, and the *yori* phrase is an adjunct that helps narrow down the value of the *pro* (69).[37] In (69), pro_1 is mapped to the maple tree given the domain of individuals in c'.

(68) Matsu-no ki-wa kaede-no ki yori takai
pine-GEN tree-TOP maple-GEN tree yori tall
'The pine tree is taller than the maple tree.'

36. I am grateful for an anonymous reviewer for pointing out the relevance of Pearson's analysis.
37. Pearson postulates a semantic type for contexts, k, and treats the meaning (or 'character') of a sentence as a function from contexts to propositions. In that framework, the standard phrase headed by *yori* takes a function from individuals to a character of a sentence and returns a function from individuals to the same character except that the context variable is now restricted to a context containing only the standard and the subject. For simplicity, I abstract away from this point and assume that *yori* works like Kennedy's analysis of *compared to* (see Section 2.3).

(69) $[\![(68)]\!]^c = 1$ iff in every context c′ just like c except that the domain of discourse includes just the pine tree and the maple tree,
$[\![\text{Matsu-no ki-wa [takai -er pro}_1\text{] [kaede-no ki yori}]\!]^{c'} = \textsc{max}(\lambda\text{d. Tall(the pine tree)} > \textsc{max}(\lambda\text{d. Tall}(g_{c'}(\text{pro}_1))$

Could a covert *-er* account for the Gitksan facts? It would correctly generate comparative readings with relative GAs, but it would also generate comparative readings with minimum-standard GAs. In Gitksan, comparative readings are unavailable without an overt comparative morpheme when the GA is minimum-standard (Section 4). A covert *-er* would therefore fail to account for the scale-sensitivity of the comparative readings under consideration in Gitksan.[38]

6.2 *Pos*

A lesson from the failure of the covert *-er* account in Gitksan is that the comparative and differential MP readings that arise with relative GAs must be attributed to their context-sensitive nature rather than a comparative operator that could also combine with minimum-standard GAs and give rise to comparative meanings. There are three existing, alternative analyses for where the context-sensitivity of relative GAs is located in the grammar, all of which would maintain that denotations of GAs themselves are context-independent, as in (70).

(70) $[\![\text{'wii 'nakw}]\!]^c = \lambda\text{d. } \lambda\text{x. Length(x)} \geq \text{d}$ (to be rejected)

The first possibility is that the context-sensitivity is contributed by *pos* (see Section 2.2). *Pos* could account for the comparative readings of relative GAs and lack thereof with minimum-standard GAs, with potential differences in how the standard degree is computed.[39] However, the *pos* account does not offer a unified explanation for comparative and differential MP readings. Because *pos* existentially closes the degree argument of a GA in addition to providing the standard degree, *pos* cannot co-occur with an MP (see Section 2.3). Recall that this incompatibility of *pos* and MPs accounted for the ungrammaticality of (71) (repeated from 24a) in English.

(71)?? Compared to Lee, Kim is 10cm tall. (Kennedy 2007a:20(58))

6.3 EVAL

Given that *pos* and MPs cannot co-occur, the second option would be to separate the context-sensitivity of *pos* from existential closure over degrees. For example, Rett (2007, 2008) proposes a covert morpheme called EVAL, which contributes a context-sensitive standard degree without existential closure over degrees. In the current framework that treats GAs as being of type ⟨d,et⟩, EVAL would be defined as in (72), where $g_c(d_3)$ is the contextual standard.

38. The same point has been made by Sawada and Grano (2011) on the differential MP interpretations in Japanese, which are only available with relative GAs in the absence of an overt standard phrase.
39. Recall that in Gitksan, a comparative reading of a relative GA is available even without an overt standard phrase like *compared to*. Therefore, as in the proposed analysis in Section 5.4, we would need to say that the comparison class can be narrowed down contextually even without an overt standard phrase in the same clause.

(72) $[\![\text{EVAL}_{d_3}]\!]^c = \lambda G_{det}.\ \lambda d.\ \lambda x.\ G(d)(x) \wedge d > g_c(d_3)$
(adapted from Rett 2007:213(9))

Recall that (73) (repeated from 52) receives a comparative reading.

(73) Context: "Which is taller, Michael or Lisa?"
'Wii 'nakw=t Michael (a[-t]=s Lisa)
big long=PN Michael PREP[-3.II]=PN Lisa
'Michael is taller (than Lisa).' (VG, HH)

The denotation of (73) with EVAL is in (74a). If $g_c(d_3)$ can be mapped to Lisa's height, we correctly predict a comparative reading to be available in (73). In (73), EVAL is obligatory because the denotation without it (74b) would be trivial. (74b) merely asserts that Michael has some height.

(74) a. $[\![\text{Michael } \exists \text{ EVAL}_{d_3} \text{ 'wii 'nakw}]\!]^c = \exists d[\text{Length(Michael)} \geq d \wedge d > g_c(d_3)]$
b. $[\![\text{Michael } \exists \text{ 'wii 'nakw}]\!]^c = \exists d[\text{Length(Michael)} \geq d]$

However, when a denotation without it is not trivial, EVAL is optional.[40] Since an MP makes a construction non-trivial, the EVAL account would wrongly predict that an absolute interpretation of an MP should be freely available. That is, contrary to VG's judgement in (75a), the reading in (76) should be available for (75) (repeated from 47).

(75) 2 f.n. 6 I K'i'y=hl t'imk̲'aax win 'wii 'nakw[-t]=hl ha'niitx̲ook̲xw
one=CN arm.span COMP big long[-3.II]=CN table
t=un
PN=DEM.PROX
'This table is one arm span longer.' (VG)
a. #Context: There is one table, and it is one arm span long.
b. Context: "That table is 4 feet long"...
VG on (28) in (28b) after rejecting it in (28a): "Oh yes, now you're comparing."

(76) $[\![\text{K'i'y=hl t'imk̲'aax 5 ha'niitx̲ook̲xw t=un } d_5 \text{ 'wii 'nakw}]\!]^c$
$= \text{MAX}(\lambda d.\ \text{Length(this table)} \geq d) \geq 1$ arm span

Furthermore, in Rett's (2014) updated implementation, evaluativity is treated as an implicature that only arises when the denotation without it would be trivial. In that framework, the empirically available differential MP reading in (75) would not be derived at all.

40. EVAL is also obligatory when the construction involves a negative polar GA (e.g., *short*), which is marked relative to a positive counterpart (*tall*), but this is not relevant to the current argument.

6.4 Coercion

The last approach to be considered is Sawada and Grano's (2011) account of Japanese, which seeks to explain differential MP readings (77 repeated from 40) as a result of coercion.

(77) Context: *The height of the maple tree is 7 m, and...*
Matsu-no ki-wa 8 m takai
this tree-TOP 8 m tall
'The pine tree is 8 m taller.' *'..8 m tall.'

Sawada and Grano (2011) follow a framework that treats GAs as denoting measure functions of type ⟨e,d⟩ (78a) (Kennedy 1999). They argue that the differential reading of the MP in (77) arises because a covert Deg head called Meas (Svenonius and Kennedy 2006), which combines with a measure function, requires the former to have a minimum degree (78b). Because relative GAs like *takai* 'tall' do not have a minimum degree, a covert coercion operator C (78c) is inserted, which takes a GA denotation and returns a new denotation associated with a derived scale, whose lower endpoint is the tallness degree of a salient individual $g_c(1)$.

(78) a. $[\![\text{takai}]\!]^c = \lambda x.\ \text{Tall}(x)$

b. $[\![\text{Meas}]\!]^c = \lambda G_{\langle e,d\rangle}$: G is a function from objects to measurable degrees and G has a minimum element. $\lambda d.\ \lambda x.\ G(x) \geq d$
(Sawada and Grano 2011:211(51))

c. $[\![C_{1,e}]\!]^c = \lambda G_{ed}.\ \lambda x.\ G_{G(g_c(1))^{\uparrow}}(x)$ (Sawada and Grano 2011:216(72))

(77) would receive the denotation in (79), where $\text{Tall}_{Tall(g_c(1))^{\uparrow}}$ denotes a measure function for height that is associated with a scale whose lower end point is the height degree of the individual $g_c(1)$, which is mapped to the maple tree in the context provided. The MP *8m* measures the height of the pine tree measured with this updated scale, which corresponds to how much taller the pine tree is than the maple tree.

(79) $[\![(77)]\!]^c = [\![[\text{Matsu-no ki}]\ [8\text{m}\ [\text{Meas}\ [C_1\ \text{takai}]]]]\!]^c$
$= \text{Tall}_{Tall(g_c(1))^{\uparrow}}(\text{the pine tree}) \geq 8\text{m}$

This coercion analysis can be applied to the MP readings in Gitksan (47). However, it would wrongly predict that the comparative readings of relative GAs should not be available without an MP, unless the Meas head is postulated even in the absence of an MP.

Moreover, postulating a coercion operator in Gitksan would deviate from Sawada and Grano's view of cross-linguistic typology. Discussing why an MP occurring with a bare relative GA is judged ungrammatical in languages such as Spanish and Russian rather than receiving a differential interpretation as in Japanese, Sawada and Grano (2011) argue that in the former languages, a coercion operator is unavailable. Their reasoning is that this is because Spanish and Russian have an overt comparative morpheme that can occur without an overt standard. They assume that in Japanese, in

the absence of an MP, a comparative reading is contributed by a standard-marking post-position *yori* (see (68)). Because *yori*, being a post-position, cannot appear without an overt standard, a coercion operator is available as a repair strategy when an MP occurs in the absence of an overt standard.

As will be demonstrated below (Section 7), Gitksan has an overt morpheme that can give rise to comparative readings even with minimum-standard GAs, and it does not require a standard. Therefore, in view of the broader degree semantic system of the language, it is less plausible to postulate a coercion operator in Gitksan.

7 Overt degree operator *k'aa*

It was demonstrated in Section 4 that minimum-standard GAs cannot receive a comparative interpretation on their own, regardless of the presence of a standard phrase (80 repeated from 62, 81 repeated from 39).

(80) Context: There are only two doors, and both are open. You point to one that is opened wider.
#K̲'ak̲=hl aats'ip t=un (a[-t]=hl aats'ip t=ust)
open=CN door PN=DEM.PROX PREP[-3.II]=CN door PN=DEM.DIST
intended: 'This door is more open than that door.' (VG)

(81) Context: John and Mary are both sick, but John can't get out of bed and Mary is only sneezing.
#Siipxw=t John a[-t]=s Mary
sick=PN John a[-3.II]=PN Mary
intended: 'John is sicker than Mary.' (HH)

How is a comparative reading achieved with these predicates then? As it turns out, Gitksan has an overt degree morpheme *k'aa*, which can give rise to a comparative reading regardless of the scale structure of the co-occurring GA. Adding *k'aa* to (80) and (81) make them acceptable with a comparative reading (82, 83).

(82) Context: As in (80).
K'aa k̲'ak̲=hl aats'ip t=un a[-t]=s=ust
k'aa open=CN door PN=DEM.PROX PREP[-3.II]=PN=DEM.DIST
'This door is more open than that door.' (VG, HH)

(83) Context: As in (81).
K'aa siipxw=t John (a[-t]=s Mary)
k'aa sick=PN John PREP[-3.II]=PN Mary
'John is sicker than Mary.' (VG)[41]

41. HH often additionally requires an alternative-sensitive morpheme *g̲ay* 'instead,' which will be discussed in Section 9. As long as *g̲ay* is present, HH also accepts a version without the standard phrase.

The compatibility with minimum-standard GAs is evidence that *k'aa* is an 'explicit' degree operator akin to *-er* rather than a morpheme that relies on the context-sensitivity of relative GAs to achieve comparison, like *pos* (Kennedy 2007a; see Section 2.3). Consistent with this view, *k'aa* is also compatible with relative GAs (84) and acceptable in crisp judgement contexts (85) (see Section 2.3, 5.6).

(84) Context: Two children, John and Mary, are standing back to back because they want you to decide who is taller of the two. They're both tall for their age, but Mary is slightly taller than John.
K'aa 'wii 'nakw=t Mary (a[-t]=s John)
k'aa big long=PN Mary PREP[-3.II]=PN John
'Mary is taller (than John).' (HH-v.)

(85) Context: John and Bob are both basketball players. John is 7'0" and Bob is 7'1/4". "Tell me about John and Bob's heights."
K'aa 'wii 'nakw=t Bob a[-t]=s John
k'aa big long=PN Bob PREP[-3.II]=PN John
'Bob is taller than John.' (VG, HH)

Regardless of the scale structure of the GA, the standard phrase remains optional in the presence of *k'aa*; this is tested in (83) and (84).

In the descriptive literature, *k'aa* is glossed as 'exceedingly' in Rigsby's (1986) grammar of Gitksan (155). Tarpent's (1987) grammar of a neighbouring language, Nisg̲a'a, glosses *k'aa* as 'most, excessively, extremely' and describes that it contributes meanings of intensification, comparatives, or superlatives (389-391). Indeed, *k'aa* appears in translations of superlatives as well. Just like with comparatives, *k'aa* is obligatory if the GA is minimum-standard (86, 87), and optional if the GA is relative (88).

(86) Context: Everyone in John's family caught a cold, but only John is in bed and the others are just coughing or sneezing.

a. K'aa siipxw=t John ts'im win'naat'ahl-t
k'aa sick=PN John in family-3.II
'John is the sickest in his family.' (VG)[42]

b. #Siipxw=t John ts'im win'naat'ahl-t
sick=PN John in family-3.II
intended: 'John is the sickest in his family.' (VG, HH)

(87) Context: There are three doors, which are all open. You point to the one that is open widest.

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42. Again, as with comparatives (see f.n. 41), HH often additionally requires an alternative-sensitive morpheme *g̲ay* 'instead.'

a. K'aa k̲'ak̲=hl aats'ip t=un
k'aa open=CN door PN=DEM.PROX
'This door is the most open.' (VG)

b. #K̲'ak̲=hl aats'ip t=un
open=CN door PN=DEM.PROX
intended: 'This door is the most open.' (VG, HH)
VG: You got away from comparing.

(88) Context: There are four children, who are almost the same height. Chris is the tallest, though only by a tiny bit.
'Wii 'nakw=t Chris
big long=PN Chris
'Chris is the tallest.' (HH)[43]

Finally, given the descriptions of *k'aa* by Rigsby (1986) and Tarpent (1987) above, it should be tested whether *k'aa* can be used as an intensifier akin to *very*. There seems to be variation on this matter,[44] but *k'aa* by itself is not productively used for intensification. HH rejects *k'aa* in a translation of a sentence with *very* (89).

(89) #K'aa 'wii 'nakw=t Michael
exceedingly big long=PN Michael
intended: 'Michael is very tall.' (HH)

VG accepted (89), but another test for teasing apart superlatives from intensification shows that even for VG, *k'aa* seems to have superlative semantics. Following Hohaus (2015:127-8(239, 241, 243)), visual contexts were set up in which 'very GA' would be true of a given entity but 'the most GA' would be false due to the presence of another entity that instantiates a greater degree. VG rejects *k'aa* in such contexts regardless of whether the cardinality of the potential comparison class is two (90) or more (91).

(90) Context: There are two basketball players, Alex and Bill, who are respectively 6'6" and 6'4" tall.
(#K'aa) 'wii 'nakw=t Bill
k'aa big long=PN Bill
intended: 'Bill is (very) tall.' (VG)

43. Even with relative GAs, there is variability between speakers and contexts as to whether a superlative reading is judged available without *k'aa*. VG requires *k'aa* in the context in (88). I assume that the variation is a pragmatic matter; relevant factors are how easily the comparison class and consequently the standard degree can be determined and the tradeoff between the cost of having an extra structure by using *k'aa* and the unambiguous meaning of comparison provided by that extra structure (see Section 8 for an analysis of *k'aa*).
44. See also Aonuki (2023).

(91) Context: Evan's bag is the second lightest of five bags, weighing 0.5 kg. The other bags weigh, respectively, 0.2 kg, 5 kg, 10 kg, and 11 kg.
(#K'aa) aapxin=hl dihlxw[-t]=s Evan
k'aa light=CN bag[-3.II]=PN Evan
intended: 'Evan's bag is (very) light.'
VG: *It would sort of hint that it's the lightest.* (VG)

Note that in both contexts, positive forms without *k'aa* are accepted. VG's comment in (91) is also in line with a superlative analysis of *k'aa*. Understanding the full distribution of *k'aa* requires further investigation, and it is possible that multiple lexical entries will have to be postulated. I conclude from the available data that there must be at least an entry of *k'aa* with superlative semantics.

8 Analysis of *k'aa* as a superlative morpheme

In Section 7, I demonstrated that *k'aa* can give rise to comparative and superlative readings even when the GA is minimum-standard. I suggested that *k'aa* should be analyzed as a superlative morpheme. My proposal is that in Gitksan, there is no LF distinction between comparatives and superlatives, that is, there is only one LF for a given construction involving *k'aa*, and it is compatible with both contexts in which comparatives and superlatives would be used in English. The only difference between what I have called comparative and superlative 'readings' is the size of the comparison class in the context.

Recall the analysis of GAs proposed in Section 5, where, due to the scale-sensitivity of the STANDARD function, relative GAs (92 repeated from 66) have context-sensitive standards, while minimum-standard GAs (93 repeated from 44) denote context-dependent relations between degrees and individuals.

(92) $[\![\text{'wii 'nakw}_{C_1}]\!]^c = \lambda d\ \lambda x.\ \text{Length}(x) \geq \text{STANDARD}(\text{Length})(g_c(C_1)(x)) + d$

(93) $[\![\underline{k}\text{'a}\underline{k}_{C_1}]\!]^c = \lambda d.\ \lambda x.\ \text{Open}(x) \geq \text{STANDARD}(\text{Open})(g_c(C_1)(x)) + d$

I analyze *k'aa* as a superlative morpheme (94), adapting Heim's (1999) analysis of *-est*. It takes a GA denotation G and returns a function of the same type; the new function takes a degree d and an individual x and returns true iff G holds of d and x and for all non-x individuals in the comparison class $g(C_3)$, G does not hold of d and y.

(94) $[\![\text{k'aa}_{C_{3,et}}]\!]^c = \lambda G_{det}.\ \lambda d.\ \lambda x.\ G(d)(x) \wedge \forall y[(y \in g(C_3) \wedge y \neq x) \rightarrow \neg G(d)(y)]$

One difference from *-est* is that *k'aa* does not existentially close the degree argument d; this is because it is compatible with an MP (95).

(95) K'i'y=hl t'im$\underline{k}$'aax win k'aa 'wii 'nakw=hl ha'niit$\underline{x}$oo$\underline{k}$xw t=un
one=CN arm.span COMP k'aa big long=CN table DEM.PROX
a[-t]=s=ust
PREP[-t]=PN=DEM.DIST
'This table is one armspan longer than that one.' (VG)

To illustrate, (96) in both comparative (82) and superlative (87a) contexts receives the denotation in (97), again assuming the presence of an existential closure operator (53) in the absence of an MP.

(96) K'aa k̲'ak̲=hl aats'ip t=un
k'aa open=CN door PN=DEM.PROX

(97) $[\![(96)]\!]^c = [\![[\text{aats'ip t=un } \exists \text{ k'aa}_{C_3} \text{ k̲'ak̲}_{C_1}]]\!]^c =$
$\exists d[\text{Open}(d)(\text{this door}) \geq \text{STANDARD}(\text{Open})(g_c(C_1)(\text{this door})) + d \wedge$
$\forall y[(y \in g(C_3) \wedge y \neq \text{this door}) \rightarrow \neg[\text{Open}(d)(y) \geq \text{STANDARD}(\text{Open})(g_c(C_1)(\text{this door})) + d]]]$

The resulting interpretation is identical to that of superlatives in English, except that the comparison class $g(C_3)$ can have a cardinality of two, in which case a comparative reading arises.

When the GA is relative, the existentially closed degree argument is the degree of deviation from the contextual standard. For example, (98), repeated from (84), receives the denotation in (99).

(98) Context: Two children, John and Mary, are standing back to back because they want you to decide who is taller of the two. They're both tall for their age, but Mary is slightly taller than John.
K'aa 'wii 'nakw=t Mary (a[-t]=s John)
k'aa big long=PN Mary PREP[-3.II]=PN John
'Mary is taller (than John).' (HH-v.)

(99) $[\![(98)]\!]^c = [\![[\text{Mary } \exists \text{ k'aa}_{C_3} \text{ 'wii 'nakw}_{C_1}]]\!]^c =$
$\exists d[\text{Length}(\text{Mary}) \geq \text{STANDARD}(\text{Length})(g_c(C_1)(\text{Mary})) + d \wedge$
$\forall y[(y \in g(C_3) \wedge y \neq \text{Mary}) \rightarrow \neg[\text{Length}(y) \geq \text{STANDARD}(\text{Length})(g_c(C_1)(\text{Mary})) + d]]]$

(99) is true iff there is a degree d such that Mary exceeds the standard degree of tallness by d, and no other member of the comparison class exceeds the standard degree by d. I assume that the GA and *k'aa* reference the same comparison class, that is, $g_c(C_1)(\text{Mary})$ and $g_c(C_3)$ refer to the same set. Crucially, despite the degree d corresponding to deviation from the standard, *k'aa* constructions are not predicted to have an evaluative interpretation; (99) does not have an inference that Mary is considered tall in general. This is because, in contexts where the superlative morpheme *k'aa* is felicitous, there is always a specific comparison class provided by the context. In (98), the comparison class contains only Mary and John, just like in positive constructions without *k'aa* (see Section 5). As a result, the output of the STANDARD function is John's height. What the sentence ends up asserting is that Mary exceeds John's height by some degree but John himself does not, which is equivalent to Mary being taller than John.

9 The role of alternatives

Before concluding, I will argue that when relative GAs without the superlative morpheme *k'aa* are accepted in comparative contexts (Section 4), one factor that helps narrow down the value of the standard degree is a consideration of alternatives.

For example, in (100) (repeated from 73), even without the standard phrase, the fact that the speaker did not choose to predicate *'wii 'nakw* 'tall' of Lisa in the context in which Michael and Lisa are the only salient individuals gives rise to an inference that the denotation of *'wii 'nakw* 'tall' (101 repeated from 92) must only hold of Michael and not Lisa. Therefore the standard degree $g_c(d_3)$ must be a salient height degree that Michael exceeds but Lisa does not, namely Lisa's height.

(100) Context: "Which is taller, Michael or Lisa?"
'Wii 'nakw=t Michael (a[-t]=s Lisa)
big long=PN Michael PREP[-3.II]=PN Lisa
'Michael is taller (than Lisa).' (VG, HH)

(101) $[\![\text{'wii 'nakw}_{C_1}]\!]^c = \lambda x.\ \lambda d.\ \text{Length}(x) \geq \text{STANDARD}(\text{Length})(g_c(C_1)(x)) + d$

There are two pieces of evidence that alternatives play a role in comparatives in Gitksan. First, translations of both comparatives and superlatives in English optionally involve focus extraction. Gitksan (and the broader Tsimshianic family) has A'-extraction patterns shared by *wh*-questions, relative clauses, and focus marking (Rigsby 1986; Tarpent 1987; Davis and Brown 2011; Forbes 2012, 2018; Aonuki 2022; Brown 2023, 2024a,b). Extraction morphology varies by the syntactic position of an extracted element, and intransitive subject extraction is marked by a suffix *-it*, as illustrated by focus extraction in (102).

(102) Tyler=hl lim-it
Tyler=CN sing-SX
'It was Tyler who sang.' (Davis and Brown 2011:52(16))

This A'-extraction aids comparative and superlative readings for VG (103). For example, while (103a) is rejected, extracting *Mary* in the second clause brings out the intended comparative reading (103b).

(103) Context: Two children, John and Mary, are standing back to back because they want you to decide who is taller of the two. They're both tall for their age, but Mary is slightly taller than John.

a. #Hi'niiluxw 'nisi'm ii 'wii 'nakw[-t]=s Mary.
tall.PL 2PL.III CCNJ big long[-3.II]=PN Mary
intended: You are both tall, but Mary is taller.' (VG, HH)

b. Hi'niiluxw 'nisi'm ii=t Mary 'wii 'nagw-it
tall.PL 2PL.III CCNJ=PN Mary big long-SX
'You are both tall, but Mary is taller.' (VG, ?HH[45])

Similarly, while the positive form in (104a) was rejected with an intended superlative reading, VG repaired it by extracting the associate of comparison (104b).

(104) Context: discussing mountains in the world.

a. #'Wii gepxs[=t] sg̲a'nist Everest
big high[=PN] mountain Everest
intended: 'Mt. Everest is the highest.' (VG)

b. Sg̲a'nist Everest[=hl] 'wii gepxs-it
mountain Everest[=CN] big high-SX
'Mt. Everest is the highest.' (VG-v.)

That comparative and superlative readings aided by focus extraction in (103b) and (104b) are due to the context-sensitivity of relative GAs rather than, say, a covert comparative or superlative operator, is supported by the unavailability of such readings when focus extraction is applied to analogous sentences with minimum-standard GAs (105-106).

(105) Context: There are only two doors, both of which are open. "Which door is more open?"
#Aats'ip t=un=hl k̲'ag̲-at
door PN=DEM.PROX=CN open-SX
intended: 'This door is more open.' (HH)

(106) Context: There are many branches, all of which are bent. "Which branch is the most bent?"
#Anist t=un=hl hlag-it
branch PN=DEM.PROX=CN bent-SX
intended: 'This branch is the most bent.' (VG)

Second, translations of comparatives and superlatives in English are often volunteered with a morpheme *g̲ay* 'instead.' Its uses outside of degree constructions (107) show that *g̲ay* can associate with any lexical element in the sentence and signal that there is a salient alternative to the referent of the associate that makes the proposition false.[46]

(107) a. Context: "Did Mary make fried bread?"
Nee. G̲ay jab-i-t=hl ixsda-m anaax.
no. instead make-TR-3.II=CN sweet-ATTR bread
'No, she made a cake instead.' (HH-v.)

45. HH remarks, "You need a pause between *'nis'im* and *ii=t*. That'll work in a conversation discussing who's taller but you need a pause."
46. In (107b), the prejacent is additionally A'-extracted, as evidenced by the agent extraction morpheme *an* (Rigsby 1986; Davis and Brown 2011).

b. Context: John was supposed to make a cake, but he was too busy, so Mary made it instead.
Gay=t Mary an=t jap[-t]=hl ixsda-m anaax
instead=PN Mary AX=3.I make[-3.II]=CN sweet-ATTR bread
'Mary made a cake instead.' (VG-v.)

Evidence that *gay* 'instead' is not a degree operator again comes from scale-structure differences. When the GA is relative (108, 109), both forms with and without *k'aa* are volunteered in the presence of *gay*.[47]

(108) Context: Anne is 3'1". Mary is 3'.
Gay (k'aa) 'wii 'nakw=t Anne a[-t]=s Mary
instead k'aa big long=PN Anne PREP[-3.II]=PN Mary
'Anne is taller than Mary.' (VG-v.)

(109) Context: discussing mountains in the world.
Gay (k'aa) 'wii t'is=hl Mount Everest.
instead k'aa big large=CN Mount Everest
'Mt. Everest is the tallest.' (HH-v.)

Similar to extraction, *gay* 'instead' seems to help bring out the meaning of comparison. Adding *gay* to the rejected example in (103a) improves acceptability for HH (110).

(110) Context: As in (103).
Hi'niiluxw 'nisi'm ii gay 'wii nakw[-t]=s Mary.
tall.PL 2PL.III CCNJ instead big long[-3.II]=PN Mary
'You are both tall, but Mary is taller.' (HH)

On the other hand, when the GA is minimum-standard, the superlative morpheme *k'aa* is obligatory, and *gay* alone is not sufficient in either comparative (111) or superlative (112) contexts.

(111) Context: John and Mary are both sick, but John can't get out of bed and Mary is only sneezing.
Gay #(k'aa) siipxw=t John a[-t]=s Mary
instead k'aa sick=PN John PREP[-3.II]=PN Mary
'John is sicker than Mary.' (VG, HH)

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47. A reviewer asks if there is any relation between *gay* 'instead' and a standard phrase. A standard phrase, or more broadly, a frame setter (see Section 5.4), continues to be acceptable but optional in the presence of gay. An example of a frame-setter co-occurring with *gay* in a sentence with a superlative interpretation is given in (i). A comparative counterpart is seen in (111). My proposal for the semantic contribution of frame-setters in Section 5.4 extend to these examples.

(i) Gay k'aa 'wii 'nakw=t Mary a=hl galts'ap
instead k'aa big long=PN Mary PREP=CN village
'Mary is the tallest in the village.'

(112) Context: There are three doors, all of which are open. "Which door is the most open?"
Gay #(k'aa) k'ak=hl aats'ip t=un
instead k'aa open=CN door PN=DEM.PROX
'This door is the most open.' (VG, HH)

In this section, I have argued that what helps narrow down the value of the standard degree and give rise to comparative and superlative readings without *k'aa* is a consideration of alternatives in the comparison class. Two empirical facts in support of this view are optional uses of focus extraction and an alternative-sensitive particle *gay*. In the absence of an overt superlative morpheme *k'aa*, both strategies are only available for relative GAs and not minimum-standard GAs. The incompatibility with minimum-standard GAs shows that the relative GA counterparts do not include a covert comparative operator akin to *-er* and that instead, the comparative and superlative readings are due to the context-sensitivity of relative GAs.

The observation that consideration of alternatives helps narrow down the context-sensitive standard of a relative GA and gives rise to comparative readings is not new. Bochnak (2013) reports that cleft constructions involving relative GAs in Luganda receive comparative interpretations (113).

(113) Kizito ye mu-kulu.
Kizito NC1-CLEFT NC1-old
'Kizito is older (than other people/things in a context).'
lit.: 'Kizito is the one who is old.' (Bochnak 2013:95(38))

In English, definite descriptions have been reported to be able to shift which entities satisfy a given relative GA (Kyburg and Morreau 2000). For example, Syrett et al. (2004) provide experimental results showing that, in a context with two entities, even if neither of them is independently considered [GA], a request like *Please give me the [GA] one* successfully solicits the [GA]-er of the two objects if the GA is relative, such as *big* and *long*. As Syrett et al. (2004) argue, shifting of the standard so that one and only one of the two objects satisfies a relative GA is driven by the existence and uniqueness presuppositions of the definite article. Gitksan thus adds to the cross-linguistic evidence that consideration of alternatives helps determine or shift the standard degree of relative GAs.

10 Discussion

I have argued that GAs in Gitksan have inherently context-sensitive denotations, as illustrated by the denotation of *'wii 'nakw* 'tall' in (114 repeated from 101).

(114) $[\![\text{'wii 'nakw}_{C_1}]\!]^c = \lambda d.\ \lambda x.\ \text{Length}(x) \geq \textsc{standard}(\text{Length})(g_c(C_1)(x)) + d$

A theoretical implication of this proposal for degree semantics cross-linguistically is that inherent context-sensitivity of GA denotations is not an exclusive property of languages without degrees. Following Bochnak et al. (2020), I will refer to languages

that have been argued to lack degrees as a semantic primitive (Beck et al. 2009; Bochnak 2013, 2015; Bowler 2016; Deal and Hohaus 2019)[48] as 'degreeless,' and those that have been analyzed with degrees as 'degreeful.' Prior to Oda's (2008) proposal for inherently context-sensitive GA denotations for Japanese (though see the issues raised for Japanese later in this section), the state of the literature was such that inherent context sensitivity was a feature of a degreeless language (Klein 1980, 1982, 1991). GA denotations in degreeful languages were necessarily context-independent, with context dependency contributed by additional (covert) morphemes or derived as an implicature (Bartsch 1975; Cresswell 1976; von Stechow 1984; Kennedy 1999; Rett 2007, 2008).

However, the typological picture resulting from this paper is that inherent context sensitivity is a point of cross-linguistic variation among degreeful languages (Table 1).

	Context-dependent GA denotations	Context-independent GA denotations
Degreeless	Washo, Nez Perce, Walpiri	NA
Degreeful	Gitksan	English, Bulgarian[49]

Table 1 Typological picture of context dependency and degreefulness

The prediction of the degreeful and inherently context-sensitive denotation in (114) is that positive constructions, that is, constructions without an overt comparative or superlative operator, should exhibit a mix of the properties that are traditionally associated with explicit and implicit comparatives (Kennedy 2007a). First, assuming that the context is rich enough to narrow down the comparison class $g_c(C_1)(x)$ to a set consisting only of x and another individual that serves as the standard of comparison, the denotation in (114) predicts that there should be a comparative reading available without an overt comparative morpheme or an overt standard when the GA is relative. Such readings should be felicitous in crisp judgement contexts, given that the GA denotation does not require the degree argument to stand out from the contextual standard, unlike *pos* (Graff 2000; Kennedy 2007a,b, 2011). Second, unlike implicit comparatives in both degreeful and degreeless languages, comparatives formed with a GA like (114) should be compatible with an MP, and the resulting interpretation should be differential, given that the degree argument of (114) corresponds to the gap between the associate's degree and the standard degree. Third, if a comparative reading available with a relative GA like (114) is indeed due to the GA's context-sensitivity rather than a covert comparative operator, an analogous construction involving a minimum-standard GA should not be able to receive a comparative interpretation. In summary, inherently context-sensitive denotations of GAs like (114) predict the existence of a comparative strategy that is compatible with relative GAs even in crisp judgement contexts and can host a differential MP but is nevertheless incompatible with minimum-standard GAs.

This is exactly what we saw in Gitksan. Table 2 shows properties of the two constructions that can receive comparative interpretations in Gitksan, namely positive

48. Though see Bochnak et al. (2020) for arguments against the binary view of whether languages have degrees or not.
49. This cell lists some of the languages reported to allow absolute readings of MPs occurring with a relative GA in Beck et al. (2009).

constructions and constructions with an explicit superlative operator *k'aa* (see Section 8), along with the properties of canonical implicit and explicit comparatives. While *k'aa* constructions align with canonical explicit comparatives, positive constructions show mixed properties of implicit and explicit comparatives.

	Crisp judgement	MP	Minimum-standard GA
Gitksan: Positive construction	✓	✓	✗
Gitksan: *K'aa* construction	✓	✓	✓
Implicit comparatives	✗	✗	✗
Explicit comparatives	✓	✓	✓

Table 2 Empirical properties of comparatives

How about Japanese? Japanese has motivated the original proposal that a degreeful language can have inherently context-sensitive GA denotations (Oda 2008).[50] We have already seen that relative GAs can directly combine with MPs without an overt standard, and the resulting MP interpretation is differential (115 repeated from 77).

(115) Context: *The height of the maple tree is 7 m, and...*
matsu-no ki-wa 8 m takai
this tree-TOP 8 m tall
'The pine tree is 8 m taller.'

Can a relative GA receive a comparative interpretation without an MP? The answer likely varies by dialect, but it is not as widely or easily available as the inherent context-sensitive approach to GAs predicts. At least in my own judgements in the Tokyo dialect, (116) does not have the intended comparative reading and rather sounds contradictory to the preceding sentence.[51]

(116) Context: There are a pine tree and a maple tree, and both are quite short, but...
matsu-no ki-ga takai
pine-GEN tree-NOM tall
intended: 'The pine tree is taller.'

In contrast, recall that an analogous example in Gitksan was even volunteered as a translation of a comparative (the second clause of 117, repeated from 55).

(117) Hi'niiluxw dip Lisa gan[-t]=s Michael, ii dulpxw[-t]=s Lisa.
tall.PL ASSOC Lisa PCNJ[-3.II]=PN Michael CCNJ short[-3.II]=PN Lisa
'Lisa and Michael are both tall, but/and Lisa is shorter.' (VG-v.)

Adding an alternative-sensitive particle *hoo* to (116) can bring out a comparative reading (118).[52]

50. I have also argued elsewhere that inherently context-sensitive GA denotations account for a wider distribution of evaluativity inferences observed in the language (Aonuki 2024c).
51. Shiori Ikawa (p.c.) reports that it is felicitous for her (see also Hayashishita 2007:95 for somewhat similar observations).
52. According to Kubota and Matsui (2010) and Matsui and Kubota (2012), who investigate occurrences of *hoo* in comparatives with an overt standard, *hoo* encodes a presupposition that its argument belongs to a set of alternatives with a cardinality of two.

(118) Context: *There are a pine tree and a maple tree, and both are quite short, but...*
matsu-no ki-no hoo-ga takai
pine-GEN tree-GEN hoo-NOM tall
'The pine tree is taller.'

Given the contrast between (116) and (118) alone, it is conceivable that the GA *takai* 'tall' is inherently context-sensitive, and the comparative reading in (118) arises from the reasoning triggered by the alternative-sensitivity of *hoo* that *takai* is not true of the other entity, the maple tree (see Section 9).

However, crucially, a parallel construction with a minimum-standard predicate[53]can also receive a comparative interpretation (119a), although it is ambiguous with the reading in which only one entity satisfies the GA (119b).

(119) Migi-no poster-no hoo-ga katamui-tei-ru
right-GEN poster-GEN hoo-NOM tilt-tei-NPST
'The poster on the right is more tilted.' OR
'The poster on the right is tilted (and the other is not).'

a. Context: There are two posters side by side, and both are tilted to some extent.

b. Context: There are two posters side by side, and only the one on the right is tilted.

To the extent that (119a) is acceptable with a comparative reading, the possibility that there is a covert comparative morpheme akin to *-er* in (118) cannot be completely ruled out.

There are comparative constructions that are incompatible with minimum-standard GAs in Japanese (Sawada 2009; Pearson 2013), which involve a conditional antecedent 'if compared to x.'

(120) Ziro-ni kurabe-{tara, ru-to} Taro-wa se-ga takai
Ziro-DAT compare-{COND, NPST-COND} Taro-TOP height-NOM tall
'Compared to Ziro, Taro is tall.' (Sawada 2009:1082(9))

However, as Sawada (2009) demonstrates, they pattern with canonical implicit comparatives (Kennedy 2007a): they are also incompatible with MPs and crisp judgement contexts (see Section 2.3). The existence of canonical implicit comparatives cannot be predicted by the existing proposals for inherently context-sensitive denotations of GAs in Japanese (Oda 2008; Aonuki 2024c) nor by applying the current proposal for Gitksan to Japanese, at least without additional mechanisms.[54]

(i) $[\![\text{hoo}_C]\!]^c = \lambda x\text{: } x \in g_c(C) \ \&\ |g_c(C)|=2.\ x$ (adapted from Kubota and Matsui 2010:69(21))

53. As discussed in the previous literature (Oda 2008; Sawada and Grano 2011; Oshima et al. 2019), even though minimum-standard predicates in Japanese are often treated as adjectives on par with relative GAs, it is morphologically transparent that most of these predicates are verbal predicates constructed with an aspectual marker *-tei-* (Kindaichi 1950; Ogihara 1998) and take the form of non-past tense for verbal predicates. I argue for a compositional analysis of these predicates elsewhere (Aonuki 2024a), but I will set aside this issue here. For the current purpose, what is crucial is that these predicates are context-independent on their own, regardless of their morphological makeup and whether or not they are lexically equipped with degrees.

54. I am grateful for an anonymous reviewer for encouraging me to consider this point.

Finally, the approach of assigning inherently context-sensitive denotations to GAs has been applied to English as well, in an attempt to account for distribution of evaluativity inferences (Breakstone 2012) and as an alternative to postulating *pos* (Cariani et al. 2023, 2024; Wellwood 2014). The potential for over-generating comparative readings in the English counterparts of positive constructions like (116) seems to be a shared issue that should be addressed in these analyses as well.[55]

11 Conclusion

This paper demonstrated that, in Gitksan, Measure Phrases (MPs) can co-occur with relative gradable adjectives (GAs) without a comparative morpheme and consistently receive differential interpretations, while minimum-standard GAs give rise to absolute interpretations of MPs. The former has only been observed in Japanese and Korean to my knowledge.[56] Unlike in Japanese, the distinction between relative and minimum-standard GAs obtains even in the absence of MPs, that is, relative GAs can receive comparative and superlative interpretations without an overt comparative morpheme, while minimum-standard GAs cannot. I argued that these two scale-sensitive phenomena receive a unified explanation in an approach that assigns inherently context-sensitive denotations to GAs, initially developed for Japanese by Oda (2008) and later adopted for English by a minority of analyses (Breakstone 2012; Cariani et al. 2023, 2024; Wellwood 2024). I proposed inherently context-sensitive denotations of GAs in Gitksan, which builds on Oda (2008) and makes explicit predictions about when comparative readings as opposed to positive readings arise.

I also revisited Japanese and observed that unlike in Gitksan, the possibility of an alternative analysis, namely that there is a covert *-er* in Japanese, cannot be completely ruled out. Gitksan shows what a language with inherently context-sensitive GAs would look like empirically. To the extent that the current analysis of Gitksan is successful, it raises a question of why other languages that have received similar analyses exhibit only a subset of the empirical properties predicted by inherent context-sensitivity.

The latter half of the paper investigated the semantics of an overt degree morpheme *k'aa* and argued for its analysis as a superlative morpheme. I also argued that in achieving comparative and superlative readings without *k'aa*, consideration of alternatives to the subject plays a role, as also observed in other languages (Kyburg and Morreau 2000; Syrett et al. 2004; Bochnak 2013).

Finally, the MP interpretation data in Gitksan are also significant from the typological perspective. The existence of typologically unrelated languages showing the same pattern suggests the possibility that the rarity of the pattern is an accidental gap rather than actual typological rarity. Nevertheless, there are claims that GAs being able to combine with MPs without a degree operator is an exception rather than the norm (Schwarzschild 2005). Questions remain as to whether the patterns of

55. The implementation in Cariani et al. (2023, 2024) and Wellwood (2024) follows the framework that treats GAs as predicates of states (Wellwood 2014, 2019), but the same issue is present.
56. Though for Korean, see f.n. 4.

differential MP interpretations shared by Gitksan and Japanese are indeed typologically rare, and if so, why. The former can only be addressed by further cross-linguistic investigations.

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