Differential measure phrases with implicit comparatives in Gitksan [*]

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Abstract In most of the literature on degree semantics, whether gradable adjectives (GAs) receive context-independent or -dependent denotations has been a correlate of whether a language is analyzed as having degrees as semantic primitives (Bartsch & Vennemann 1972; Cresswell 1976; von Stechow 1984; Kennedy 1999) or not (Klein 1980, 1982, 1991). A third logical possibility is to postulate degree-based yet context-dependent denotations of gradable adjectives (Beck, Oda & Sugisaki 2004, Oda 2008 on Japanese; Breakstone 2012, Cariani, Santorio & Wellwood 2023 on English; see also Cariani, Santorio & Wellwood 2024 and Wellwood 2024). I argue that this third option predicts (i) availability of readings of implicit comparison (in Kennedy's (2007a) sense) in positive constructions. Some implementations of this approach (Beck et al. 2004; Oda 2008; Breakstone 2012) also predict (ii) compatibility of measure phrases with implicit comparatives. While they are wrong predictions for English, I demonstrate that Gitksan (Tsimshianic) exhibits both (i) and (ii), providing support for the idea that degree-based GA denotations can be inherently context-dependent. Being the first systematic description and formal analysis of degree semantics in the Tsimshianic language family, this paper also demonstrates that Gitksan lacks a semantic distinction between comparatives and superlatives, and analyzes a morpheme that gives rise to both readings, *k'aa*, as a superlative morpheme.

Keywords: degree, measure phrases, comparatives, superlatives, Gitksan, Tsimshianic

1 Introduction

Most analyses of languages that are argued have degrees as semantic primitives, including English, assign context-independent denotations to gradable adjectives (GAs) (e.g., Bartsch & Vennemann 1972; Cresswell 1976; von Stechow 1984; Kennedy 1999). Proposals for context-sensitive denotations of GAs tend to be

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found in analyses that do not involve degrees in GA denotations (Klein 1980, 1982, 1991; Bochnak 2013, 2015; Bowler 2016; Pearson 2010; Deal & Hohaus 2019). A third logical possibility is to postulate degree-based yet context-dependent GA denotations (Beck et al. 2004; Oda 2008; Breakstone 2012; Cariani et al. 2023; see also Cariani et al. 2024; Wellwood 2024). Examining predictions of degree-based and inherently context-sensitive GA denotations, I will point out that (i) such denotations over-generate readings of 'implicit comparison' (Kennedy 2007a) in positive constructions in English and that (ii) depending on the framework, measure phrases (MPs) are predicted to be compatible with implicit comparison. I then demonstrate that both are exactly the right predictions for Gitksan.

A preview of the relevant data is in (1-2). First, a positive construction can receive a comparative reading, even without an optional standard phrase (1).[12]

(1) Context: Looking at Anne and Ben. They are almost the same height, but Anne is a bit taller.
'Wii 'nakw=t Anne (a[-t]=s Ben)
big long=PN Anne (PREP[-3.II]=PN Ben)
'Anne is taller (than Ben).' (HH-v.)

Second, MPs are consistently compatible with implicit comparison, and they receive differential interpretations (2), that is, the MP in (2) measures the difference between the length of 'this table' and, for example, that of another table in the context. This is similar to Japanese (Snyder, Wexler & Das 1995; Beck et al. 2004; Oda 2008; Beck, Krasikova, Fleischer, Gergel, Hofstetter, Savelsberg, Vanderelst & Villalta 2009; Hayashishita 2009; Kubota 2011; Sawada & Grano 2011; Watanabe 2013; Aonuki 2024b) and Korean (Beck et al. 2004).

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1 Parentheses on the right of examples provide speaker initials, where "-v." indicates that the sentence was volunteered by the speaker as opposed to being evaluated for acceptability.
Glosses mostly follow conventions in Rigsby (1986). ASSOC: associative; CCNJ: clausal conjunction; CN: common noun connective; COMP: complementizer; DEM.DIST: distal demonstrative; DEM.PROX: proximal demonstrative; PCNJ: phrasal conjunction; PN: proper noun connective; PREP: preposition; SX: subject extraction; TR: transitive; WH: general purpose *wh*-word; I: series I clitic; II: series II suffix; III series III independent pronouns, =: clitic.

2 In (1), readers may suspect that the combination of the two predicates, *'wii* 'big' and *'nakw* 'long', may have an effect of intensification. That does not seem to be the case. 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 'He's long.'

(2) K'i'y=hl   t'im k'aax   win   'wii 'nakw[-t]=hl   ha'niit<u>x</u>oo<u>k</u>xw
     one=CN   whole arm   COMP   big   long[-3.II]=CN   table

       t=un
       PN=DEM.PROX   (VG)
     'This table is one fathom longer (than another one).' *'..one fathom long.'

I start by reviewing the existing analyses involving degreeless and context-dependent GA denotations (Section 2.1) and degree-based and context-independent GA denotations (Sec. 2.2), including their consequences for implicit and explicit strategies of comparison (Kennedy 2007a). I introduce the third option of degree-based yet inherently context-dependent GAs, which have been applied to Japanese (Beck et al. 2004, Oda 2008) and English (Breakstone 2012, Cariani et al. 2023; see also Cariani et al. 2024; Wellwood 2024), and point out the above mentioned issues of over-generation in English (Sec. 2.3). I then provide data on implicit comparatives in Gitksan (Sec. 3), pointing out the role of alternatives (Sec. 3.2.1), and compare their semantic properties with implicit comparatives in other languages (Sec. 3.2.2). After discussing MP interpretations (Sec. 3.3) and lack of a semantic distinction between comparatives and superlatives (Sec. 3.4, 3.5), I provide an analysis of the Gitksan facts based on Beck et al.'s and Oda's proposals for Japanese (Sec. 4). Section 5 concludes.

2 Background

One major decision point in an analysis of degree constructions in a given language is whether or not the language has degrees as semantic primitives, so much so that Beck et al. (2009) treat this variation with a binary parameter, *Degree Semantics Parameter* (DSP).[3] In contrast, the choice of whether or not denotations of GAs are inherently context-dependent tends to be a mere correlate of whether a given language is degreeful. Traditionally, degreeless analyses assign context-dependent denotations to GAs (Klein 1980, 1982, 1991), while degreeful analyses postulate context-independent GA denotations (Bartsch & Vennemann 1972; Cresswell 1976; von Stechow 1984; Kennedy 1999). In this section, I review these two approaches as well as strategies of comparison predicted by these approaches. I then introduce proposals for a third logical possibility, degreeful yet inherently context-sensitive

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3 Though see Bochnak, Bowler, Hanink & Koontz-Garboden (2020) for arguments against such a binary view. Following Bochnak et al. (2020), for convenience, I use the terms *degreeful* and *degreeless*. Degreeful languages are those that would receive degree-based analyses (i.e., +DSP in Beck et al.'s terms), while degreeless languages are those that would be analyzed without postulating degrees as primitives (i.e., −DSP in Beck et al.'s terms). In addition to these descriptive uses, I occasionally use *degreeful* and *degreeless* to refer to analyses that postulate degrees and those that do not, respectively.

GA denotations (Beck et al. 2004; Oda 2008; Breakstone 2012; Cariani et al. 2023), and discuss their predictions.

2.1 Degreeless and context-dependent GAs

An analysis of degree constructions that do not postulate degrees as semantic primitives is developed by Klein (1980, 1982, 1991), who treats GAs as context-sensitive predicates. For example, *tall* is a function that maps an entity x to true iff x counts as tall given the comparison class $\mathscr{U}(c)$ in a context c.[4]

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

Comparatives depend on the inherent context-sensitivity of GAs. In Klein's implementation, a comparative sentence in (4a) is true iff the comparison class can be partitioned in a way that Mary belongs to the positive extension of *tall* and John does not.

(4)   a.   Mary is taller than John.

    b. $[\![(4a)]\!]^{g,c} = \exists X[X \subseteq \mathscr{U}(c)$ & Mary is tall with respect to X & John is not tall with respect to X]   (based on Klein 1980:19(29))

This context-dependent strategy of comparison is termed *implicit comparison* (5a) in Kennedy (2007a) and contrasts with *explicit comparison* (5b), which requires degrees.

(5)   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*.

                     (Kennedy 2007a:16(45))

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

While most subsequent works on English postulate degrees as primitives (e.g., von Stechow 1984; Kennedy 1999; Heim 2000), the degreeless approach has been adopted for languages such as Motu (Beck et al. 2009), Fijian (Pearson 2010; cf. Hanink 2020), Washo (Bochnak 2013, 2015), Walpiri (Bowler 2016), and Nez

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4 I have simplified Klein's original denotation to set aside the 'extension gap', or the set of entities that are neither definitely tall nor definitely not tall.

Perce (Deal & Hohaus 2019).

2.2 Degreeful and context-independent GAs

Unlike Klein's delineation approach, in most analyses that take degrees to be semantic primitives, GAs receive context-independent denotations (6) (Bartsch & Vennemann 1972; Cresswell 1976; von Stechow 1984; Kennedy 1999).[5]

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

To account for the context-sensitivity of positive constructions, a covert degree operator is postulated, often referred to as *pos* (7).[6] (7) takes the denotation of a GA, G, and returns a predicate of individuals x such that there is a degree d that is "significantly greater than" (Graff 2000:74) the standard degree of G in the context c, and G(d) is true of x.[7]

(7) $[\![\text{pos}]\!]^c = \lambda G_{det}.\ \lambda x.\ \exists d[d \succ_! \text{STANDARD}(G)(c)\ \&\ G(d)(x)]$

Unlike Klein's analysis, under the degreeful approach, the comparative in (4a) is an instance of explicit comparison (5b), where the degree operator *-er* compares the tallness degrees of Mary and John.

2.2.1 Implicit comparison and *pos* in English

Kennedy (2007a) states that every language has implicit comparison, providing *compared to* constructions as an example of implicit comparison in English.

(8) Compared to Lee, Kim is tall. (Kennedy 2007a:(48a))

Kennedy (2007a, 2011) argues that a *compared to* phrase narrows down the domain of contextually salient individuals, or the comparison class, to include only the associate and standard of comparison (9).

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5 The denotation in (6) takes GAs to denote a relation between degrees and individuals, of type $\langle d, et \rangle$ (Heim 2000). An alternative view is to treat GAs as measure functions of type $\langle e, d \rangle$ (Kennedy 1999). The current discussion of context (in)sensitivity is independent of the choice between the two frameworks.

6 See Rett (2007, 2008) for an alternative account that postulates EVAL rather than *pos* to account for evaluativity inferences in a wider set of degree constructions including positive forms, and Rett (2014) for an account that abandons EVAL and analyzes evaluativity as an implicature.

7 The denotation in (7) follows Kennedy & McNally (2005:350(13)) in using relational denotations of GAs and follows Kennedy (2011) in adopting the "significantly greater than" notation $\succ_!$ from Graff (2000).

(9) $[\![$compared to y$]\!]$($[\![$A$]\!]$) is true of x in a context c iff $[\![$A$]\!]$ is true of x in any context c′ just like c except that the domain includes just x and y.

(Kennedy 2007a:17(49))

Compared to constructions involve *pos* (Kennedy 2007a, 2011; Hohaus 2015), so putting everything together, (8) would receive the denotation in (10).

(10) $[\![(8)]\!]^c = [\![$[compared to Lee] Kim pos tall$]\!]^c$
      $= \exists d[d \succ_! \text{STANDARD}([\![\text{tall}]\!]^{c'})(c') \text{ & } \text{Tall}(\text{Kim}) \geq d]$
      where c′ is just like c except that the domain includes just Kim and Lee

If the contribution of *compared to* was merely narrowing down of the comparison class, we might expect that similarly narrowing down the comparison class via the visual context or previous utterances would make readings of implicit comparison available for positive constructions without *compared to*. However, this is a wrong prediction for English. In (11), even with the comparison class narrowed down linguistically and the intended standard degree specified by an MP, the positive construction cannot receive a comparative reading.[89]

(11)   *There are a red tower and a blue tower, and the blue tower is 10 m tall.* The red tower is tall.

This suggests that a *compared to* phrase does not merely narrow down the comparison class but forces comparison between two entities.[10]

Presence of *pos* in *compared to* constructions makes three correct predictions for English. First, implicit comparison is incompatible with MPs (13).

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

Formally, this is because an MP manipulates the degree argument of a GA, and so does *pos* (7), meaning that they cannot co-occur. By the same logic, in a version of

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8 Italicization in numbered examples indicates a prior utterance that is provided to set up the linguistic context and not a target of my analysis.

9 An exhaustive implicature that the blue tower is not tall may give rise to an inference of comparison. However, that is different from at least some instances of implicit comparison in that it would have an additional evaluativity inference that the red tower is tall in general.

10 An alternative account of a *compared to* phrase that does not over-generate implicit comparison readings in positive constructions without such a phrase is proposed by Hohaus (2015). Hohaus (2015) uses situation semantics and analyzes that *compared to x*, combined with a covert FRAME operator (12), adds a presupposition that a situation argument s is the minimal situation in which there are some entity y and some dimension μ such that y measures no less than x by μ.

(12) $[\![\text{FRAME compared to Lee}]\!] = \lambda q_{st}.\ \lambda s: \text{MIN}(\lambda s.\ \exists y,\mu[\mu(s)(y) \geq \mu(s)(\text{Lee})])(s).\ q(s)$
      where MIN:= $\lambda p_{st}.\ \lambda s.\ p(s) \text{ & } \neg\exists s'[s' \prec s \text{ & } p(s')]$

(based on Hohaus 2015:64(119),68(129)(130))

(13) without the *compared to* phrase (14), the sentence is context-independent due to the absence of *pos*, with *10 cm* corresponding to Kim's absolute height.

(14) #Kim is 10 cm tall.

Finally, *compared to* constructions are incompatible with "crisp judgment" contexts (Kennedy 2007a), where the two entities only differ minimally with respect to the relevant dimension (15).

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

Formally, this is due to the requirement of *pos* (7) that the degree of the associate of comparison must be 'significantly greater than' (Graff 2000; Kennedy 2011) the contextual standard.

2.3   Third option: Degreeful and context-dependent GAs

There are proposals that GAs in English should receive degreeful yet inherently context-sensitive denotations (Breakstone 2012; Cariani et al. 2023).[11] Both Breakstone (2012) and Cariani et al. (2023) (see also Cariani et al. 2024; Wellwood 2024) seem to predict readings of implicit comparison to be available in positive constructions without a special comparison-inducing phrase like *compared to*.

Breakstone's (2012) denotation of *tall* is a relation between degrees d and individuals x (see 6), with an additional component that d is greater than the contextual standard, $standard_c$.

(16) $[\![tall]\!]^c = \lambda d.\ \lambda x.\ Height(x) \geq d\ \&\ d > standard_c$

(Breakstone 2012:116(13a))

While $standard_c$ seems to correspond to a vague contextual standard by default, Breakstone (2012) proposes a covert morpheme SSM (17) to cancel evaluativity arising from (16) in some contexts. Application of SSM is unrestricted unless it would lead to trivial truth or contradiction.

(17) $[\![SSM_d\ Adj]\!]^c = [\![Adj]\!]^{c_d}$ where context $c_d \equiv c$, except that
  $standard_{c_d}(Adj) = d$: a salient degree   (Breakstone 2012:121(28))

His assumption seems to be that the 'salient degree' that replaces a vague contextual standard is either the absolute zero degree or the relevant degree of the entity in the *than* phrase, such as the height of Mary in *John is shorter than Mary*. However, it is hard to come up with a precise definition of a salient degree such that

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11 Breakstone (2012) argues for such an analysis in order to account for evaluativity and MP (in)compatibility of relative GAs, while Cariani et al.'s motivation is to address theoretical and empirical problems with *pos*. See the respective papers for detailed discussions.

it includes the above two cases and not the height of the blue tower in (11). The denotation of (11) with SSM replacing standard$_c$ with the height of the blue tower is provided in (19).[12]

(19) $[\![(11)]\!]^{g,c} = [\![$the red tower $\exists_{degree}$ SSM$_d$ tall$]\!]^{g,c} = \exists$d[Height(the red tower) $\geq$ d & d > Height(the blue tower)]

Moreover, with GAs being inherently context-sensitive, there is no *pos* in this framework. Therefore, Breakstone would predict that an MP should be able to occur in a positive construction in which an SSM contributes a salient degree, with or without *compared to*. For example, in (20a), if SSM replaces standard$_c$ with Lee's height, that would result in a differential MP reading in which 1 inch corresponds to the difference between Kim's and Lee's heights (20b).[13]

(20)   a.   *Lee is 5 ft tall.* Kim is 1 inch tall.

         b. $[\![(20a)]\!]^{g,c} = [\![$1 inch 4 Kim t$_4$ SSM$_d$ tall$]\!]^{g,c} = [\![$1 inch$]\!]^{g,c}(\lambda$d. Height(Kim) $\geq$ d & d > Height(Lee))

In summary, when there is a linguistically contributed salient degree to serve as the standard, SSM seems to over-generate readings of implicit comparison in positive sentences and further predict that such implicit comparison readings are compatible with MPs, contrary to the empirical facts.

Cariani et al. (2024, 2023) and Wellwood (2024) implement the idea of inherent context-sensitivity in English in a framework that treats GAs as predicates of mereologically ordered states (Wellwood 2015, 2019). For example, *tall* (21a) is a predicate of states s such that s is ordered equal to or higher than the threshold state in the context C, **contrast$_C$(tallness)**.[14]

(21)   a. $[\![$tall$]\!]^{g,C} = \lambda$s: s $\in$ Dom($\langle$D$_{height}, \gtrsim \rangle$). **tallness$_C$**(s)

         b.   **g-ness$_C$**(s) is true iff s $\gtrsim_{g\text{-}ness}$ **contrast$_C$(g-ness)**

(adapted from Cariani et al. 2024:12(30))

In the absence of a mechanism to rule out a possibility that the threshold state

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12 Breakstone (2012) assumes that an operator (18) existentially closes the degree argument of the GA in the absence of an MP.

(18) $\exists_{degree}(P_{det}) := \lambda$x. $\exists$d[P(d)(x)]   (Breakstone 2012:117(16a))

13 Breakstone (2012) analyzes MPs as generalized quantifiers over degrees that undergo QR.

14 Despite the absence of degrees in GA denotations, I discuss Cariani et al.'s and Wellwood's accounts in this section because 1) they are applied to an *empirically* degreeful language, English and 2) Cariani et al. (2023) demonstrate that their analysis can be implemented in the degree-based framework as well, showing that the idea of inherent context-sensitivity is independent from whether one takes degree-based or state-based approaches (Paolo Santorio, p.c.), at least for degreeful languages.

corresponds to a height state held by a particular individual, this account also seems to predict implicit comparison to be possible in (11), with the state **contrast**$_C$(**tallness**) corresponding to the height state of the blue tower.[15]

2.3.1 Beck et al. (2004) and Oda (2008)

The first proposal for inherently context-dependent and degreeful GAs predates the above applications of the same idea to English. Based on a suggestion in Beck et al. (2004), Oda (2008) argues that *takai* 'tall' in Japanese has a denotation in (22), where the degree argument d′ corresponds to a difference between the contextual standard, d_c, and the height of x.

(22)　$\llbracket takai \rrbracket^c = \lambda d'.\ \lambda x.\ \max(\lambda d.\text{tall}(d)(x)) = d_c + d'$

<div align="right">(adapted from Beck et al. 2004:342(e.n.15-ib))</div>

    This denotation is not only inherently context-sensitive but also inherently differential. This is partially motivated by the fact that in Japanese, MPs occurring with bare GAs obligatorily receive differential interpretations (23a) (Snyder et al. 1995; Beck et al. 2004; Oda 2008; Beck et al. 2009; Hayashishita 2009; Kubota 2011; Sawada & Grano 2011; Watanabe 2013; Aonuki 2024b).[16] (23a) is analyzed as in (23b), where the MP is assumed to denote a degree. According to this analysis, (23a) is an instance of an MP occurring with implicit comparison, which was unavailable in English (13, 20a).

(23)　a.　Kono tana-wa　2 cm takai　　　　(adapted from Oda 2008:68(12))
　　　　　 this　　shelf-TOP 2 cm tall
　　　　　 'This shelf is taller by 2 cm (e.g., than the other shelf).'

　　　b.　$\llbracket$(23a)$\rrbracket^c = 1$ iff $\max(\lambda d.\text{tall}(d)(\text{this shelf})) = d_c + 2$ cm

<div align="right">(adapted from Oda 2008:69(14))</div>

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15 Implementation of inherent context-sensitivity in Wellwood (2024:4(8)) would rule out implicit comparison in crisp judgment contexts. Moreover, Wellwood (2024) would not predict a differential MP reading in (20a) (without covert operators) because MPs do not directly modify states in her system.

16 My reference to GAs in Japanese excludes verbal predicates constructed with an aspectual marker *-tei-*, which have been treated as minimum-standard GAs (Kubota 2011; Sawada & Grano 2011). See Aonuki (2024a) for a compositional analysis of these verbal predicates.

3 Gitksan data

3.1 Language background

Gitksan is spoken in northern British Columbia, Canada. Gitksan and a neighbouring language, Nisg̲a'a, constitute the Interior Tsimshianic branch of the Tsimshianic language family. There are approximately 255 fluent speakers of Gitksan as of 2022 (Gessner, Herbert & Parker 2022). Unless otherwise noted, the data presented in this paper are from my fieldwork with two speakers, Vincent Gogag (VG) and Hector Hill (HH).

This paper is the first systematic description and formal work on degree semantics in the Tsimshianic family, aside from preliminary descriptions of various degree constructions in Aonuki (2023). In the previous literature on Gitksan, there are some documentations of amount comparatives and equatives (Bicevskis, Davis & Matthewson 2017:346-7) and degree questions (Rigsby 1986: 95-96). In addition, Tarpent's (1987) grammar of Nisg̲a'a documents gradable nominals (244-6) and some comparative sentences (232, 306).

The word order in Gitksan is VSO. Definiteness is not overtly marked, except that NPs are preceded by what are known as *connectives* in the Tsimshianic literature, which track the distinction between common nouns and proper nouns.[17]

3.2 Implicit comparatives

Positive constructions involving relative GAs can receive a reading of implicit comparison (24 repeated from 1) even without a dedicated comparison-inducing expression like *compared to* (24).[18] Note that (24) is accepted in a crisp judgement context, unlike *compared to* constructions in English (Kennedy 2007b; see (15) above).

(24) Context: Anne and Ben are almost the same height, but Anne is a bit taller.
'Wii 'nakw=t Anne (a[-t]=s Ben)
big long=PN Anne (PREP[-3.II]=PN Ben)
'Anne is taller (than Ben).' (HH-v.)

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17 These connectives are respectively glossed as CN and PN; see f.n. 1, Rigsby (1986), and Davis (2018).

18 In (24), comparison can be achieved even without the standard marked by the preposition *a∼e*, which is a "general preposition" (Rigsby 1986: 422) used for oblique arguments. This suggests that the standard phrase is likely a modifier. I assume that its semantic contribution is along the lines of what Kennedy (2007a, 2011) proposes for *compared to* (9), but I set aside this issue for the rest of the paper. Part of the difficulty in analyzing the semantic contribution of a standard phrase is that a variety of semantic objects can appear in it, including a location and an MP (see Aonuki 2023 for relevant data).

One reliable diagnostic of implicit comparison involves minimum-standard GAs. In contrast to *relative* GAs, which are associated with a scale open on both upper and lower ends and have context-dependent standards, *minimum-standard* GAs are associated with a scale closed on (at least) the lower end and use that lower end as the standard regardless of the context.[19] This predictability of the nature of the standard from the associated scale structure is captured by Kennedy's (2007b) principle of Interpretive Economy, which requires that a scale endpoint be used as the standard if available.

(26) Interpretive Economy
      Maximize the contribution of the conventional meanings of the elements of
      a sentence to the computation of its truth conditions.

                                                          (Kennedy 2007b:36(66))

Against this background, Kennedy (2007a) proposes that incompatibility with minimum-standard GAs (27) is a property of implicit comparison, which relies on context-sensitivity of a positive form.

(27)??Compared to Rod A, Rod B is bent.   (Kennedy 2007a:(56b))

Applied to Gitksan, this diagnostic shows that (24) is indeed an implicit comparative. With a minimum-standard GA like <u>k</u>'a<u>k</u> 'open', comparative readings are unavailable for positive constructions (28), even with a standard phrase.

(28) #<u>K</u>'a<u>k</u>=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)

3.2.1   Consideration of alternatives in implicit comparison

I argue that what facilitates implicit comparison in positive constructions is consideration of alternatives. For example, in (24), the fact that the speaker did not

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19 See Rotstein & Winter (2004) and Kennedy & McNally (2005) for diagnostics of scale structures. To illustrate, a positive construction involving a relative GA like *tall* (25a) is context-sensitive in that the standard of tallness that the subject needs to exceed in order for the sentence to be true would be different depending on whether the comparison class is a group of three-year-olds or professional basketball players. On the other hand, truth of a positive construction involving a minimum-standard GA like *open* (25b) only requires that the subject has some minimal degree of openness (i.e., the door is not closed), regardless of how open other doors may be.

(25)   a.   John is tall.

       b.   The door is open.   (Kennedy & McNally 2005:356(29b))

predicate *'wii 'nakw* 'tall' of Ben even though he is also salient in the context implicates that the predicate is not true of Ben, narrowing down the standard degree in the denotation of *'wii 'nakw* 'tall' to a degree exceeded by Anne's height and not Ben's, which is most likely Ben's height in this case. There are two pieces of overt evidence that invoking alternatives is relevant for comparison. First, the associate of comparison is optionally A'-extracted (29).

(29) Context: Speaking to two children, John and Mary, 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.
Mary=hl   'wii nagw-it.
Mary=CN big   long-SX
'Mary is taller.'   (VG-v.)

The morpheme *-it* in (29) marks A'-extraction of intransitive subjects, and this extraction pattern is shared with *wh*-questions, relative clauses, and focus marking (30) in Gitksan and the Tsimshianic family in general (Rigsby 1986; Davis & Brown 2011; Aonuki 2022; Brown 2024).

(30) Tyler=hl   lim-it
Tyler=CN sing-SX
'It was Tyler who sang.'   (Rigsby 1986:303)

Second, implicit (as well as explicit) comparatives are optionally accompanied by a morpheme *gay* 'instead' (31).

(31) Gay   'wii 'nakw=t Michael a[-t]=s   Lisa
instead big   long=PN Michael PREP[-3.II]=PN Lisa
'Michael is taller than Lisa.'   (HH-v., VG)

Outside of comparatives, *gay* 'instead' 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 (32).

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

3.2.2   Lack of negative implicatures and evaluativity in implicit comparison

Compared to constructions in English (33) (Kennedy 2007a:20(54a)) have a negative implicature that the associate of comparison involving a GA, *A*, is not *A* in the

general sense (Sawada 2009).

(33) ??That essay is long compared to this one, and it's already quite long.

In contrast, (34) shows that implicit comparatives in Gitksan lack negative implicatures.[20] This pattern seems to be shared by Nez Perce (Deal & Hohaus 2019: 352(17)), which is analyzed as a degreeless language.

(34)   Context: As in (29).
       Niiluxw 'nisi'm ii   gay   'wii nagw[-t]=s   Mary.
       tall.PL   2PL.III CCNJ instead big long[-3.II]=PN Mary
       'You are both tall, but/and Mary is taller.'   (HH)

In addition, similar to Nez Perce (Deal & Hohaus 2019) but unlike another degreeless language, Washo (Bochnak 2013, 2015), implicit comparatives are not evlauative in Gitksan; if they were, the implicit comparative in (35) would contradict the first conjunct.

(35)   *Hi'niiluxw dip   Lisa gan[-t]=s   Michael, ii   dulpxw[-t]=s*
       tall.PL   ASSOC Lisa PCNJ[-3.II]=PN Michael CCNJ small[-3.II]=PN

       Lisa.

       Lisa
       'Michael and Lisa are both tall, but/and Lisa is shorter.'
                                        (VG-v., inspired by Deal & Hohaus 2019:353(18))

3.3   MP interpretations

Having established that a comparative reading of a bare GA is an instance of implicit comparison, this section shows that implicit comparatives in Gitksan are compatible with MPs, as predicted by some of the proposals for degreeful yet inherently context-sensitive GA denotations (Beck et al. 2004; Oda 2008; Breakstone 2012). Just like in Japanese, MPs occurring with bare relative GAs receive differential interpretations (2 repeated as 36, 37). In (37), the contextual standard corresponds to a desired degree, and this results in an excessive reading that would be expressed by *[MP] too [GA]* in English.[21]

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20 The version of (34) without *gay* is degraded, likely because interpreting the second conjunct as saying that Mary is tall in general would be redundant given the first conjunct. However, the two alternative-invoking strategies discussed above, namely use of *gay* 'instead' as in the example and focus extraction, facilitate the reading of the second conjunct as an implicit comparative.

21 See Hayashishita (2009:91(52)) for a similar example in Japanese.

(36) K'i'y=hl t'im k'aax win 'wii 'nakw[-t]=hl ha'niitxookxw
one=CN whole arm COMP big long[-3.II]=CN table

   t=un
   PN=DEM.PROX (VG)
   'This table is one fathom longer (than another one).' *'..one fathom long.'

(37) Context: You have to be 4 feet or taller to get on the roller coaster. John is 3
feet and 11 inches.
K'i'y=hl hlek moos win dulpxw[-t]=s John
one=CN crook thumb COMP small[-3.II]=PN John
'John is 1 inch too short.' (HH, VG)

Following von Stechow (1984) and Deal & Hohaus (2019), I take the existence of
differential MPs as evidence that Gitksan has degrees as semantic primitives.

On the other hand, positive constructions with minimum-standard GAs give rise
to absolute readings of co-occurring MPs (38).

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

3.4 Lack of comparative-superlative distinctions

Although I have so far described that positive forms of relative GAs in Gitksan can
have readings of implicit 'comparison', Gitksan lacks morphological and seman-
tic distinctions between comparatives and superlatives, both in implicit and explicit
strategies. For a positive construction involving *'wii 'nakw* 'tall', a superlative read-
ing is available if the comparison class has more than two individuals (39); again,
(39) is a crisp judgment context.

(39) Context: There are four children. Chris is the tallest by a tiny bit.
'Wii 'nakw=t Chris
big long=PN Chris
'Chris is the tallest.' (✓HH, ?VG)

As with implicit comparative readings, implicit superlative readings are unavail-
able for positive constructions involving a minimum-standard GA (40), as also sug-
gested by VG's comment.

(40) Context: There are many doors, and all are open.
       #Nde=hl aats'ip (g̲ay) k̲'ag̲-it?

    WH=CN door   instead open-SX
    intended: 'Which door is the most open?'
    VG: All the rest are closed.   (VG)

3.5 Overt superlative operator *k'aa*

Gitksan has an explicit comparative/superlative construction involving a morpheme *k'aa*, which is glossed as 'exceedingly' by Rigsby (1986:155). In Tarpent's (1987) grammar of Nisg̲a'a, it is glossed as 'most, excessively, extremely' and argued to contribute meanings of intensification, comparatives, or superlatives (389-391). Evidence that *k'aa* is a degree operator comes from the fact that it gives rise to comparative (41) and superlative (42) readings with minimum-standard GAs.

(41) (G̲ay) k'aa k̲'ak̲=hl aats'ip t=un   a[-t]=hl   aats'ip
       instead k'aa open=CN door   PN=DEM.PROX PREP[-3.II]=CN door

        t=ust
        PN=DEM.DIST
    'This door is more open than that door.'   (VG-v.)

(42) Context: There are many branches, and all are bent.
       Nde=hl anist   (g̲ay) k'aa hlag-it?

    WH=CN branch instead k'aa bent-SX
    'Which branch is the most bent?'   (VG-v.)

While there are likely some dialectical and possibly diachronic variations in the semantics of *k'aa*,[22] as also suggested by vairous glosses in Rigsby (1986) and Tarpent (1987) above, it seems that at least in present-day Gitksan, *k'aa* is a superlative marker rather than an intensifier. (43) shows that *k'aa* alone cannot be used as an intensifier.[23]

(43) Context: Two basketball players, Alex (6'6") and Bill (6'4").
       (#K'aa) 'wii 'nakw=t Bill
       k'aa   big long=PN Bill
       intended: 'Bill is (very) tall.'   (VG)

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22 See Aonuki (2023) for relevant data.

23 Following Hohaus (2015:127-8(239, 241, 243)), who shows that positive constructions in Samoan have superlative semantics, (43) and (44) involve contexts with which intensification should be compatible. As in Hohaus (2015), these contexts were established with visual aids.

The same holds with a larger comparison class. In (44), with five salient entities, *k'aa* is rejected while a positive sentence is accepted. VG's comment aligns with a superlative analysis of *k'aa*.

(44) Context: Evan's bag is the second lightest of five bags (0.2 kg, 0.5kg, 5 kg, 10 kg, 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 [the version with *k'aa*] would sort of hint that it's the lightest.   (VG)

4   Analysis

Building on the inherently context-sensitive and differential denotations of GAs in Japanese (22) proposed by Beck et al. (2004) and Oda (2008), I propose that *'wii 'nakw* 'tall' in Gitksan has the denotation in (45).[24]

(45) $[\![$'wii 'nakw$_1]\!]^{g,c,i} = \lambda$x. λd: d$\in$D$_{length}$ & g(1)$\in$D$_{length}$. Length(x)(w$_i$) $\geq$ g(1) + d

In (45), unlike (22), the standard degree is contributed by an index on the GA, via the assignment function. This allows the explicit degree operator *k'aa* to bind and manipulate the standard degree (see below).

The positive construction in (24) (without the optional standard phrase)[25] receives the denotation in (46), with existential closure over degrees performed as the last step. It is true iff there is a degree of length d such that the height of Anne is no less than the sum of the salient degree g(1) and d.

(46) $[\![(24)]\!]^{g,c,i}$ = $[\![$'wii 'nakw$_1$ Anne$]\!]^{g,c,i}$ = $\exists$d:d$\in$D$_{length}$[Length(Anne)(w$_i$) $\geq$ g(1) + d]   Defined only if g(1)$\in$D$_{length}$

If there are only two contextually salient individuals to be measured on the length scale, as in (24), a comparative reading is obtained by mapping g(1) to a degree exceeded by the associate but no the standard of comparison, which is likely Ben's

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24 The presupposition that the degree argument and the value of the degree index are in the set of degrees of length is an attempt to make the relevance of scale structures (see Section 3.2 for a brief review) maximally explicit, following the notations in Cariani et al. (2023). I use 'length' rather than 'height' in order to include cases like (36).

25 In (24), I assume that contribution of the optional standard phrase *a[-t]=s Ben* is something along the lines of what Kennedy (2007a) proposes for *compared to* phrases in English (9). However, I have to leave the exact semantic contribution of standard phrases for future work. The main challenge in analyzing these phrases comes from the wide range of semantic objects that can appear in them. See Aonuki (2023) for some relevant data.

height in (24). In contrast, if there are more than two salient individuals, as in (39), a superlative reading arises. Since the scale of length is open on the lower (and upper) end(s), and therefore D_{length} does not include the absolute zero degree, neither $g(1)$ nor d can be the absolute zero degree.

A minimum-standard GA $\underline{k'ak}$ 'open' (47) has a denotation analogous to (45) in form, but one crucial difference is that $D_{openness}$ has the absolute zero degree, corresponding to being closed, as the lower end of the scale. Because $g(1)$ is mapped to this absolute zero degree, comparative and superlative readings are unavailable in positive constructions (28, 40).

(47) $[\![\underline{k'ak_1}]\!]^{g,c,i} = \lambda x. \ \lambda d: \ d \in D_{openness} \ \& \ g(1) \in D_{openness}. \ \text{Openness}(x)(w_i) \geq g(1) + d$

An assumption here is that whatever mechanism determines the standard contributed by *pos* according to the scale structure of a GA in English, such as Kennedy's (2007b) Interpretive Economy (26), is active in Gitksan as well. In my implementation, this amounts to saying that Interpretive Economy applies to the assignment function.

Similar to Oda's (2008) account of Japanese, compatibility of MPs with implicit comparison and the resulting differential interpretations receive a straightforward analysis. Assuming that an MP denotes a degree for concreteness, (36) receives the denotation in (48), where 1 fathom corresponds to the difference between the salient degree $g(1)$ and the length of 'this table'. Again, because the set of degrees D_{length} does not include the absolute zero degree, $g(1)$ must be mapped to a salient degree other than the zero degree, such as the length of another table in the context.

(48) $[\![(36)]\!]^{g,c,i} = [\![\text{k'i'y=hl t'im k'aax 'wii 'nakw}_1 \text{ ha'niit}\underline{x}oo\underline{k}xw \text{ t=un}]\!]^{g,c,i}$
     $= [\text{Length(this table)}(w_i) \geq g(1) + 1 \text{ fathom}]$
     Defined only if $g(1) \in D_{length}$ and 1 fathom $\in D_{length}$

In explicit comparative/superlative constructions, the degree index of a GA is bound, and the superlative operator *k'aa* plugs in the maximum degree held by another member of the comparison class (49a). To compute such a degree, I assume that *k'aa* has an index for a salient measure function, μ (Hayashishita 2009; Hohaus 2015; Wellwood 2019, 2024; Cariani et al. 2024, 2023).

(49) a. $[\![\text{k'aa}_\mu]\!]^{g,c,i} = \lambda P_{dedt}. \ \lambda x. \ \lambda d. \ P(\text{MAX}[\lambda d'. \ \exists y[y \in C_c \ \& \ y \neq x \ \& \ g(\mu)(y) \geq d']])(x)(d) \ \& \ [\text{MIN}(\text{DOM}(P)) \text{ is defined} \rightarrow d \neq \text{MIN}(\text{DOM}(P))]$

     b. $\text{DOM} := \lambda P_{dedt}. \ \tau D_{dt}[\forall x, d, d'[P(d)(x)(d') \rightarrow [d \in D_{dt} \ \& \ d' \in D_{dt}]]]$

(49a) takes the denotation of a GA with the degree index lambda-bound, P, and returns a relation between individuals x and degrees d such that the GA denotation holds of x and d, except that the value of the degree index in the GA is replaced

by the maximum degree held by a non-x individual in the comparison class C_c. In addition, there is a requirement that if the GA is minimum-standard, d cannot be the minimum degree on the relevant scale; it uses the DOM function (49b), which takes P and returns the set of degrees associated with P, similar to **background** (**bg**) function in Cariani et al. (2024, 2023) and Wellwood (2024). Without this requirement, d could be mapped to the absolute zero degree, which would result in mere equative rather than comparative/superlative interpretations. At the same time, the requirement is formulated as a conditional one so that taking a relative GA would not result in undefinedness due to MIN(DOM(P)) being undefined.

The denotation of an explicit comparative involving a minimum-standard GA in (41) (excluding *gay* 'instead' and the standard phrase) is provided in (50). It is true iff there is a non-minimum degree of openness d such that the openness of 'this door' is no less than the sum of d and the maximum degree held by another individual in the comparison class as measured by the salient measure function $g(\mu)$, where that degree is presupposed to be a degree of openness.

(50) $[\![(41)]\!]^{g,c,i} = [\![\text{k'aa}_\mu \text{ } \underline{\text{k}}\text{'a}\underline{\text{k}}_1 \text{ aats'ip t=un}]\!]^{g,c,i}$
       $= \exists d \in D_{openness}[\text{Openness(this door)}(w_i) \geq \text{MAX}[\lambda d'. \text{ } \exists y[y \in C_c \text{ \& } y \neq \text{this}$
       door & $g(\mu)(y) \geq d']] + d \text{ \& } [\text{MIN}(D_{openness}) \text{ is defined} \rightarrow d \neq \text{MIN}(D_{openness})]]$
       Defined only if MAX$[\lambda d'. \text{ } \exists y[y \in C_c \text{ \& } y \neq \text{this door \& } g(\mu)(y) \geq d']] \in D_{openness}$

5   Conclusion

This paper demonstrated that (i) Gitksan allows readings of implicit comparison in positive constructions without a comparison-inducing phrase like *compared to* and that (ii) similar to Japanese (e.g., Snyder et al. 1995) and Korean (Beck et al. 2004), positive constructions in Gitksan are compatible with MPs, consistently giving rise to differential interpretations. Having pointed out that these two properties are predicted by the approach that assigns degree-based yet inherently context-sensitive denotations to GAs (Beck et al. 2004; Oda 2008; Breakstone 2012; see also Cariani et al. 2024, 2023; Wellwood 2024), I argued that even though the predictions are wrong for English, Gitksan provides empirical support for this approach. I also demonstrated that Gitksan lacks morphological and semantic distinctions between comparatives and superlatives, and that the choice between them depends on the size of a comparison class. I analyzed a degree morpheme *k'aa*, which gives rise to otherwise unavailable comparative/superlative readings of minimum-standard GAs, as a superlative operator. Future studies should investigate consequences of inherent context sensitivity in other degree constructions as well as cross-categorial comparatives (Wellwood 2015, 2019).

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Differential MPs with implicit comparatives in Gitksan

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