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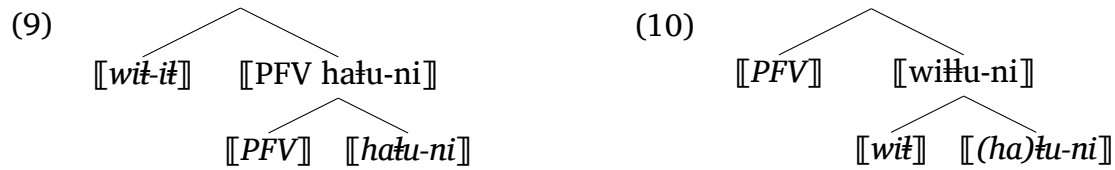# Monotonicity enables degree modification in Ktunaxa

Main claims: *Wiⱡ*, a root in Ktunaxa that translates to 'big', functions as an intensifier with preverbal morphology (1) and via predicate incorporation (2) (Dryer 1997, Bertrand 2021). As a preverb, *wiⱡ-iⱡ* (big-PRVB) intensifies events, states, and times, but as a direct prefix, *wiⱡ-* only accesses events and states. Both forms only modify variables with monotonic dimensions, aligning with theories by Schwarzschild (2002) and Wellwood (2015). I argue this is evidence that in Ktunaxa (i) *wiⱡ*, not the predicate, introduces degrees into the model and (ii) grammatical aspect is introduced above prefixes but below preverbs.

Data: Ktunaxa does not morpho-syntactically distinguish adjectives and verbs. Both property-denoting predicates that would be translated into other languages as adjectives and eventive predicates receive indicative marking, and neither occur with a copula (Morgan 1991). *Wiⱡ-iⱡ* can intensify the state of property-denoting predicates (3) and the event or time of eventive predicates (4). While in e.g. English, syntactic differences (at least) prevent a unified morpheme for the intensification of gradable properties (5) and events (6), Ktunaxa has no such syntactic restrictions. However, all dimensions modifiable by *wiⱡ-iⱡ* are monotonic: the part-whole structure between their measures is maintained. Monotonicity is manifested as gradabilty in states, volume in events, and atelicity in times (Wellwood 2015). However prefix *wiⱡ* only occurs in a subset of contexts that the preverb *wiⱡ-iⱡ* occurs in. While *wiⱡ-* can intensify the physical dimension of an event via direct prefixation to the predicate (7), it is unable to access times, as preverb *wiⱡ-iⱡ* is (8).

Analysis: I argue that the root *wiⱡ*, not the predicate, introduces degrees into the model, as opposed to degrees being built into events, states, and times. Predicates are represented as functions from states to worlds to truth values or events to worlds to truth values (Wellwood 2015). I propose that *wiⱡ-iⱡ* introduces degrees via a measure function that takes the degree of a predicate applied to a monotonic state, event, or time (e.g. degree of length, snow event volume, snow event time). ⟦wiⱡ⟧ takes in a function, P, of type $\langle \alpha, st \rangle$ where alpha ranges over variables type i, v, and s, then α and a world variable, w. It applies P to α and w and it applies **std** to P to yield the standard degree of α in context, c, in world w. μ applies to α to yield its degree. I follow Kennedy & McNally (1999) in setting the degree of the variable to significantly greater than a contextually given standard (11). I assume the preverb suffix, *-iⱡ*, in *wiⱡ-iⱡ* to be syntactic purposed and semantically vacuous. The ambiguity between the event volume and time intensification of eventive predicates modified by *wiⱡ-iⱡ* hinges on whether *wiⱡ* applies to event variable, e, or time variable, t. Following Cable (2013), I use a null perfective operator, ⟦PFV⟧, that does not existentially bind the event variable (12). It applies to the predicate before ⟦wiⱡ-iⱡ⟧ (9), thus *wiⱡ-iⱡ* can access both e and t (13). Direct prefix *wiⱡ-*'s modification limit to event volume can be explained structurally: unlike the preverbal form, it applies to the event before aspect is introduced (10), thus it is unable to intensify times– only event volume (14). I also assume *ha-* in *haⱡuni* to be a verbal prefix that lacks semantic content, explaining its absence in *wiⱡⱡuni*. Regarding states, ⟦wiⱡ-iⱡ⟧ still applies to ⟦wukaʔni⟧ after the perfective has been applied, but because the event time of being long is not monotonic, only the state variable, s is accessible, not t (15).

Outlook: This analysis has provided cross-linguistic support for monotonicity as a relevant ingredient in gradability across syntactic categories.

(1) *wiɬ-iɬ   ʔaȼ-kikǫuʔ-ni*
    big-PRVB VERB-laugh-IND

    'They laughed a lot'

(2) *wiɬ-kikǫu-ni*
    big-laugh-IND

    'They laughed a lot.'

(3) *wiɬ-iɬ   wuqaʔ-ni*
    big-PRVB long-IND

    'It is very long'

(4) *wiɬ-iɬ   ha-ɬu-ni*
    big-PRVB VERB-snow-IND

    'It snowed a lot.' (vol. or duration)

(5) a. It is **very** long.

    b. *It is long **(much/a lot)**

(6) a. It snowed **a lot**

    b. *It **very** snowed

(7) *wiɬ-ɬu-ni*
    big-snow-IND

    'It snowed a lot.' (vol./*duration)

(8) *wiɬ-iɬ   ha-ɬu-ni*
    big-PRVB VERB-snow-IND

    'It snowed a lot.' (vol. or duration)

(9)

$⟦wiɬ\text{-}iɬ⟧$ $⟦PFV\ haɬu\text{-}ni⟧$

$⟦PFV⟧$ $⟦haɬu\text{-}ni⟧$

(10)

$⟦PFV⟧$ $⟦wiɬɬu\text{-}ni⟧$

$⟦wiɬ⟧$ $⟦(ha)ɬu\text{-}ni⟧$

(11) $⟦\text{wiɬ}⟧^C = \lambda P_{\langle \alpha, st\rangle} \lambda \alpha \lambda w \,.\, P(\alpha)(w) \wedge \mathbf{std}_{\alpha,c,w}(P) \prec \prec_{P,c} \mu(\alpha)$

(12) $⟦\text{PFV}⟧ = \lambda P_{\langle v, st\rangle} \lambda t \lambda e \lambda w \,.\, P(e,w) \wedge \tau(e) \subset t$

(13) $⟦\text{PFV}⟧(⟦\text{haɬuni}⟧) = \lambda t \lambda e \lambda w \,.\, \mathbf{snow}(e,w) \wedge \tau(e) \subset t$
event volume reading
$⟦\text{wiɬ-iɬ PFV haɬuni}⟧^C = \lambda t \lambda e \lambda w \,.\, \mathbf{snow}(e)(w) \wedge \tau(e) \subset t \wedge \mathbf{std}_{e,c,w}(\mathbf{snow}) \prec \prec_{\mathbf{snow},c} \mu(e)$
duration reading
$⟦\text{wiɬ-iɬ PFV haɬuni}⟧^C = \lambda t \lambda e \lambda w \,.\, \mathbf{snow}(e)(w) \wedge \tau(e) \subset t \wedge \mathbf{std}_{t,c,w}(\mathbf{snow}) \prec \prec_{\mathbf{snow},c} \mu(t)$

(14) *event volume reading*
$⟦\text{wiɬɬuni}⟧ = ⟦\text{wiɬ}⟧(⟦\text{haɬuni}⟧) = \lambda e \lambda w \,.\, \mathbf{snow}(e)(w) \wedge \mathbf{std}_{e,c,w}(\mathbf{snow}) \prec \prec_{P,c} \mu(e)$

(15) $⟦\text{PFV}⟧(⟦\text{wukaʔni}⟧) = \lambda t \lambda s \lambda w \,.\, \mathbf{long}(s,w) \wedge \tau(s) \subset t$
state reading
$⟦\text{wiɬ-iɬ PFV wukaʔni}⟧^C = \lambda s \lambda w \,.\, \mathbf{long}(s)(w) \wedge \tau(s) \subset t \wedge \mathbf{std}_{s,c,w}(\mathbf{long}) \prec \prec_{\mathbf{long},c} \mu(s)$

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