Maximal and non-minimal change in Salish event structure

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Data from Secwepemctsín (Interior Salish) supports the claim that (non)-culmination and (non)-change-of-state readings are derived compositionally through an underlying degree semantics measuring the degree of change on the theme argument. Contrastive (in)transitivizing suffixes give rise to different degrees of change: transitive marking on the verb restricts the degree of change to the maximal point on its scale, yielding culmination; theme-oriented middles, which are formally intransitive (Davis 1996; Gerdts and Hukari 1998), restrict the degree of change to a non-minimal point on its scale, yielding a Change-of-State (CoS) reading.

Background and Data: Secwepemctsín marks (in)transitivity via suffixes, which also encode a distinction between control (CTR) and limited-control (LCTR). The control distinction on transitive verbs plays out as a distinction between a culmination implicature (CTR) and a culmination entailment (LCTR; (1)), a pattern found across Salish (Bar-el 2005; Bar-el et al. 2005; Kiyota 2007, 2008; Jacobs 2011; Huijsmans and Mellesmoen 2021). A discovery in Secwepemctsín is that the contrast between implicature and entailment also plays out between CTR and LCTR theme-oriented middle verbs: a CoS implicature (CTR) contrasts with a CoS entailment (LCTR; (2)):

(1) a. Jim k̓úl-**en-[t]**-s re mim̓c, ta7 k s-wi7-s ey
Jim make-CTR-TR-3ERG DET basket NEG DET NMLZ-finish-3POSS still
'Jim made a basket but he still hasn't finished.' (CTR-transitive)

b. #Jim c-tsíq-**enwé̓n-[t]**-s re tsípwen, k̓émell ta7 k s-wi7-s
Jim LOC-dig-LC-TR-3ERG DET root.cellar however NEG DET NMLZ-finish-3POSS
Intended: 'Jim dug a root cellar but has not finished.' (LCTR-transitive)

(2) a. Jim q̓wl-**em** te peták, k̓émell re c-k̓weltsenélten-s q̓uwúp-úke7.
Jim roast-CTR.MID DET.OBL potato however DET LOC-stove-3POSS broken-EVID
Ye-rí7 ul peták s[t]-tsixw ey
DEM-DIST SO potato STAT-raw still
'Jim roasted some potatoes, but his stove was broken. That's why the potatoes are still raw.' *Consultant's comment:* 'This makes sense, but not in English' (CTR-middle)

b. #Jim q̓wl-**enwélln̓** te peták, k̓émell re c-k̓weltsenélten-s q̓uwúp-úke7.
Jim roast-LC.MID DET.OBL potato however DET LOC-stove-3POSS broken-EVID
Ye-rí7 ul peták s[t]-tsixw ey
DEM-DIST SO potato STAT-raw still
Intended: 'Jim roasted some potatoes, but his stove was broken. That's why the potatoes are still raw.' *Consultant's comment:* 'No, they cannot all be raw still.'
(LCTR-middle)

Measuring change: I propose to account for the event maximalization and change-of-state readings through degree semantics, following work by Kennedy and Levin (2008); Piñón (2008); Wellwood (2015); Martínez Vera (2021); a.o., on degree-based aspectual composition. I propose that the (in)transitivizing suffixes introduce the measure function $\mathbf{m}_{\Delta}$ (following Kennedy and Levin 2008), which takes an object x and an event e in world w and returns the degree that represents the amount that x changes in the property measured by **m** as a result of participating in e in w. The degree of change is measured by mapping an argument x onto a scale whose minimal value is the degree of x that is measured by **m** at the initiation of e. The output is the degree of difference between the degree of x at the beginning and the degree measured by **m** at the end of e.

(3) For any measure function **m**, $\mathbf{m}_{\Delta} = \lambda x \lambda e . \lambda w . \mathbf{m}^{\uparrow}_{\mathbf{m}(x)(init(e))(w)}(x)(fin(e))(w)$
(adapted from Kennedy and Levin 2008: 18)

Maximal and minimal Points: In addition to introducing degrees, the (in)transitivizing aspectual morphology on the predicate restricts where the degree falls on its respective scale and introduces specific points on the scale of $\mathbf{m}_\Delta$, namely **min** and **max** (adapted from Morzycki 2016: 128-129):

(4) $[\![\mathbf{max}(\mathbf{S_{m_\Delta}})]\!] = \iota d\,[d \in \mathrm{S}_{\mathrm{m}_\Delta} \wedge \forall d' \in \mathrm{S}_{\mathrm{m}_\Delta}\,[d' \leq d]\,]$

(5) $[\![\mathbf{min}(\mathbf{S_{m_\Delta}})]\!] = \iota d\,[d \in \mathrm{S}_{\mathrm{m}_\Delta} \wedge \forall d' \in \mathrm{S}_{\mathrm{m}_\Delta}\,[d \leq d']\,]$

Maximal and non-minimal change: In (6)-(7), the (in)transitivizing suffixes compose with a verbal root that is a *P*-event of *x*. The degree of change on transitives is restricted to being equal to the maximal point on the scale. This yields culmination. The degree of change on middles is restricted to being larger than the minimal point on its scale. This yields a CoS. Thus, culmination or CoS follows from whether the degree-of-change measure represents a maximal degree of change, or whether it is exceeds the smallest degree on the scale.

(6) a. $[\![\textsc{lctr-tr}]\!] = \lambda \mathrm{P}_{\langle e,vt\rangle}.\lambda x.\lambda e.\lambda w[P(x)(e)(w) \wedge \mathbf{m}_\Delta(x)(e)(w) = \mathbf{max}(\mathrm{S}_{\mathbf{m}_\Delta})\,]$

b. $[\![\textsc{lctr-mid}]\!] = \lambda \mathrm{P}_{\langle e,vt\rangle}.\lambda x.\lambda e.\lambda w[P(x)(e)(w) \wedge \mathbf{m}_\Delta(x)(e)(w) > \mathbf{min}(\mathrm{S}_{\mathbf{m}_\Delta})\,]$

Implicature and entailment of change: The limited control forms (6a-b) entail culmination or CoS, because the measure function applies in the utterance world. The control forms implicate culmination or a CoS. This is derived through inertia worlds. In CTR verbs (7a-b), $\mathbf{m}_\Delta$ returns a degree of change in all inertia worlds *w'*, whose history is identical to *w*, but may branch off at the *beginning* of the event (Bar-el et al. 2005, cf. Dowty 1979; Landman 1992; Portner 1998).

(7) a. $[\![\textsc{ctr-tr}]\!] = \lambda \mathrm{P}_{\langle e,vt\rangle}.\lambda x.\lambda e.\lambda w.\forall w'[P(x)(e)(w) \wedge w'$ is an inertia world w.r.t *w* at the beginning of $e \rightarrow \mathbf{m}_\Delta(x)(e)(w') = \mathbf{max}(\mathrm{S}_{\mathbf{m}_\Delta})\,]$

b. $[\![\textsc{ctr-mid}]\!] = \lambda \mathrm{P}_{\langle e,vt\rangle}.\lambda x.\lambda e.\lambda w.\forall w'[P(x)(e)(w) \wedge w'$ is an inertia world w.r.t *w* at the beginning of $e \rightarrow \mathbf{m}_\Delta(x)(e)(w') > \mathbf{min}(\mathrm{S}_{\mathbf{m}_\Delta})\,]$

Outlook: This analysis extends the idea that there is a link between CoS and degree semantics, with (a)telicity following from how the measure of change of the theme argument is evaluated, i.e., maximal vs. non-minimal. It is (in)transitivizing morphology that introduces a degree of change calculated by a measure function, and the degree of change may be implicated (CTR) or entailed (LC), depending on the world in which the degree of change is evaluated.

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