Gradable change of state and variable culmination in Salish

Main claim: Based on evidence from nɬeʔkepmxcín (Salish), I argue for a gradable analysis of change of state (CoS) predication, which I exploit to explain different degrees of change of state and variable culmination. My proposal extends the semantics of Degree Achievements of Kennedy and Levin (2008) and adopts measure of change functions for CoS verbs generally.

Background/Data: nɬeʔkepmxcín has a number aspectual configurations of CoS verbs that yield varying degrees of CoS, including the following four:

(1)	*-n-t-*	'control transitive'	culmination default	(2)
	-əm	'control middle'	partial CoS default	(3)
	-t	'intransitive' (unaccusative)	culmination entailment	(4)
	-ə́p/<ʔ>	'inchoative' (unaccusative)	culmination underspecified	(5)

(2) **Culmination default** 'control transitive'
ḳʷy**[-n]-t**-∅-és e=smíyc
roast-CTR-TR-3OBJ-3ERG DET=deer
'He roasted meat (all of it).'

(3) **Partial CoS default** 'control middle'
ḳʷy-**ém**=kn t=e=sqyéytn
roast=CTR.MID=1SG.SBJ OBL=DET=salmon
'We (somewhat) roasted (some of) a salmon.'

The translation of the control transitive in(2) reflects an interpretation in which the event culminates, whereas the translation of the control middle in (3) reflects an interpretation of partial completion of an event.

(4) **Culmination** 'intransitive' (unaccusative)
ḳʷéy-**t**=∅ e=smíyc (*ʔe=ƛ̓uʔ xeʔe e=s=ḳʷéy-t=s)
roast-INTR=3SBJ DET=deer INT=2CL DEM D/C=NMLZ-roast-INTR=3POSS
'The meat got roasted (*and it's almost roasted).'

Intransitive morphology entails culmination, and example (4) shows that its cancellation is illicit, even when the extent of the event being done is near-complete.

(5) **Culmination underspecified** 'inchoative' (unaccusative)
z<**ʔ**>íx̣=∅ e=pəs∼pús
melt<INCH>=3SBJ DET=REDUP∼fat
'The fat melted/is melting.'

The inchoative in (5) is underspecified for culmination. This means that both partial completion and culmination are possible interpretations, which is reflected in the ambiguity of the translation.

Analysis: I propose a gradable analysis of change of state verb roots that explains how different degrees of CoS are derived in nɬeʔkepmxcín. I adopt the semantics of measure-of-change (Kennedy and Levin 2008): a CoS root denotes a measure of change function ($\mathbf{m}^{\uparrow}$), which measures the change the internal argument x undergoes between the initial (*init*(*e*)) and final point of the event (*fin*(*e*)), as a result of participating in the event.

(6) $[\![\sqrt{\mathrm{V}_{CoS}}]\!] = \lambda x \lambda e\ \mathbf{m}^{\uparrow}_{\mathbf{m}(x)(\mathit{init}(e))}(x)(\mathit{fin}(e))$ $\langle e, \langle v, d\rangle\rangle$

This root structure enables other morphology to derive culmination or partial change via the scale structure, supported by *Interpretive Economy* (IE):

(9) *Interpretive Economy*: Maximize the contribution of the conventional meanings of the elements of a sentence to the computation of its truth conditions. (Kennedy 2007:36)

IE maximizes the contribution of the scale, which in turn derives the aspectual facts, namely default culmination, default partial CoS, entailed culmination, and underspecified, variable cul-

mination.

Culmination default: Control transitive verbs state that the relevant scale is closed and that the degree minimally meets a comparative standard; IE sets this standard to culmination due to the closed scale.

(7) $[\![\text{CTR-TR}]\!] = \lambda g_{\langle e,\langle v,d\rangle\rangle}\lambda x\lambda e\exists d\ \mathbf{m}^{\uparrow}_{\mathbf{m}(x)(\mathit{init}(e))}(x)(\mathit{fin}(e)) = d \wedge d \geq \mathbf{stnd}(g) \wedge d \in S_{[0,1]}$ $\langle\langle e,\langle v,d\rangle\rangle,\langle e,\langle v,t\rangle\rangle\rangle$

Partial CoS default: Control middle verbs state that the scale is top-open and that the degree of change meets or exceeds a comparative standard; IE maximizes the contribution of the scale and sets this standard to partial change.

(8) $[\![\text{CTR-MID}]\!] = \lambda g_{\langle e,\langle v,d\rangle\rangle}\lambda x\lambda e\exists d\ \mathbf{m}^{\uparrow}_{\mathbf{m}(x)(\mathit{init}(e))}(x)(\mathit{fin}(e)) = d \wedge d \geq \mathbf{stnd}(g) \wedge d \in S_{[0,_)}$ $\langle\langle e,\langle v,d\rangle\rangle,\langle e,\langle v,t\rangle\rangle\rangle$

CoS inferences of transitive and middle verbs are pragmatically derived through IE, which is violable. This predicts that culmination and partial CoS are cancelable. This bears out (also across Salish: Bar-el et al. 2005; Kiyota 2008; Jacobs 2011; Huijsmans and Mellesmoen 2021 and Nederveen 2024):

(10) **Cancellation of culmination**

ɋʷey**[-n]-t**-∅-éne e=smíyc ḵeḿéɬ
roast-CTR-TR-3OBJ-1ERG DET=deer but
təté?e k=s=cúkʷ-s[-t]-∅-ne
NEG D/C=NMLZ=finish-CAUS-TR-3OBJ-1ERG
'I roasted deer but I haven't finished it yet.'

(11) **Cancellation of partial change**

níḵ**-əm**=kn t=ə=kəyxm-éke?
cut-CTR.MID-1SBJ OBL=DET=limb-arm
ḵeḿéɬ təté?e k=s=?es-níḵ=s
but NEG D/C=NMLZ=STAT-cut=3POSS
'I cut the branch but it didn't get cut at all.'

Culmination entailed (unaccusative): Intransitive *-t* existentially quantifies over the degree of change. The degree of change is set to a maximum, which entails a closed scale and culmination.

(12) $[\![\text{INTR}]\!] = \lambda g_{\langle e,\langle v,d\rangle\rangle}\lambda x\lambda e\exists d\ \mathbf{m}^{\uparrow}_{\mathbf{m}(x)(\mathit{init}(e))}(x)(\mathit{fin}(e)) = d \wedge d = \mathbf{max}(g)$ $\langle\langle e,\langle v,d\rangle\rangle,\langle e,\langle v,t\rangle\rangle\rangle$

Culmination underspecified (unaccusative): Inchoative verbs are underspecified with respect to culmination, and optionally culminate, resembling DAs with variable telicity (Hay et al. 1999; Kennedy and Levin 2008). The inchoative existentially quantifies over the degree of change, and places the output on a closed scale, indicated by $S_{[0,1]}$.

(13) $[\![\text{INCH}]\!] = \lambda g_{\langle e,\langle v,d\rangle\rangle}\lambda x\lambda e\exists d\ \mathbf{m}^{\uparrow}_{\mathbf{m}(x)(\mathit{init}(e))}(x)(\mathit{fin}(e)) = d \wedge d \in S_{[0,1]}$ $\langle\langle e,\langle v,d\rangle\rangle,\langle e,\langle v,t\rangle\rangle\rangle$

While the closed scale provides a culmination point, the inchoative lacks a comparative standard that must be met. This renders the inchoative underspecified with respect to culmination. As a result, both culmination and non-culmination are possible.

Implications: If roots are measure of change functions, we predict that CoS roots are of type $\langle e,\langle v,d\rangle\rangle$ and must be derived into an expression of the appropriate type to serve as a predicate. This prediction is borne out: bare CoS roots in nɬeʔkepmxcín are illicit (also in other Salish languages, see Lyon 2023; Davis and Nederveen 2025):

(14) * niḵ e=keyxm-éke?
cut DET=limb-hand
Intended: 'The branch got cut.'

(15) * zéxʷ e=qʷtéɬ
melt DET=fat
Intended: 'The fat got melted.'

Outlook: A gradable analysis of CoS verbs allows for varying degrees of change of state, with aspectual morphology generating different scale structures that inform whether an event may or must culminate. This analysis presents a radically gradable approach to CoS predication, expanding on cross-linguistic work on gradability and scalarity of verbs (Piñón 2009; Bochnak 2013; Fleischhauer 2016; Martínez Vera 2021).

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