A How-To Guide to Control Infinitives in St'át'imcets*

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Abstract: This paper is a sequel to Davis (2020), which introduced the three main classes of infinitives in St'át'imcets and examined the first class (raising infinitives) in detail. Here I turn to the second class, which comprises complements to *epistemic verbs*, including verbs of knowing, learning, and teaching. The infinitival complements of these verbs are invariably interpreted as 'how-to' questions; in the first part of the paper, I consider the hypothesis that rather than being directly selected by epistemic verbs, they are in fact complements to the WH-predicate *(ʔə)s-kas* 'how', which is selected by an epistemic verb and then optionally undergoes ellipsis. In the second part of the paper, I focus on the null subject of the infinitival clause: I argue that it should be treated uniformly as obligatorily control *PRO*, in spite of cases of apparent arbitrary control, which I ascribe to the presence of an implicit generic or modal operator.

Keywords: St'át'imcets, Salish, infinitives, 'how-to' questions, obligatory control, *PRO*

1 Introduction

Infinitival clauses are not common in Salish; in fact, for the last quarter of a century, it has been assumed that they were a strictly local development, confined to the two Northern Interior Salish languages St'át'imcets (a.k.a. Lillooet: ISO 639-3 lil) and nɬeʔkepmxcín (a.k.a. Thompson (River) Salish: ISO 639-3 thr): see Kroeber (1999:220-223). However, very recent work on ʔayʔaǰuθəm (a.k.a. Comox-Sliammon: ISO 639-3 coo) has revealed for the first time that infinitives also exist in Central Salish, with a remarkably similar distribution to that in the Interior languages.[1] It is possible that now we know where to look, they will turn out to be more widespread across the family than we had previously thought, though steadily shrinking fieldwork opportunities may also mean that for many languages we will never find out.

Infinitival clauses in St'át'imcets were first identified as such in Davis and Matthewson (1996), subsequently featured in Matthewson (2005a), and more systematically investigated in Davis

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[1] Marianne Huijsmans and Daniel Reisinger, p.c. (2024, 2025).

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(2020). As discussed in the last of these papers, they are related to and probably historically derived from nominalized complement clauses: in particular, they are invariably introduced by *kʷ(u)=*, one of the two 'determiner-complementizer' (D/C) elements which also introduce finite (nominalized) complement clauses in the language.[2] In contrast to nominalized clauses, however, infinitives lack the two criterial ingredients of finiteness: the nominalizer *s=* and an associated possessive subject clitic.[3]

As shown in Davis (2020), predicates which take infinitival complements fall into three classes (there are no infinitival adjuncts). The first of these contains a single *raising predicate*, *c̓íla* '(be) like, resemble', discussed in detail in Davis (2020). The second consists of *epistemic verb*s, including the St'át'imcets equivalents of 'know', teach', 'show', etc., and the third consists of *evaluative adjectives* including the equivalents of 'good', 'fun', 'hard', etc. The present paper focuses on the second of these classes; I plan to investigate the third in a future ICSNL paper.

The paper is structured as follows. Section 2 introduces and exemplifies infinitival complements to epistemic verbs. Section 3 considers in detail the hypothesis that in fact these infinitival complements are selected by the WH-predicate *(ʔə)s-kas* 'how', which undergoes optional ellipsis. Section 4 turns to an examination of the null subject of the embedded infinitival clause, paying particular attention to the distinction between obligatory and non-obligatory control. Section 5 concludes.

2 Infinitival complements to epistemic predicates

I begin by enumerating and exemplifying the class of infinitival-selecting epistemic verbs; note that each of these verbs also occurs freely with finite (nominalized or subjunctive) complements, and – significantly in light of the analysis to follow – all of them select embedded questions as well as declarative complements.

The most common members of the class are verbs meaning 'know', derived from the two roots √*zəwat* 'be/get known' and √*łik* 'get clear/apparent'. Together with the directive/full control transitivizer (*-Vn*), √*zəwát* yields the transitive verb *zəwát-ən* 'know something/somebody', shown in (1) with an infinitival complement clause (bracketed for ease of reference). The same meaning is obtained by adding the stative prefix *(ʔə)s-* and the causative transitivizer *-s* to the root √*łik* to yield the transitive verb *(ʔe)s-łik-s*, shown in (2) with an infinitival complement. Note that in both examples, the D/C element *kʷ(u)=* is contracted with the imperfective auxiliary *waʔ* to yield *kʷa*; this combination is extremely frequent in infinitive clauses.[4]

[2] The other D/C element, *t(a)=*, is only used in factive clauses, which are always nominalized. St'át'imcets contrasts in this respect with nłeʔkepmxcín, which does allow *(h)e=*, the equivalent of *t(a)=*, to introduce infinitives (Kroeber 1999, Hall 2023).

[3] A possessive clitic is not always present in nominalized clauses. In nominalized transitive clauses with no auxiliary, possessive clitics are replaced by subject suffixes (though only optionally so in the first person singular). When an auxiliary is present, either a possessive subject clitic attaches to the auxiliary or a subject suffix attaches to the main predicate, with a preference for the former in Lower St'át'imcets and for the latter in Upper St'át'imcets. In cases without a possessive clitic, the nominalizer itself is the only persistent morphological clue which differentiates finite from infinitival clauses.

[4] Since D/C *kʷ(u)=* is homophonous with the polarity determiner *kʷu=*, (and both contract with *waʔ* to yield *kʷa*), I refer to it in the rest of this paper simply as *kʷu=*. It remains an open question (which I will not tackle here) as to whether the two are one and the same element semantically: see Arregui and Matthewson (2001) for a unified analysis of D and D/C elements.

(1) wáʔ=łkan **zəwát-ən**-Ø [**kʷa** mays-ən-Ø-táli
IPFV=1SG.SUBJ **get.known-DIR**-3OBJ [**D/C**+IPFV fix-DIR-3OBJ-NTS
kʷu=n-qtás-tən]
DET=LOC-pitcook-INS]
'I know how to make cooking pits.'[5] (Davis et al. *in prep.*)

(2) ʔaz=Ø n-sxʷákʷəkʷ kʷas
NEG=3SUBJ 1SG.POSS-heart D/C+NMLZ+IPFV+3POSS
s-łik-s-Ø-twítas [**kʷa** kʷukʷ] ʔi=núkʷ=a,
STAT-be.clear-CAUS-3OBJ-3PL.ERG [**D/C**+IPFV cook] PL.DET=some=EXIS
waʔ=Ø cunaṁ-ən-túmuł-as sə́naʔ
IPFV=3SUBJ teach-DIR-1PL.OBJ-3ERG CNTR
'I don't think some of them knew how to cook, but they taught us all the same.'
(Matthewson 2005b:475)

The bare-root unaccusative verb *zəwát* 'be/get known', also shows up with infinitival complements, yielding a meaning approximately equivalent to an English impersonal passive ('it is known how to…'):

(3) plan=Ø ʔaył ʔaz kʷas **zəwát** [**kʷa**
already=3SUBJ now NEG D/C+NMLZ+IPFV+3POSS **get.known** [**D/C**+IPFV
mays-ən-Ø-táli kʷu=sqʷəlǐp]
fix-DIR-3OBJ-NTS DET=black.tree.moss]
'It's no longer known how to prepare black tree moss (for consumption).'
(Davis et al. *in prep.*)

Verbs meaning 'learn' are derived from √*zəwát* and √*łik* via change-of-state (C_2) reduplication plus either the active intransitive suffix *-xal* or the causative transitive suffix *-s*; both take infinitival complements, as shown in (4) and (5)-(6), respectively.

[5] Examples are given in the variant of the North American Phonetic Alphabet standardly used in work on Salish. All unattributed examples are from original fieldwork by the author. Unless explicitly mentioned, all examples are from the Upper (Northern) dialect of the language. Glossing abbreviations are as follows: ABSN = absent, ACT = active intransitive, ANTI = antithetical, AUT = autonomous (lexical reflexive) intransitive, CAUS = causative transitivizer, CHA = characteristic, CIRC = circumstantial modal, CNTR = counter-to-expectation, COMP = complementizer, COP = (equational) copula, COS = change-of-state (C_2) reduplication, D/C = determiner-complementizer, DEM = demonstrative, DET = determiner, DIM = diminutive (C_1) reduplication, DIR = directive (full control) transitivizer, EMPH = emphatic, EPIS = epistemic modal, ERG = ergative (transitive subject suffix), EXCL = exclusive, EXIS = existential enclitic, INCH = inchoative, INS = instrument, INT = intensifier, IPFV = imperfective, LOC = locative, MID = middle, NEG = negation, NMLZ = nominalizer, NTS = non-topical subject marker, OBJ = object suffix, OOC = out of control, PASS = passive, PL = plural inflection, PLU = plural/pluractional (C or C_1C_2) reduplication, PN = proper name, POSS = possessive, PROS = prospective aspect, POSS = possessive, PROG = progressive aspect, PRSP = presupposed knowledge, Q = yes-no question, QUOT = quotative, RDR = redirective (applicative) transitivizer, REC = reciprocal, REM = remote in time, RLT = relational (applicative) transitivizer, SJV = subjunctive ("conjunctive") subject clitic, SUBJ = indicative subject clitic. An affix is marked with a dash (-), a clitic with an equals sign (=), a prefixal reduplicant with a tilde (~), an infix (including reduplicated infixes) with angled brackets (<…>), unsegmentable morpheme combinations with a plus sign (+), and segments deleted by regular phonological processes with curly brackets ({..}).

(4) xʷúż=łkan **zəwát~ət-xal** [**kʷ**a ċáẇ-xal kʷu=sqlaẇ]
PROS=1SG.SUBJ **get.known-DIR~COS-ACT** [**D/C**+IPFV wash-ACT DET=gold]
'I'm going to learn how to pan for gold.' (Davis et al. *in prep.*)

(5) **zəwát~ət-s**-Ø-as [**kʷ**a píx̌əṁ]
get.known-DIR~COS-CAUS-3OBJ-3ERG [**D/C**+IPFV hunt]
'S/he has learned how to hunt.' (Davis et al. *in prep.*)

(6) **łík~ək-s**-Ø=kan [**kʷ**a sámʔa-c]
be.clear~COS-CAUS-3OBJ=1SG.SUBJ [**D/C**+IPFV white.person-mouth]
'I learned how to speak English.' (Davis et al. *in prep.*)

Ditransitive verbs meaning 'show', 'instruct', and 'teach' comprise a semantically related set of infinitive-taking predicates; like other ditransitives, they are either suffixed with the redirective transitivizer *-xit*, as in (7)-(8) or more exceptionally with the directive transitivizer *-ən* (9).

(7) **halə̓-xí{t}**-c-as [**kʷ**a łk̓ʷ-ál̓us] na=n-kʷə́kʷʔ=a]
show-RDR-1SG.OBJ-3ERG [**D/C**+IPFV poke-eye] ABSN.DET=1SG.POSS-grandmother=EXIS]
'My grandmother showed me how to make baskets.' (Davis et al. *in prep.*)

(8) **x̌ək-xít**-Ø láti ʔ [**kʷ**a qʷəc-ən-Ø-táli
instruct-RDR-3OBJthere[**D/C**+IPFV move-DIR-3-OBJ-NTS
ta=n-q̓ʷíċ-mən=a]
DET=LOC-wash.clothes-INS=EXIS]
'Instruct him/her how to start the washing machine.' (Davis et al. *in prep.*)

(9) xʷuż=Ø **cunáṁ-ən**-c-as [**kʷ**a sítk-əm]
PROS=3SUBJ **teach-DIR**-1SG.OBJ-3ERG [**D/C**+IPFV mesh-MID]
'S/he is going to teach me how to make a net.'

And finally, verbs for 'remember' and 'forget' complete the class:

(10) tqíɬ=Ø=ƛ̓uʔ xʷʔaz kʷənswá **ləx̌láx̌-s**-Ø
almost=3SUBJ=EXCL NEG D/C+1SG.POSS+NMLZ+IPFV **remember-CAUS**-3OBJ
[**kʷ**a ʔuxʷalmíxʷ-c]
[**D/C**+IPFV indigenous-mouth]
'I just barely remember how to talk *ucwalmícwts* (the language of the people).'

(11) tqíɬ=kan=ƛ̓uʔ **ɬáp-ən**-Ø [**kʷ**a ʔuxʷalmíxʷ-c]
almost=1SG.SUBJ=EXCL **get.forgotten-DIR**-3OBJ [**D/C**+IPFV indigenous-mouth]
'I've almost forgotten how to speak *ucwalmícwts* (the language of the people).'

The bare-root unaccusative alternant *łap* 'get forgotten' also surfaces with infinitival complements, yielding an impersonal meaning parallel to that of *zəwát* get known':

(12) tqíɬ=Ø=ɬ̓uʔ **łap** [**kʷ**a ʔuxʷalmíxʷ-c]
almost=3SUBJ=EXCL **get.forgotten** [**D/C**+IPFV indigenous-mouth]
'It's almost been forgotten how to speak *ucwalmícwts* (the language of the people).'

The reader will no doubt have noticed by now that these examples show a striking common characteristic: they are all translated into English as embedded 'how to' questions. This raises the possibility that they *are* in fact concealed WH-questions: I explore this possibility in the next section.

3 Infinitival complements to epistemic predicates as concealed questions

In this section, I consider the hypothesis that infinitival complements to epistemic predicates (henceforth 'how-to infinitives') are in fact complements to the WH-question predicate *(ʔə)s-kas* 'how (to)', which is itself selected by a matrix epistemic predicate and may be elided just in case it takes an infinitival complement. The argument runs as follows:

1. While all adjunct WH-predicates select for finite complement clauses, (*ʔə)s-kas* is the only WH-predicate which can also take an infinitival complement clause.
2. Since WH-predicates occur in both matrix and embedded contexts, (*ʔə)s-kas* may take an infinitival complement in main clauses (in which case there is no higher selecting verb).
3. All epistemic predicates select for embedded questions, including those headed by (*ʔə)s-kas*.
4. This means that while (*ʔə)s-kas* directly selects for an infinitival complement, epistemic verbs only do so indirectly, via the selection of (*ʔə)s-kas*.
5. Optional elision of (*ʔə)s-kas* makes it appear that selection is direct.
6. Elision may take place only when (*ʔə)s-kas* takes an infinitival complement in an embedded clause, because only in this environment is its meaning fully recoverable.

Section 3.1 introduces *(ʔə)s-kas* questions; 3.2 shows that they take infinitival complements in both matrix and embedded contexts; 3.3 introduces the hypothesis that apparent how-to infinitival complements to epistemic verbs are actually complements of an elided version of *(ʔə)s-kas*; and 3.4 points out various problems with the concealed question hypothesis.

3.1 WH-questions with *(ʔə)s-kas* 'how'

In St'át'imcets, as in other Salish languages, WH-questions are formed using a WH-predicate whose range is restricted by its complement: see Kroeber (1999, Chapter 7) for a general overview of WH-questions in Salish, and Davis (2008) for a more detailed examination of WH-questions in St'át'imcets. In the case of WH-phrases linked to argument positions, the complement is a DP, typically containing a subject- or object-centred relative clause. In the case of adjunct WH-phrases (including locative, temporal, instrumental, and reason adjuncts) the complement is a CP, either subjunctive-marked (introduced by the proclitic complementizer *ɬ=*), or nominalized (and usually introduced by the determiner-complementizer *kʷu=*).

'How' questions are formed with the WH-predicate *kas*, which is usually prefixed with the stative marker *(ʔə)s-*, and takes either a subjunctive or a nominalized complement clause. Typically, *(ʔə)s-kas* questions have an instrumental ("means") reading, as shown in the main clause questions in (13)-(15) below.

(13) **s-kas**=Ø [**ɬ=**xʷúẋ**=an** máys-ən-Ø
STAT-how=3SUBJ [**COMP=**PROSP**=1SG.SJV** fix-DIR-3OBJ
ti=n-pə̓m-p-sút=a]
DET=1SG.POSS-fast-INCH-OOC-EXIS]
'How am I going to fix my car?'

(14) **s-kas**=Ø [**kʷ=s=**x̌áɬ̓-miṅ-c-axʷ
STAT-how=3SUBJ [**D/C=NMLZ=**want-RLT-1SG.OBJ-2SG.ERG
[kʷ=s=máys-n=Ø-an]]
[D/C=NMLZ=fix-DIR-3OBJ-1SG.ERG]]
'How did you want me to fix it?'

(15) **s-kas**=Ø [**kʷ**asu cut (e=)tsʔa
STAT-how=3SUBJ [**D/C+NMLZ**+IPFV+2SG.POSS say (to=)this
l=ta=ʔuxʷalmíxʷ-c=a]
in=DET=indigenous-mouth=EXIS]
'How do you say this in *ucwalmícwts* ('the language of the people of the land')?'

A textual example of an *(ʔə)s-kas* question embedded under the epistemic predicate *zəwát-ən* 'know' is given in (16). (Note that *(ʔə)s-kas* questions are often preceded by the imperfective auxiliary *waʔ*, which when unstressed contracts with the complementizer *ɬ=* and subjunctive subject enclitics to yield e.g., *ɬwas* or *ɬus* from *ɬ=wáʔ=as*.)

(16) niɬ s=was kəns-zəwat-ən-Ø-ítas [**ɬ=us**
COP NMLZ=IPFV+3POSS try-know-DIR-3OBJ-3PL.ERG [**COMP=IPFV+3SJV**
ʔəs-kás [**ɬ=was** xʷuẋ x̌aɬ̓əm-s-Ø-twítas
STAT-how [**COMP=IPFV+3SJV** PROS go.uphill-CAUS-3OBJ-3PL.ERG
ʔákʷuʔ ʔi=k̓ʷul̓-lakʔ-íh=a múta ʔ
to.there PL.DET=make-tool-3PL.POSS=EXIS and
ʔi=sʔiɬən-íh=a]]
PL.DET=food-3PL.POSS=EXIS]]
'So then they wanted to know how they could get their tools and their food up there.'
(Alexander 2016:88)

3.2 The WH-predicate *(ʔə)s-kas* with infinitival complements

Crucially, besides subjunctive and nominalized complement clauses, *(ʔə)s-kas* also frequently takes infinitival complements, which, as to be expected, yield how-to meanings. Examples of embedded *(ʔə)s-kas* with infinitival complements are given in (17)-(18):[6]

[6] The example in (18) forms a minimal pair with (8) above, where the intermediate clause with *(ʔə)s-kas* is absent; by hypothesis, the latter is a reduced version of the former.

(17) ʔaꞌ=Ø kʷ=n=s=zəwát-ən-Ø pináni? [**ɬ=us**
NEG=3SUBJ D/C=1SG.POSS=NMLZ=know-DIR-3OBJ around.then [**COMP=IPFV+3SJV**
(s-)kas [**kʷa**=súq̓ʷ-əm]]
(STAT-)how [D/C+IPFV=skin-MID]]
'I didn't know how to skin an animal back then.' (Alexander 2016:166)

(18) x̌ək-cít-Ø láti? [**ɬ=us** **(s-)kas** [**kʷ**a
instruct-RDR-3OBJ there [**COMP=IPFV+3SJV** **(STAT-)how** [**D/C**+IPFV
qʷəc-ən-Ø-táli ta=n-q̓ʷíc̓-mən-tən=a]]
move-DIR-3OBJ-NTS DET=LOC-wash.clothes-INS-LOC=EXIS]]
'Instruct him how to start the washing machine.' (Davis et al. *in prep.*)

However, infinitival complements to *(ʔə)s-kas* are not confined to embedded clauses: they also occur in *main clause* how-to questions. Compare (19) below to (13) above:

(19) a. waʔ=Ø **s-kas** [**kʷ**a mays-ən-Ø-táli
IPFV=3SUBJ **STAT-how** [**D/C**+IPFV fix-DIR-3OBJ-NTS
ti=n-pə̓m-p-súť=a]
DET=1SG.POSS-fast-INCH-OOC=EXIS]
'How do I fix my car?' (More literally, 'How is it to fix my car?')

b. **s-kás**=as=k̓a [**kʷ**a mays-ən-Ø-táli
STAT-how=3SJV=EPIS [**D/C**+IPFV fix-DIR-3OBJ-NTS
ti=n-pə̓m-p-súť=a]
DET=1SG.POSS-fast-INCH-OOC=EXIS]
'I wonder how to fix my car?' (More literally, 'How might it be to fix my car?')

(Note the example in (b) involves a "conjectural" question: see Matthewson 2010.)

Of course, in main clause *(ʔə)s-kas* questions, there is no question of a higher epistemic verb selecting for an infinitival complement: the WH-predicate itself is responsible. But if so, that should also be the case for the embedded infinitives illustrated in (17)-(18) above. In other words, the relation between the higher epistemic predicates and the infinitives in embedded cases is indirect: the higher predicates select for *(ʔə)s-kas*, and *(ʔə)s-kas* selects for an infinitival complement. It is now but a short step to the claim that in cases of apparent direct selection of an infinitival complement by an epistemic verb (i.e., all the cases in Section 2), the relation is also mediated by *(ʔə)s-kas*; the only difference is that in these cases, *(ʔə)s-kas* has been elided.

An immediate prediction of this hypothesis is that we expect all epistemic predicates which take how-to infinitives to select for embedded questions. This is indeed the case, as shown in the examples below in (20)-(25).[7]

(20) wáʔ=ɬkaxʷ=ha **zəwát-ən-Ø** [ɬ=**kánmas**=as [ɬ=xʷúż=as cʔas]]
IPFV=2SG.SUBJ=Q **know-DIR**-3OBJ[COMP=**when**=3SJV [COMP=PROS=3SJV come]]
'Do you know when he will come?'

[7] This also predicts that the converse is true: i.e., that every predicate that selects an embedded question will also take a how-to infinitive. See 3.4 below for discussion.

(21) ʔáz=Ø=ƛ̓uʔ kʷ=s=**zəwát**=s [(ɬ=)**nkáʔ**=as=tuʔ
NEG=3SUBJ=EXCL D/C=NMLZ=**get.known**=3POSS [(COMP=)**where**=3SJV=REM
[ɬ=as wáʔ=wit]]
[COMP=IPFV+3SJV be=3PL]]
'Their whereabouts was unknown.' (More literally: 'It was not known where they were.')

(22) ʔáy=s=ƛ̓uʔ s=**zəwát<ət>**-s-Ø-an [(ɬ=)**stám̓**=as
NEG=3POSS=EXCL NMLZ=**get.known<COS>-CAUS**-3OBJ-1SG.ERG [(COMP=)**what**=3SJV
[l=kʷas qʷəz kʷu=məlą́mən
[at=D/C+NMLZ+IPFV+3POSS get.used D/C=medicine
(ʔi=)nmáx̌ʷtən=a]]
(PL.DET=)false.solomon's.seal=EXIS]]
'I still haven't learned what False Solomon's Seal is used as medicine for.'
(Davis et al. *in prep.*)

(23) cixʷ=Ø **halȧ-xí{t}**-c-as s-xaʔxʔálus [(ɬ=)**stám̓**=as
get.there=3SUBJ **show-IND**-1SG.OBJ-3ERG NMLZ-Ca7c7álus [(COMP=)**what**=3SJV
[kʷa cəkláẇsxən]]
[DET+IPFV edible.thistle]]
'Ca7c7álus went to show me what a *tsekláw'scen* (a kind of edible thistle) was.'
(Davis et al. *in prep.*)

(24) cún-c-as=tuʔ kʷ=s=xʷʔąy=s kʷənswá
tell+DIR-1SG.OBJ-3ERG=REM D/C=NMLZ=NEG=3POSS D/C+1SG.POSS+NMLZ+IPFV
ɬáp-ən-Ø [ɬəl=(ɬ=)**nkáʔ**=as [ta=n=s=cʔás=a]]
forget-DIR-3OBJ [from=(COMP=)**where**=3SJV [DET=1SG.POSS=NMLZ=come=EXIS]]
'She told me not to forget where I came from.' (Matthewson 2005b:359)

(25) xʷʔąz kʷənwá **ləx̌láx̌-s**-Ø
NEG=EXCL D/C+1SG.POSS+NMLZ+IPFV **remember-CAUS**-3OBJ
[(ɬ=)**kənkán**=as [ʔi=wáʔ s-x̌aq̇-s
[(COMP=)**how.much**=3SJV [PL.DET=IPFV NMLZ-pay-3POSS
ʔi=sámʔ=a
PL.DET=white.person=EXIS
'I don't remember how much the white people paid.' (Matthewson 2005b:77)

On the other hand, no other WH-predicate besides *(ʔə)s-kas* can take an infinitival complement, as shown in (26) and (27) below for *nkaʔ* 'where' and *kánmas* 'when'.

(26) a. sqʷál̓-ən-Ø [(ɬ=)**nkáʔ**=as [**ɬ=**xʷúż**=as** nas]]
inform-DIR-3OBJ [(COMP=)**where**=3SJV [**COMP=**PROS**=3SJV** go]]
'Tell him where to go.'

b.* sqʷál̓-ən-Ø [(ɬ=)**nkáʔ**=as [**kʷ**a nas]]
inform-DIR-3OBJ [(COMP=)**where**=3SJV [**D/C**+IPFV go]]
(Intended meaning: 'Tell him where to go.')

(27) a. cun-Ø [ɬ=**kánmas**=as [**kʷ=s=**qʷacác**=s**]]
tell+DIR-3OBJ [COMP=**when**=3SJV [**D/C=NMLZ=**leave**=3POSS**]]
'Tell him when to leave.'

b.* cun-Ø [ɬ=**kánmas**=as [**kʷ**a qʷacác]]
tell+DIR-3OBJ [COMP=**when**=3SJV [**D/C**+IPFV leave]]
(Intended meaning: 'Tell him when to leave.')

3.3 How-to infinitives as elided *(ʔə)s-kas* questions

The existence of questions like those in (19) above suggests that the how-to infinitival clauses seen in (1)-(12) above can be analyzed as elided versions of embedded *(ʔə)s-kas* questions with infinitival complements. And indeed, it is possible to construct minimal pairs of infinitival complement clauses with and without *(ʔə)s-kas*, with no detectable difference in meaning, as shown in (28) and (29) below.

(28) a. zəwát<ət>-s-Ø=kan [**kʷ**a s<us>q̓ʷ-en-Ø-táli
get.known<COS>-CAUS-3OBJ=1SG.SUBJ [**D/C**+IPFV skin<PLU>-DIR-3OBJ-NTS
ʔi=x̌ʷíx̌ʷm̓əs=a]
PL.DET=marten=EXIS
'I learned how to skin martens.'

b. zəwát<ət>-s-Ø=kan [ɬ=us **s-kas** [**kʷ**a
get.known<COS>-CAUS-3OBJ=1SG.SUBJ [**COMP=**IPFV+3SJV **STAT-how** [**D/C**+IPFV
s<us>q̓ʷ-en-Ø-táli ʔi=x̌ʷíx̌ʷm̓əs=a]]
skin<PLU>-DIR-3OBJ-NTS PL.DET=marten=EXIS
'I learned how to skin martens.'

(29) a. hal̓a-xí{t}c-as [**kʷ**a cəq-ən-Ø-táli
appear-RDR-1SG.OBJ-3ERG [**D/C**+IPFV get.set.down-DIR-3OBJ-NTS
ʔi=sq̓ʷúʔ=a]
PL.DET=trap=EXIS]
'He showed me how to set the traps.'

b. hal̓a-xí{t}c-as [ɬ=us **s-kas** [**kʷ**a
appear-RDR-1SG.OBJ-3ERG [**COMP=**IPFV+3SJV **STAT-how** [**D/C**+IPFV
cəq-ən-Ø-táli ʔi=sq̓ʷúʔ=a]]
get.set.down-DIR-3OBJ-NTS PL.DET=trap=EXIS
'He showed me how to set the traps.'

Since *(ʔə)s-kas* is the only WH-predicate which selects for an infinitival complement, its meaning is fully recoverable when elided in cases like the (a) examples above. In contrast, ellipsis of an embedded WH-phrase with a subjunctive or nominalized complement would be unrecoverable, because the elided string could contain any WH-predicate; and in fact, such ellipsis is impossible, as shown in (30) and (31):

(30) a. xʷʔaz=Ø kʷ=s=zəwát-ən-Ø-an [**ɬ=nkáʔ=as**
NEG=3SUBJ D/C=NMLZ=get.known-DIR-3OBJ-1SG.ERG [**COMP=where=3SJV**
[ɬ=ləp̓=ás niʔ kʷu=snúkʷaʔ-s]]
[COMP=get.buried=3SJV ABSN.DEM DET=relative-3POSS]]
ta=n-skíxəzʔ=a]]
DET=1SG.POSS-mother=EXIS]]
'I don't know **where** that relative of my mother was buried.' (Matthewson 2005b:65)

b. xʷʔaz=Ø kʷ=s=zəwát-ən-Ø-an [**ɬ=**ləp̓=ás
NEG=3SUBJ D/C=NMLZ=get.known-DIR-3OBJ-1SG.ERG [**COMP=**get.buried=3SJV
niʔ kʷu=snúkʷaʔ-s ta=n-skíxəzʔ=a]
ABSN.DEM DET=relative-3POSS DET=1SG.POSS-mother=EXIS]
'I don't know **if** that relative of my mother was buried.'

(31) a. ʔaz=Ø kʷənswá zəwát-ən-Ø
NEG=3SUBJ D/C+1SG.POSS+NMLZ+IPFV get.known-DIR-3OBJ
[**ɬ=kánəm=as** [ɬ=was ʔilal]]
[**COMP=how.come=3SJV** [COMP=IPFV+3SJV cry]]
'I don't know **why** s/he is crying.'

b. ʔaz=Ø kʷənswá zəwát-ən-Ø
NEG=3SUBJ D/C+1SG.POSS+NMLZ+IPFV get.known-DIR-3OBJ
[**ɬ=**was ʔilal]
[**COMP=**IPFV+3SJV cry]
'I don't know **if** s/he is crying..'

Both these examples involve subjunctive complements (to 'where' in (30a), and to 'why' in (31a)). And in both cases, ellipsis of the WH-phrase fails, as shown in the (b) examples, where only the default 'if' (polar question) reading of the subjunctive complement is available.

The concealed question analysis thus successfully accounts for a number of connected generalizations: first, *(ʔə)s-kas* independently selects for an infinitival clause; second, all epistemic verbs select for embedded questions, and therefore for clauses headed by *(ʔə)s-kas*; third, the meaning of how-to infinitives is identical with or without *(ʔə)s-kas*; and fourth, only *(ʔə)s-kas* is recoverable under deletion in embedded questions.

3.4 Problems with the concealed question analysis

In spite of these advantages, the concealed question account is not without problems. The most serious of these is that the ellipsis process needed to make it work is unusual and otherwise unmotivated, as can be seen in (32), which is a schematic representation of the putative ellipsis structure in (28a), with the elided string marked by strike-through.

(32) zəwát<ət>-s-Ø=kan [~~**ɬ=us**~~ ~~**s-kas**~~ [**kʷ**a
get.known<COS>-CAUS-3OBJ=1SG.SUBJ [~~**COMP=IPFV+3SJV**~~ ~~**STAT-how**~~ [**D/C**+IPFV
s<us>q̓ʷ-en-Ø-táli ʔi=x̌ʷíx̌ʷm̓əs=a]]
skin<PLU>-DIR-3OBJ-NTS PL.DET=marten=EXIS
'I learned how to skin martens.'

What is elided here is not just *(ʔə)s-kas* itself, but the entire clause of which it is the main predicate, with the exception of its infinitival complement. The elided string is not a constituent, and therefore violates a basic syntactic condition on ellipsis. There are ways to fix this, in particular by moving the infinitival clause out of its base-generated position: but I do not know of any independent evidence to support such a move.

A second problem concerns the selectional properties of epistemic verbs. As I have indicated, all verbs which take infinitival complements independently select for embedded questions, supporting the concealed question analysis. However, it is not clear whether the converse is true: that is, whether all verbs that select for embedded questions take infinitival complements. In particular, the two verbs for 'ask (a question)', *sáwłən* (intransitive) and *sáw-ən* (transitive), seem to be at least somewhat resistant to taking infinitival how-to complements. Both verbs canonically select for embedded questions, including those headed by *(ʔə)s-kas* as shown in (33) and (34):

(33) sáwłən=łkan [**ɬ**=us **s-kas** [**kʷ**a mays-ən-Ø-táli
ask=1SG.SUBJ **[COMP**=IPFV+3SJV **STAT-how** [**D/C**+IPFV fix-DIR-3OBJ-NTS
ta=n-kə́h=a]]
DET=car=EXIS
'I asked how to fix my car.'

(34) sáw-ən-Ø=łkan (ta=)n-snúḵʷʔ=a **[ɬ**=us
ask-DIR-3OBJ=1SG.SUBJ(DET=)1SG.POSS-friend=EXIS **[COMP**+IPFV+3SJV
s-kas [**kʷ**a mays-ən-Ø-táli ta=n-kə́h=a**]]**.
STAT-how [**D/C**+IPFV fix-DIR-3OBJ-NTS DET=1SG.POSS-car=EXIS]]
'I asked my friend how to fix my car.'

However, when first presented with reduced versions of these sentences with the intermediate *(ʔə)s-kas* clause removed, my consultant initially rejected the how-to interpretation, as shown in (35) and (36).

(35) sáwłən=łkan [**kʷ**a mays-ən-Ø-táli ta=n-kə́h=a]
ask=1SG.SUBJ [**DET**+IPFV fix-DIR-3OBJ-NTS DET=car=EXIS
(i) # 'I asked how to fix my car.'
(ii) 'I asked who can fix my car.' (more literally: '…(for someone) to fix my car')

(36) a. * sáw-ən-Ø=łkan (ta=)n-snúḵʷʔ=a **[kʷ**a
ask-DIR-3OBJ=1SG.SUBJ (DET=)1SG.POSS-friend=EXIS **[D/C**+IPFV
mays-ən-Ø-táli ta=n-kə́h=a]
fix-DIR-3OBJ-NTS DET=1SG.POSS-car=EXIS**]**
Intended: 'I asked how to fix my car.'
Consultant: 'One little word missing.'

b. sáw-ən-Ø=łkan (ta=)n-snúḵʷʔ=a [**ɬ=swát=as**
ask-DIR-3OBJ=1SG.SUBJ (DET=)1SG.POSS-friend=EXIS [**COMP=who=3SJV**
[**kʷ**a mays-ən-Ø-táli ta=n-kə́h=a]]
[**DET**+IPFV fix-DIR-3OBJ-NTS DET=1SG.POSS-car=EXIS]]

'I asked my friend who could fix my car.' (more literally: '…if there was anyone to fix my car')

With the intransitive example in (35), the consultant reanalyzed the complement as an indefinite headless relative clause, and with the transitive case in (36), he converted the infinitival complement to an indirect question introduced by *ɬ=*, containing the WH-predicate *swat* 'who' plus a subject-centred relative clause.

In subsequent elicitation, however, the same consultant variably accepts infinitival complements of both verbs with how-to readings, as shown in (37) and (38):

(37) a. sáwłən=łkan [**ɬ=s-kás=as** [**kʷ**a cəq-ən-Ø-táli
ask=1SG.SUBJ [**COMP=STAT-how=3SJV** **[D/C**+IPFV put.down-DIR-3OBJ-NTS
ta=sq̓ʷúʔ=a]]
DET=trap=EXIS]]
'I asked how to set a trap.'

b. sáwłən=łkan [**kʷ**a cəq-ən-Ø-táli ta=sq̓ʷúʔ=a]]
ask=1SG.SUBJ **[D/C**+IPFV put.down-DIR-3OBJ-NTSDET=trap=EXIS]]
Interviewer's question: "Is that the same?"
Consultant: "Yeah. I asked how do you set a trap."

(38) a. sáw-ən-Ø=łkan (ta=)n-sqácəzʔ=a [**ɬ=s-kás=as**
ask-DIR-3OBJ=1SG.SUBJ(DET=)1SG.POSS-father=EXIS [**COMP=STAT-how=3SJV**
[**kʷ**a cəq-ən-Ø-táli ta=sq̓ʷúʔ=a]]
[D/C+IPFV put.down-DIR-3OBJ-NTSDET=trap=EXIS]]
'I asked my father how to set the trap.'

b. sáw-ən-Ø=łkan (ta=)n-sqácəzʔ=a [**kʷ**a
ask-DIR-3OBJ=1SG.SUBJ (DET=)SG.POSS-father=EXIS **[D/C**+IPFV
cəq-ən-Ø-táli ta=sq̓ʷúʔ=a]]
put.down-DIR-3OBJ-NTS DET=trap=EXIS]]
'I asked my father how to set the trap.'

The status of how-to infinitival complements with these verbs is thus not entirely clear, though it does appear that they are at least somewhat degraded compared to other verbs which take how-to infinitival complements. The issue is important because under the concealed question analysis, epistemic verbs do not directly select for infinitival complements: the WH-predicate *(ʔə)s-kas* does. This means that we do not expect variation in whether a particular epistemic verb can appear with a how-to infinitive: as long as the verb selects for an embedded question, then it should automatically select for a how-to infinitive.

In this respect, it is worth noting that English how-to infinitives pose the same problem. There is variation amongst epistemic verbs as to whether they allow reduced infinitival how-to questions, as show in (39):

(39) a.??I knew to play chess. (≠ I knew how to play chess.)
b. I learned to play chess. (= I learned how to play chess.)
c. I taught him to play chess. (= I taught him how to play chess.)

d. I instructed him to play chess. (≠ I instructed him how to play chess.)
e.* I showed him to play chess. (≠ I showed him how to play chess.)
f. I remembered to play chess. (≠ I remembered how to play chess.)
g. I forgot to play chess. (≠ I forgot how to play chess.)
h. I asked her to play chess. (≠ I asked her how to play chess.)

All of these verbs select for embedded questions, and since in English all embedded questions may appear in finite or infinitival form, all of them automatically allow infinitival complements with 'how (to)'. But the availability of *reduced* infinitival how-to questions is lexically restricted: of the eight verbs in (39), only 'learn' and 'teach' permit this option. There is no obvious semantic basis for this restriction: it must presumably therefore be encoded in the lexical entries of individual epistemic verbs. If St'át'imcets parallels English in this respect (i.e., there are epistemic verbs that do *not* permit how-to infinitives), this counts as an argument against the concealed question hypothesis.

A final problem does not come from St'át'imcets, but from the Central Salish language ʔayʔaǰuθəm. Recall from the introduction that – remarkably – ʔayʔaǰuθəm has recently been observed to have infinitives which closely resemble those in St'át'imcets. This includes how-to infinitives, as shown below.[8]

(40) hihiw təx̌^{w}-n<i>x^{w}-mut-Ø-as [k^{w}=k^{w}u~k^{w}uk^{w}]
really know-LCT<STAT>-INT-3OBJ-3ERG [D/C=PROG~cook]
'He really knows how to cook.'

(41) tiwš-əm=štəm [k^{w}=x̌^{w}u~x̌^{w}upiʔič] st̓^{θ}uk̓^{w}
learn-MID=1PL.SUBJ+FUT [D/C=PROG~weave] today
'We will learn how to weave today.'

The problem for the concealed question hypothesis here is quite simple: ʔayʔaǰuθəm has no equivalent of *(ʔə)s-kas*, so there is no source for the putative ellipsis. (The language uses various workarounds to convey the meaning of 'how' questions, such as resorting to polar questions.) Again, there are ways to rescue the hypothesis (for example, by positing a null version of *(ʔə)s-kas*): but in the absence of independent evidence, these have the feel of ad-hoc fixes.[9]

[8] Thanks to Betty Wilson and Molly Harry for providing these examples, and to Daniel Reisinger and Marianne Huijsmans for eliciting them.

[9] Having said this, there *is* a potential candidate for ellipsis in ʔayʔaǰuθəm how-to infinitives, though it is not a WH-predicate: several cases have come to light introduced by the approximative predicate *nam̓* 'be like, resemble', as in (i)-(ii):

(i) tiwš-əm-stu-mš=čx^{w} (s=)**nam̓**=s [k^{w}=hə~həy-t-Ø
learn-MID-CAUS-1SG.OBJ=2SG.SUBJ (NMLZ=)**be.like**=3POSS [D/C=PROG~make-CTR-3OBJ
(k^{w}=)tək~takin]
(DET=)PLU~sock]
'You teach me how to make socks.'

(ii) ti~tiwš-əm=č (s=)**nam̓**=s [k^{w}=ʔuwuł-it k^{w}=ti<t>qiw]
PROG~learn-MID=1SG.SUBJ (NMLZ=)**be.like**=3POSS [D/C=make-STAT DET=horse<DIM>]

These are not inconsiderable problems. Nevertheless, it is worth considering what giving up the concealed question account would lose. In particular, the apparently identical interpretation of how-to infinitives in main clause questions with *(ʔə)s-kas*, embedded questions with *(ʔə)s-kas*, and embedded questions without *(ʔə)s-kas* would no longer follow automatically; for example, the synonymy between the pairs of examples in (28) and (29) would be accidental.

In light of these considerations, and in spite of the problems laid out in this section, I will therefore adopt the concealed question analysis as a working hypothesis for the rest of this paper, with the proviso that much more work is needed to establish it firmly (or provide a viable alternative). I now turn to a different set of problems, centred on the infinitival clause itself, and more specifically, on its *PRO* subject.

4 How-to infinitives and obligatory control *PRO*

In this section, I investigate the structure of how-to infinitival clauses in more detail, focusing on their subject, which I identify as (obligatory) control *PRO*. In 4.1, I review evidence that how-to infinitives are full clauses, before turning in 4.2 to contrasts between how-to and raising infinitives. I then show in 4.3 that the empty subject of how-to infinitives shows the behaviour of a bound variable, as diagnosed by sloppy identity contexts; in addition, the bound variable analysis provides a unified aaccount of the non-topical subject marker *tal(')i* as invariably triggering A'-extraction of a transitive subject. On this basis, I identify the subject of how-to infinitives as obligatory control *PRO*. In 4.4, I compare the very restricted distribution of *PRO* in St'át'imcets (and Salish more generally) to its much wider distribution in more familiar (largely European) languages. In 4.5 I turn to the nature of the control relation, arguing that apparent cases of arbitrary control in how-to infinitives involve an implicit controller for *PRO*.

4.1 How-to infinitives are clauses

First, let us briefly review the evidence that how-to infinitives are clausal in St'át'imcets, rather than consisting of just a predicate phrase (a possibility raised by the fact that they appear at least superficially to lack a subject, like their counterparts in English).

An obvious piece of evidence for clausal status is that how-to infinitives are obligatorily introduced by the D/C element *kʷu=*: by definition, a complementizer introduces a clause.

In addition, they may (and usually do) contain imperfective *waʔ*, an aspectual auxiliary which I have argued elsewhere (Davis 2011) is diagnostic of clausal status.

A third argument can be constructed on the basis of the presence in most transitive how-to infinitives of the non-topical subject marker *-tal(')i*.[10] As documented in Davis (1994), *-tal(')i* is normally only licensed when a transitive subject is A'-extracted, either in relative clauses, WH-

'I'm learning how to ride a pony.'

If a covert version of *nam̓* is present in apparent direct infinitival complements to epistemic verbs, there is the potential to maintain some version of the concealed question hypothesis for ʔayʔaǰuθəm (though of course, the intermediate elided predicate here is not a WH-predicate).

[10] The *[l]* in *-tal(')i* is glottalized when the preceding *[a]* is unstressed: see van Eijk (1997:159).

questions, or clefts (all of which share the same basic structure: see Davis 2010).[11] Some typical examples are given in (42)-(44):

(42) sáma?=Ø=ḵa [kʷu=sqʷalˈ-ən-Ø-**táli**]
white.person=3SUBJ=EPIS [DET=inform-DIR-3OBJ-**NTS**]
'It seems that it was a white person who reported it.' (van Eijk and Williams 1981:70)

(43) swat=Ø [kʷu=məc-ən-Ø-**táli** cʔa]
who=3SUBJ [DET=mark-DIR-3OBJ-**NTS** this]
'Who wrote this?' (Davis et al. *in prep.*)

(44) niɬ=Ø ʔiż ʔi=naplít=a [ʔullˈus-ən-Ø-**táli**
COP=3SUBJ PL.DEM PL.DET=priest=EXIS [gather-DIR-3OBJ-**NTS**
ʔi=ʔuxʷalmíxʷ=a]
PL.DET=Indigenous.person=EXIS]
'It was those priests who gathered the people together.' (Mitchell 2022:471)

Assuming (as is standard) that A'-extraction involves movement to the left periphery of the clause, the presence of *-tal(')i* is diagnostic for clausal status. (Of course, this doesn't explain *why -tal(')i* is present in how-to infinitives: I return to that issue in 4.3 below.)

Overall, then the case for the clausal status of how-to infinitives is very strong. And given that clauses must by definition contain subjects, this means that there is a null subject present in how-to infinitives. The next question is: what is it?

4.2 How-to infinitives versus raising infinitives

There is a very long line of syntactic and semantic work on the nature of infinitive subjects: in fact, it has been one the principal preoccupations of syntactic theory almost since the dawn of generative grammar. I have no intention of even attempting to summarize the relevant literature here; instead, I will simply cut straight to the question of whether the subject of how-to infinitives is best characterized in terms of *raising* or *control* (the latter term of course referring to the standard syntactic notion of control, rather than the Salish-specific semantic notion of agent control). In a raising construction, the null subject of the infinitive will be a trace/deleted copy of the matrix subject; in a control construction, the subject will be the empty pronominal *PRO*.

Since St'át'imcets has a raising construction, discussed in Davis (2020), one way we can frame this question is in terms of the comparison between raising infinitives and how-to infinitives. Raising infinitives are confined to the predicate *ċíla* '(be) like, resemble', as exemplified below:

(45) **ċ̓ila=łkán**=ƛ̓uʔ [**kʷ**a matq l=kʷu=sx̌ə́t<x̌ət>q x.wał]

[11] A'-extraction of a transitive subject is a necessary but not sufficient condition for the use of *-tal(')i:* as its gloss indicates, it is typically employed in contexts where the subject of a transitive clause does not represent the continuing topic of a discourse. If we assume that a continuing topic is represented syntactically as *pro* and semantically as a free variable, we can construct a plausible account of the connection between the A'-extraction and discourse properties of *-tal(')i*: A'-extraction leaves a *bound* variable, which is incompatible with the status of a continuing topic as a free variable; therefore, by forcing A'-extraction, *-tali(')* indirectly disqualifies the subject from acting as a continuing topic. See Roberts (1994), Davis (1994) for relevant discussion.

like=1SG.SUBJ=EXCL [**D/C**+IPFV walk on=DET=hole<PLU> road]
'It was like I was walking along a road full of potholes'. (Davis et al. *in prep.*)

(46) **c̓íla=ʔɬuʔ** **kʷu=n-məzác=a** [**kʷu**=qʷə́ts-p]
like=EXCL **DET=1SG.POSS-body=EXIS** [**D/C**=shake-INCH]
'My body felt like it was shaking.' (Mitchell 2022:293)

In each of these examples, the external argument of the embedded infinitival surfaces in the matrix clause, as a subject clitic in (45) and a DP subject in (46).

To this, we can another characteristic: raising structures with *c̓íla* do not trigger non-topical subject marking with *-tal(')i*. A search of spontaneous production of *-tal(')i* in five volumes of texts (Matthewson 2005, Alexander 2016, Edwards et al. 2017, Mitchell 2022 and Alexander 2025), plus the example sentences in two dictionaries (van Eijk 2013 and Davis et al. in prep.) turned up 23 instances of *-tal(')i* in infinitives: of these, 11 were complements of epistemic verbs (with or without intermediate *(ʔə)s-kas*), and the other 12 were complements to evaluative adjectives: none were found in infinitival complements to *c̓íla*, in spite of the fact that the latter are amongst the most common infinitival structures in the language.[12]

How-to infinitives, in contrast, do not tolerate raising and do trigger *-tal(')i*. Putative raising cases are given in (47a) and (48a) with a pronoun and a lexical subject, respectively. I have used the unaccusative epistemic verb *zəwát* 'get known' here as the closest notional equivalent to the raiusing predicate *c̓íla*; in each case, the consultant corrected the sentence to one with transitive *zəwát-ən*.[13]

[12] Follow-up elicitation, however, has yielded mixed results: my consultant is at least sometimes willing to accept *-tal(')i* in the infinitival complement to *c̓íla*, though he has never produced it spontaneously. Further work is needed here.

[13] There is more to say here, though. It turns out if we leave an overt subject *inside* the infinitival clause in examples parallel to the (a) cases in (47) and (48), the results are unexpectedly *grammatical*, as shown in (i) and (ii), respectively:

(i) ʔaz kʷas **zəwát** [**kʷ**a mə́c-ən-Ø**-an**
NEG D/C+NMLZ+IPFV+3POSS **get.known** [**D/C**+IPFV write-DIR-3OBJ**-1SG.ERG**
ta=ʔuxʷalmíxʷ-c=a]
DET=Indigenous.person-mouth=EXIS]
'I don't know how to write *ucwalmícwts* ('the language of the people of the land').'

(ii) ɬuʔ wáʔ=Ø=həm̓=ɬuʔ **zəwát** [**kʷ**a məc-xál
but IPFV=3SUBJ=ANTI=EXCL **get.known** [**D/C**+IPFV write-ACT]
ʔi=n-səq̓ʷ~s<ə́s>q̓ʷəz̓=a]
PL.DET=1SG.POSS-PLU~younger.sibling<DIM>=EXIS]
'But my younger siblings know to write.'

These cases are extremely puzzling. Notably, they cannot be analyzed either as cases of *backwards control* (Polinsky and Potsdam 2002), or of *backwards raising* (Potsdam and Polinsky 2012). Backwards control is out because the matrix epistemic verb is unaccusative: there is no position in in the matrix clause for a controller. Backwards raising is out because the interpretation is wrong: under a raising interpretation, (i) would mean 'It is not known how I am able to write *ucwalmícwts*' and (ii) would mean 'It is known how my siblings are able to write', contrary to fact. At present, I have no clue how to analyze these cases, but I do

(47) a. * ʔaz kʷ**ən**swá **zəwát** [**kʷ**a mə́c-ən-Ø
NEG D/C+1SG.POSS+NMLZ+IPFV **get.known** [**D/C**+IPFV write-DIR-3OBJ
ta=ʔuxʷalmíxʷ-c=a]
DET=Indigenous.person-mouth=EXIS]

Corrected to:

b. ʔaz kʷənswá **zəwát-ən-Ø** [**kʷ**a məc-ən-Ø-táli
NEG D/C+1SG.POSS+NMLZ+IPFV get.known-DIR-3OBJ [**D/C**+IPFV write-DIR-3OBJ-NTS
ta=ʔuxʷalmíxʷ-c=a]
DET=Indigenous.person-mouth=EXIS]
'I don't know how to write *ucwalmícwts* ('the language of the people of the land').'

(48) a. * ƛ̓uʔ wáʔ=Ø=həm̓=ƛ̓uʔ
butIPFV=3SUBJ=ANTI=EXCL
ʔi=n-səq̓ʷ~s<ə́s>q̓ʷəz̓=a
PL.DET=1SG.POSS-PLU~younger.sibling<DIM>=EXIS
zəwát [**kʷ**a məc-xál]
get.known [**D/C**+IPFV write-ACT]

Corrected to:

b. ƛ̓uʔ wáʔ=Ø=həm̓=ƛ̓uʔ **zəwat-ən-Ø-ítas** [**kʷ**a məc-xál]
but IPFV=3SUBJ=ANTI=EXCL **get.known-DIR-3OBJ-3PL.ERG** [**D/C**+IPFV write-ACT]
ʔi=n-səq̓ʷ~s<ə́s>q̓ʷəz̓=a
PL.DET=1SG.POSS-PLU~younger.sibling<DIM>=EXIS
'But my younger siblings know to write.'

As for *-tal(')i* we have already seen plenty of evidence that it is freely permitted in transitive how-to infinitives: see e.g. (1), (3), (8), (18) and (19).

The profile of how-to infinitives is therefore distinct from that of raising infinitives. However, this does not yet provide direct evidence for *PRO* as the subject of how-to infinitives: for that, we must take a closer look at *-tal(')i.*

4.3 *PRO* and *-tal(')i*

know they are not tied to infinitives per se, because they have also surfaced in finite (nominalized complements) like (iii):

(iii) łap [kʷ=s=łáp-an̓-Ø**-an** ʔi=sc̓ák̓ʷ=a
get.forgotten [**D/C=NMLZ=**get.extinguished-IR-3OBJ**-1SG.ERG** PL.DET=light=EXIS]
'I forgot to turn the lights out.' (Literally: 'It was forgotten that I turned the lights out.')

More investigation is obviously needed here!

Recall the two environments where *-tal(')i* is found: in contexts of A'-extraction, and in how-to infinitives. It thus appears at first sight to have a curiously disjoint distribution, which invites a unified analysis.

It turns out one is readily available, but only if the subject of a how-to infinitive is *PRO.* The argument is simple: if *PRO* is actually an A'-bound variable, then *-tal(')i* uniformly marks A'-extraction. And in fact, there is strong evidence in the theoretical literature for the claim that (obligatory control) *PRO* is interpreted as a variable, based on the phenomenon of *sloppy identity.* This is illustrated in (55) below (based on Landau 2013:30).

(49) a. Only Peter$_i$ claimed [that he$_i$ was the winner].
   (i) *Only Peter λx[x claimed **x** is the winner]*
   (ii) *Only Peter λx[x claimed **Peter** is the winner].*

   b. Only Peter$_i$ claimed [*PRO*$_i$ to be the winner].
   (i) *Only Peter λx[x claimed **x** is the winner]*
   (ii) #*Only Peter λx[x claimed **Peter** is the winner].*

The (a) case with a finite complement clause is ambiguous between readings (i) and (ii). Reading (i) (the *sloppy* reading) is true for example in a scenario where in a race, the only person that declared *themself* to be the winner was Peter: everyone else could also declare Peter to be the winner, and the sentence would still be true. On reading (ii) (the *strict* reading), however, Peter is the only one that declared *Peter* to be the winner: on this reading, if anyone else declared Peter to be the winner, the sentence would be false. Crucially, however, the sentence in (b) with an infinitival complement containing a *PRO* subject is unambiguous: it only has the sloppy reading in (i), indicating that *PRO* must be a bound variable.

A similar contrast can be constructed for how-to infinitives in St'át'imcets. Consider the following discourse context (given in St'át'imcets and checked with the consultant):

(50) a. waʔ pəl̓p ʔi=nkəkaʔɬás=a ʔúxʷalmixʷ cixʷ píx̌əm̓
   IPFV get.lost PL.DET=three.human=EXIS Indigenous.person get.there hunt
   l=ki=s-qʷə́m<qʷəm>=a
   in=PL.DET=NMLZ-mountain<PLU>=EXIS
   'Three hunters are lost in the mountains.'

   b. waʔ qʷəl̓~qʷal̓<əl̓>t-s-twál̓=wit ɬ=swát=as kʷu=xʷúż
   IPFV PLU~speak<PLU>-CAUS-REC=3PL COMP=who=3SJV DET=PROS
   pún-Ø-tal̓i ta=xw<ə́ẇ>ɬ=a
   get.found+DIR-3OBJ-NTS DET=road<DIM>=EXIS
   'They're discussing who will be able to find the trail.'

   c. wáʔ=wiʔ zəwat-ən-Ø-ítas ta=xw<ə́ẇ>ɬ=a wi=s-Albert
   IPFV=EMPH get.known-DIR-3OBJ-3PL.ERG DET=road<DIM>=EXIS PL=NMLZ-Albert
   múta? s-Kenny, ƛ̓uʔ ptínus-əm=wit kʷ=s=xʷʔạy=s
   and NMLZ-Kenny but think-MID=3PL D/C=NMLZ=NEG=3POSS
   kʷas zəwát-ən-Ø-əm ʔə=s-Carl
   D/C+NMLZ+IPFV+3POSS get.known-DIR-3OBJ-3PASS by=NMLZ-Carl

‘Albert and Kenny know the trail, but they don’t think Carl does.’

d. wáʔ=həm̓=ƛ̓uʔ cut kʷ=s-Carl:
IPFV=ANTI=EXCL say PN.DET=NMLZ-Carl
‘But Carl says:’

e. “waʔ=łkan=á=qaʔ ƛ̓it zəwát-ən-Ø ł=nkáʔ=as
IPFV=1SG.SUBJ=A=PSRP also get.known-DIR-3OBJ COMP=where=3SJV
ł=lák=as ta=xw<ə́ẇ>ł=a!”
COMP=be.situated=3SJV DET=road<DIM>=EXIS
“I know where the trail is too!”

This context strongly favours strict identity, since Carl is the only hunter who thinks *Carl* knows the trail (the other two know the trail too, but that is not relevant). The strict and sloppy readings can then be tested using the following sentences, the first with a finite (nominalized) complement clause, the second with a how-to infinitival clause.

(51) a. *finite clause*

cúkʷ=ƛ̓uʔ s-Carl ta=waʔ zəwat-ən-Ø-táli
finish=EXCL NMLZ-Carl DET=IPFV get.known-DIR-3OBJ-NTS
[**kwas** waʔ ƛ̓it **ka-pún-s-Ø-as-a**
[**D/C+NMLZ+IPFV+3POSS** IPFV also **CIRC-get.found-CAUS-3OBJ-3ERG-CIRC**
ta=xw<ə́ẇ>ł=a]
DET=road<DIM>=EXIS]
‘Only Carl knows that he can find the trail too.’
Consultant: “Good.” (i.e., **true: strict reading**)

b. *infinitival clause*

#cúkʷ=ƛ̓uʔ s-Carl ta=waʔ zəwat-ən-Ø-táli [**kwa**
finish=EXCL NMLZ-Carl DET=IPFV get.known-DIR-3OBJ-NTS [**D/C+ IPFV**
pún-Ø-talƛ̓ ta xw<ə́ẇ>ła]
get.found+DIR-3OBJ-NTS DET=road<DIM>=EXIS]
‘Only Carl knows how to find the trail.’
Consultant: “No: Albert and Kenny know it too!” (i.e., **false: sloppy reading only**)

The results here show that strict identity is available for the finite but not for the infinitival clause, which only has a sloppy reading and is therefore false in context.

Next, by minimally altering the context, we create a scenario where the sloppy reading is strongly favoured, as in (52).

(52) a. waʔ pəlƛ̓p ʔi=nkəkaʔłás=a ʔúxʷalmixʷ cixʷ píx̌əm̓
IPFV get.lost PL.DET=three.human=EXIS Indigenous.person get.there hunt
l=ki=s-qʷə́m<qʷəm>=a
in=PL.DET=NMLZ-mountain<PLU>=EXIS
‘Three hunters are lost in the mountains.’

b. waʔ qʷəl̓~qʷal̓<əl̓>t-s-twál̓=wit ɬ=swát=as kʷu=xʷúẋ
IPFV PLU~speak<PLU>-CAUS-REC=3PL COMP=who=3SJV DET=PROS
pún-Ø-tal̓i ta=xw<ə́ẇ>ɬ=a
get.found+DIR-3OBJ-NTS DET=road<DIM>=EXIS
'They're discussing who will be able to find the trail.'

c. xʷʔaz kʷ=s=zəwat-ən-Ø-ítas ta=xw<ə́ẇ>ɬ=a
NEG D/C=NMLZ=get.known-DIR-3OBJ-3PL.ERG DET=road<DIM>=EXIS
wi=s-Albert múta? s-Kenny, ƛ̓u? waʔ sə́naʔ
PL=NMLZ-Albert and NMLZ-Kenny but IPFV CNTR
zəwát-ən-Ø-əm ʔə=s-Carl
get.known-DIR-3OBJ-3PASS by=NMLZ-Carl
'Albert and Kenny don't know the trail, but Carl does.'

Here, Carl is the only hunter who believes *himself* to know the trail (Albert and Kenny crucially do not). The same test sentences can then be given in this second context:

(53) a. *finite clause:*

cúkʷ=ƛ̓uʔ s-Carl ta=waʔ zewat-en-Ø-táli [**kwas**
finish=EXCL NMLZ-Carl DET=IPFV get.known-DIR-3OBJ-NTS [**D/C+NMLZ+IPFV+3POSS**
waʔ ƛ̓it **ka-pún-s-Ø-as-a** ta=xw<ə́ẇ>ɬ=a]
IPFV also **CIRC-get.found-CAUS-3OBJ-3ERG-CIRC** DET=road<DIM>=EXIS]
'Only Carl knows that he can find the trail.'
Consultant: "I guess so, yes." (i.e., **true: sloppy reading**)

b. *infinitive:*

cúkʷ=ƛ̓uʔ s-Carl ta=waʔ zewat-en-Ø-táli [**kwa**
finish=EXCL NMLZ-Carl DET=IPFV get.known-DIR-3OBJ-NTS [**D/C+ IPFV**
pún-Ø-tal̓i ta xw<ə́ẇ>ɬa=]
get.found+DIR-3OBJ-NTS DET=road<DIM>=EXIS]
'Only Carl knows how to find the trail.'
Consultant: "That's a little better than the other one." (i.e., **true: sloppy reading**)

Here, the sloppy reading is available with both finite and infinitival clauses, with the infinitive preferred, as indicated by the speaker's comments.

This pattern of data is summarized in Table 1.

Table 1: Strict and sloppy identity in finite and non-finite clause

	finite clause	*Infinitival clause*
strict	√	*
sloppy	√	√

This is exactly the same contrast as is found between English finite and infinitival clauses (see (54) above), thereby providing indirect evidence that the subject of how-to infinitives in St'át'imcets has the same properties as (obligatory control) *PRO* in English: it must be interpreted as a bound variable.

We now have the evidence we need for a unified analysis of the non-topical subject marker *-tal(')i*: in both transitive subject extraction contexts and how-to infinitives, *-tal(')i* marks an A'-bound variable. And furthermore, since by hypothesis obligatory control *PRO* in infinitives must be interpreted as a variable, we also have the evidence we need to identify the subject of a how-to infinitive as *PRO*.[14]

Notice, however, that I have so far failed to follow up on one important detail. The bound variable analysis of *PRO* specifically refers to *obligatory* control (henceforth OC). In fact, it forms the second part of what Landau (2013:29) refers to as the *OC signature*, given in (54) below.

(54) *The OC signature*
In a control construction [. . . X_i . . . [$_S$ PRO_i . . .] . . .], where X controls the PRO subject of the clause S:
a. The controller(s) X must be (a) co-dependent(s) of S.
b. PRO (or part of it) must be interpreted as a bound variable.[15]

Under this definition, *non-obligatory control* (NOC) is really just the converse of OC: NOC *PRO* need not be interpreted as a bound variable, and in fact does not even need a linguistic antecedent; furthermore, if an antecedent is present, it need not be a co-dependent of the S containing *PRO* (Landau 2013:232).

Since we have established that the *PRO* subject of how-to infinitives is obligatorily interpreted as a bound variable, the prediction is that it will show the other properties of OC. However, before turning directly to this prediction, it is worth taking a slight detour in order to look at where control structures are *not* found in St'át'imcets.

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[14] Of course, this does not explain *why* obligatory control (OC) *PRO* invariably takes the form of a bound variable, nor what its binder is. In answer to the latter question, I assume that *PRO* is bound by a λ-operator, thereby creating a derived predicate out of the infinitival clause (it is important that this operation is syntactically visible, in order to provide a unified account for the distribution of *-tal('i)* as marking A'-extraction). The controller of *PRO* then saturates the abstracted argument in the higher clause. This way of thinking about OC suggests that infinitive-taking predicates select for *properties* (as originally argued by e.g., Chierchia 1984), rather than propositions. However, on the reduced question analysis, the WH-predicate *(ʔə)s-kas* presumably selects for a set of *propositions* with existential quantification over an instrumental adjunct (as in standard semantic representations dating back to Hamblin 1973 and Kartunnen 1977). This apparent contradiction can be resolved if it is assumed that when *(ʔə)s-kas* takes an infinitival complement, it *syntactically* selects for a CP, but *semantically* selects for (a set of) properties. The first assumption is supported by the syntactic argumentation given above that an infinitival complement is a full clause (contra Chierchia, who assumes that OC constructions involve bare VPs); the second is supported by the behaviour of *PRO* (e.g., with respect to sloppy identity). Together, they conspire to force lambda abstraction over the subject of the infinitive, creating a *derived* predicate – or more accurately, set of predicates, each of which must be saturated by the controller of *PRO* by pointwise functional application. It is also important to point out that there is no interaction between the *PRO*-binding mechanism outlined here and the separate A'-dependency induced by the WH-predicate in its clausal complement; even though both are types of A'-dependency, they do not interfere with each other with respect to minimality, for example.

[15] The reason that the definition here refers to "part" of *PRO* is to cover cases of partial and split control; these have yet to be systematically checked in St'át'imcets.

4.4 The landscape of control in St'át'imcets

The landscape of control constructions in St'át'imcets is very different from that of better-described (mainly Standard Average European) control systems. In particular, the limited distribution of infinitives overall means that most canonical SAE control constructions are simply missing. For example, all the major classes of OC verbs in English take finite (nominalized) complements in St'át'imcets, rather than infinitives.[16] Examples with 'want', 'try', and 'tell' are given in (55)-(57):

(55) xáɬ̓-min̓-Ø=łkan [kʷənswá qʷic-wíl̓x]
want-RLT-3OBJ=1SG.SUBJ D/C+1SG.POSS+NMLZ+IPFV rich-become]
'I want to get rich!' ('I want that I become rich.')

(56) ɬ̓anam̓-ílx [kʷ=s=sək̓ʷ-ən-Ø-áxʷ ta=k̓áɬ̓h=a]
try-AUT [D/C=NMLZ=break-DIR-3OBJ-2SG.ERG DET=rock=EXIS]
'Try to break the rock.' ('Try that you break the rock.')

(57) cún-c-as na=skíxzaʔ-sw=a
tell+DIR-1SG.OBJ-3ERG ABSN.DET=mother-2SG.POSS=EXIS
[kʷ=n=(s=)xʷíl̓-ən-cin]
[D/C=1SG.POSS=(NMLZ=)look.for-2SG.OBJ
'Your mother told me to look for you.' ('Your mother told me that I look for you.')

While infinitival complements are severely restricted in St'át'imcets, infinitival subjects and most infinitival adjuncts appear to be missing altogether. Sentential subjects are generally unavailable, whether finite or infinitival, and typical cases of infinitival adjuncts in English,

[16] Of course, the notion of control is in principle separable from the grammar of infinitives, and therefore from *PRO*, since it is also hypothetically possible for the *overt* pronominal subjects of finite clauses to be obligatorily covalued with a syntactic antecedent (i.e., controlled). This possibility has in fact been mooted for Upriver Halkomelem by Thompson (2008); however, it does not seem to be realized in St'át'imcets, where not only do the equivalents of canonical control verbs like 'try' and 'force' take finite complement clauses rather than infinitives, but their subjects need not necessarily be covalued with a matrix argument. This is shown in (i)-(ii).

(i) ɬ̓anam̓-ílx ta=n-sqácəzʔ=a [kʷ=n=s=nas ʔátaʔ skʷúl=a]
try-AUT DET=1SG.POSS-father=EXIS [D/C=1SG.POSS=NMLZ=go to.there school=EXIS]
'My father tried to get me to go to school.' (Literally: 'My father tried that I go to school.')

(ii) x̌ʷəc̓-ən-cí=łkan [kʷ=s=nas=c skʷul
force-DIR-2SG.OBJ=1SG.SUBJ [D/C=NMLZ=go=3POSS school
ta=skʷúzaʔ-sw=a]
DET=offspring-2SG.POSS=EXIS]
'I forced you to send your child to school.' (Literally: 'I forced you that your child went to school.')

In other words, OC seems to be missing in complements to the St'át'imcets equivalents of canonical English control verbs, irrespective of finiteness.

including purpose clauses (58), temporal adjunct clauses (59), and clausal complements to prepositions (66) are all realized as finite clauses in St'át'imcets:

(58) n-q̓əlx-anaʔ-mín-Ø=łkan ta=szík=a **[nił**
LOC-jump-ear-RLT-3OBJ=1SG.SUBJ DET=log=EXIS **[COP**
[kʷ=s=kʷán<ən>-s-Ø-an ta=n-ʔ̓amín=a]]
[D/C=NMLZ=get.taken<COS>-CAUS-3OBJ-1SG.ERGDET=1SG.POSS-axe=EXIS]]
'I jumped over the log in order to get my axe.' (More literally: 'I jumped over the log so that I could get my axe.' (Davis et al. *in prep.*)

(59) waʔ łuq̓ʷ-usaʔ-ən-Ø-ítas ʔi=ptąk=a
IPFV peel-round.thing-DIR-3OBJ-3PL.ERG PL.DET=potato=EXIS
[ʔəł puł-uʔ̓-Ø-ítas]
[and.then boil-DIR-3OBJ-3PL.ERG]
'They peel the potatoes before boiling them.' (More literally: 'I peeled the potatoes and then I boiled them.') (Davis et al. *in prep.*)

(60) xʷʔáz=ʔ̓uʔ kʷas ka-ʔ̓él-a, plán=s=a=ʔ̓uʔ
NEG=EXCL D/C+NMLZ+IPFV+3POSS CIRC-still-CIRC already=3POSS=EXIS=EXCL
ʔəs-xʷəlát **[łəl=na=s=łwal-ən-ém=a=tuʔ]**
STAT-messed.up **[from=ABSN.DET=NMLZ=get.abandoned-DIR-3PASS=EXIS=REM]**
'She can't keep still, she's so depressed from getting abandoned.' (More literally: 'She can't keep still, she's so depressed from (the fact) that she got abandoned.')
(Davis et al. *in prep.*)

It is unclear exactly why control is so restricted in St'át'imcets (and more broadly, why it is also either highly restricted or entirely absent in other Salish languages). Furthermore, the attested cases have a peculiar distribution: as far as I can see, they are limited to how-to infinitives and the complements to evaluative adjectives (the latter comprising the other main class of control infinitives in St'át'imcets, which I do not discuss in this paper). What is even more striking is that this distribution does not appear to be arbitrary: both of the other two Salish languages where infinitives have been positively identified, nłeʔkepmxcín and ʔayʔaǰuθəm, have the *same* two classes of control infinitive (for nłeʔkepmxcín, this is perhaps unsurprising, since it is a neighbour and close relative of St'át'imcets, but for ʔayʔaǰuθəm, which is not even in the same branch of the family, it is quite startling.) I do not know what if anything unites these two classes, or why control infinitives are systematically absent in other environments where we would expect them to appear: this is a topic for future research.

4.5 Control in how-to infinitives

Turning back now to the question of control in how-to infinitives, recall that we have already seen that they test positively for one half of the OC signature given in (54) above: *PRO (or part of it) must be interpreted as a bound variable.* What about the other half? Here we are interested in the locality of the relation between *PRO* and its controller: *The controller(s) X must be (a) co-dependent(s) of S*. This means that the controller must either be an argument or an adjunct in the clause immediately dominating the infinitival clause containing *PRO*.

With how-to infinitives, either the subject or object of the matrix verb typically controls *PRO*: see for example (1)-(2) versus (7)-(8) above. When a potential alternative (non-local) controller is provided, only local control is possible, as shown in the (a) cases in (61)-(62) below. In contrast, with a finite (nominalized) clause, either a local or a non-local antecedent is available, as shown in the (b) cases.

(61) a. ka-x̌ə́k-s-Ø-as-a **s-Mary** kʷ=s=plan=s
CIRC-reckon-CAUS-3OBJ-3ERG-CIRC **NMLZ-Mary** D/C=NMLZ=already=3POSS
zəwát-ən-Ø-as **s-John** **[kʷa** **pumákʔ-am]**
know-DIR-3OBJ-3ERG **NMLZ-John** **[D/C+IPFV** **drum-MID]**
(i) 'Mary figured out that John already knew how to drum.'
(ii)# 'Mary figured out that John already knew she could drum.'

b. ka-x̌ə́k-s-Ø-as-a **s-Mary** kʷ=s=plan=s
CIRC-reckon-CAUS-3OBJ-3ERG-CIRC **NMLZ-Mary** D/C=NMLZ=already=3POSS
zəwát-ən-Ø-as **s-John** **[kʷas**
know-DIR-3OBJ-3ERG **NMLZ-John** **[D/C+NMLZ+IPFV+3POSS**
ka-pumákʔ-am-a]
CIRC-drum-MID-CIRC]
(i) 'Mary figured out that John already knew how to drum.'
(ii) 'Mary figured out that John already knew she could drum.'

(62) a. cún-Ø=łkan **ʔi=təw~tw<ə́w>ẃt=a**
tell+DIR-3OBJ=1SG.SUBJ **PL.DET=PLU~boy<DIM>=EXIS**
kʷ=n=s=xʷuż cunáḿ-ən-Ø **ʔi=smət̓~m<ə́ḿ>łac=a**
D/C=1SG.POSS=NMLZ=PROS teach-DIR-3OBJ **PL.DET=PLU~girl<DIM>=EXIS**
łus kas **[kʷa** **sítk-əm]**
COMP+IPFV+3SJV be.how **[D/C+IPFV** **net-MID]**
(i) 'I told the boys that I would show the girls how to make nets.'
(ii)# 'I told the boys that I would show the girls how they (the boys) made nets.'

b. cún-Ø=łkan **ʔi=təw~tw<ə́w>ẃt=a**
tell+DIR-3OBJ=1SG.SUBJ **PL.DET=PLU~boy<DIM>=EXIS**
kʷ=n=s=xʷuż cunáḿ-ən-Ø **ʔi=smət̓~m<ə́ḿ>łac=a**
D/C=1SG.POSS=NMLZ=PROS teach-DIR-3OBJ **PL.DET=PLU~girl<DIM>=EXIS**
łus kas **[łas** **sítk-əm=wit]**
COMP+IPFV+3SJV be.how **[COMP+IPFV+3SJV** **net-MID=3PL]**
(i) 'I told the boys that I would show the girls how to make nets.'
(ii) 'I told the boys that I would show the girls how they (the boys) make nets.'

This contrast is in line with the treatment of how-to infinitives as cases of OC, since only local control is possible in the infinitival cases.[17]

[17] There is technical problem here, however. On the concealed question analysis, there is an elided intermediate *(ʔə)s-kas* clause between the controller in the matrix clause and *PRO* in the infinitival clause even in cases where it does not appear overtly, as in (61a). This means that none of the cases of OC given

Two sets of how-to infinitives, however, clearly challenge the OC analysis. The reason is obvious: they appear to have no controller at all. The first consists of main clause questions with *(ʔə)s-kas* 'how', as in (19) above, exemplified again in (63) below:

(63) a. **(ʔə)s-kas** [**kʷa** cəq cʔa kʷu=sq̓ʷuʔ]
STAT-how [D/C get.put.down DEM DET=trap
'How do you set this trap?' (More literally: 'How is it for this trap to be set?')

b. **(ʔə)s-kas** [**kʷa** cəq-ən-Ø-táli cʔa kʷu=sq̓ʷuʔ]
STAT-how [D/C get.put.down-DIR-3OBJ-NTS DEM DET=trap
'How do you set this trap?' (More literally: 'How is it to set this trap?')
Consultant: 'Yeah, just a little different' (than the previous).

The *PRO* in these cases is clearly interpreted as arbitrary (as indicated by the 'you' paraphrase in the English translations, equivalent to arbitrary 'one').

The second case comprises the "impersonal" (unaccusative) epistemic verbs *zəwát* 'be/get known' and *łap* 'get forgotten', illustrated once more in (64) and (65), respectively.

(64) waʔ **zəwát** [**kʷa** ka-ʕʷə́l-s-Ø-as-a ʔi=sc̓á**k̓**ʷ=a
IPFV **be.known** [**D/C**+IPFV CIRC-burn-CAUS-3OBJ-3ERG-CIRC PL.DET=light=EXIS
łəl=ti=snə́qʷəm=a] łkúnsa
from=DET=sun=EXIS] now
'It's known how to make electricity from the sun these days.'

(65) lán=tuʔ **łap** [**kʷa** mays-ən-Ø-táli ʔi=k̓ʷəlcáz̓ʔ=a]
already=REM **get.forgotten** [**D/C**+IPFV get.fixed-DIR-3OBJ-NTS PL.DET=fish.trap=EXIS]
'It's been forgotten how to make fish traps.'

The typical move for an OC analysis of parallel cases in English (e.g., 'It is not allowed to walk on the grass', 'It is required to keep your dog on a leash') is to appeal to the implicit agent of the passive as a controller. But such an analysis is not tenable for bare root epistemic verbs in St'át'imcets: as first detailed in Davis (1997), bare root unaccusatives (including those which semantically entail an agent) do not have a syntactically represented external argument, explicit or implicit (and contrast in this respect with passives, which do). The same argument is made by Bhatt and Pancheva (2017:4) for Hindi, which also has unaccusative verbs with a semantic entailment of agency but no syntactically represented external argument.

This leaves two options. One is to abandon the idea that *PRO* in St'át'imcets is always subject to OC, and assume instead that these are cases of NOC. I am reluctant to do so, for reasons both internal and external to St'át'imcets. Internally, we would end up with contradictory diagnostics for OC in St'át'imcets, since, as we have seen, *PRO* in how-to infinitives behaves like a bound variable and shows local control effects with overt antecedents, as shown in (61)-(62) above.

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here technically involve local control (at least according to the OC signature given in (60) above). However, notice that an overt *(ʔə)s-kas* clause intervening between an epistemic predicate and an infinitival clause containing OC *PRO*, as in (61b), makes no difference to control possibilities: this means that the locality condition on OC will in any case have to be modified so that the *(ʔə)s-kas* clause is invisible for the purposes of the locality condition.

Externally to St'át'imcets, it is notable that the *PRO* subjects of embedded infinitival questions in English and other languages (including how-to questions) also have an ambivalent status: though they are not necessarily "theta-controlled" (that is, by an explicit or implicit argument of the higher predicate), they do not show the referential freedom of NOC *PRO*. For example, Landau (2013:159) points out that "genuine" arbitrary *PRO* in NOC contexts is insensitive to the presence of a potential local controller, as shown in (66):

(66) It is dangerous for **babies$_i$** [PRO_{arb} to smoke around **them$_i$**].

Here, PRO_{arb} gets its reference independently of 'babies', which can consequently be coreferent with an overt pronoun in the infinitival clause without violating Condition B of the Binding Theory. Landau points out that this is not true of *PRO* in infinitival questions, as shown by the paradigm in (67).

(67) a. * **Mary$_i$** didn't know [where PRO_{i+} to hide **her$_i$**].[18]
b. * **Sue$_i$** asked [what PRO_{i+} to buy **her$_i$** in Rome].
c. **Mary$_i$** didn't know [where *one* should hide **her$_i$**].
d. **Sue$_i$** asked [what *one* should buy **her$_i$** in Rome].

The infinitival cases in (a) and (b) above contrast with (66) in that local control is obligatory (as in the St'át'imcets how-to infinitive cases in (61)-(62) above). This means that coreference with an overt pronoun in the infinitival clause induces a Condition B violation. On the other hand, the parallel finite WH-complement cases in (c) and (d), with an overt arbitrary pronoun ('one') in the subject position of the embedded clause, show no such effect: hence, coreference between a matrix antecedent and a pronoun in the embedded clause is fine.

For these reasons, I choose the only other available option, and assume that there must be a covert controller in the apparently arbitrary cases of control in (63)-(65). Of course, this then raises the pressing question of what that controller is. Answering that question unfortunately goes well beyond the scope of this article. I can offer here only a few speculative remarks: see Constantini and Laskova (2009) for an overview of approaches to PRO_{arb} as a type of implicit control (including in how-to infinitives).

I suspect the most likely candidate for an implicit controller is a *generic operator*: see Moltmann (2006) for the claim that arbitrary 'one' and PRO_{arb} are both bound by a generic operator in [Spec, CP] of the matrix clause. A generic operator seems to capture the quasi-universal interpretation of bare root epistemic verbs: *zəwát* means 'it is generally known', rather than 'somebody knows' and *łap* means 'it has generally been forgotten', rather than 'somebody forgot it'.[19]

[18] The subscript notation *i*+ is used by Landau to indicate partial control: that is, the overt antecedent to *PRO* does not necessarily exhaustively control its reference, since other antecedents (explicit or implicit) may also be implicated.

[19] Notice that the parallel English impersonal passive cases also have generic interpretations: 'It is not allowed to walk on the grass' means that walking on the grass is forbidden in general, and 'It is required to keep your dog on a leash' means that everyone must keep their dog on a leash, not just someone or other. Interestingly, Bhatt and Izvorski (1998) have also proposed that a generic operator binds *PRO* with evaluative adjectives such as 'fun' and 'difficult' (as in e.g., 'It is fun *PRO* to swim' and 'It is difficult *PRO* to solve this problem'); evaluative adjectives form the other main class of control predicates in St'át'imcets, suggesting that a generic operator is more generally available in control contexts in the language.

A different but related approach is suggested by Bhatt and Izvorski (1998), who make the important observation that embedded infinitival questions in English contain an implicit circumstantial modal. More specifically, how-to infinitives seem to contain *dispositional ability modals*: 'know how to' can be paraphrased as 'have the (cognitive) capacity to', 'learn how to' as 'acquire the (cognitive) capacity to', 'teach how to' as 'cause someone to acquire the (cognitive) capacity to', 'forget how to' as 'lose the (cognitive) capacity to', and so on. This suggests the WH-predicate *(ʔə)s-kas* contains an ability modal component, which potentially supplies an implicit antecedent for control PRO_{arb} (since dispositional ability modals require an 'ability holder').

Which of these two approaches to choose (and whether they might be compatible) is a task for the future, however: I leave the issue open here.

5 Conclusion

In this paper, I have undertaken a detailed investigation of the infinitival complements of a set of predicates in St'át'imcets which I term *epistemic verbs.* In the first part of the paper I argued – though not without reservations – that epistemic verbs only indirectly select for infinitives, via the WH-predicate *(ʔə)s-kas* 'how (to)', which alone amongst question predicates directly takes an infinitival complement; optional ellipsis leads to the appearance of direct selection by a higher question-embedding epistemic verb.

In the second part of the paper, I examined the subject of 'how-to' infinitives in some detail, showing that it behaves like a bound variable, and therefore can be identified as (OC) *PRO*: this is the first time, to my knowledge, that OC *PRO* has been positively identified in a Salish language. Finally, I proposed that in cases where a controller appears to be lacking, a generic operator is inserted to yield an "arbitrary" interpretation for *PRO.*

This is the second of what I have always intended to be a trilogy of ICSNL papers on infinitives in St'át'imcets. It has taken me five years to follow up on Part I, which dealt with raising infinitives; I hope to complete Part III, on the infinitival complements of evaluative adjective, in a more timely fashion. Though I confess that the more I investigate the grammar of infinitives, the more challenging it becomes, that is also, of course, why this corner of the grammar of St'át'imcets remains so fascinating.

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