Orbital Clitics in Nxaʔamxčín*

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Abstract: This paper presents a description and theoretical account of linearization and orientation for a subset of Nxaʔamxčín (a.k.a. Moses-Columbian) clitics. Parallels are drawn with sister-language Nsyilxcn (a.k.a. Okanagan), building on previous descriptive accounts of clitics and particles in these two languages (Kinkade 1974, 1982; Czaykowska-Higgins 2019; Lyon 2019). Lyon (2019) proposes two main phonological domains at which Nsyilxcn clitics are parsed: core and pivotal inner clitics which are parsed with the main predicate as a prosodic word or phonological phrase, and outer clitics which need not be. We expand and extend this general analysis to Nxaʔamxčín, which unlike Nsyilxcn exhibits an interesting clitic 'mirroring' effect, whereby a given clitic may either precede or follow a prosodic host in a defined 'orbit'. We propose two families of alignment constraints which linearize clitics based on the phonological level at which they are parsed: a family of STAY constraints (Agbayani & Golston 2010) tailored to specific phonological units (i.e. prosodic word (ω), phonological phrase (φ), or intonational phrase (ι)) assure linear correspondence is satisfied, unless outranked by a corresponding set of STRONG-START constraints (Selkirk 2011) which will derive the mirror image. Restricted partial constraint orderings (Antilla 2001) are formally expressed by implicational relations between individual members of the STAY and STRONG-START constraint families, deriving the attested linearizations, while also allowing for flexibility in clitic orientation and limited orbital independence.

Keywords: Nxaʔamxčín, Nsyilxcn, clitics, Southern Interior Salish, prosody

1 Introduction

This paper examines a subset of clitics in Nxaʔamxčín and Nsyilxcn. Our primary goal for the paper is to provide a detailed description of the distribution of these clitics, and our secondary goal is to lay the foundations for a theoretical analysis of clitics within and across these two languages. The primary focus of our theoretical analysis is on *clitic linearization* in Nxaʔamxčín: in other words, predicting where clitics will occur within a string of words. Our approach also makes certain predictions regarding *clitic orientation*, for example whether a clitic will be attracted towards the right or the left, though orientation is addressed only secondarily.

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1.1 Language Information

Nxaʔamxčín (a.k.a. Moses-Columbian) and Nsyilxcn (a.k.a. Okanagan) are related sister languages of the Southern Interior sub-branch of the Salish language family. Both are extremely endangered: Nxaʔamxčín is spoken in west-central Washington, with only two first-language speakers working with the Language Program. Nsyilxcn is spoken in north-central Washington and south-central British Columbia, and has approximately 132 elder speakers remaining (FPCC 2018). There are successful language revitalization efforts occurring on both sides of the international border.

1.2 Particles or Clitics?

Nespor and Vogel (1986) define clitics as elements with relative freedom of movement, which are able to attach to a variety of hosts, exhibit less phonological integration than affixes, and are not inherently stressed. Together, these properties should allow us to distinguish a class of clitics from predicates, adverbs, and other particles in Nxaʔamxčín and Nsyilxcn. In this paper, we use the word *particle* to refer to a stress-bearing, prosodic word which can host other clitics, yet which may not undergo inflection (Kinkade 1982).

Nxaʔamxčín and Nsyilxcn share a high number of lexical-class and functional-class cognates (Kinkade 1976, 1982), as well as regular vowel correspondences. Table 1 is a non-exhaustive list of functional-class elements from these two languages which are cognate and/or functionally equivalent. Many of the Nsyilxcn items have been analyzed as clitics (Mattina 1973, Lyon 2019), and at least some of the Nxaʔamxčín items have clitic-like properties (Czaykowska-Higgins 2019).

Table 1: A subset of cognate/functionally equivalent elements in Nxaʔamxčín and Nsyílxcn[1]

Gloss	Nxaʔamxčín	Nsyílxcn
1st SG. intransitive subject	**kn**	**kn**
2nd SG. intransitive subject	**kʷ**	**kʷ**
1st PL. intransitive subject	**kt**	**kʷu**
2nd PL. intransitive subject	**kp**	**p**
3rd PL. intransitive subject	**lx**	**lx**
future	**naʔ** / našúʔ	**mi**
past	**(ʔ)ay̓ /** ƛ̓əm	ƛ̓əm
yes/no question marker	**šá / a**	**ha / (h)a**
imperative	taʔ	-
temporal complementizer	łuʔ	ɬ(aʔ)
adjunct complementizer	či	kiʔ
conjunction	kʷaʔ	uł
absolutive case marker	wa	-
oblique / prepositions	t, tl, k̓ɬ, l	t, tl, k̓l, l
modal, epistemic	šəm̓, čmał	cəm̓, cmay
modal, epistemic	mə́t, maxʷ	mat
modal, bouletic	šak	cakʷ

In this paper, we will focus on intransitive subject pronouns, future and past tense markers, and yes/no question markers (all bolded in Table 1 above) since there is ample enough data for these

[1] 3rd singular intransitive subjects are null in both languages. The hyphen in Table 1 indicates that there is no corresponding cognate or functionally equivalent morpheme.

elements in Nxaʔamxčín to inform our analysis. Additionally, this subset of elements presumably falls, inclusively, between the C and T projections in the clausal syntax, and an understanding of the distribution of these clitics may allow us to make interesting predictions regarding clitic syntax. Distributional facts, cross-linguistic evidence, and the limited phonetic evidence we currently have available suggest that all of the bolded items above are clitics, with the exception of Nxaʔamxčín *sá* which is always a particle, and *(ʔ)ay̓* which may sometimes be a particle (Czaykowska-Higgins 2019) under circumstances to be discussed. Detailed phonetic studies will eventually need to be carried out in order to confirm the status of these elements as clitics.

Nxaʔamxčín and Nsyilxcn intransitive pronouns (Table 1) lack full vowels (with the exception of Nsyilxcn 1st plural *kʷu*), and so under the assumption that schwa does not carry primary stress, these pronouns will be inherently non-stressed, supporting a clitic analysis. These pronouns also exhibit a relatively high freedom of movement, though this is realized differently in the two languages. In Nsyilxcn for example, an intransitive subject pronoun can occur to the left (1a) or the right (1b) of complementizer *łaʔ,* which itself patterns as a clitic (Lyon 2019).

(1) a. cakʷ lut **kʷ łaʔ** ʔitx skə̓kl̓áxʷ, lut aksqiłt ʕapnáʔ.

cakʷ	lut	**kʷ**	**łaʔ**	ʔitx	skə̓kl̓áxʷ	lut	a-ks-qíłt	ʕapnáʔ
BOUL	NEG	2SG.INTR	COMP	sleep	last.night	NEG	2SG.POSS-PROS-wake	now

‘If you didn’t sleep last night, you wouldn’t be awake this morning.’ (LL, VF) (Nsyilxcn)

b. kn tə̓kʷ̓ncút **łaʔ kn** sʔayx̌ʷt.

kn	tə̓kʷ̓-ncút	**łaʔ**	**kn**	s-ʔáyx̌ʷt	
1SG.INTR	lay.down-REFL	COMP	1SG.INTR	NMLZ-tired	

‘I laid down when I was tired.’ (LL, VF) (Nsyilxcn)

A similar linear variation can be found for the determiner *iʔ* and the prepositions (cf. Table 1).[2] Such linear variation is never allowed for clear cases of prefixes or suffixes.

In Nxaʔamxčín (unlike Nsyilxcn), pronoun clitics can occur in many different places, including before negation (2a), before the main predicate (2b), and before another clitic such as *ay̓* (2c).[3]

(2) a. šac’kámәx kʷaʔ **kʷ lút núx̌ʷt** ay̓?

šac’kámәx	kʷaʔ	**kʷ=lút**	√**núx̌ʷt**=ay̓
why	CONJ	2SG.INTR=NEG	go=PAST

‘Why didn’t you go home?’ (Y29.184) (Nxaʔamxčín)

b. naʔ čhúymnč ʔay̓kʷáast łuʔ **kʷ núx̌ʷt** kɬ Spokane.

naʔ	č-√húy-mn-č	ʔay̓kʷáast	łuʔ	**kʷ**	√**núx̌ʷt**	kɬ	Spokane
FUT	CISL-go-RLT-1SG.OBJ+3ERG	tomorrow	COMP	2SG.INTR	go	to	Spokane

‘He will be visiting me tomorrow while you go to Spokane.’ (EP4.44.7) (Nxaʔamxčín)

[2] Though variation in the relative ordering of determiners and prepositions in Nsyilxcn may differ primarily along dialectal lines. More work is needed here. It is also worth noting that in neither Nxaʔamxčín nor Nsyilxcn do determiners exhibit the mirroring effect, at least in an obvious manner. In Nxaʔamxčín, however, the DP-internal genitive marker *l* does exhibit a considerable freedom of movement (N. Mattina 2002).

[3] We use the symbol ‘=’ in Nxaʔamxčín to indicate a morphological boundary involving a clitic that was transcribed as being attached to an adjacent morpheme. These transcriptions correspond to a prediction that the clitic will orientate towards the prosodic host as indicated.

c. lút **kʷ** **ay̓** náẇəlx.
lút **kʷ=ay̓** √náẇ-əlx
NEG 2SG.INTR=PAST run-AUT
'You didn't run.' (W2.88) (Nxaʔamxčín)

This freedom of movement supports the analysis of pronouns as clitics in both languages.

Intransitive subject pronouns also show a fair degree of phonological integration. In Nxaʔamxčín, for example, they syllabify with their hosts and other adjacent clitics.[4] Syllabification for the bolded clitics and their hosts in (3a) is [šaikʷ], and for (3b) [naʔ.šúkʷ].[5]

(3) a. xʷús taʔ naq̓ʷiqc̓tn **šaikʷ** ʔáłm wíxən txaʔ....
xʷús taʔ na-q̓ʷiqc̓tn **ša=i=kʷ** ʔáłm wíxən txaʔ
hurry IMP LOC-? Q=PAST=2SG.INTR very see here
'Hurry have you seen here....' (ECH.ED.90.CD) (Nxaʔamxčín)

b. **naʔšukʷ** lút nwənaxʷánaʔ….
naʔšu=kʷ lút √n-wənaxʷ-ánaʔ
FUT=2SG.INTR NEG LOC-true-ear
'If you don't listen to me....' (ECH.ED.90.CD.l21) (Nxaʔamxčín)

Regarding the remaining bolded clitics in Table 1, the phonological shape of Nxaʔamxčín *ay̓* (PAST) and *a* (YES/NO QUESTION) marker (in final position) as lacking onsets strongly supports the idea of treating them as clitics, though *naʔ* (FUTURE) appears less clitic-like.[6] Given, however, that intransitive pronouns in both languages *are* clitics, all other bolded items in Table 1, including *naʔ*, will be shown to occur linearly to the outside of the pronoun and its prosodic host in regular distributional patterns which are distinctive to clitics, as opposed to particles.

1.3 Outline of Paper

In Section 2, we describe clitic linearization and orientation patterns in Nxaʔamxčín, and an interesting 'mirroring effect' whereby at least some clitics appear to be distributed in regular, defined 'orbits' around their prosodic host. We also discuss certain exceptions to this mirroring, e.g. *(ʔ)ay̓* (PAST). At many points we compare and contrast the linearization and orientation of Nxaʔamxčín clitics with Nsyilxcn, which is almost entirely pro-cliticizing.

In Section 3, we extend the idea of inner and outer clitic domains from Nsyilxcn (Lyon 2019) to Nxaʔamxčín. Inner clitics must form a prosodic word or a phonological phrase with the main predicate in both languages and show phonetic evidence of being phonologically more integrated with their host. Outer clitics may linearize before a host that is not a main predicate, and do not show the same kind of phonological interaction with their host, indicating that they may be phonologically parsed at a higher level of the prosodic hierarchy.

[4] More work is required to determine to what extent constraints on syllabification and metrical structure may play a role in clitic placement.
[5] In Nsyilxcn, pronoun clitics also syllabify with their hosts, but the requirement that the pronoun linearize *before* the predicate outweighs any possible requirement on syllabification.
[6] Nxaʔamxčín *naʔ* should be distinguished from *naʔšúʔ* which is also a future morpheme but has the distribution and shape of a particle or adverb, rather than a clitic.

In Section 4, we present a theoretical analysis of the patterns observed in the two languages. We follow Gerdts and Werle (2014) in assuming that clitics may be parsed at different levels of a prosodic hierarchy (Selkirk 1995). We then propose two families of alignment constraints which linearize clitics based on the phonological level at which they are parsed: a family of STAY constraints (Agbayani & Golston 2010) tailored to specific phonological units, i.e. prosodic word (ω), phonological phrase (φ), or intonational phrase (ι) (Selkirk 1995), assure linear correspondence is satisfied, unless outranked by a corresponding set of STRONG-START constraints (Selkirk 2011), which will derive the mirror image. Restricted partial constraint orderings (Antilla 2001) are formally expressed by implicational relations between individual members of the STAY and STRONG-START constraint families, deriving the correct linearizations while allowing for flexibility in clitic orientation and limited orbital independence. We then revisit the case of *(ʔ)ay̓* (PAST), which on the surface appears to linearize outside of its expected orbit in certain cases. Such exceptional distributions can be explained if *(ʔ)ay̓* undergoes limited promotion to prosodic word.

In Section 5, we discuss implications and limitations of our analysis, as well as future directions. In Section 6, we conclude.

2 Clitic Orientation and Linearization in Nxaʔamxčín and Nsyilxcn

This section focuses on basic orientation and linearization patterns found in Nxaʔamxčín and Nsyilxcn clitics (Section 2.1), a notable exception to the linearization pattern in Nxaʔamxčín (*ay̓* PAST) (Section 2.2), how clitic linearization patterns change in the context of more than one potential prosodic host (Section 2.3), and probable syntactic constraints on clitic placement (Section 2.4). The overall focus will be on Nxaʔamxčín. See Lyon (2019) for additional data on Nsyilxcn clitics.

2.1 Basic Linearization Patterns

It has for some time been noted that pronominal clitics in Nxaʔamxčín may either precede or follow a main predicate (4–5) (Kinkade 1974, N. Mattina 2002, Bell 2003, Willett 2003, Czaykowska-Higgins 2019, Lyon & Czaykowska-Higgins 2019). For example, Kinkade (1974) describes Nxaʔamxčín clitics as "movable", N. Mattina (2002) discusses mobile clitics in the nominal domain, and Willett (2003:287) states that "there is some variation as to the syntactic positioning of the 1st and 2nd person clitics, but they generally appear in 1st or 2nd position."[7]

(4) a. **kn** qʷətnáyaʔqn.
kn √qʷətn-áyaʔ-qn
1SG.INTR big-top.of-head
'My head is big.' (MLW.AB.25.4) (Nxaʔamxčín)

b. qʷətnáyaʔqn **kn**.
√qʷətn-áyaʔ-qn **kn**
big-top.of-head 1SG.INTR
'My head is big.' (MLW.AB.25.4) (Nxaʔamxčín)

[7] The variation shown in (4–5) on the surface resembles the apparent free ordering of intransitive predicate and DP subjects in Nsyilxcn (Lyon 2018). Assuming however that the subject clitics in (4–5) are agreement (likely in Tense, cf. Baier 2020 for Montana Salish) and not syntactic arguments, the variation above could only be explained syntactically by assuming optional head-raising, which we assume is a non-starter, based partially on evidence that verbs in closely-related Nsyilxcn do not raise as high as or higher than T.

(5) a. **kn** ċəlíx.
kn ċəlíx
1SG.INTR stand
'I stood up.' (W4.168) (Nxaʔamxčín)

b. ċəlút **kn**.
ċəlút **kn**
stand 1SG.INTR
'I stood up.' (W4.167) (Nxaʔamxčín)

This apparent optionality has not been hitherto described in detail, and is puzzling from the Salish viewpoint, given that most other Salish languages do not allow such variation for any given clitic, instead following a strictly procliticizing (e.g. Nsyilxcn) or encliticizing (e.g. St'át'imcets) strategy.

The variable placement of clitics shown in (4–5) extends beyond just pronominal clitics in Nxaʔamxčín, also involving tense clitics and the yes/no question marker. For example, a future morpheme *naʔ* in (6) precedes an intransitive pronoun clitic and the main predicate, while in (7) it follows both.

(6) a. **naʔ kn** lčkíčx.
naʔ **kn** l-č-√kíčx
FUT 1SG.INTR return-CISL-arrive
'I will be back.' (W7.261) (Nxaʔamxčín)

b. lút **naʔ kn** ʔíɬn.
lút **naʔ**=**kn**=√ʔíɬn
NEG FUT=1SG.INTR=eat
'I do not want to eat.' (Y29.115) (Nxaʔamxčín)

(7) a. k'ám̓ **kn naʔ.**
√k'ám̓ **kn** **naʔ**
stay 1SG.INTR FUT
'I will stay.' (Y23.3) (Nxaʔamxčín)

b. šúlt **kʷ naʔ**.
√šúl-t **kʷ**=**naʔ**
cold-STAT 2SG.INTR=FUT
'You will get cold.' (Y25.36) (Nxaʔamxčín)

There is no data to indicate that the future marker and pronoun can be reversed with respect to one another in examples like (6) and (7). Unfortunately, it is not currently possible to conduct fieldwork with fluent speakers of Nxaʔamxčín, so we cannot say for sure that a sentence like *šúlt naʔ kʷ* (cf 7b) is ungrammatical. While this is a major limitation to our study, given the large size of the corpus, we believe that the absence of such data is suggestive.

Since Nxaʔamxčín and Nsyilxcn are sister languages, we might assume their syntax and prosody to be similar also. However, the two languages seem to exhibit a major split with respect to clitic behaviour: As shown above in (4–7), the same clitic in Nxaʔamxčín can precede a prosodic

host as a proclitic, or it can follow the same prosodic host as an enclitic.[8] In contrast, for Nsyilxcn, intransitive pronoun and tense clitics must precede their host (8), never follow (9).[9]

(8) a. **kn** nc̓aʔrqín.
kn n-c̓a<ʔ>r=qín
1SG.INTR LOC-ache<INCH>=head
'I have a headache.' (Mattina 1987) (Nsyilxcn)

b. **mi kʷu** xʷúy̓.
mi **kʷu** √xʷúy̓
FUT 1PL.INTR go.PL
'Let's go.' (LL, VF; SM, VF) (Nsyilxcn)

(9) a. * ncaʔrqín **kn**.
* n-c̓a<ʔ>r=qín **kn**
LOC-ache<INCH>=head 1SG.INTR
'I have a headache.' (SM) (Nsyilxcn)

b. * xʷúy̓ **kʷu mi**.
* √xʷúy̓ **kʷu** **mi**
go.PL 1PL.INTR FUT
'Let's go.' (SM) (Nsyilxcn)

The Nxaʔamxčín clitic 'mirroring' pattern shown in (4–7) appears also to apply to the yes/no question marker, though this marker is realized as a stress-bearing particle *šá* in initial position, and as the clitic *a* in final position.[10, 11] To be clear, we do not consider *šá* in (10a) to be a clitic, since it affects the linearization of other clitics similar to other non-clitic particles, to be discussed below. Nevertheless, the linearization of *sá* in (10a) mirrors that of the clitic form *a* in (10b).

(10) a. **šá kʷp** kpəqʷqʷánaʔ?
šá=**kʷp** k-pəqʷ·qʷ-ánaʔ
Q=2PL.INTR DRV-spill·FRED-ear
'Did it spill on you folks?' (W1.58) (Nxaʔamxčín)

b. šč̓ḥaẇiymíx **kʷp á**?
š-č-ḥaẇiy-míx **kʷp**=**á**
NMLZ-IPFV-work-CONT 2PL.INTR=Q
'Are you folks working?' (JM3.107.3) (Nxaʔamxčín)

[8] Or, the same clitic can precede a prosodic host as a proclitic or follow a *different* prosodic host as an enclitic.
[9] The Nsyilxcn yes/no question marker *ha* sometimes acts as a 2nd position enclitic.
[10] Nsyilxcn yes/no question marker *ha* optionally loses the [h], becoming *a*, when it occurs after its host.
[11] Bell (2003) states that Nxaʔamxčín *a* always carries stress. This appears to be a right-edge stress associated with an intonation phrase. In support of this, stressed particles which occur before *á* sometimes lose their stress (ibid). Bell summarizes the observation noting that "only the right-most particle will receive stress in *some* strings of particles and clitics." (p. 15)

Just as there is no data to indicate that future *naʔ* can intervene linearly between an intransitive pronoun and the prosodic host, under either ordering, there is also no data to indicate that a yes/no question marker can intervene linearly between an intransitive pronoun and the prosodic host. We predict linearizations like those in (11) to be ungrammatical.[12]

(11)	a.	P* **kn naʔ** lčkičx.	'I will be back.'	(cf. 6a)
	b.	P* k'ám̓ **naʔ kn**.	'I will stay.'	(cf. 6a)
	c.	P* **kʷp (š)á** k-pəqʷ·qʷ-ánaʔ?	'Did it spill on you folks?'	(cf. 10a)
	d.	P* ščḥaẇiymíx **a kʷp**?	'Are you folks working?'	(cf. 10b)

What emerges from Nxaʔamxčín examples like (4–7) and (10) above is a 'mirroring effect', whereby clitics are not restricted to linearizing on one specific side of their prosodic host: Instead, so long as they maintain a specific *relative distance* from their prosodic host, their position in absolute terms is variable. In other words, Nxaʔamxčín clitics appear to move in defined 'orbits'. The Nxaʔamxčín clitics discussed in this paper appear to fall into three orbits (12a). This is in stark contrast to the (more-or-less) strict ordering observed in Nsyilxcn (12b).

(12) a. [*yes/no question* [*tense* [*pronoun* [**host**] *pronoun*] *tense*] *yes/no question*]
b. [*yes/no question* [*tense* [*pronoun* [**host**]]] (*yes/no question*)]

In support of this general picture, existing data show that the yes/no question particle *sá* will always precede future *naʔ* in pre-predicate position (13a). We have no data showing the post-predicative order *naʔ a* (FUT Q), though based on the pattern shown above we do predict this to be a possible order (13b). Other possible orders we predict to be ungrammatical are shown in (13c,d).[13]

(13) a. **šá naʔ** q'ʷə́ln ʔači ḥananík.
šá **naʔ** √q'ʷə́l-n ʔači ḥananík
Q FUT roast+DIR-1SG.ERG that jack.rabbit
'Can I roast that jack rabbit?' (JM3.121.4) (NxaʔamxčínN)

b. P √q'ʷə́l-n **naʔ a** ʔači ḥananík. (cf. 13a)
c. P* **naʔ šá** √q'ʷə́l-n ʔači ḥananík. (cf. 13a)
d. P* √q'ʷə́l-n **a naʔ** ʔači ḥananík. (cf. 13a)

Interestingly, clitic orbits seem to operate independently of one another. In (14a) below, the pronoun *kʷ* precedes its prosodic host, while future *naʔ* follows. In (14b), future *naʔ* (ambiguously) precedes *lkʷáš* and follows *lút*, while *a* clearly follows its host.

[12] We use the combined symbol 'P*' before examples which we predict to be ungrammatical and the symbol 'P' before examples we predict to be grammatical, but which have not been documented as having been judged ungrammatical or grammatical by a fluent speaker. Examples marked as 'P' are based on directly parallel, attested grammatical examples. We hope that examples like these can eventually be checked with fluent speakers.

[13] There are other possible orderings to the clitics in (13) following the DP *ʔači ḥananík* 'that jackrabbit', but we abstract away from these for the purposes of this paper, partially because verbal domain clitics interact with nominal hosts somewhat differently.

(14) a. **kʷ** nhampátkʷ **naʔ**.
kʷ nhamp-átkʷ **naʔ**
2SG.INTR fall.in-water FUT
'You will fall in the river.' (cf. 6–7) (JM3.139.2) (Nxaʔamxčín)

b. lút **naʔ** lkʷáš **á**.
lút=**naʔ** l-kʷá-š **á**
NEG=FUT LOC-take+DIR-3ERG Q
'He won't take it back, will he?' (cf. 13a,b) (MDK.Y29.154) (Nxaʔamxčín)

c. P* **naʔ** nhampátkʷ **kʷ**. (cf. 14a)
d. P* lút (**š**)**á** l-kʷá-š **naʔ**. (cf. 14b)

Orbital independence may have limits, however: There is no data to indicate that in such cases, a tense clitic may precede the host, and the pronoun follow the host (14c),[14] or that a yes/no question marker can precede the host while a tense clitic follows (14d). We tentatively predict these linearizations to be ungrammatical.

As a preview of our analysis (Section 4), the independence of clitic orbits shown in examples like (14a,b) follows from our proposal that pronouns like *kʷ*, future *naʔ*, and yes/no question marker *a* are parsed at different levels of the prosodic hierarchy, and subject to different alignment constraints. Additionally, the absence in our corpus of certain 'independent' orderings (e.g. 14c,d) suggests an implicational relationship between alignment constraints operating at different orbital levels. While stress and syllabification *may* play a role in the placement of some clitics (Sections 2.2 and 2.3),[15] the major point to remember is that minimal pair examples like (4) show that some level of prosodic optionality must be present in Nxaʔamxčín grammar.

2.2 The case of *ay̓* PAST

The tense-related clitic *ay̓* PAST exhibits a more flexible distributional pattern than *naʔ* FUTURE, as discussed above. When *ay̓* cooccurs with a subject clitic in the context of one potential prosodic host,[16] it always follows the pronoun, regardless of the orientation of other clitics towards the predicate (15–16). (Note additionally that when *ay̓* occurs before a prosodic host, as in (15a), it is often transcribed as *ʔay̓*.) This ordering shows that the mirroring effect has limitations and that *ay̓* represents a different class of clitic, and/or other phonological or syntactic considerations are also important.

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[14] Apparent counterexamples such as (i) below almost certainly involve two hosts, for reasons discussed below: *ay̓* is encliticizing to *šwát,* and *kʷ* is either encliticizing to *ʔaní* or procliticizing to *čút*.

(i) šwát **ay̓** ʔaní **kʷ** čút t xʷay̓əm?
šwát **ay̓** ʔaní **kʷ** čút t xʷay̓-əm
who PST DET 2SG.INTR say OBL run.away-MID
'Who did you say it was that ran away?' (MLW.AB.47.1) (Nxaʔamxčín)

[15] Bell (2003) discusses Nxaʔamxčín clitics as elements that "do not normally participate in the stress-bearing patterns of a phonological phrase and can surface as either proclitics or enclitics to the prosodic nucleus. Particles, on the other hand, participate in the stress patterns of the phonological phrase and always precede the prosodic nucleus." The effect of stress on clitics remains unclear, however.

[16] With a secondary potential stress-bearing host in initial position (e.g. 16a), *ay̓* optionally behaves as a second-position enclitic, 'jumping over' a pronoun (see Section 2.3).

(15) a. **kn ʔaẏ̓** nuǩʷtútiyˀaʔ.
kn **ʔaẏ̓** √nuǩʷt-útiyˀaʔ
1SG.INTR PAST go-on.foot
'I went on foot.' (JM3.185.8) (Nxaʔamxčín)

b. naǩáł **kn aẏ̓**.
na-√ǩáł **kn=aẏ̓**
LOC-afraid 1SG.INTR=PAST
'I was scared.' (W3.10) (Nxaʔamxčín)

(16) a. šá **kʷ aẏ̓** xə́λ'p?
šá=**kʷ=aẏ̓** √xə́λ'-p
Q =2SG.INTR=PAST lose-INCH
'Did you lose?' (W9.29.84) (Nxaʔamxčín)

b. xə́λ'p **kʷ aẏ̓ á**?
xə́λ'-p=**kʷ=aẏ̓**=**á**
lose-INCH=2SG.INTR=PAST=Q
'Did you lose?' (W.9.5.85) (Nxaʔamxčín)

Given that *aẏ̓* and *naʔ* are both semantically tense-related, we hypothesize that both occupy a syntactic position somewhere in the neighbourhood of T(ense).[17] Assuming also that intransitive proclitics are agreement markers occupying T(ense) (cf. Davis 2018 for St'át'imcets, and Baier 2020 for Montana Salish), then pronoun clitics are close to *aẏ̓* and *naʔ* not only prosodically, but also syntactically. It is therefore surprising that *aẏ̓* linearizes differently than *naʔ*, and hints at a prosodic difference between the two markers. We return to the topic of *aẏ̓* in the next section.

2.3 Linearization Patterns in the Context of Multiple Potential Hosts

Clitic linearization patterns in the context of one potential prosodic host are fairly straightforward (Sections 2.1 and 2.2). There is good evidence, however, that in the presence of multiple potential prosodic hosts, some Nxaʔamxčín clitics will in many cases gravitate towards the first prosodic host in the clause as enclitics. In the case of (17a–c), the initial hosts are particles, and in (17d) the host is a quantifier. Note that the clitics in (17) follow the predicted orbits as given in (12), the only difference being that the prosodic host in these cases is not the main predicate.

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[17] Past *aẏ̓* and future *naʔ* can co-occur in 'future-in-the-past' sentences. In (i) below, *aẏ̓* and *naʔ* appear to be in separate clauses, though in (ii) they seem to be in the same clause, suggesting that although they are both tense-related, they may be in different syntactic positions. (Alternatively, *na* in (ii) may be an allomorph of the locative prefix *n-*.)

(i) ǩmánkš **aẏ̓ naʔ** ščúẇ̓š.
ǩmánk-š=**aẏ̓** **naʔ** š-√čúẇ̓-š
want-(DIR)-3ERG=PAST FUT NMLZ-hit-3POSS
'He wanted to hit him.' (Y29.169) (Nxaʔamxčín)

(ii) łu šak **aẏ̓ na** čúč kʷa šak **aẏ̓** kíčnč.
łu šak **aẏ̓** **na** čúč kʷa šak **aẏ̓** √kíč-n-č
COMP POT PAST FUT say[?] CONJ POT PAST arrive-DIR-2SG.OBJ+1SG.ERG
'He could visit me if he really wanted to.' (EP4.47.6) (Nxaʔamxčín)

(17) a. tíl̓ **kt** šxəšxəštmíx.
[tíl̓=**kt**] š-xəšxəšt-míx
EXCL=1PL.INTR NMLZ-getting.lost-CONT
'I think we are getting lost.' (W9.81) (Nxaʔamxčín)

b. tíl̓ **ay̓ á** čkìčx?
[tíl̓=**ay̓=á**] č-√kìčx
EXCL=PAST=Q CISL-arrive
'Did he get here?' (Y29.155) (Nxaʔamxčín)

c. mət **ay̓ á** t̓i ʔačkʷənkšntwáxʷ.
[mət=**ay̓=á**] t̓i ʔač-√kʷən-kš-nt-wáxʷ
EPIS=PAST=Q EXCL IPFV-take-hand-DIR-RECP
'Maybe she was married.' (JM3.113.5) (Nxaʔamxčín)

d. yaʕ̓yaʕ̓tú **lx á** xʷáy̓ʕštəxʷ?
[yaʕ̓yaʕ̓tú **lx á**] xʷáy̓ʕ-št-əxʷ
all 3PL Q scold-CAUS-2SG.ERG
'Did you scold every one of them?' (MLW.AB.26.5) (Nxaʔamxčín)

Distributionally speaking, there is no evidence to suggest that anything besides a stress-bearing particle or word can attract a clitic string in this manner. In other words, these environments provide a diagnostic for distinguishing particles from clitics.

For similar cases involving a subject pronoun and *ay̓,* the pronoun usually precedes *ay̓* following the pattern established in Section 2.2 above.[18]

(18) a. šá **lx ay̓** yaʕ̓yaʕ̓tú xʷáy̓ʕštəxʷ?
[šá **lx ay̓**] yaʕ̓yaʕ̓tú xʷáy̓ʕ-št-əxʷ
Q 3PL PAST all scold-CAUS-3SG.ERG
'Did you scold every one of them?' (MLW.AB.26.6) (Nxaʔamxčín)

b. ša **kʷ ay̓** táwəm t štaṁ?
[ša **kʷ ay̓**] √táw-əm t štaṁ
Q 2SG.INTR PAST buy-MID OBL what
'Did you buy anything?' (MLW.AB.52.2) (Nxaʔamxčín)

However, the presence of an initial, secondary potential host affects the linearization possibilities of *ay̓*: *ay̓* may optionally precede a pronoun (19) in such cases.[19] In (19b, cf. 18b), *ay̓* becomes contracted, syllabifying with the host *sá* as a diphthong vowel within the syllable nucleus [saikʷ].

(19) a. šáẇnč **ay̓ kn** kašʔíłnəxʷ.
šáẇnč=**ay̓** **kn**=kaš-√ʔíłn-əxʷ
ask-DIR-1SG.OBJ+3ERG=PAST 1SG.INTR=PROS-eat-CONT
'He asked me to eat.' (Y29.188) (Nxaʔamxčín)

[18] Contrasting (17d) and (18a) shows that *ay̓* is optional in past tense contexts.
[19] See Huijsmans (2015) for a discussion of reordering of tense and subject clitics in Northern Straits.

b. xʷús taʔ naq̓ʷiqc̓tn ša**ikʷ** ʔáłm wíxən txaʔ....
xʷús taʔ na-q̓ʷiqc̓tn ša**=i=kʷ** ʔáłm wíxən txaʔ
hurry IMP LOC-? Q=PAST=2SG.INTR very see here
'Hurry have you seen here....' (ECH.ED.90.CD) (Nxaʔamxčín)

Examples like (20–21) below reinforce an argument that the relative ordering of *ay̓* and pronoun clitics is optional in the context of multiple possible prosodic hosts, especially the minimal pair shown below as (20a, 21a).

(20) a. pláqəl **ay̓ kn** nk̓upəlwáš.
pláqəl **ay̓** **kn** nk̓upəlwáš
yesterday PAST 1SG.INTR lonely
'Yesterday I was lonely.' (ECH.AB.91.56) (Nxaʔamxčín)

b. lút **ay̓ kʷ** čxxák'ənaʔ.
lút=**ay̓** **kʷ** č-x+√xák'=ənaʔ
NEG=PAST 2SG.INTR IPFV-RED+listen=ear
'You weren't listening.' (W8.231) (Nxaʔamxčín)

(21) a. pláqəl **kn ay̓** nk̓upəlwáš.
pláqəl **kn** **ay̓** nk̓upəlwáš
yesterday 1SG.INTR PAST lonely
'Yesterday I was lonely.' (ECH.AB.91.56) (Nxaʔamxčín)

b. lút **kʷ ay̓** náẇəlx.
lút **kʷ=ay̓** náẇ-əlx
NEG 2SG.INTR=PAST run-AUT
'You didn't run.' (W2.88) (Nxaʔamxčín)

Comparing the distributions of tense morphemes *naʔ* and *ay̓*, it seems clear that *naʔ* operates orbitally like intransitive pronouns and the yes/no question marker, and yet while it is also clear that orbits are relevant to *ay̓,* which seems always to follow a pronoun to a post-host position, the linearization of *ay̓* seems to be dependent on additional considerations.

Multiple possible linearizations for *ay̓* in the context of multiple potential hosts could be attributed to a tension between its preference for second-position (Czaykowska-Higgins 2019) (e.g. 20a),[20] and its preference for remaining in orbit (e.g. 21a).[21] Alternatively, and more simply, given that pronouns can either precede or follow their hosts, when *ay̓* occurs in second position before a pronoun as in (20), it is because the pronoun must be procliticizing to the following host. In support of this alternative, recall that in the presence of a single possible prosodic host, the pronoun will always precede *ay̓* (15). The post-host distribution of *ay̓* in similar cases (22) is always that

[20] Other post-host items discussed in Czaykowska-Higgins (2019) are imperative *taʔ,* 3rd plural marker *lx*, and yes/no question marker *a*. The apparent ordering of these four items are *taʔ lx ay̓ a,* though these do not all co-occur for semantic reasons.

[21] An additional consideration is that pronoun clitics nearly always consist only of consonants, and hence are ideal onset providers, which may feed into an explanation why the pronoun clitic optionally 'attracts' *ay̓* away from second-position.

predicted by the tense orbit as established by the regular distribution of *naʔ* (23), rather than the alternative ordering shown above in (20). We predict that the orderings shown in (24) are not possible for *naʔ* or *ay̓* in contexts with only one potential prosodic host.[22]

(22) a. šúlt **kʷ ay̓ á**?
√šúl-t **kʷ=ay̓=á**
cold-STAT 2SG.INTR=PAST=Q
'Were you cold?' (Y25.36) (Nxaʔamxčín)

b. naxáł **kn ay̓**.
na-√xáł **kn=ay̓**
LOC-afraid 1SG.INTR=PAST
'I was scared.' (W3.10) (Nxaʔamxčín)

(23) šúlt kʷ **naʔ**.
√šúl-t kʷ=**naʔ**
cold-STAT 2SG.INTR=FUT
'You will get cold.' (Y25.36) (Nxaʔamxčín)

(24) a. P* na-√xáł **ay̓ kn**. 'I was scared.' (cf. 24b)
b. P* k'ám̓ **naʔ kn.** 'I will stay.' (cf. 11b, 6a,b)

The preceding discussion describes the distribution of the vast majority of documented cases of pronoun clitics with respect to the tense clitics *ay̓* and *naʔ,* and the yes-no question clitic *a.* In general, clitics have been shown to move in three basic orbits, though the distribution of *ay̓* introduces complications, as shown by the fact that in environments involving multiple potential hosts, there is more than one possible linearization (20–21). Importantly, second-position is attested for neither *naʔ* nor *ay̓* when they co-occur with a pronoun in a post-predicative *single-host* environment (24). We argue that cases such as (24) are unattested, and likely ungrammatical, because in lieu of an additional prosodic host for the pronoun clitic to *pro*cliticize to (20), the linearization is orbit-violating.

There are several additional distributions of *ay̓* which require attention, and which must be accounted for under any analysis. First, *ay̓* is not attracted by the initial stressed adverb in (25), which supports the idea that although *ay̓* prefers to follow a prosodic host, this host need not be the first prosodic word in a clause.

(25) t'unáxʷ naxáłn **ay̓**.
t'unáxʷ na-√xáł-n**=ay̓**
a.little.bit LOC-afraid-(DIR)-1SG.ERG=PAST
'I scared him a little bit.' (W3.14) (Nxaʔamxčín)

[22] Possible linearizations like (24) are revisited in detail in Section 4.4. They are predicted to be ungrammatical because a tense clitic, which must be parsed as a part of a phonological phrase, cannot linearly intervene between the prosodic word host and a subject clitic, which must be parsed as part of the host's prosodic word. This is achieved by BINARITY(φ) (Elfner 2012).

In support of this, consider (26a) where *ay̓* assumes second-position after the initial stress-bearing exclusive particle *t̓il̓,* but in similar (26b), *ay̓* instead attaches to the main predicate.[23]

(26) a. čnəqínəm kʷaʔ t̓íl̓ **ay̓** łət̓.
č-nəqín-əm kʷaʔ [tíl̓=**ay̓** łət̓]
CISL-come.into.house-MID CONJ EXCL=PAST wet
'He came into the house and he was already wet.' (W10.10) (Nxaʔamxčín)

b. t̓il̓ łət̓ **ay̓**.
t̓il̓ łət̓ **ay̓**
EXCL wet PAST
'It's already wet.' (MDK notes; quoted in Bell 2003,7) (Nxaʔamxčín)

Note that *t̓il̓* is transcribed as stressed in (26a), while *łət̓* is transcribed as stressed in (26b), and so for this pair at least, the placement of *ay̓* plausibly depends on the formation of a trochaic foot. However metrical considerations do not explain the free alternation shown above in (20a, 21a).

Second, there are rare cases where *(ʔ)ay̓* occurs initially in a clause (27). In these cases, it is transcribed as beginning with a glottal stop.

(27) **ʔay** ʔačkíčštmš yaʕʔtú sx̌ə́lx̌əlt łu ay̓ páṅká ʔaní.
ʔay ʔač-kíč-št-m-š yaʕʔtú sx̌ə́lx̌əlt łu ay̓ páṅká ʔaní
PAST IPFV-arrive-CAUS-2SG.OBJ-3ERG all day COMP PAST when there
'He used to visit me every day.' (EP4.46.2) (Nxaʔamxčín)

In pre-predicative single host environments (28-29), *(ʔ)ay̓* is also sometimes transcribed as beginning with a glottal stop (28), though it is never transcribed as such in post-host environments.

(28) **kn ʔay̓** nux̌ʷtútiyʾaʔ.
kn **ʔay̓** √nux̌ʷt-útiyʾaʔ
1SG.INTR PAST go-on.foot
'I went on foot.' (cf. 15a) (JM3.185.8) (Nxaʔamxčín)

(29) **kn ay̓** nk̓upəlwáš pláqəl.
kn **ay̓** nk̓upəlwáš pláqəl
1SG.INTR PAST lonely yesterday
'Yesterday I was lonely.' (cf. 20a, 21a) (ECH.AB.91.56) (Nxaʔamxčín)

In our analysis, the main restriction on clitic *ay̓* is that it not be parsed initially in its phonological phrase (Section 4.4). This allows for considerable freedom of movement within a clause, accounting for examples like (25-26). If *ay̓* is parsed initially in its phonological phrase, then it must also be promoted to a prosodic word. This accounts not only for the initial glottal stop in such

[23] The failure of *ay̓* to attach to the conjunction *kʷaʔ* in (26a) may be syntactic: *kʷaʔ* is too high in the clause. Modal particles also seem to block *ay̓* from moving into second-position, as discussed in Section 2.4. Alternatively, Bell (2003) analyzes *kʷaʔ* as an "extrametrical unit" which does not carry stress, thus accounting for its exceptional behaviour, though Bell's analysis does not explain the modal data in (32–33), where a clearly stressed *šá* or potentially stress-bearing *t̓il̓* also does not attract a clitic.

positions (27, 28), but also the apparent orbit-violating linearization of the pronoun occurring before *(ʔ)ay̓* (28, 29).

2.4 Probable Syntactic Limitations on Clitic Placement

There seem to be syntactic factors which limit the placement of certain clitics in the context of multiple potential hosts, which suggests that clitic linearizations are determined, in part, syntactically.

Firstly, there is evidence that at least some clitics are clause-bound. Though data is limited, it seems that *ay̓* must attach within the clause that it is interpreted. In (30a), for example, it is the *making* that occurred in the past, not the *telling.* This is less clear for (30b), but still apparent with the translation of *ay̓* as 'already' in the second clause.

(30) a. šak čúntxʷ šwát **ay̓** ḥáẇiyš.
šak čún-t-xʷ šwát=**ay̓** ḥáẇiyš
POT say-DIR-2SG.ERG who=PAST make(TR)
'You can tell him who made it.' (JM3.120.7) (Nxaʔamxčín)

b. čnəqínəm kʷaʔ t̓íl̓ **ay̓** łət̓.
čnəqínəm kʷaʔ t̓íl̓=**ay̓** łət̓
come.in.house CONJ EXCL=PAST wet
'He came into the house and he was already wet.' (W.10.10) (Nxaʔamxčín)

Second, the syntactic status of a potential prosodic host may affect linearization. The proper name argument DP in (31a) is presumably stress-bearing, and therefore a potential host, but *ay̓* does not attach to the DP.[24] In (31b), the proper name DP is in the focus position of a cleft sentence, as indicated by clefting complementizers *łuʔ* and *či*, but in this case *ay̓* does attach to the DP.

(31) a. John šč̓qaq̓ítəxʷ **ay̓** pláqəl.
John š-č-q̓aq̓ít-əxʷ **ay̓** pláqəl
John NMLZ-IPFV-fishing-CONT PAST yesterday
'John went fishing yesterday.' (Nxaʔamxčín)

b. Mary **ay̓** łuʔ/či kxápnč plaqəl.
Mary **ay̓** łuʔ/či kxáp-n-č plaqəl
Mary PAST COMP chase-DIR-1SG.OBJ+3ERG yesterday
'It was Mary who chased me yesterday.' (ECH.AB.92.244) (Nxaʔamxčín)

Third, despite the pattern shown above in examples (17–18), pronoun clitics will never precede a stress-bearing modal particle like *máxʷ* or *sáʔk* in favour of an initial prosodic host (32).

(32) a. t̓íl̓ máxʷ **kt** sxəšxəštmíx.
t̓íl̓ máxʷ=**kt** sxəšxəštmíx
EXCL EPIS=1PL.INTR getting.lost
'Maybe we're lost.' (W9.23) (Nxaʔamxčín)

[24] Alternatively, *ay̓* in (31a) could be in second-position, and the subject DP has raised post-linearization.

b. ṫíl̓ šáʔk **kt** təx̌ʷp.
ṫíl̓ šáʔk=**kt** təx̌ʷp
EXCL POT=1PL.INTR quit
'We'd better quit now.' (W.6.66) (Nxaʔamxčín)

The same pattern is apparent for *ay̓* and *naʔ* (33–34).[25] In (33a), yes/no particle *šá* hosts *ay̓* as an enclitic, but in the context of a modal such as *máxʷ* or *mət* (33b,c), *ay̓* always follows the modal.[26]

(33) a. ša **ay̓** x̌əlq̓aχ̌ƛ̓čín.
ša **ay̓** x̌əlq̓aχ̌ƛ̓čín
Q PAST slaughter.animal
'Did he kill/slaughter an animal?' (Willett, 2003:320) (Nxaʔamxčín)

b. šá **máxʷ ay̓** kʷáš.
šá **máxʷ ay̓** kʷáš
Q EPIS PAST take+DIR+3ERG
'I wonder if he took it.' (W4.79) (Nxaʔamxčín)

c. ṫil̓ kʷən **mət ay̓** káłən.
ṫil̓ kʷən **mət** **ay̓** káłən
EXCL EVID[?] EPIS PAST give+DIR+SG.ERG
'I guess I did give it to him.' (W11.41) (Nxaʔamxčín)

(34) a. máxʷ **naʔ** ʔəmtən.
máxʷ **naʔ** √ʔəm-t-ən
EPIS FUT feed-DIR-1SG.ERG
'Maybe I will feed him.' (W11.107) (Nxaʔamxčín)

b. máxʷ **naʔ kn** núx̌ʷt.
máxʷ=**naʔ** **kn** núx̌ʷt
EPIS=FUT 1SG.INTR go
'Maybe I will go.' (W11.85) (Nxaʔamxčín)

There is no clear prosodic reason that a pronoun or tense clitic could not in principle precede a modal particle and attach to an initial host, but this is unattested. If modal particles block intransitive pronoun clitics and tense clitics from attaching to an initial prosodic host, it seems likely that this is due to a syntactic restriction, such that these clitics cannot occur higher than the modal.

Assuming that modals act as syntactic barriers to clitic linearization, and that modals are lower in the syntax than yes/no question particles, we additionally predict that intransitive pronoun clitics and tense clitics will neither *precede* a yes/no question marker *before* a prosodic host (35a), nor

[25] Although a related, stress-bearing future marker *naʔšúʔ* can precede a modal (i) and the conjunction *kʷaʔ* (ii). *naʔšúʔ* has the phonological shape and distribution of an adverb, rather than a clitic.

(i) ...kʷaʔ **naʔšúʔ maxʷ** ʔitx.
...kʷaʔ **naʔšúʔ** **maxʷ** ʔitx
CONJ FUT EPIS sleep
'...and then maybe he'll sleep.' (CD.64)

(ii) **naʔšuʔ kʷaʔ** kʷ wiʔčín…
naʔšuʔ **kʷaʔ** kʷ √wiʔ-čín
FUT CONJ 2SG.INTR finish-food
'After you are finished eating…' (CD)

[26] Modal particles never follow the main predicate, unlike tense-related particles.

follow a question particle *after* a prosodic host (35b), and indeed such data are not found in the corpus.

(35) a. ᵖ* **kʷ ay̓ šá** √xə́ƛ'p. (cf. 16a)
b. ᵖ* xə́ƛ'p **a kʷ ay̓**. (cf. 16b)

The implication is that prosodic orbits correspond in some sense to syntactic position, and a clitic which is syntactically lower than a modal cannot escape to a position whose linearization implies a higher position.

(36) [*yes/no question* **[*modal*]** [*future* [*pronoun* [**host**] *pronoun*] *future*] *yes/no question*]

Last, consider that both *ay̓* and *naʔ* are similar in maintaining a tight relationship with subject clitics, such that normally, nothing can intervene between *ay̓* or *naʔ* and a subject clitic. In the few cases in which they orbit independently, the intervening element is always the main predicate (37a,b), negation (37c,d), or negation plus the main predicate (37e). This indicates that subject and tense clitics are syntactically close not only to one another, but also syntactically closer to their predicate host than other clitics.[27] (Recall that in such cases the pronoun will always precede the host, and the tense clitic will always follow the/a host: the reverse order is unattested.)

(37) a. **kʷ** nhampátkʷ **naʔ**.
kʷ nhamp-átkʷ **naʔ**
2SG.INTR fall.in-water FUT
'You will fall in the river.' (JM3.139.2) (Nxaʔamxčín)

b. **kn** ʔíłn **ay̓** t̓íl̓.
kn √ʔíłn=**ay̓** t̓íl̓
1SG.INTR eat=PAST EXCL
'I already ate.' (W3.16) (Nxaʔamxčín)

c. šac'kámx kʷaʔ **kʷ** lút **ay̓** táw x̌əƛ'čín n l wənáči?
šac√'kámx kʷaʔ **kʷ**=lút=**ay̓** √táw x̌əƛ'čín n l wənáči
why CONJ 2SG.INTR=NEG=PAST buy horse [?] at Wenatchee
'Why didn't you buy a horse when you were in Wenatchee?' (Y29.185) (Nxaʔamxčín)

d. kʷaʔ šac'kámx kʷaʔ **kʷ** lút **naʔ** k̓lči**ʔ**áł nùx̌ʷt?
kʷaʔ šac'kámx kʷaʔ **kʷ** lút **naʔ** k̓lči**ʔ**áł √nùx̌ʷt
CONJ why CONJ 2SG.INTR NEG FUT to.there go
'Why won't you go there?' (W11.92) (Nxaʔamxčín)

e. šac'kámx kʷaʔ **kʷ** lút núx̌ʷt **ay̓**?
šac'kámx kʷaʔ **kʷ**=lút √núx̌ʷt=**ay̓**
why CONJ 2SG.INTR=NEG go=PAST
'Why didn't you go home?' (Y29.184) (Nxaʔamxčín)

[27] This pattern also implies that negation is lower than tense. See Huijsmans (2015) for Northern Straits.

In preparation for our analysis in Section 4, Section 3 reviews the idea of clitic domains as discussed in Lyon (2019), who presented evidence that Nsyilxcn clitics are parsed at different prosodic levels (see Gerdts & Werle 2014 for Halkomelem). Here, we extend this concept to Nxaʔamxčín.

3 Clitic Domains

In Section 3.1, we re-establish three clitic domains for Nsyilxcn based on distributional, phonological, and syntactic criteria (Lyon 2019): core inner, pivotal inner, and outer clitics. In Section 3.2, we extend these domains, which are crucial components in our analysis of clitic linearizations, to Nxaʔamxčín.

3.1 Nsyilxcn Clitic Domains

Lyon (2019) demonstrates that some Nsyilxcn clitics must linearize closer to their predicate host (inner clitics) than other clitic types (outer clitics). Distributional and phonological differences support a further distinction between 'core' inner and 'pivotal' inner clitics on the one hand, and pivotal inner clitics and outer clitics on the other. In this section, I review the evidence.

Example (38) shows an Nsyilxcn sentence consisting of two stresses, and therefore potentially two separate clitic domains, as shown by the bracketing. The yes/no question marker *ha* (i) is an outer clitic, *yámx̌ʷaʔ* 'basket' and *kʷíntxʷ* 'you take it' (ii) are inherently stressed prosodic word hosts of the nominal and verbal domains, respectively. The determiner *iʔ* and future marker *mi* (iii) are examples of inner pivotal clitics of the nominal and verbal domains, respectively.

(38) **ha iʔ** yámx̌ʷaʔ **mi** kʷíntxʷ?
[**ha iʔ** yámx̌ʷaʔ][**mi** kʷí[n]-nt-xʷ]
(i) (iii) (ii) (iii) (ii)
ha iʔ yámx̌ʷaʔ mi kʷí[n]-nt-xʷ?
Q DET basket FUT take-DIR-2SG.ERG
'Is it the basket you're going to take?' (SM) (Nsyilxcn)

Core inner clitics (not shown in 38) attach directly to the main predicate in Nsyilxcn. Core inner clitics of the verbal domain include intransitive subject pronouns (39a), the *ɬ(aʔ)* complementizer (39b), and the negative factual marker *t̓(a)* (39c).[28] These clitics sometimes show differences in relative ordering with respect to one another (cf. 1), but occur closer to the predicate than other inner clitics.

(39) a. **kn** ʔayx̌ʷt.
kn ʔayx̌ʷt
1SG.INTR tired
'I am tired.' (LL, VF) (Nsyilxcn)

b. **kʷu ɬ** ʔalʔílxʷt…
kʷu **ɬ(aʔ)** ʔal·ʔílxʷt
1PL.INTR COMP TRED·hungry
'When we are/were hungry...' (SM, VF) (Nsyilxcn)

[28] Core inner clitics of the nominal domain include the set of prepositions (see Table 1).

c. lut **kn t̓a** kłkəkəwáp.
lut **kn** **t̓a** kł-kəˑkəˑwáp
NEG 1SG.INTR NEG.FAC have-horseˑDIM.REDˑ
'I don't own any dogs.' (SM, VF) (Nsyilxcn)

Nsyilxcn inner clitics must parse as part of an extended prosodic word which includes the main predicate, and never parse with an adverb or other prosodic host (in contrast to Nxaʔamxčín). Example (40a) is ungrammatical because the subject pronoun *kʷ* is attaching to an adverbial host *púti?*, rather than to the main predicate as in grammatical (40b). Outer clitics like the yes/no question marker *ha* are not subject to this restriction (40b).

(40) a. * **ha kʷ** púti? q̓ʷʕaylqs?
* **ha** **kʷ** púti? q̓ʷʕay-lqs
Q 2SG.INTR still black-robe
'Are you still a priest?' (SM) (Nsyilxcn)

b. **ha** púti? **kʷ** q̓ʷʕáylqs? (LL, VF) (Nsyilxcn)

Pivotal inner clitics are similar to core cases in that they must attach to a prosodic host which includes the main predicate, but they always occur to the outside of core inner clitics such as a pronoun or the *ła?* complementizer. Pivotal inner clitics include the complementizer *ki?,* and future marker *mi*, as shown in (41).

(41) **mi kʷu** xʷuy̓.
mi **kʷu** xʷúy̓
FUT 1PL.INTR go.PL
'Let's go.' (LL, VF; SM, VF) (Nsyilxcn)

Most core and pivotal inner clitics participate in a phonological process known as '[a]-insertion/replacement' (A. Mattina 2000). When a core inner clitic occurs before a [n, l, y, w], [a] is inserted between the clitic and that consonant (42). When an inner clitic with an [i] vowel occurs before [c] or [ɬ], the [i] vowel becomes [a] (43). This only occurs with inner clitics, never prefixes, adverbs, outer clitics, or other particles.

(42) **[a] insertion**

a.	k̓l‿nʔiƛ̓tk 'to the north'	⇒	k̓l**a**‿nʔíƛ̓tk
b.	tl‿nyxʷut 'from inside'	⇒	tl**a**‿nyxʷút
c.	lúti? ɬ‿nʔułxʷ 'before he went in'	⇒	lúti? ɬ**a**‿nʔúɬxʷ
d.	cúntəm iʔ‿t‿lʔiws 'his dad told him'	⇒	cúntəm iʔ‿t**a**‿lʔiws
e.	iʔ‿t‿ylmíxʷəm 'by the boss'	⇒	iʔ‿t**a**‿ylmíxʷəm
f.	iʔ‿ylmíxʷəm 'the boss'	⇒	y**a**‿ylmíxʷəm

(43) **[a] replacement**

a. cniłc iʔ cqʷəlqʷílsts ‘He’s talking to him.’ ⟹ cniłc **a‿**cqʷəlqʷílsts

b. iʔ łcxʷústxʷ ‘what you brought back’ ⟹ **a‿**łcxʷústxʷ

c. ...kiʔ ctərq̓áməlx ‘when they winter dance’ ⟹ ...k**a‿**ctərq̓áməlx

An exception to this rule is future *mi,* which does not undergo [a]-replacement. Nevertheless, given its complementary distribution with *kiʔ* (which becomes *ka* in 43c), its ability to ‘double’ (see below), and its linearization to the left of pronouns, Lyon (2019) analyzes it as a pivotal inner clitic.

An additional distinction between inner and outer clitics comes from ‘clitic doubling’. Only inner clitics, core (44a) or pivotal (44b), have the ability to ‘double’ within a single clause. The optional ‘double’ can attach to a prosodic host other than the main predicate.[29]

(44) a. (**kʷu**) yaʕyáʕt **kʷu** łaʔɬʕát̓.

(**kʷu**)	yaʕyáʕt	**kʷu**	łaʔ·ɬ<ʔ>ʕát̓
(1PL.INTR)	all	1PL.INTR	TRED·wet<INCH>

‘We all got wet.’ (LL, VF) (Nsyilxcn)

b. **mi** anwí **mi kʷ** xʷúy.

(**mi**)	anwí	**mi**	**kʷ**	xʷúy
(FUT)	2SG.INDEP	FUT	1SG.INTR	go

‘Yeah, you go.’ (SM, VF) (Nsyilxcn)

In terms of linear ordering, future *mi* and complementizer *kiʔ* are the leftmost inner clitics (45): any clitic occurring to the left of *mi* or *kiʔ* will never undergo [a] insertion/replacement or double, and need not attach to the main predicate, i.e. they are outer clitics.[30]

(45) a. pənʔkín **mi kʷu** xʷuẏ?

pənʔkín	**mi**	**kʷu**	xʷúẏ
when	FUT	1PL.INTR	go.PL

‘When will we go?’ (LL, VF) (Nsyilxcn)

b. pənʔkín **kiʔ kʷu** xʷuẏ?

pənʔkín	**kiʔ**	**kʷu**	xʷúẏ
when	COMP	1PL.INTR	go.PL

‘When did we go?’ (SM, VF) (Nsyilxcn)

Lyon (2019) claims that these *outermost* inner clitics are syntactically in the neighbourhood of T(ense). Modals and other syntactically high-scope-taking particles cannot occur linearly to the right of *mi* and *kiʔ,* suggesting that modals and outer clitics such as the yes/no question marker *ha* are in syntactic positions above T(ense).[31] Because *mi* and *kiʔ* are syntactically and prosodically at the borderline, we refer to them as pivotal inner clitics.

[29] It is unclear at this point whether clitic doubling is primarily a phonological or syntactic phenomenon.

[30] Important Nsyilxcn outer clitics not discussed in this paper include some modals and evidentials.

[31] The complementizer *łaʔ* is an exception to this rule, as a core inner clitic, but there is some evidence to indicate a localized prosodic inversion of *łaʔ* and clitic pronouns, on par with the prosodic inversion of determiner *iʔ* and prepositions in nominal contexts.

In sum, Nsyilxcn inner clitics must attach to the main predicate as their prosodic host, they are phonologically integrated with their host as shown by the [a] insertion/replacement data, and they can optionally 'double'. Outer clitics, in contrast, can attach to either a pre-predicative prosodic host or the main predicate, and do not double. Though pivotal clitics are still inner clitics, they may not be quite so phonologically integrated, as shown by the fact that future *mi* does not undergo [a]-replacement.

3.2 Nxaʔamxčín Clitic Domains

Given the cognacy and/or functional equivalency between Nsyilxcn and Nxaʔamxčín functional morphemes (Table 1) and assuming that Nsyilxcn clitics are ordered and fall into domains (Section 3.1), then given the evidence shown in Section 2, it seems extremely likely that Nxaʔamxčín clitics also fall into similar domains.

Independent phonological evidence for clitic domains in Nxaʔamxčín, on par with [a]-insertion/replacement in Nsyilxcn, is difficult to find. More phonetic and phonological work needs to be done in this area.[32] There is nevertheless some evidence to support a pivotal inner clitic status for future *naʔ*: Like Nsyilxcn *mi,* it doubles (46a). Example (46b) shows similar data for *ay̓*.[33]

(46) a. **náʔ** nx̌əštmíš **naʔ**.
náʔ n-x̌əšt-mí-š **naʔ**
FUT LOC-good-RLT-3ERG FUT
'That will do him good.' (Y26.31) (Nxaʔamxčín)

b. lxaʔáł **ay̓** čkíčštmš **ay̓** pl̓áqəl łu kʔl̓əm̓čáxʷ.
lxaʔáł=**ay̓** č-kíč-št-m-š=**ay̓** pəl̓áqəl
here=PAST CISL-arrive-CAUS-RLT-3ERG=PAST yesterday
łu k-√ʔl̓əm̓-čá-xʷ
COMP go.by-RLT+DIR+1SG.OBJ-2SG.ERG
'He was visiting me yesterday when you went by.' (EP4.45.1b) (Nxaʔamxčín)

Evidence against analyzing *naʔ* and *ay̓* as core inner clitics on par with subject pronoun clitics comes from the fact that in post-predicative environments they only attach directly to the main predicate in the *absence* of a subject clitic (cf. P*24), which is particularly surprising given the preference of *ay̓* to attach directly to the host in other environments. Ordering parallels between Nsyilcxn *mi* and Nxaʔamxčín *naʔ* with pronoun clitics in pre-predicative single host environments further supports a distinction between pivotal and core inner clitics in Nxaʔamxčín (cf. 6, 8).

[32] Though Bell (2003) makes many interesting and relevant observations regarding the interaction between different types of clitics and particles in Nxaʔamxčín, and stress.

[33] Example (i) below could be evidence for doubling in Nxaʔamxčín pronoun clitics: The first modal is transcribed as *šakʷ* and the second as *šak,* so the initial modal may be a contraction of *šak* and 2SG.INTR *kʷ*.
(i) **šakʷ** lút **kʷ** ḥáẇiym kʷaʔ tíʔ **šak** táx̌ʷpštumn.
šakʷ lút **kʷ** √ḥáẇiy-m kʷaʔ tíʔ **šak** √táx̌ʷ-p-štu-m-n
POT NEG 2SG.INTR work-MID CONJ EXCL POT stop-INCH-CAUS-2SG.OBJ-1SG.ERG
'If you're not working, I might just as well stop you.' (J.1.29) (Nxaʔamxčín)

Evidence for a distinctive, outer clitic analysis of Nxaʔamxčín question marker *a* may come from the fact that *a* always carries what seems to be a phrase-final, right-most stress.[34] This right-most stress may also be carried by other phrase-final clitics, however this stress always shifts to *a* when present, leading Bell (2003) to hypothesize a distinct class of *stress-attracting* clitics including *a*, as opposed to *stress-shifting* clitics which may receive or lose phrasal stress depending on other factors.[35] Though the facts remain unclear, it is possible that a distinction between stress-attracting and stress-shifting clitics may be couched in terms of a difference in how these clitics are phonologically parsed within the prosodic hierarchy.

In sum, the null hypothesis is that clitic domains across the two languages are as given in Table 2. With these arguments and assumptions in place, we now introduce our analysis.

Table 2: Clitic domains for a subset of Nxaʔamxčín and Nsyílxcn clitics

Gloss	Nxaʔamxčín	Nsyílxcn	Domain
1st SG. intrans	kn	kn	core inner
2nd SG. intrans	kʷ	kʷ	core inner
1st PL. intrans	kt	kʷu	core inner
2nd PL. intrans	kp	p	core inner
3rd PL. intrans	lx	lx	core inner
future	naʔ	mi	pivotal inner
past	ay̓	*	pivotal inner
yes/no question marker	a	(h)a	outer

4 An Orbital Analysis

In this section, we give our analysis. In Section 4.1, we discuss the prosodic hierarchy and how we parse clitics within the prosodic hierarchy, based on the evidence, arguments, and assumptions given in preceding sections. In Section 4.2, we present the basics of our constraints-based analysis, and how partially ordered constraints (Antilla 2001) inform the basic orbital patterns discussed above. In Section 4.3, we address the issue of orbital independence in Nxaʔamxčín by formalizing relations between specific alignment constraints as conditionals, and illustrate some predictions for clitic orientation which follow from our analysis. In Section 4.4, we address complications introduced by *(ʔ)ay̓*.

We include multiple sample derivations in Sections 4.3 and 4.4 in order to illustrate our approach, which *may* overgenerate possible parsings in some instances. With further study and additional language data, we hope to verify, and/or increase the accuracy of our analysis.

4.1 The Prosodic Hierarchy and Parsing Clitics

Our analysis utilizes a prosodic hierachy (Selkirk 1995) which ranks phonological elements within a hierarchy whose largest unit is an utterance, and whose smallest unit is a mora.

[34] Caldecott & Czaykowska-Higgins (2012) found that most phrases with stressed boundary vowels showed no rising or falling tone.

[35] Bell (2003) notes an intriguing parallel between their observation that a (potentially) larger prosodic unit containing a clitic string in Nxaʔamxčín bears right-most stress, and Czaykowska-Higgins' (1993) observation that prosodic word-level stress is also right-most, except in the case of prosodic words containing only schwa vowels, in which case stress is assigned left-most.

(47) utterance > intonational phrase > phonological phrase > prosodic word > foot > syllable > mora

For the purposes of this paper, we will only be concerned with prosodic words (ω), phonological phrases (φ) consisting of one or more prosodic word(s), and intonational phrases (ι) consisting of one or more phonological phrases. These units and their internal constituency are illustrated schematically in (48a–c).

(48) a. $(_{\omega}.....)(_{\omega}.....)$ *prosodic words*
b. $(_{\varphi}…..(_{\omega}.....)(_{\omega}.....))$ *phonological phrases*
c. $(_{\iota}.....(_{\varphi}.....(_{\omega}.....)(_{\omega}.....))(_{\varphi}....))$ *intonational phrases*

We follow Gerdts and Werle (2014) in assuming that prosodic words (ω) bear word-level prominence (i.e. stress) and are pronounceable in isolation, that phonological phrases (φ) contain one or more prosodic words, and that intonational phrases (ι) contain one or more phonological phrases. We also follow Gerdts and Werle (2014) in assuming that it is not necessarily the case that an element be parsed as part of a prosodic word in order to occur within a phonological phrase, just as it is not necessarily the case that an element be parsed as part of a phonological phrase in order to occur in an intonational phrase. We additionally assume for this paper that two clitics cannot, by themselves, parse together as a ω.[36]

Clitics are phonologically parsed in different ways, depending on the degree of phonological integration with their prosodic host: Clitics parsed as part of ω are more integrated than those parsed at the φ or ι level. Gerdts and Werle (2014) apply the prosodic hierarchy to clitics in Halkomelem Salish, resulting in the following typology:

(49) a. $(_{\varphi}(_{\omega}\text{part})\,(_{\omega}\text{lex}))$ particle (not a clitic) less phonologically integrated
b. $(_{\varphi}\text{cl}\,(_{\omega}\text{lex}))$ free clitic
c. $(_{\varphi}(_{\omega}\text{cl}\,(_{\omega}\text{lex})))$ adjoined clitic
d. $(_{\varphi}(_{\omega}\text{cl lex}))$ internal clitic more phonologically integrated

Particles (49a) are parsed as their own independent ω, and can therefore bear lexical stress and host other clitics. Free clitics (49b) are parsed as part of φ containing the host ω, and hence are predicted to show greater variability in terms of position. Adjoined clitics (49c) are parsed as part of a recursive ω[37] containing the host ω, and are therefore predicted to show less positional variability than free clitics. Lastly, internal clitics (49d) are parsed as part of the host ω, and as such are predicted to undergo phonological processes which less integrated clitics will not.

The chief utility of the prosodic hierarchy (47–48) and a parsing typology similar to (49) for our analysis as given in this paper is that it provides a theoretical framework to predict possible clitic linearizations, in conjunction with the prosodic alignment constraints discussed in following sections (Sections 4.2 to 4.4). Furthermore, in the context of multiple potential prosodic hosts, more

[36] Allowing two clitics to parse as a prosodic word leads to a different theoretical account, which could, conceivably, end up being the correct approach. Bell (2003), for example, observes "that certain particles attach to other particles to form a first constituent," though the pattern hinted at is not clear.

[37] Phonology does not have recursion in the sense of a structure which contains itself, or of a function which calls itself, so phonological 'recursion' is better termed embedding (Golston 2020). Furthermore, a 'recursive' prosodic word is theoretically problematic since the utility in positing ω as a phonological level holds only insofar as all instances of ω are treated equally by the theory (ibid). As such, we do not utilize recursive prosodic words.

than one possible clitic orientation may emerge directly from parsing and alignment (Section 4.3). Based on evidence given above in Section 3, we assume the prosodic classification of Nxaʔamxčín and Nsyilxcn clitics given below in Table 3.

Table 3: Prosodic classification of a subset of Nxaʔamxčín and Nsyílxcn clitics

Parse	Label	Nxaʔamxčín	Nsyílxcn
(φ(ωcl lex))	core inner clitic (‘internal clitics’)	subject clitics	subject clitics
(φcl (ωlex))	pivotal inner clitic (‘free clitics’)	*naʔ, ay̓*	*mi*
(ι cl (φ(ωlex)))	outer clitics	*a*	*(h)a*
(φ(ωcl) (ωlex))	particles	*šá, tl̓ʔl̓, lút, etc.*	…

Further independent phonetic and phonological evidence for this classification is needed, as discussed in the previous section. For example, by parsing the Nxaʔamxčín yes/no question marker *a* at the ι-level, we can correctly predict that it will always linearize to the outside of tense clitics in its own orbit, but currently our only major piece of independent phonetic/phonological evidence to parse *a* at its own prosodic level is that it always attracts a right-most phrasal stress, while other clitics in a post-host environment may potentially lose their phrasal stress (Bell 2003, Section 3.2).[38]

4.2 Linearizing Orbital Clitics

We propose that the linearization of clitics in Nsyilxcn and Nxaʔamxčín is derived by two families of constraints, each with three members tailored to the ω, φ, and ι levels of the prosodic hierarchy.

(50) a. $\text{STAY}_{\omega,\varphi,\iota}$: No daughter of ω,φ,ι moves. (Agbayani & Golston 2010)

b. $\text{STRONG-START}_{\omega,\varphi,\iota}$: Assign one violation mark for every leftmost daughter constituent lower in the Prosodic Hierarchy than its sister constituent immediately to its right. (Selkirk 2011)

The basic idea is that if STAY-family constraints are dominant, all clitics will linearize before their hosts,[39] while if STRONG-START-family constraints (henceforth abbreviated STR-ST) are dominant, all clitics will linearize after their hosts. The variability in clitic positioning seen for Nxaʔamxčín can be derived by allowing for multiple possible rankings for a defined subset of constraints (Antilla 2001). To illustrate using a simple attested case: For (51a), STAY_{ω} wins, while for the minimal pair (51b), STR-ST_{ω} wins. We therefore predict free variation.

(51) a. **kn** qʷətnáyaʔqn.
(ω**kn** qʷətn-áyaʔ-qn) $\text{STAY}_{\omega} > *\text{STR-ST}_{\omega}$
1SG.INTR big-top.of-head
‘My head is big.’ (MLW.AB.25.4) (Nxaʔamxčín)

[38] It is worth mentioning that analyzing yes-no question marker *(s)á* as an (in)direct daughter of an intonational phrase receives theory-internal support from Match Theory (Elfner 2012), wherein MATCHCLAUSE enforces a correspondence between ForceP (or CP) and ι.

[39] We are assuming linear-correspondence and an underlying head-initial syntax for both languages, based on the Nsyilxcn pattern.

b. qʷətnáyaʔqn **kn**.
(ωqʷətn-áyaʔ-qn **kn**) STR-ST$_{\omega}$ > *STAY$_{\omega}$
big-top.of-head 1SG.INTR
'My head is big.' (MLW.AB.25.4) (Nxaʔamxčín)

Allowing for multiple possible rankings between specific STAY and STR-ST-family constraints is crucial to explaining the 'orbital' effect seen with Nxaʔamxčín pronoun clitics, tense clitics, and the yes/no question marker.[40] We refer to the notion of multiple possible rankings informally as 'revolving doors', symbolized by '⊕'.[41] The difference between the flexibility seen with Nxaʔamxčín clitic pronoun linearization in cases like (51), and the corresponding lack of flexibility in Nsyilxcn, can be captured generally by the following rankings:

(52) a. Nxaʔamxčín: STAY$_{\omega}$ ⊕ STR-ST$_{\omega}$
b. Nsyilxcn: STAY$_{\omega}$ > STR-ST$_{\omega}$

Recall that Nxaʔamxčín future *naʔ* always occurs on the outside of a pronoun clitic in pre-host position, and after a pronoun clitic in post-host position (53). Given that *naʔ* is the functional and syntactic equivalent of *mi* in Okanagan, and both show evidence of being a pivotal inner clitic, we propose that *naʔ* and *mi* are both parsed at the level of φ.

(53) a. **naʔ kn** lčkíčx.
(φ **naʔ** (ω **kn** l-č-√kíčx)) STAY$_{\omega,\varphi}$ > *STR-ST$_{\omega,\varphi}$
FUT 1SG.INTR return-CISL-arrive
'I will be back.' (W7.261) (Nxaʔamxčín)

b. k'ám̓ **kn naʔ**.
(φ(ω√k'ám̓ **kn**) **naʔ**) STR-ST$_{\omega,\varphi}$ > *STAY$_{\omega,\varphi}$
stay 1SG.INTR FUT
'I will stay.' (Y23.3) (Nxaʔamxčín)

The variation within Nxaʔamxčín, as well as the variation between Nxaʔamxčín and Nsyilxcn can so far be expressed as follows:

(54) a. Nxaʔamxčín: STAY $_{\omega,\varphi}$ ⊕ STR-ST$_{\omega,\varphi}$
b. Nsyilxcn: STAY $_{\omega,\varphi}$ > STR-ST$_{\omega,\varphi}$

To account for the linearization of the yes/no question clitic *á*, and given that it always attracts phrasal stress, we propose that it is parsed at the level of the intonational phrase (55a). For corresponding (55b), we assume that *sá*, as a stress-bearing particle, is parsed as its own ω, and that STAY$_{\iota}$ prevents it from moving.

[40] It is not the case that every STAY constraint has a revolving door with every STR-ST constraint, given that certain orderings are not apparent. See below.
[41] Arto Antilla's (2001) work on partial orderings in Finnish phonology provides the foundation for the "revolving door" idea, though the term itself was coined by Chris Golston.

(55) a. ʔinwí **kʷ áʔ**?
(ι (ωʔinwí **kʷ**) **áʔ**) STR-ST$_{ω,φ,ι}$ > *STAY$_{ω,φ,ι}$
2SG.INDEP 2SG.INTR Q
'Is it you?' (NM.2006.41b) (Nxaʔamxčín)

b. **šá naʔ** qʼʷə́ln ʔači ḥananík?
(ι(ω**šá**) (φ **naʔ** (ω√qʼʷə́l-n)) ʔači ḥananík) STAY$_{ω,φ,ι}$ > *STR-ST$_{ω,φ,ι}$
Q FUT roast+DIR-1SG.ERG that jack.rabbit
'Can I roast that jack rabbit?' (JM3.121.4) (Nxaʔamxčín)

Parsing Nxaʔamxčín clitic *a* distinctly at the level of the intonational phrase receives indirect, cross-linguistic support from the equivalent Nsyilxcn particle *ha,* which is the only clitic in Nsyilxcn which moves in a Nxaʔamxčín-like orbit (56).[42]

(56) a. **ha** cxʷúystxʷ iʔ sqəltmíxʷ?
(ι **ha** (ωc-xʷúy-st-xʷ) (φiʔ (ωsqəltmíxʷ))) STAY$_ι$ > *STR-ST$_ι$
Q‿IPFV-go-CAUS-2SG.ERG DET‿man
'Did you bring the man?' (Nsyilxcn)

b. cxʷúystxʷ **(h)a** iʔ sqəltmíxʷ?
(ι (ωc-xʷúy-st-xʷ) **(h)a** (φiʔ (ωsqəltmíxʷ))) STR-ST$_ι$ > *STAY$_ι$

The basic variation between Nxaʔamxčín and Nsyilxcn in the linearization of verbal clitics is given as (57):

(57) a. Nxaʔamxčín: STAY $_{ω,φ,ι}$ ⊕ STR-ST$_{ω,φ,ι}$
b. Nsyilxcn: STAY $_{ω,φ}$ > (STAY$_ι$ ⊕ STR-ST$_ι$) > STR-ST$_{ω,φ}$

There are two factors which complicate the Nxaʔamxčín picture given in (57a), however, which we seek to address in this paper: First, the issue of orbital independence and clitic orientation (Section 4.3). Second, addressing the linearization of *ay̓* (Section 4.4).

4.3 Addressing Orbital Independence and Variable Clitic Orientation

Recall that orbits in Nxaʔamxčín show evidence of linearizing independently of one another in Nxaʔamxčín (58a).[43] But recall also that there may be limits on that independence, since linearizations like (58d) are never found. Such limits may be expressed by implicational relations between specific STAY and STRONG-START constraints, which will rule out unattested orderings.

[42] There are several examples of Nxaʔamxčín questions involving a yes/no particle *há*, phonologically equivalent to Nsyilxcn *ha.* In (i), *há* may come from Nsyilxcn, or may be a dialectal variant of *sá.*
(i) **há kʷ** štqnúxʷ?
há=**kʷ**=štqnúxʷ
Q=2SG.INTR=hungry
'Are you hungry?' (G7.63) (Nxaʔamxčín)

[43] Other unattested orderings for examples (58), such as ᵖ*k^w *naʔ nhampátk^w* or ᵖ**nhampátk^w naʔ k^w*, are predicted ungrammatical by a highly-ranked constraint BINARITY(φ) which disallows vacuous parsings of ω as φ. See section 4.4.

(58) a. **k^{w}** nhampátk^{w} **naʔ**.
(φ(ω**k^{w}** nhamp-átk^{w}) **naʔ**)
2SG.INTR fall.in-water FUT
'You will fall in the river.' (JM3.139.2) (Nxaʔamxčín)

b. ^{p} (φ **naʔ** (ω**k^{w}** nhampátk^{w}))
c. ^{p} (φ (ωnhampátk^{w} **k^{w}**) **naʔ**)
d. ^{p}*(φ **naʔ** (ω nhampátk^{w} **k^{w}**))

For (58), the implication is that if STAY_{φ} is satisfied (58b,d), then STAY_{ω} must also be satisfied (58b). Given the family-level revolving door so far proposed, this is equivalent to saying that if STR-ST_{ω} is satisfied (58c,d), then STR-ST_{φ} must also be satisfied (58c). This is formalized as the implication in (59).

(59) $(\text{STAY}_{\varphi} \rightarrow \text{STAY}_{\omega}) \oplus (\text{STR-ST}_{\omega} \rightarrow \text{STR-ST}_{\varphi})$ (cf. 58)

Utilizing a standard logical equivalence for conditional statements, $\neg(p \rightarrow q) \leftrightarrow (p \,\&\, \neg q)$,[44] a violation of the antecedent of any conditional will not result in the entire conditional incurring a violation, while a violation of the consequent of any conditional will result in the entire conditional incurring a violation, if the antecedent is not itself also violated. Example (60) below shows (58) again, as applied to the conditional in (59). For orbitally independent (60a), even though the antecedents of both conditionals incur violations, both conditionals will as a result automatically be true.

(60) a. (φ(ω**k^{w}** nhampátk^{w}) **naʔ**).
$(*\text{STAY}_{\varphi} \rightarrow \text{STAY}_{\omega}) \oplus (*\text{STR-ST}_{\omega} \rightarrow \text{STR-ST}_{\varphi})$ T ⊕ T

b. ^{p} (φ **naʔ** (ω**k^{w}** nhampátk^{w})).
$(\text{STAY}_{\varphi} \rightarrow \text{STAY}_{\omega}) \oplus (*\text{STR-ST}_{\omega} \rightarrow *\text{STR-ST}_{\varphi})$ T ⊕ T

c. ^{p} (φ (ωnhampátk^{w} **k^{w}**) **naʔ**).
$(*\text{STAY}_{\varphi} \rightarrow *\text{STAY}_{\omega}) \oplus (\text{STR-ST}_{\omega} \rightarrow \text{STR-ST}_{\varphi})$ T ⊕ T

d. ^{p}*(φ **naʔ** (ω nhampátk^{w} **k^{w}**)).
$!(\text{STAY}_{\varphi} \rightarrow *\text{STAY}_{\omega}) \oplus !(\text{STR-ST}_{\omega} \rightarrow *\text{STR-ST}_{\varphi})$ F ⊕ F

Formalizations such as (59) are a shorthand for restricted partial constraint orderings accompanied by outranking, banned pairings: For example $(\text{STAY}_{\varphi} \rightarrow \text{STAY}_{\omega})$ is equivalent to a more convoluted $*(*\text{STAY}_{\omega}, \text{STAY}_{\varphi}) > (\text{STAY}_{\omega} \oplus \text{STAY}_{\varphi})$.[45] In English: Any ranking of STAY_{ω} and STAY_{φ} is possible with respect to a specific input, unless that input satisfies STAY_{φ} while violating STAY_{ω}. Such candidates will never be optimal, since $\text{STR-ST}_{\omega} \rightarrow \text{STR-ST}_{\varphi}$ (which is shorthand for $*(\text{STR-ST}_{\omega},*\text{STR-ST}_{\varphi}) > (\text{STR-ST}_{\omega} \oplus \text{STR-ST}_{\varphi})$) will also automatically be violated. If *both* STAY_{ω} and STAY_{φ} are violated however (e.g. 60c), then the candidate can still win just in case $\text{STR-ST}_{\omega} \rightarrow \text{STR-}$

[44] ¬ is equivalent to a violation, marked as *. Fatal violations of conditionals are indicated by !.
[45] The formula in (59) is formally equivalent to:
$[*(*\text{STAY}_{\omega}, \text{STAY}_{\varphi}) > (\text{STAY}_{\omega} \oplus \text{STAY}_{\varphi})] \oplus [*(\text{STR-ST}_{\omega},*\text{STR-ST}_{\varphi}) > (\text{STR-ST}_{\omega} \oplus \text{STR-ST}_{\varphi})]$

ST_{φ} is ranked higher. In other words, when an entire conditional incurs a violation, the revolving door is 'activated' to save the candidate, but if the conditional on the other side of the revolving door is also violated, the candidate will be ruled out. For most derivations in this section, the STAY and STR-ST conditionals make the same predictions, and so it is tempting to propose a simpler system which uses only STAY constraints. However, several examples below show that both are needed.

Next, consider (61) which shows orbital independence at the level of φ and ι:

(61) a. lút **naʔ** lkʷáš **á** ?
(ι (ω lút) (φ **naʔ** (ω l-kʷá-š)) **á**)
NEG FUT LOC-take+DIR-3ERG Q
'He won't take it back, will he?' (MDK.Y29.154) (Nxaʔamxčín)

b. ᵖ (ι (ω lút) (ω **šá**) (φ **naʔ** (ω lkʷáš)))
c. ᵖ (ι (ω lút) (φ (ω lkʷáš) **naʔ**) **á**)
d. ᵖ* (ι (ω lút) (ω **šá**) (φ (ω lkʷáš) **naʔ**))

For (61), the implication is that if $STAY_{\iota}$ is satisfied (61b,d), then $STAY_{\varphi}$ must also be satisfied (61b).[46] This is formalized as the implication in (62).[47]

(62) $(STAY_{\iota} \rightarrow STAY_{\varphi}) \oplus (STR\text{-}ST_{\varphi} \rightarrow STR\text{-}ST_{\iota})$ (cf. 61)

Example (61) is repeated below as (63), but is explicitly applied to (62) for the sake of demonstration.

(63) a. (ι (ω lút) (φ **naʔ** (ω lkʷáš)) **á**).
$(*STAY_{\iota} \rightarrow STAY_{\varphi}) \oplus (*STR\text{-}ST_{\varphi} \rightarrow *STR\text{-}ST_{\iota})$ T ⊕ T

b. ᵖ (ι (ω lút) (ω **šá**) (φ **naʔ** (ω lkʷáš))).
$(STAY_{\iota} \rightarrow STAY_{\varphi}) \oplus (*STR\text{-}ST_{\varphi} \rightarrow *STR\text{-}ST_{\iota})$ T ⊕ T

c. ᵖ (ι (ω lút) (φ (ω lkʷáš) **naʔ**) **á**).
$(*STAY_{\iota} \rightarrow *STAY_{\varphi}) \oplus !(STR\text{-}ST_{\varphi} \rightarrow *STR\text{-}ST_{\iota})$ T ⊕ F

d. ᵖ* (ι (ω lút) (ω **šá**) (φ (ω lkʷáš) **naʔ**)).
$!(STAY_{\iota} \rightarrow *STAY_{\varphi}) \oplus !(STR\text{-}ST_{\varphi} \rightarrow *STR\text{-}ST_{\iota})$ F ⊕ F

For (63), note that $STR\text{-}ST_{\iota}$ is violated if *lút,* which is parsed as a prosodic word, remains initial in the intonational phrase.[48] For (63c,d), this is fatal to the STR-ST conditional. For this reason, the STAY conditional will take precedence: Both (63c) and (63d) violate the consequent $STAY_{\varphi}$, but this

[46] This generally corresponds to the implication that if $STR\text{-}ST_{\varphi}$ is satisfied then $STR\text{-}ST_{\iota}$ must also be satisfied, but in the context of an initial stressed particle, the STR-ST implication will be violated, as in (63c,d).

[47] The implication in (62) is formally equivalent to:
$[*(*STAY_{\varphi}, STAY_{\iota}) > (STAY_{\iota} \oplus STAY_{\varphi})] \oplus [*(*STR\text{-}ST_{\iota}, STR\text{-}ST_{\varphi}) > (STR\text{-}ST_{\iota} \oplus STR\text{-}ST_{\varphi})]$

[48] One strategy to save (63d) would be to move (ω lút) and (ω šá) to the end of the intonational phrase, though it is unclear if this is possible in Nxaʔamxčín. Particles prefer to occur before rather than after the main predicate (Kinkade 1982).

is fatal just in case STAY_{ι} is satisfied, as in the case of (63d). In other words, the only ordering of (63) which violates both conditionals in (62) will be (63d). Notice that in (63c), the two conditionals make different predictions, and so this is a good example of why the large revolving door, and both families, are still needed under this approach: The STAY conditional will allow one or more ω to precede a φ, even though the STR-ST conditional is fatally violated.

Implicational relations such as (59) and (62) allow for multiple possible parsings of the same string, thus accounting not only for variable clitic linearizations, but for variable *orientations*. Example (64) below consists of a clitic pronoun surrounded by two prosodic hosts. As an inner clitic, it can potentially parse in either direction.[49]

(64) a. tíl̓ **kt** šxəšxəštmíx.
(φ (ω tíl̓ **kt**) (ω šxəšxəštmíx))
EXCL 1PL.INTR getting.lost
'I think we are getting lost.' (W9.81) (Nxaʔamxčín)
$!(\text{STAY}_{\varphi} \rightarrow {*}\text{STAY}_{\omega}) \oplus (\text{STR-ST}_{\omega} \rightarrow \text{STR-ST}_{\varphi})$ F ⊕ T

b. (φ (ω tíl̓) (ω **kt** šxəšxəštmíx))
$(\text{STAY}_{\varphi} \rightarrow \text{STAY}_{\omega}) \oplus !({*}\text{STR-ST}_{\omega} \rightarrow \text{STR-ST}_{\varphi})$ T ⊕ F

Consider (65) below, which is identical to (63a) above except that *naʔ* parses as a free enclitic with preceding *lút,* rather than as a free proclitic with the main predicate *lkʷás*. In this case, both implicational relations are true, predicting that in such an environment, *naʔ* can parse either as a proclitic, or as an enclitic, so long as it maintains the φ orbit of a free clitic. (In fact, *naʔ* in (60) was originally transcribed as part of the same word as *lút*, suggesting (65) is the correct parse.)

(65) lút **naʔ** lkʷáš **á**?
(ι (φ (ω lút)=**naʔ**) (ω lkʷáš) **á**)
$({*}\text{STAY}_{\iota} \rightarrow {*}\text{STAY}_{\varphi}) \oplus (\text{STR-ST}_{\varphi} \rightarrow \text{STR-ST}_{\iota})$ T ⊕ T

More generally, this approach supports parsing initial stress-bearing particles, such as *lút*, *tíl̓*, and *sá* as prosodic words, since assuming that these are parsed in turn directly by an intonational or phonological phrase and do not move, they will never in themselves violate the STAY conditional.[50]

The implications given as (59) and (62) are combined in (66), resulting in a concise view of the relation between STAY and STRONG-START family constraints in Nxaʔamxčín.[51]

(66) $(\text{STAY}_{\iota} \rightarrow (\text{STAY}_{\varphi} \rightarrow \text{STAY}_{\omega})) \oplus ((\text{STR-ST}_{\omega} \rightarrow \text{STR-ST}_{\varphi}) \rightarrow \text{STR-ST}_{\iota})$ (cf. 59, 62)

[49] We abstract away from intonational phrases here for the sake of brevity. For (64), we assume that both prosodic words are parsed as a φ, though a parsing of each ω as separate φ within an ι will also be generated. We also predict (φ (ω **kt** tíl̓) (ω šxəšxəštmíx)) as a possible parse. Though there is no evidence that a pronoun can procliticize to *tíl̓*, possibly for syntactic reasons similar to those discussed in Section 2.4, there is evidence that a pronoun can precede other prosodic words, such as *lút* in (37e): šac'kámx kʷaʔ [**kʷ** lút núx̌ʷt **aʔy̓**]?. As such, it makes sense not to prevent (φ (ω **kt** tíl̓) (ω šxəšxəštmíx)) as a possible parse, a priori.

[50] Given the difference in the way STAY and STR-ST constraints are defined, the prediction is that secondary, prosodic word hosts will adhere to their syntax and occur *before* the main predicate rather than after it.

[51] The implication in (66) is formally equivalent to: $[{*}({*}\text{STAY}_{\omega}, \text{STAY}_{\varphi}) > {*}({*}\text{STAY}_{\varphi}, \text{STAY}_{\iota}) > (\text{STAY}_{\omega} \oplus \text{STAY}_{\varphi} \oplus \text{STAY}_{\iota})] \oplus [{*}({*}\text{STR-ST}_{\varphi}, \text{STR-ST}_{\omega}) > {*}({*}\text{STR-ST}_{\iota}, \text{STR-ST}_{\varphi}) > (\text{STR-ST}_{\omega} \oplus \text{STR-ST}_{\varphi} \oplus \text{STR-ST}_{\iota})]$

For the sake of demonstration, (66) is applied to (67) below (cf. 24a). Though five out of the six linearizations below are predicted by the analysis as it currently stands, possibly suggesting overgeneration, (67d,f) will be removed from consideration in the next section.

(67) a. šúlt **k^{w} ay̓ á**?
(ι (φ (ω√šúl-t **k^{w}**)=**ay̓**)=**á**)
cold-STAT 2SG.INTR=PAST=Q
'Were you cold?' (Y25.36) (Nxaʔamxčín)
(*STAY$_{ι}$ → (*STAY$_{φ}$ → *STAY$_{ω}$)) ⊕ ((STR-ST$_{ω}$ → STR-ST$_{φ}$) → STR-ST$_{ι}$) T ⊕ T

b. ^{p} (ι (ω **šá**) (φ (ω šúlt **k^{w}**) **ay̓**))
(STAY$_{ι}$ → (*STAY$_{φ}$ → *STAY$_{ω}$)) ⊕ !((STR-ST$_{ω}$ → STR-ST$_{φ}$) → *STR-ST$_{ι}$) T ⊕ F

c. ^{p*}(ι (ω **šá**) (φ **ay̓** (ω šúlt **k^{w}**)))
!(STAY$_{ι}$ → (STAY$_{φ}$ → *STAY$_{ω}$)) ⊕ !((STR-ST$_{ω}$ → STR-ST$_{φ}$) → *STR-ST$_{ι}$) F ⊕ F

d. ^{p} (ι (ω **šá**) (φ **ay̓** (ω **k^{w}** šúlt)))
(STAY$_{ι}$ → (STAY$_{φ}$ → STAY$_{ω}$)) ⊕ !((*STR-ST$_{ω}$ → *STR-ST$_{φ}$) → *STR-ST$_{ι}$) T ⊕ F

e. ^{p} (ι (φ (ω **k^{w}** šúlt) **ay̓**) **á**)
(*STAY$_{ι}$ → (*STAY$_{φ}$ → STAY$_{ω}$)) ⊕ ((*STR-ST$_{ω}$ → STR-ST$_{φ}$) → STR-ST$_{ι}$) T ⊕ T

f. ^{p} (ι (φ **ay̓** (ω **k^{w}** šúlt)) **á**)
(*STAY$_{ι}$ → (STAY$_{φ}$ → STAY$_{ω}$)) ⊕ !((STR-ST$_{ω}$ → STR-ST$_{φ}$) → *STR-ST$_{ι}$) T ⊕ F

In sum, for the simple Nxaʔamxčín linearizations addressed in Section 4.2, individual STAY and STRONG-START constraints seem to group together as 'family units' with respect to the revolving door. Orbital independence, however, complicates the picture Section 4.3, and the data suggest that while STAY and STRONG-START constraints do indeed group together as a family, the absence of certain possible linearizations in our corpus suggests that the grouping involves implicational relationships between individual constraints which limit orbital independence, yet still allow flexibility in clitic orientation. This approach correctly accounts for attested linearizations, and rules out unattested ones, though it may overgenerate in its current form.

4.4 Addressing the Linearization of *(ʔ)ay̓*

Data involving *(ʔ)ay̓* introduce complications to our analysis, given the patterns discussed above in Sections 2.2 and 2.3. The basic pattern which holds in the context of one potential prosodic host is given again in (68). The pronoun always occurs before *(ʔ)ay̓*, though in (68a) *ay̓* remains in orbit, while in (68b) the orbit appears at first glance to be overruled. The other possible orderings, shown in (68c) and (68d), are unattested. We predict (68c) to be possible, though not (68d), for reasons discussed below.

(68) a. naxáł **kn ay̓**.
na-√xáł **kn**=**ay̓** ***tense orbit***
LOC-afraid 1SG.INTR=PAST
'I was scared.' (W3.10) (Nxaʔamxčín)

b. **kn ʔaẏ̓** nuǩʷtútiẏaʔ.
kn **ʔaẏ̓** √nuǩʷt-útiẏaʔ ***second-position***
1SG.INTR PAST go-on.foot
'I went on foot.' (JM3.185.8) (Nxaʔamxčín)

c. ᵖ **ʔaẏ̓ kn** na-√ǩáł 'I was scared.' ***tense orbit***
d. ᵖ* na-√ǩáł **aẏ̓ kn**. 'I was scared.' ***second-position***

We predict (68c) to be possible given data showing that rarely, *(ʔ)aẏ̓* occurs initially: In such cases, *(ʔ)aẏ̓* is transcribed with an initial glottal stop, which we take as evidence that it has been promoted to a prosodic word (69a). In cases such as (68b), *(ʔ)aẏ̓* is also sometimes transcribed as containing a glottal stop. If *aẏ̓* is promoted to a ω *ʔaẏ̓* in these cases as well, then the pronoun clitic can then parse with *ʔaẏ̓* as a ω (69b). Thus, there is no actual orbital violation.

(69) a. **ʔay** ʔačkíčštmš yaʕʔtú šx̌álx̌əlt łu aẏ̓ páṅká ʔaní.
(φ (ω **ʔay**) (ω ʔač-√kíč-št-m-š)) yaʕʔtú šx̌álx̌əlt łu aẏ̓ páṅká ʔaní
PAST IPFV-arrive-CAUS-1SG.OBJ-3ERG all day COMP PAST where DEM
'He used to visit me every day.' (EP4.46.2) (Nxaʔamxčín)

b. **kn ʔaẏ̓** nuǩʷtútiẏaʔ.
(φ (ω **kn** **ʔaẏ̓**) (ω √nuǩʷt-útiẏaʔ))
1SG.INTR PAST go-on.foot
'I went on foot.' (JM3.185.8) (Nxaʔamxčín)

It is important to note that *(ʔ)aẏ̓* is never transcribed as containing an initial glottal stop when it *follows* a host, which suggests that promotion to ω is position dependent, and that post-host *aẏ̓* will always be an enclitic. In other words, the promotion of *(ʔ)aẏ̓* to ω seems to be dependent on STAY_{φ} being satisfied: Assuming that enclitic *aẏ̓* can never occur initially in a φ, (70a) becomes (70b) in order to save the linearization. In (71a), STR-ST_{φ} takes precedence, so *aẏ̓* will not be promoted to ω.

(70) a. ᵖ*(φ **aẏ̓** (ω **kn** √nuǩʷt-útiẏaʔ))
b. ᵖ(φ (ω **ʔaẏ̓**) (ω **kn** √nuǩʷt-útiẏaʔ))

(71) a. ᵖ(φ (ω √nuǩʷt-útiẏaʔ **kn**) **aẏ̓**)
b. ᵖ*(φ (ω √nuǩʷt-útiẏaʔ **kn**) (ω **ʔaẏ̓**))

It is noteable that this proposed distribution of *ʔaẏ̓* and *aẏ̓* and is parallel to that of the yes/no question marker, which is realized as a ω *sá* in pre-predicative or initial position, and an enclitic *á* when it occurs post-host. The problem of orbit-violating linearizations like (68d) remain, however. This is parsed below as (72).

(72) ᵖ*(φ (ω √nuǩʷt-útiẏaʔ **aẏ̓ kn**))

In (72), STAY_{φ} is violated, since *aẏ̓* moves to a linear position internal to ω. As such, word promotion is not a possibility, but STR-ST_{ω} is nevertheless satisfied, as is STR-ST_{φ} albeit vacuously, and so the revolving door should save (72), all else being equal.

We suggest that the correct approach to ruling out (72), and other possible orbit-violating linearizations involving tense clitics and pronoun clitics, is to prevent vacuous parsings of ω as φ,

as in (72). This is achieved by the following highly-ranked constraint BINARITY(φ) (see Elfner 2012 among others), which will essentially force (72) to parse as (71a).

(73) BINARITY(φ): φs are binary-branching.

The linearization of *ay̓* in other cases is then based partially on the promotional constraint in (74).

(74) $\text{PROMOTE}_{\text{ay̓}\rightarrow\omega}$: Parse *ay̓* as a prosodic word.

Since promotion of *ay̓* occurs if and only if STAY_{φ} is satisfied, these two constraints are paired together as in (75). (We assume for now that in binary φs without *ay̓,* (75) is satisfied vacuously.)

(75) $\text{PROMOTE}_{\text{ay̓}\rightarrow\omega} \leftrightarrow \text{STAY}_{\varphi}$

The biconditional in (75) is ranked below the orbital conditional below in (76), though this *may* not be crucial. What is crucial, however, is that promotional-related constraint relations like (75) operate semi-independently from orbital conditionals, rather than being included within them. BINARITY(φ) is undominated, in any case. Derivations are given below in (77), abstracting away from intonational phrases. (77a-c) are predicted parses, and (77d-g) are predicted to be impossible.

(76) $\text{BINARITY}(\varphi) > (\text{STAY}_{\iota} \rightarrow (\text{STAY}_{\varphi} \rightarrow \text{STAY}_{\omega})) > (\text{PROMOTE}_{\text{ay̓}\rightarrow\omega} \leftrightarrow \text{STAY}_{\varphi})$

(77) a. $^{p}(_{\varphi}\ (_{\omega}$ **ʔay̓**$)\ (_{\omega}$ **kn** √nuǩʷtútiy̓aʔ$))$
$\text{BINARITY}(\varphi) > (\text{STAY}_{\varphi} \rightarrow \text{STAY}_{\omega}) > (\text{PROMOTE}_{\text{ay̓}\rightarrow\omega} \leftrightarrow \text{STAY}_{\varphi})$

b. $^{p}(_{\varphi}\ (_{\omega}$ **kn ʔay̓**$)\ (_{\omega}$ √nuǩʷtútiy̓aʔ$))$
$\text{BINARITY}(\varphi) > (\text{STAY}_{\varphi} \rightarrow \text{STAY}_{\omega}) > (\text{PROMOTE}_{\text{ay̓}\rightarrow\omega} \leftrightarrow \text{STAY}_{\varphi})$

c. $^{p}(_{\varphi}\ (_{\omega}$ √nuǩʷtútiy̓aʔ **kn**$)$ **ay̓**$)$
$\text{BINARITY}(\varphi) > (*\text{STAY}_{\varphi} \rightarrow *\text{STAY}_{\omega}) > (*\text{PROMOTE}_{\text{ay̓}\rightarrow\omega} \leftrightarrow *\text{STAY}_{\varphi})$

d. $^{p}*(_{\varphi}$ **ay̓** $(_{\omega}$ **kn** √nuǩʷtútiy̓aʔ$))$
$\text{BINARITY}(\varphi) > (\text{STAY}_{\varphi} \rightarrow \text{STAY}_{\omega}) > !(*\text{PROMOTE}_{\text{ay̓}\rightarrow\omega} \leftrightarrow \text{STAY}_{\varphi})$

e. $^{p}*(_{\varphi}\ (_{\omega}$ **ʔay̓ kn**$)\ (_{\omega}$ √nuǩʷtútiy̓aʔ$))$
$\text{BINARITY}(\varphi) > !(\text{STAY}_{\varphi} \rightarrow *\text{STAY}_{\omega}) > (\text{PROMOTE}_{\text{ay̓}\rightarrow\omega} \leftrightarrow \text{STAY}_{\varphi})$

f. $^{p}*(_{\varphi}\ (_{\omega}$ **kn ay̓** √nuǩʷtútiy̓aʔ$))$
$!\text{BINARITY}(\varphi) > (\text{STAY}_{\varphi} \rightarrow \text{STAY}_{\omega}) > !(*\text{PROMOTE}_{\text{ay̓}\rightarrow\omega} \leftrightarrow \text{STAY}_{\varphi})$

g. $^{p}*(_{\varphi}\ (_{\omega}$ √nuǩʷtútiy̓aʔ **kn**$)\ (_{\omega}$ **ʔay̓**$))$
$\text{BINARITY}(\varphi) > (*\text{STAY}_{\varphi} \rightarrow *\text{STAY}_{\omega}) > !(\text{PROMOTE}_{\text{ay̓}\rightarrow\omega} \leftrightarrow *\text{STAY}_{\varphi})$

This general picture allows considerable freedom of movement for enclitic *ay̓* within a clause, so long as it forms a binary φ with a ω.

I now apply the ranking in (76) to cases involving *ay̓* and multiple potential prosodic hosts, as shown in (78) and (79) (cf 20-21). This analysis strongly predicts only one possible parse each for (78) and (79), though other parses are possible if *ay̓* is promoted, as discussed above.

(78) a. ^{p}(φ(ω pláqəl **kn**) **ay̓**) (ω nk̓upəlwáš)
BINARITY(φ) > (*STAY$_{φ}$ → *STAY$_{ω}$) > (*PROMOTE$_{ay̓→ω}$ ↔ *STAY$_{φ}$)

b. ^{p}*(ω pláqəl **kn**) (φ **ay̓** (ω nk̓upəlwáš)
BINARITY(φ) > !(STAY$_{φ}$ → *STAY$_{ω}$) > !(*PROMOTE$_{ay̓→ω}$ ↔ STAY$_{φ}$)

c. ^{p}*(ω pláqəl) (φ (ω **kn ay̓** nk̓upəlwáš))
!BINARITY(φ) > (*STAY$_{φ}$ → STAY$_{ω}$) > (*PROMOTE$_{ay̓→ω}$ ↔ *STAY$_{φ}$)

(79) a. ^{p}(φ (ω pláqəl) **ay̓**) (ω **kn** nk̓upəlwáš)
BINARITY(φ) > (*STAY$_{φ}$ → STAY$_{ω}$) > (*PROMOTE$_{ay̓→ω}$ ↔ *STAY$_{φ}$)

b. ^{p}*(φ (ω pláqəl **ay̓ kn**)) (ω nk̓upəlwáš)
!BINARITY(φ) > (*STAY$_{φ}$ → *STAY$_{ω}$) > (*PROMOTE$_{ay̓→ω}$ ↔ *STAY$_{φ}$)

c. ^{p}*(ω pláqəl) (φ **ay̓** (ω **kn** nk̓upəlwáš))
BINARITY(φ) > (STAY$_{φ}$ → STAY$_{ω}$) > !(*PROMOTE$_{ay̓→ω}$ ↔ STAY$_{φ}$)

The strongly predicted parse in (79a) may actually be supported by phonetic evidence. Consider that the pronoun *lx* has a stronger tendency to occur before *ay̓* than other pronoun clitics, thus almost always follows the pattern in (78) (Czaykowska-Higgins 2019).[52] When the opposite order occurs (79), it appears to do so in the context of a significant pause (#), as shown in (80).

(80) ʔa lut **ay̓ lx** cilám.

ʔa	lut	**ay̓**	#	**lx**	cilám.
ASR	NEG	PAST		3PL	run(PL.)

'They hadn't started to run.' (ECH.ED.90.CD.l49) (Nxaʔamxčín)

Combining the complex orbital implication in (66) with (76) yields the current working comprehensive constraint ranking for Nxaʔamxčín (81).[53]

(81) BINARITY(φ)
> ((STAY$_{ι}$ → (STAY$_{φ}$ → STAY$_{ω}$)) ⨁ ((STR-ST$_{ω}$ → STR-ST$_{φ}$) → STR-ST $_{ι}$))
> (PROMOTE$_{ay̓→ω}$ ↔ STAY$_{φ}$)

This represents our working understanding of how orbits interact with one another to yield specific linearizations, and how second-position clitics like *ay̓* interact with these orbits. A full study will examine other second-position enclitics.

[52] However unlike other pronouns, *lx* never occurs initially, which makes *lx* very much like *ay̓*. A full treatment of *lx* is beyond the scope of this paper.

[53] (81) is formally equivalent to:
[BINARITY(φ) > *(*STAY$_{ω}$, STAY$_{φ}$) > *(*STAY$_{φ}$, STAY$_{ι}$) > (STAY$_{ω}$ ⨁ STAY$_{φ}$ ⨁ STAY$_{ι}$) > (PROMOTE$_{ay̓→ω}$ ↔ STAY$_{φ}$)] ⨁ [BINARITY(φ) > *(*STR-ST$_{φ}$, STR-ST$_{ω}$) > *(*STR-ST$_{ι}$, STR-ST$_{φ}$) > (STR-ST$_{ω}$ ⨁ STR-ST$_{φ}$ ⨁ STR-ST$_{ι}$) > (PROMOTE$_{ay̓→ω}$ ↔ STAY$_{φ}$)]

5 Summary and Discussion

Assuming that Nxaʔamxčín pronominal markers are clitics, that pronominal clitics are somewhere in Tense, and that verbs do not raise as high as Tense, examples (4-5) shown again below as (82-83) provides strong evidence that there is some level of prosodic optionality in Nxaʔamxčín.

(82) a. **kn** qʷətn-áyaʔqn.
kn √qʷətn-áyaʔ-qn
1SG.INTR big-top.of-head
'My head is big.' (MLW.AB.25.4) (Nxaʔamxčín)

b. qʷətnáyaʔqn **kn**.
√qʷətn-áyaʔ-qn **kn**
big-top.of-head 1SG.INTR
'My head is big.' (MLW.AB.25.4) (Nxaʔamxčín)

(83) a. **kn** c̓əlíx.
kn c̓əlíx
1SG.INTR stand
'I stood up.' (W4.168) (Nxaʔamxčín)

b. c̓əlút **kn**.
c̓əlút **kn**
stand 1SG.INTR
'I stood up.' (W4.167) (Nxaʔamxčín)

The general pattern in (82-83) was shown to extend to other tense-related clitics and one C-domain clitic, the yes/no question marker.

The macro-pattern of Nxaʔamxčín clitics may be described as orbital. Clitic orbits were defined in terms of the prosodic hierarchy, but clitic orbits also seem to correspond in some ways to hierarchy in the clausal syntax, since for example stress-bearing modal particles appear to block initial prosodic words from attracting a clitic string. Within these orbits, optionality in linearization and the blocking of unattested patterns was modeled using a set of conditionals as a shorthand for partially-ordered constraint rankings (Antilla 2001) accompanied by higher-ranked banned pairings. Certain micro-variations are apparent within the larger pattern with second-position enclitics, such as *ay̓*.

While our analysis successfully explains attested linearizations of orbital clitics in Nxaʔamxčín, and rules out unattested patterns, the major limitation of our study is that we cannot currently confirm that the majority of unattested patterns are, in fact, *ungrammatical.* Given the relatively large size of the Nxaʔamxčín corpus, the absence of unattested patterns to us is strongly suggestive of ungrammaticality, but this is of course no substitution for negative data.

Another major limitation of our study is the scarcity of independent phonetic and phonological evidence for parsing Nxaʔamxčín clitics as we have chosen to do. Appealing to cognacy and distributional similarities between Nxaʔamxčín and Nsyilxcn clitics and particles will only go so far, however evidence such as clitic doubling with future *naʔ,* phrasal stress on question marker *a,* and parallels between Nxaʔamxčín and Nsyilxcn in the linearization of functionally-equivalent clitics is strongly suggestive that our analysis is at least on the right track.

Other areas in need of further work include a better understanding of the role of clitic promotion, syllabification, and metrical considerations, and stress in Nxaʔamxčín clitic linearization and orientation. First, there is good evidence that clitics have been promoted in certain cases, for example the locative clitic preposition *kɬ* versus particle *kɬal*,[54] and past-tense clitic *ay̓* versus particle *ʔay̓*. It is unclear however whether all clitics can be promoted or only a subset, and under what conditions promotion occurs, and relying on orthographic transcription is certainly not sufficient to tell whether a clitic has or has not been promoted. Second, clitics in many cases clearly syllabify with their hosts, and while not removing the need for orbits, syllabification does plausibly affect linearization and orientation in certain cases. The same can be said for our understanding of the role of metrical structure in clitic prosody, which is not well understood. Third, Bell's (2003) classification of Nxaʔamxčín particles and clitics rests in part on whether a given element is always stressed, never stressed, or whether it is stressed in certain contexts, but loses its stress when co-occurring with certain particles or clitics, in putative cases of 'stress-shift'. Many of the patterns which Bell (2003) observes have numerous exceptions, which is why these observations were of limited use in the current study. It will nevertheless be a worthwhile pursuit to try and clarify the patterns noticed by Bell, and to determine how they inform our present project.

Future studies should examine how clitics of the nominal domain, such as prepositions and determiners, differ from the verbal domain clitics discussed in this paper. For Nxaʔamxčín and Nsyilxcn, determines always linearize before head nominals, and as such prosodic alignment constraints seem to be sensitive to the syntax in ways not discussed in this paper.[55] In any case, though it is fairly clear that syntax does play some role in the placement of clitics within the verbal domain, more work is needed to clearly separate the roles of phonology versus syntax in Southern Interior Salish language prosody.

Next, in our theoretical analysis, we have assumed that unattested patterns of orbital independence in Nxaʔamxčín are in fact ungrammatical. If this assumption turns out to be true, then ι, φ, and ω orbits stand in an implicational relationship with one another. The utility of a conditional analysis is most obvious in the context of a single prosodic host (Section 4.3), but the analysis also makes predictions for clitic linearization and orientation in the context of multiple prosodic hosts (Sections 4.3 and 4.4), some of which seem to be supported. Further phonetic, phonological, and descriptive work will hopefully clarify whether the predictions in multiple prosodic host environments are actually borne out, or whether certain prosodic parsings are incorrectly predicted by the relatively weak conditional analysis given above.

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[54] Though Kinkade (1974) questions whether *kɬal̓* is in fact the same as preposition *kɬ*, since rather than meaning 'to, into', it can be translated 'together with, along with.'

[55] Example (i) below from Kinkade (1974) (cf. Bell 2003) presents an interesting challenge for this analysis. A prepositional phrase is functioning as a predicate, but the preposition (presumably an inner clitic of the nominal domain) precedes the predicate, while the subject clitic (an inner clitic of the verbal domain), follows the prepositional phrase. A separate but related challenge: N. Mattina (2002) shows that the genitive clitic *l* (homophonous with the preposition *l*) can occur in any position internal to a possessed DP (ii).

(i) **l** štxʷúl kn.
l štxʷúl kn
in house 1SG.INTR
'I'm in the house.'

(ii) a. ʔani Mary **l** štxʷulš.
ʔani Mary **l** štxʷul-š
DET Mary GEN house-3POSS
'Mary's house'
b. ʔani **l** Mary štxʷulš.
c. ʔani štxʷulš **l** Mary.
d. ʔani štxʷulš Mary **l**.

Last, the cross-linguistic difference between Nxaʔamxčín and Nsyilxcn is interesting: The orbital clitics of Nxaʔamxčín correspond to an (almost) total absence of variation in Nsyilxcn, which is similar to other Interior Salish languages in allowing only one orientation per clitic. Theoretically, we account for this cross-linguistic variation by assuming a more-or-less strict constraint ranking for Nsyilxcn as opposed to Nxaʔamxčín, but the questions remain: Why are Nxaʔamxčín clitics orbital,[56] and how did this system develop? Do other languages also have orbital clitics, and if so, are their distributions subject to similar constraints?

6 Conclusion

This paper examines the distribution of verbal clitics in Nxaʔamxčín, a Southern Interior Salish language. Clitics seem to move in defined, prosodic orbits around a prosodic host, resulting in a 'mirroring' effect. Linearization before a prosodic host as opposed to after a prosodic host appears to be optional, so long as orbits are adhered to.

For the macro-pattern, we propose that clitic orbits in Nxaʔamxčín correspond to different levels of the prosodic hierarchy (Selkirk 1995, 2011), based partially on evidence from closely related Nsyilxcn. We derive linear variation within an orbit by appealing to a tension between a set of STAY and STRONG-START constraints, whose individual members apply specifically to prosodic words, phonological phrases, or intonational phrases. We assume partial constraint orderings (a.k.a. 'revolving doors') (Antilla 2001) in order to account for apparently free linear variation, given an orbit. Attested orbital independence, and limits on unattested independence, are expressed through constraint implications, which utilize a standard logic for conditionals.

Micro-variation exists within these orbits, and is most apparently exhibited by second-position enclitics, such as the past tense marker *ay̓*. We propose higher-ranked word-promotion constraints for second-position clitics, which in some cases override linearization patterns found within the macro-pattern.

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[56] Bell (2003) speculates that variation in clitic placement may be due to "pragmatic emphatic effect" though this remains to be seen.

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Appendix Abbreviations

Abbreviation	Translation	Abbreviation	Translation
ASR	assertive	INTR	intransitive
AUT	autonomous	IPFV	imperfective
BOUL	bouletic modal	LOC	locative
CAUS	causative transitivizer	MID	middle intransitivizer
CISL	cislocative	NEG	negative
COMP	complementizer	NEG.FAC	negative factual
CONJ	conjunction	NMLZ	nominalizer
CONT	continuative	OBJ	object
DEM	demonstrative	OBL	oblique
DET	determiner	PAST	past
DIM	diminutive	PL	plural
DIR	directive transitivizer	POSS	possessive
DRV	misc. derivational	POT	potential
EPIS	epistemic modal	PROS	prospective
ERG	ergative	Q	y/n question
EVID	evidential	RECP	reciprocal
EXCL	exclusive	RED	reduplication
FRED	final reduplication	REFL	reflexive
FUT	future	RLT	relational transitivizer
GEN	genitive	SG	singular
IMP	imperative	STAT	stative
INCH	inchoative	TR	transitive
INDEP	independent pronoun	TRED	total reduplication