

The temporal interpretation of clause chaining in Northern Paiute*

Maziar Toosarvandani
University of California, Santa Cruz

December 26, 2015

Abstract

Northern Paiute uses clause chaining to express temporal relations between clauses conveyed by temporal subordinators, such as *after* and *while* in English. Rather than a subordination structure, however, I show that clause chaining in the language has an underlying coordination structure. I propose that the temporal relations between clauses in a chain arise, in part, from verbal morphology conveying relative tense. In Northern Paiute, these relative tenses can be bound in a coordination structure, just as in an embedded clause in other languages (Ogihara 1994, 1995, 1996, Abusch 1997). This semantics is enriched pragmatically, I argue, to produce a ‘forward moving’ temporal interpretation that is characteristic of narrative discourse (Kamp and Rohrer 1983, among others). This in-depth investigation of one language raises questions about the syntax and semantics of clause chaining in other languages.

Languages have a variety of grammatical resources for conveying information about time, including tense, temporal adverbials, and temporal adjunct clauses. Northern Paiute—a Uto-Aztecan language of the Numic branch spoken in the western United States—frequently uses a different device. In *CLAUSE CHAINING*, two or more clauses convey that some events take place, roughly

*I am greatly indebted to Grace Dick, Edith McCann, and Madeline Stevens for their patience in continuing to teach me about their language over the years. I am extremely grateful to an anonymous reviewer and Associate Editor William Davies, whose comments greatly improved the paper. In addition, I thank Pranav Anand, Adrian Brasoveanu, Donka Farkas, Andrew Garrett, Line Mikkelsen, Sarah Murray, David Pesetsky, Anna Szabolcsi, and Tim Thornes for their insightful questions and comments. I have learned a lot from audience members at the 2012 and 2013 Linguistic Society of America Annual Meetings in Portland and Boston and at the 18th Workshop on the Structure and Constituency of Languages of the Americas at the University of California, Berkeley, as well as at Rice University, Stony Brook University, the Massachusetts Institute of Technology, the University of California (Los Angeles, Santa Cruz, and San Diego). Tim Thornes very kindly shared a number of his unpublished texts from the Burns variety of Northern Paiute (cited as Thornes, p.c.). Early work on this project was carried out with Timothy Ho, who compiled raw data and formulated some of the basic generalizations.

The fieldwork for this paper was supported by a Jacobs Research Fund Grant (Whatcom Museum Foundation, Bellingham, Washington), Phillips Fund Grant (American Philosophical Society, Philadelphia), and a Grant in Great Basin Studies from the Sven and Astrid Liljeblad Endowment Fund (University of Nevada, Reno). This research was also assisted by a New Faculty Fellowship from the American Council of Learned Societies, funded by the Andrew W. Mellon Foundation and a Faculty Research Grant awarded by the Committee on Research from the University of California, Santa Cruz.

speaking, at the same time or in a temporal sequence, depending on whether they contain the suffix *-na* (1a) or the suffix *-si* (1b).¹

- (1) a. Yaisi o=woetsimmi-**na**, yaisi o=ggwidzi-**na**,
 PTC 3SG.ACC=watch-**SIM** PTC 3SG.ACC=stir-**SIM**
 o=ddza-puni-hu-dzaga-ti.
 3SG.ACC=IP.fingers-see-PFV-MOT-TI
 ‘While you are watching it, while you are stirring it, you look at it every once and a while.’ (dialogue, MS, BP09-1-t4, 7)
- b. Yaisi mi=toogi=tiwau nobiya-u-**si**, mi=toogi=tiwau
 PTC PL=dog=also pack-PFV-**SEQ** PL=dog=also
 tsa-hibi-ki-u-ga-**si**, tammi mia-ga-kwi mii.
 IP.fingers-drink-APPL-PFV-MOT-**SEQ** 1PL.INCL.NOM go-MOT-IRR QUOT
 ‘So then, having packed up the dogs, and having made sure those dogs get a drink, so we’d take off.’ (narrative, Nepa Kennedy, ‘Root-Digging Time’, Thornes, p.c.)

The clauses that contain one of these suffixes, which I will call MARKED CLAUSES, cannot stand on their own. In contrast, the final clause in each chain above, which I will call the UNMARKED

¹The data in this paper comes primarily from my own fieldwork on the variety of Northern Paiute spoken at Mono Lake in eastern California (Lee Vining, California) and immediately to the north in Bridgeport and Coleville, California and Sweetwater, Nevada. In addition to the Mono Lake dialect, there are several other closely related dialects spoken across, and immediately adjacent to, the Great Basin. These dialects are all mutually intelligible; the variation amongst them is primarily phonological and lexical (see Babel, Houser, and Toosarvandani 2012 and Babel, Garrett, Houser, and Toosarvandani 2013 for details). To a lesser extent, I have also drawn on data from the Burns, Oregon variety (Thornes 2003).

Northern Paiute is severely endangered. For all dialects, there are probably no more than 300 fluent speakers today (Golla 2011:174). For the Mono Lake dialect specifically, there are around five speakers, with varying levels of proficiency. The fieldwork data I present here comes entirely from the two oldest, most fluent speakers of the Mono Lake variety. At the time of writing, Edith McCann was 90 years old and Madeline Stevens was 93 years old. They learned Northern Paiute as their first language and were introduced to English when they started school. Both trace their ancestry to Bridgeport, though they also have family from Mono Lake (Lee Vining) and Sweetwater. There are only a few differences in their speech; these consist entirely of very small lexical differences that reflect minor historical variation amongst the communities in the Mono Lake dialect area (e.g. *tiba’a* ‘pinenut’ in Lee Vining, but *tiba* elsewhere).

Examples from other sources receive the usual parenthetical citation. Examples from my own fieldwork are annotated with relevant metadata: (i) how the data was collected: in a dialogue, through elicitation, in a narrative, or in a prompted narrative, (ii) the initials of the speaker who uttered the example or provided a judgement for the example (EM or MS), (iii) a number (starting with BP) identifying the source recording for the example, and (iii) the example’s location in the source recording (either a line number in the corresponding transcription of the recording or a times-tamp). The source recordings and transcriptions are not available to the public, at the request of the speakers, because they contain culturally sensitive and personal content.

I use the following abbreviations in this paper: ACC = accusative, APPL = applicative, DAT = dative, DEM = demonstrative, DIM = diminutive, DL = dual, DS = different subject, EMPH = emphatic particle, EXCL = exclusive, GEN = genitive, IMPF = imperfective, ERG = ergative, FOC = focus, INCEP = inceptive, INCL = inclusive, IND = indicative mood, INT = intensive, IP = instrumental prefix, IRR = irrealis, L = l-grade in Choctaw (Broadwell 1997:32), LOC = locative postposition, MOD = modal particle, MOT = motion suffix, NEG = negation, NOM = nominative, NSP = nonspecific patient, PASS = passive, PFV = perfective, PL = plural, PRF = perfect, PROG = progressive, PRS = present tense, PST = past tense, PTC = discourse particle, Q = question particle, QUOT = quotative, REFL = possessive anaphor, SEQ = sequential suffix, SG = singular, SIM = simultaneous suffix, SS = same subject, STAT = stative, TI = ‘general tense’ (see Section 2), TOP = topic, TPAST = today’s past tense in Amele (Roberts 1988:45).

CLAUSE, is inflected like an independent sentence.²

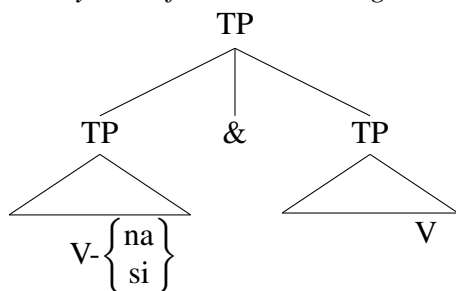
In many languages, these relations between clauses—temporal simultaneity and sequence—are conveyed by temporal subordinators, such as *while* and *after* in English. They create subordination structures that look strikingly similar to clause chaining in Northern Paiute.

- (2) a. **While** the senators were debating the motion, they drank tea.
 b. **After** Ben won the race, he collapsed with exhaustion.

The temporal adjunct clauses either temporally include (2a) or precede (2b) the main clause. In addition, the main clause in each example can stand on its own as an independent sentence, while the clause introduced by the temporal subordinator can only be adjoined.

Despite this surface resemblance, there is a persistent intuition in the literature that the clauses in a chain stand in a looser relation to each other—“like beads on a string” in Foley’s (2010:27) words—one that is more characteristic of coordination. Indeed, as I will show later in Section 1, clause chaining in Northern Paiute has a coordination structure, as in some other languages (see Roberts 1988 on Amele, Foley 2010 on various Papuan languages, and Nonato 2014 on Kisêdjê).

- (3) *The syntax of clause chaining in Northern Paiute (preliminary version)*



If clause chaining in Northern Paiute has this coordination structure, how does it convey temporal relations between clauses, as temporal subordinators do?

I argue in Section 2 that the SIMULTANEOUS SUFFIX *-na* and the SEQUENTIAL SUFFIX *-si* realize the T(ense) head inside the marked clause. In terms of their semantics, I propose that they are dedicated markers of RELATIVE TENSE—specifically, what von Stechow (1995:372) calls ‘bound relative tense.’ They only relate the time at which the marked clause is interpreted to a time whose value is provided by linguistic material elsewhere in the sentence. Foley (2010:44f.) suggests an account along these lines for several Papuan languages, though he does not show how the semantics of relative tense gives rise to the temporal interpretation of clause chaining.

In Section 3, I propose that the simultaneous and sequential suffixes combine compositionally with coordination to produce part of the temporal interpretation of a clause chain. In Northern Paiute, the relative tense conveyed by one of the suffixes is abstracted over in a coordination structure, just as relative tenses are in embedded clauses in other languages (Ogihara 1994, 1995, 1996, Abusch 1997). This semantic binding establishes a relation of temporal inclusion or temporal precedence between each marked clause and the unmarked clause, deriving the insensitivity of these temporal relations to the linear order of the marked and unmarked clauses.

²These are sometimes called ‘medial’ and ‘final’ clauses, respectively (Longacre 2007:399). While this might seem an accurate characterization of the clause chains in 1a–b, the terms adopted in the text are more appropriate for Northern Paiute. The linear order of the marked and unmarked clauses is variable—see Section 3.2.

In Northern Paiute, the marked clauses in a chain are also related temporally to one another, though this is not part of their semantic content. I argue in Section 4 that these temporal relations arise through pragmatic enrichment. In narratives, the clauses in a chain receive the same ‘forward moving’ interpretation that a sequence of independent sentences does (Kamp and Rohrer 1983, among others). This additional meaning component is sensitive to the linear order of clauses in a chain, capturing Foley’s intuition that they resemble “beads on a string.”

The existing literature on clause chaining consists largely of typological surveys (e.g. Longacre 2007) and comparative work on geographically or genetically related languages (e.g. Foley 2010), or it deals with clause chaining only in connection with another topic (e.g. Finer 1985, Roberts 1988, Broadwell 1997). It is thus difficult right now to determine whether the syntax and semantics that I propose for clause chaining in Northern Paiute can be extended to other languages, since they cannot be compared in any really substantive way. But I hope that this in-depth investigation of one language will raise questions about others, leading in the end to a richer theory of clause chaining.

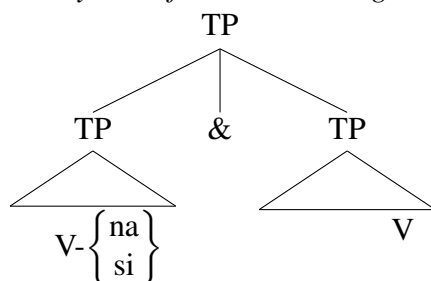
1 The syntax of clause chaining in Northern Paiute

Clause chaining has a remarkably uniform surface profile across languages. In his typological survey, Longacre (2007:398–417) identifies a number of core properties. First, one clause “has a verb of distinctive structure that occurs but once in the entire chain, while the other clauses have verbs of different and more restricted structures” (p. 399). In Northern Paiute, as we have already seen, there is one unmarked clause, accompanied by one or more marked clauses. Second, the temporal relations between clauses are marked by morphology signaling a distinction between either (i) temporal simultaneity or (ii) temporal sequence (p. 400). In Northern Paiute, these relations are conveyed by verbal morphology: the simultaneous suffix *-na* and the sequential suffix *-si*.

In addition, Longacre observes (p. 399) that clause chaining frequently marks switch reference—that is, whether the subject of one clause is the same as or different from the subject of the following clause. As far as I know, Northern Paiute never realizes switch reference formally (see also Thornes 2003:277f.). But there is no reason to think that this is a necessary property of clause chaining. Switch reference marking can, but need not, appear at a variety of clause junctures, including both unequivocal coordination structures and a variety of subordination structures (see the discussion in McKenzie 2012:79–91).

Moving beyond this surface description, I propose that clause chaining has a coordination structure in Northern Paiute. Two or more full clauses, which I assume are TPs, are combined by an asyndetic, or phonologically null, coordinator. (These clauses are headed by T(ense), a label that does not necessarily have any semantic import.)

- (4) *The syntax of clause chaining in Northern Paiute (preliminary version)*



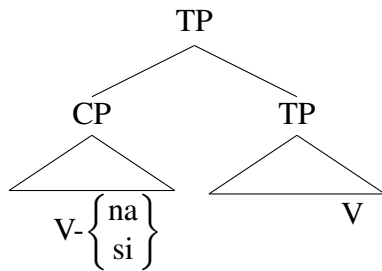
I will argue for a clausal asyndetic coordination structure by setting aside three alternative structures. While each of these alternatives may be able to account for some of the properties of clause chaining in Northern Paiute, only a structure like 4 can account for all of them.

In some languages, clause chaining is analyzed as subordination (Finer 1985, Broadwell 1997, 2006). But as I show in Section 1.1, questions and left-peripheral operators, such as modal clitics and negation, do not treat the marked clause as contained within the unmarked clause in Northern Paiute. In other languages, clause chaining is analyzed as coordination at the level of the verb phrase (Foley 2010, Nonato 2014:45–63). I argue in Section 1.2 that clause chaining in Northern Paiute must coordinate full clauses, because each member of a chain can contain the same left-peripheral elements. Finally, in Section 1.3, I consider the possibility that the simultaneous and sequential suffixes are themselves coordinators. I conclude, however, that they must be contained within the marked clause, since they select for its contents.

1.1 Clause chains are not subordinated

For several North American languages, Finer (1985) assumes a subordination structure like 5 for clause chaining to accommodate his theory of switch reference marking.

- (5) *The syntax of clause chaining in Northern Paiute (first alternative)*



The marked clause would have to be adjoined quite high—to the entire unmarked clause—since it precedes everything in the unmarked clause. This alternative subordination structure ends up being quite difficult to distinguish syntactically from the coordination structure in 4. In neither does an expression in the marked clause c-command into the unmarked clause, or vice versa.

Broadwell (1997, 2006) adopts this subordination structure for clause chaining in Choctaw (Muskogean: Southeastern United States), in part because the marked clause cannot contain tense, unlike a true coordination structure. This argument is not relevant for Northern Paiute, since the language lacks ABSOLUTE TENSE (Comrie 1985:36): it does not mark the relation between the time at which a clause is interpreted and the utterance time (see also Thornes 2003:396). Below, I offer three other arguments that clause chaining in Northern Paiute does not have the subordination structure in 5.

Before proceeding, let me briefly set aside another alternative. The primary subordination strategy in Northern Paiute is nominalization (see also Thornes 2003:427–447). One nominalizer, the suffix *-na*, derives patient nominalizations (6a), object relative clauses (6b), and the complements of perception verbs (6c) (Toosarvandani 2011, 2014b).

- (6) a. **I=saa-na** ne-hu.
 1SG.GEN=cook-NMLZ burn-PFV
 ‘What I was cooking burned.’ (elicitation, EM, BP32-9-s, 15)

- b. **Isu siadami i=bisabi-na** wadzi-mia-hu.
 DEM.NOM girl 1SG.GEN=like-NMLZ hide-go-PFV
 ‘The girl that I like ran away.’ (elicitation, MS, BP32-4-s, 40)
- c. **Nii a=bbauma-winni-na** naka.
 1SG.NOM 4.GEN=rain-PROG-NMLZ hear.IMP
 ‘I hear it raining.’ (elicitation, MS, BP37-1-s, 6)

Even though they have the same form, the simultaneous suffix in clause chaining cannot be assimilated to the nominalizer suffix. To start, it is in complementary distribution with the sequential suffix, which cannot plausibly be analyzed as a nominalizer. The sequential suffix cannot occur on a verb in argument position (7a), in a relative clause (7b), or on the complement of a perception verb (7c).

- (7) a. ***I=saa-si** ne-hu.
 1SG.GEN=cook-SEQ burn-PFV
 (elicitation, EM, BP47-10, 46:49)
- b. ***Isu siadami i=bisabi-si** wadzi-mia-hu.
 DEM.NOM girl 1SG.GEN=like-SEQ hide-go-PFV
 (elicitation, EM, BP50-2, 1:10:00)
- c. ***Nii a=bbauma-winni-si** naka.
 1SG.NOM 4.GEN=rain-PROG-SEQ hear.IMP
 (elicitation, EM, BP47-10, 46:13)

In the Appendix, I provide three additional arguments that the simultaneous suffix is distinct from the homophonous nominalizer suffix.

Asymmetrical wh-movement

While extraction is not possible from an adjoined clause, it is possible from the main clause. A wh-phrase, for instance, can raise to precede a temporal adjunct clause.³

- (8) **What₁**, when he was studying for his exam, did John drink **t₁**?

In Choctaw, Broadwell (1997:39) argues that clause chaining has such a subordination structure, because it is possible to extract from the unmarked clause (9a). This contrasts with unambiguous coordination structures, which do not permit such asymmetrical wh-movement (9b).

- (9) *Choctaw*
- a. **Katah-oosh₁** John-at taloowa-nah **t₁** hilhah?
 who-FOC.NOM John-NOM sing.L-DS dance
 ‘Who₁ did John sing and t₁ dance?’
- b. ***Katah-oosh₁** John-at taloowa-tok anoti **t₁** hilha-tok?
 who-FOC.NOM John-NOM sing-PST and dance-PST

(Broadwell 1997:39)

³The orthographic commas in 8 belie that the temporal adjunct clause is fully integrated into the sentence. The characteristic intonation of a parenthetical is missing.

In Northern Paiute, if clause chaining had the alternative subordination structure in 5, it should exhibit the same extraction pattern. But a *wh*-phrase cannot move across the marked clause.⁴

- (10) * **Haga**₁ su=miitsi-'yu nana tība tika-na, su=tiitsi-'yu naatsi'i t₁ mutuhe'e?
who NOM=short-NOM man pinenut eat-SIM NOM=little-NOM boy kiss.IMPF
 Intended: 'Who, while the short man was eating pinenuts, did the little boy kiss?' (cf. **Who*₁ was the short man eating pinenuts, and the little boy kissed t₁?) (elicitation, EM, BP48-3, 52:50)

The ungrammaticality of 10 does, however, follow from the coordination structure in 4. The asymmetrical movement of a *wh*-phrase violates the Coordinate Structure Constraint (Ross 1967:161).

Interestingly, it is possible to question a constituent inside the marked clause. (This is completely ruled out in temporal adjunct clauses: **What*₁ when he was studying for t₁, did John drink?)

- (11) **Haga**₁ su=tiitsi-'yu nana t₁ mutuhe-na, yaisi su=naatsi'i=bino'o tība tika?
who NOM=little-NOM man kiss-SIM PTC NOM=boy=PTC pinenut eat.IMPF
 'Who is the little man kissing while the boy is eating pinenuts?' (cf. **Who*₁ is the little man kissing t₁, and the boy is eating pinenuts?) (elicitation, MS, BP48-3-s, 13)

How is this possible if clause chaining in Northern Paiute has a coordination structure? The *wh*-phrase in 11 appears to raise out of the first coordinate in violation of the Coordinate Structure Constraint. There is good reason to think, though, that it does not actually leave the first coordinate. Northern Paiute only has optional *wh*-movement to a clause-initial position (12a–b).

- (12) a. **Haga**₁ su=mogo'ni t₁ pisapi?
who NOM=woman like.IMPF
 'Who does the woman like?' (elicitation, EM, BP44-7, 7:25)
 b. Su=mogo'ni **haga** pisapi?
 NOM=woman **who** like.IMPF
 'Who does the woman like?' (elicitation, EM, BP44-7-s, 5)

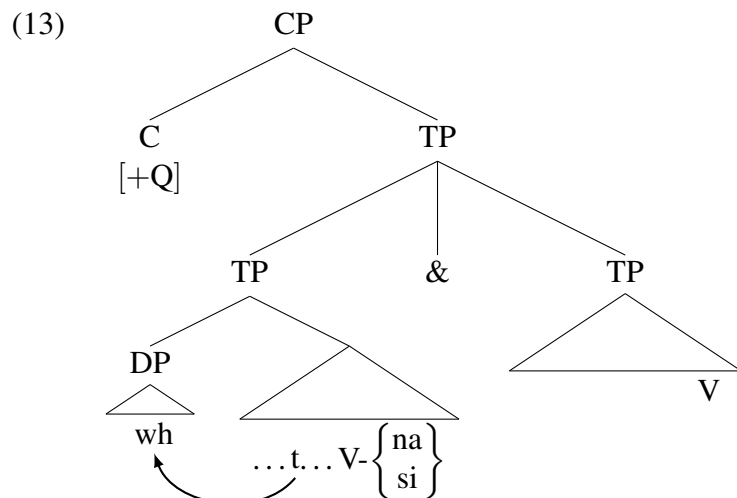
This suggests that the *wh*-phrase in 11 might raise into the left periphery of the first coordinate. Question semantics would be contributed by an operator taking scope over both clauses in the chain, perhaps along the lines suggested by Cable (2010).⁵

⁴For reasons of space, I have only included clause chains with the simultaneous suffix as examples in this section. But clause chains with the sequential suffix have exactly the same properties.

⁵While this operator is phonologically null in *wh*-question, there is an overt question particle in polar questions. It can take scope over an entire clause chain.

- (i) Context: I come into the house. I hear stomping and singing coming from another room.
Hau su=tiitsi-'yu naatsi'i hubiadu-na, yaisi su=u=bbiia=bino'o nika?
Q NOM=little-NOM boy sing-SIM PTC NOM=3SG.GEN=friend=PTC dance.IMPF
 'Was the little boy's friend dancing while he was singing?' (elicitation, EM, BP50-4-s, 2)

The context in i makes it felicitous for the question particle to take wide scope. It establishes that the speaker does not know whether either clause in the chain is true.



This correctly predicts that a constituent inside the unmarked clause can also undergo *wh*-movement, as long as it does not leave that clause.⁶

- (14) Su=nana iwi-na, yaisi **himma**₁ su=naatsi'i t₁ tika?
 NOM=man sleep-SIM PTC **what** NOM=boy eat.IMPF
 'While the man is sleeping, what is the boy eating?' (elicitation, MS, BP58-4, 21:05)

Clause chaining in Northern Paiute cannot have a subordination structure, then, because it does not permit asymmetrical *wh*-movement from just one clause. This is compatible with it having a coordination structure instead.

Across-the-board *wh*-movement

While across-the-board extraction is permitted in coordination structures (15a), it is ungrammatical in subordination structures, because the moved element crosses an adjunct island boundary (15b).

- (15) a. **What**₁ did the nurse polish t₁, and the plumber play t₁?
 b. * **Who**₁ did Max tell t₁ after he saw t₁?

In Northern Paiute, *wh*-movement can take place from each clause in a chain.

- (16) **Himma**₁ niï t₁ tika-na, yaisi su=naatsi'i=bino'o t₁ tika?
what 1SG.NOM eat-SIM PTC NOM=boy=PTC eat.IMPF
 'What, while I eat it, does the boy eat, too?' (cf. *What*₁ *do I eat t*₁, *and the boy eats t*₁, *too?*) (elicitation, EM, BP39-2-s, 24)

If clause chaining in Northern Paiute had a subordination structure, 16 should be ungrammatical. But this across-the-board *wh*-movement is completely expected if it has a coordination structure.

⁶In a three-clause chain, it should be grammatical for the medial marked clause to contain a *wh*-phrase at its left edge. And, it should be ungrammatical for a *wh*-phrase to move out of the medial marked clause. Unfortunately, the relevant sentences are quite challenging for speakers to judge because of their length.

Second-position clitics

Another argument that clause chaining in Northern Paiute does not have a subordination structure comes from second position clitics, which express modality and occur after the first major sentence constituent (Thornes 2003:336–341). The modal clitic =*sakwa*, for instance, can occur after the subject (17a), a fronted direct object (17b), or a sentence initial adverb (17c).

- (17) a. **Ii=sakwa** pida.
2SG.NOM=**MOD** start.fire
‘You should start the fire.’ (elicitation, EM, BP33-5-s, 47)
- b. **Himma=sakwa** tammi madabbui.
thing=**MOD** 1PL.INCL make
‘We might make something.’ (elicitation, EM, BP34-2-s, 17)
- c. **Mu’a=sakwa** tammi t̥iba’a hani-gaa-kwi.
tomorrow=**MOD** 1PL.INCL pinenut do-MOT-IRR
‘Tomorrow, we are going to go get pinenuts.’ (elicitation, EM, BP33-5-s, 51)

If the marked clause were adjoined to the unmarked clause in first position, as in the alternative subordination structure in 5, modal clitics should follow the marked clause. Instead, they appear after the first constituent inside the unmarked clause, taking scope within that clause. (The sentence in 18 was judged relative to a context in which the marked clause describes an actual situation.)

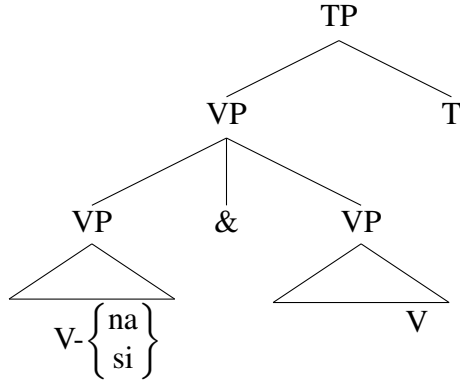
- (18) Context: The woman is making a fire, but the boy is sitting around doing nothing.
Su=miitsi-’yu mogo’ni pida-na, su=naatsi’i=**sakwa** ka=kutsu patsa.
NOM=short-NOM woman make.fire-SIM NOM=boy=**MOD** ACC=cow kill.IMP
‘While the short woman is starting a fire, the boy should kill the cow.’ (elicitation, EM, BP50-4, 16:25)

Since the marked clause does not count as the first element, clause chaining in Northern Paiute cannot have a subordination structure. By contrast, the distribution of second position clitics is compatible with a coordination structure: in 18, the modal clitic appears after the first element inside a coordinate, the unmarked clause. (As I will show below, second position clitics can also occur inside the marked clause.)

1.2 Clause chaining coordinates full clauses

Based on the three arguments above, I conclude that clause chaining in Northern Paiute does not have a subordination structure, though this may be appropriate for Choctaw and other languages. This leaves a coordination structure. For various Papuan languages, Foley (2010) proposes that clause chaining coordinates subclausal constituents under a single T head (see also Nonato 2014).

(19) *The syntax of clause chaining in Northern Paiute (second alternative)*



The main argument for this low-coordination structure comes from the absence of functional categories in the marked clause that are found in an independent sentence, such as absolute tense, negation, and illocutionary force (Foley and Van Valin 1984:256–263). Since Northern Paiute does not overtly mark absolute tense, I instead use negation and second-position clitics to show that clause chaining does not have the low-coordination structure in 19.

Negation

In Northern Paiute, negation appears either in sentence-initial position (20a) or following the subject at the left edge of the verb phrase (20b) (Thornes 2003:328).

- (20) a. **Kai** nɪmmi wiupui-gga yaa.
 NEG 1PL.EXCL.NOM buckberry-have there
 ‘We have no buckberries this time.’ (dialogue, MS, BP23-1-t1, 3)
- b. Su=natɪzuabi **kai** togi i=ma-nɪmma.
 NOM=medicine NEG correct 1SG.ACC=CAUS-feel.IMPF
 ‘The medicine doesn’t make me feel quite right.’ (elicitation, Thornes 2003:328)

Assuming that negation adjoins either to TP or to VP—the two positions where it is attested cross-linguistically (Laka 1990:9–85)—it can be used to probe the structure of clause chaining.

Under the alternative low-coordination structure, high negation should be impossible inside the unmarked clause because it would be just a VP. But this is, in fact, possible.

- (21) Su=tɪɪtsi-’yu naatsi’i iwi-na, **kai** su=mogo’ni mia-hu.
 NOM=little-NOM boy sleep-SIM NEG NOM=woman go-PFV
 ‘While the little boy was sleeping, the woman didn’t leave.’ (elicitation, EM, BP50-4, 17:46)

High negation should not be possible inside the marked clause either, though showing this is a bit more involved. It is clear that the negative particle *kai* can occur in sentence initial position.

- (22) **Kai** su=tɪɪtsi-’yu naatsi’i yaga-na, nii o=ddika-ggi-kwi.
 NEG ACC=little-NOM boy cry-SIM 1SG.NOM 3SG.ACC=eat-APPL-IRR
 ‘When the little boy is not crying, I will feed him. (elicitation, EM, BP44-7-s, 2)
 [EM: “You’re going to feed him, before he starts to cry.”]

If the clause chain in 22 had a low-coordination structure, high negation should only scope over the entire coordination. But as the speaker's comments indicate, it can take scope inside the marked clause. This is entirely expected if clause chaining in Northern Paiute coordinates full clauses.

Second-position clitics

Recall from Section 1.1 that modal clitics occur in second position in Northern Paiute. I assume they occupy C, like the highest verb in a verb-second Germanic language (Koster 1975, among others). If clause chaining had the alternative low-coordination structure, then, modal clitics should not be possible inside the unmarked clause. But as we saw in 18 above, this is possible.

It is unclear whether a low-coordination structure should also permit a modal clitic inside the marked clause. This depends on whether a modal clitic can be interpreted inside the first VP coordinate, and yet surface in C of the matrix clause. At any rate, it is possible for a modal clitic to appear after the first element of the marked clause.

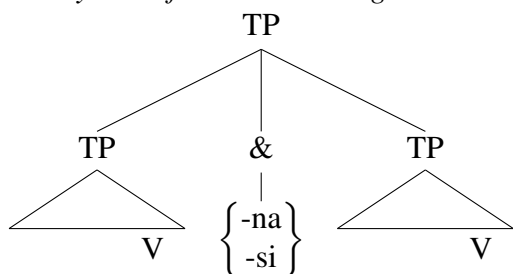
- (23) Su=miitsi-'yu mogo'ni=**sakwa** pida-na, su=naatsi'i yaisi kutsu patsa.
 NOM=short-NOM woman=**MOD** make.fire-SIM NOM=boy PTC cow kill
 'The short woman should start a fire, so the boy will kill a cow.' (elicitation, EM, BP48-6, 17:45)

This distribution for second-position clitics is expected if clause chaining in Northern Paiute coordinates full clauses. While I have been assuming for simplicity that these are TPs, they could also be CPs. There is a position, then, for a modal clitic in both the marked and unmarked clauses.

1.3 Clause chaining is asyndetically coordinated

Northern Paiute does not have overt coordinators, so clause chaining would have to employ asyndetic coordination. Unless, that is, the simultaneous and sequential suffixes were themselves coordinators. They would be terminal nodes in the syntax, but they would attach phonologically to the element on their left.

- (24) *The syntax of clause chaining in Northern Paiute (third alternative)*



With this structure, the marked clause would have no special status: it would be whatever clause happens to occur first. But there is good reason to think that clause chaining in Northern Paiute has an asyndetic coordination structure. The simultaneous and sequential suffixes interact with aspectual morphology inside the marked clause.

In Northern Paiute, verbs cannot appear in a bare form in nonmodal contexts (25): they must bear some type of aspect morphology. In the marked clause of a chain, however, the verb can appear without any aspectual morphology (26).

- (25) *Idzi'i su=nana ti=kaadzi **madabbui**.
 yesterday NOM=man REFL=car **fix**
 (elicitation, EM, BP44-4, 3:27)
- (26) Su=nana ti=kaadzi **madabbui**-na, hubiatu.
 NOM=man REFL=car **fix**-SIM sing.IMPF
 'While the man is fixing his car, he is singing. (elicitation, EM, BP48-5, 38:03)

If clause chaining had the alternative structure in 24, where the simultaneous and sequential suffixes were simply coordinators, this should be impossible. While the suffixes' interaction with aspect remains to be explained, I conclude that they are contained inside the marked clause and that clause chaining in Northern Paiute has an asyndetic coordination structure.

1.4 One last alternative

I have argued that clause chaining in Northern Paiute has a clausal asyndetic coordination structure. Like other coordination structures, clause chaining in Northern Paiute does not permit asymmetrical extraction, a violation of the Coordinate Structure Constraint, though it does allow for across-the-board movement; second-position clitics also do not treat the marked clause like a (subordinated) first element. Moreover, clause chaining in Northern Paiute must coordinate *full* clauses, as negation and second-position clitics can occur in both the marked and unmarked clauses. Finally, the simultaneous and sequential suffixes cannot themselves be coordinators, since they are located inside the marked clause and are able to select for its contents.

In the preceding discussion, I have assumed a binary distinction between coordination and subordination, into which I have fit clause chaining in Northern Paiute. There is, however, a substantial line of inquiry that allows for clause chaining to instantiate a third, intermediate category between coordination and subordination (Olson 1981, Foley and Van Valin 1984:256–263, Van Valin and La Polla 1997:448–454, Van Valin 2005:183f.). In a COSUBORDINATION relation, neither clause is embedded inside the other, as in coordination. But “[t]he crucial property distinguishing cosubordination from coordination is operator dependence” (Van Valin 2005:187). As in subordination, one of the clauses is semantically dependent on the other: in particular, the cosubordinated clauses share a single operator, such as tense, mood, or illocutionary force, taking scope under it together.

Within Role and Reference Grammar (RRG), the category of cosubordination is often assumed as a theoretical primitive. Foley (2010:40) warns, however, that the relevant notion of semantic dependence “remain[s] undertheorized.” While a putative cosubordinated clause may be semantically dependent with respect to one operator, it may not be semantically dependent with respect to another operator. In Tauya (Trans-New Guinea: New Guinea), for instance, clauses in a chain can—though they need not—take scope together in a polar question (27a). This is not the case with other operators: in 27b, only the second clause takes scope under negation.

- (27) *Tauya*
- a. Tepau-fe-pa yate fitau-e-nae?
 break-PRF-SS go throw-1/2-Q
 'Did you break it and go away?'
 'You broke it, and did you go away?'
 'Did you break it? And you went away.' (MacDonald 1990:226)

- b. Ne fofe-a-te ya-ni wate Ø-tu-e-ʔa.
 3SG come-3SG-DS 1SG-ERG NEG 3SG-give-1/2-IND
 ‘He came, and I didn’t give it to him.’ (MacDonald 1990:233)

Thus, there is no unified notion of semantic dependence even within one construction in one language, much less across constructions and across languages.

For this reason, I do not take clause chaining in Northern Paiute to instantiate a category of cosubordination. It is nonetheless clear that while the clauses in a chain are not embedded inside one another, as in a typical coordination structure, the marked clause is semantically dependent on the unmarked clause in some intuitive way. This underlaid the original observation in the introduction that the marked clause in a chain superficially resembles a temporal adjunct clause. The semantics that I propose in the following sections for clause chaining in Northern Paiute can be seen as an attempt to theorize the relevant notion of semantic dependence for this construction in one language without appealing to a primitive category of cosubordination.

2 The temporal contribution of the suffixes

The clausal asyndetic coordination structure for clause chaining in Northern Paiute leaves us with something of a mystery. In general, coordinates must be alike in some sense (see, for instance, Huddleston and Pullum 2002:1323). But the marked clause contains the simultaneous or the sequential suffix, while the unmarked clause does not. I will argue that this asymmetry reflects only a superficial difference between the marked and unmarked clauses. The suffixes are members of a syntactic category that is not phonologically overt in the unmarked clause.

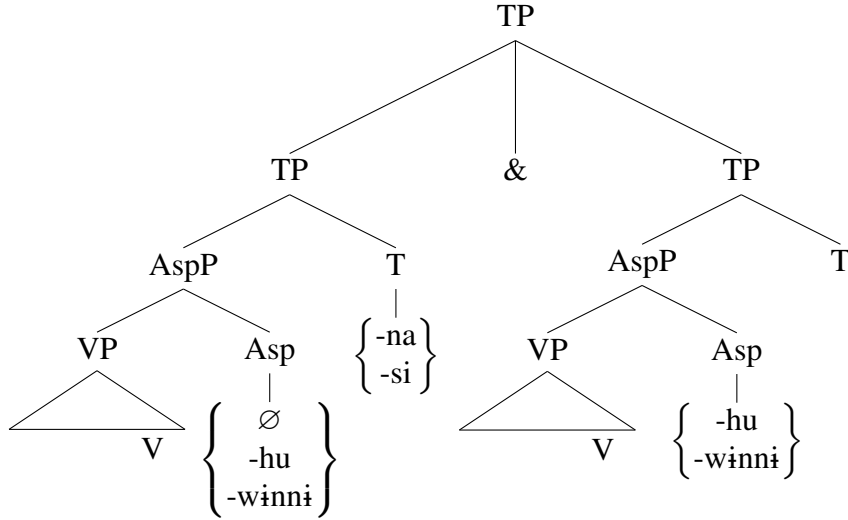
It is tempting to treat the simultaneous and sequential suffixes as aspect, since they appear on verbs in place of aspectual morphology (see Section 1.3). But they can cooccur with the progressive and perfective suffixes (28a–b), which are themselves in complementary distribution (29a–b).

- (28) a. Su=naatsi’i ti=kaadzi madabbui-**winni-na**, yaisi hubiadu-winni.
 NOM=boy REFL=car fix-**PROG-SIM** PTC sing-PROG
 ‘While the boy is fixing his car, he is singing.’ (elicitation, EM, BP50-1, 9:19)
- b. Su=nana ti=kaadzi madabbui-**hu-si**, yaisi u=ddza-kana-ggi-hu.
 NOM=man REFL=car fix-**PFV-SEQ** PTC 3SG.ACC=IP.fingers-grab-APPL-PFV
 ‘After the man fixed his car, he started it.’ (elicitation, EM, BP50-1-s, 1)
- (29) a. *Su=naatsi’i ti=kaadzi madabbui-**winni-hu**.
 NOM=boy REFL=car fix-**PROG-PFV** (elicitation, EM, BP50-1, 34:39)
- b. *Su=naatsi’i ti=kaadzi madabbui-**hu-winni**.
 NOM=boy REFL=car fix-**PFV-PROG** (elicitation, EM, BP50-1, 34:46)

I take the simultaneous and sequential suffixes instead to be members of a syntactic category that *selects* for aspect. Specifically, I propose that they are members of T.

Among other things, this means that the simultaneous and sequential suffixes can select for overt aspectual morphology like the progressive and perfective suffixes, or they can select for a phonological null member of Asp(ect) that is in complementary distribution with them.

(30) *The syntax of clause chaining in Northern Paiute (intermediate version)*



In the unmarked clause or in an independent sentence, T is not pronounced, and it must select for an overt member of Asp (perhaps for that reason). Thus, only in the marked clause of a chain can a verb appear without overt aspectual morphology.

Northern Paiute does not have absolute tense—the time at which a clause is interpreted is not related to the utterance time—so it is not surprising that T is phonologically null in the unmarked clause. But why is the T head in marked clauses realized as the simultaneous or sequential suffix? Elaborating on a suggestion by Foley (2010:44f.), I propose that they are dedicated markers of what von Stechow (1995:372) calls ‘bound relative tense’, or simply *RELATIVE TENSE*. They can only relate the time of the marked clause to a time whose value is provided by linguistic material elsewhere in the sentence. In other languages, relative tenses appear in embedded clauses, where they relate the time of the embedded clause to the time of the main clause (Ogihara 1994, 1995, 1996, Abusch 1997, and many others). As I will discuss later, the simultaneous and sequential suffixes relate the time of the marked clause to the time of the unmarked clause in Northern Paiute.

If a language does not have absolute tense, we might think that it should also lack relative tense. But it is not implausible that a language might have at some point had distinct morphemes dedicated to absolute and relative tense, and then lost just the set conveying absolute tense. Something like this probably happened in Northern Paiute. In Mono, the most closely related sister language, Lamb (1957:282) identifies an absolute tense marker *-ti*, which “[i]ndicates present or near past time.” He also observes (p. 281) that this nonfuture tense suffix is in complementary distribution with the simultaneous and sequential suffixes, demonstrating directly that they are members of T.

Northern Paiute preserves the fossilized remnants of the nonfuture tense suffix. The so-called ‘general tense’ suffix *-ti* occurs in two morphological environments: (i) after the applicative suffix *-ggi* (Thornes 2003:398) and (ii) after certain motion suffixes, including *-dzaga*, which indicates random motion, e.g. 1a. While the general tense suffix is neither productive nor semantically contentful, it cannot cooccur with the simultaneous (31a) and sequential (31b) suffixes.

- (31) a. Su=naatsi’i **na-dika-ggi(*-ti)-na**, yaka.
 NOM=boy PASS-eat-APPL-TI-SIM cry.IMPF
 ‘While the boy is being fed, he cries.’ (elicitation, EM, BP40-5, 27:11)

- b. Su=naatsi'i **na-dika-ggi(*-ti)-si**, yaisi iwi-huka.
 NOM=boy **PASS-eat-APPL-TI-SEQ** PTC sleep-INCEP
 'After the boy was fed, he fell asleep.' (elicitation, EM, BP40-5, 29:47)

The distribution of this remnant of absolute tense in Northern Paiute confirms that the simultaneous and sequential suffixes realize the T head in the marked clause.

For now, I focus on the semantics of the simultaneous and sequential suffixes, leaving for later how they combine compositionally with surrounding material to produce the temporal interpretation of a clause chain. To start, in Section 2.1, I provide some general background on tense and aspect in Northern Paiute. In particular, I demonstrate that the language lacks absolute tense. Then, in Section 2.2, I turn to the simultaneous suffix, which I argue conveys relative present tense. In contrast, the sequential suffix conveys relative past tense, as I argue in Section 2.3. Both suffixes can select either for an overt aspectual morpheme or for a null Asp head.

2.1 Background on tense and aspect in Northern Paiute

In one common framework for tense and aspect, a sentence is interpreted with respect to three times (Reichenbach 1947, among many others). The **EVENT TIME** is the run time of the event described by the sentence. The **REFERENCE TIME** is the time that the sentence can broadly be said to be 'about,' relative to which the event time is positioned. The **EVALUATION TIME** is a time that restricts the location of the reference time.

It is possible to treat tense as establishing a relation between the reference time and the evaluation time, while aspect establishes a relation between the reference time and the event time (Klein 1994). For absolute tenses, such as the present or past tense in main clauses in English, the evaluation time is the time of utterance. The absolute present tense establishes a relation of overlap between the reference time and utterance time, while the absolute past tense locates the reference time before the utterance time. An absolute future tense would locate the reference time after the utterance time.

Northern Paiute lacks absolute tense altogether, cf. Yukatec Maya (Bohnenmeyer 2002), Kalaallisut (West Greenlandic; Shaer 2003, Bittner 2005), and Paraguayan Guaraní (Tonhauser 2011). While the sentence in (32a) receives a default present interpretation, adding a temporal adverb can result in a past (32b) or future (32c) interpretation.

- (32) a. Su=nana ti=kaadzi madabbui-winni.
 NOM=man REFL=car fix-PROG
 'The man is fixing his car.' (elicitation, EM, BP46-3, 33:44)
- b. **Idzi'i** ti=kaadzi madabbui-winni.
yesterday REFL=car fix-PROG
 'He was fixing his car yesterday.' (elicitation, EM, BP44-4, 8:00)
- c. **Mu'a** ti=kaadzi madabbui-winni.
tomorrow REFL=car fix-PROG
 'He will be fixing his car tomorrow.' (elicitation, EM, BP44-4-s, 8)

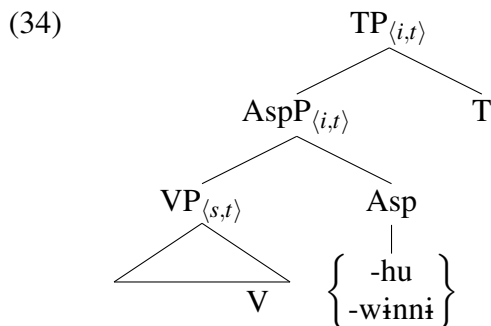
Crucially, in 32a–c, the form of the verb does not change; the reference time is constrained entirely by the temporal adverb. Northern Paiute does not even seem to have a covert absolute tense that would restrict temporal interpretation to the nonfuture, as in St'át'imcets (Matthewson 2006).

In many languages without absolute tense, aspect determines a default temporal interpretation. Imperfective aspect, such as the progressive, gives rise to a default present interpretation (32a), and perfective aspect gives rise to a default past interpretation (33a).

- (33) a. Su=nana ti=kaadzi madabbui-hu.
 NOM=man REFL=car fix-PFV
 ‘The man fixed his car.’ (elicitation, EM and MS, BP44-4, 3:55)
- b. **Mino’o** ti=kaadzi madabbui-hu.
now REFL=car fix-PFV
 ‘He just fixed his car now.’ (elicitation, EM, BP50-1-s, 10)
- c. **Mu’a** ti=kaadzi madabbui-hu.
tomorrow REFL=car fix-PFV
 ‘He will fix his car tomorrow.’ (elicitation, EM, BP44-4-s, 6)

Again, this default past interpretation can be overridden by a temporal adverb, such as *mino’o* ‘now’ (33b) or *mu’a* ‘tomorrow’ (33c).

Compositionally, the Asp head establishes a relation between the event time and the reference time by taking the VP, which denotes a property of events (type $\langle s, t \rangle$), as its argument and returning a property of times (type $\langle i, t \rangle$) (Kratzer 1998).⁷



I assume that every clause in Northern Paiute is headed by T for syntactic reasons: it assigns case to, and agrees with, the subject in its specifier. But since there is no absolute tense, in independent sentences and in the unmarked clause of a chain, the T head does not establish a relation between the reference time and the utterance time. It thus can denote the identity function, which returns the property of times expressed by AspP.

For simplicity, I assume a standard extensional semantics for aspect in Northern Paiute. The progressive suffix returns a property of times that holds of any reference time that is located within a non-final subpart (\subset_{nf}) of the event time, thus describing an event that is ongoing (35).⁸

⁷I assume a type-theoretic, compositional semantics that has a rule of Function Application for interpreting complex constituents (cf. Heim and Kratzer 1998:49). The truth conditions of a sentence, and the contribution that subparts of a sentence make to them, are represented by a predicate logic metalanguage with the lambda calculus. Constants are bolded. I use x, y , and z as variables over individuals (type e); e, e', e'' , etc. as variables over events (type s); t, t', t'' , etc. as variables over time intervals (type i); and, p, q , and r as variables over truth values (type t). The only higher-order variables are f, g , and h , which range over functions from either individuals, events, or time intervals to truth values.

⁸More formally, the progressive and perfective suffixes existentially quantify over the VP’s event argument. The run time of this event is given by the temporal trace function τ (Link 1987:250).

- (35) *The semantics of the progressive suffix*
 $\llbracket \text{-winni} \rrbracket = \lambda f \lambda t \exists e (f(e) \wedge t \subset_{nf} \tau(e)) : \langle \langle s, t \rangle, \langle i, t \rangle \rangle$
- (36) *The semantics of the perfective suffix*
 $\llbracket \text{-hu} \rrbracket = \lambda f \lambda t \exists e (f(e) \wedge \tau(e) \subseteq t) : \langle \langle s, t \rangle, \langle i, t \rangle \rangle$

By contrast, as shown in 36, the perfective aspect returns a property of times that is true of any reference time that contains the event time (Kratzer 1998:107). For telic predicates, it will describe an event that culminates within the reference time.

Sentences in Northern Paiute are interpreted relative to a time interval in the context, just as in English (Partee 1973, 1984), so that the final semantic value of a sentence is not a property of times, but a truth value. This time interval is often taken to be introduced by absolute tense (Kratzer 1998). In Northern Paiute, it can instead be introduced by an interpretive rule (cf. Tonhauser 2011:288).

- (37) *Root Clause Rule*
The final translation of a root clause translated as ϕ of type $\langle i, t \rangle$ is $\phi(t_n)$.

If a TP denotes a property of times, the Root Clause Rule predicates this property of a time interval whose referent comes from the context (t_n , where n is a numerical index).⁹ While this temporal reference may not be constrained by absolute tense in Northern Paiute, it is by temporal adverbials and other expressions.

2.2 The simultaneous suffix

Moving on to the simultaneous suffix, I propose that it is a relative present tense. As shown in the lexical entry in 38, it takes the property of times expressed by AspP as its argument. The simultaneous suffix requires that this property hold of the reference time (t_1), and it relates the reference time to the evaluation time (t_0). As a present tense, the evaluation time must be contained in the reference time.

- (38) *The semantics of the simultaneous suffix*
 $\llbracket \text{-na} \rrbracket = \lambda f (f(t_1) \wedge t_0 \subseteq t_1) : \langle \langle i, t \rangle, t \rangle$

In an absolute tense, the evaluation time invariably refers to the time of utterance. But by hypothesis, the simultaneous suffix is a dedicated marker of *relative* tense. The evaluation time does not receive an interpretation from the context. It instead receives its value through semantic binding, as I will discuss in the next section, and will ultimately be identified with the reference time of the unmarked clause. This establishes the relation of temporal overlap between the two clauses.

In other languages, the reference time introduced by relative tense has been argued to be existentially quantified (see, for example, Ogihara 1995). But in Northern Paiute, there is reason to think that the reference time introduced by the simultaneous suffix is referential, as Partee (1973) argues for absolute tense. In 22a, the marked clause contains negation. If its reference time were existentially quantified, this clause would be trivially true: there is always some time interval at which the little boy is not sleeping. Since the marked clause makes an informative contribution,

⁹As an alternative, this definite time interval could be introduced by a time-referring pronoun that adjoins to root clauses, cf. topic situations (Kratzer 2014). The property of times expressed by the TP would be predicated of this pronoun to yield a truth value. As far as I can see, this does all the same work the Root Clause Rule does.



Figure 1: The boy is bathing. The dog is sitting and looking at him in the bathtub. (Mercer Mayer. 1969. *Frog, where are you?* New York: Dial Books.)

the reference time must instead refer to a time during which the boy is not sleeping. In the lexical entry above, the reference time is thus a free variable (t_1) that finds its value in the context.

This semantics correctly accounts for the meaning of the clause chain in 39a. It is judged true in the context depicted in Figure 1, where the bathing and looking events take place at the same time.

- (39) a. Su=tĩĩtsi-'yu naatsi'i nabagia-winnĩ-**na**, su=ddoogga u=bbuni-katĩ.
 NOM=little-NOM boy bathe-PROG-SIM NOM=dog 3SG.ACC=see-sit.IMPF
 'While the little boy is bathing, the dog is sitting and looking at him.' (elicitation, EM, BP53-3, 57:25)
- b. #Su=tĩĩtsi-'yu naatsi'i nabagia-hu-**si**, su=ddoogga u=bbuni-katĩ.
 NOM=little-NOM boy bathe-PFV-SEQ NOM=dog 3SG.ACC=see-sit.IMPF
 'After the little boy bathed, the dog is sitting and looking at him.' (elicitation, EM and MS, BP53-3, 1:00:15)
 [MS: "*Nabagiahusi* means he's through bathing." [...] EM: "Probably *issaya'e* ['lying'], init?" MS: "Uh huh."]

When the marked clause instead contains the sequential suffix, the clause chain is judged false in the same context (39b).

As an overt realization of T, the simultaneous suffix selects for Asp in the marked clause. It can appear without any overt aspectual marking (40a) or with the progressive suffix -*winnĩ* (40b). But

it is not compatible with the perfective suffix (40c).

- (40) a. Su=nana ti=kaadzi **madabbui-na**, yaisi hubiadu-winni.
 NOM=man REFL=car **fix-SIM** PTC sing-PROG
 ‘While the man is fixing his car, he is singing.’ (elicitation, EM, BP52-2, 12:31)
- b. Su=naatsi’i ti=kaadzi **madabbui-winni-na**, yaisi hubiadu-winni.
 NOM=boy REFL=car **fix-PROG-SIM** PTC sing-PROG
 ‘While the boy is fixing his car, he is singing.’ (elicitation, EM, BP50-1, 9:19)
- c. *Su=nana ti=kaadzi **madabbui-hu-na**, yaisi hubiadu-winni.
 NOM=man REFL=car **fix-PFV-SIM** PTC sing-PROG
 (elicitation, EM and MS, BP50-1, 10:15)

I take this to mean that the simultaneous suffix always selects for imperfective aspect, regardless of whether it is overt (40b) or phonologically null. Even when there is no overt aspectual morphology, the simultaneous suffix needs a property of times as its argument. In this case, I assume it selects for an Asp head that is phonologically null.

$$(41) \quad \llbracket \emptyset_{\text{PROG}} \rrbracket = \lambda f \lambda t \exists e (f(e) \wedge t \subset_{nf} \tau(e)) : \langle \langle s, t \rangle, \langle i, t \rangle \rangle$$

This null Asp head has the same semantics as the progressive suffix (35), locating the reference time within a non-final subpart of the event time.

This makes a couple of correct predictions. First, even without any aspectual morphology, the simultaneous suffix is compatible with an assertion of continuation (42), just like the progressive suffix (43).

- (42) Su=nana ti=kaadzi **madabbui-na**, yaisi tiggwisu u=madabbui-winni.
 NOM=man REFL=car **fix-SIM** PTC still 3SG.ACC=fix-PROG
 ‘The man was fixing his car, and he is still fixing it.’ (elicitation, EM, BP51-7, 42:10)
- (43) Amamu’a su=naatsi’i ti=kaadzi **madabbui-winni**. Yaisi mino’o tiggwisu
 morning NOM=boy REFL=car **fix-PROG** PTC now still
 madabbui-winni.
 fix-PROG
 ‘This morning, the boy was fixing his car. He is still fixing it now.’ (elicitation, MS, BP46-7, 3:10)

Second, when there is no aspectual morphology, the simultaneous suffix is still infelicitous with achievement predicates (45a) and coerces an iterative interpretation with semelfactives (45b). This again parallels the behavior of the progressive suffix (45a–b). (See Toosarvandani 2014a for a discussion of aktionsart in Northern Paiute.)

- (44) a. #Su=nana **mia-na**, hubiatu.
 NOM=man **go-SIM** sing.IMPF
 Intended: ‘While the man is leaving, he is singing.’ (elicitation, EM, BP48-5, 21:08)

- b. Nii **akwissiye-na**, su=naatsi'i=duadzu akwissiye-winni.
 1SG.NOM **sneeze-SIM** NOM=boy=PTC sneeze-PROG
 'While I am sneezing, the boy is sneezing, too.' (elicitation, EM, BP56-1, 41:03)
 [EM: "More than once."]
- (45) a. #Su=nana **mia-winni**.
 NOM=man **go-PROG**
 Intended: 'The man is leaving.' (elicitation, EM, BP44-7, 1:24:13)
- b. Nii **akwissiye-winni**.
 1SG.NOM **sneeze-PROG**
 'I am sneezing (over and over again).' (elicitation, EM, BP45-5, 1:45:04)
 [EM: "[...]means you sneeze a lot of times."]

Crosslinguistically, it is quite common for present tense to be incompatible with an event described from a perfective viewpoint. This restriction is sometimes said to arise because an event that overlaps with the time of utterance "by definition [...] could not be viewed as bounded" (Bybee et al. 1994:83). If this explanation is correct, it needs to be generalized to account for why the simultaneous suffix only selects for imperfective aspect, which is a *relative* present tense.

2.3 The sequential suffix

I propose that the sequential suffix conveys a relative past tense. Like the simultaneous suffix, it takes the property of times expressed by AspP as its argument, requiring this property to hold of the reference time. But as shown in the lexical entry in 46, the sequential suffix requires the reference time of the marked clause (t_1) to *temporally precede* the evaluation time (t_0).

- (46) *The semantics of the sequential suffix*
 $\llbracket -si \rrbracket = \lambda f(f(t_1) \wedge t_1 < t_0) : \langle \langle i, t \rangle, t \rangle$

Again, the evaluation time is a variable (t_0) that does not receive an interpretation from the context. It receives its value instead through semantic binding from the reference time of the unmarked clause. This establishes a relation of temporal sequence between the marked and unmarked clauses.

As expected, the clause chain in 47a is judged true in the context depicted in Figure 2, where the event of the boy waking up precedes the event of him discovering that the frog is missing.

- (47) a. Su=naatsi'i tibuni-hu-**si**, ti=pa'mogo yaa-hu.
 NOM=boy wake.up-PFV-**SEQ** REFL=frog miss-PFV
 'After the boy woke up, he missed his frog.' (elicitation, EM, BP53-3, 1:06:10)
- b. #Su=naatsi'i tibuni-winni-**na**, ti=pa'mogo yaa-hu.
 NOM=boy wake.up-PROG-**SIM** REFL=frog miss-PFV
 Intended: 'While the boy was waking up, he missed his frog.' (elicitation, EM and MS, BP53-3, 1:07:08)
 [EM: "Probably would be lying, init?[...]"] MS: "He's not quite awake, *tibuniwinnina*."
 EM: "He's not awake, real awake."]



Figure 2: While the boy is asleep, the frog escapes. After the boy wakes up, he notices the frog is gone. (Mercer Mayer. 1969. *Frog, where are you?* New York: Dial Books.)

By contrast, the parallel clause chain with the simultaneous suffix in 47b is judged false in the same context, since it requires the marked clause to temporally include the unmarked clause.

Unlike the simultaneous suffix, the sequential suffix is compatible with perfective aspect. It can occur with both the progressive suffix *-winni* (48b) and the perfective suffix (48c).

- (48) a. Su=nana ti=kaadzi **madabbui-si**, yaisi u=ddza-kana-ggi-hu.
 NOM=man REFL=car **fix-SEQ** PTC 3SG.ACC=IP.fingers-grab-APPL-PFV
 ‘The man fixed his car, and then he started it.’ (elicitation, EM and MS, BP50-1, 5:50)
- b. Ti=kaadzi **madabbui-winni-si**, yaisi sonapina-pinni.
 REFL=car **fix-PROG-SEQ** PTC take.break-STAT
 ‘He was fixing his car, and then he took a rest.’ (elicitation, EM, BP50-1-s, 6)
- c. Su=nana ti=kaadzi **madabbui-hu-si**, yaisi u=ddza-kana-ggi-hu.
 NOM=man REFL=car **fix-PFV-SEQ** PTC 3SG.ACC=IP.fingers-grab-APPL-PFV
 ‘The man fixed his car, and then he started it.’ (elicitation, EM, BP50-1-s, 1)

When the sequential suffix appears without aspectual morphology (48a), I assume that it also selects for a phonologically null Asp head. As a default, this has the same semantics as the perfective suffix in 36.

$$(49) \quad \text{PFV} = f t e(f(e) (e) t): s t i t$$

Since the marked clause can entail event culmination, e.g. 48a, the reference time must be able to contain the event time.

But the sequential suffix is compatible with an assertion of continuation, even when there is no overt marker of imperfective aspect (50a). This is also possible when the marked clause contains the progressive suffix (50b), but not the perfective suffix (50c).

- (50) a. Su=naatsi'i ti=kaadzi **madabbui-si**, yaisi tiggwisu u=madabbu'i.
 NOM=boy REFL=car **fix-SEQ** PTC still 3SG.ACC=fix.IMPF
 'After the boy was fixing his car, he was still fixing it.' (elicitation, EM and MS, BP49-3, 1:19:55)
- b. Su=naatsi'i ti=kaadzi **madabbui-winni-si**, yaisi tiggwisu u=madabbu'i.
 NOM=boy REFL=car **fix-PROG-SEQ** PTC still 3SG.ACC=fix.IMPF
 'After the boy was fixing his car, he was still fixing it.' (elicitation, EM, BP52-2, 39:15)
- c. # Su=naatsi'i ti=kaadzi **madabbui-hu-si**, yaisi tiggwisu u=madabbu'i.
 NOM=boy REFL=car **fix-PFV-SEQ** PTC still 3SG.ACC=fix.IMPF
 Intended: 'After the boy was fixing his car, he was still fixing it.' (elicitation, EM and MS, BP49-3, 1:16:19)
 [EM: "No, you can't say that." MS: "No, *madabbuihusi* means he's done, he's gone."]

This suggests that the sequential suffix can select not only for a phonologically null Asp head that conveys perfective aspect (49), but also for one that conveys imperfective aspect (41). In 50a, it selects for the latter, so that no contradiction arises.

I have been treating the sequential suffix as a type of tense — rather than aspect — because the marked clause can have both imperfective and perfective interpretations. The combination of past tense and perfective aspect is not, however, that different from perfect aspect, which locates the reference time after the event time (Klein 1994:109). These alternatives can be distinguished, Bohnemeyer (2014) observes, by using temporal adverbials, which constrain the reference time. In 51a, where the marked clause does not contain any aspectual morphology, the reference time located at 2 o'clock cannot follow the event, which culminates by 12 o'clock.

- (51) Context: The man started fixing his car at 9 o'clock; he finished fixing it at 12 o'clock. He drove off at 2 o'clock.
- a. # **Waha-ggwe** su=nana ti=kaadzi **madabbui-si**,
two-LOC NOM=man REFL=car **fix-SEQ**
 u=ddza-mia-ggi-huka.
 3SG.ACC=IP.fingers-go-APPL-INCEP
 Intended: 'At two o'clock, the man finished fixing his car, and then he drove it off.'
 (elicitation, EM, BP50-7, 15:40)
 [EM: "Well, you're lying[...] cuz you finished it at twelve o'clock."]

- b. # **Waha-ggwe** su=nana ti=kaadzi **madabbui-hu-si**,
two-LOC NOM=man REFL=car **fix-PFV-SEQ**
u=ddza-mia-ggi-huka.
3SG.ACC=IP.fingers-go-APPL-INCEP
Intended: ‘At two o’clock, the man finished fixing his car, and then he drove it off.’
(elicitation, EM, BP50-7, 14:42)
[EM: “*Issaya’e* [‘Lying’ ...]because he finished his car at twelve o’clock.”]

This is also true when the sequential suffix selects for the perfective suffix (51b). Since the marked clause never receives a perfect interpretation, the sequential suffix must convey relative past tense.

3 The temporal semantics of clause chaining

How does this semantics for the simultaneous and sequential suffixes give rise to the temporal interpretation of clause chaining? As dedicated markers of relative tense, they introduce a variable for the evaluation time (t_0) that does not get its value from the context. It neither refers to the utterance time nor to any other salient time interval, getting its value instead from surrounding linguistic material. This only happens when the evaluation time of the marked clause is bound by an appropriate operator in certain syntactic configurations.¹⁰ Thus, the simultaneous and sequential suffixes can never occur in an independent sentence: the evaluation time would not have a value.

In many languages, relative tenses only occur in embedded clauses, where the evaluation time can get its value from the main clause. In English, for instance, relative tense shows up in the complement clause of propositional attitude verbs, such as *think*.

- (52) He thought [that a burglar attacked him]. (Abusch 1997:4)

The past tense in English is ambiguous between an absolute tense, which locates the reference time before the utterance time, and a relative tense. There is an interpretation for 52 where the evaluation time of the embedded clause is not the utterance time, but the reference time of the main clause. That is, the time at which the burglar attacked him precedes *the time at which he was thinking*.

There is crosslinguistic variation in the environments where relative tenses can occur (see Ogi-hara and Sharvit 2012 for a survey). In some languages, it is restricted to the complements of propositional attitude verbs, e.g. English (Abusch 1997), Hebrew (Hataf 2010), and Russian (Bar-entsen 1996, Schlenker 2003:70f.). In other languages, relative tense is allowed in additional embedded contexts. In Japanese, the evaluation time of present or past tense inside relative clauses

¹⁰This dependency between the operator and the variable can be implemented formally in different ways, depending on certain theoretical assumptions about semantic composition. If sentences of Northern Paiute are translated into an intermediate logical language, the variable’s lack of reference can be stated there. We might say, for instance, that for any model and any assignment, the denotation of any expression containing a free occurrence of the variable t_0 is undefined. The marked clause will not have a semantic value, then, unless this variable is bound.

If there is no intermediate logical language — if natural language expressions are instead interpreted directly as model theoretic objects — another mechanism must be employed. One possibility is that the dependency between the variable and the operator is established syntactically. For switch reference marking, McKenzie (2012:190–202) proposes that the expression introducing the operator must agree syntactically with the expression introducing the variable. After copying its index, the operator can bind any variable with that index. Under this view, the obligatory binding relation originates in the binder, rather than the variable.

and temporal adjunct clauses can be identified with the reference time of the main clause (Ogihara 1994, 1995, 1996).

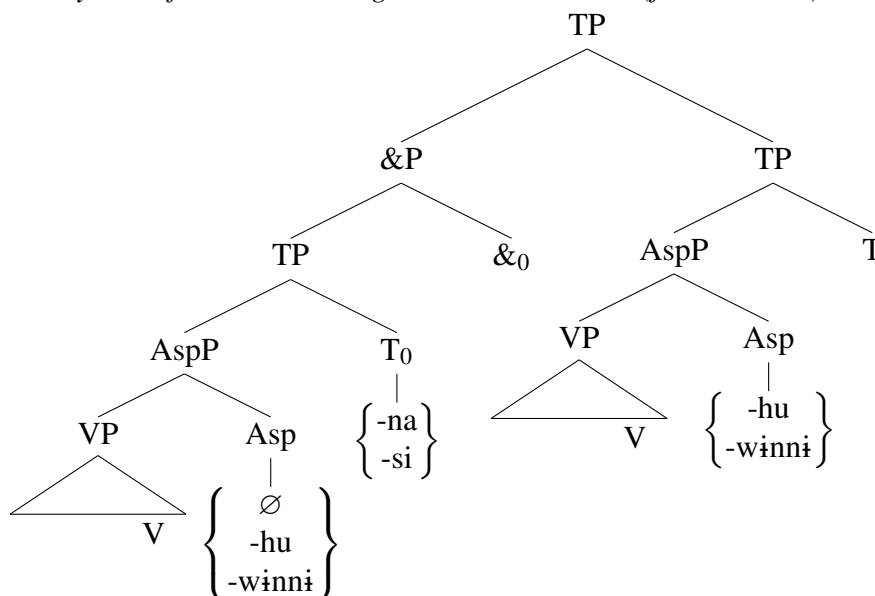
(53) *Japanese*

- a. Taroo-wa [nai-te i-ru otok]-o mi-ta.
 Taro-TOP cry-PROG-PRS man-ACC see-PST
 ‘Taro saw a man who was crying (at the time of the meeting).’ (Ogihara 1996:153)
- b. Taroo-wa [nooberu-syoo-o tot-ta otoko]-o sagasi-ta.
 Taro-TOP Nobel-prize-ACC win-PST man-ACC seek-PST
 ‘Taro looked for a/the man who won a Nobel prize.’ (Ogihara 1996:159)

In 53a, for example, the reference time of the relative clause is not related to the utterance time, but rather to the reference time of the main clause. The time at which the man was crying overlaps with the time at which Taro saw him.

I propose that coordination is another syntactic environment where relative tense can occur. There is evidence from many languages that coordination structures are not symmetrical: the coordinator forms a constituent with one of the coordinates (see Ross 1967:162–165 and much subsequent work). Clause chaining in Northern Paiute must also have an asymmetrical structure, then.

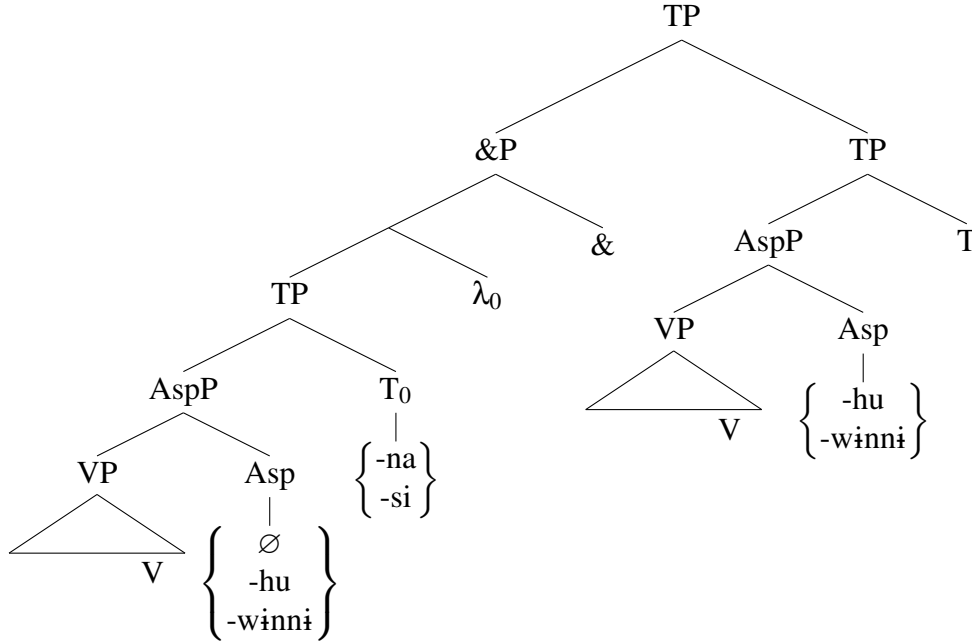
(54) *The syntax of clause chaining in Northern Paiute (final version)*



I assume the asyndetic coordinator is a head that takes one coordinate as its complement (Munn 1993). The resulting phrase adjoins to the other coordinate, creating a coordinate structure whose category is identical to that of both coordinates.

The simultaneous and sequential suffixes occur in the first coordinate of 54 because the coordinator introduces an operator that binds the evaluation time of the marked clause. This language-specific property of Northern Paiute can be represented as an index on the coordinator (Kratzer 2009:194). For the purposes of the semantics, this index is parsed as a λ -operator, which abstracts over any variable whose index matches its own inside the coordinator’s complement.

(55)



The λ -operator binds the evaluation time of the marked clause to create a property of (evaluation) times. The asyndetic coordinator can then combine the marked clause with the unmarked clause, which already expresses a property of (reference) times (as discussed in Section 2.1). As a result, the evaluation time of the marked clause is identified with the reference time of the unmarked clause, and the simultaneous and sequential suffixes end up expressing a temporal relation between the reference times of the marked and unmarked clauses.

More generally, this analysis of clause chaining in Northern Paiute supports a broader typology of lexical items that can introduce a λ -operator. From the distribution of relative tense, we know that certain content morphemes must be able to come with a binder, e.g. propositional attitude verbs (von Stechow 1995). In addition, DPs that have undergone movement (Heim and Kratzer 1998:186) and some functional morphemes (Adger and Ramchand 2005, Kratzer 2009) have been argued to introduce a λ -operator. To this list, coordinators can be added, and perhaps not just for clause chaining in Northern Paiute. To account for the properties of switch reference in Kiowa, McKenzie (2012:218–228) argues that coordinators, as well as certain subordinators, come with a λ -operator that binds a variable introduced by switch reference markers.

In Section 3.1, I go through a detailed derivation for a basic case of clause chaining in Northern Paiute, showing that the correct truth conditions arise compositionally. This semantics makes a couple predictions, which I show are borne out. First, it predicts that the meaning of a clause chain should not be affected by the linear order of the clauses, because they are related by semantic binding. Indeed, in Section 3.2, I show that a marked clause containing the sequential suffix always temporally precedes the unmarked clause, regardless of whether it precedes or follows it linearly. Second, this semantics provides relatively weak truth conditions for clause chains that contain multiple marked clauses. This is necessary, I argue in Section 3.3, to account for marked clauses that are not themselves temporally related to one another.

3.1 Deriving temporal simultaneity and sequence

I proposed above that the λ -operator introduced by the asyndetic coordinator binds the evaluation time in the marked clause, abstracting over it to create a property of times. The unmarked clause already expresses a property of times, which in an independent sentence would be directly predicated of a time interval from the context by the Root Clause Rule. In a clause chain, however, the property of times expressed by the unmarked clause is first combined by the asyndetic coordinator with the property of times expressed by the marked clause.

As shown in the lexical entry in 56, I take the asyndetic coordinator to express a generalized version of logical conjunction (Rooth and Partee 1982). When it combines two properties of times, their conjunction is true of a time just in case each property is individually true of that time.

- (56) *The semantics of coordination*

$$\llbracket \& \rrbracket = \lambda f \lambda g \lambda t (f(t) \wedge g(t)) : \langle \langle i, t \rangle, \langle \langle i, t \rangle, \langle i, t \rangle \rangle \rangle$$

Since the marked clause expresses a property of (evaluation) times and the unmarked clause expresses a property of (reference) times, the resulting conjoined property will be true of a time in the context just in case the property expressed by each clause holds of it individually. The evaluation time of the marked clause is consequently identified with the reference time of the unmarked clause, thereby establishing a relation of either temporal simultaneity or sequence between the reference times of the marked and unmarked clauses.

To see this more formally, consider the following clause chain, repeated from 40b above, which contains the simultaneous suffix.

- (57) Su=naatsi'i ti=kaadzi madabbui-winni-na, yaisi hubiadu-winni.
 NOM=boy REFL=car fix-PROG-SIM PTC sing-PROG
 'While the boy is fixing his car, he is singing.' (elicitation, EM, BP50-1, 9:19)

The semantic derivation of 57 is given in Figure 3. The unmarked clause expresses a property of time intervals (①). Before λ -abstraction, the marked clause denotes a truth value (②). Once the evaluation time introduced by the simultaneous suffix is abstracted over, the marked clause also expresses a property of time intervals (③). The asyndetic coordinator combines the marked and unmarked clauses to yield a conjoined property of time intervals (④). Consequently, once the Root Clause Rule has applied, the whole clause chain is true at a time t_2 in the context just in case: (i) t_2 is contained in another time t_1 in the context that is itself contained in a nonfinal segment of the event of the boy fixing his car, and (ii) t_2 is contained in a nonfinal segment of the event of the boy singing (⑤). In other words, the sentence in 57 is true just in case the two events overlap in time.

The semantic derivation for the following clause chain containing the sequential suffix, repeated from 47a, proceeds in the same way.

- (58) Su=nana ti=kaadzi madabbui-hu-si, yaisi u=ddza-kana-ggi-hu.
 NOM=man REFL=car fix-PFV-SEQ PTC 3SG.ACC=IP.fingers-grab-APPL-PFV
 'The man fixed his car, and then he started it.' (elicitation, EM, BP50-1-s, 1)

I do not provide a complete semantic derivation for this sentence, but its final translation, after the Root Clause Rule applies, is given below.

$$(59) \quad (\exists e(\text{fix}(\text{his-car})(\text{the-man})(e) \wedge \tau(e) \subseteq t_1) \wedge t_1 < t_2) \wedge \exists e'(\text{start}(\text{his-car})(\text{the-man})(e') \wedge \tau(e') \subseteq t_2) = 58$$

In prose, the entire clause chain is true at a time t_2 in the context just in case: (i) t_2 is located after a time t_1 in the context that contains the event of the man fixing his car, and (ii) t_2 itself contains the event of the man starting his car. Consequently, the sentence in 58 is true just in case the event described by the marked clause temporally precedes the event described by the unmarked clause.

I have used semantic binding — specifically, abstraction over a variable introduced by the simultaneous or sequential suffix — to identify the evaluation time of the marked clause with the reference time of the unmarked clause. This mechanism is parallel to the one that McKenzie (2012:218–228) uses to account for switch reference in Kiowa.

- (60) *Kiowa*
 John hébà nàu Sam èm kífǎu.
 John 3SG.enter.PFV and.DS Sam 3SG.REFL leave.PFV
 ‘John entered, and Sam left.’ (McKenzie 2012:219)

McKenzie proposes that the coordinator in 60 introduces a λ -operator that binds a variable contributed by the switch reference marker inside one coordinate. This creates a property that is combined with the property conveyed by the other coordinate. Finally, this conjoined property is predicated of an element in the context. This parallelism is striking, suggesting that similar mechanisms may be responsible for establishing the temporal relations in clause chaining and switch reference marking. While Northern Paiute does not have switch reference marking in clause chaining, many other languages do (Longacre 2007:399).

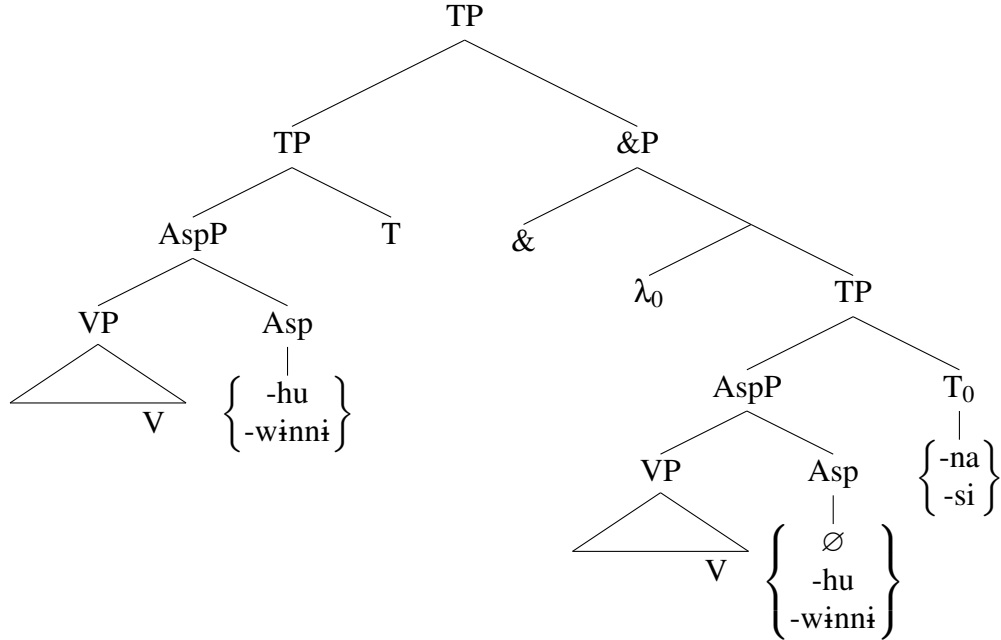
3.2 When the marked clause follows the unmarked clause

This semantics makes an interesting prediction about chains in which the marked clause *linearly follows* the unmarked clause. In Northern Paiute, this happens not infrequently with both the simultaneous (61a) and sequential (61b) suffixes.

- (61) a. Yaisi ka=ggwitua tiggwisu ti=ddzoti’a ddiḡḡwa’ni mani-kati, **yaa paa’a-we**
 PTC ACC=pail still REFL=hat look.like do-sit.IMPF **there water-LOC**
kati-na.
sit-SIM
 ‘He still has the pail on his head that looks like a hat, while sitting in the water.’
 (prompted narrative, MS, BP24-1-t3, 42)
- b. Yaisi yaa su=hibbi tihidda mia-hu, **umi-ma sie-hu-si.**
 PTC there NOM=thing deer go-PFV **2/3PL.ACC-LOC get.scared-PFV-SEQ**
 ‘The deer left, because it got scared of them.’ (prompted narrative, EM, BP25-2-t1, 93–95)

To account for this variation in the linear position of the marked clause, I propose that asyndetic coordination is structurally ambiguous in Northern Paiute. While the coordinator can form a constituent with the first coordinate, it forms a constituent with the *second* coordinate in 61a–b. This way, the simultaneous or sequential suffix can be bound in the second coordinate by a λ -operator.

(62)



While this kind of structural ambiguity does not seem common, Northern Paiute may not be alone. In Lavukaleve (Central Solomons: Russell Islands), “pauses before coordinators are roughly equal in frequency to pauses after the coordinator” (Terrill 2004:430). If these pauses correspond to constituency boundaries, then in this language, too, the coordinator can be parsed with either the first or the second coordinate.

Let me briefly consider an alternative. In many languages, a coordinate can be extraposed to the end of the sentence, along with the coordinator (Haspelmath 2004:7f.). If the marked clause in 61a–b was extraposed, it should be an island for extraction. But *wh*-movement in an across-the-board fashion is possible even when the marked clause follows the unmarked clause.

- (63) **Himma**₁ su=naatsi'i t₁ tika, yaisi su=mogo'ni=bino'o t₁ tika-na?
what NOM=boy eat.IMPF PTC NOM=woman=PTC eat-SIM
 ‘What, while the woman eats it, does the boy eat, too?’ (cf. *What*₁ *does the boy eat t*₁,
*and the woman eat t*₁, *too?*) (elicitation, EM, BP50-4, 29:14)

With the structure in 62, across-the-board movement is correctly predicted to be possible, since no coordinate has been extraposed.

In addition, if asyndetic coordination in Northern Paiute is structurally ambiguous, we can neatly capture the fact that many languages, including Amele (Trans-New Guinea: New Guinea), do not allow the marked clause to follow the unmarked clause.

- (64) *Amele*
- a. **Ho busale-ce-b** dana age qo-ig-a.
pig run.out-SEQ.DS-3SG man 3PL hit-3PL-TPAST
 ‘The pig ran out, and the men killed it.’ (Roberts 1988:53)
- b. *Dana age qo-ig-a **ho busale-ce-b.**
 man 3PL hit-3PL-TPAST **pig run.out-SEQ.DS-3SG**
 (Roberts 1988:56)

Clause chaining in Amele has a coordination structure (Roberts 1988:53–58). If the language only allows the coordinator to form a constituent with the first coordinate, then the marked clause should only be able to linearly precede the unmarked clause. Besides Northern Paiute, I know of only one other language that allows the marked clause to have a variable order: Mbyá Guaraní (Tupí: Brazil; Dooley 2010:93f.). The relative rarity of clause chaining with this property could derive from the relative rarity of coordination structures that are structurally ambiguous.

The semantics that I have proposed assigns the same temporal interpretation to a clause chain, whether the marked clause precedes or follows the unmarked clause. The temporal relation between the evaluation time of the marked clause and the reference time of the unmarked clause does not depend in any way on linear order. Indeed, in 61a, the marked clause containing the simultaneous suffix is interpreted as temporally overlapping the unmarked clause. More strikingly, when the marked clause contains the sequential suffix, it still *temporally precedes* the unmarked clause. In 61b, the event of the deer getting scared (by the boy and dog) precedes the event of it leaving.

Without going through a complete semantic derivation, the clause chain in 61b has the following final translation, after the Root Clause Rule applies.

$$(65) \quad \exists e(\text{go}(\text{the-deer})(e) \wedge \tau(e) \subseteq t_1) \wedge (\exists e'(\text{get-scared}(\text{the-deer})(e') \wedge \tau(e') \subseteq t_2) \wedge t_2 < t_1) \\ = 61b$$

Even though the marked clause follows the unmarked clause in linear order, the entire sentence is true at a time t_1 provided by the context just in case: (i) t_1 contains the event of the deer leaving, and (ii) t_1 follows a time t_2 in the context that contains the event of the deer getting scared. That is, it is true just in case the event of the deer getting scared *precedes* the event of the deer leaving.

This temporal relation between the marked and unmarked clauses is entailed. Clause chains are judged as true only when the event described by a marked clause bearing the sequential suffix precedes the event described by the unmarked clause in time, regardless of whether the marked clause precedes (66a) or follows (66b) in linear order. (Speakers were asked to provide truth value judgments for the sentences below with respect to the state of affairs depicted in Figure 2.)

- (66) a. **Su=pa'mogo wadzi-mia-hu-si**, yaisi su=naatsi'i tībuni-hu.
 NOM=frog **hide-go-PFV-SEQ** PTC NOM=boy wake.up-PFV
 'After the frog escaped, the boy woke up.' (elicitation, EM, BP38-2, 17:47)
- b. Su=naatsi'i tībuni-hu, **su=tiitsi-'yu pa'mogo wadzi-mia-hu-si**.
 NOM=boy wake.up-PFV NOM=little-NOM frog **hide-go-PFV-SEQ**
 'After the little frog escaped, the boy woke up.' (elicitation, EM, BP42-7-s, 8)
- c. #**Su=naatsi'i tībuni-hu-si**, su=pa'mogo wadzi-mia-hu.
 NOM=boy **wake.up-PFV-SEQ** NOM=frog **hide-go-PFV**
 Intended: 'After the frog escaped, the boy woke up.' (elicitation, EM and MS, BP38-2, 19:16)
 [MS: "No, that would be after he woke up, but this is when he went to sleep."]
- d. #**Su=pa'mogo wadzi-mia-hu**, **su=tiitsi-'yu naatsi'i tībuni-hu-si**.
 NOM=frog **hide-go-PFV** NOM=little-NOM boy **wake.up-PFV-SEQ**
 Intended: 'After the frog escaped, the little boy woke up.' (elicitation, EM and MS, BP43-4, 22:39)
 [EM: "If he was awake and the frog left, then you could say that."]

When the marked clause instead describes the event of the boy waking up—which in the context provided temporally follows the event of the frog escaping—speakers accordingly judged the clause chain as false (66c–d).

3.3 When there are multiple marked clauses

When there is more than one marked clause with the sequential suffix, speakers often report that they are temporally related not just to the unmarked clause, but also to one another.

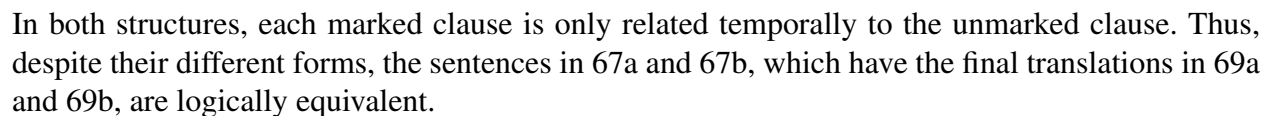
- (67) a. **Nimmi** **puggu tinoo-ggi-si,** **u=hibi-ggi-si,** mia-hu.
 1PL.EXCL.NOM horse pack-APPL-SEQ 3SG.ACC=drink-APPL-SEQ go-PFV
 ‘We packed up the horses, and then we watered them, and then we left.’ (elicitation, EM and MS, BP44-2, 14:20)
 [MT: “What happened first?[...]” EM: “Pack the horses. Then you gave them water, and then you left.”]
- b. **Nimmi** **puggu hibi-ggi-si,** **u=ddinoo-ggi-si,** mia-hu.
 1PL.EXCL.NOM horse drink-APPL-SEQ 3SG.ACC=pack-APPL-SEQ go-PFV
 ‘We watered the horses, and then we packed them up, and then we left.’ (elicitation, EM and MS, BP44-2, 16:12)
 [EM: “You fed them first, and then you pack it, and then you...”]

In 67a, the event of packing the horses is interpreted as temporally preceding the event of watering them. When the linear order of the two marked clauses is reversed, as in 67b, the temporal relation between them is also reversed.

But with the semantics for clause chaining in Northern Paiute I have proposed, the sentences in 67a and 67b have the same semantic content. To see this, consider their structures in 68a and 68b, respectively.¹¹ These are identical except for the order of the two marked clauses.

¹¹There is no other structure for these sentences that allows the evaluation time of both marked clauses to be bound and all three clauses to be combined by asyndetic coordination. Consider, for instance, an alternative structure in which the two marked clauses are first coordinated, and then this coordination structure combines with the unmarked clause: [TP [&P [TP [&P [TP VP-si] &] [TP VP-si]] &] [TP VP]]. While the evaluation time in both marked clauses is bound, they will not be able to compose semantically because of a type mismatch. The &P containing the first marked clause expresses a property of times, while the TP containing the second marked clause denotes a truth value.

(68) a. TP = 67a



- Both sentences are true at a time in the context just in case: (i) that time contains the event described by the unmarked clause, and (ii) for each marked clause, that time follows a time that contains

the event described by the marked clause. The marked clauses are not related temporally to each another in any way, and so their linear order does not matter.

Setting aside for the moment speakers' comments about the sentences in 67a–b, this relatively weak semantics is necessary to account for clause chains in which two marked clauses with the sequential suffix overlap in their temporal interpretation.

- (70) a. **O'o-no yaisi una-tu kwaya mia-si, sogo-mia-si, una-u**
 DEM-with PTC DEM-LOC far go-SEQ on.foot-go-SEQ DEM.ACC-EMPH
 yaisi uuni-kwai piti-ga na-tihona-di-kwai.
 PTC that.kind-LOC arrive-MOT PASS-dig.roots-NMLZ-LOC
 'So then it was that they went far off, going on foot, and arrived there at the root digging place.' (narrative, Thornes 2003:486)
- b. **Yaa hibbi-ggwe-tu paba tiipi hani-si, o=wi-taaggi-si,**
 there place-LOC-LOC big earth do-SEQ 3SG.ACC=IP.long-make.hole-SEQ
 yaisi oi-tu painitsi oi-tu wokwati-kwi.
 PTC there-LOC pinenuts there-LOC dump-IRR
 'At that place, after we dig a lot of dirt and we make a big hole in the ground, then we will dump the pinenuts in there.' (elicitation, EM, BP13-4-t9, 5)

In 70a, the event of leaving on foot described by the second marked clause overlaps with the event of leaving described by the first marked clause, adding more detail about how that event took place. Similarly, in 70b, the marked clauses do not form a temporal sequence: the second simply contributes additional information about the event described by the first.

The same fact can be shown more directly as well. Speakers judge clause chains like the one in 71a as true, even when the events described by the two marked clauses overlap temporally.

- (71) Context: The boy and girl are at home. Instead of studying, he is playing and she is dancing at the same time. They both stop before their mother comes home.
- a. **Su=naatsi'i ti'tia-hu-si, su=tsia'a niga-hu-si, su=mogo'ni**
 NOM=boy play-PFV-SEQ NOM=girl dance-PFV-SEQ NOM=woman
 nobi-ggwe iga-hu.
 house-LOC enter-PFV
 'After the boy played and the girl danced, the woman came home.' (elicitation, EM, BP53-3, 51:12)
 [EM: "They probably doing that when the lady was not there[...]at the same time. Then she came in after they were through."]
- b. **Su=tsia'a niga-hu-si, su=naatsi'i ti'tia-hu-si, su=mogo'ni nobi-ggwe**
 NOM=girl dance-PFV-SEQ NOM=boy play-PFV-SEQ NOM=woman house-LOC
 iga-hu.
 enter-PFV
 'After the girl danced and the boy played, the woman came home.' (elicitation, EM, BP53-3, 54:00)
 [EM: "They mean the same thing."]

Importantly, the linear order of the marked clauses does not matter. Speakers judged the clause chain in 71b as true in the same context, since it has the same semantic content as 71a.

The semantics I have proposed for clause chaining in Northern Paiute only establishes a temporal relation between each marked clause and the unmarked clause. This correctly predicts that when there is more than one marked clause containing the sequential suffix, they can overlap temporally, though they must both temporally precede the unmarked clause. There must be more to the meaning of clause chaining in Northern Paiute, since speakers describe additional temporal relations between the marked clauses. In the next section, I argue that these do not arise from the semantics of clause chaining, but from the way that clause chains are interpreted in discourse.

Before moving on, I would like to mention another prediction. In Northern Paiute, clause chains can contain any number and combination of marked clauses. When a marked clause with the simultaneous suffix is interleaved between two marked clauses with the sequential suffix, the chain should only convey that the second marked clause temporally overlaps the unmarked clause. It should not have to temporally overlap either of the other marked clauses. This prediction is unfortunately very difficult to test. The simultaneous suffix selects for the progressive aspect, which conversational participants usually assume describes an event that begins and ends well before and after the time it is asserted of, like a stative predicate (Dowty 1986:48–52). Even if the semantics of clause chaining does not require it, the second marked clause in this chain will likely be interpreted as temporally overlapping the adjacent clauses.

4 Interpreting clause chains in discourse

The semantics of clause chaining in Northern Paiute only establishes a temporal relation between each marked clause and the unmarked clause. Their linear position does not matter for the entailments of the sentence. When there are multiple marked clauses, their linear order also does not matter. Nonetheless, speakers describe additional temporal relations between marked clauses. In each sentence in 72a–b, repeated from 67a–b above, the second marked clause is interpreted as taking place *immediately after* the first marked clause.

- (72) a. **Nimmi** **puggu tinoo-ggi-si,** **u=hibi-ggi-si,** mia-hu.
 1PL.EXCL.NOM horse pack-APPL-SEQ 3SG.ACC=drink-APPL-SEQ go-PFV
 ‘We packed up the horses, and then we watered them, and then we left.’ (elicitation, EM, BP44-2, 14:20)
 [MT: “What happened first?[...]” EM: “Pack the horses. Then you gave them water, and then you left.”]
- b. **Nimmi** **puggu hibi-ggi-si,** **u=ddinoo-ggi-si,** mia-hu.
 1PL.EXCL.NOM horse drink-APPL-SEQ 3SG.ACC=pack-APPL-SEQ go-PFV
 ‘We watered the horses, and then we packed them up, and then we left.’ (elicitation, EM, BP44-2, 16:12)
 [EM: “You fed them first, and then you pack it, and then you...”]

Moreover, the unmarked clause is related temporally to the preceding clause in a way that goes beyond its semantics. The event described by the unmarked clause does not just follow the event described by the second marked clause — it takes place *immediately after* it. These additional

temporal relations, which mirror the linear order of the clauses in the chain, recall the temporal interpretation that sentences receive in narrative discourse.

When a sequence of sentences is understood as a narrative, it is often interpreted as ‘forward moving’ (Kamp and Rohrer 1983, among others). The sentences in 73, which contain telic predicates (achievements or accomplishments) in the perfective aspect, are interpreted as taking place in close temporal succession.

- (73) Jameson entered the room. He shut the door. He switched off the light.
(after Hinrichs 1986:68)

Jameson’s switching off the light is interpreted as taking place immediately after his shutting the door, which is itself interpreted as taking place immediately after his entering the room. In Northern Paiute, a sequence of sentences can receive the same forward moving interpretation.

- (74) Nimmī ka=puggu tinoo-ggi-hu. U=hibi-ggi-hu. Mia-hu.
1PL.EXCL ACC=horse pack-APPL-PFV 3SG.ACC=drink-APPL-PFV go-PFV
‘We packed the horse. We watered it. We left.’ (elicitation, MS, BP53-3, 1:35)
[MS: ‘You loaded the horses, and then you gave it drink, and then you went.’]

I propose that the additional temporal relations in the clause chains in 72a–b are produced by the same pragmatic enrichment that produces a forward moving interpretation for a sequence of independent sentences in narrative discourse.

The question of why some discourses are interpreted as forward moving narratives, and why some are not, is a complicated one. In Section 4.1, I simply state some generalizations about how sentences are temporally related to the preceding discourse in narrative progression. For it to contribute to the temporal interpretation of clause chaining, every clause in a chain must be able to participate. In Section 4.2, I show that marked clauses are indeed temporally related to the preceding discourse according to the generalizations for narrative progression. Finally, in Section 4.3, I show that the unmarked clause also obeys these generalizations.

4.1 The role of aspect in narrative progression

Aspect plays a crucial role in narrative progression (Kamp and Rohrer 1983, Partee 1984, Hinrichs 1986). The forward moving sequence of sentences in 74 is entirely in the perfective aspect. The imperfective aspect does not advance the narrative in the same way. For instance, the second sentence in 75, which is in the progressive aspect, describes the event of Josephine firing her weapon and is interpreted as temporally overlapping the event of her turning around described by the first sentence. Consequently, the third sentence, which describes the event of Josephine firing his her, is interpreted as taking place immediately after the first sentence.

- (75) Josephine turned around. The thief was fumbling in his bag. She fired her gun.

In Northern Paiute, the imperfective aspect similarly does not advance the narrative. In 76, the second sentence containing the progressive suffix describes an event of playing that overlaps with the event described by the first sentence. Importantly, as the speaker’s comments indicate, the third sentence is interpreted as taking place immediately after the *first* sentence.

- (76) Su=mogo'ni nobi-ggwe iga-hu. Su=naatsi'i ti'atia-winni. Su=mogo'ni
 NOM=woman house-LOC enter-PFV NOM=boy play-PROG NOM=woman
 u=haa-hu.
 3SG.ACC=scold-PFV
 'The woman came into the house. The boy was playing. The woman scolded him.' (elicitation, EM, BP53-3, 20:45)
 [EM: "He probably was playing in the house. Then the woman come in and then she bawl him out."]

There is one difference in how narrative progression works in the two languages. In English, atelic predicates in the perfective aspect exhibit the same behavior as predicates in the progressive aspect. In Northern Paiute, however, they pattern like telic predicates. In 77, the event of the woman scolding the boy described by the third sentence takes place immediately after the event of the boy playing described by the second sentence.

- (77) Su=mogo'ni nobi-ggwe iga-hu. Su=naatsi'i ti'atia-hu. Su=mogo'ni
 NOM=woman house-LOC enter-PFV NOM=boy play-PFV NOM=woman
 u=haa-hu.
 3SG.ACC=scold-PFV
 'The woman came into the house. The boy finished playing. The woman scolded him.' (elicitation, EM, BP53-3, 25:35)
 [EM: "She bawled him out when he quit playing, I guess."]

These generalizations about narrative progression in Northern Paiute can be stated precisely in terms of how a sentence is interpreted temporally with respect to the preceding discourse.

- (78) *Narrative progression in Northern Paiute*
 For a clause *S* and for the closest linearly preceding clause in the perfective aspect *S'*:
 (i) if *S* is in the perfective aspect, *S* is interpreted as temporally immediately following *S'*;
 (ii) if *S* is in the imperfective aspect, *S* is interpreted as temporally overlapping *S'*.

Since only perfective sentences advance the narrative, each sentence is interpreted relative to the closest linearly preceding perfective sentence. Thus, when a sentence is in the perfective aspect, it is interpreted as taking place immediately after the closest preceding perfective sentence, e.g. (74) and (77). When a sentence is in the imperfective aspect, it is interpreted as temporally overlapping the closest preceding perfective sentence, e.g. the second sentence in (76).

I will not attempt here to provide a theory of narrative progression. At first glance, it might plausibly arise as a conversational implicature from Grice's (1975:46) fourth maxim of manner ("Be orderly.") The hearer infers a forward moving interpretation for narrative discourse because she assumes that the speaker is obeying the maxim and describing a sequence of events iconically. While seemingly reasonable, there have been no attempts, to my knowledge, to develop a comprehensive theory of narrative progression in a Gricean framework. To be successful, it would have to address how the maxim of manner can make reference to the relevant aspectual distinctions.

There is a substantial line of inquiry on narrative progression within Discourse Representation Theory (DRT; Partee 1984, Kamp and Reyle 1993:521–555, Muskens 1995, Kamp et al.

2011:196–249, Altshuler 2012). Every sentence is interpreted relative to a dynamically updated time interval, with the specific temporal relation depending on aspect. While this relatively simple algorithm can account for narrative progression, there are many non-narrative discourses that are *not* interpreted as forward moving. One way of dealing with this challenge might be to incorporate information about world knowledge and/or rhetorical relations (Moens and Steedman 1988, Hobbs 1979, Hobbs et al. 1993, Kehler 2002, Asher and Lascarides 2003). For our purposes, the empirical generalizations above about narrative progression are good enough.

4.2 The marked clause's relation to the preceding discourse

If narrative progression is responsible for the enriched temporal interpretation of clause chaining, marked clauses must be related to the preceding discourse in the way described by the generalizations in 78. While independent sentences participate in narrative progression, not all clauses do. In English, for instance, temporal adjunct clauses are not related temporally to the preceding discourse (Partee 1984:257–265, Hinrichs 1986:73–77).

- (79) a. Mary turned the corner. While the cars were stopped, she crossed the street.
b. Mary turned the corner. After John saw her, she crossed the street.

The state of the cars being stopped described by the temporal adjunct clause in 79a does not overlap with, or even immediately follow, the event of Mary turning the corner. Similarly, in 79b, John's seeing Mary does not have to immediately follow her turning the corner. In both cases, the temporal adjunct clause is interpreted at some subsequent time.

In clause chaining in Northern Paiute, however, the marked clause is temporally related to the preceding discourse in narratives. A marked clause containing the simultaneous suffix, which always selects for imperfective aspect, temporally overlaps the closest preceding perfective clause.

- (80) [...] **yaisi su=naatsi'i ti=ddogga-tsi-no ka=pa'mogo yaa-hu.** Yaa
PTC NOM=boy REFL=dog-DIM-with ACC=frog miss-PFV DEM
na-ggwatima-ggwe-tu kado'o. Moko=sabbi yaa yakwi-gwaddi. Yaisi kado'o. Mia-pi
PASS-lock-LOC-LOC nothing shoe=PTC DEM sit.DL.IMPF-DL PTC nothing go-PRF
amamu'a. **Yaisi sida niimma-gwaddi-na,** yaa ti=habinnu-ggwe
morning PTC bad feel-DL-SIM DEM REFL=bed-LOC
o=bbuni-ddakwi-gwaddi.
3SG.ACC=see-sit.DL-DL
'[...] **the little boy and his dog realized the frog was missing.** The place where he was locked up was empty. Only the shoes were sitting there. There was nothing. It had left in the morning. **They were feeling bad,** sitting there in their bed looking at it.' (prompted narrative, MS, BP25-2-t2, 10–13)

The narrative in 80 was prompted using a picture book in which a boy and his dog are looking for a frog.¹² The marked clause describes the state of the boy and his dog feeling bad, which overlaps with the event of their realizing that the frog is missing.

¹²Mercer Mayer. 1969. *Frog, where are you?* New York: Dial Books.

Partee (1984:262) provides an easy way to test whether or not a sentence is temporally related to the preceding discourse. She observes that the discourse in 81a is ill formed because the second sentence is interpreted as temporally overlapping the first sentence, even though the state of the room being empty cannot hold at the same time people begin to leave. By contrast, the parallel discourse in 81b is felicitous, because the state of the room being empty is described by a temporal adjunct clause, which is not related temporally to the preceding sentence.

- (81) a. #People began to leave. The room was empty. The janitors came in.
 b. People began to leave. When the room was empty, the janitors came in.
 (Partee 1984:262)

This test confirms that marked clauses are temporally related to the preceding discourse. The discourse in 82a is infelicitous because the state of the wood being gone cannot hold at the time that the fire is being made, only at a later time when the fire has burned down to just embers.

- (82) a. #Nii pida-hu. Su=kuna kado'o.
 1SG.NOM make.fire-PFV NOM=wood nothing
 Intended: 'I made a fire. **There was no wood.**' (elicitation, EM and MS, BP44-2, 1:27:50)
 [EM: "Yeah, but how are you gonna be making fire when you got no wood?"]
 b. #Nii pida-hu. Su=kuna kado'o-na, nii ka=kutsu
 1SG.NOM make.fire-PFV NOM=wood nothing-SIM 1SG.NOM ACC=meat
 tinoho.
 roast.IMPF
 Intended: '**I made a fire. When there was no wood,** I was roasting the meat.'
 (elicitation, EM and MS, BP44-5, 5:50)
 [MS: "How did you start the fire if you didn't have no wood?"]

The parallel clause chain in 82b is also ill formed. The marked clause is interpreted as temporally overlapping the preceding sentence, but the wood cannot be gone at the same time the fire is made.

When a marked clause contains the sequential suffix, it can be interpreted as immediately temporally following the closest preceding perfective clause in narratives. This happens, in accordance with the generalizations in 78, when the marked clause is in the perfective aspect.

- (83) [...]yaisi tiwao ka=ti=pia ti-patsa-kwai-tu mimia-u, ka=kutsu.
 PTC also ACC=REFL=friend NSP-kill-LOC-LOC go.DL-PFV ACC=cow
 U-ba yaisi pipiti-u-gaa-si, yaisi usu tiwao idza pii owi
 3SG-LOC PTC arrive.PL-PFV-MOT-SEQ PTC DEM.NOM also coyote self DEM
 manai-ċaa.
 do-MOT
 '[...]and also went to where their friend was killed, the cow. Having arrived beside it, that Coyote, *he* went and took over.' (narrative, Thornes 2003:481)

The marked clause describes the event of Coyote and the Porcupine arriving at where the Cow was killed, which takes place immediately after their leaving.

Partee's test can again be used to confirm this. The discourse in 84a was judged infelicitous in the context depicted in Figure 2, where the boy does not miss the frog immediately when it escapes, only later after he wakes up.

- (84) a. #Su=pa'mogo wadzi-mia-huka. **Su=naatsi'i o=yaa-hu.**
 NOM=frog hide-go-INCEP NOM=boy 3SG.ACC=miss-PFV
 Intended: 'The frog started to escape. **The boy missed his frog.**' (elicitation, EM and MS, BP43-6, 4:00)
 [EM: "Tibunihusi, yaisi o=yaahu ['He wakes up and then he misses him']."]
- b. #Su=pa'mogo wadzi-mia-huka. **Su=tiitsi-'yu naatsi'i**
 NOM=frog hide-go-INCEP NOM=little-NOM boy
o=yaa-hu-si, sita-hu.
 3SG.ACC=miss-PFV-SEQ get.angry-PFV
 Intended: '**The frog started to escape. The little boy missed his frog,** and then he got angry.' (elicitation, EM, BP43-6, 6:45)
 [EM: "Well I think he was sleep, you know, when the frog left, yeah. Then, when he woke up, well he missed him and he got mad."]

The parallel clause chain in 84b is also bad, because the marked clause is interpreted as taking place immediately after the preceding sentence.

I conclude, then, that the marked clauses in a chain are temporally related to the preceding discourse according to the generalizations in 78. A marked clause with the simultaneous suffix is interpreted as temporally overlapping the closest preceding perfective clause. A marked clause with the sequential suffix is interpreted as taking place immediately after the closest preceding perfective clause when it is in the perfective aspect. When a clause chain contains more than one marked clause, as in 72a–b, they are each temporally related to the preceding discourse. Since the closest preceding perfective clause can be another marked clause, the marked clauses in a chain can have the forward moving interpretation that is characteristic of narrative discourse.

4.3 The unmarked clause's relation to the preceding discourse

The unmarked clause in a chain is also temporally related to the preceding discourse in narratives. In 72a–b, for instance, the unmarked clause is interpreted as taking place *immediately after* the second marked clause. This is confirmed by Partee's test: the clause chain in 85 is infelicitous in the context depicted in Figure 2, because the event described by the unmarked clause does not occur immediately after the event described by the marked clause, cf. 84a–b.

- (85) #Su=tiitsi-'yu pa'mogo wadzi-mia-huka-si, su=naatsi'i o=yaa-hu.
 NOM=little-NOM frog hide-go-INCEP-SEQ NOM=boy 3SG.ACC=miss-PFV
 'The little frog started to escape, and then the boy missed him.' (elicitation, MS, BP53-3, 31:45)
 [MS: "Issaya'e['Lying'...]he missed him when he woke up."]

This is a stronger meaning than the semantics of clause chaining alone provides. The sequential suffix only conveys that the unmarked clause takes place *sometime* after the marked clause.

If the unmarked clause participates in narrative progression when it occurs last in a clause chain, it should also do so when it *precedes* the marked clause. This is indeed the case.

- (86) Su=naatsi'i=bino'o ka=ti=ddoogga haa-na, **kuyaa o=ddaya-ggwine-hu**
 NOM=boy=PTC ACC=REFL=dog scold-SIM **far** 3SG.ACC=send-MOT-PFV
tabbu'a. Yaisi ka=ggwitua tiggwisu ti=tsoti'a ddiggwa'ni mani-kati, yaa
appear PTC ACC=pail still REFL=hat look.like do-sit.IMPF there
 paa'a-we kati-na.
 water-LOC sit-SIM
 'The boy is scolding his dog, **and it looks like he sends him away. He still has the pail on his head that looks like a hat**, while sitting in the water.' (prompted narrative, MS, BP24-1-t3, 41–42)
- (87) **Su=ddoogga=bino'o yaa ika tibbi-ma yaa-na'ona-ba-ti mia-hu. Yaisi**
 NOM=dog=PTC **there** DEM.ACC rock-LOC **there-LOC-LOC-LOC go-PFV PTC**
yaa su=hibbi tihidda mia-hu, umi-ma sie-hu-si.
there NOM=thing deer go-PFV 2/3PL.ACC-LOC get.scared-PFV-SEQ
 'The dog went around the rock. The deer left because it got scared of them.' (prompted narrative, EM, BP25-2-t1, 92–95)

In 86, repeated from 61a above, the state described by the unmarked clause of the boy continuing to have a bucket on his head overlaps the event of the boy sending the dog away. Similarly, in 87, the deer's leaving is interpreted as taking place immediately after the dog's going around the rock.

Just like a marked clause, then, the unmarked clause in a chain is temporally related to the preceding discourse in narratives. When the marked clause contains the sequential suffix, the unmarked clause can be interpreted as taking place immediately after it, an interpretation that is stronger than what is provided by the semantics of the suffix alone. In addition, when the unmarked clause occurs first in a chain, it is interpreted as either temporally overlapping or immediately following the closest preceding perfective clause. This gives rise to a forward moving interpretation in narratives across all the clauses in a chain.

5 Conclusion and future prospects

The temporal interpretation of clause chaining in Northern Paiute has two components of meaning. First, there is verbal morphology dedicated to conveying relative tense—the simultaneous and sequential suffixes—which establishes a temporal relation between each marked clause in a chain and the unmarked clause. This component is insensitive to linear order and is derived through semantic binding inside the marked clause. The semantics of clause chaining is then enriched pragmatically in narrative discourse. This second meaning component is sensitive to linear order, giving rise to a forward moving temporal interpretation across the clauses in a chain.

We probably cannot, as Foley (2010:48) suggests, "[...]assume that clause chaining always corresponds to the same types of structures across languages." While clause chaining in Northern Paiute has a coordination structure, it likely has a subordination structure in Choctaw and several other North American languages (Finer 1985, Broadwell 1997, 2006). Nonetheless, the surface form of clause chaining is strikingly similar across a number of genetically unrelated and geographically isolated languages. As Longacre (2007:398–417) observes, many languages indicate

In Northern Paiute, a relative tense can establish a temporal relation between the clauses in a coordination structure because the coordinator introduces an operator that semantically binds it. If a subordinator had the same property, clause chaining could instead have a subordination structure.

There is one property of clause chaining that I have for the most part ignored. In many languages, though not in Northern Paiute, clause chaining marks switch reference (Longacre 2007:399), just as coordination and subordination structures do. To account for switch reference marking in coordination structures, McKenzie (2012) proposes a compositional semantics that parallels the one that I have proposed for clause chaining. This suggests that there may be a more general compositional mechanism operating at clause junctures, which lies behind both the binding of relative tenses and switch reference markers. With further investigation, I hope that a more comprehensive theory of clause chaining will emerge, embedded within a more general understanding of clause combination.

Appendix: On deverbal nominalization

There are three arguments that the simultaneous suffix is distinct from a homophonous deverbal nominalizer, whose syntax and semantics I have discussed elsewhere (Toosarvandani 2011, 2014b).

First, the subject of a nominalization created by *-na* must be realized overtly. A weather verb, such as *tiiggwa* ‘snow’, normally takes no subject at all (89). But in the corresponding nominalization, an expletive—the fourth person clitic—is obligatory (90a).

- (89) *Tiiggwa-winni.*
snow-PROG
‘It’s snowing.’ (elicitation, MS, BP32-4-s, 13)
- (90) a. *Nii *(a=)ddiiggwa-winni-na punni.*
1SG.NOM 4.GEN=snow-PROG-NMLZ see.IMPF
‘I see it snowing.’ (elicitation, EM, BP37-3, 1:14:26)
- b. *Tiiggwa-na, nii kai pisa ka=poo punni.*
snow-SIM 1SG.NOM NEG good ACC=road see.IMPF
‘When it is snowing, I don’t see the road well.’ (elicitation, MS, BP32-4-s, 1)

By contrast, the subject of the marked clause in a clause chain need not be overt (90b).

Second, the subject of the nominalization bears the genitive case (90b), never the nominative case (91a).

- (91) a. **Nii saa-na ne-hu.*
1SG.NOM cook-NMLZ burn-PFV
Intended: ‘What I was cooking burned.’ (elicitation, EM, BP43-2, 11:14)
- b. *Nii haki’i-na, nabagi’a.*
1SG.NOM hiccough-SIM bathe.IMPF
‘While I was hiccoughing, I swam.’ (elicitation, MS, BP31-5-s, 5)

The subject of the marked clause can, however, bear nominative case (91b).

Third, as I discuss in Section 2.2, the simultaneous suffix imposes a number of restrictions on the aktionsart of the verb. For instance, it is impossible with achievements (92a), and it forces an iterative interpretation with semelfactives (92b).

- (92) a. **Su=nana mia-na, hubiatu.*
NOM=man go-SIM sing.IMPF
Intended: ‘When the man was leaving, he was singing.’ (elicitation, EM, BP48-5, 21:08)
- b. *Su=naatsi’i huni-na, nabagi’a.*
NOM=boy fart-SIM bathe.IMPF
‘While the boy is farting, he is taking a bath.’ (elicitation, EM and MS, BP49-5, 1:36:37)
[MS: “Probably make couple bubbles.” [...] MT: “Could it have been more than once?” MS: “Yeah, it can be more than one.” EM: “Yeah.”]

- (93) a. Su=mogo'ni **i=mia-na** punni-'yu.
 NOM=woman **1SG.GEN=go-SIM** see.IMPF-IMPF
 'The woman sees me leaving.' (elicitation, EM, BP49-3-s, 4)
- b. Su=mogo'ni **i=huni-na** naka.
 NOM=woman **1SG.GEN=fart-NMLZ** hear
 'The woman heard me fart.' (elicitation, EM, BP48-6, 42:33)
 [EM: "That's just once."]

But the homophonous nominalizer is compatible with achievements (93a) and does not coerce an iterative interpretation with semelfactives (93b).

References

- Abusch, Dorit. 1997. Sequence of tense and temporal de re. *Linguistics and Philosophy* 20:1–50.
- Adger, David and Gillian Ramchand. 2005. Merge and Move: *Wh*-dependencies revisited. *Linguistic Inquiry* 36:161–193.
- Altshuler, Daniel. 2012. Aspectual meaning meets discourse coherence: A look at the Russian imperfective. *Journal of Semantics* 29:39–108.
- Asher, Nicholas and Alex Lascarides. 2003. *Logics of conversation*. Cambridge: Cambridge University Press.
- Babel, Molly, Andrew Garrett, Michael J. Houser and Maziar Toosarvandani. 2013. Descent and diffusion in language diversification: A study of Western Numic dialectology. *International Journal of American Linguistics* 79:445–489.
- Babel, Molly, Michael J. Houser and Maziar Toosarvandani. 2012. Mono Lake Northern Paiute. *Journal of the International Phonetic Association* 42:233–243.
- Barentsen, Adrian. 1996. Shifting points of orientation in Modern Russian. In *Reported speech: Forms and functions of the verb*, eds. Theo Janssen and Wim van der Wurff, 15–55. Amsterdam: John Benjamins.
- Bittner, Maria. 2005. Future discourse in a tenseless language. *Journal of Semantics* 22:339–387.
- Bohnemeyer, Jürgen. 2002. *The grammar of time reference in Yukatek Maya*. Munich: Lincom.
- Bohnemeyer, Jürgen. 2014. Aspect vs. relative tense: The case reopened. *Natural Language and Linguistic Theory* 32:917–954.
- Broadwell, George Aaron. 1997. Binding theory and switch-reference. In *Atomism and binding*, eds. Hans Bennis, Pierre Pica, and Johan Rooryck, 31–49. Dordrecht: Foris.
- Broadwell, George Aaron. 2006. *A Choctaw reference grammar*. Lincoln: University of Nebraska Press.
- Bybee, Joan, Revere Perkins and William Pagliuca. 1994. *The evolution of grammar: Tense, aspect, and modality in the languages of the world*. Chicago: University of Chicago Press.
- Cable, Seth. 2010. *The grammar of Q: Q-particles, wh-movement, and pied-piping*. Oxford: Oxford University Press.
- Comrie, Bernard. 1985. *Tense*. Cambridge: Cambridge University Press.
- Dooley, Robert A. 2010. Foregrounding and backgrounding in Mbyá Guaraní clause chaining. In *A mosaic of languages and cultures: Studies celebrating the career of Karl J. Franklin*, eds. Kenneth A. McElhanon and Ger Reesink, 90–110. Dallas: SIL International.

- Dowty, David. 1986. The effects of aspectual class on the temporal structure of discourse. *Linguistics and Philosophy* 9:37–61.
- Finer, Daniel L. 1985. The syntax of switch-reference. *Linguistic Inquiry* 16:35–55.
- Foley, William and Robert D. Van Valin, Jr. 1984. *Functional syntax and universal grammar*. Cambridge: Cambridge University Press.
- Foley, William A. 2010. Clause linkage and nexus in Papuan languages. In *Clause linking and clause hierarchy*, ed. Isabelle Bril, 27–50. Amsterdam: John Benjamins.
- Golla, Victor. 2011. *California Indian languages*. Berkeley: University of California Press.
- Grice, Herbert Paul. 1975. Logic and conversation. In *Speech acts*, eds. Peter Cole and Jerry L. Morgan, volume 3 of *Syntax and Semantics*, 41–58. New York: Academic Press.
- Haspelmath, Martin. 2004. Coordinating constructions: An overview. In *Coordinating constructions*, ed. Martin Haspelmath, 3–39. Amsterdam: Benjamins.
- Hatav, Galia. 2010. Relative and absolute tense interpretation in Modern Hebrew. *Hebrew Studies* 51:261–285.
- Heim, Irene and Angelika Kratzer. 1998. *Semantics in Generative Grammar*. Oxford: Blackwell.
- Hinrichs, Erhard. 1986. Temporal anaphora in discourses of English. *Linguistics and Philosophy* 9:63–82.
- Hobbs, Jerry R. 1979. Coherence and coreference. *Cognitive Science* 3:67–90.
- Hobbs, Jerry R., Mark E. Stickel, Douglas E. Appelt and Paul Martin. 1993. Interpretation as abduction. *Artificial Intelligence* 63:69–142.
- Huddleston, Rodney and Geoffrey K. Pullum, eds. 2002. *The Cambridge grammar of the English language*. Cambridge: Cambridge University Press.
- Kamp, Hans, Josef van Genabith and Uwe Reyle. 2011. Discourse Representation Theory. In *Handbook of philosophical logic*, eds. Dov M. Gabbay and Franz Guenther, volume 15, 125–394. Dordrecht: Springer, 2nd edition.
- Kamp, Hans and Uwe Reyle. 1993. *From discourse to logic: Introduction to modeltheoretic semantics of natural language, formal logic, and Discourse Representation Theory*. Dordrecht: Kluwer Academic Publishers.
- Kamp, Hans and Christian Rohrer. 1983. Tense in texts. In *Meaning, use, and interpretation of language*, eds. Rainer Bäuerle, Christoph Schwarze, and Arnim von Stechow, 250–269. Berlin: Mouton de Gruyter.
- Kehler, Andrew. 2002. *Coherence, reference, and the theory of grammar*. Stanford, CA: CSLI.
- Klein, Wolfgang. 1994. *Time in language*. London: Routledge.
- Koster, Jan. 1975. Dutch as an SOV language. *Linguistic Analysis* 1:111–136.
- Kratzer, Angelika. 1998. More structural analogies between pronouns and tense. *Semantics and Linguistic Theory (SALT)* 8:92–110.
- Kratzer, Angelika. 2009. Making a pronoun: Fake indexicals as windows into the properties of pronouns. *Linguistic Inquiry* 40:187–237.
- Kratzer, Angelika. 2014. Situations in natural language semantics. In *The Stanford encyclopedia of philosophy*, ed. Edward N. Zalta. Spring 2014 edition. URL <http://plato.stanford.edu/archives/spr2014/entries/situations-semantics/>.
- Laka, Itziar. 1990. Negation in syntax: On the nature of functional categories and projections. Ph.D. Dissertation, Massachusetts Institute of Technology.
- Lamb, Sydney M. 1957. Mono grammar. Ph.D. Dissertation, University of California, Berkeley.
- Link, Godehard. 1987. Algebraic semantics for event structures. *Amsterdam Colloquium* 7:243–

- Longacre, Robert E. 2007. Sentences as combinations of clauses. In *Language typology and syntactic description*, ed. Timothy Shopen, volume 2, 372–420. Cambridge: Cambridge University Press, 2nd edition.
- MacDonald, Lorna. 1990. *A grammar of Tauya*. The Hague: Mouton de Gruyter.
- Matthewson, Lisa. 2006. Temporal semantics in a superficially tenseless language. *Linguistics and Philosophy* 29:673–713.
- McKenzie, Andrew. 2012. The role of contextual restriction in reference-tracking. Ph.D. Dissertation, University of Massachusetts, Amherst.
- Moens, Marc and Mark Steedman. 1988. Temporal ontology and temporal reference. *Computational Linguistics* 14:15–28.
- Munn, Alan B. 1993. Topics on the syntax and semantics of coordinate structures. Ph.D. Dissertation, University of Maryland.
- Muskens, Reinhard. 1995. Tense and the logic of change. In *Lexical knowledge in the organization of language*, eds. Urs Egli, Peter E. Pause, Christoph Schwarze, Armin von Stechow, and Götz Wienold, 147–183. Amsterdam: John Benjamins.
- Nonato, Rafael. 2014. Clause chaining, switch reference, and coordination. Ph.D. Dissertation, Massachusetts Institute of Technology.
- Ogihara, Toshiyuki. 1994. Adverbs of quantification and sequence-of-tense phenomena. *Semantics and Linguistic Theory (SALT)* 4:251–267.
- Ogihara, Toshiyuki. 1995. The semantics of tense in embedded clauses. *Linguistic Inquiry* 26:663–679.
- Ogihara, Toshiyuki. 1996. *Tense, attitudes, and scope*. Dordrecht: Kluwer.
- Ogihara, Toshiyuki and Yael Sharvit. 2012. Embedded tenses. In *The Oxford handbook of tense and aspect*, ed. Robert I. Binnick, 638–668. Oxford: Oxford University Press.
- Olson, Michael L. 1981. Barai clause junctures. Ph.D. Dissertation, Australian National University.
- Partee, Barbara H. 1973. Some structural analogies between tenses and pronouns in English. *Journal of Philosophy* 70:601–609.
- Partee, Barbara H. 1984. Nominal and temporal anaphora. *Linguistics and Philosophy* 7:243–286.
- Reichenbach, Hans. 1947. *Elements of symbolic logic*. Berkeley, CA: University of California Press.
- Roberts, John R. 1988. Amele switch-reference and the theory of grammar. *Linguistic Inquiry* 19:45–63.
- Rooth, Mats and Barbara Partee. 1982. Conjunction, type ambiguity, and wide scope “or”. *West Coast Conference on Formal Linguistics (WCCFL)* 1:353–362.
- Ross, John Robert. 1967. Constraints on variables in syntax. Ph.D. Dissertation, Massachusetts Institute of Technology.
- Schlenker, Philippe. 2003. A plea for monsters. *Linguistics and Philosophy* 26:29–120.
- Shaer, Benjamin. 2003. Toward the tenseless analysis of a tenseless language. *Semantics of Underrepresented Languages in the Americas (SULA)* 2:139–156.
- von Stechow, Arnim. 1995. On the proper treatment of tense. *Semantics and Linguistic Theory (SALT)* 5:362–386.
- von Stechow, Arnim and Atle Grønn. 2013. Tense in adjuncts part 2: Temporal adverbial clauses. *Language and Linguistics Compass* 7:311–327.
- Terrill, Angela. 2004. Coordination in Lavukaleve. In *Coordinating constructions*, ed. Martin

- Haspelmath, 427–444. Amsterdam: John Benjamins.
- Thornes, Tim. 2003. A Northern Paiute grammar with texts. Ph.D. Dissertation, University of Oregon.
- Tonhauser, Judith. 2011. Temporal reference in Paraguayan Guaraní, a tenseless language. *Linguistics and Philosophy* 34:257–303.
- Toosarvandani, Maziar. 2011. The role of nominalization in Northern Paiute relative clause formation. *Workshop on Structure and Constituency in the Languages of the Americas (WSCLA)* 16:151–165.
- Toosarvandani, Maziar. 2014a. Achievements in Northern Paiute. *Semantics of Underrepresented Languages in the Americas (SULA)* 8:105–120.
- Toosarvandani, Maziar. 2014b. Two types of deverbal nominalization in Northern Paiute. *Language* 90:786–833.
- Van Valin, Robert D., Jr. 2005. *Exploring the syntax-semantics interface*. Cambridge: Cambridge University Press.
- Van Valin, Robert D., Jr. and Randy J. La Polla. 1997. *Syntax: Structure, meaning, and function*. Cambridge: Cambridge University Press.

University of California, Santa Cruz
 Department of Linguistics
 1156 High Street
 Santa Cruz, CA 95064
 mtoosarv@ucsc.edu
<http://people.ucsc.edu/~mtoosarv/>