Graded and Evidential Tenses in Mvskoke (Creek)

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1 Introduction

This paper examines the semantics of the graded past tense system of Creek, also known as Mvskoke or Seminole. Creek is an endangered Muskogean language spoken by fewer than 600 people in the Seminole and Muscogee (Creek) Nations of Oklahoma, as well as in the Seminole Tribe of Florida. Creek has four past tenses which locate an event in increasingly remote spans of time (Haas 1940; Martin 2010; a.o.). In addition to encoding remoteness, this paper claims that Creek past tenses have an evidential meaning component. Data presented here demonstrates that the first three past tenses are used as direct evidentials in most cases, but that they are also acceptable in certain indirect evidence contexts. This finding is novel in that the existing major documentary works make no mention of the evidential component of the tenses (Innes et al. 2004, 2009; Martin 2011), though two early grammatical descriptions hint at the possible relevance of evidence to the tense system (Brinton 1870; Nathan 1977). The major claim of this paper is that the Creek tenses make reference to the time evidence was acquired. A relation between the evidence time and the event time - mediated by aspect - is responsible for the evidential flavor of the tenses. In using the notion of evidence acquisition time, the analysis links Creek to recent semantic ac-

counts of evidential tenses such as Chung (2007); Lee (2013) for Korean, Koev (2011); Smirnova (2013) for Bulgarian, and Kalsang et al. (2013) for Tibetan.

This paper also investigates the temporal contribution of the Creek graded tense system and shows how the temporal and evidential meanings together affect the distribution of the past tense morphemes. The Creek system is compared to Bantoid systems which have been analyzed in the literature (particularly Gĩkũyũ (Cable 2013) and Luganda (Bochnak & Klecha 2015; Klecha & Bochnak 2016)). While the most recent past in Bantu, Inuktitut, and Creek covers just the day of utterance, more remote tenses in Creek cover much larger spans of time. In this way, the Creek remote tenses resemble graded tenses in South Baffin Inuktitut (Hayashi 2011; Hayashi & Oshima 2015) more than the Bantu tenses. Drawing on original data from fieldwork, this study proposes a semantics for Creek graded tenses which can be extended to South Baffin Inuktitut and which refers to a contextually dependent notion of temporal distance, following Bochnak & Klecha (2015).

1.1 Basic facts of the Creek past tenses

All four Creek past tenses are verbal suffixes that come just before the indicative mood suffix. The first past tense (Past 1) takes the form of an affix when the sentence is imperfective, but is infixed when the sentence is perfective. The infixed form of Past 1 is morphologically part of the aspectual system and an operation of stem-internal ablaut results in infixed aspiration or, between two consonants, an infixed /*-ey*/ ([æ]) sound. The data in (1) illustrate the four tense markers that will be the focus of this paper.[1]

(1) a. Mary lvt**i**kes.
Mary lat***éy***k-is
Mary fall.**P1**.PFV-IND
'Mary fell.' (today)

[1]The data in this paper come from the author's fieldwork unless otherwise indicated. The reference for such data gives the code for the speaker(s) who produced the sentence, the date and their dialect - Mus for Muskogee Creek and Sem for Oklahoma Seminole. The abbreviations for the glosses are found in Appendix A.

b. Mary latk**vnk**s.
Mary lâ:tk-**ánk**-s
Mary fall.PFV-**P2**-IND
'Mary fell.' (yesterday)

c. Mary latk**emvc**.
Mary lâ:tk-**imát**-s
Mary fall.PFV-**P3**-IND
'Mary fell.' (at one time)

d. Mary latk**vtē**s.
Mary lá:tk-**atí:**-s
Mary fall.IMPFV-**P5**-IND
'Mary had fallen/fell.'

(PF-Mus-Elic07/2018)

Martin (2011) provides data showing that Pasts 2 and 3 can occur with either perfective or imperfective aspect. Past 5, however, invariably combines with the stem in its imperfective form. An explanation for this idiosyncrasy is a subject for future research.

1.1.1 Graded tenses

Until recently, the Creek language had five past tenses. Descriptions of the past tenses as early as 1860 associate each tense with a distinct time frame (Buckner & Herrod 1860; Grayson 1885; Loughridge & Hodge 1890). Martin (2010) - following Haas (1940) - provides a more precise description of the system in which the tenses cover disjoint, adjacent intervals of time that are increasingly remote from the present. In his 2010 paper, Martin also notes that the fourth past (P4) has fallen out of use and is no longer recognized by speakers. As a result the temporal intervals which are compatible with each tense have shifted. His representation of the older and more modern systems are reproduced below.

(2) *Older Creek Tense System*

P1	today – last night
P2	yesterday – 2/3 weeks
P3	2/3 weeks –1/2 years
P4	1/2 years – 60 years
P5	60 years – ancient

(3) *Modern Creek Tense System*

P1	today – last night
P2	yesterday – 1 year
P3	1 year – 20 years
P5	20 years – ancient

(Martin 2010: 54)

Innes et al. (2004) provide a second, and seemingly incompatible, description of the tense system in their teaching grammar. Innes and her co-authors separate Recent Past (P1) from the other pasts, which they claim cover overlapping time spans which begin yesterday and extend into the past. Under this view, middle (P2), distant (P3) and remote (P5) pasts differ in how far back they extend.

(4) *Innes et al. (2004)'s description of Creek tenses*

Recent Past	(P1)	"a short time has passed"
Middle Past	(P2)	from yesterday to one year ago
Distant Past	(P3)	from yesterday to a long time ago
Remote Past	(P5)	from yesterday to mythic past

(Innes et al. 2004: 119,135)

It is interesting to note that these two descriptions fall nicely into the two current semantic analyses given to graded tense systems. Cable (2013) and Klecha & Bochnak (2016) give semantics for graded tenses[2] in which they stand in a strength relationship with each other - the most recent past having the most restricted temporal reference and the remote past compatible with all past time. It is precisely this semantics which forces a Quantity Implicature-like competition between the forms and results in their disjoint distribution in actual use. That is, when the speaker's knowledge does

[2]Temporal Remoteness Morphemes in Cable (2013)'s terms

not support the most specified recent past the next weakest form is used and the implicature arises that the event did not take place within the recent past time span. Looking at the two descriptions of the Creek tenses through this lens, we might expect to see a similar kind of competition between the past tense as described by Innes et al. (2004) which would result in a distribution similar to Martin (2010). Mucha (2017) on the other hand, provides evidence to support an analysis wherein Medumba graded tenses actually refer to disjoint intervals of time. This approach corresponds to the description in Martin (2010).

In the earliest descriptions of the tense system, native speakers and linguists have expressed the intuition that there is a divide between Past 1, 2 and 3 and Past 5. While Past 5 is most often used in folktales and to describe events long past, many have noticed that it has a wider use. Several authors agree that Past 5 does not take part in the graded system of the first three past tenses but can be used for any past time. They label it "historic past" (Buckner & Herrod 1860) or "indefinite past" (Loughridge & Hodge 1890). Grayson (1885), a native speaker of Creek, also sets Past 5 apart from the other tenses. He labels it "past perfect tense" in his description and does not translate it as having a graded time span like the other tenses. Martin also notes the wider use of Past 5 in his 2010 paper. He mentions that in relative clauses, Past 5 seems to have a nongraded meaning. Martin writes it "shifts time" and "is simply vague about when in the past the event occurred" (Martin 2010: 54). These intuitions hint at a more complex system than those represented in the tables above.

1.1.2 Evidentiality

In claiming that evidentiality plays a role in the past tense system of Creek, this paper also builds on the rich literature on the Creek language as well as comparative Muskogean literature. Several authors characterize Past 5 as an indirect evidential. They write that Past 5 refers to "transactions of which the subject of the verb has no personal knowledge, nor is directly connected with" (Brinton 1870: 307), or that it is used when "the speaker did not witness, but has heard about, the activity that the sentence refers to" (Nathan 1977: 115). Martin (2010) addresses whether or not Past 5 can

be understood as indicating an unwitnessed event, but concludes from textual data that Past 5 can indeed be used when an event was witnessed. Taking into account Martin (2010)'s conclusions, this paper considers the opposite approach to the question of evidentiality: if Past 5 is not an indirect evidential, could Pasts 1-3 be direct evidentials?

This approach receives support from work on Proto-Muskogean by Booker (1980). Booker writes that tense is so varied across Muskogean languages that "the evidence for reconstructing tense morphemes is so fragmentary that the existence of any temporal marking at all in the proto-language is questionable" (1980: 112). There is, however, evidence upon which to reconstruct direct evidentials. Booker finds Choctaw morphemes in Byington (1915)'s Dictionary of Choctaw which she argues are cognates of Creek Past 2 and Past 3. Byington defines these as evidentials which imply that "the speaker has knowledge of what he speaks" (Byington 1915: 222). Based on this evidence, Booker reconstructs two "first-hand knowledge evidentials" in Proto-Muskogean.

1.2 General Questions & Outlook

Two main areas of investigation emerge from the discussion above. The first to be addressed is the interaction of evidentiality with the tense system. Do Pasts 1-3 encode evidentiality? And if so, what are the restrictions on the type of evidence that will license these morphemes? We will see that these tenses do indeed have an evidential meaning component which in most situations implies that the speaker of the utterance directly witnessed the event. This also raises the question: *How do gradedness and evidentiality interact with each other and influence the distribution of the tenses?* §2 presents data showing the evidential meaning of the tenses, discusses two puzzles to characterizing them as direct witness evidentials, and provides a formal analysis. For the purposes of §2, I will adopt Martin (2010)'s intervals for the tenses. The interesting behavior of Past 5 described above also raises the question as to whether it belongs in a category with Pasts 1-3. We will see evidence supporting Martin's intuition that Past 5 is not graded. §3 tackles the puzzle of the temporal intervals covered by each tense. The main questions here are: *How are we to understand*

the apparent overlap between tenses and their gradedness? and *What are the semantics of these morphemes that allows these different uses?*

The data presented in this paper comes from original fieldwork with speakers of both the Oklahoma Seminole and Muskogee dialects of Creek. The data were collected in one-on-one interviews through translation tasks and acceptability judgment tasks. Examples from the author's fieldwork are given in the standard Seminole Nation orthography, with a phonemic transcription (following Martin 2011), and a morpheme-by-morpheme gloss adapted from Martin 2011's glossing conventions. Original data is referenced by speaker code, dialect - Mus for Muskogee Creek, Sem for Oklahoma Seminole - and date of elicitation.

2 Evidentiality in the Past Tense System

Creek speakers often characterize the difference between past tenses as a difference in *closeness* to the speaker, or force of the statement - *making a declaration* or *stating it as fact*. Drawing on these characterizations, Martin claims that a speaker will use more recent past tenses refer to events that are personal, closer, or more vivid whereas they will use more remote tenses describe events that they feel more removed from (Martin 2010: 67). A notion that also tracks subjective distance of an event is evidence. What happens to oneself is almost always directly witnessed; what happens to one's friend is more likely to be witnessed than what happens to a political or historical figure. This section demonstrates the role evidentiality plays in a speaker's choice of a past tense morpheme. Specifically, Creek native speakers have the intuition that using Pasts 1-3 commits them to having witnessed the event they are reporting. The following is a set of minimally different sentences along with speaker intuitions that capture both the temporal and evidential meanings of each past tense morpheme.

(5) a. Prompt: Can you tell me when you might say this sentence?

b. Estē mekko arat, Mary kerrēt ow**i**s.
ísti: míkko á:ɬ-â:t Mary kiɬɬ-í:-t ó:w-**éy**-s
person chief go.about.SG.IMPFV-COMP Mary know-DUR-SS be.IMPFV-**P1**-IND
'Mary met (lit. got to know) a man who is chief.'

Speaker Comment: I witnessed it recently, like last night.

c. Estē mekko arat, Mary kerrēt ow**vnk**s.
ísti: míkko á:ɬ-â:t Mary kiɬɬ-í:-t ó:w-**ánk**-s
person chief go.about.SG.IMPF-COMP Mary know-DUR-SS be.LGR-**P2**-IND
'Mary met a man who is chief.'

Speaker Comment: It could be that she met him a couple days ago or 5 years ago. But I know because, for instance, I saw her shaking hands with him.

d. Estē mekko arat, Kim kerrēt owe**mvc**.
ísti: míkko á:ɬ-â:t Kim kiɬɬ-í:-t ó:w-**imát**-s
person chief go.about.SG.IMPF-COMP Kim know-DUR-SS be.LGR-**P3**-IND
'Kim met a man who is chief.'

Speaker Comment: This is making a declaration, that she does know him. I witnessed it, for instance her shaking hands with him, a long time ago.

e. Estē mekko arat, Mary kerrēt ow**vtē**s.
ísti: míkko á:ɬ-â:t Mary kiɬɬ-í:-t ó:w-**atí:**-s
person chief go.about.SG.IMPF-COMP Mary know-DUR-SS be.IMPFV-**P5**-IND
'Mary used to know/met a man who is chief.'

Linguist: Do you have to have seen them shaking hands to say this?

Speaker Comment: You're saying she used to know him, but you're not for sure now whether she does or not. (RH-Sem-Elic07/2018)

For each of the above sentences with Pasts 1, 2 or 3, the speaker comments that the person uttering the sentence must have direct visual evidence of what they are reporting; no such intuition is reported for the sentence with Past 5. In what follows we will see that the choice between past tenses is determined by both temporal interval and whether the event was witnessed by the speaker.

2.1 Direct witness intuition for Pasts 1-3

In order to demonstrate that evidentiality is really something these past tenses are encoding, we need to see that there is some restriction on the type of evidence that licenses the tense. Languages differ greatly in how many distinct evidence sources they encode grammatically, but the most general cut seems to be between direct and indirect evidence (**?**Aikhenvald 2004). Direct evidence usually includes perceptual evidence such as visual, auditory and other sensory evidence. Indirect evidence is reportative evidence and inferential or reasoning-based evidentials (**?**: 57). Each of the examples below establishes an indirect evidence scenario where the speaker either hears of or reads a report of the event described in the sentence or else the speaker infers it based on some perceivable results. In these contexts, Past 1, 2 and 3 are infelicitous. Instead, speakers use Past 5 or another strategy.

I exemplify this first with Past 1. The context in (6a) establishes an interval of time compatible with Past 1 (today) and an indirect evidence context, i.e. seeing missed calls on your answering machine. In this context a simple verb with the Past 1 infix is not acceptable; instead speakers use two alternate strategies. The strategy exemplified here is the use of an indirect evidence ending *-vttis*. This ending usually occurs in indirect evidence contexts or in direct evidence contexts with a mirative use, but it is not well understood. The second strategy speakers employ is to use an auxiliary construction, which I address in a later section.[3]

[3]The ending on the verb in (6b) is a complex construction that is not well understood. As such this is not the best example to demonstrate the evidential requirement of Past 1. A better example (to be elicited this summer) is:

(i) Context: Imagine a friend of yours tells you that her sister Mary talked to the chief today.

a. (Mucv nettv) Mary Mekko emponahyes.
(móca nítta) Mary míkko im-ponáhy-is
(this day) Mary chief 3.DAT-talk.PFV.P1-IND
Intended: Mary talked to the chief today.

An astute observer will notice that both verbs in (6) contain the Past 1 perfective infix. This is a mysterious property of these *-vttis* constructions which is in need of further investigation.

(6) a. Context: Imagine you've been gone from the house all day, and when you return in the evening you see that you have missed two calls from your friend Sam on the answering machine. How would you say, Sam called me twice?

b. Sam ahokkolvn vnhuehik**vttis**.
Sam a:-hókkolv-n an-hóyh*ey*k-**attéys**
Sam DIR-two-ACC 1.SG.DAT-call.PFV-**INDIR**
'Sam called me twice.'

c. # Sam ahokkolvn vnhuehi**i**kes.
Sam a:-hókkola-n an-hóyh***ey***k-is
Sam DIR-two-ACC 1.SG.DAT-call.PFV.**P1**-IND
'Sam called me twice.'

Speaker Comment: That would be Sam called me twice, like from across the room, not on the phone. (ME-Sem-Elic08/2018)

We take the above example to show that a simple verb form with Past 1 (6c) is only acceptable if the person uttering the sentence is able to personally witness/experience being called. Finding a notification on your answering machine constitutes indirect evidence.

The examples for Past 2 and Past 3 involve reportative contexts. The context for (7) establishes a past time for the event that falls within the span compatible with Past 2 (last year), but for which the speaker of the sentence has no direct evidence. In this reportative context, the speaker volunteered a sentence marked with Past 5 (7b). The corresponding sentence with Past 2 in (7c) was rejected as infelicitous in the given context.

(7) a. Context: Last year, a woman you know, Mary, spoke with Chief Leonard Harjo and she told you about it. Now you want to tell me about it.

b. Mary okrolopē hvnkvnkē Mekko Leonard emponay**vtē**s.
Mary okłolopi: hank-ánk-i: mikko Leonard im-poná:y-**atí:**-s
Mary year one-P2-NLZ chief Leonard 3.DAT-speak.LGR-**P5**-IND
'Last year, Mary spoke with Chief Leonard.'

c. # Mary okrolopē hvnkvnkē Mekko Leonard emponay**vnk**s.
Mary okłolopi: hank-ánk-i: mikko Leonard im-ponâ:y-**ánk**-s
Mary year one-P2-NLZ chief Leonard 3.DAT-speak.PFV-**P2**-IND
'Last year, Mary spoke with Chief Leonard.'

Speaker Comment: That's like I saw Mary talking to him. (JWH-Sem-Elic07/2018)

We take unacceptability of (7c) in the reportative context to indicate that Past 2 is not compatible with a report as evidence source. This in addition to the speaker comment for (7c) supports the hypothesis that Past 2 has a direct evidential meaning component. The same type of judgment holds in another reportative context. In the example below the target sentence includes a subordinate clause *cokv-tvlvmē 'svklikat* 'it was printed in the newspaper' which ensures that the sentence is judged with the indirect evidence source. The verb marked with Past 5 is acceptable when paired with this subordinate clause. The corresponding sentence with Past 2 was judged unacceptable.

(8) a. Context: Imagine that you see an article in the newspaper that the President bought a dog yesterday.

b. Cokv-tvlvmē 'svklikat, Wvcenv Mekko efvn vpoh**vtē**s.
cóka-talami: 's-ak-lêyk-a:t wacina mikko ifa-n apo:h-**atí:**-s
paper-daily INST-LOC-sit.SG-COMP washington chief dog-ACC buy.LGR-**P5**-IND
'It was printed in the newspaper, the President bought a dog.'

c. # Cokv-tvlvmē 'svklikat, Wvcenv Mekko efvn
cóka-talami: 's-ak-lêyk-a:t wacina mikko ifa-n
paper-daily INST-LOC-sit.SG-COMP washington chief dog-ACC
vpoh**vnk**s.
apô:h-**ánk**-s
buy.PFV-**P2**-IND
Speaker Comment: No, that sounds like you were there when he bought the dog.

(DLR-Mus-Elic07/2018)

Again in this example, the speaker comments that the sentence would be acceptable if the speaker directly witnessed the event they are reporting. The same holds of Past 3. In the example below,

the context establishes a past time which precedes the present by 30 or so years. Though technically, according to Martin (2010)'s intervals, we might expect this to be incompatible with Past 3, speakers most naturally volunteer Past 3 when speaking of someone's childhood. In (9) the context is locating an event within the current chief's childhood about 30-40 years ago.[4]

(9) a. Let's imagine I want to tell you that the chief went to a certain church when he was young. How would I say "When he was young, the chief went to that church" in the language?

b. Mekko mvnettof, mv mēkusvpkv-cuko arēt
míkko manítt-o:f má mi:kosapka-cóko a:r-í:-t
chief young-when DEM.DIST prayer-house go.about.SG.IMPFV-DUR-SS
ow**ēmvt**s.
o:w-**i:mát**-s
be.IMPFV-**P3**-IND
'When the chief was young, he went to that church.' (ME-Sem-Elic07/2018)

With the example above having established that Past 3 is acceptable for this interval of time, the following example makes an indirect evidence context explicit through the use of the subordinate clause *cokv-tvlvmē hocihocat* 'it was written in the newspaper'. The sentence with Past 3 is judged unacceptable in the new context, and the speaker volunteered Past 5 instead.

(10) a. Prompt: Now imagine you read a newspaper story about the chief in which you learned that he frequented a certain church when he was young. Could you say the sentence in (10b)?

b. # Cokv-tvlvmē hocihocat, Mekko mv mēkusvpkv-cuko
cóka-talami: hócey*hó*c-â:t míkko má mi:kosapka-cóko
paper-daily write.IMPF-CAUS.IMPL-REF chief DEM.DIST prayer-house
arēt ow**ēmvt**s.
a:r-í:-t o:w-**i:mát**-s
go.SG.IMPFV-DUR-SS be.IMPFV-**P3**-IND

[4]The chief of the Seminole Nation at the time of elicitation is Greg Chilcoat, who was 50 years old at that time.

Speaker Comment: No, if it's according to the paper it would be [the sentence in (10c)]

c. Cokv-tvlvmē hocihocat, Mekko mv mēkusvpkv-cuko
cóka-talami: hócey*hóc*-â:t míkko má mi:kosapka-cóko
paper-daily write.IMPF-CAUS.IMPL-REF chief DEM.DIST prayer-house
arēt ow**vtē**s.
a:r-í:-t o:w-**atí:**-s
go.SG.IMPFV-DUR-SS be.IMPFV-**P5**-IND
'It was written in the newspaper, the chief went to that church.'

(ME-Sem-Elic07/2018)

The examples presented so far demonstrate that Pasts 1-3 are not compatible with all information sources. They are infelicitous in reportative contexts as well as in inferential indirect evidence contexts (the answering machine message context). On the other hand, we have seen that Past 5 is preferred in reportative contexts and is compatible with both Past 2 and Past 3 intervals of time. There appear to be two ways one could explain these facts. First, this could be an indication that Past 5 is a reportative evidential (and possibly more broadly an indirect evidential). The unacceptability of Pasts 2 and 3 could then be reduced to competition with Past 5. If Past 5 were specified for indirect evidence sources, it would be the more informative morpheme and Gricean pragmatic reasoning would mitigate against the use of Past 2 or 3. A strong argument against this explanation comes from Martin (2010). Martin provides evidence that, at very remote past times, Past 5 can be used for a directly witnessed event. He gives the example below.

(11) hofŏ^{n}-o:f mi:c-ay-**áti:**-s.
long.ago.INT-when do.IMPFV-1.SG.AG-**P5**-IND
'I did it long ago [P5].' (*abbreviations adapted,* Martin 2010: 53)

The alternative explanation would be to take the examples in this section to support the view that Pasts 1-3 are direct witness evidentials. This leaves open the possibility that Past 5 is underspecified for evidentiality. An approach like this would allow for the use of Past 5 in direct and

indirect evidence contexts, making sense of the examples presented here and of (11). This approach predicts that Past 5 is in competition with Pasts 1-3 and would be unacceptable in a context where one of the other past tenses is licensed. This is borne out and exemplified below.

(12) a. Context: Imagine you've been telling your brother there's a girl who wants to see him in Seminole. Then last week you drove by the diner and saw them together. You want to tell me that they saw each other.

b. Etehēcak**vnk**s.
iti-hi:c-â:k-**ánk**-s
RECIP-see-PL.PFV-**P2**-IND
'They saw each other.'

c. Linguist: Could you say...

d. # Etehēcak**vtē**s.
iti-hi:c-á:k-**atí:**-s
RECIP-see-PL.IMPFV-**P5**-IND
Speaker Comment: Not if I saw them at the diner. (LSB-Mus-Elic06/2017)

In this example both the temporal interval and the direct witness is compatible with Past 2. In this context speakers reject Past 5.

In summary, the examples seen in this section have demonstrated that Pasts 1-3 are incompatible with indirect evidence contexts - particularly reportative contexts. Taking the speaker intuitions at face value, the following interim hypothesis is proposed.

(13) *Evidentiality of Past Tense Morphemes - Interim Hypothesis:*
Pasts 1, 2 and 3 indicate that the speaker has directly witnessed the event reported in the utterance.

There are puzzles for this hypothesis though. Characterizing the past tenses as direct witness evidentials is problematic in a number of contexts where the past tenses are still used, but the event was not witnessed by the person uttering the sentence. We turn to these puzzles now.

2.2 Puzzles for a 'Direct Witness' approach

The examples in the previous section demonstrated that speakers generally use Pasts 1-3 if they saw the event happen. There are two situations in which a speaker may use Pasts 1-3 without having witnessed the event in question. First, a speaker may use an evidential tense when they receive a report about the event *as it is taking place*. Second, a speaker may use an evidential tense on an auxiliary verb if they learn about the event through a report or by perceiving its results *after the fact*.

2.2.1 When a report is simultaneous with an event

Direct witness has been characterized in various ways in literature on evidentials. Kalsang et al. (2013) characterize Tibetan direct evidentials as communicating that the situation in which the speaker gets evidence overlaps with the event situation. Chung (2007) gives an analysis of a Korean evidential tense in which it requires the speaker's location to overlap with the location of the event. Both of these approaches seem to capture the state of affairs when one has witnessed an event.

In Creek however there seems to be no obligation that the speaker actually witness the event or even be in the same location as the event. In the context below, the speaker is learning of the event over the phone as it is happening. In this scenario, one can felicitously use Past 2 on the main verb.

(14) a. Context: Imagine that yesterday, your friend called you and said, "Yeah, I'm over here at the barber shop. My wife is getting her hair cut." Then today I ask how your friend's wife is doing and you want to tell me that she got her hair cut.

b. Vnhessēt ehiwvn entonhow**vnk**s.
an-hissi:-t i-héywa-n in-ton*ho*w-**ánk**-s
1.SG.DAT-friend-NOM 3.SG.PAT-wife-ACC 3.SG.DAT-cut.IMPL.PASS-**P2**-IND
'My friend's wife got her hair cut.'

c. Paksvnkēn entonhow**vnk**s.
Pa:ks-ánk-i:-n in-ton*ho*w-**ánk**-s
day-P2-NLZ-ACC 3.SG.DAT-cut.IMPL.PASS-**P2**-IND
'Yesterday, she got her hair cut.' (PF-Mus-Elic11/2018)

The example above is evidence that what counts as *direct* evidence in Creek is only that the speaker learn of the event as it is happening. In most situations - and definitely before the invention of telephones and televisions - to learn of an event as it is happening meant the speaker was present and witnessed the event. However scenarios like that above demonstrate that only times are required to overlap. Lee (2013) and Smirnova (2013) claim for Bulgarian and Korean evidential tenses that overlapping times are all that is required for an evidential to count as direct. Under their accounts, direct evidentiality is when the time the speaker *acquires evidence* of the event coincides with the run time of the event itself. This is not the whole story for Pasts 1-3, as we will see next.

2.2.2 When direct evidence follows the event

When a speaker has direct perceptual evidence of an event after the fact - visual evidence of the results or a first-hand account - it is no longer felicitous to use Past 1-3 on the main verb. But speakers accept Past 1-3 when they are affixed instead to an auxiliary verb. In each example below, the context establishes an event that falls within the time span appropriate for each of the tenses. In the context for Past 1, the person uttering the sentence learns about the event after it has taken place through a first-hand report. In that context, a main verb inflected for Past 1 is unacceptable. Instead the speaker volunteered a sentence with an auxiliary construction. Past 1 appears on the auxiliary.

(15) *Past 1*

a. Context: Imagine your friend Bill called you on the phone just now and told you he just cut his hair. Would it sound okay to say the following sentence?

b. # Vnhesset vnhuehiket ekv-issē wa**h**res.
an-híssi-t an-hôyh*e*yk-it ika-éyssi: wá:**hɬ**-is
1.SG.DAT-friend-NOM 1.SG.DAT-call.PFV-SS head-hair cut.**P1.PFV**-IND
Speaker Comment: No, you'd say (15c).

c. Vnhesset vnhuehiket ekv-issē warēpvt
an-híssi-t an-hôyh*e*yk-it ika-éyssi: wa:ɬ-í:p-at
1.SG.DAT-friend-NOM 1.SG.DAT-call.PFV-SS head-hair cut-IP.LGR-?
hakis.
ha:k-éy-s
become.LGR-P1-IND
'My friend called, he cut his hair.' (AM-Mus-Elic11/2018)

For the next two examples, the context establishes the event of Sam calling within time spans compatible with Past 2 and Past 3, respectively. The context also makes it clear that the speaker was present when the phone rang, but did not answer. These contexts count as direct and the past tenses can be affixed to the main verbs in the (b) examples. The speaker judged auxiliary constructions (the c examples) as infelicitous in these contexts, and provided a verifying scenario in which the person uttering the auxiliary construction was not at home when Sam called.

(16) *Past 2*

a. Context: You were in the room when your friend Sam called on the phone a month ago, but you didn't answer.

b. Hvsē hvnkvnkē Sam ahokkolan vnhuehk**vnk**s.
hási: hank-ánk-i: Sam a:-hókkol-ân an-hôyhk-**ánk**-s
month one-P2-NLZ Sam DIR-two-COMP.DS 1.SG.DAT-call-**P2**-IND
'Sam called me twice, one month ago.'

c. # Hvsē hvnkvnkē Sam ahokkolan vnhuehkvt
hási: hank-ánk-i: Sam a:-hókkol-ân an-hôyhk-at
month one-P2-NLZ Sam DIR-two-COMP.DS 1.SG.DAT-call-?
hakvnks.
hâ:k-ánk-s
become.PFV-P2-IND
Speaker Comment: This would be used if you weren't at home when Sam called, and you saw he called on the answering machine. (ME-Sem-Elic08/2018)

(17) *Past 3*

a. Context: Two years ago, Sam called you on the phone. You were in your house when he called, but you didn't answer the phone.

b. Okrolopē hokkolvnkē mahen, Sam vnhuehk**ēmvt**s.
okłolopi: hókkol-ánk-i: mâ:h-in Sam an-hoyhk-i:mát-s
year two-P2-NLZ very.PFV-DS Sam 1.SG.DAT-call-P3-IND
'About two years ago, Sam called me.'

c. # Okrolopē hokkolvnkē mahen, Sam vnhuehkvt **hakemvts**.
okłolopi: hókkol-ánk-i: mâ:h-in Sam an-hôyhk-at **hâ:k-imát-s**
year two-P2-NLZ very.PFV-DS Sam 1.SG.DAT-call-? **become.PFV-P3-IND**
Speaker Comment: This would mean that you weren't there when Sam called and you saw on the answering machine. (ME-Sem-Elic08/2018)

These examples demonstrate that when the speaker learns of an event through perceptual evidence - such as a message on an answering machine or a first-hand report - after the event takes place, the speaker can use Past 1-3 but only in an auxiliary construction. In each of these auxiliary constructions the main verb takes a curious ending which is not the typical switch reference ending *-it*, and not the relative clause ending *-a:t*, but an ending whose meaning has proved elusive. Martin (2011) labels it *happenstance*, but its exact contribution remains mysterious. I provide a way to think about this morpheme in terms of a temporal contribution.

In conclusion, this section has presented evidence for making the following generalizations about the evidential contributions of the past tenses.

(18) a. *Generalization #1:* When Pasts 1, 2 and 3 are affixed to the main verb, the speaker has learned of the event as it happens.

b. *Generalization #2:* When Pasts 1, 2 and 3 are affixed to an auxiliary verb, the speaker has learned of the event after the fact.

We should note that the data set is incomplete at this point. For these generalizations to truly follow, we would need examples for Past 2 and 3 that are parallel to the Past 1 example. These would show that all three past tenses are unacceptable on the main verb in a *learning after the fact*-context. Additionally, we would need an example for Past 1 which is parallel to the Past 2 and 3 examples, showing that an auxiliary construction with Past 1 is unacceptable in a *simultaneous learning*-context.

The characterization of Pasts 1-3 above are very different from characterizations of either tense or evidentials. Notice that there is no mention of any *source of evidence*. Notice also that these morphemes do not directly restrict the topic time of a sentence, rather they restrict the *time of learning* to a particular past interval. If the *time of learning* and the *time of the event* are simultaneous, the morpheme must be affixed to the main verb. If the *time of learning* occurred after the *time of the event*, then the morpheme must appear on an auxiliary verb.

2.3 Analysis

In formalizing the generalizations above, this analysis draws on work by Speas (2010) in which she recasts evidentiality in terms of a relation between situations. Under this approach, direct evidentiality is an overlap relation between situations and indirect evidentiality is non-overlap between situations. Other authors have built on this work to describe morphemes that do not readily fit the stereotypical profile of an evidential. Lee (2013) and Smirnova (2013) argue that evidential tenses in Korean and Bulgarian relate a time they call Evidence Acquisition Time (abbreviated EAT). These authors augment the neo-Reichenbachian system of times with EAT so that there are four times that a sentence's temporal operators can refer to: event time (ET), evidence acquisition time

(EAT), topic time (TT) and utterance time (UT). We propose that Creek evidential tenses are similar to Bulgarian and Korean evidential tenses in locating the EAT with respect to another time. The difference between monoverbal and auxiliary constructions with Pasts 1-3 can be narrowed down to the temporal relation between the learning of the event and the event itself. We characterize the learning time as Evidence Acquisition Time, and derive the relation between learning time and event time through the interaction of aspect with the definition of Pasts 1-3.

In monoverbal constructions EAT and ET overlap. This is achieved through commonly assumed semantics for (im)perfective aspect. Aspect relates properties of events to properties of times, giving us the relation between the run time of the event and the topic time. Past 1, 2 or 3 then restrict the topic time in two ways. First, they place it within an interval of time a certain remoteness from the utterance time. Second, they restrict it to the time the speaker learned of the prejacent. Thus in monoverbal constructions EAT and TT refer to the same time and overlap with ET. This derives the "direct witness" contexts as well as the "simultaneous" contexts. Monoverbal constructions with Past 5, on the other hand, quite simply locate an event in the past of the utterance. Thus under this approach, Past 5 is an unrestricted past tense similar to English past tense.

In auxiliary constructions ET precedes EAT. We take the auxiliary construction itself to be a past perfect construction. Essentially then, the Past 1-3 morphemes take a clausal complement in the perfect aspect. In auxiliary constructions (im)perfective aspect on the verb relates ET to TT as usual, but then the perfect contributes a precedence relation between TT and another time. The evidential tense on the auxiliary then relates that time to the utterance time and identifies it as the time of learning - this time is what we label the EAT. In essence, auxiliary constructions communicate that the speaker learned of a past event. Since the learning came after the event took place, these constructions are compatible with indirect evidence contexts. The evidential tenses in both clause-types have the same semantics and relate EAT to the UT through the intervals that they refer to. Past 1 locates the EAT in the past within the day of utterance. Past 2 locates the EAT in

the interval preceding the day of utterance up to a year ago. Past 3 likewise locates the EAT in the interval preceding a year from the day of utterance to 20 years ago.

Drawing on the informal language used here, we take EAT (or learning time) to represent the time at which the speaker *came to believe* a proposition. We further formalize this as the time at which one's belief states change from not believing p to believing p. More specifically, for an individual x to come to believe a proposition p at a time t means that for all times preceding t, p was not true in all of x's belief worlds at those past times. Similarly, for all times equal to and following t, p is true in all x's belief worlds at those future times. This is formalized below.

(19) $\lambda x_e \lambda t_i \lambda P_{\langle st \rangle}$:COME-TO-BELIEVE(x,t,P) = $\lambda x_e \lambda t_i \lambda P_{\langle st \rangle}[\forall t'.t' \prec t : \neg \forall w' \in$ BEL(x,w,t'): P(w') = T & $\forall t''.t \preceq t'' : \forall w'' \in$ BEL(x,w,t''): P(w'') = T

For a world to be in the belief worlds of x it must be consistent with x's beliefs at a certain world and time.

(20) $w' \in$ BEL(x,w,t) iff w' is consistent with the beliefs of x in w at t.

This definition formalizes evidence acquisition time as the time at which the speaker comes to believe p. In other words, EAT is the time the speaker's belief states change - when they go from being agnostic about the proposition to believing the proposition. What - if any - evidence initiates this change in belief states is not explicit in this semantics. This does not however make the semantics of Pasts 1-3 too weak, because in the proposed semantics for Pasts 1-3 require that the time of coming to believe p is identical to the time at which p holds.

Let us see how this yields the appropriate truth conditions for the monoverbal sentence below with Past 2. The truth conditions we want for the sentence in (21) are informally spelled out in (22).

(21) Wvcenv Mekko efvn vpohvnks.
wacína míkko ífa-n apô:h-ank-s
white chief dog-ACC buy.PFV-P2-IND
'The President bought a dog.'

(22) ⟦ The President bought-P2 a dog ⟧ = T iff there is a past time t' included in the P2-Interval (yesterday to a year ago), and the speaker came to believe at t' that the President bought a dog at t'.

We assume the tense node is pronominal and anaphoric to a salient interval of time. We give the evidential past tenses an analysis in which they take two arguments - an interval and a property of times - and return a truth value. They are of type $\langle i, \langle it, t\rangle\rangle$. This is illustrated for Past 2.

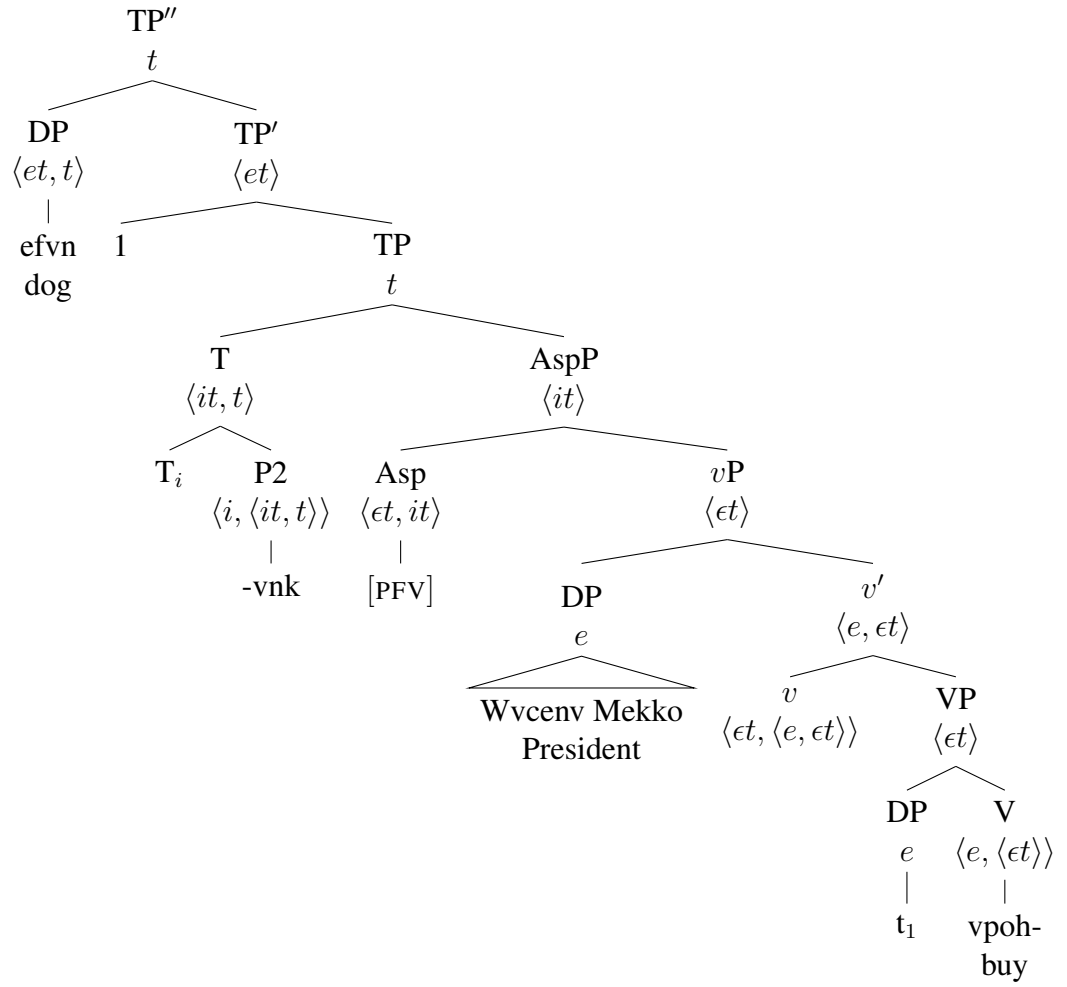
(23) ⟦ Past 2 ⟧^{c,w,g,t} = $[\lambda t'_i : \lambda P_{\langle it\rangle} : t' \infty$ P2-interval & COME-TO-BELIEVE(sp(c),t′,P(t′))]

Past 2 is evaluated relative to a context c, a world w, a variable assignment function g and a speech time t. It relates an interval (denoted by the tense node) to the P2-Interval - which is an interval of past times which, according to Martin, include times preceding today up to 1 year from today. (This interval is revised and formalized in §3.) The interval denoted by the tense node is the time at which the speaker comes to believe p. Crucially, the *coming to believe*-time is also the time which is applied to the proposition. Because the proposition that Past 2 takes is perfective, the time of belief-state change ends up overlapping with the time of the event. We assume a semantics for perfective aspect which include existential quantification over events as illustrated in (24).

(24) ⟦ PFV ⟧^{w,g,t} = $[\lambda P_{\langle \epsilon t\rangle} : [\lambda t'_i : \exists e.\tau(e) \subseteq t' \& P(e) = T]]$

With these two essential ingredients in place, we can compose this Past 2 sentence and it will have the desired truth conditions laid out in (22). The following is an LF for this sentence.

(25) *LF for (21): Wvcenv Mekko efvn vpohvnks.*



The truth conditions of the Past 2 sentence are as follows:

(26) ⟦ The President bought-P2 a dog ⟧^{c,w,g,t} = T iff $\exists x$. dog(x) & g(i) ∞P2-interval & COME-TO-BELIEVE(sp(c), g(i), $\exists e.\tau(e)$ $\subseteq$g(i) & buy(e) & Ag(e)=The President & Th(e) = x) =T

Applying the meaning of COME-TO-BELIEVE, we get the following truth conditions.

(27) $[\![$ The Pres. bought-P2 a dog $]\!]^{c,w,g,t}$ = T iff

$\exists x$. dog(x) & g(i) ∞ P2-interval & $\forall t'.t' <$ g(i): $\neg\forall w' \in$ BEL(sp(c),w,t') . [$\exists e.\tau(e,w') \subseteq$ g(i) & buy(e,w') & Ag(e,w')=The President & Th(e,w') = x] = T & $\forall t''$. g(i) $< t''$: $\forall w'' \in$ BEL(sp(c),w,t'') . [$\exists e.\tau(e,w'') \subseteq$ g(i) & buy(e,w") & Ag(e,w")=The President & Th(e,w") = x] = T

These truth conditions will be satisfied only if the time that the speaker came to believe the proposition is also the topic time of the proposition. Since the proposition bears perfective aspect, the time of the event ends up overlapping with the learning time. In most contexts this will mean the speaker directly witnessed the event, but it will also hold in "simultaneous" contexts like (14).

The only way in which Past 2 differs from the other evidential tenses is in the intervals that the times are related to.

(28) a. $[\![$ P1 $]\!]^{c,w,g,t}$ = [$\lambda t'_i : \lambda P_{\langle it\rangle} : t' \infty$ P1-interval & COME-TO-BELIEV(sp(c),t',P(t'))]

b. $[\![$ P2 $]\!]^{c,w,g,t}$ = [$\lambda t'_i : \lambda P_{\langle it\rangle} : t' \infty$ P2-interval & COME-TO-BELIEVE(sp(c),t',P(t'))]

c. $[\![$ P3 $]\!]^{c,w,g,t}$ = [$\lambda t'_i : \lambda P_{\langle it\rangle} : t' \infty$ P3-interval & COME-TO-BELIEVE(sp(c),t',P(t'))]

The intervals themselves enforce the pastness of the time t' in relation to the time of evaluation t.

An evidential tense sentence in the imperfective aspect will receive similar truth conditions and will also enforce an overlap between the event time and the time the speaker came to believe p. We assume a semantics for imperfective which is the mirror of perfective aspect.

(29) $[\![$ IMPFV $]\!]^{w,g,t}$ = $[\lambda P_{\langle \epsilon t\rangle} : [\lambda t'_i : \exists e.t' \subseteq \tau(e) \& P(e) = T]]$

Thus the truth conditions for a imperfective sentence with Past 1-3 will require that the speaker come to believe p at a time which is contained in the run time of the event. For a direct witness context this would mean that the speaker witnessed the event, but perhaps not the entire event.

For a purely simultaneous context, this would mean that the speaker learned of the event while it was happening, but the event may have continued after that time. A perfective sentence on the other hand would require that the speaker witness the entire event or learn of the event as it was completed.

Kalsang et al. (2013), building on Speas (2010), provide an analysis of two direct evidentials in Tibetan along exactly these lines. They show that the evidential SHAG is felicitous in contexts where the speaker witnessed part or all of the event, and the evidentials DUG and SONG are only felicitous in contexts where the speaker witnessed the entire event. They link this with the contribution of aspect. In their situation semantics they sketch the difference between them as a difference in relation between the Event Situation (ES) and the Information Situation (IS).

(30) a. DUG, SONG: ES $\subset$ IS

b. SHAG: IS $\subset$ ES (Kalsang et al. 2013: 557)

The semantics we propose for Creek Pasts 1-3 on main verbs predicts that perfective and imperfective sentences should be compatible with contexts that differ along those same lines.

Linking the direct evidentiality of Past 1-3 to an interaction with aspect like this leads quite nicely to our analysis of auxiliary constructions. As mentioned above, we take auxiliary constructions to be a type of past perfect construction. Following Speas (2010), we understand the precedence relation introduced by perfect aspect to lead to the indirect evidential flavor of auxiliary constructions. The formula in (32) gives the informal truth conditions of sentence (31).

(31) Sam vnhuehkvt hakvnks.
Sam an-hôyhk-at hâ:k-ánk-s
Sam 1.SG.DAT-call-? become.PFV-P2-IND
'Sam called me.'

(32) ⟦ Sam called aux-P2 me ⟧ = T iff there is a past time t' included in the P2-Interval (yesterday to a year ago), and the speaker came to believe at t' that Sam had called at a time t'' prior to t'.

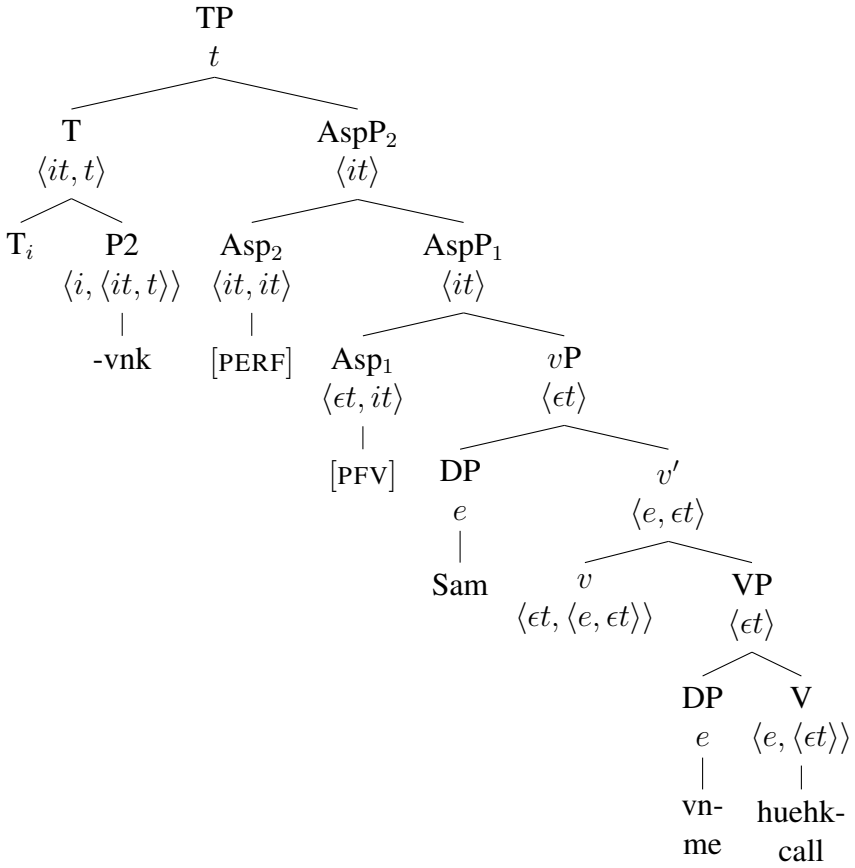
We assume that perfect aspect is a kind of *high* aspect as in English. It is of type ⟨ it,it ⟩; perfect aspect introduces existential quantification over times and contributes a precendence relation between times.

(33) $[\![\text{PERF}]\!]^{w,g,t} = \lambda P_{\langle it \rangle}[\lambda t_i[\exists t' : t' \prec t \& P(t') = T]]$

We assume that, as in English, the auxiliary that appears in perfect constructions is inserted to host tense features and that the features of perfect aspect are realized on the main verb (see Arregi & Klecha (2015) and references therein). We take the *-vt* ending on the main verb to be the realization of perfect features on the verb.[5]

[5]Arregi & Klecha (2015) and Klecha & Bochnak (2016) analyze English perfect and Luganda complex tense as constructions involving two TP projections and unify past tense and perfect aspect. The possibility of embedding Past 5 in Creek auxiliary constructions suggests that we are dealing with a complex tense construction along the lines they propose. Whether the Creek construction can be given an similar analysis is a promising topic for future research.

(34) LF for Sam vnhuehkvt hakvnks.



When composed, the tree above yields the truth conditions in (35).

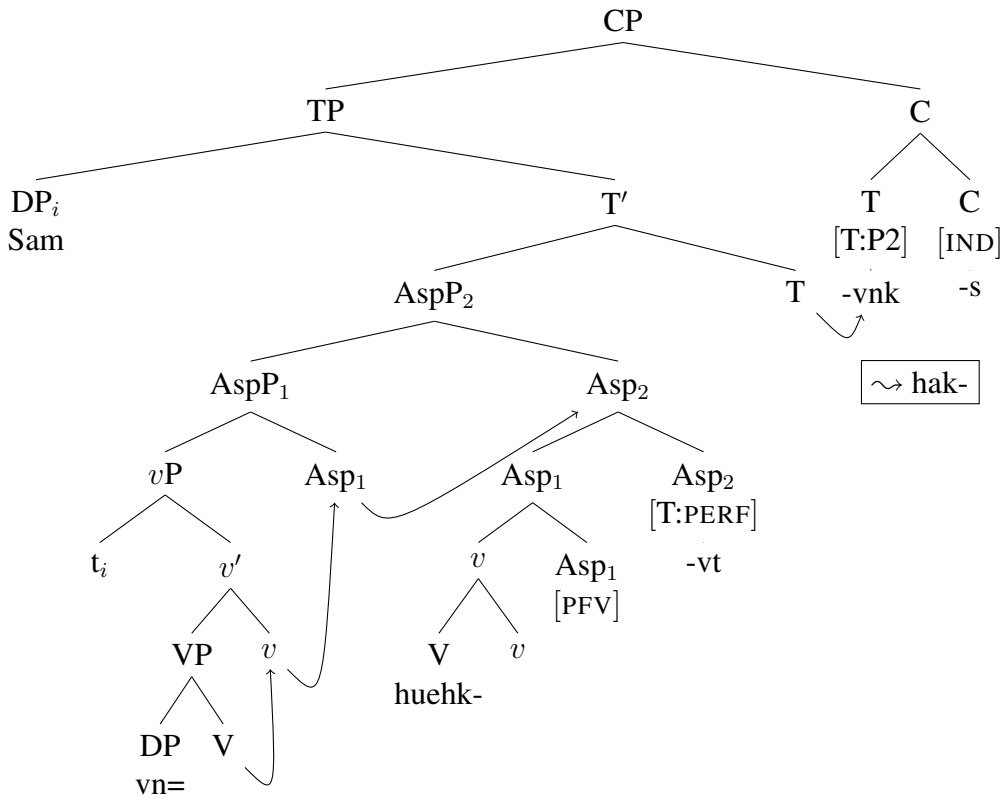
(35) $[\![$ Sam called.PERF Aux-P2 me $]\!]^{c,w,g,t}$ = T iff g(i) ∞P2-interval & COME-TO-BELIEVE(sp(c), g(i), $\exists t' : \exists e.t' \prec$ g(i) & $\tau(e) \subseteq t'$ & call(e) & Ag(e)=Sam & Th(e) = sp(c))

To achieve the order of morphemes, we assume a head-final syntax for Creek and that the verb undergoes total head-movement - that is V moves through each functional head until it reaches the highest functional projection. To account for the auxiliary construction, we propose that head-movement stops if it would result in a *feature conflict*. We follow Arregi & Klecha (2015) in defining feature conflict as a situation that arises when adjacent heads bear a feature of the same type. We reword their definition of feature conflict in (36).

(36) *Feature Conflict*: Two heads X and Y conflict in features if X and Y both bear features of type F.

Crucially, we assume along with Arregi & Klecha (2015) that the features of perfect aspect are the same type as tense features. Alternatively, one could think of auxiliary insertion as a morphological repair for the incompatibility of perfect aspect and tense features without assuming perfect aspect to be a type of tense feature. Either way the result is that the verb moves only as high as Asp_2 and the auxiliary *hak-* is inserted to host tense and indicative features.

(37) *Morphosyntax of (31).*



In summary, we have seen that the semantics of both monoverbal and auxiliary constructions can be captured using the same semantics for Past 2 (and for Past 1 and 3). The difference between monoverbal and auxiliary constructions comes down to the aspect of the clausal complement of the

evidential tense. In a monoverbal clause, P2 takes an (im)perfective AspP, the temporal relation introduced by both perfective and imperfective aspect result in an overlap between the event time and the time of the speaker's coming to believe. In an auxiliary construction, P2 takes a clause in the perfect aspect. Perfect contributes a precedence relation between the time of the event and the speaker comes to believe that event took place. The presence of perfect aspect affect the construction in two ways. Semantically, the precedence relation that perfect contributes is responsible for the indirect evidential meaning. Morphosyntactically, the presence of perfect features is responsible for auxiliary support.

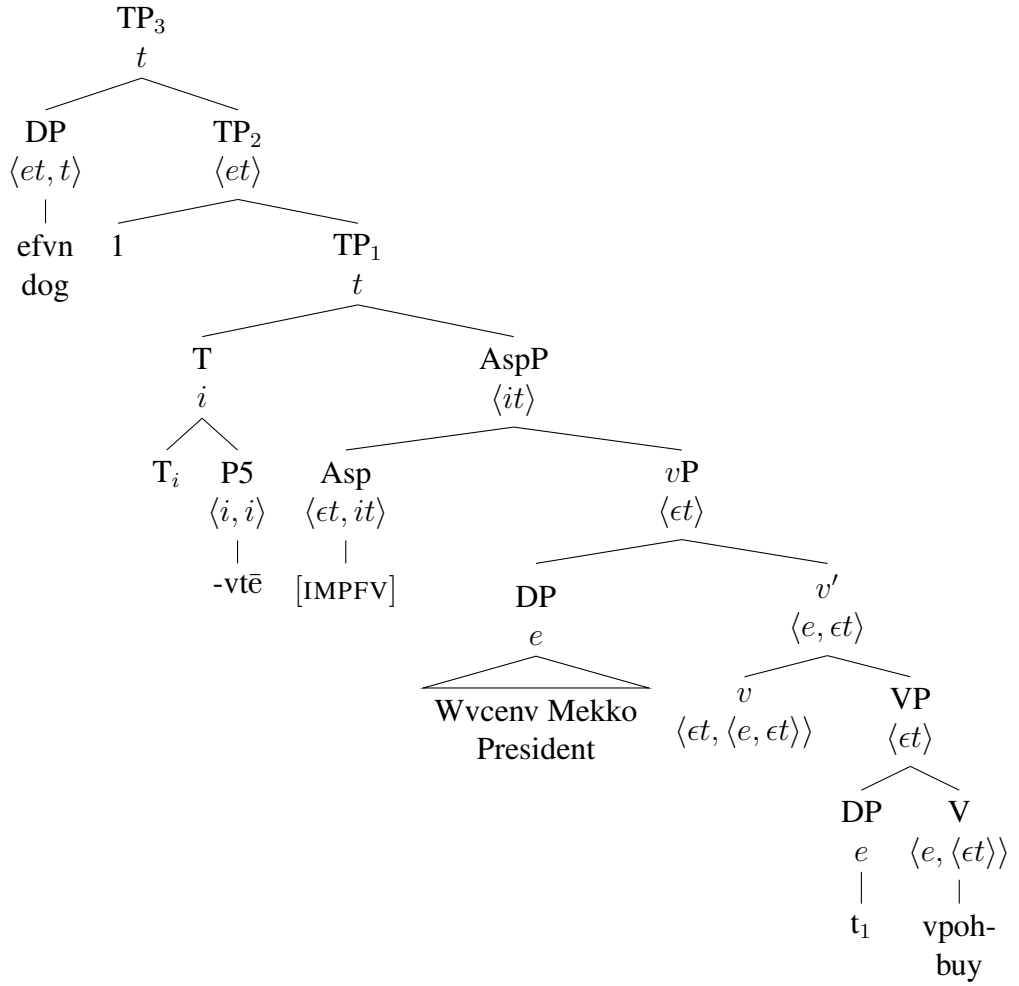
To conclude, we will demonstrate how a Past 5 sentence is composed. The evidence in previous sections illustrated that a sentence with Past 5 is acceptable in both direct and indirect evidence contexts. It was further shown through speaker comments and in discussion of Martin (2010) that Past 5 is compatible with all past times.[6] Here we depart from Martin (2010)'s intervals and take Past 5 to be a partial identity function on the tense node, restricting the tense node to past times through a presupposition.

(38) $[\![\text{ Past 5 }]\!]^{w,g,t} = \lambda t_i : t' < t.\ t'$

The LF for a Past 5 sentence is given below for the Past 5 sentence in (8).

[6]Stronger support for this hypothesis comes from data presented in §3, example (46).

(39) LF for *The President bought-P5 a dog*.



This LF using the definitions of Past 5 and imperfective aspect yields the following truth conditions.

(40) Truth conditions of *Wvcenv Mekko efvn vpohvtēs*, 'The President bought(-P5) a dog'.

a. $[\![$ The President bought-P5 a dog $]\!]^{w,g,t}$ is defined only if g(i) < t

b. If defined, $[\![$ The President bought-P5 a dog $]\!]^{w,g,t}$ = T iff $\exists e$. g(i) $\subseteq \tau(e)$ & buy(e) & Ag(e) = The President & Th(e) = x

In conclusion, this analysis of Past 5 captures the fact that a Past 5 sentence is underspecified for evidentiality and is compatible with all past times. Competition between Past 5 and Pasts 1-3 result in its use being largely restricted to indirect evidence contexts.

2.4 Prediction of the analysis

A prediction of this analysis is that Pasts 1-3 track the evidence acquisition time (EAT) instead of the event time. This prediction in borne out in examples like (41) and (42). In both examples, the evidence for the event was acquired at noon on the day of utterance (withing Past 1's interval). They differ minimally in the remoteness of the event - either it occurred on the day of utterance (P1 interval) or two days before (P2 interval). If the past tenses tracked ET, then we would expect to see the past tense ending that corresponds to the event time - P1 in (41) and P2 in (42). Instead we find that both sentences take a Past 1 ending on the auxiliary verb.

(41) a. Context: I arrived at my friend's house at noon (EAT), only to find a note that she had left that morning (ET).

b. Fvccvlikē rorayof, Mēlē hvtē-haykēn ayēpet
faccaléyk-i: ɬ-oɬ-ay-of Mi:li: hatí:-ha:yki:-n a:y-í:p-it
noon-NLZ DIR-arrive-1.SG.AG-when Mary morning-ACC go-IP.LGR-SS
ow**i**s.
ó:w-**éy**-s
be-**P1**-IND
'When I arrived at noon, Mary had left that morning.' (RB-Mus-ELic07/2018)

(42) a. Context: I arrived at my friend's house at noon (EAT), only to find a note that she had left two days before (ET).

b. Fvccvlikē rorayat, Mēlē nettv hokkolvnkē
faccaléyk-i: ɬ-oɬ-ay-â:t Mi:li: nítta hokkol-ank-i:
noon-NLZ DIR-arrive-1.SG.AG-COMP Mary day two-P2-NLZ
ayēp**vtē**t ow**i**s.
a:y-í:p-**atí:**-t ó:w-**éy**-s
go-IP.LGR-**P5**-SS be-**P1**-IND
'I arrived at noon, (and) Mary had left two days ago.' (RB-Mus-Elic07/2018)

In (42b), we see that Past 5 is embedded on the main verb and serves to shift the ET further into the past of the EAT. This possibility also supports an analysis of perfect constructions in which they involve an embedded past tense.

3 Graded Tense Intervals

As we saw in the previous section, the intervals that Martin (2010) proposes for the past tenses are no longer entirely accurate. Specifically, we saw evidence that Past 5 could be used in the Past 2 and Past 3 intervals. We also saw that Past 3 is compatible with times more remote than 20 years ago. The intervals proposed by Innes et al. (2004) also hint at a wider distribution for Pasts 2, 3 and 5. Martin's and Innes et al.'s proposed intervals are repeated here.

(43) *Martin (2010)'s Intervals*

P1	today – last night
P2	yesterday – 1 year
P3	1 year – 20 years
P5	20 years – ancient

(44) *Innes et al. (2004)'s Intervals*

Recent Past	(P1)	"a short time has passed"
Middle Past	(P2)	yesterday to one year ago
Distant Past	(P3)	yesterday to a long time ago
Remote Past	(P5)	yesterday to mythic past

Martin (2010) very clearly demonstrates that the Creek tense system has changed substantially since it was first documented in the 1800's. Not only has Past 4 dropped out of use, but the intervals of the remaining tenses have shifted. The contribution of this paper in redefining the intervals associated with Pasts 1-3 can be thought of as the most recent update to the description of the Creek system.

The second part of this section makes an original contribution to our knowledge of the Creek tense system. We address the behavior of graded past tenses in contexts where the time of the event is unknown. This question is integral to analyses of the semantics of graded past tense systems cross-linguistically (Martin 2010; Hayashi 2011; Cable 2013; Hayashi & Oshima 2015; Klecha & Bochnak 2016; Mucha 2017). Applying this diagnostic to the Creek past tenses reveals that there is more to their semantics than the intervals we observe in ordinary declarative sentences.

3.1 Redefining Interval Boundaries

The data presented here motivate making a cut between Pasts 1-3 and Past 5 in terms of gradedness. I present data showing that Pasts 1-3 are restricted as to the past temporal interval they can make reference to, but that Past 5 is unrestricted. The table below summarizes the distribution of the tenses according to the data in this section.

(45) Summary of Temporal Intervals/Adverbials Compatible with Tenses

Time	P1	P2	P3	P5
today	✓	*	*	✓
yesterday	*	✓	*	✓
when I was young	*	*	✓	✓

I illustrate the graded nature of the first three past tenses using temporal adverbs and contexts specifying temporal reference. More importantly, I present comprehensive evidence that Past 5 is compatible with all past times and thus is not technically part of the graded tense system.

3.1.1 The day of utterance: Past 1 & Past 5

The time span covered by Past 1 is relatively undisputed and covers times just preceding the moment of utterance up to the evening of the day before. There is quite a bit of disagreement about whether Past 5 can refer to times included in the day of utterance. Both Innes et al. (2004) and Martin (2010)'s intervals preclude the possibility of Past 5 referring to events happening in the day of utterance. Just two authors labeled Past 5 as an indefinite past or past perfect tense (Grayson 1885; Loughridge & Hodge 1890) and, although in principle this characterization allows for Past 5 to describe events that happened today, specific evidence for this was lacking. Example (46) demonstrates that Past 5 can indeed locate an event at a past time included in today. In the example below, the context establishes temporal reference as the morning of the day of utterance and both Past 1 and Past 5 are acceptable.

(46) a. Context: Imagine I want to learn to make Sofkey. You tell me your cousin is planning to make Sofkey today and he can show me how. When I arrive at his house, I find he already made it this morning.

b. Kvpē-cvfkē hay**ehp**es. / hayep**vtē**s.
kapi:-cafki: ha:y-**íhp**-is / ha:y-ip-**atí:**-s
sofkey make-**IP.P1.PFV**-IND / make.LGR-IP-**P5**-IND
'He's already made Sofkey.'

Speaker Comment: With that one (the verb with P5) you're emphasizing that it's too late. He had already made it. (LSB-Mus-Elic06/2017)

In the same context, Past 2 is unacceptable. The speaker comment clarifies that Past 2 cannot refer to times contained in the day of utterance.

(47) a. Context: (same as above) Your cousin tells me...

b. # Kvpē-cvfkē hayēpvy**vnk**s.
kapi:-cafki: ha:y-î:p-ay-**ánk**-s
sofkey make-IP.PFV-1.SG.AG-**P2**-IND
Speaker Comment: That would be saying, 'I already made it yesterday, or even weeks ago.' (LSB-Mus-Elic06/2017)

The cut-off between Past 1 and Past 2 is replicated below with an overt temporal adverb *mucv nettv* 'today'.[7]

(48) a. Context: I attended Cold Springs church today and heard a nice hymn. Now you mention the hymn and I want to tell you when I heard it.

b. Mucv nettv pohis. / # pohay**vnk**s.
móca nittá póh-éy-s / pôh-ay-**ánk**-s
this day hear.**P1.PFV**-1.SG.AG-IND / hear.FGR-1.SG.AG-**P2**-IND
'Today, I heard it.' (RH-Sem-Elic06/2018)

[7] A missing piece of data would demonstrate that Past 3 is also incompatible with the temporal adverb *today*.

Past 1 is also compatible with the temporal adverbs *nerē-yisē* 'last night' and *paksvnkē yafken* 'yesterday evening.' The example below demonstrates that the day of utterance begins as the sun goes down and continues throughout the next day. In using TODAY as defining interval of time, Creek joins the majority of languages with graded tense systems according to Botne (2012).

(49) Nerē-yisē / paksvnkē yafken pohis.
niłí:-yêys-i: / pa:ks-ánk-i: yá:fki-n póh-éy-s
night-P1-NLZ / day-P2-NLZ evening-ACC hear.**P1.PFV**-1.SG.AG-IND
'Last night / yesterday evening I heard it.' (RH-Sem-Elic06/2018)

At times before sunset yesterday Past 1 cannot be used.

(50) a. Context: Yesterday, I attended Cold Springs church and around noon I heard a nice hymn. Now you mention the hymn and I want to tell you when I heard it.

b. Paksvnkē hvsē ennvrkvpēcen pohay**vnk**s. /
pa:ks-ánk-i: hási: in-nałkapí:c-in pôh-ay-**ánk**-s /
day-P2-NLZ sun 3.DAT-reach.mid.point-DS hear.PFV-1.SG.AG-**P2**-IND /
#pohis.
póh-éy-s
hear.**P1.PFV**-1.SG.AG-IND
'Yesterday at noon, I heard it.' (RH-Sem-Elic06/2018)

These data have shown that both Past 1 and Past 5 are compatible with temporal reference included in the day of utterance. Past 1 but not Past 2 can co-occur with the temporal adverb 'today,' and interval of the day of utterance begins with sunset on the day before. Together these examples support the generalizations represented in the first line of Table (45).

3.1.2 Yesterday and before: Past 2 & Past 5

Past 2 is the tense used for times before the day of utterance. Data presented here demonstrates that Past 5 can also be used to refer to times included in yesterday. In (51) Past 2 can co-occur with

the temporal adverb *paksvnkē* 'yesterday', but Past 3 is unacceptable. This particular data point contradicts Innes et al. (2004)'s description of the Past 3 interval.

(51) a. Context: Yesterday, you saw Mary fall. Now you want to tell me that she fell.

b. Paksvnkē Maret latk**vnk**s. / # latk**emvc**
pa:ks-ánk-i: Mari-t lâtk-**ánk**-s / lâtk-**imát**-s
day-P2-NLZ Mary-NOM fall.PFV-**P2**-IND / fall.PFV-**P3**-IND
'Yesterday, Mary fell.'

Speaker Comment: [P3] doesn't work. You're saying she fell once upon a time, not yesterday. (PF-Mus-Elic07/2018)

Past 5 can also co-occur with the temporal adverb *yesterday*. This is unsurprising given the data seen in the previous section, where Past 5 was the preferred tense for unwitnessed events taking place in the Past 2 interval. In (52) as well as (46), the translation provided by the speaker for a Past 5 sentence suggests that Past 5 goes along with a past perfect aspectual meaning. This intuition is a subject for future fieldwork to make precise.

(52) a. Prompt: Could you imagine a fluent speaker ever saying this sentence?

b. Maret paksvnkē latk**vtē**s.
Mari-t pa:ks-ánk-i: la:tk-**atí:**-s
Mary-NOM day-P2-NLZ fall.LGR-**P5**-IND
'Yesterday, Mary had fallen.' (PF-Mus-Elic07/2018)

The data in this section have shown that only Past 2 and Past 5 can felicitously describe an event that occurred during the day preceding the day of utterance. Neither Past 1 nor Past 3 can locate an event within *yesterday*. Martin (2010) gives Past 2 an interval that extends from yesterday to about a year ago. Speaker intuitions suggest that the left-boundary can extend further back in time. (53), repeated from (5), is one example where a speaker commented that they would still use Past 2 if the event took place 5 years ago.

(53) a. Prompt: Can you tell me when you might say this sentence?

b. Estē mekko arat, Mary kerrēt ow**vnk**s.
ísti: míkko á:ɬ-â:t Mary kiɬɬ-í:-t ó:w-**ánk**-s
person chief go.about.SG.IMPF-COMP Mary know-DUR-SS be.LGR-**P2**-IND
'Mary met a man who is chief.'

Speaker Comment: It could be that she met him a couple days ago or **5 years ago**.

(RH-Sem-Elic06/2018)

These examples point to Past 2 covering a larger span of time than yesterday to a year ago. Past 2's interval extends at least as far back as 5 years ago, but the left boundary of this interval remains somewhat vague. Likewise the time at which a person could begin using Past 3 is vague. Some speakers say that they would start using Past 3 for something that happened more than 3 months ago. This is substantially earlier than the right boundary of Martin (2010)'s intervals, but much later than Innes et al. (2004)'s right boundary. This description makes it clear that there is a substantial amount of overlap between times at which one could theoretically use both Past 2 and Past 3. Section 3.2.1 addresses this puzzle and provides some initial thoughts on how to distinguish between Past 2 and 3 when both are in theory possible.

3.1.3 Talking about childhood memories: Past 3 & Past 5

One context in which speakers reliably volunteer a sentence in Past 3, is when speaking about someone's childhood. In the data presented below this adverbial phrase could refer to times from 30 years ago to 60 years ago depending on the age of the relevant individual. As (54) demonstrates, Past 2 is incompatible with the adverbial phrase *cvmvnettof* "when I was young."

(54) a. Context: Imagine you heard a nice hymn when you were young (50-60 years ago). We are talking about that hymn today and you want to tell me when you heard it before.

b. Cvmvnettov yvhiketv powvhay**emvc**. /
ca-manitto-a yahéykita powah-ay-**imát**-s /
1.SG.PAT-young-WHEN song hear.?-1.SG.AG-**P3**-IND /
#powvhay**vnk**s.
powah-ay-**ánk**-s
hear.?-1.SG.AG-**P2**-IND
'When I was young, I heard that song.' (RH-Sem-Elic06/2018)

Data from section 2 provided evidence that Past 3 could be used to speak about an event that took place 30-40 years ago during someone's childhood. (9) is repeated here as (55).

(55) a. Let's imagine I want to tell you that the chief went to a certain church when he was young (30-40 years ago). How would I say "When he was young, the chief went to that church" in the language?

b. Mekko mvnettof, mv mēkusvpkv-cuko arēt
míkko manítt-o:f má mi:kosapka-cóko a:r-í:-t
chief young-when DEM.DIST prayer-house go.about.SG.IMPFV-DUR-SS
owē**mvt**s.
o:w-**i:mát**-s
be.IMPFV-**P3**-IND
'When the chief was young, he went to that church.' (ME-Sem-Elic07/2018)

With a reportative context, Past 5 is acceptable referring to the same range of time, as shown in (56) (repeated from (10)).

(56) a. Prompt: Now imagine you read a newspaper story about the chief in which you learned that he frequented a certain church when he was young.

b. Cokv-tvlvmē hocihocat, Mekko mv mēkusvpkv-cuko
cóka-talami: hóceyhóc-â:t míkko má mi:kosapka-cóko
paper-daily write.IMPF-CAUS.IMPL-REF chief DEM.DIST prayer-house
arēt owvtēs.
a:r-í:-t o:w-**atí:**-s
go.SG.IMPFV-DUR-SS be.IMPFV-**P5**-IND
'It was written in the newspaper, the chief went to that church.'

(ME-Sem-Elic07/2018)

This data demonstrates that Past 3 and Past 5 are both possible when the event took place 30-60 years ago. Taking into account the speaker intuition that Past 3 could be used for an event that happened more than 3 months ago, Past 3 appears to have a much larger interval than Martin (2010) reports and a smaller interval than Innes et al. (2004) report.

In conclusion, the boundaries of the intervals compatible with Pasts 2, 3 and 5 need to be redefined. While this data confirms Past 1 refers to past events within TODAY, evidence was also presented that Past 5 is not in fact a graded tense. This data, missing in previous documentary and analytical works, supports the hypothesis that Past 5 is compatible with all past times. We also saw evidence that Pasts 2 and 3 do not quite have the distribution reported in either Martin (2010) or Innes et al. (2004). Past 2 extends from yesterday to at least 5 years ago; Past 3 starts as early as 3 month ago and extends to at least 60 years ago. It is unclear at this point when one would begin using Past 3; there is a great deal of overlap between them. The rightmost boundaries of Pasts 2 and 3 intervals are also unclear and could extend further back.

(57) *Interim Hypothesis: Redefined Intervals*

Tense	Left Boundary	Right Boundary
Past 1	just now	sunset yesterday
Past 2	yesterday	5(+) years ago
Past 3	≈3 mo. ago	60(+) years ago
Past 5	today	(no boundary)

A speaker's choice between Pasts 1-3 and Past 5 was shown to be dependent on the evidence they have for the utterance. But the overlap between Past 2 and 3 begs the question as to how speakers choose between Pasts 1, 2 and 3. The distribution of Past 2 and 3 shown above demonstrates that their choice is not dependent on temporal intervals alone. A question that has proved most illuminating in the study of graded tense systems is *which tense do speakers use when they are unsure of when an event happened?* The next section tackles this question.

3.2 Choosing between Pasts 1, 2 and 3

In this section, we return to the question brought up in the introduction as to whether the distribution of the tense morphemes is due to competition between overlapping forms or to the disjoint semantics of their temporal intervals. In other words, is Martin's description or Innes et al.'s description a more accurate representation of the semantic contribution of the morphemes? A diagnostic that has been applied to other languages with graded tenses is to see what tense is used in a context that Hayashi (2011) and Hayashi & Oshima (2015) label a *remoteness indeterminacy context*. These are contexts where the speaker is ignorant of when an event occurred. The logic behind this test is that if one tense morpheme covers a larger span of time than another, it will be used in contexts which do not license the more restricted interval of the other tense morpheme. According to Innes et al. (2004) and the re-analyzed intervals in (57), Past 2 has a shorter interval than Past 3. This hypothesis predicts that when one doesn't know if the event happened in the Past 2 interval or further back, one should use Past 3. The disjoint interval hypothesis predicts that speaker should use another strategy in remoteness indeterminacy contexts. They may be forced to guess at an appropriate interval or use another morpheme altogether such as an epistemic modal or Past 5.

3.2.1 Remoteness Indeterminacy Contexts

Using remoteness indeterminacy contexts to test the Creek tenses is complicated by the evidential requirement of Pasts 1-3. If the speaker doesn't know when an event occurred, they most likely

did not witness it. Thus the declarative responses were confounded and speakers used several of the strategies predicted by the disjoin interval hypothesis: they used evidential endings, Past 5 and circumlocution.

(58) a. Declarative Context (Today or This Week - P1 or P2): You've been out of town for a week. Today when you get home, you see that you've missed a call from Sam. You're not sure when he called though; it could have been last week or it could have been this morning before you got back to your house. How would you tell me that Sam called?

b. Oh, Sam vnhuehik**vttes**.
oh Sam an-hóyhêyk-**attís**
oh Sam 1.SG.DAT-call.PFV-**EVID**
'Oh, Sam called me!' (JWH-Sem-Elic06/2018)

c. Sam vnhuehk**vttis**.
Sam an-hóyhk-**attéys**
Sam 1.SG.DAT-call-**EVID**
'Sam called me.' (ME-Sem-Elic07/2018)

d. Sam vmvhuehk**vtē** **hehcis**.
Sam am-ahóyhk-**atí:** **híhc-éy-s**
Sam 1.SG.DAT-call-**P5 see.P1.PFV-1.SG.AG-IND**
'I just saw Sam (had) called me.' (PF-Mus-Elic07/2018)

Examples (58b) and (58c) have an indirect evidential ending in place of a tense morpheme. Example (58d) is an example of using circumlocution as a strategy. This example has the verb *hicetv* 'to see' with Past 1 embedding the verb 'call' marked with Past 5.

A similar strategy was observed in declarative remoteness indeterminacy contexts where the event could have happened in either Past 1, 2 or 3 intervals. In (59), the speaker uses Past 5 to talk about the event of coin-buying that he did not witness.

(59) a. Declarative Context (Today or 30 years ago - P1, 2 or 3): Your friend has been collecting ancient coins for thirty years. You know he just bought another one this morning. He shows you his collection and you notice a certain coin. It could be one of the first ones he bought or it could be the one he bought this morning. You're not sure. How would you tell me, John bought this coin?

b. John yv toknvwucē nēs**vtē**s.
John yá toknáw-ocí: ni:s-**atí:**-s
John DEM.PROX money-DIM buy.IMPFV-**P5**-IND
'John bought this coin.' (PF-Mus-Elic07/2018)

To determine which of the evidential pasts are used for declarative sentences in these contexts requires more careful control of the evidential variable. In interrogatives, evidentials flip the burden of evidence to the addressee. Because of this evidential flip, Pasts 1-3 are acceptable in questions responding to a remoteness indeterminacy context. Thus we are able to see which tense a speaker chooses when they ask when an event happened.

When the speaker doesn't know whether the event happened the day of the utterance or a few days earlier, they can ask a questions marked with Past 2.[8]

(60) a. Interrogative Context (Today or This Week - P1 or P2): You've been out of town for a week. Today when you get home, you see that you've missed a call from Sam. You're not sure when he called though; it could have been last week or it could have been this morning before you got back to your house. How would you ask Sam when he called?

b. Estofvnkēn amvhuehkecc**vnk**a?
istóf-ánk-i:-n a:m-ahóyhk-íck-**ánk**-a:
when-P2-NLZ-ACC 1.SG.DAT-call.PFV-2.SG.AG-**P2**-Q
'When did you call me?' (PF-Mus-Elic07/2018)

[8] A missing piece of data is whether or not a speaker could use a question marked with Past 1 in this context.

c. ’Stofvnkēn vnhuehkecc**vnk**a?
istóf-ánk-i:-n an-hóyhk-ick-**ánk**-a:
when-P2-NLZ-ACC 1.SG.DAT-call.PFV-2.SG.AG-**P2**-Q
‘When did you call me?’ (JWH-Sem-Elic07/2018)

d. Sam, ’stofvn vnhuehkecc**vnk**a?
Sam istófa-n an-hóyhk-ick-**ánk**-a:
Sam when-ACC 1.SG.DAT-call.PFV-2.SG.AG-**P2**-Q
‘Sam, when did you call me?’ (DRL-Mus-Elic07/2018)

The questions in (60) seem to indicate that when the event could have fallen in either the Past 1 interval or the Past 2 interval, Past 2 is used. If the speaker has any evidence off of which to base a guess about when the event occurred, they can use that evidence to choose an appropriate past tense. This is seen in the following context. Here the speaker bases their choice on whether the flowers look fresh or wilted.

(61) a. Interrogative Context (today or yesterday - Past 1 or 2): Imagine you were at your sister’s house on Friday and she invited you to dinner on Sunday. You come over on Sunday and see some flowers on her table. You know she must have bought them yesterday or today, you want to ask her when she got them.

b. Estof**vnk**ēn nēsetsk**vnk**v?
istóf-**ánk**-i:-n nî:s-ick-**ánk**-a
when-**P2**-NLZ-ACC buy.PFV-2.SG.AG-**P2**-Q
‘When did you buy those?’

Speaker Comment: I might say this if they didn’t look fresh, or if I was unsure.

c. Estof**is**ēn nēsetskv?
istóf-**éys**-i:-n ni:s-ick-a
when-**P1**-NLZ-ACC buy.PFV-2.SG.AG-Q
‘When did you buy those?’

Speaker Comment: This would be if I think they look fresh. (LSB-Mus-Elic06/2017)

Notice that although the verb in (61c) is not clearly marked for tense, the nominal tense on the *wh*-word indicates that this question is in the Past 1 tense. The speaker comment for (61b) strongly suggests that Past 2 is the appropriate tense to use if unsure of whether the event happened in the Past 1 or Past 2 interval. This supports the evidence from (60) and leads to the following hypothesis:

(62) *Past 2 Hypothesis - Version #1*: Past 2's interval is larger than and subsumes the Past 1 interval.

At this point, if Creek graded tenses were like Gĩkũyũ or Luganda graded tenses, we would expect Past 3 to have the largest interval. This is also expected under Innes et al. (2004)'s proposed intervals, as discussed above. What we find however, is that there is a clear preference to use Past 2 in contexts of speaker ignorance, but not a clear dis-preference for Past 3. In a remoteness indeterminacy context spanning all three intervals, speakers most often volunteered Past 2 for interrogatives.

(63) a. Interrogative Context (Today or 30 years ago - P1, 2 or 3): Your friend Sam has been collecting antique cars for the past 30 years. Today he shows you his collection and says he was just at a show this morning and bought another car. You want to ask him when he bought a particular car. It might be the one he bought this morning, or even the first car he acquired 30 years ago.

b. 'Stofvnkēn mv ato nēsecc**vnk**a?
istóf-ánk-i:-n má á:to nî:s-íck-**ánk**-a:
when-P2-NLZ-ACC DEM car buy.PFV-2.SG.AG-**P2**-Q
'When did you buy that car?' (JWH-Sem-Elic07/2018)

(64) a. Interrogative Context (Today or 30 years ago - P1, 2 or 3): Your friend has been collecting ancient coins for thirty years. You know he just bought another one this morning. He shows you his collection and you want to ask him when he bought a certain coin. It could be one of the first ones he bought or it could be the one he bought this morning. You're not sure.

b. Estofvnkēn yv toknvwucē nēsetc**vnk**a?
istóf-ank-i:-n yá toknáw-ocí: nî:s-íck-**ánk**-a:
when-P2-DUR-ACC this money-DIM buy.PFV-2.SG.AG-**P2**-Q
'When did you buy this coin?' (PF-Mus-Elic07/2018)

When speakers were asked to judge the same question with Past 3, they accepted the Past 3 question in that context.[9]

(65) a. Context: (Same as (64a))

b. 'Stofvn cenhēck**vnk**a?
istófa-n cin-hî:ck-**ánk**-a:
when-ACC 2.DAT-seen.PFV-**P2**-Q
'When did you find it?'

c. ? 'Stofvn cenhēck**ēmvt**ē?
istófa-n cin-hî:ck-**i:mát**-i:
when-ACC 2.DAT-seen.PFV-**P3**-Q
'When did you find it?'

Note: The speaker hesitated and confirmed there was a difference between these two.

(ME-Sem-Elic07/2018)

In contexts which provide the speaker with visual evidence upon which to base a guess about the time the event took place, they use this evidence to inform their choice of past tense. The following pair of questions demonstrates that Past 3 is chosen if the speaker has evidence that the event took place long ago.

[9]A missing piece of data is how speakers judge Past 1 questions in these contexts.

(66) a. Context: You haven't seen your cousins in a few years. When you see them again, they have a different car from the one you remember them having. How would you ask when they bought their car?

b. Atvmē estofvnkēn nēsetsk**vnk**a?
a:tami: istof-ánk-i:-n nî:s-íck-**ánk**-a:
car when-P2-NLZ-ACC buy.PFV-2.SG.AG-**P2**-Q
'When did you buy the car?'

c. Linguist: Could you say (66d)?

d. Atvmē estofvnkēn nēsetsk**ēmvt**ē?
a:tami: istof-ánk-i:-n nî:s-íck-**i:mát**-i:
car when-P2-NLZ-ACC buy.PFV-2.SG.AG-**P3**-Q
'When did you buy the car?'

Speaker Comment: Yes, I would say that if the car looked older.

(LSB-Mus-Elic06/2017)

These examples have demonstrated that Pasts 2 is used in contexts where an event could have happened recently or as much as 30 years ago and thus compatible with times as far back as 30 years ago.This leads to the revised hypothesis in (67)

(67) *Past 2 Hypothesis - Revised Version*: Past 2's interval is larger than and subsumes both the Past 1 and Past 3 intervals.

Thus it appears that the Past 2 interval encompasses both the Past 1 interval as well as much (if not all) of the Past 3 interval. As such Past 2 is compatible with the largest span of time and is used when the information provided by the context does not call for the more specific Pasts 1 and 3.

3.3 Analysis: Nested Intervals and Vague Remoteness

Past 1 is quite clearly restricted to past times within the day of utterance. We propose that Past 3 is also more restricted than Past 2. Specifically, we propose that Past 3 encodes subjective

remoteness. Two facts suggest this approach. First, we saw above that Past 3 was acceptable in remoteness indeterminacy contexts when the speaker has physical evidence that the event happened long ago, e.g. (66d). Secondly although the cut-off between Past 1 and 2 is quite clear, it was noted that there is substantial overlap between Pasts 2 and 3. This amount of overlap is unexpected if Pasts 2 and 3 differ only in terms of restrictions on their temporal intervals.

To illustrate this, consider graded tenses in the Bantu language Gĩkũyũ. Cable (2013) uses remoteness indeterminacy contexts to motivate analyzing Gĩkũyũ graded tenses in terms of nested intervals. In contexts where the speaker knows when something took place the tenses have the following distribution.

(68) *Temporal remoteness distinctions in Gĩkũyũ past perfectives* (Cable 2013: 226)

a. Mwangi nĩain**ire**.
Mwangi nĩ-a-∅-in-**ire**
Mwangi ASRT-3.SG.SUBJ-**CUR**-dance-**PST.PFV**
'Mwangi danced (within the day).' Current Past

b. Mwangi nĩa**ra**in**ire**.
Mwangi nĩ-a-**ra**-in-**ire**
Mwangi ASRT-3.SG.SUBJ-**NRP**-dance-**PST.PFV**
'Mwangi danced (before today, but recently).' Near Past

c. Mwangi nĩa**a**in**ire**.
Mwangi nĩ-a-**a**-in-**ire**
Mwangi ASRT-3.SG.SUBJ-**REMP**-dance-**PST.PFV**
'Mwangi danced (some time ago; not recently).' Remote Past

Although Cable (2013) writes that what counts as 'near' or 'remote' is flexible and depends on pragmatic factors, for a given verb there is a clear cut-off between the two.

(69) *Cut-off between Gĩkũyũ Near Past and Remote Past* (Cable 2013: 224)

a. Mwangi nĩa**ra**inaga (*iyo).
Mwangi ASRT-3.SG.SUBJ-**NRP**-dance-PST.IMP day.before.yesterday
'Mwangi was dancing.' Near Past

Speaker judgment: Not correct if Mwangi was dancing two days ago.

b. Mwangi nĩ**ã**inaga (iyo).
Mwangi ASRT-3.SG.SUBJ-**REMP**-dance-PST.IMP day.before.yesterday
'Mwangi was dancing.' Remote Past

Speaker judgment: With or without *iyo*, could be said if he danced two days ago.

The Creek data suggests that the difference between Pasts 2 and 3 is dependent on a more subjective notion of remoteness. For example, to describe a falling event that took place five years ago, both Past 2 and Past 3 are possible. A slight difference in the context decides between the two. Specifically, when the results of the event no longer hold, Past 2 is preferred over Past 3. In the following context, the subject - Susan - has completely recovered from her fall five years ago. In this context, the speaker prefers to use Past 2.

(70) a. Context: Imagine that your friend Susan fell five years ago. It was a really memorable occasion because you were with her when she fell and she had hip problems for a long time. Now she's completely recovered.

b. Hofonvnkē Susan latk**vnk**s.
hofó:n-ánk-i: Susan lâ:tk-**ánk**-s
long-P2-IND Susan fall.PFV-**P2**-IND
'Long ago, Susan fell.'

c. ? Hofonvnkē Susan latk**emvc**.
hofó:n-ánk-i: Susan lâ:tk-**imát**-s
long-P2-IND Susan fall.PFV-**P3**-IND
'Long ago, Susan fell.'

A minimal change to context flips the speaker's preferences. If the results of the fall still hold at the time of the utterance, Past 3 is preferred over Past 2.

(71) a. Context: Now imagine that Susan is still having hip problems.

b. ? Hofonvnkē Susan latk**vnk**s.
hofó:n-ánk-i: Susan lâ:tk-**ánk**-s
long-P2-IND Susan fall.PFV-**P2**-IND
'Long ago, Susan fell.'

c. Hofonvnkē Susan latk**emvc**.
hofó:n-ánk-i: Susan lâ:tk-**imát**-s
long-P2-IND Susan fall.PFV-**P3**-IND
'Long ago, Susan fell.'
Speaker Comment: Yeah, that one sounds better. Like she fell and she's still hurting.

(PF-Mus-Elic11/2018)

We take this change in context to emphasize that Susan's fall was a long time ago and she should have recovered by now. This is the sense in which we mean "subjective remoteness." This term has also been employed by Botne (2012). For Botne subjective remoteness is synonymous with "epistemic remoteness." He uses these terms to describe systems in which the remote past is compatible with intervals of time close to the day of utterance, but which the speaker considers less certain. Botne's notion of subjective remoteness cannot be applied to Past 3 which is used for remote events which the speaker has direct evidence for, and hence is certain of. Instead, Past 5 seems to fit this notion of epistemic remoteness much better.

Hayashi & Oshima (2015) describe a past tense morpheme in South Baffin Inuktitut which is very close to Past 3. They describe South Baffin *-lauqsima* as belonging to a secondary "layer" in the tense system. It also overlaps substantially with the primary tense *-lauq*, but is used to "make more fine-grained and subjective temporal specifications" (Hayashi & Oshima 2015: 795). They also conclude that this subjectivity is not in the same sense as Botne (2012). We propose an analysis for Creek Past 3 that might be extendable to South Baffin *-lauqsima*.

The previous discussion brought to the forefront three generalizations to be captured in an analysis of Creek past tenses. First, Past 2 is the default evidential past tense and its interval subsumes both Past 1 and Past 3 intervals. Secondly, Past 1 is restricted to past times within the day of utterance. Thirdly, Past 3 is restricted to times the speaker judges to be remote.

The first two are easily encoded into the semantics of these tenses. Past 2 has weaker truth conditions that Past 1 in that any past time which is also the EAT will satisfy the definition in (72a) Past 1 is tightly restricted to past times within the day surrounding the utterance. Thus Past 1 will block the use of Past 2 in those contexts when the EAT is known to be in the day of the utterance.

(72) a. $[\![\text{ P2 }]\!]^{c,w,g,t} = [\lambda t'_i : \lambda P_{\langle it \rangle} : t' \prec t$ & COME-TO-BELIEVE(sp(c),t′,P(t′))]

b. $[\![\text{ P1 }]\!]^{c,w,g,t} = [\lambda t'_i : \lambda P_{\langle it \rangle} : t' \prec t$ & $t' \infty$ day(t) & COME-TO-BELIEVE(sp(c),t′,P(t′))]

To formalize the subjective remoteness of Past 3, we adopt Bochnak & Klecha (2015)'s vagueness analysis of graded tense in Luganda (Bantu). They propose that graded tenses in Luganda are vague in the sense that degree predicates are vague; both are evaluated relative to some contextually salient standard. Drawing on Kennedy (2007), they define two measure functions on intervals of time as in (73).

(73) *Measure Functions on Time Intervals* (Bochnak & Klecha 2015: 23)

a. **close**(t, t') assigns to a time t' a degree on a scale of closeness to t

b. **far**(t, t') assigns to a time t' a degree on a scale of distance from t

We give Past 3 the following semantics.

(74) $[\![\text{ P3 }]\!]^{c,w,g,t} = [\lambda t'_i : \lambda P_{\langle it \rangle} : t' \prec t$ & **far**$(t, t') >$ **s**(**far**) & COME-TO-BELIEVE(sp(c),t′,P(t′))]

According to this formula, Past 3 restricts the topic time t' to times in the past of the evaluation time t, assigns t' a degree of distance from t that is greater than the contextual standard of distance (**s**(**far**)), and applies t' to the COME-TO-BELIEVE predicate.

This semantics for Past 3 explains some of the puzzling distributional facts discussed earlier.

(75) *Puzzles for Past 3*

1. Past 3 is used when the speaker has evidence suggesting the event happened longer ago.
2. Past 3 and Past 2 have substantial temporal overlap.
3. Past 3 is most reliably volunteered when speaking about childhood experiences.

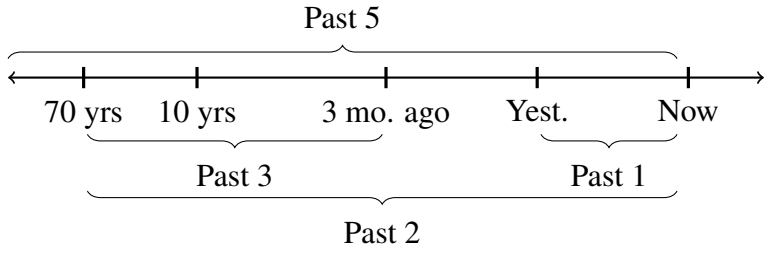
Since Past 3 has an additional subjective component which is context dependent we expect contexts which provide a physical, salient standard of comparison to more readily accommodate Past 3. For instance, if the standard is a car in good shape as in (66) and the car looks old, then the event of buying a car is more likely to be considered distant from the utterance time. Additionally, since what counts as long ago depends on the speaker and varies from context to context, we expect there to be great deal of temporal overlap between Past 2 and Past 3. For instance, we may consider seeing a friend to be quite distant if it happened three months ago, but wouldn't consider buying a car distant until at least a few years had past. Finally, this characterization of subjective remoteness explains why Past 3 is most reliably used to speak about childhood experiences. For adults, childhood experiences nearly always qualify as more distant than some contextual standard.

3.4 Predictions of the nested interval analysis

This analysis correctly predicts the general distribution of the past tenses. In direct witness contexts, Pasts 1-3 will be used to pick out (somewhat) disjoint temporal intervals, which accord with Martin (2010)'s intervals. This will arise due to Quantity Implicatures associated with the use of one tense versus another, and will arise in spite of the actual temporal intervals compatible with

each tense's semantics. The following diagram illustrates the intervals compatible with each tense according to the proposed semantics.

(76) *Times Covered by Past Tenses*



The distribution we see on the surface arises due to competition and blocking between the forms. The availability of Past 1 to describe witnessed events during the day of utterance will block the use of Past 2. Similarly, the availability of Past 3 to describe distant times will block Past 2 for distant times such as a speaker's childhood. Thus Past 2 will be restricted to approximately the Past 2 interval Martin (2010) gives it - yesterday to about a year ago. Similarly, Past 5 will be blocked by the availability of the evidential Pasts 1-3, and in general will be restricted to speaking about remote times and/or unwitnessed events.[10]

Another prediction of this account is that there may not be left boundaries to the temporal intervals compatible with Pasts 2 and 3. Since Pasts 2 and 3 require the speaker to have direct evidence (when affixed to the main verb), it is this requirement that enforces a left boundary. When speaking about an event that happened at a time prior to the speaker's birth, Past 3 is unacceptable. For these sentences, only Past 5 can be used.

[10]Employing measure functions and degrees suggests that there should be Scalar Implicatures associated with the choice between Past 2 and 3.

(77) a. Prompt: Imagine your mother went to this one church before you were born. How would you say that in the language?

b. Cvhēckeko monkof, cvckē yv mēkusvpkv-cuko
ca-hí:ck-ikó mónk-of cácki: yá mi:kosapka-cóko
1.SG.PAT-seen-NEG still-WHEN my.mother DEM.PROX prayer-house
ay**vtē**s. / # ay**emvt**s.
á:y-**atí:**-s / â:y-**imát**-s
go.SG.LGR-**P5**-IND / go.SG.PFV-**P3**-IND
'Before I was born, my mother went to this church.'

Speaker Comment.: No, you couldn't say [the verb with P3] because you're not born yet. You have to be present to use that one. (ME-Sem-Elic07/2018)

This effect is not so much a reflection of the interval Past 3 refers to, but is the result of its evidential component.

4 Conclusions

At the outset, the main puzzles we desired to explain were how to account for the distribution of Creek graded tenses and how speakers choose between the four tenses. This paper presented novel empirical evidence which motivated a split between Past 5 and Pasts 1-3. It was shown that Past 1-3 refer to evidence acquisition time (Lee 2013; Smirnova 2013) and indicate direct witness if the presence of imperfective or perfective aspect enforce an overlap relation between evidence acquisition time and the event time. We presented data similar to some Bulgarian data from Smirnova (2013) to support a view under which this "evidential" component involves times and not witness *per se*. Indirect evidential uses of Pasts 1-3 were shown to result from the tense embedding a clause in perfect aspect which enforces a precedence relation between evidence acquisition time and event time. Thus the Creek data provides additional support for the proposal put forward initially by Speas (2010) that direct and indirect evidentiality in some languages comes down to a relation between situations or times mediated through grammatical aspect.

Having seen that Past 5 is compatible with all past times but is restricted to use in indirect evidence contexts where Pasts 1-3 are not licensed, this paper also tackled re-defining the temporal intervals each tense makes reference to in contemporary Creek. We saw that the intervals associated with Pasts 1 is very stable, but that Pasts 2 and 3 had much wider distributions than previously described. This paper argued that when one considers remoteness indeterminacy contexts (Cable 2013; Hayashi & Oshima 2015; Klecha & Bochnak 2016), we find evidence that Creek past tenses do not pick out disjoint temporal intervals, but rather have an overlapping semantics. We presented novel empirical data which supported analyzing Pasts 1-3 as denoting nested intervals of time. Past 2 was shown to be compatible with the largest span of time subsuming those descriptively called Past 1 and Past 3 intervals. We also presented evidence that Past 3 refers to subjectively remote times similarly to what has been discussed for *-lauqsima* in South Baffin Inuktitut by Hayashi & Oshima (2015). This paper proposed a formalization of this subjectivity in terms of contextually dependent temporal measure functions (Bochnak & Klecha 2015). Thus the distribution of Pasts 1-3 was argued to be due to pragmatic competition and Quantity Implicatures arising from the use of one over the others.

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Appendix A

The following is a list of the abbreviations I use:

ACC accusative
AG agent
ASRT aktionsart
COMP complementizer
CUR current past
DAT dative
DEM demonstrative
DIR directional
DIST distal
DS different subject
DUR durative
IMPFV imperfective aspect
IMPL.PASS impersonal passive
IND indicative
INST instrumental
INT intensifier
IP medio-passive/ spontaneous
LOC locative
NEG negation
NOM nominative
NRP near past
NZL nominalizer
P1 recent past
P2 intermediate past
P3 distant past
P5 remote past
PAT patient
PFV perfective aspect
PL plural
PROX proximal
RECIP reciprocal
REMP remote past
SG singular
SS same subject