Morphological tenselessness and SOT: Evidence for a covert relative pronominal tense in Gitksan[1]

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Abstract. Gitksan (Tsimshianic) is morphologically tenseless. Simple matrix clauses in Gitksan are compatible with both past and present contexts, and attitude complements and relative clauses are compatible with both simultaneous and back-shifted contexts, similar to the Sequence of Tense (SOT; Comrie, 1985; Enç, 1987) in English. Despite this similarity, an account of SOT in English does not extend to morphologically tenselessness clauses in Gitksan in light of data from *before/after* clauses. I argue that this in turn supports the existence of a covert non-future tense in Gitksan (Jóhannsdóttir and Matthewson, 2007) and that this tense is specifically a relative pronominal tense. After a brief overview of the Gitksan data (Section 1), I introduce my analysis of SOT in English involving a temporal pronoun with no tense restriction, which I call a 'tense operator-less' account (Section 2). This analysis is applied to the puzzling temporal interpretations of present-under-*will* relative clauses (Abusch, 1998) as well as *before/after* clauses in English (Section 3). I then introduce data from matrix and embedded clauses in Gitksan (Section 4) and demonstrate the existence of a temporal pronoun as a semantic primitive in the language (Section 5). I develop an analogous tense operator-less account of Gitksan (Section 6), but this account is challenged by data from *before/after* clauses (Section 7). I argue for an alternative analysis of Gitksan involving a relative pronominal non-future tense (Section 8) and conclude (Section 9).

Keywords: relative tense, pronominal tense, morphological tenselessness, sequence of tense, Gitksan

1. Introduction

In English, a past-under-past attitude complement with a stative predicate exhibits the sequence of tense (SOT) phenomenon (Comrie, 1985; Enç, 1987). For example, in (1), Sally's time of being in London according to the speaker can precede the speaker's hearing time (1a) or be simultaneous with it (1b).

(1) I heard that Sally was in London. (Enç, 1987: 635(7))

a. subordinate ET (sET) < matrix ET (mET) < utterance Time (UT)
Context: *Sally's being in London precedes the hearing time, according to what the speaker heard.*

b. sET=mET < UT
Context: *Sally's being in London is simultaneous with the hearing time, according to what the speaker heard.*

Gitksan lacks an overt tense marker. Similar to SOT in English, attitude complements with a

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stative predicate are compatible with both back-shifted and simultaneous contexts (2).[2,3]

(2) Ha'niigoot=s Lisa [luu getxw=hl goot=s Michael]
think=PN Lisa [in difficult=CN heart=PN Michael]
'Lisa thought that Michael was sad.'
a. sET < mET < UT
Context: *When Lisa saw Michael earlier, he was covering his face. Looking back, Lisa thought "Michael was sad."*
b. sET=mET < UT
Context: *Lisa saw Michael covering his face and thought, "Michael is sad."*

One caveat here is that the Gitksan sentence in (2) is not semantically ambiguous in the way that the English sentence in (1) is. In most analyses, (1) receives two distinct denotations corresponding to the back-shifted and simultaneous readings (cf. Gennari, 2003; Altshuler and Schwarzschild, Altshuler and Schwarzschild). On the other hand, according to both the existing literature (Jóhannsdóttir and Matthewson, 2007) and my analyses below, the Gitksan sentence in (2) has one denotation that happens to be compatible with both contexts that would require back-shifted and simultaneous readings of an English past-under-past attitude complement.

Nevertheless, the parallel between (1) and (2) is striking. Moreover, in most existing analyses of English, a past-under-past attitude complement lacks a semantic past tense operator under its simultaneous reading (e.g., Ogihara, 1996; Kusumoto, 1999; von Stechow, 2009; Grønn and von Stechow, 2010). Therefore, it is worth asking whether such an analysis without a tense operator would extend to morphological tenselessness in Gitksan, especially as it brings a new perspective to the existing debate between tensed analyses of morphologically tenseless languages (e.g., Jóhannsdóttir and Matthewson, 2007 on Gitksan) and tenseless analyses of such languages (e.g., Tonhauser, 2011, Pancheva and Zubizarreta, 2019 on Paraguayan Guaraní).

2. SOT phenomena in English: Overview of analysis

I analyze the ambiguity between back-shifted and simultaneous readings in (1) as a result of morphosyntactic agreement imposed on the T(ense) head. English allows three options in the Logical Form (LF) of a T head (3-5). Shared between all three options is a covert temporal pronoun pro, which by itself lacks any temporal restriction. This temporal pronoun may be accompanied by a presuppositional present (3a) or past (4a) tense operator denoted by an overt tense morpheme or be the only content of the T head (5). The absolute present tense operator in (3a) takes a temporal argument t with a presupposition that t is equal to the UT, t_c, and returns t. The relative past tense operator in (4a) builds on Heim's (2015) denotation of relative

[2]The Gitksan transcriptions largely follow the conventions by Rigsby (1986). There is a third person series II (3.II) suffix *-t* in independent clauses with a third person ergative argument and in dependent clauses with a third person absolutive argument, but it is systematically deleted immediately before a coindexed DP argument introduced by the enclitic connectives *=hl* and *=s* (Davis, 2018). The elided *-t* is not represented in the transcriptions here.

[3]Glosses: '-'=affix boundary; '='=clitic boundary; 1=1st person; 2=2nd person; 3=3rd person; I=Series I person marker; II=Series II person marker; III=Series III person marker; CAUS=causative; CCNJ=clausal coordinator; CN=common noun connective; DWID=domain widener; FOC=focus; FUT=future; IRR=irrealis; NEG=negation; NONPST=non-past; PART=particle; PROG=progressive; PN=proper noun connective; SG=singular; SX=intransitive subject (S) extraction; T='T' suffix; TR=transitive marker for independent clauses; WH=*wh*-word

pronominal past tense in English; it encodes a presupposition that the temporal argument t precedes its Evaluation time (EvalT) t_i set by the shiftable index i and that t is the maximally long interval in the set of contextually salient times R_c, which is picked out by the σ operator.[4]

(3) a. $[\![\text{PRES}]\!]^{g,c,i} = \lambda t\text{: } t{=}t_c.\ t$
b. $[\![\text{pro}_n]\!]^{g,c,i} = g(n)$

(4) a. $[\![\text{PAST}]\!]^{g,c,i} = \lambda t\text{: } t < t_i \ \&\ t = \sigma[R_c].\ t$
b. $[\![\text{pro}_n]\!]^{g,c,i} = g(n)$

(5) $[\![\text{pro}_n]\!]^{g,c,i} = g(n)$

(5) is the LF of a T head involved in SOT phenomena; it is subject to morphosyntactic tense agreement, which renders the corresponding PF identical to that of either the semantic present tense (3) or the semantic past tense (4). Since the PF of (5) is identical to that of a semantic tense, to formally implement this analysis, some sort of SOT mechanism is required to distinguish the two. Among various SOT mechanisms that have been proposed in the literature, I follow Ogihara's (1996) use of an SOT rule as the most empirically transparent mechanism to account for SOT phenomena as a matter of morphosyntactic agreement (see Aonuki, 2021 for a review of other SOT mechanisms). My definition of an SOT rule is provided in (6).

(6) If a tense morpheme *A* agrees with tense morphemes B_1, B_2, ...B_n in PF, and these morphemes are in an immediately c-commanding relationship such that A c-commands B_1 with no intervening tense in between, B_1 c-commands B_2 with no intervening tense in between, ... and so on, each of B_1... B_n may lack a semantic content.

Since the overt present and past morphemes with a semantic content denote a tense operator in (3a) and (4a), respectively, the T head with application of the SOT rule has a temporal pronoun with no tense operator. I call this account a 'tense operator-less' account; it is not semantically tenseless, as it still has a temporal pronoun in the lexicon and times as semantic primitives.

To illustrate my analysis, the denotation of (1) with application of the SOT rule is provided in (7), assuming the existence of a covert perfective morpheme (8a) and a covert eventuality variable[5] (8b) in the Asp(ectual) head of every clause that lacks an overt progressive marker. In (7), while the matrix clause has a presuppositional past tense operator, the attitude complement lacks one; the temporal pronoun pro_2 has no temporal restriction. The whole sentence asserts that the run time of the eventuality e_1 is included in the matrix reference time (RT), g(1); for all worlds w' such that w' is compatible with what the speaker hears in the actual world in e_1, the run time of the eventuality e_2 is included in g(2); and e_2 is an eventuality of Sally being in London in w', where it is presupposed that g(1) precedes the UT and is the maximal interval in the set of contextually salient times R_{c1}. Since there is no restriction on the reference of g(2), (7) alone is compatible with both back-shifted and simultaneous readings available in (1).

[4]That t is the maximally long interval in R_c is necessary to account for out-of-the-blue infelicity of a past imperfective sentence (Heim, 2015; See Section 5).

[5]A covert eventuality variable is necessary because the relative pronominal past tense occurring in a subordinate clause must be able to 'refer' to the matrix ET as its Evaluation time (EvalT); this reference would be implausible if the matrix eventuality was existentially bound.

(7) With application of the SOT rule: compatible with both readings[6]
$[\![$w* PAST pro_1 PFV e_1 I hear that pro_2 PFV e_2 Sally be in London$]\!]^{g,c,i}$
$= \tau(e_1) \subseteq g(1)$ & $\forall$ w'[w' $\in$ HEAR (Spkr, e_1, w*) $\rightarrow$ $\tau(e_2) \subseteq g(2)$ & in-Lon. (Sal)(e_2)(w')]
where $g(1) < t_c$ & $g(1)=\sigma[R_{c_1}]$

(8) a. $[\![\text{PFV}]\!]^{g,c,i}_{\langle v,\langle\langle v,st\rangle,\langle i,st\rangle\rangle\rangle} = \lambda e.\ \lambda P_{\langle v,st\rangle}.\ \lambda t.\ \lambda w.\ \tau(e) \subseteq t$ & P(e)(w)
(adapted from Kratzer, 1998: 107)

b. e_1

Without application of the SOT rule, pro_2 in the attitude complement would be accompanied by a semantic past tense operator, resulting in the denotation in (9). With the subordinate RT, g(2), presupposed to precede the matrix ET, $\tau(e_1)$, (9) is only compatible with a back-shifted reading.

(9) Without application of the SOT rule: compatible with the back-shifted reading only
$[\![$w* PAST pro_1 PFV e_1 I hear that PAST pro_2 PFV e_2 Sally be in London$]\!]^{g,c,i}$
$=\tau(e_1) \subseteq g(1)$ & $\forall$ w'[w' $\in$ SAY (John, e_1, w*) $\rightarrow$ $\tau(e_2) \subseteq g(2)$ & leave (Mary)(e_2)(w')]
where $g(1) < t_c$ & $g(1)=\sigma[R_{c_1}]$, $g(2) < \tau(e_1)$ & $g(2)=\sigma[R_{c_2}]$

Since the two LFs map onto an identical PF in (1), either LF is plausible when the sentence has a back-shifted reading.

When a past-under-past attitude complement has an eventive predicate with an episodic interpretation, only a back-shifted reading is available (10).

(10) John said that Mary left. (Ogihara, 1996: 104(8))
a. Back-shifted sET <mET <UT
b. #Simultaneous sET=mET <UT

The denotation of (10) with application of the SOT rule is given in (11). Similar to (7), the attitude complement lacks a tense operator, and the subordinate RT, g(2), is temporally unrestricted. Therefore, g(2) itself is technically compatible with both back-shifted and simultaneous readings. Nevertheless, a simultaneous reading is independently ruled out: unlike states, events lack the subinterval property (Bach, 1981; Dowty, 1986), and therefore in (10), no event of Mary's leaving can fit inside John's time of saying. This analysis was proposed by Wurmbrand (2014) and Todorović (2015), and an analogous analysis for matrix sentences goes back to Bennett and Partee (1978), who argued that a present-tensed simple matrix sentence with an eventive predicate lacks an episodic reading because the UT is near-instantaneous. This unavailability of an episodic interpretation of an eventive predicate with respect to a (near-) instantaneous RT will be henceforth referred to as the 'Bennett and Partee effect.'

(11) With application of the SOT rule
$[\![$w* PAST pro_1 PFV e_1 John say that pro_2 PFV e_2 Mary leave$]\!]^{g,c,i}$
$= \tau(e_1) \subseteq g(1)$ & $\forall$w'[w' $\in$ SAY (John, e_1, w*) $\rightarrow$ $\tau(e_2) \subseteq g(2)$ & Leave(Mary)(e_2)(w')]
where $g(1) < t_c$ & $g(1)=\sigma[R_{c_1}]$

Since the denotations with application of the SOT rule in (7) and (11) have no restriction on the subordinate RT, they would wrongly predict an unavailable forward-shifted reading. This must

[6]The unrestricted temporal pronoun pro_2 may require res-movement (Ryan Bochnak p.c.).

be ruled out by an independent mechanism; I adopt Abusch's Upper Limit Constraint (12).

(12) Upper Limit Constraint (ULC) (Abusch, 1997: 25)
[T]he local evaluation time is an upper limit for the denotation of tenses.

3. Further application of my SOT analysis

3.1. Present-under-*will* relative clauses

According to Abusch (1998), the meanings of the past- and present- marked relative clauses seem to overlap under a matrix *will*. That is, in (13), both (13a), with the past tense in the relative clause, and (13b), with the present tense in the relative clause, are felicitous in a context in which the speaker gives an automatic A to a paper submitted between the UT and May 21.

(13) a. On May 21, I will give an automatic A to the first student who turn**ed** in a term paper at least 15 pages long.
b. On May 21, I will give an automatic A to the first student who turn**s** in a term paper at least 15 pages long. (Abusch, 1998: 13(4))

What is unexpected is the interpretation of (13b); with the present tense morpheme in the relative clause, one might expect that the subordinate ET may be simultaneous with the UT, if the present tense is absolute, or the matrix ET, if the present tense is relative.[7] Instead, the relative clause is felicitous in a 'relative past' context, with the subordinate ET following the UT but preceding the matrix ET. This unexpected overlap between present-under-*will* and past-under-*will* constructions forces Abusch (1998: 24) to argue that "under the scope of the future auxiliary, the semantics for tense is so weak that the eventuality arguments of past and present tense verbs in identical configurations have, loosely put, overlapping ranges of possible denotations." However, without independent support, it does not seem ideal to posit these special denotations tied specifically to relative clauses under *will/would*.

Instead, I argue that the temporal overlap is due to the present tense morpheme in the relative clause in (13b) being merely a manifestation of morphosyntactic tense agreement and lacking a semantic tense operator; formally, this is a result of applying the SOT rule (14). I assume that *will* is a combination of the present tense and WOLL (Heim, 1994; Abusch, 1997), which is defined in (15).

(14) With application of the SOT rule
$[\![$On May 21, w* PRES pro_1 WOLL PFV e_1 I give A to the first student who w* pro_2 PFV e_2 $\lambda 1$ t_1 turn in a term paper...$]\!]^{g,c,i}$
$= \exists t[g(1) < t \ \&\ \tau(e_1) \subseteq t \ \&\ t=$May 21 $\&$ give-A$(\iota[\lambda x.$ student(x) $\&\ \tau(e_2) \subseteq g(2)\ \&$ turn-in-a-term-paper...$(x)(e_2)(w^*)])$ $(Spkr)(e_1)(w^*)]$ where $g(1) = t_c$

(15) $[\![\text{WOLL}]\!]^{g,c,i}_{\langle\langle i,st\rangle,\langle i,st\rangle\rangle} = \lambda P_{\langle i,st\rangle}.\ \lambda t.\ \lambda w.\ \exists t'[t < t' \ \&\ P(t')(w)]$

Without a tense operator in the relative clause, the subordinate RT, g(2), is temporally unrestricted. Nevertheless, a back-shifted reading is the only option to interpret this sentence. g(2)

[7] See Section 3.2 for why the English present tense cannot be a (relative) non-past tense, which would most straightforwardly explain why the subordinate ET can follow the UT in (13b).

cannot be simultaneous with the matrix ET due to the Bennett and Partee effect (1978) (see Section 2). A forward-shifted reading is pragmatically ruled out since usually a paper can only be graded after it is submitted.

This analysis makes two predictions: 1) a simultaneous reading should be available in a present-under-*will* relative clause with a stative predicate, and 2) a forward-shifted reading should be available if it is compatible with world knowledge and the discourse context. Both predictions are borne out.

Starting with the first prediction, indeed, when the relative clause has a stative predicate, there is no overlap between past- and present- marked relative clauses under *will*. In (16a), people who were sick before noon on March 1 receive medicine, regardless of whether or not they are still sick at noon on March 1. On the other hand, in (16b), one must be sick at noon on March 1 to receive medicine.[8]

(16) a. Back-shifted sET(sick) <mET(give medicine)
On March 1 at noon, the doctor will give medicine to people who **were** sick.
b. Simultaneous UT <sET(sick)=mET(give medicine)
On March 1 at noon, the doctor will give medicine to people who **are** sick.

The denotation of (16b) with application of the SOT rule is provided in (17).

(17) With application of the SOT rule
$[\![$On Mar. 1 at noon, w* PRES pro_1 WOLL PFV e_1 the doctor give medicine to people who w* pro_2 PFV e_2 λ 1 t_1 be sick...$]\!]^{g,c,i}$
$= \exists t[g(1) < t \ \& \ \tau(e_1) \subseteq t \ \& \ t =$ Mar.1 at noon & give-medicine$(\iota[\lambda x.$ person(x) & $\tau(e_2) \subseteq g(2)$ & sick (x)$(e_2)(w^*)])$ (doctor)$(e_1)(w^*)]$
where $g(1) < t_c$ & $g(1) = \sigma[R_{c_1}]$

Again, there is no temporal restriction on g(2). A forward-shifted reading is pragmatically implausible (at least without a modal in the relative clause), assuming that one cannot predict who will be sick in the future. A simultaneous reading is available; the stative predicate *be sick* has the subinterval property (Bach, 1981; Dowty, 1986), and therefore a time of being sick can fit inside the matrix ET. A back-shifted reading analogous to (13b) is technically available but ruled out by competition with the past-tensed counterpart (16a), which is more informative for being specialized in that reading. An underlying assumption here is that interpreting the sentence is somehow prioritized over having no temporal overlap with the past-tensed counterpart; (13b) receives a back-shifted reading despite the overlap with (13a) because that is the only available interpretation, but such a reading is blocked in (16b) because it can receive a simultaneous reading.

Regarding the second prediction of the tense operator-less account, indeed, when compatible with world knowledge and the context, a forward-shifted reading of a present-under-*will* relative clause is available. In (18), the time of someone running over the addressee's foot can follow the time of meeting.

[8]There is another reading in which those who are sick at the UT will receive medicine (Hotze Rullmann, p.c.). This reading would correspond to the denotation of (16b) without application of the SOT rule.

(18) Forward-shifted UT < mET(meet) < sET(run over)
Context: *A fortune teller breaks the silence:*
On March 1, you will meet someone who runs over your foot. (Lisa Matthewson, p.c.)

3.2. *Before/after* clauses

In this section, I continue my illustration of the tense operator-less account, with respect to *before/after* clauses. I will demonstrate that this account offers the most straightforward and both intra- and cross- linguistically consistent explanation for lack of the deictic reading of the present tense morpheme in *before/after* clauses.

The empirical generalization about the tense morphemes in *before/after* clauses is that they always agree with those of the matrix clause.[9] Regardless of the anteriority relations between the matrix ET, subordinate ET, and UT, a *before/after* clause is past-marked if the matrix clause is past-tensed (19), and it is present-marked if the matrix clause is present-tensed (20).

(19) a. mET < ET < UT Alex **left** before Blake arrive**d**.
b. sET < mET < UT Blake arrive**d** after Alex **left**.

(20) a. UT < mET < ET Alex **will** leave before Blake arrive**s**.
b. UT < ET < mET Blake **will** arrive after Alex leave**s**.

Notice that the present tense morpheme in *before/after* clauses (20) lacks a deictic present reading, as the subordinate ET follows the UT. This sharply contrasts with behaviours of the present tense in other contexts: the present tense has an obligatory double-access reading due to its deictic nature in attitude complements (21) and relative clauses (22) under past (Ogihara, 1996; Abusch, 1997), and it has an optional deictic reading under *will* (23) (Ogihara, 1996; cf. Stump, 1985, who claims that the deictic reading is obligatory in (23)).

(21) John believed that Mary **is** pregnant. (Abusch, 1997: 5(8))

(22) John met a man who **is** crying in sorrow. (Ogihara, 1996: 161(19b))

(23) John will claim that Mary **is** hitting Bill. (Stump, 1985: 108(30))

In my analysis, the lack of deictic reading of the present tense morpheme in *before/after* clauses (20) follows from the fact that this morpheme is merely a manifestation of morphosyntactic agreement with the matrix present tense and that the T head in *before/after* clauses consistently lacks a tense operator. In other words, among the three possible LFs of the T head in English (3, 4, 5), only a tense operator-less pronoun (5) is allowed given the temporal ordering required by the denotations of the lexical items *before* and *after*. Formally, this analysis corresponds to obligatory application of the SOT rule in *before/after* clauses, which has been argued for by Ogihara (1996) and von Stechow (2009) although details of the analyses differ.

Using Beaver and Condoravdi's (2003) EARLIEST operator (24a), the denotation of *before* is given in (24b).

[9] See Kusumoto (1999) and Aonuki (2021) for tense-mismatched cases involving measure phrases.

(24) a. $[\![\text{EARLIEST}]\!]^{g,c,i}_{\langle\langle i,st\rangle,si\rangle}=\lambda P_{\langle i,st\rangle}.\ \lambda w.$ the t such that P(t)(w) & $\forall$ t'[t'$\neq$t & P(t')(w) $\rightarrow$ t < t']

b. $[\![\text{before}]\!]^{g,c,i}_{\langle\langle i,st\rangle,\langle i,st\rangle\rangle}= \lambda P_{\langle i,st\rangle}.\ \lambda t.\ \lambda w.$ t< EARLIEST(P)(w)

Fig. 1 is a schematic syntactic representation of a *before* clause with no tense operator in the T head (i.e., with application of the SOT rule). Covert *wh*-movement leaves a trace t_1 of type i, which is lambda-bound at the CP level. The CP corresponds to a constituent of type ⟨i,st⟩, which is the argument of *before*. The resulting *before* clause is combined with the denotation of the matrix aspectual phrase (AspP) through predicate modification.

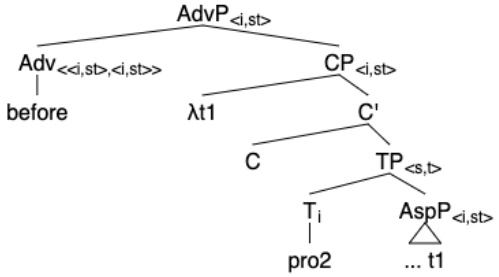

Figure 1: Schematic representation of a *before* clause in English

The denotation of (20a) is provided in (25). The denotation of the *before* clause (25a) takes a time variable t and a world variable w and states that t precedes the earliest time t_1, which is equal to g(2), such that the run time of the event e_2 of Blake's arriving in w fits inside g(2). After predicate modification with the *before* clause, the matrix AspP (25b) denotes a function that takes a time variable t and a world variable w and states that the run time of the event e_1 of Alex's leaving in w fits within t and that t precedes the earliest time t_1 such that t_1 is equal to g(2) and the run time of the event e_2 of Blake's arriving in w fits inside g(2). The whole sentence (25c) states that there is a time t such that t follows g(1), the run time of the event of Blake's arriving in the actual world fits within t, and t precedes the earliest time t_1 such that the run time of Alex's leaving in the actual world fits within t_1, where it is presupposed that g(1) equals the UT, t_c.

(25) Alex will leave before Blake arrives.

a. $[\![$before λt_1 pro_2 PFV e_2 Blake arrive $t_1]\!]^{g,c,i}= \lambda t.\ \lambda w'.$ t<EARLIEST[$\lambda t_1.\ \lambda w.$ $\tau(e_2)\subseteq g(2)$ & Blake-arrive(e_2)(w) & g(2)=t_1](w')

b. $[\![$PFV e_1 Alex leave [before λt_1 pro_2 PFV e_2 Blake arrive $t_1]]\!]^{g,c,i} = \lambda t.\ \lambda w'.$ $\tau(e_1)\subseteq t$ & Alex-leave(e_1)(w') & t<EARLIEST [$\lambda t_1.\ \lambda w.$ $\tau(e_2)\subseteq$ g(2) & Blake-arrive(e_2)(w) & g(2)=t_1](w')

c. $[\![$w* PRES pro_1 WOLL PFV e_1 Alex-leave [before λt_1 pro_2 PFV e_2 Blake-arrive $t_1]]\!]^{g,c,i} = \exists t$[g(1)< t & $\tau(e_1)\subseteq$t & Alex-leave(e_1)(w*) & t < EARLIEST [$\lambda t_1.\ \lambda w.$ $\tau(e_2)\subseteq$ g(2) & Blake-arrive(e_2)(w) & g(2)=t_1](w*) where g(1)=t_c

Note that unlike g(1), the subordinate RT, g(2), is not restricted by any presupposition. This accounts for the lack of deictic reading of the present tense morpheme in the *before* clause. Temporal restriction on g(2) is instead provided by the denotation of *before*, which requires that the earliest time corresponding to g(2) follows the matrix ET.

The lack of deictic reading of the present tense morpheme in *before/after* clauses has received various explanations in the literature. To illustrate the merits of the current analysis, the remainder of this section discusses alternative proposals by Kubota et al. (2012) and von Stechow and Grønn (2013) as well as Abusch's idea that WOLL somehow changes the denotation of a tense in its scope (see Section 3.1).

In their cross-linguistic comparison of *before/after* clauses, Kubota et al. (2012) analyze the English present as a relative non-past tense sharing its denotation (26) with the Japanese non-past tense.

(26) $[\![\text{NPST}(\varsigma)]\!]^{M,i,g} = 1$ iff $i \leq [\![\varsigma]\!]^{M,i,g}$ (**?**: 147(21))kubota2012a

While Kubota et al.'s (2012) relative non-past approach is compatible with the *before/after* clause data, it does not capture the deictic nature of the English present tense in other contexts (21-23). Moreover, as Kubota et al. (2012) themselves suggest, analyzing the English present tense as a non-past tense overlooks the differences in the availability of a future reading between the English present tense and a truly non-past tense like the Japanese counterpart. In a simple matrix sentence, the Japanese non-past tense freely allows a future reading (27).

(27) a. A: *Let's go to the beach tomorrow.* (Based on Rullmann et al., 2021: 3(4)B')
b. B: Gomen, ashita zasso tori su-**ru**-no
Sorry, tomorrow weed removal do-**NONPST**-PART
Lit: 'Sorry, I weed my garden tomorrow.'

In contrast, a future reading is not available for the English present tense in the same context (28), and a future-oriented English present (i.e., futurate) requires the existence of a schedule (29) in the sense of Rullmann et al. (2021).[10]

(28) a. A: *Let's go to the beach tomorrow.* (Rullmann et al., 2021: 3(4))
b. B: #Sorry, I **weed** my garden tomorrow.

(29) a. A: *Let's go to the beach tomorrow.*
b. B: ?Sorry, I **weed** my garden tomorrow, like every Saturday.

von Stechow and Grønn (2013) maintain the absolute present denotation of the English present tense morpheme and derive the non-deictic reading by inserting a covert future operator (30a) in present-marked *before/after* clauses, as in (30b).

(30) a. $[\![\text{FUT}]\!]^{g,c} = \lambda t.\ \exists t'[t' > t]$
b. Alex pres WOLL leave before Blake pres **FUT** arrive.

However, this insertion of a covert future operator seems implausible. As the authors note, since this covert operator shares its denotation with the overt future marker WOLL, it is not clear why the covert version would be inserted while WOLL cannot occur in *before/after* clauses by default. Moreover, this covert future marker is predicted to be semantically incompatible with the denotation of *before*, as existential temporal markers are argued to cause a presupposition

[10]Rullmann et al. (2021) present Likert scale acceptability judgements of 1-4, with 1 being the most acceptable. (28) received an average score of 2.24 and (29) 1.76, compared to 1.09 for a progressive futurate, which does not require the existence of a schedule.

failure when combined with Beaver and Condoravdi's EARLIEST operator in the denotation of *before* (von Stechow, 2009; Sharvit, 2014).

Finally, since all instances of non-deictic present tense morphemes in *before/after* clauses occur under the matrix *will*, it is worth revisiting Abusch's (1998) idea that tenses have distinct denotations under a future auxiliary. If the non-deictic nature of the present tense morpheme is due to some special property of the modal WOLL, then the same non-deictic reading should be available under *would*, combination of WOLL and the past tense. This prediction seems wrong. Elicitation with three native speakers of Canadian English reveals that a present-marked *before* clause under *would* is unacceptable (31a), while a past-tensed counterpart is completely acceptable (31b) and a *before* clause with *would* is somewhat acceptable (31c).[11]

(31) a. *I was a tidy kid. Every morning I would clean my room before I **go** to school.
b. I was a tidy kid. Every morning I would clean my room before I **went** to school.
c. ?I was a tidy kid. Every morning I would clean my room before I **would** go to school.

Since the non-deictic reading of the present tense morpheme in *before* clauses is only observed under a matrix *will* and not *would*, it must be that this reading is due to the only difference between the two contexts: the occurrence of the present tense morpheme in the matrix clause. It is then most plausible that the non-deictic nature of the present tense morpheme in *before/after* clauses is due to the fact that this morpheme is a reflection of morphosyntactic tense agreement with the matrix present tense, with the implication that the denotations of these clauses lack a tense operator.

4. Temporal interpretation in Gitksan: Parallel with SOT in English

The remainder of the paper discusses Gitksan data in relation to SOT in English. Gitksan is an indigenous language spoken in northern British Columbia, Canada. It belongs to the Tsimshianic language family, and it constitutes the Interior Tsimshianic branch along with a neighbouring language, Nisg̲a'a. There are approximately 520 fluent speakers (Dunlop et al., 2018). The word order is V̲SO (Rigsby, 1986), and crucially for the current purpose, the language is morphologically tenseless.

Simple matrix clauses are generally compatible with both 'past' and 'present' contexts (32), with some variability according to the aspectual properties of the predicate (Jóhannsdóttir and Matthewson, 2007: (1)-(4)).

(32) Luu am=hl g̲oot=s Diana
in happy=CN h̲eart=PN Diana
'Diana is happy.'/'Diana was happy.'/≠'Diana will be happy.'

Future readings require a future marker *dim* (33), which has been analyzed as being analogous to English WOLL (Jóhannsdóttir and Matthewson, 2007: (7)-(9)).

[11] It is interesting that (31c) is even somewhat acceptable given the semantic incompatibility of WOLL and *before* explained above. See Kusumoto (1999: 261) for a similar exception with *will*.

(33) Dim yookw=t James (ji t'aahlakxw)
FUT eat=PN James (IRR tomorrow)
'James will eat (tomorrow).'

These data led Jóhannsdóttir and Matthewson (2007) to propose a covert non-future tense; it was formulated as an absolute pronominal tense based on its behaviours in matrix clauses.

Attitude complements can be similarly compatible with both back-shifted and simultaneous contexts (34), where English past-under-past attitude complements would be felicitous.

(34) Ha'niigoot=s Lisa [yukw wiyitxw=s Michael]
think=PN Lisa [PROG cry=PN Michael]
'Lisa thought that Michael was crying.'
a. Back-shifted sET(cry) < mET(think) < UT
Context: *When Lisa saw Michael earlier, he was covering his face. Looking back, Lisa thought "Michael was crying."*
b. Simultaneous sET(cry)=mET(think) < UT
Context: *Lisa saw Michael covering his face and thought "Michael is crying."*
c. #Forward-shifted mET(think) < sET(cry)

The same compatibility with both back-shifted and simultaneous readings is observed under the future marker *dim* (35). Note that the subordinate ET follows the UT in both cases, which shows that if Gitksan indeed has a covert non-future tense, it must be a relative tense.[12]

(35) Dim wilaax-i=s nox-'m [win yukw hahla'lsd-in]
FUT know-TR=PN mother-1PL.II [COMP PROG work-2SG.II]
'Our mother will know that you were/are working.'
(modelled on Chen et al., 2020: (21))
a. Back-shifted UT < sET(work) < mET(know)
Context: *Your sister doesn't want to work, so you encourage her to finish her work before your mother gets home.*
b. Simultaneous UT < sET(work)=mET(know)
Context: *Your sister doesn't want to work, so you encourage her to show herself working when your mother gets home.*

The compatibility with both back-shifted and simultaneous readings is observed in relative clauses as well (36).

(36) Nee=dim=dii=dip ts'ilim anook=hl [get=hl (#dim) siipxw-it]
NEG=FUT=FOC=1PL.I in allow=CN [man=CN (#FUT) sick-SX]
'We will not let in people who are/were sick.'
a. Back-shifted UT < sET(sick) < mET(not let in)
Context: *Invitation for a party three months later. Those who were sick within two weeks before the party can't enter.*
b. Simultaneous UT < sET(sick)=mET(not let in)
Context:... *People who are sick at the time of the party can't enter.*

[12]Matthewson (2006) presents analogous data in another morphologically tenseless language, St'át'imcets, as evidence that the future marker *kelh* shifts the EvalT of the subordinate covert non-future tense. Matthewson's analysis of St'át'imcets originally motivated Jóhannsdóttir and Matthewson's tensed analysis of Gitksan.

The above data have demonstrated that simple matrix clauses, attitude complements, and relative clauses in Gitksan parallel SOT in past-under-past constructions in English: they are all compatible with both back-shifted and simultaneous contexts.[13] Given this empirical parallel, it is worth applying the tense operator-less account motivated by the English SOT phenomena to Gitksan.

5. Temporal pronoun as a semantic primitive in Gitksan

Before applying the tense operator-less account to Gitksan, recall that this account is semantically 'tensed' in a sense that it still postulates times as semantic primitives and temporal pronouns as elements of the lexicon. This section provides empirical evidence for the existence of a covert temporal pronoun in Gitksan.

In support of pronominal analyses of tense, Partee (1973) demonstrated that tenses in English can receive deictic (37), anaphoric (38), and bound (39) readings analogous to those observed in personal pronouns.

(37) Context: *Driving on a highway, you suddenly realize and say:*
I didn't turn off the stove. (Partee, 1973: 602(3))

(38) Sheila had a party last Friday and Sam danced. (adapted from Partee, 1973: 605(10))

(39) When you eat fast food, you're always hungry an hour later.
(adapted from Partee, 1973: 606(20))

Another diagnostic for pronominal tense is proposed by Heim (2015), who demonstrates that the infelicity of a past imperfective sentence in an out-of-the-blue context (40) can only be predicted by the pronominal rather than existential approach to tense.

(40) Context: *Out of the blue*
a. #John was attending a private school. (Heim, 2015: 2(14))
b. John went to a private school. (Partee, 1973: 603(6))

Both of these diagnostics were originally applied to English, which in my analysis allows a T head filled by a temporal pronoun with or without a presuppositional tense operator. Strictly speaking, what these diagnostics are picking up is the existence of a temporal pronoun denoting the RT, regardless of whether or not it is restricted by a tense operator. Therefore, these diagnostics can be applied to Gitksan to diagnose the presence of a temporal pronoun, independently of whether or not the language has a presuppositional tense operator.

Simple matrix clauses in Gitksan allow deictic (41), anaphoric (42), and bound (43) readings.

(41) Context:*You're driving on a highway, suddenly you realize and say:*
Nee=dii=n ts'eg=ehl an-mehl-i=hl lekw
NEG=FOC-1SG.I extinguish=CN NMLZ-burn-T=CN fire
'I didn't turn off the stove.'

[13] I recognize that the terms 'back-shifted' and 'simultaneous' are usually reserved for interpretations of subordinate tenses with respect to the matrix ET. It will be clear in Section 6 that for analytical purposes, past and present readings of a simple matrix sentence can be subsumed under 'back-shifted' and 'simultaneous' readings, respectively.

(42) Li'ligit Sheila ga-doo'o=hl ganuutxw [ii miiluxw=s Sam]
feast Sheila DSTR-ROOT=CN week [CCNJ dance=PN Sam]
'Sheila had a party last week, and Sam danced.'

(43) Ligi nda win mokw-t=hl hun [si-mi'yen-din-t]
DWID WH COMP catch-3SG.II=CN fish [CAUS1-smoke-CAUS2-3SG.II]
'Whenever he catches fish, he makes smoked fish.'

Out-of-the-blue infelicity of an imperfective sentence in a past context is also replicated in Gitksan (44).

(44) Context: *You run into your friend. You tell him, "Hey,...*
a. #Yukw=na t'aahl(=hl) maa'y
PROG=1SG.I pick(=CN) berry
'I was picking berries.'
b. T'aahl-i-'y=hl maa'y
pick-TR-1SG.II=CN berry
'I picked berries.'

Both diagnostics point to the existence of a temporal pronoun denoting the RT in Gitksan.

6. Tense operator-less account of Gitksan

Given the above empirical evidence for the existence of a temporal pronoun denoting the RT in Gitksan, I now proceed to apply my tense operator-less account of SOT in English to morphological tenselessness in Gitksan. In this account, every T head in Gitksan is filled with a covert temporal pronoun referring to the RT (45), which is not restricted by any tense operator. To rule out unavailable forward-shifted readings, I refer to Abusch's ULC (12).

(45) $[\![\text{pro}_n]\!]^{g,c} = g(n)$

(32) is analyzed in (46), assuming the existence of a covert perfective marker and a covert eventuality variable (8). The reference of pro_1, g(1), has no temporal restriction; this is why the sentence is compatible with both simultaneous and back-shifted contexts.

(46) $[\![\text{w* pro}_1 \text{ PFV } e_1 \text{ luu am=hl goot=s Diana}]\!]^{g,c} = \tau(e_1) \subseteq g(1)$ & Happy(Diana)(e_1)(w*)

To rule out a forward-shifted reading, I propose to extend the ULC so that the upper limit of pro_1 in the matrix clause is the speaker's now, or the UT; this should be a reasonable move given the existing proposals to represent the speaker role syntactically (e.g., Ross, 1970).

In attitude complements (34 analyzed in 47), the upper limit of the matrix RT, g(1), is still the UT, and that of the subordiante RT, g(2), is the attitude holder's *now*, or in this case Lisa's thinking time. This accounts for the compatibility with both back-shifted and simultaneous contexts and the unavailability of a future reading.

(47) Ha'niigoot=s Lisa [yukw wiyitxw=s Michael]
think=PN Lisa [PROG cry=PN Michael]
'Lisa thought that Michael was crying.'
$[\![$w* pro$_1$ PFV e$_1$ ha'niigoot=s Lisa pro$_2$ yukw e$_2$ wiyitxw=s Michael$]\!]^{g,c}$ = τ(e$_1$)$\subseteq$g(1)
& $\forall$w[w$\in$THINK(Lisa, e$_1$, w*) $\rightarrow$ g(2)$\subseteq$ τ(e$_2$) & cry(Michael)(e$_2$)(w)]

In summary, the compatibility of morphologically tenseless matrix and subordinate clauses with both back-shifted and simultaneous contexts can be predicted without a tense operator.

7. Distribution of the future marker *dim* in Gitksan *before/after* clauses

The tense operator-less account of Gitksan developed in Section 6 predicts that *before/after* clauses in Gitksan should parallel the LFs of the English counterparts. Recall that in my analysis, tense morphemes in English *before/after* clauses are merely manifestations of morphosyntactic agreement, and these clauses lack a tense operator; they solely rely on the lexical items *before* and *after* to locate the subordinate ET in relation to the matrix ET. If *before/after* clauses in Gitksan similarly lacked a tense operator, they should also depend on the lexical items *hlagook/xsgook* 'before' and *hlis* 'after' to locate the subordinate ET with respect to the matrix ET. Crucially, they should never require the future marker *dim*, which would be redundant. This prediction turns out to be wrong.

Before clauses in Gitksan always require the future marker *dim* regardless of the temporal relation among the matrix and subordinate ETs and the UT (48, 49).

(48) Daa'whl=t Alex [hlagook/xsgook *(dim) (k)'witxw=s Blake]
leave=PN Alex [before *(FUT) arrive=PN Blake]
Lit: 'Alex leave before Blake WOLL arrive.' ('Alex left before Blake will arrive.')
a. mET < sET < UT
b. mET < UT < sET

(49) Dim {daa'whl/ha'w}=t Alex [hlagook/xsgook *(dim) (k)'witxw=s Blake]
FUT {leave/go.home}=PN Alex [before *(FUT) arrive=PN Blake]
Lit: 'Alex WOLL leave before Blake WOLL arrive' ('Alex will leave before Blake will arrive.')

After clauses lack the future marker *dim* as long as the subordinate ET precedes the UT (50, 51).

(50) (K)'witxw=t Blake [hlis daa'whl=s Alex]
arrive=PN Blake [after leave=PN Alex]
Lit: 'Blake arrive after Alex leave.' ('Blake arrived after Alex left.')
sET < mET < UT

(51) Dim (k)'witxw(=s) Blake [hlis daa'whl=s Alex]
FUT arrive=PN Blake [after leave=PN Alex]
Lit: 'Blake woll arrive after Alex leave.' ('Blake will arrive after Alex left.')
sET < UT < mET

However, perhaps unexpectedly, *after* clauses require the future marker *dim* if the subordinate

ET follows the UT (52).

(52) Dim (k)'witxw=s Blake [hlis #(dim) daa'whl=s Alex]
FUT arrive=PN Blake [after #(FUT) leave=PN Alex]
Lit: 'Blake WOLL arrive after Alex WOLL leave.' ('Blake will arrive after Alex will leave.')
UT < sET < mET

The above data demonstrated that all *before* clauses and some *after* clauses in Gitksan require the future marker *dim*, contrary to the prediction of the tense operator-less account developed in Section 6. The reason why *dim* is required in these clauses even though the temporal location of the subordinate ET is fully recoverable from the lexical items *hlagook/xsgook* 'before' and *hlis* 'after' must be that the temporal interpretations of these clauses would otherwise be incompatible with the requirements of *hlagook/xsgook* 'before' and *hlis* 'after'.

There is also a cross-linguistic reason for analyzing Gitksan with a tense operator: a tense operator-less account of Gitksan would not explain the contrast between Gitksan and Paraguayan Guaraní, a morphologically tenseless language that has received semantically tenseless analyses (Tonhauser, 2011; Pancheva and Zubizarreta, 2019). Tonhauser's (2011) argument for a tenseless analysis of Paraguayan Guaraní comes from the availability of future readings without a prospective marker in various matrix and subordinate contexts, one of which is a *before* clause. Notice that in (53), the lexical item *mboyve* 'before' requires that the subordinate ET follows the matrix ET, and the context forces it to follow the UT.

(53) Re-ho-mboyve, re-karú-ta.
A2sg-go-before A2sg-eat-PROSP
'Before you leave, you are going to eat.' (Tonhauser, 2011: 275(31b))
Context: *I'm getting ready to leave the house. Maria tells me:*

In summary, the distribution of the future marker *dim* in *before/after* clauses supports the existence of a covert tense operator in Gitksan, both from intra- and cross-linguistic perspectives.

8. Relative pronominal non-future tense analysis of Gitksan

Recall that if Gitksan has a covert non-future tense it must be a relative tense (Section 4). I also demonstrated that Gitksan has a covert temporal pronoun corresponding to the RT (Section 5) and argued that the occurrence of the future marker *dim* in *before/after* clauses is due to the existence of a covert non-future tense operator in these clauses (Section 7). Synthesizing these pieces of evidence, I propose that Gitksan has a covert relative pronominal tense, which consists of a presuppositional relative non-future operator (54a) and a temporal pronoun corresponding to the RT (54b). The non-future operator (54a) takes a time t and encodes the presuppositions that t is no later than the EvalT t_i and that t is the maximal interval in the set of salient times R_c.

(54) a. $[\![\text{NON-FUT}]\!]^{g,c,i} = \lambda t\text{: } t \leq t_i \ \&\ t{=}\sigma[R_c].\ t$
b. $[\![\text{pro}_n]\!]^{g,c,i} = g(n)$

Unlike English, Gitksan does not allow a T head without the non-future operator. To be clear, the SOT rule is irrelevant to Gitksan; as SOT phenomena in English are due to morphosyntactic agreement in my account, being morphologically tenseless, Gitksan is never subject to the SOT rule. Unless additional data suggest otherwise, every T head is filled with both the non-future operator and the pronoun.

The future marker *dim* was originally analyzed as being existential (Jóhannsdóttir and Matthewson, 2007), but it must be revised as a non-existential operator given that it is required in *before* clauses (48, 49). It has been argued that an existential temporal marker, whether it is an existential past tense (Sharvit, 2014) or a future marker like the English WOLL (von Stechow, 2009), is semantically incompatible with the denotation of *before* (see also Section 3.2). Assuming that the denotation of *hlagook/xsgook* 'before' is identical to that of English *before*, I propose a non-existential denotation of *dim* (55a): it takes two temporal arguments, the first of which is filled by a covert temporal pronoun (55b) similar to the one I postulated in the T head. *Dim* (55a) takes t_1, the denotation of the AspP, P, another temporal argument t', and a world variable w, and asserts that t follows t' and that P holds at t in w.

(55) a. $[\![dim]\!]^{g,c,i}_{\langle i,\langle\langle i,st\rangle,\langle i,st\rangle\rangle\rangle} = \lambda t.\ \lambda P_{\langle is,t\rangle}.\ \lambda t'.\ \lambda w.\ t' < t\ \&\ P(t)(w)$

b. t_1

Again, I assume the existence of a covert perfective marker and a covert eventuality variable (8) in the absence of an overt aspectual marker. The overt progressive marker *yukw* has the denotation in (56a), which takes a covert eventuality variable as its first argument (56b).

(56) a. $[\![yukw]\!]^{g,c,i}_{\langle v,\langle\langle v,st\rangle,\langle i,st\rangle\rangle\rangle} = \lambda e.\ \lambda P_{\langle v,st\rangle}.\ \lambda t.\ \lambda w.\ t \subseteq \tau(e)\ \&\ P(e)(w)$

b. e_1

The denotation (35) is provided in (57). While the presupposition of the matrix non-future tense requires the matrix RT, g(1), to be no later than the UT, the subordinate RT, g(2), is required to be no later than the matrix ET and unordered with respect to the UT. This explains why the subordinate ET can follow the UT without the future marker *dim* in the complement and correctly predicts that the sentence is compatible with both back-shifted and simultaneous contexts.

(57) Dim wilaax-i=s nox-'m [win yukw hahla'lsd-in]
FUT know-TR=PN mother-1PL.II [COMP PROG work-2SG.II]
'Our mother will know that you were/are working.'
$[\![$w* NON-FUT pro_1 *dim* t_1 PFV e_1 *wilaax-i=s nox-'m win* NON-FUT pro_2 *yukw* e_2 *hahla'lsd-in*$]\!]^{g,c,i}$ = $g(1) < t_1$ & $(e_1) \subseteq t_1$ & $\forall w[w \in$ KNOW(our mother, e_1, w*) $\rightarrow g(2) \subseteq \tau(e_2)$ & work(you)$(e_2)(w)]$
where $g(1) \leq t_c$ & $g(1) = \sigma[R_{c1}]$, $g(2) \leq \tau(e_1)$ & $g(2) = \sigma[R_{c2}]$

In *before/after* clauses, the most straightforward explanation for the requirement of the future marker *dim* in all *before* clauses and some *after* clauses is to say that the EvalT of the subordinate non-future tense in these clauses is the RT of the matrix non-future tense. For example, assuming that the denotation of *hlagook/xsgook* 'before' is identical to that of *before* (24b), in the denotation of (48) provided in (58), the subordinate RT, g(2), must be no later than the RT of the matrix non-future tense, g(1). Therefore, without the future marker *dim*, the requirement of the subordinate non-future tense would contradict the denotation of *hlagook/xsgook* 'before',

which requires that g(1) precedes the earliest time at which Blake arrives in the actual world.

(58) Daa'whl=t Alex [hlag̲ook̲/xsg̲ook̲ *(dim) (k)'witxw=s Blake]
leave=PN Alex [before *(FUT) arrive=PN Blake]
'Alex leave before Blake woll arrive.' ('Alex left before Blake will arrive.')
a. mET < sET < UT b. mET < UT < sET
$[\![$w* NON-FUT pro_1 PFV e_1 *Daa'whl=t Alex hlag̲ook̲/xsg̲ook̲* λt_α NON-FUT pro_2 *dim* t_1 PFV e_2 *(k)'witxw=s Blake* $t_\alpha$$]\!]^{g,c,i}$ = $\tau(e_1) \subseteq$ g(1) & Alex-leave(e_1)(w*) & g(1) < EARLIEST[λt_α. λw. g(2) < t_1 & $\tau(e_2) \subseteq t_1$ & Blake-arrive(e_2)(w) & t_1=t_α](w*)
where g(1)≤t_c & g(1)=$\sigma[R_{c1}]$, g(2)≤g(1) & g(2)=$\sigma[R_{c2}]$

In summary, the covert relative pronominal non-future tense accounts for the compatibility of matrix clauses, attitude complements, and relative clauses with both back-shifted and simultaneous contexts, which initially motivated the tense operator-less account of morphological tenselessness. Moreover, unlike the tense operator-less account, the non-future tense account provides an explanation for the distribution of the future marker *dim* in *before/after* clauses as well as the difference in this regard between Gitksan and another morphologically tenseless language, Paraguayan Guaranńi (Tonhauser, 2011; Pancheva and Zubizarreta, 2019).

9. Conclusion

This paper proposed to account for the SOT phenomena in English by a tense operator-less analysis, or an analysis involving a temporal pronoun without a tense operator restricting its referent, and upon demonstrating that this account does not extend to Gitksan, I argued for the existence of a covert relative pronominal non-future tense in Gitksan. In this process, I demonstrated striking empirical similarities between the SOT phenomena in English and temporal interpretations of matrix clauses, attitude complements, and relative clauses in Gitksan, which are perhaps masked by the superficial difference between an overtly tensed language with morphosyntactic tense agreement on the one hand and a morphologically tenseless language on the other. The tense operator-less analysis first developed to account for the SOT phenomena in English was successfully extended to account for matrix clauses, attitude complements, and relative clauses in Gitksan, with independent evidence that Gitksan has temporal pronouns as part of its lexicon. Although eventually deemed inapplicable to Gitksan, the tense operator-less account offered a new perspective on both SOT and morphological tenselessness. For English, the tense operator-less analysis accounted for, in addition to the (classic) SOT phenomena in attitude complements, the puzzling interpretations of present-under-*will* relative clauses (Abusch, 1998) and the lack of an otherwise available deictic reading of the present tense in *before* clauses. The tense operator-less analysis may still be a viable option for morphologically tenseless languages and clauses outside of Gitksan (see also Mucha, 2013 on Hausa; Bochnak, 2016 on Washo), and this paper has shown exactly what those languages and clauses would look like.

Crucial evidence against the tense operator-less account of Gitksan was the occurrence of the future marker *dim* in *before/after* clauses and its contrast from another morphologically tenseless language, Paraguayan Guaranńi (Tonhauser, 2011; Pancheva and Zubizarreta, 2019), which in turn served as support for the existence of a covert non-future tense operator in Gitksan. This

result calls for similar investigations of temporal interpretations across subordinate contexts to arrive at an accurate picture of the temporal system, especially when it may be covert.

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