

BUNDLING PERFECTIVE AND PERFECT: THE ATAYAL *WAL**

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1 Introduction

This paper provides an analysis for the semantics of the preverbal auxiliary *wal* in Atayal, an Austronesian language spoken in Taiwan.¹ *Wal* is grammaticalized from a past verb of motion (Huang 2008), and has been described or glossed in different ways in the literature, as a past tense (Egerod 1965, 1980, Rau 1992) or a perfective aspect (Huang 1993), due to lack of focal attention on its semantics.

In this paper, I show that *wal* possesses properties of anteriority and temporal boundedness which cannot be captured by a simple past tense or a perfective aspect. I then apply diagnostics that identify various properties of the English perfect, and show that *wal* shares with the English perfect the possession of result state readings and of a current relevance requirement. Building upon the theory of Perfect Time Span (Iatridou et al. 2003, Portner 2003, Rothstein 2008, among others), I pursue a proposal whereby *wal* is a perfect aspect bundled with a perfective component. I show how this proposal in conjunction with pragmatic competition with other temporal/aspectual markers in the language explains the ways in which *wal* differs from the English perfect, namely (a) the absence of universal and experiential perfect readings, (b) the compatibility with definite past-time adverbs, and (c) the (un)acceptability in contexts with a result state.

The rest of the paper is structured as follows. Section 2 provides arguments against analyzing *wal* as a simple past tense or a simple perfective aspect. Section 3 illustrates the behavior of *wal* with predicates of different aspectual classes. Section 4 shows how *wal* is similar to and different from the English present perfect. Section 5 presents my proposal. Section 6 concludes.

* I thank Lisa Matthewson and Hotze Rullmann for their guidance and suggestions on various versions of this work. For helpful comments I thank abstract reviewers for TripleA3, SuB21, and GLOW-in-Asia XI, and audiences at Academia Sinica, and GLOW-in-Asia XI. Deepest thanks to my Atayal consultants for countless effort that they have put into teaching me. All remaining errors are my own.

¹ The dialect investigated in this study is Sqliq Atayal spoken in Taoshan Village, Wufeng Township, Hsinchu County, Taiwan.

2 Atayal *Wal* Cannot be a Past Tense or a Perfective Aspect

Atayal *wal* has been described as a past tense (Egerod 1965, 1980, Rau 1992) or a perfective aspect (Huang 1993), but a close examination shows that *wal* doesn't behave like either. The event in the scope of *wal* can be anterior to a future time, as given in (1), which shows that the reference time of *wal* is not restricted to the past, as a past tense would do.

- (1) Context: *You're going to eat right now but Tali' asks you to wait for him. You reply:*
 musa'=saku' *wal* rima' maniq kya kira' la.²
 FUT=1S.ABS WAL first eat.AV LOC today.later PRT
 'I will have already eaten by then.'

Furthermore, a past-tense analysis would predict that *wal* can combine with the progressive aspect, yielding a past progressive reading. This prediction is not borne out; *wal* is incompatible with the progressive aspect in either word order:

- (2) *{*wal* *cyux* / *cyux* *wal*} m-qwalax la.
 WAL PROG.PROX / PROG.PROX WAL AV-rain PRT
 Intended for 'It was raining.'

Another difficulty for analyzing *wal* as a past tense is that it would not readily explain why stative verbs, which are ambiguous between a homogeneous and inchoative reading when they are aspectually unmarked, are only accepted as inchoative when combined with *wal*. If *wal* were a simple past tense, (3) would be able to be translated as 'Tali' was big', and in contexts of past homogeneous states like in (4), *wal* would be felicitous. In this respect, *wal* rather patterns like an aspectual marker, which across languages exhibits restrictions with respect to lexical aspect.

- (3) *wal* krahu' qu Tali' la.
 WAL big.AV ABS Tali' PRT
 'Tali' got big(er).' / ≠ 'Tali' was big.

- (4) Context: *You see Tali's size is beyond the kids' average.*
 (#*wal*) krahu' qu Tali'.
 WAL big.AV ABS Tali'
 'Tali' is big.'

Wal also cannot be analyzed as a simple perfective aspect that places the event time inside the reference time, because *wal* has a back-shifting effect, shown not only in (1) but also in (5):

² Abbreviations: 1 = first person; 3 = third person; ABS = absolutive; AV = actor voice; CAUS = causative; CONJ = conjunction; DIST = distal; ERG = ergative; EVID = evidential; FUT = future; GEN = genitive; LOC = locative; LV = locative voice; N = Neuter; NEG = negation; P = plural; PRT = particle; PROG = progressive; PROX = proximal; PST = past; PV = patient voice; S = singular; STA = stative; TOP = topic; VBLZ = verbalizer.

(5) Context: *You joke about the way he spoke Atayal, “When I heard it, I couldn’t help but laugh.”*

pawng-an=maku’ kkayal=nya’ kay’ na ’tayal lga, (#wal) m-syaq=saku’ la.
listen-LV=1S.ERG speaking=3S.ERG word GEN Tayal PRT.TOP WAL AV-laugh=1S.ABS PRT
‘When I heard him speak Atayal, I laughed.’

Without *wal*, the matrix laughing event is consecutive to the subordinate hearing event, but with *wal*, the former is anterior to the latter, which causes the infelicity in the context of (5). The anteriority effect holds for other lexical classes in addition to the activity verb in (5): an accomplishment in (6), an achievement in (7), and an inchoative state in (8).

(6) tayhuk qu Tali’ lga, wal=naha kblay-un qu ngasal la.
arrive.AV ABS Tali’ PRT.TOP WAL =3P.ERG make-PV ABS house PRT
‘When Tali’ arrived, they had built the house.’

(7) mwah=saku’ shira’ ga wal=nya’ p-k-tunux-un bzyuwak qasa.
AV-come=1S.ABS yesterday TOP WAL =3S.ERG CAUS-VBLZ-head-PV boar that
‘When I came yesterday, he had killed that boar.’

(8) kt-an=maku’ Tali’ sa kawas wayal lga, wal qthuy iyal la.
see-LV=1S.ERG Tali’ LOC year past PRT.TOP WAL fat.AV very PRT
‘When I saw Tali’ last year, he had got much fatter.’

The anteriority effect also correlates with the fact that *wal* doesn’t move the reference time forward in narratives, unlike what is assumed for perfectives (Partee 1984, Kamp and Reyle 1993). A perfective sentence would describe an eventuality as temporally ordered after the eventuality described in the previous sentence, but such a function falls on unmarked forms in Atayal.

I have presented evidence that falsifies a past-tense and a perfective-aspect hypothesis. Unlike a past tense, *wal* is not temporally restricted to the past, incompatible with the progressive aspect, and results in an inchoative effect with states. Unlike a perfective aspect, *wal* is equipped with anteriority. I conclude that *wal* is neither a past tense nor a perfective aspect marker.

3 Interactions with Lexical Aspect

One salient feature that the marker *wal* imposes on every lexical aspect is boundedness. Sentences containing *wal* represent situations as temporally reaching a terminal point, beyond which the situations cannot continue (Declerck 1995, Depraetere 1995). *Wal* does not mark telicity, which concerns whether events have an intrinsic final point; as will be shown below, accomplishment and activity events in the scope of *wal* still reveal a telicity difference.

With accomplishments, *wal* ensures that the described event culminates; attempting to cancel the completion of the event results in a contradiction:

(9) *wal* kblay-un ni Watan sa kawas wayal (#ga ini’ tmasuq na’).
WAL make-PV ERG Watan LOC year past TOP NEG finish.AV still
‘Watan built the house last year (#but he didn’t finish it yet).’

- (10) *wal* kblay-un ni Watan (#*ru cyux=nya' kblay-un na'*).
 WAL make-PV ERG Watan CONJ PROG.DIST=3SG make-PV still
 'Watan built the house (#and he is still building it).'

Activities have two types. One type of activities marked by *wal* is compatible with a continuation asserting that the event is not finished:

- (11) *wal* m-nbuw qwaw qu Tali' *ga ini'=nya' suqi*.
 WAL AV-drink wine ABS Tali' TOP NEG=3S.ERG finish.PV
 'Tali' drank wine but he didn't finish it.'

The other type shows a contradiction when they are conjoined with such a continuation:

- (12) *wal* m-ngilis qu Tali' (#*ga nyuw ini' tmasuq na'*).
 WAL AV-cry ABS Tali' TOP PROG.PROX NEG finish.AV still
 Intended for '??Tali' cried but he has not finished it yet.'

The infelicity however is not because the event has to culminate but rather because the event has no culmination at all; firstly, the unmarked counterpart is still incompatible with the same continuation:

- (13) m-ngilis qu Tali' (#*ga nyuw ini' tmasuq na'*).
 AV-cry ABS Tali' TOP PROG.PROX NEG finish.AV still
 Intended for '??Tali' cried but he has not finished it yet.'

Moreover, both types of activities in the scope of *wal* cannot be continued with an assertion that the event is still ongoing, as given in (14-15); this indicates that *wal* imposes a termination rather than culmination point on activity events.

- (14) *wal=saku'* maniq (#*ru cyux=saku' maniq na'*).
 WAL=1S.ABS eat.AV CONJ PROG.DIST=1S.ABS eat.AV still
 'I ate/have eaten (#and I am still eating).'
 Consultant's comment: "No, you can't say *cyux maniq* after you said *wal maniq*."
 "You can add *bung su' nanak qani hya' la* 'the rest is yours'."

- (15) *wal* m-ngilis mlhngan shira' (#*ki'a cyuw m-ngilis na'*).
 WAL AV-cry night yesterday may PROG.DIST AV-cry still
 'She cried last night. (#Maybe she is still crying).'
 Consultant's comment: "It doesn't sound logical." "The first part sounds like 'he already cried yesterday'."

As for achievements and inchoative states, both culminate; the completion of the dying event in (16), and the change from not being tired to being tired in (17) cannot be cancelled:

(16) Context: *You describe to your friend how Rimuy's husband survived an accident.*

wal m-huqil qu mlikuy=nya' la, *ulung* *ini'* *huqil*.

WAL AV-die ABS man=3S.GEN PRT fortunately NEG die.AV

Intended for 'Her husband was dying, but fortunately he didn't die.'

Consultant's comment: "No!" "Maybe I haven't taught you how to say "dead" and "not dead"?"

(17) Context: *Describe that Tali' almost got exhausted.*

wal balay m-'uy hiya' ga *nyux* *ini'* *k-'uy* *la*.

WAL truly AV-tired 3S.N TOP PROG.PROX NEG STA-tired.AV PRT

Intended for 'He was getting really tired but has not got tired.'

Overall, the result shows that final points of events (i.e., a termination point for atelic events and a culmination point for telic events) are not cancellable for verbs of any lexical aspectual class when they are marked with *wal*. I conclude that *wal* places a right-edge temporal boundary for the VP-event.

4 A Restricted Type of Perfect

In this section I explore an analysis of *wal* as a perfect. A perfect analysis nicely predicts that *wal* has an anterior reading, and is temporally unrestricted, but does not straightforwardly capture the boundedness effect, the inchoative reading with stative predicates, and the incompatibility with the progressive aspect. There is also an empirical question as to whether or not *wal* possesses other readings and properties of a perfect. I compare the Atayal *wal* with the English present perfect *have*, which is well studied and can serve as a comparison model.

The present perfect in English has been characterized as having at least three readings: experiential-perfect readings, universal-perfect/continuous readings, and result state readings, and a set of pragmatic properties (McCawley 1971, 1981, Comrie 1976, McCoard 1978, and many others). In what follows, I show that the Atayal *wal* exhibits only partial similarities with the English perfect.

4.1 Properties Shared with the English Present Perfect

A similarity to the English present perfect is that *wal* allows a result state reading, typically associated with change-of-state predicates. *Wal* is felicitously uttered in a context where the state resulting from the described event remains at the speech time:

(18) Context: *You and a group of friends climb Jade Mountain. A friend is way ahead of you guys. Shortly, another friend reports to you that he is already at the summit.*

wal rima' tayhuk kya' hiya' la.

WAL already arrive.AV there 3S.N PRT

'He has already arrived there.'

If the context makes it clear that the relevant result state has ended, *wal* cannot be used; instead, the past tense *-in-* is appropriate:

(19) Context: *Describe to your friend how you lost your watch and found it.*

- | | |
|---|---|
| a. # <i>wal</i> m-gzyuwaw la.
WAL AV-lost PRT
Intended for ‘My watch got lost.’ | b. m-< <i>in</i> >gzyuwaw tuki=maku’.
AV-<PST>lost watch=1S.GEN
‘My watch has (once) got lost.’ |
|---|---|

Nevertheless, a current result state is not required. In (20), the state of being drunk is less likely to remain at the speech time (and it is not the focus of the question) but *wal* is still felicitous.³

(20) Context: *You drank with your friends yesterday but you left early. Today you ask whether one of them got drunk.*

- wal* m-busuk shira’?
WAL AV-drunk yesterday
‘Did he get drunk yesterday?’

Another similarity is that when using *wal*, the speaker considers that there is a link of some sort between the past situation and the present context, often labeled ‘current relevance’ or ‘present relevance’ for the present perfect (McCoard 1978, Inoue 1979, McCawley 1981, Depraetere 1998, Portner 2003, Nishiyama and Koenig 2010, a.o.). In some cases, the relevant proposition is explicitly stated:

- (21) *wal* m-bka’ qu tubung lru *ghzyaq balay qbyan*.
WAL AV-break ABS window PRT.CONJ cold.AV truly night
‘All the windows have broken so it’s very cold in the night.’

In others, the current relevance implicitly hinges on the context. The sentence was volunteered in the context of (22) but was judged as marginal when uttered out of the blue by the same speaker, which shows that the event of passing away is currently relevant to the listener’s greeting.

(22) Context: “*How is the chief?*” asked by someone who hasn’t long heard his news.

- wal* m-huqil sa kawas wayal la.
WAL AV-die LOC year past PRT
‘He died last year.’

In (23), the *wal* sentence is uttered not to inform about the past event of my chopping bamboo but to provide a courtesy offer to the listener; the same sentence however is judged infelicitous when the context is part of a chat, in which the past event bears no direct relevance to the interlocutors’ current state of mind.⁴

³ Cases like this are not comparable with the English present perfect, which cannot co-occur with a past time adverb; in this respect, the Atayal *wal* patterns more like the perfective in English.

⁴ Note that opposite to the judgment on the *wal* sentence, the counterpart with the past tense *-in-* is rejected in (23)-i and accepted in (23)-ii. The markers *wal* and *-in-* thus differ in the (lack of) current relevance, much like the difference between the present perfect and the past tense in English.

- (23) *wal*=maku' tt-un shira' mpuw msyaw ruma' la.
 WAL=1S.ERG chop-PV yesterday ten rest bamboo PRT
 'I (have) chopped more than ten pieces of bamboo yesterday.'
 (i) Context with current relevance: *You hear that Tali' is asking people for some bamboo, and you intend to offer him some.* Accepted
 (ii) Context without current relevance: *You chatted with your son over the phone, and you told him that you chopped some bamboo yesterday.* Rejected

4.2 Properties Different from the English Present Perfect

Unlike English perfect, Atayal *wal* lacks experiential and universal perfect readings. The English perfect can assert that a given event has held at least once during an interval extending back from the speech time, while for universal perfect readings, the relevant event must start from a past time and continue through the reference time; in English, universal perfect readings require the presence of progressives and statives (Dowty 1979, Mittwoch 1988, Vlach 1993, Iatridou et al. 2003, Portner 2003). (24) exemplifies the two types of readings:

- (24) a. Mary has been to Vancouver three times since last year. (experiential reading)
 b. John has been running since 6 o'clock this morning. (universal reading)

In Atayal, experiential readings are not rendered by the marker *wal* but by the past tense *-in-*:

- (25) Context: "Has he ever hunted?" "Yes, ..."
 a. # *wal* q<m>alup mit sraral hiya'. b. q<m><n>alup mit sraral hiya'.
 WAL hunt<AV> goat before 3S.N hunt<AV><PST> goat before 3S.N
 Intended for 'He has (once) hunted before.' 'He has hunted goats before.'

A definitional feature of experiential readings is that they are often associated with an inference that recurrence of the event is possible at the utterance time, dubbed 'repeatability', 'present possibilities', 'present existence', or 'future possibility' (McCawley 1971, McCoard 1978, Inoue 1979, Michaelis 1994, Katz 2003, Portner 2003, a.o.). One of the proposals attributes the possible re-occurrence of the event to 'lifetime effects', which state that the referent of the subject must be alive at the utterance time, e.g., #*Einstein has visited Princeton*. A parallel fact involves events that naturally occur only once or those with an irreversible result, e.g., *John has died* has only a result state reading but not an experiential one (Depraetere 1998, Mittwoch 2008). Unlike an experiential perfect, the use of *wal* does not incur repeatability condition/lifetime effects. (26) shows that with an atelic event, and with the speaker's awareness of Egerod's life span, the *wal* sentence is still accepted.

- (26) Context: *Talking about who wrote an Atayal dictionary, the speaker is reminded of Egerod (1923-1995):*
wal miru' khu' na biru' na tayal qu Egerod qasa ma.
 WAL write.AV depot GEN book GEN Atayal ABS Egerod that EVID
 'It's said that Egerod has written an Atayal dictionary.'

Furthermore, *wal* is compatible with predicates of once-only events, such as the dying event in (22) above, and with properties that are not reversible in the actual world:

- (27) Context: *Rimuy was very beautiful but she got old now.*
wal nkis balay qu Rimuy la.
 WAL old.AV truly ABS Rimuy PRT
 ‘Rimuy has got really old.’ (cf. #‘Rimuy has been really old.’)

I therefore conclude that repeatability conditions are not relevant to *wal*. The lack of a repeatability effect is expected given that *wal* has no use as an experiential perfect.

Next consider universal perfect readings. First, *wal* is infelicitous in contexts that explicitly specify that the event persists to the utterance time:

- (28) Context: *The child has been playing the mouth harp since this morning. “It’s really noisy”, you complain.*
 # *wal* tlubuw aring mayzbuq ru qani na’ qu laqi’ qani.
 WAL play.mouth.harp.AV start.AV morning CONJ this still ABS child this
 Intended for ‘This child has been playing the mouth harp starting from this morning *and* is still playing now.’

Moreover, in English, an individual-level stative that holds throughout an individual’s life is only felicitous in a universal perfect, e.g., *He has had brown eyes *(since he was born)* (Iatridou et al. 2003:160). The unacceptability of such a sentence in Atayal, exemplified by (29), evidences that *wal* has no universal perfect reading; in fact, the speaker’s comment suggests that the stative verb is only interpreted as inchoative, corroborating an earlier finding.

- (29) Context: *Tali’ is a big boy. He used to be big; ever since he was born he has been big!*
 # *wal* krahu’ hi’=nya’ aring squ m-htuw.
 WAL big.AV body=3S.GEN start.AV LOC AV-come.out
 Intended for ‘His body has been big since he was born.’
 Consultant’s comment: ‘*Wal krahu’* means he already got bigger.’

Lastly, Atayal *wal* can co-occur with definite past temporal adverbials, contrary to English present perfect, dubbed the ‘present-perfect puzzle’ by Klein (1992); see the examples (9), (15), (20), (22), and (23). A similar fact is however shared with perfects in Italian, German, Icelandic, Dutch, Latin, French, etc. (Giorgi and Pianesi 1997, de Swart 2007).

Table 1 summarizes the properties of the aspect *wal* in a comparison with the English present perfect *have*, with the differences highlighted. We have seen that the Atayal *wal* shares with *have* the ability to refer to an event anterior to the reference time, allowing a result state which obtains at the reference time, and bearing certain relevance effects to the current context. The differences between the two languages are that Atayal *wal* lacks experiential perfect readings, the repeatability condition/lifetime effects, and universal perfect readings, and exhibits no restriction on the occurrence of past time adverbials.

Table 1. Properties of *have* versus *wal*

Readings	<i>have</i>	<i>wal</i>
Anteriority	√	√
Result state	√	√
Current relevance	√	√
Experiential perfect	√	*
Repeatability/Lifetime effects	√	*
Universal perfect	√	*
Adverbial restrictions	√	*

5 The Proposal

I have presented a range of properties of *wal*, and have explored several hypotheses for *wal*, a past tense, a perfective, and a perfect. The empirical facts on *wal* can be summarized as follows: The marker *wal* imposes boundedness and anteriority effects on eventive predicates, thereby shifting backward the time of culmination/termination of the event from the reference time, and also inchoativity effects on statives; *wal* allows (but does not require) the result state to hold at the reference time, and co-occurs with definite past-time adverbs; the event in the scope of *wal* bears current relevance.

5.1 Bundling Perfective and Perfect

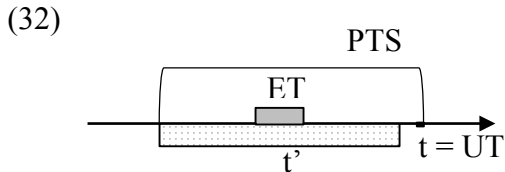
Based on these properties, which overlap with those of a perfective and of a perfect aspect at the same time, I propose that *wal* encodes the semantics of both types of aspectual markers. Specifically, *wal* is a perfect aspect restricted to bounded events. For the semantics of the perfect component, I follow the theory of the Perfect Time Span (Iatridou et al. 2003, Pancheva and von Stechow 2004, Rathert 2004, Rothstein 2008, Matthewson et al. 2015, a.o.), which originates from the Extended Now theory (McCoard 1978, Dowty 1979, Rathert 2004, Portner 2003; see also Bennett and Partee 1978, Inoue 1979, etc.). The shared intuition behind these theories is that the perfect describes an event, not anterior to a reference point, but included within an extended reference time interval. According to Iatridou et al. (2003), the left boundary of the interval, termed Perfect Time Span (PTS), can be set contextually or by some temporal adverbials, and the right boundary is set by tense (p. 158; 166); assuming that tense provides the reference time, it follows that the right boundary of PTS varies with the reference time. A formal definition of the PTS is given in (30), following Matthewson et al. (2015: 22):

- (30) $\text{PTS}_c(t)$ is the interval of which t is a final subinterval and whose left boundary is determined by c

My proposal is that Atayal *wal* not only introduces the PTS, as with the English perfect in Iatridou et al.'s characterization, but also requires that an event of the predicate P is instantiated within a non-final subinterval of the PTS. The semantics of perfective aspect is then built into the PTS by including inside that subinterval the runtime of the event described by the predicate. The lexical entry proposed for the aspect *wal* is as follow:

- (31) $[[wal]]^{g,c} = \lambda P_{\langle t, st \rangle}. \lambda t. \lambda w. \exists t' \exists e [t' \subseteq \text{PTS}_c(t) \wedge t' < t \wedge \tau(e) \subseteq t' \wedge P(e)(w)]$

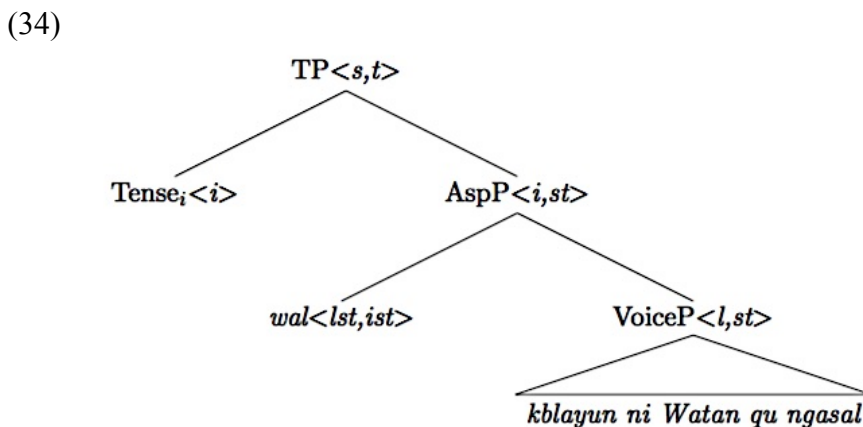
(31) says that *wal* takes a predicate P , a time t and a world w , and asserts that there is a subinterval t' of the PTS defined by t such that t' precedes t , and there is an event of P whose runtime is included within the interval t' . The interval t' can be any subinterval of the PTS as long as it doesn't overlap with t . (32) schematizes the relation of the subinterval t' (indicated by the lightly dotted area), the runtime of the P -event (indicated by the gray area), and the PTS (indicated by the span above the timeline):



It should be noted that the proposal that *wal* couples two aspects is a semantic amalgamation of two aspects rather than a syntactic implementation; the proposal does not imply that the Atayal *wal* spells out two aspectual heads in the syntax. I suggest that the marker *wal* is the head of an AspP, which takes a VoiceP as its argument; see (34) below. Since the aspect *wal* is of type $\langle lst, ist \rangle$, it is only compatible with predicates of events, which are of type $\langle l, st \rangle$, but not predicates of times, which are of type $\langle i, st \rangle$. I assume that the latter include homogeneous states and predicates marked by an aspect in Atayal. Thus, we correctly account for the inchoativity effect of *wal*-marked stative sentences, and the incompatibility of *wal* and the progressive aspect.

Now I illustrate how this proposal gives the right result for *wal*-marked eventive sentences. Take an accomplishment event in (33), which is durative and telic, for example.⁵ (34) is the LF structure of the sentence, and (35) gives the derivation of the truth conditions.

- (33) *wal* kblay-un ni Watan qu ngasal.
 WAL make-PV ERG Watan ABS house
 ‘Watan has built the house.’



⁵ The sentence in (33) in principle can receive a past and present interpretation; I analyze that Atayal has a covert tense variable denoted by the head of TP, which is restricted to a non-future time interval (Chen 2017), and the tense variable will saturate the first argument of the *wal* phrase, giving the correct interpretation depending on context. For simplicity, however, I only illustrate the present interpretation (which is also the out-of-the-blue reading) here, and assume that the utterance time fills in the time argument of the *wal* phrase, as in (35)c.

- (35) a. $\llbracket \text{VoiceP} \rrbracket^{\text{g,c}} = \lambda e. \lambda w. [\text{build}(e)(w) \ \& \ \text{agent}(\text{Watan})(e)(w) \ \& \ \text{theme}(\text{house})(e)(w)]$
 b. $\llbracket \text{AspP} \rrbracket^{\text{g,c}} = \llbracket \text{wal} \rrbracket^{\text{g,c}} (\llbracket \text{VoiceP} \rrbracket^{\text{g,c}})$
 $= [\lambda P. \lambda t. \lambda w. \exists t' \exists e [t' \subseteq \text{PTS}_c(t) \wedge t' < t \wedge \tau(e) \subseteq t' \wedge P(e)(w)]] (\lambda e. \lambda w. [\text{build}(e)(w)$
 $\ \& \ \text{agent}(\text{Watan})(e)(w) \ \& \ \text{theme}(\text{house})(e)(w)])$
 $= \lambda t. \lambda w. \exists t' \exists e [t' \subseteq \text{PTS}_c(t) \wedge t' < t \wedge \tau(e) \subseteq t' \wedge \text{build}(e)(w) \ \&$
 $\ \text{agent}(\text{Watan})(e)(w) \ \& \ \text{theme}(\text{house})(e)(w)]$
 c. $\llbracket \text{TP} \rrbracket^{\text{g,c}} = \llbracket \text{AspP} \rrbracket^{\text{g,c}}(t^*)$
 $= \lambda w. \exists t' \exists e [t' \subseteq \text{PTS}_c(t^*) \wedge t' < t^* \wedge \tau(e) \subseteq t' \wedge \text{build}(e)(w) \ \& \ \text{agent}(\text{Watan})(e)(w)$
 $\ \& \ \text{theme}(\text{house})(e)(w)]$

The resulting denotation in (35c) says that the sentence is true if there is an event e in a world w within a non-final subinterval t' of the PTS, whose final subinterval is no later than the utterance time, and e is an event of Watan building the house. Given that the runtime of the entire event is properly included inside t' , this denotation correctly predicts that the culmination of the event is anterior to the utterance time, yielding a perfect-and-perfective reading.

5.2 Explaining the Properties of *Wal*

Since *wal* requires the runtime of a P -event to be included inside a non-final subinterval of the PTS whose right boundary is demarcated by the reference time, i.e., $t' < t \wedge \tau(e) \subseteq t'$, both the anteriority and boundedness effects follow.

The boundedness effects mean that the described event is temporally over before the reference time. Therefore, we expect no universal perfect readings, which require the runtime of a P -event to extend throughout the PTS (either equal to the PTS or going beyond the reference time).

Since I assume that states in Atayal are either homogeneous or inchoative, the former of which denote a predicate of times and the latter a predicate of events, the aspect *wal*, being of type $\langle \text{lst}, \text{ist} \rangle$, only takes as an input an inchoative state. In other words, the inchoative effects are simply an eventive requirement for the complement of *wal*. While *wal* contributes anteriority and boundedness to inchoative states, the latter effect is not noticeable as inchoatives span a very short time and naturally culminate even without *wal*.

Given that *wal* introduces an existential quantification over a non-final subinterval of the PTS, which excludes the utterance time in the case of present perfect, the interval can be modified by a past time adverb. As a consequence, this proposal implies that the English perfect, which is incompatible with a past time adverb, should not involve such a non-final subinterval of the PTS in its semantics.

The event variable in the proposed formula in (31) predicts that *wal* allows for experiential perfect readings. The lack of experiential perfects, I argue, results from pragmatic competition with the past tense *-in-*, which simply encodes an existential quantification over past times at which the described event occurs, without involving any interval stretching from the present, or the reference time (i.e., the PTS) (Chen et al. 2017). In other words, although *-in-* and *wal* both assert the existence of a past event, the past tense *-in-* does so by quantifying over a time interval unambiguously prior to the reference time, whereas *wal* quantifies over a time interval that is prior to the reference time *and within the PTS*. In the use of experiential perfects, which only concerns a past occurrence of the described event, uttering a *wal* form would be more

informative than required, and hence Grice's Quantity maxim correctly predicts that an *-in-*marked form is chosen over a *wal*-marked one.

Since the state resulting from a change-of-state event is not part of the built-in semantics of *wal* (and may not be even entailed), a *wal*-marked form allows but does not enforce a result state to persist up to the reference time. Pragmatic reasoning also accounts for why the past tense *-in-* is chosen over *wal* in contexts where the result state is clearly undone before the utterance time (see (19) above) based on the fact that a cessation effect is triggered by the past tense *-in-* (Chen et al. 2017). Uttering the past tense sentence evokes a Gricean quantity implicature that the non-past tense sentence is not true, namely, the state does not hold at the utterance time (see Altshuler and Schwarzschild 2013). By contrast, no such implicatures are triggered with *wal* since *wal* always involves the PTS. Upon hearing a *wal* sentence, the hearer assumes that the result state persists until the utterance time in normal circumstances; if the hearer is given the evidence to the contrary, (i.e., the cessation implicature is present), then Quantity predicts that the past tense is chosen.

5.3 Current Relevance: the Work of the PTS

What I didn't include in the explanations above are current relevance effects of *wal*, which share with the English perfect. The exact nature of current relevance is difficult to pin down, and has been debated in the literature (McCoard 1978, Inoue 1979, Portner 2003, Nishiyama and Koenig 2004, 2010, Schaden 2013, a.o.). Given that the goal of this work is to explore the semantics of the morpheme *wal*, clarifying the debate would go too far.

Portner (2003) argues that the perfect presupposes that an answer is provided to a (explicit or implicit) question in the current conversation and the answer stands in an epistemic relation to the question. Portner further suggests that the presupposition of a current state of relevance to the discourse topic is only marked on the perfect, rather than on the simple past, although both share a similar temporal configuration (p. 502). Given that the PTS is a central component of the perfect and is lacking in the simple past, I assume that if adopting an approach along Portner's idea, the current relevance presupposition must be introduced by the PTS, and hence can be equally applied to the Atayal *wal*.

6 Conclusions

In this paper I have argued that the morpheme *wal* in Atayal encodes the ingredients of both a perfect and a perfective, based on novel data from interactions with lexical aspectual classes and a direct comparison to the English present perfect. While *wal* shares with the English perfect the core temporal semantics, anteriority, as well as the characteristic pragmatic effects including result state and current relevance, it differs from English in several respects: *wal* imposes a strict requirement for bounded events, hence giving no universal perfect readings, lacks experiential perfect readings, and co-occurs with definite past time adverbials. I have provided an analysis in the theory of the Perfect Time Span, in which *wal* is argued as a perfect aspect that requires the described event to fall within a non-final subinterval of the PTS. With the event being necessarily bounded within the PTS, this analysis accounts for the absence of universal perfect readings. I argued that the non-final interval, which is unambiguously situated in the past, is the key to the compatibility with past-time adverbials. The absence of experiential perfect readings was readily explained by pragmatic competition between *wal* and the past tense without ad hoc semantics or stipulation.

The correlation between the unavailability of unbounded events due to the bundled perfective ingredient, and the absence of universal perfect readings provide cross-linguistic evidence that languages vary in how they combine the perfect with a lower aspectual component (Iatridou et al. 2003, Pancheva 2003, Guekguezian 2016); The Atayal perfect is typologically unique in contributing the perfective meaning without an additional operator. The non-final subinterval of the Perfect Time Span, by which the perfective ingredient is defined, provides a possible avenue of looking at the present perfect puzzle (and the lack thereof) cross-linguistically.

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