Future-oriented Actuality Entailments: A puzzle from Tagalog*

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1. Background

Actuality Entailments (AE) of circumstantial modals are known to be tied to the presence of perfective aspect, either through aspectual morphology or through time adverbials that contribute past episodic interpretations. With an AE, a circumstantial modal construction comes to entail that its complement predicate has occurred in the actual world.

This phenomenon was first analyzed by Bhatt (1999), focusing on English examples like the ones below. Bhatt observed that a sentence like (1) is ambiguous between the two interpretations in (2). With the past episodic reading in (2a), an AE is generated, and the implication is that John actually did eat five apples in an hour. With the past generic reading in (2b), no AE is generated, and this implication is absent.

(1) John was able to eat five apples in an hour.

(2) a. Yesterday, John was able to eat five apples in an hour.
b. In those days, John was able to eat five apples in an hour.

More striking examples of this phenomenon can be found in languages that mark aspect overtly, such as French. The following examples from Hacquard 2006 show a contrast parallel to the one found in (2) that covaries with the choice of aspectual marking on the circumstantial modal *pouvoir*.[1]

*I would like to thank Luis Alonso-Ovalle and Bernhard Schwarz for their supervision and guidance on this project as well as the attendees of NELS 45 and the anonymous reviewers for helpful comments. All Tagalog data is from my own judgements as well as the judgements of other native speakers currently living in Manila. All errors are mine.

[1]The following glosses are used in this paper: PAST – past tense, PFV – perfective aspect, IMPF – imperfective aspect, PROSP – prospective aspect, AV – agent voice, PV – patient voice, LK – linker, POSS – possibility modal, ANG – *ang*-case, NG – *ng*-case. I use the last two glosses as a theory-neutral way of referring to the NP/DP-marking options in Tagalog, which are the subject of debate in the literature on this language.

(3) a. Jane *a pu* prendre le train, #mais elle a pris l'avion.
Jane can.PAST.PFV take the train but she took the.plane
'Jane was able to take the train, #but she took a flight.'

b. Jane *pouvait* prendre le train, mais elle a pris l'avion.
Jane can.PAST.IMPF take the train but she took the.plane
'Jane had the ability to take the train, but she took a flight.'

French (3a) corresponds to English (2a) with the past perfective *passé composé* morphology on *a pu* generating an AE. (3a) says that not only was it possible for Jane to take the train in the past, she actually did so. On the other hand, French (3b) corresponds to English (2b) with the past imperfective *imparfait* morphology on *pouvait* resulting simply in a modal sentence with a past interpretation. This sentence does not have an AE, and just conveys that it was possible for Jane to take the train, without saying anything about whether or not she actually did.

The examples in (3) also show us that AEs are indeed entailments. A continuation asserting something that is incompatible with the modal complement creates a contradiction only in the AE-containing sentence. Thus, asserting that Jane actually took a flight is contradictory in (3a) but not in (3b) because the former entails that Jane took the train while the latter is non-committal regarding Jane's transportation choice. The examples shown so far have involved possibility modals, but AEs can also be found with necessity modals, as noted by Hacquard (2006).

Formulating a compositional analysis of this phenomenon is non-trivial. It is not immediately obvious why the combination of a modal and an aspectual operator should result in an apparent elimination of the meaning contribution of the modal element. Nevertheless, recent analyses of AE (e.g., Hacquard 2006, Kratzer 2011) have taken this compositional route, deriving the AE without proposing technology that is specific to its generation. For these authors, AEs simply result from the interaction between a modal operator and an aspectual operator as they appear elsewhere in a particular language.

Interestingly, these analyses make different assumptions regarding the contribution of aspect, and so make different predictions for the distribution of AE. I argue that these predictions can be tested in Tagalog. In this paper, I present data from this langauge that I argue is more compatible with the proposal put forward by Hacquard (2006). The rest of this paper is organized as follows. Sections 2 and 3 present summaries of Hacquard 2006 and Kratzer 2011 respectively. Section 4 then introduces the data from Tagalog that bears on these two analyses. In Section 5, I consider seemingly conflicting data put forth by Matthewson (2012) and rather speculatively suggest a possible avenue of future research. Section 6 briefly concludes.

2. Hacquard 2006: A world-anchoring account

Hacquard (2006) derives AE by relying on the interaction of two main innovations: a world anchoring property on aspectual operators and an event identification principle that effectively transfers properties of events between worlds. Under this account, the temporal

information that is conveyed by aspect is irrelevant to the generation of AE, so other aspectual operators are predicted to also be able to give rise to AE. In this section, I summarize Hacquard's account and show how this prediction follows from it.

Let us first consider the role of aspect. Aspect is typically taken to situate the running time of an event in relation to some relevant time interval such as that provided by tense. For example, Comrie (1976) notes that perfective aspect treats an event as a single complete unit and situates its running time completely within the relevant time interval. One lexical entry capturing this characterization is given below, from Bhatt & Pancheva 2005 via Hacquard 2006.

(4) $[\![\text{PFV}]\!] = \lambda P \lambda t . \exists e \, [\tau(e) \subseteq t \wedge P(e)] .$

Hacquard (2006) proposes to update aspectual operators with an additional conjunct that anchors the relevant event to some possible world. This updated version is given below in (5), with the additional conjunct underlined.

(5) **World-anchoring property on aspect**
$[\![\text{PFV}]\!] = \lambda w . \lambda t . \lambda P . \exists e \, [\underline{e \text{ is in } w} \wedge \tau(e) \subseteq t \wedge P(e)]$

Hacquard (2006) further argues that circumstantial modals occupy a syntactically low position, so aspect takes scope over them, producing an LF like the one below in (6a). Under this configuration, the world argument that aspect receives is the actual world w^*. The resulting truth conditions are given in (6b).[2] They assert that some event e is an actual past-contained event, and that it is a train taking event by Jane in some accessible world.

(6) a. [PAST [PFV [can [Jane take the train]]]]
b. $\exists e [e \text{ part of } w^* \wedge \tau(e) \subseteq t_{past} \wedge \exists w' \in Acc(w^*) \, [\text{take-train}(w')(e)(\text{Jane})]]$

The truth conditions above alone are not sufficient to derive the AE. For this, we need Hacquard's second innovation, her event identification principle, given in (7). This principle ensures invariance of events across worlds, so the properties of the event anchored in the circumstantially accessible world w' hold for other worlds where e is anchored. Since e is also anchored in the actual world w^*, e must also be a train taking event by Jane in w^*, thus deriving the AE. The effects of (7) just described are schematized in (8).

(7) **Event Identification Across Worlds**[3]
For any w_1, w_2: If an event e occurs in w_1 and w_2 and e is described as a P-event in w_1, it will be identifiable as a P-event in w_2 as well.

(8) $\text{take-train}(w')(e)(\text{Jane}) \; + \; e \text{ part of } w^* \; + \; (7) \; \longrightarrow \; \text{take-train}(w^*)(e)(\text{Jane})$

[2] I follow Hacquard 2006 in treating tense as a pronoun whose temporal information is introduced via presupposition. I adopt the notation that I use here for expositional simplicity.

[3] Hacquard eventually reformulates this principle to handle cases involving things like mistaken beliefs, commenting that "this [updated] version will only matter in cases where the modal base is not realistic".

In the preceding derivation, the temporal information contributed by aspect was irrelevant. Instead, the crucial contribution that aspect makes to the derivation of AEs is the world-anchoring property. This predicts that other aspectual operators should also be able to trigger AE, as this world-anchoring property is general for aspect, according to Hacquard.[4]

3. Kratzer 2011: A temporal account

Kratzer's (2011) account of AE is built upon Lewis's (1986) metaphysics. Under this system, AEs fall out of the interaction between the way modal accessibility is computed and a more articulated treatment of possible worlds where time information is crucial. In contrast to Hacquard 2006, the temporal contribution of aspect is crucial for deriving AE in Kratzer 2011, predicting that only specific combinations of tense and aspect can trigger these entailments. This section summarizes Kratzer's account and the framework that it is built on to show how the predictions for other aspectual operators follow.

The core innovation that derives AE in Kratzer's system lies in the computation of modal accessibility. In this system, possible worlds can be thought of as contiguous timelines. These timelines can be subdivided into smaller time-slices, allowing us to explicitly focus on temporal subparts of these possible worlds. Furthermore, she follows Lewis (1986) in adopting the notion of counterparts. Various types of objects, such as individuals and the aforementioned time-slices, are uniquely associated with a single possible world, but have counterparts in other worlds, defined based on some relation. This contrasts with a view where these objects can exist across different possible worlds.

Accessibility in this system amounts to finding pairs of individuals and time-slices that are counterparts to the contextually relevant pair. In the train-taking case, for example, circumstantial modality corresponds to quantification over the individual–time-slice pairs that are maximally similar to Jane around, or before, the time she took the train in the actual world.

Aspect in this system more or less follows the standard treatment, given previously in (4). Kratzer's version of this is given below in (9). She also assumes that aspect scopes below modal operators, contra Hacquard (2006), so her LF for the original train-taking example corresponds to the one in (10a). The resulting truth conditions are given in a simplified form in (10b).

(9) $[\![\text{PFV}]\!] = \lambda P.\lambda t.\exists e\,[e \subseteq t \wedge P(e)]$

(10) a. [PAST [Jane$_x$ can [PFV [x take the train]]]]

b. $\exists x \exists t \exists e\,[\langle x,t\rangle \in f(\langle \text{Jane}, t_{past}\rangle) \wedge \text{take-train}(x)(e) \wedge e \subseteq t]$
where f denotes a function that returns a set of individual–time-slice pairs that are identical counterparts of the input pair.

[4] While this is not explicitly stated in Hacquard 2006, it falls out from the analysis. In fact, Hacquard devotes some discussion to the *imparfait* morphology, arguing that it does not correspond to aspect, but is rather the reflex of syntactic configurations that result in non-perfective interpretations (e.g., progressive, habitual, generic, etc.).

Remember that we have defined all accessible time-slices t to be identical counterparts of the actual past time-slice t_{past}. Any assertion made about t should therefore also be true of t_{past} (and vice versa). Further, note that the truth conditions above assert a train-taking event e to be contained in some time interval t. Because of the identity relationship between t and t_{past}, the train-taking event e must also be contained in the actual past time-slice t_{past}, generating the AE.

The temporal contribution of aspect is crucial to this derivation of AE. The properties of the event e are propagated from the counterpart time-slice to the actual one because perfective aspect situates the running time of e *within* t ($e \subseteq t$). Other aspectual operators relate events to time-slices in different ways, and so AEs should not necessarily arise when they appear with circumstantial modality. Compare (10) containing perfective aspect with (11) containing prospective aspect.

(11) a. [PAST [Jane$_x$ can [PROSP [x take the train]]]]

b. $\exists x \exists t \exists e\,[\langle x, t\rangle \in f(\langle \text{Jane}, t_{past}\rangle) \wedge \text{take-train}(x)(e) \wedge e \subseteq \text{future of } t]$

The truth conditions in (11b) assert that some event e is contained in the *future* of some time-slice t, instead of in t itself, preventing the properties of e from transferring from t to t_{past}. This is because counterpart time-slices are selected based on identity within the period of time that they delimit. Two worlds that are identical at a particular point in time may have reached that point through different paths, and may also diverge to unfold into different series of events. In other words, we cannot glean any information about the future of t_{past} given the future of t. It should now be apparent that for Kratzer (2011), the particular properties of different aspectual operators can determine whether or not an AE arises in a sentence.

4. The Tagalog ability modal *kaya*

The two analyses previously discussed, Hacquard 2006 and Kratzer 2011, make different predictions regarding whether or not aspectual operators other than perfective aspect should generate AE. Hacquard's analysis predicts that any aspectual operator should have the potential to generate AE, due to the world-anchoring property that she proposes to be general to these operators. Kratzer's analysis, on the other hand, predicts that only specific aspects have this same potential because the temporal properties of the aspectual operator are crucial to triggering the AE.

Adjudicating between the two analyses has thus far been difficult, as the differences that they predict are not observable in the languages that they originally cover. In this section, I present new data from Tagalog that bears on this issue. Specifically, prospective aspect marking the Tagalog ability modal *kaya*, generates an AE, providing evidence that supports Hacquard's account of this phenomenon.

Tagalog is an Austronesian language spoken mainly in the Philippines, particularly in the capital, Manila, and its neighboring provinces. Basic word order in this language is

VSO, with verbs typically appearing marked for aspect and voice.[5] Basic examples are given in (12) for past-oriented perfective aspect, future-oriented prospective aspect, and the ungrammatical bare form. In contrast to this is the Tagalog ability modal *kaya*, which is part of a class of Tagalog verbs that typically appear bare.[6] Compare (12c) to (13).

(12) a. Nag-salita siya ng Tagalog.
<PFV.AV>-speak 3S.ANG NG Tagalog
'He spoke Tagalog.'

b. Mag-sa~salita siya ng Tagalog.
AV-PROSP~speak 3S.ANG NG Tagalog
'He will speak Tagalog.'

c. *Salita siya ng Tagalog.
speak 3S.ANG NG Tagalog
(Intended: 'He speaks Tagalog.')

(13) Kaya niya=ng mag-salita ng Tagalog, pero Ingles lang ang gina~gamit niya.
KAYA 3S.NG=LK AV-speak NG Tagalog but English only ANG IMPF.PV~use 3S.NG
'She is able to speak Tagalog, but she only uses in English.'

Kaya in its bare form functions solely as an ability modal, and is typical in this regard. That is, (13) simply makes a claim about the intrinsic capabilities of some individual to speak Tagalog without claiming anything about whether this capability was realized. That (13) does not generate an AE is shown by the felicity of the continuation entailing the non-occurrence of the prejacent, *magsalita ng Tagalog* 'speak Tagalog'.

The syntactic behavior of *kaya* is also consistent with a low root modal characterization, following the discussion in Hacquard 2006. Two pieces of evidence show this. First is the case assigned to the subject, which can be seen in the examples above. The sentences in (12)

[5]The exact details of the Tagalog voice system are not relevant for this paper. I use the term voice pretheoretically and point out its existence here, since it will appear in the data.

[6]This class of Tagalog verbs share a few properties in common. In their bare form, they have a stative interpretation. When they are overtly marked for voice and aspect, they take on an inchoative meaning. Examples are given below.

(i) a. Alam ko ang sagot.
know I.NG ANG answer
'I know the answer.'

b. N-alam-an ko ang sagot.
PFV-know-VOICE I.NG ANG answer
'I found out the answer.'/'I came to know the answer'

There is a question here of whether or not the behavior of *kaya* can be attributed to the behavior of this class of verbs in general and if this tells us something the phenomenon of AE crosslinguistically.

show the third person pronoun appearing in its *ang*-form, *siya*, since it is the agent of an agent voice (AV) clause. In contrast, the third person pronoun appears in its *ng*-form, *niya*, in (13) even if the embedded verb appears in agent voice like in the previous examples. I take this as evidence that the case form of the subject in (13) is in a sense controlled by *kaya* instead of the embedded verb.

Second, (13) also shows that *kaya* takes as a complement a VP that is only marked for voice and not aspect. Aspect-marked forms are ungrammatical, as shown in (14), using verb forms from (12a-b). In contrast, higher epistemic modals display the opposite behavior.[7]

(14) *Kaya niya=ng (nag-salita / mag-sa~salita) ng Tagalog.
KAYA 3S.NG=LK PFV.AV-speak / AV-PROSP~speak NG Tagalog
(Intended: 'He is able to speak/have spoken/be speaking Tagalog.')

(15) Maaari=ng (nag-salita / mag-sa~salita / *mag-salita) siya ng Tagalog.
POSS=LK PFV.AV-speak / AV-PROSP~speak / AV-speak 3S.ANG NG Tagalog
'It's possible that she spoke/will speak Tagalog.'

I take these two pieces of evidence, the form of the subject and the unavailability of aspect marking on the embedded verb, to show that *kaya* appears syntactically low, behaving like a control construction and taking two arguments: a subject and a predicate (cf. Wurmbrand 1999). Having shown that *kaya* behaves similarly with the circumstantial modals that are the focus of Hacquard's analysis, we now look at examples where *kaya* exhibits AE-like behavior.

In addition to appearing bare, *kaya* can also appear marked with voice and aspectual morphology. The sentences in (16) differ minimally from (13) in the presence of voice as well as perfective and prospective aspect marking on *kaya*. As a consequence of this, the examples in (16) contrast with (13) in that they do generate AE, as shown by the infelicity of the contradictory continuation.

(16) a. K<in>aya niya=ng mag-salita ng Tagalog, #pero Ingles lang
<PFV.PV>KAYA 3S.NG=LK AV-speak NG Tagalog but English only
ang g<in>amit niya.
ANG <PFV.PV>use 3S.NG
'She managed to speak Tagalog, #but she only used English.'

b. Ka~kaya-nin niya=ng mag-salita ng Tagalog, #pero Ingles lang
PROSP~KAYA-PV 3S.NG=LK AV-speak NG Tagalog but English only
ang ga~gamit-in niya.
ANG PROSP~use-PV 3S.NG
'He will manage to speak Tagalog, #but he will only use English.'

The behavior in (16a) should be familiar from the previous discussion of French and English. Here, we see again an ability modal overtly marked with perfective aspect and

[7]Notice also that the pronoun in (15) patterns with (12) instead of (13) and (14).

subsequently generating an actuality entailment. On the other hand, (16b) shows us something new. This sentence asserts not only that the relevant person will have the ability to speak Tagalog, but that they will actually speak it. Here, we see that the generation of AEs is not limited to just perfective aspect, at least in Tagalog.

This observation falls in line with the prediction that Hacquard's (2006) analysis of AE makes: that generation of AE is a property of all aspectual operators. On the other hand, this data appears to be a point against Kratzer's (2011) analysis, since prospective aspect for her is crucially what prevents AEs from surfacing.

5. Contrasting data: Gitksan

The data from Tagalog is particularly interesting when we consider other cross-linguistic evidence that has been brought forth with regards to this issue. Specifically, Matthewson (2012) provides some data from Gitksan, whose lack of AE she ties to the obligatory prospective marker that appears in modal constructions. For her, this prospective marker limits the temporal position of the prejacent to a point in time that is future to the relevant reference time (cf. Kratzer's (2011) PROSP in Section 3). Some examples from her are given below. (17) is a simple baseline sentence showing the circumstantial possibility modal *da'a<u>k</u>hlxw* co-occurring with the prospective marker *dim*, while (18) shows that such a circumstantial possibility construction fails to generate an AE.

(17) *da'a<u>k</u>hlxw*-i-s Henry *dim* jam-t
CIRC.POSS-TRA-PN Henry **PROSP** cook-3SG.II
'Henry is able to cook.' / 'Henry was able to cook.'

(18) *da'a<u>k</u>hlxw*-'y *dim* hahla'alsd-'y k'yoots, ii ap nee=dii
CIRC.POSS-1SG.II **PROSP** work-1SG.II yesterday and EMPH NEG=CONTR
wil-'y
be-1SG.II
'I was able to work yesterday, but I didn't.'

For Matthewson, the prospective marker *dim* in the previous examples occurs low in the structure, scoping under the modal, in accordance with Kratzer's (2011) view. Notice that (17) receives either a past or present tense interpretation (Gitksan distinguishes between future and non-future). Matthewson notes that information that encodes tense scopes high in Gitksan. In fact, circumstantial possibility constructions with a future tense interpretation have two instances of *dim*.

(19) a. *Context: He can't cook now, but he will be able to cook (after taking a cooking course).*

b. **dim** *da'a<u>k</u>xw*-i-t **dim** jam-t
PROSP CIRC.POSS-TRA-3SG.II **PROSP** cook-3SG.II
'He will be able to cook.'

The question now arises of how to reconcile the facts from Tagalog and Gitksan, which seem to support opposing views. A possibility that I have not explored very thoroughly yet is one where both low-scoping and high-scoping aspect play a role in how an AE is generated. This would mean that both Hacquard (2006) and Kratzer (2011) each account for only part of the story.[8] Both analyses are committed to the aspectual operator that is relevant for generating AE being in a particular position, even though we might not have a strong reason to assume so. Moving forward with this line of thought would require a closer look at the behavior of aspect in Tagalog. For example, it would be useful to establish how exactly aspect scopes and the nature of the embedded verb form in *kaya* constructions (whether this is truly the lack of aspect or something else).

6. Conclusion

In this paper, I have juxtaposed two opposing analyses of Actuality Entailments, which made different commitments regarding the role of aspect. For Hacquard (2006), aspectual operators in general can be involved in the generation of AE, regardless of temporal information. On the other hand, for Kratzer (2011), the temporal information contributed by aspect is crucial. I then presented data from Tagalog that I argued supported Hacquard's analysis of AE, since this phenomenon is not limited to perfective aspect, but also to prospective aspect as well in this language. Finally I considered some data from Matthewson 2012 supporting Kratzer's analysis and speculated on a direction for future research on the issue.

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[8] In fact, it seems to me that while the Gitksan data does not actively support Hacquard's (2006) analysis, it is not incompatible with it either.