

Exploring modality and temporality interactions through the storyboard *Bill vs. the weather**

Jozina Vander Klof
University of Oslo

Abstract: This paper presents the storyboard *Bill vs. the weather* as a cross-linguistic tool to investigate modal-temporal interactions, targeting a possibility epistemic claim with a past temporal perspective and future temporal orientation. The target contexts in the storyboard are also potentially compatible with a past counterfactual claim, which differs minimally in having a circumstantial modal base instead of an epistemic one. This tool is illustrated with Javanese (Austronesian), which provides insights into how to disambiguate the two interpretations as well as into the kinds of additional markers or constructions languages may employ in the target contexts.

Keywords: modality, temporal perspective, temporal orientation, Javanese, storyboard

1 Introduction

Modality and temporality interact in interesting ways in natural language, and the research question of this paper explores one aspect of their interaction through the storyboard, *Bill vs. the weather*.

To first briefly introduce the main linguistic concepts under discussion, MODALITY concerns possibility or necessity claims compatible with different ‘modal flavours’; these flavours are *deontic*, concerning a body of rules or regulations; *epistemic*, what is known or understood; *circumstantial*, the facts of the actual world; *bouletic*, one’s desires or wishes, and others (see e.g., Palmer 1986; van der Auwera & Plungian 1998; Portner 2009; Hacquard 2011). Kratzer’s influential theoretical work (1977; 1981; 1991; 2012) analyzes modals as quantifiers ranging over possible worlds (where a possibility modal claim corresponds to an existential quantifier, and a necessity modal claim corresponds to a universal quantifier). One of the main insights of Kratzer’s work is that modals are context-dependent—that is, sets of propositions restrict the domain of quantification that the quantifier ranges over. It is the make up of these sets of propositions which determine the modal flavour as epistemic, deontic, circumstantial, or bouletic.

TEMPORALITY includes the distinction between temporal perspective and temporal orientation, where the temporal perspective is the time at which the modal base is calculated and temporal orientation is the relation between the time of the event and the temporal perspective (Condoravdi 2002). Other relevant times are the event time (ET), reference time (RT), and the utterance time (UT), following e.g., Reichenbach (1947).

Condoravdi’s (2002) seminal paper on English observes one such interaction concerning ambiguous sentences like (1). One of Condoravdi’s main insights is that this ambiguity is rooted in a difference in temporality as well as in modal flavour.

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(1) He might have won the game.

(Condoravdi 2002:4)

To better understand this interaction, consider that on one reading of (1), it is a contradiction to assert that he didn't win. For instance, in answer to the question *Why are Richard's parents jumping with joy?*, it is infelicitous to answer *#He might have won the game but he didn't*. The modal claim of this reading is epistemic, compatible with the speaker's knowledge. Concerning temporality, this reading has present temporal perspective (the time at which the epistemic modal base is calculated is the utterance time) and past temporal orientation. A paraphrase of this reading of (1) is *Some worlds that are consistent with the speaker's knowledge at the utterance time t are ones where he won the game at a time before t* . In other words, the speaker does not know whether Richard won the game or not at the time of utterance.

On an alternate reading of (1), it is not a contradiction to assert that he didn't win. In answer to *Why are Richard's parents crying?*, it is felicitous to follow up with *He might have won the game but he didn't*. This reading is based on the facts of the actual world; it is a circumstantial modal claim. This reading has a different temporal perspective and orientation than the first: it has a past perspective and a future orientation. In other words, *Some worlds that match the actual world in terms of the facts at a past time t are ones where he won the game at a time after t* . But sadly, at the time of utterance, it is known that Richard did not win the game, even though it seemed a viable possibility in the past.

One difference Condoravdi (2002) notes is that the two modal claims have distinct temporal perspectives. The epistemic modal claim has *present* temporal perspective while the circumstantial modal claim has *past* temporal perspective. A question that arises is whether these modal flavours are restricted to only these temporal perspectives. That is, can a particular modal flavour be interpreted with various temporal perspectives?

This question has been posed many times, but remains pertinent in light of contradictory claims. On the one hand, some have claimed that epistemic modals with a past temporal perspective are not possible based on data from English, French, and Spanish (e.g., Groenendijk & Stokhof 1975; Cinque 1999; Drubig 2001; Condoravdi 2002; Stowell 2004; Hacquard 2006; Borgonovo & Cummins 2007; Demirdache & Uribe-Etxebarria 2008; Laca 2012). On the other hand, some have argued that past temporal perspectives are possible for epistemic modals, based on data from English and French as well as Dutch and Norwegian (e.g., Eide 2003; Boogaart 2007; von Fintel & Gillies 2008; Martin 2009; Homer 2010). Recent research has corroborated the latter finding from a typologically diverse range of other languages including Gitksan (Tsimshianic), St'át'imcets (Salishan), Blackfoot (Algonquian) and Atayal (Austronesian) (Chen et al. 2017). To illustrate with one example from English, von Fintel and Gillies (2008) argue that the modal claim with *might* in (2) has a past temporal perspective (and present temporal orientation). That is, *It is compatible with Sophie's knowledge at some past time t that there was ice cream in the freezer at t* .

(2) Context: *Sophie is looking for some ice cream and checks the freezer. There is none in there. Asked why she opened the freezer, she replies:*

There might have been ice cream in the freezer.

(von Fintel & Gillies 2008:87)

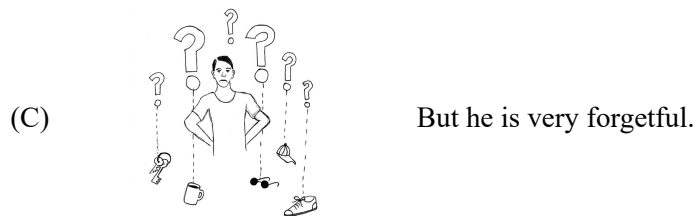
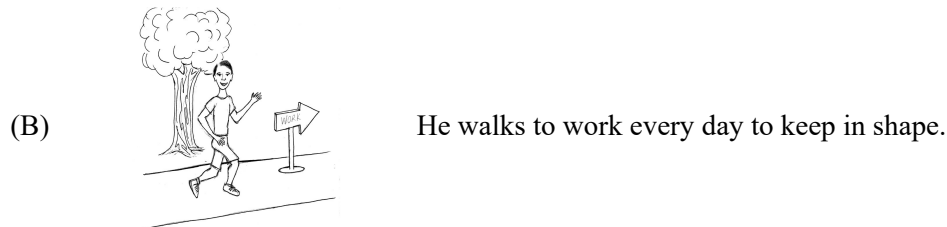
In order to further investigate the existence of past temporal perspective with epistemic modality using a different tool than translation or elicitation (e.g., felicity judgment tasks), I designed the storyboard *Bill vs. the weather*.¹ This storyboard is created to set up felicitous contexts for an epistemic

¹ Available online at http://totemfieldstoryboards.org/stories/bill_vs_the_weather/.

modal claim with a past temporal perspective to answer the question whether this interpretation is allowed with epistemic modals cross-linguistically.²

Further, if past temporal perspectives are available with an epistemic modal claim, the null hypothesis is that they are compatible with any temporal orientation: past, present, or future (Chen et al. 2017; Rullmann & Matthewson 2018). The above context in (2) is with present temporal orientation. The storyboard *Feeding Fluffy* (TFS Working Group 2012) also targets an epistemic modal claim with past temporal perspective and present temporal orientation. The storyboard under discussion, *Bill vs. the weather*, targets an epistemic modal claim with past temporal perspective and *future* orientation. It also seems to allow for a past counterfactual claim (circumstantial modal base; past perspective and future orientation). These interpretations—as well as how to disambiguate the two—are detailed in Section 4. The following section introduces the storyboard *Bill vs. the weather* and Section 3 illustrates the narration of *Bill vs. the weather* from one speaker of Javanese. Section 5 concludes.

2 Storyboard: *Bill vs. the weather*



²Other theoretical or empirical points of interest in the storyboard *Bill vs. the weather* are weather predicates, how *why*-questions are asked, and negation.

(D)



One day, Bill gets to his office and he is soaking wet.

(E)



His colleague asks him right away, "Why are you so wet?"

(F)



Bill replies, "I forgot my umbrella, and it started raining while I was walking to work."

(G)



The next day, Bill arrives at his office and he is shivering.

(H)



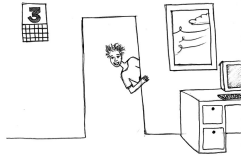
His colleague asks him right away, "Why are you so cold?"

(I)



Bill replies, "I forgot my coat, and it started snowing while I was walking to work!"

(J)



The next day, Bill arrives at his office and his hair is all over the place.

(K)



His colleague asks him right away, “Why is your hair so crazy?”

(L)



Bill replies, “I forgot my hat, and the wind started blowing while I was walking to work!”

(M)



The next day, Bill walks to work with a huge backpack.

(N)



His colleague notices Bill is carrying a huge backpack, but he doesn't ask him any questions because Bill looks so perfect!

(O)



But Bill's colleague is curious so he phones Bill the next day, “What was in your huge backpack yesterday?”

(P)



Bill: "I brought an umbrella, a coat, and a hat."

(Q)



Colleague: "Why did you bring an umbrella (yesterday)?"

(R)



Bill: "It might have rained when I walked to work (just like last week)."

(S)



Colleague: "Why did you bring a coat?"

(T)



Bill: "It might have snowed when I walked to work (just like last week)."

(U)



Colleague: "Why did you bring a hat?"



Bill: “It might have been very windy when I walked to work (just like last week).”



Colleague: “You didn’t need to bring all that yesterday! It was forecast to be sunny and warm outside!!”

3 Sample results

The storyboard *Bill vs. the weather* was narrated in Paciran Javanese, a variety of East Javanese spoken in Lamongan regency, East Java, Indonesia, by three language consultants in total: Ibu (‘Mrs.’) Deti Salamah, Ibu Finaty Ahsanah, and Ibu Bahrul Ulum. This section presents a sample transcription of *Bill vs. the weather* as told by Ibu Deti Salamah.

The methodology follows the established method for storyboard elicitation as outlined in Burton and Matthewson (2015): The fieldworker first tells the storyboard in the contact language, which in this case is English. Note that the fieldworker could tell the story more than once or go over certain pictures to ensure that the consultant is comfortable with the task, or in case it was not clear or the storyboard is very long. In working with consultants who are unfamiliar with such a task, this step might be necessary. Immediately following this narrative, the language consultant then retells the same storyboard in the object language; in this case, Paciran Javanese. Following the language consultant’s rendition of the storyboard, the researcher follows up with any elicitation questions. This is easily done, as the contexts are already salient and well-established from the storyboard. In this sample result, near the beginning of the storytelling, Ibu Deti Salamah asks the fieldworker for a verification of the story, which the fieldworker answers. She also transcribed this storyboard; I have added morpheme breaks, glosses, and English translations. The ellipses [...] in the transcription indicate slight pauses.^{3,4}

Javanese (Western Malayo-Polynesian, Austronesian) is spoken by over 90 million people in Indonesia, mainly on the eastern and central parts of the island of Java. Javanese has three main

³Javanese dialects are highly divergent across all areas of grammar. Readers familiar with Javanese may note a variety of differences. For instance, some lexical differences are the form of negation (*gak* in East Javanese vs. *ora* in Central Javanese) or the marker ‘with’ (*mbek* in Paciran vs. *karo* primarily in Central Javanese). Phonological differences include vowel lowering in closed syllables (cf. Hoogervorst 2010) in East Javanese, reflected for instance in the preferred spelling of *wes* instead of *wis* ‘already’.

⁴In addition to the Leipzig Glossing conventions, the following glosses are used: AV ‘Actor Voice’; CIRC ‘circumstantial modality’; CL ‘clitic’; DEON ‘deontic modality’; EPIS ‘epistemic modality’; EXLM ‘exclamative’; INT ‘intensifier’; NEC ‘necessity’; POS ‘possibility’; PROSP ‘prospective aspect’; PRT ‘particle’; RED ‘reduplicate’; VBLZ ‘verbalizer’. *ke-* is a prefix indicating adversative/accidental passives (cf. Robson & Wibisono 2002); the suffix *-en/an* is in some cases a nominalizer and in others a verbalizer.

speech levels: *ngoko* ‘Low Javanese’, *madya* ‘Middle Javanese’, and *krama* ‘High Javanese’ (e.g., Poedjosoedarmo 1979; Errington 1985, 1998). The storyboard is told in *ngoko*. *Ngoko* is the common, everyday speech used in Paciran, given its distance from the courtly centers of Yogyakarta and Surakarta/Solo (where traditionally the full range of speech levels is used). *Madya* and *krama* are also used in Paciran, but with mainly high frequency words and more commonly by speakers over 35 years old (Vander Klok *to appear*).^{5,6}

(i) Iki cerita-ne Bill.
DEM story-DEF Bill
‘This is Bill’s story.’

(ii) Bill iku [...] wong lanang sing kuat mbek seneng olah raga.
Bill DEM person male REL strong with like manner sport
‘Bill is a man who is strong and likes exercising.’

(iii) Tapi Bill iku [...] wong-e lali-nan. Seneng-an-e lali.
but Bill DEM person-DEF forget-NMLZ happy-NMLZ-DEF forget
‘But Bill is a forgetful person. He easily forgets.’

(iv) Suatu saat [...] Bill teko kantor. M-laku toh iki?
one time Bill arrive office AV-walk FOC DEM
‘One day, Bill arrives at the office. Is it by foot?’

(v) FIELDWORKER: he em, m-laku, he em.
yes AV-walk yes
‘Yes, it’s by foot, yes.’

(vi) Bill m-laku teko kantor. Trus, awak-e teles kabeh.
Bill AV-walk arrive office then body-DEF wet all
‘Bill walked to work. And he got completely soaked.’

(vii) Konco-ne takok, “Awakmu kenek opo? Kok teles kabeh pas teko kantor?”
friend-DEF ask 2 able what PRT wet all when arrive office
‘His friend asked, “Why were you completely soaked when you got to work?!”’

⁵*Krama* is endangered due to shifts in social structure, language shifts within domains of use, and pressures from Indonesian, the national language, and English, which is now introduced as early as kindergarten (e.g., Smith-Hefner 2009; Ravindranath & Cohn 2014; Zentz 2015).

⁶Note that the numbering does not necessarily reflect the sequence of pictures in the slides of *Bill vs. the weather* as presented in Section 2.

- (viii) “Iyo, aku lali ng-gowo payung. Aku lali gak ng-gowo payung.”
 yes 1SG forget AV-bring umbrella 1SG forget NEG AV-bring umbrella
 ‘“Yes, I forgot to bring an umbrella. I forgot and didn’t bring an umbrella.”’
- (ix) Seksuk-e maneh Bill teko kantor maneh, mbek m-laku.
 tomorrow-DEF again Bill arrive office again with AV-walk
 ‘The following day Bill arrived at the office again by foot.’⁷
- (x) Tibak-e k-anyep-en [...] k-adem-en.
 evident-DEF KE-chill-VBLZ KE-cold-VBLZ
 ‘Evidently it was really chilly ... freezing.’
- (xi) Terus, konco-ne takok maneh. “Bill, kenek opo awakmu kok k-anyep-en ngono?”
 then friend-DEF ask again Bill able what 2 PRT KE-cold-VBLZ like.that
 ‘Then his friend asked again, “Bill, why were you so cold?”’
- (xii) “Oooh yo [...] aku lali gak ng-gowo jaket.”
 oooh yes 1SG forget NEG AV-bring jacket
 ‘“Oh yes, I forgot to bring a jacket.”’
- (xiii) Seksuk-e maneh, Bill lungo nek kantor.
 tomorrow-DEF again Bill go to office
 ‘The following day, Bill went to work.’
- (xiv) Tapi, lali gak suri-nan. Rambut-e gak karu-karu-an [...] n-jeprak-n-jeprak.
 but forget NEG comb-VBLZ hair-DEF NEG RED-clear-VBLZ RED-AV-spread
 ‘But he forgot to comb his hair. His hair was not tidy...it was all over the place.’
- (xv) Konco-ne takok, “He... awakmu iku piye!!! Awakmu iku piye! Kon gak n-duwe
 friend-DEF ask hey 2 DEM how 2 DEM how IMP NEG AV-have
 suri toh? Rambut-mu kok njeprak-n-jeprak ngono.”
 comb FOC hair-your PRT RED-AV-spread like.that
 ‘His friend asked, “Hey, what are you doing?! What are you doing! Don’t you have a comb?
 Your hair is all over like that!”’

⁷Concerning the discrepancy between the gloss of *seksuk-e* ‘tomorrow-DEF’ and the translation ‘the following day’, the adverb *seksuk/sesok/sesuk* in Javanese has free indexical shift to any time in the future, but its default or out-of-the-blue interpretation is the day after today (tomorrow). Similarly, the adverb *wingi/ngi*, as seen in (xix) and elsewhere, has free indexical shift to any time in the past, but its default interpretation is the day before today (yesterday). As far as I know, this has not been noted in the literature on Javanese.

- (xvi) “Oooh yo, aku lali maneh gak ng-gowo topi. Pancen-e aku lali-nan.”
 oooh yes 1SG forget again NEG AV-bring hat really-DEF 1SG forget-NMLZ
 ‘“Oh yes, I forgot again and didn’t bring a hat. Honestly, I’m so forgetful.”’
- (xvii) Seksuk-e maneh Bill ng-gowo tas g<uw>edi [...] Tas ransel dik-gowo
 tomorrow-DEF again Bill AV-bring bag <INT>big bag backpack PASS-bring
 neng kantor.
 to office
 ‘The next day Bill brought a huge bag; the backpack was brought to work.’
- (xviii) Konco-ne n-(t)itek tapi [...] konco-ne gak gak gelem takok soal-e
 friend-DEF AV-deduce but friend-DEF NEG NEG willing ask because-DEF
 Bill wes ng-gowo tas. Dadi wes. Wes ng-gowo tas, wes
 Bill already AV-bring bag become already already AV-bring bag already
 suri-nan, wes macak apik.
 comb-VBLZ already dress.up good
 ‘His friend deduced why, but he didn’t want to ask because Bill had already brought a bag,
 so that was it. Bill had brought a bag, his hair was combed, he looked good.’
- (xix) Dadi, konco-ne yakin Bill mesti wis siap kabeh tapi konco-ne
 become friend-DEF certain Bill EPIS.NEC already ready all but friend-DEF
 penasaran gek ngi.
 curious just yesterday
 ‘So his friend was sure that Bill was certainly ready for anything but his friend was curious
 about yesterday.’
- (xx) Kenek opo kok Bill ng-gowo tas? Trus, ono opo ndek tas-e iku [...] [...]
 able what PRT Bill AV-bring bag then exist what in bag-DEF DEM
 nek njero-ne?
 in inside-DEF
 ‘Why did Bill bring a bag? And what is inside that bag?’
- (xxi) Akhir-e konco-ne telpon.
 finally-DEF friend-DEF telephone
 ‘Finally his friend phoned him.’

- (xxii) “Bill, he, awakmu wingi kenek opo ng-gowo tas? Terus, isi-ne opo
 Bill hey 2 yesterday able what AV-bring bag then fill-DEF what
 bae loh? Aku oleh ngerti toh?”
 just PRT 1SG DEON.POS understand FOC
 ‘“Bill, hey, as for you, why did you bring a bag yesterday? And, what exactly was inside
 the bag? May I know?”’
- (xxiii) “Hmm, aku lho lali-nan. Awakmu ngerti toh [...] aku lali-nan.
 hmm 1SG PRT forget-NMLZ 2 understand FOC 1SG forget-NMLZ
 Dadi aku ng-gowo tas. Tak gawe m-(p)adhahi topi mbek
 become 1SG AV-bring bag 1SG.CL make AV-put.into.container hat with
 payung-ku, mbek jaket-ku.”
 umbrella-my with jacket-my
 ‘“Hmm, I’m so forgetful. You do understand that I’m forgetful. So I brought a bag. I put
 a hat and my umbrella, and my jacket in it.”’
- (xxiv) “Payung gawe opo Bill? Wingi kok ng-gowo payung?”
 umbrella make what Bill yesterday PRT AV-bring umbrella
 ‘“What was the umbrella for, Bill? Yesterday, why did you bring an umbrella?!”’
- (xxv) “Yo, bonak-e udan, wingi.”
 yes evidential-DEF rain yesterday
 ‘“Yeah, it might have rained yesterday.”’
- (xxvi) “Trus, ng-gowo jaket barang gawe opo?”
 then AV-bring jacket together make what
 ‘“And why did you also bring the jacket?”’
- (xxvii) “Yo, bonak-e wingi iku ono salju. Engko aku k-adem-en maneh,
 yes evidential-DEF yesterday DEM exist snow later 1SG KE-cold-VBLZ again
 gak ng-gowo jaket.”
 NEG AV-bring jacket
 ‘“Yeah, yesterday there might have been snow. And I could have been freezing again, not
 bringing a jacket.”’
- (xxviii) “Terus, topi gawe opo? Wong wingi lho gak [...] wong wingi loh
 then hat make what PRT yesterday PRT NEG PRT yesterday PRT
 gak lapo-lapo.”
 NEG RED-do.what
 ‘“And why a hat? Yesterday there wasn’t anything happening.”’

- (xxix) “Yo bonak-e wingi angin-e kenceng, terus rambut-ku engko
 yes evidential-DEF yesterday wind-DEF strong then hair-my later
 jeprak-n-jeprak maneh.”
 RED-AV-spread again
 ‘“Yeah, it might have been windy yesterday. And then my hair would have been crazy
 again.”’
- (xxx) “Bill, awakmu lali toh? Wingi iku loh, cuaca-ne cerah, panas. Gak
 Bill 2 forget FOC yesterday DEM PRT weather-DEF bright hot NEG
 ono angin!”
 exist wind
 ‘“Bill, did you forget? Yesterday, the weather was clear, hot. There was no wind!”’

4 Discussion

Overall, the storyboard *Bill vs. the weather* was well-received by all three Paciran Javanese language consultants (Ibu Deti Salamah, Ibu Finaty Ahsanah, and Ibu Bahrul Ulum) that I presented it to. They all found this storyboard to be amusing and were not bored. (In the past, I have found that boredom leads to poor results, such as not remembering the story at all.) However, one downside to this story is that it is relatively long compared to other storyboards that I have used on totemfieldstoryboards.org. One consultant commented that *Bill vs. the weather* was “*Duwowo. Aku rondok-rondok lali. / Too long. I just about forgot.*”. Despite this sentiment, all consultants retold the storyboard in their own words, following the same plot as I had presented in the contact language (English) without any prompts or interruptions (except for the one mentioned in the above sample result). Based on these results, while consultants might feel that the storyboard is long, they are still easily able to retell the story with the pictures as aids.

Concerning the main research question, *Bill vs. the weather* investigates whether epistemic modals allow for a past temporal perspective in natural language; the results are divided into three sub-sections. I show in Section 4.1 that independently known epistemic modals in Javanese are accepted in the target contexts. In Section 4.2, I present results concerning the secondary research question, which investigates future temporal orientation with a past temporal perspective for epistemic modal claims. Lastly, in Section 4.3, I discuss alternative strategies that speakers used in the storyboards beyond the known epistemic modals in Paciran Javanese.

4.1 Possibility epistemic modals in Javanese allow for a past temporal perspective

The storyboard *Bill vs. the weather* sets up contexts to license an epistemic modal claim with past temporal perspective and future temporal orientation, such as *It might have snowed/rained/been windy* (thumbnail examples (R), (T), and (V) in Section 2). That is, *In some worlds compatible with the speaker’s (=Bill’s) knowledge at a past time t, it snows/rains/is windy after t*. This section focuses on the results concerning the availability of a past temporal perspective for possibility epistemic modals. If epistemic modals in a given language are felicitous in these contexts, it shows that epistemic modal claims can indeed have past temporal perspectives, such as observed in von Stechow and Gillies (2008) for English. In order to test this claim, it is necessary to show independent evi-

dence that the marker under discussion is compatible with epistemic modality. The target contexts in *Bill vs. the weather* are not designed to test whether a marker in a given language is epistemic; thus, one cannot claim that because some marker appears in such contexts that it is a marker that lexically specifies for epistemic modality or is compatible with epistemic modality (but referentially ambiguous).

In Javanese, almost all modals lexically specify for their type of modality (Vander Klok 2012, 2013). The modals *paleng* and *mungkin* as used in Paciran, East Java, lexically specify for epistemic modality, glossed as ‘EPIS.POS’.⁸ As such, these modals are felicitous in epistemic contexts, as shown in (3) from a questionnaire on modality⁹ and (4) from elicitation.

- (3) EPISTEMIC context: *Amin’s parents told him that he is not allowed to go to see his friend in Jakarta because it is too far away. You heard that Amin is leaving Paciran next week, but you don’t know where he will go. Amin is a daring type of guy that usually does things that he is not permitted to do. You think:*

Amin **paleng** reng Jakarta

Amin EPIS.POS to Jakarta

‘Amin may go to Jakarta.’

(Vander Klok 2013:357, (18))

(Semi-forced choice task: 15/15 responses for the target sentence with *paleng* ‘EPIS.POS’, 0/15 responses for the one with *oleh* ‘DEON.POS’)

- (4) **Mungkin** wong wong wedok kabeh podo lungo ng-aji mergo sepi
 EPIS.POS RED person female all PL go AV-recite.Qur’an because quiet
 nek kene.
 at here

‘Maybe all the women went to recite the Holy Qur’an together because it’s quiet here.’

(Elicitation)

These same markers are incompatible with any other type of modality. To illustrate with *paleng*, this modal is judged as unacceptable in circumstantial or deontic contexts as shown in (5) and (6) from the modal questionnaire results.¹⁰ *Paleng* and *mungkin* are also infelicitous in bouletic contexts, as shown in (7) from elicitation.

⁸In my fieldwork, I have observed that currently there is a change-in-progress, where the borrowed Indonesian form *mungkin* is starting to be used more often than Javanese *paleng* with younger speakers. Further, with constituent negation, only *gak mungkin* ‘impossible’ is accepted (**gak paleng*) for all speakers. In Standard Javanese, *mungkin* is widespread, while *paleng* is rarely used. Other Javanese varieties may exhibit additional variations in how the modal space is lexically carved up.

⁹All contexts were presented in Javanese, but for space reasons, I present the contexts in English only. See Vander Klok (2012, 2013) for the Javanese contexts. In this implementation as a semi-forced choice task, 15 participants were presented with the contexts and two target sentences. Participants were asked to choose the target sentence(s) which best fit the context, and/or provide an alternative sentence. For details and other types of implementations, see Vander Klok (2014).

¹⁰While the results are different between the circumstantial and deontic contexts, with *paleng* being accepted by only 1 speaker vs. 4 speakers respectively, that *paleng* is unacceptable overall in these contexts is corroborated by a rating task of the same questionnaire. In this implementation, the same target sentences were presented individually in the same context, and were each judged by 10 different speakers, where 1 represents “completely natural given the context” and 5 represents “completely unnatural given the context”. In the

- (5) CIRCUMSTANTIAL context: *Jozi knows how to make dudoh menir (a kind of vegetable soup). Now she is back in Canada, and she wants to make dudoh menir, but the right kind of ingredients are not sold where she lives! So she's unhappy because she wanted to show her parents how to make it.*

Jozi **iso** / #**paleng** ng-gawe dudoh menir
 Jozi CIRC.POS EPIS.POS AV-make sauce *menir*

'Jozi can make *menir* sauce.'

(Vander Klok 2013:354, (12))

(Semi-forced choice task: 14/15 responses for *iso* 'CIRC.POS', 0/15 responses for *paleng* 'EPIS.POS'; 1/15 both)

- (6) DEONTIC context: *Dewi's parents are very strict, but they realize that Dewi is getting older and needs more space. They know that Dewi has not ever dated someone yet, but they know that she likes this one guy from school. They decide that:*

Dewi **oleh** / #**paleng** pacar-an
 Dewi DEON.POS EPIS.POS boy.girlfriend-VBLZ

'Dewi is allowed to date.'

(Semi-forced choice task: 11/15 responses for *oleh* 'DEON.POS', 4/15 responses for *paleng* 'EPIS.POS')

- (7) BOULETIC context: *Budi's wish was to become a teacher, but his father ordered him to follow the family tradition and become a fisherman. So Budi was a fisherman all his life and never became a teacher.*

Budi **kudu** / #**paleng** / #**mungkin** dadi guru.
 Budi want EPIS.POS EPIS.POS become teacher

'Budi wanted to be a teacher.'

(Elicitation)

We can now address the main research question of whether epistemic modals allow for a past temporal perspective in Javanese using *paleng* and *mungkin*, which lexically specify for epistemic modality.¹¹ Results show that both *paleng* and *mungkin* are compatible in the target contexts with a past temporal perspective based on follow-up elicitation. In particular, for Ibu Finaty Ahsanah, either *paleng* or *mungkin* is acceptable, and for Ibu Deti Salamah, *mungkin* is preferred:¹²

circumstantial context, results show an average rating of 1.8 for the target sentence with *iso* 'CIRC.POS' and 3.3 for that with *paleng* 'EPIS.POS'. In the deontic context; results show an average rating of 1.5 for the target sentence with *oleh* 'DEON.POS' and 3.1 for that with *paleng* 'EPIS.POS'. See Vander Klok (2013) for additional details.

¹¹The lexical restriction for epistemic modality of *paleng* and *mungkin* is analyzed as a presupposition on the modal base and ordering source as in (i) (Vander Klok 2013; cf. Rullmann, Matthewson and Davis 2008):

(i) $\llbracket \text{PALENG/MUNGKIN}(f)(g)(\alpha) \rrbracket^{w,c}$ is only defined if $c(f)$ is an epistemic modal base and $c(g)$ is an empty ordering source.

If defined, $\llbracket \text{PALENG/MUNGKIN}(f)(g)(\alpha) \rrbracket^{w,c} = \text{T}$ iff $\exists w' \in \max_{c(g)(w)} (\cap c(f)(w)) : \llbracket \alpha \rrbracket^{w'} = \text{T}$

¹²This difference between Ibu Deti Salamah and Ibu Finaty Ahsanah, who are sisters, may have to do with their social circles—Ibu Deti Salamah is married to a Javanese man from outside Paciran, and due to their dialectal differences, they often speak Indonesian, while Ibu Finaty Ahsanah is more rooted in Paciran.

- (8) a. **Mungkin** / **paleng** ape udan dino iki.
 EPIS.POS EPIS.POS PROSP rain day DEM
 ‘It might have rained that day.’ (Elicitation; Ibu Finaty Ahsanah)
- b. **Mungkin** / **#paleng** ape udan.
 EPIS.POS EPIS.POS PROSP rain
 ‘It might have rained.’ (Elicitation; Ibu Deti Salamah)

Given that the independently-known epistemic modals *paleng* and *mungkin* in Javanese are judged as felicitous in a past possibility context, this strongly suggests that epistemic modal claims can indeed have past temporal perspectives. Overall, it corroborates the data from other, unrelated languages (e.g., Eide 2003; Boogaart 2007; von Fintel & Gillies 2008; Martin 2009; Homer 2010; Chen et al. 2017) for the attestation of a past temporal perspective occurring with epistemic modality.

Before turning to the second part of the research question regarding the attestation of a future temporal orientation with past temporal perspective, I want to first address two concerns about the target contexts of the storyboard as past epistemic possibility environments. The first issue is in regards to a possible past counterfactual interpretation and how to rule it out, and the second is about the validity of using *why* questions as contexts in this storyboard.¹³

4.1.1 Possible past counterfactual interpretations

A potential confound raised by a reviewer in using this storyboard as a tool to obtain the target interpretation of an epistemic possibility claim with past temporal perspective and future orientation is the observation that past counterfactual statements seem to be equally possible. Past counterfactual statements have a different modal base (circumstantial), and past temporal perspective and future orientation. Under this reading in the context of *Bill vs. the weather*, when Bill says “It might have rained/snowed/been windy when I walked to work”, he is asserting about a relevant past time, that one possible future from that past time was one where it was raining/snowing/windy. This possible future is rendered impossible at the end of the storyboard when Bill’s colleague exclaims that the weather was sunny (analogous to the second reading of (1) introduced in Section 1).

The Javanese data on the modals *paleng* and *mungkin* rule out this interpretation: these modals lexically specify for an epistemic modal base as shown by independent evidence in Section 4.1; they cannot be interpreted with a circumstantial modal base (see also Vander Klok 2013). One could argue that *paleng* and *mungkin* could still be interpreted as making a past counterfactual statement in that they only have a circumstantial modal base when their temporal perspective is restricted to past. But the claim that the type of modal base is conditioned by past temporal perspective seems implausible on the grounds that temporal perspective is *independently* supplied by tense (Rullmann & Matthewson 2018). Additional data also corroborate the implausibility of this argument for Javanese: Chen et al. (2017) show clear examples of *paleng* with past temporal perspective that can only be epistemic.

Interestingly, the possibility modal *iso* which lexically specifies for a circumstantial modal base in Paciran Javanese (Vander Klok 2013) was not offered in any of the three narratives, but otherwise can be used for past counterfactual statements (see Chen et al. 2017: 254). This may suggest

¹³Thank you to a reviewer for raising and commenting on the first issue (Section 4.1.1) and Lisa Matthewson for the second issue (Section 4.1.2) and further discussion of the first.

that although a past counterfactual reading is possible, a past epistemic possibility interpretation is perhaps more salient in *Bill vs. the weather*.

Nevertheless, in using the *Bill vs. the weather* storyboard, linguists thus must note that there are two potential interpretations of the target contexts: a past epistemic possibility or a past counterfactual reading. Both have past temporal perspective and future orientation, but differ in their modal flavour. In order to distinguish which reading speakers use in the narrative, independent evidence concerning the modal flavour of the modal marker in question is necessary. For a language in which the modal is referentially ambiguous between epistemic and circumstantial modal bases (like English *might*), this storyboard cannot be used in claiming that epistemic modals can have past temporal perspectives.

4.1.2 ‘Why’ contexts are valid contexts to test for past epistemic possibility

The second issue concerns *why* questions. A *why* question lends itself easily to a past epistemic possibility (or necessity) claim: the speaker is justifying their prior actions based on a possibility (or necessity) in the past. In *Bill vs. the weather*, all of the target contexts are answers to *why* questions: *Why did you bring an umbrella (yesterday)?, Why did you bring a coat?, Why did you bring a hat?* (cf. thumbnails (Q), (S), (U)). In the literature, *why* questions are also prevalent in setting the context for what are argued to be examples of past epistemic possibility: von Fintel and Gillies’ (2008) example in English, shown in (2) above, is a case in point, and another example is in (9) for French (Homer 2010).

- (9) Context: *On the day of the utterance D0, the speaker’s grandfather asks her why she panicked and stormed out of the house yelling on D-6, when she saw him lying on the floor. The man is 90 years old but the speaker knows at D0 that he has never had any health problem; right after her fit of panic on D-6, the speaker realized that her grandfather was in fact meditating on the floor.*

Tu pouv_{EPIS}-ais très bien / dev_{EPIS}-ais sûrement avoir eu une crise cardiaque.

You might-PST very well must-PST surely have had a attack cardiac

‘It was held very likely/certain (by me) that you had had a heart attack.’

(Homer 2010:3, (4))

The question then arises whether this reading is licensed independently in *why* contexts, and is not due to the availability of a past temporal perspective of the epistemic modal claim after all.

Hacquard (2010:87, 2011:1501) argues that it is precisely *why* contexts which are one of the environments that allow for a past epistemic possibility: an overt or covert *because* licenses a past temporal perspective without the epistemic modal being embedded under tense.¹⁴ This is important in terms of the syntactic-semantic architecture of where epistemic modals are argued to be located: for Hacquard, among others (e.g., Brennan 1993; Cinque 1999), epistemic modals always scope over tense, and thus a past temporal perspective is predicted to be impossible. In other words, only the addition of something like an overt/covert *because* would allow for the attestation of a past epistemic possibility while maintaining the architecture that epistemic modality outscopes tense.

¹⁴Other factors for Hacquard (2006, 2010, 2011), among others, which would license a past temporal perspective include embedding the modal claim under an overt/covert attitude verb; when the conversational background is overtly specified by an adverbial; and a free indirect discourse (FID) environment.

Thus under Hacquard’s view, the *why* contexts in *Bill vs. the weather* would not constitute evidence that epistemic modal claims allow for a past temporal perspective.

However, there are at least two main reasons to think that *why* contexts are valid contexts to test for a past temporal perspective of an epistemic modal claim. The first is that it is not clear how *because* independently functions to determine a past epistemic possibility. Hacquard (2011:1501) argues that *because* is able to shift the evaluation parameters based on Stephenson’s (2007) proposal that epistemic modals are evaluated with respect to a judge parameter (that is, the agent whose relevant beliefs or knowledge it is representing), as well as a time parameter. There are two points to note: (a) *because* can shift the judge parameter to the relevant person whose reasoning is involved, and (b) the relevant knowledge of the judge is at the time the judge takes themselves to be located at the time of evaluation. In other words, the relevant knowledge of the judge can be evaluated at some past time which would allow for the past possibility reading of *might*. Stephenson (2007:513) proposes that this shift is not unique to *because* contexts, but is generalized to all contexts to account for how past evaluation may be shifted with *might* (cf. examples from von Stechow and Gillies 2008 which are not *why* contexts). Since Stephenson’s account is not specific to *because*, it does not support Hacquard’s proposal that *why* contexts would independently license a past possibility reading of an epistemic modal but other contexts would not. This argument can be extended to the other environments which are proposed to independently license a past possibility epistemic modal claim (cf. footnote 14).

A related and relevant criticism for both Stephenson’s (2007) proposal and Hacquard’s extension to *because* is raised by Rullmann and Matthewson (2018:324). They point out that a shift in the evaluation time is not necessarily tied to a shift in the judge parameter with *because*. They show that without any marker that has a past semantics, *because* cannot shift the time to the past. Thus, in their example, while the judge of the taste predicate embedded under *because* is shifted to Fido, ‘being tasty’ is not interpreted as being in the past, and “...there is no independent evidence that *because* shifts the time at which the judging takes place”:

(10) Fido always eats Whiskas because it’s tasty. (Rullmann & Matthewson 2018:324, (144))

The second observation that weakens the claim that *why* contexts independently license a past temporal perspective of epistemic modals is that these readings are not limited to *why* contexts (or other specific environments; cf. footnote 14).¹⁵ Rullmann and Matthewson (2018) provide cross-linguistic evidence from English, Dutch, Gitksan and St’át’imcets that past temporal perspective is due to the individual tense-aspect system of that language—independent of a covert/overt *because* or other factors. That is, an operator scoping over the modal, usually tense, will determine a past temporal perspective. The example in (11) from non-standard Norwegian shows that the individual tense-aspect system of the language plays a role in determining past temporal perspective (see Eide 2003). See also Martin (2009) and Homer (2010) on French and Boogaart (2007) on Dutch for other accounts of the effects of the individual tense-aspect systems.

(11) Han har måtta arbeidd med det i heile natt. Norwegian
he has must.PRF work.PRF on it in all night
‘He must have worked on it all night through.’ (Eide 2003:124, (10a))

¹⁵Nor are the past temporal perspectives necessary in these environments, as shown in Rullmann and Matthewson (2018).

On Hacquard’s view, these types of examples in English are problematic since there is nothing that would independently license the past temporal perspective.

These reasons thus bring into doubt the claim that a past temporal perspective is independently due to being embedded under an overt or covert *because*. We can conclude that *why* contexts are valid contexts in which to test the availability of a past epistemic possibility (or necessity) claim.

4.1.3 Interim summary

To summarize so far, the Javanese modals *paleng* and *mungkin*—independently argued to lexically specify for epistemic modality—are felicitous in the target contexts in *Bill vs. the weather*. That these modals are felicitous is evidence from Javanese that epistemic modals can have a past temporal perspective. One alternative analysis of the target contexts in this storyboard, where these modals allow for circumstantial modality and are interpreted as a past counterfactual, is argued to not exist for Javanese. However, it could be the case that this reading is possible in other languages. A second alternative analysis, where this interpretation is due to additional semantics of a covert *because* licensed under a *why* context, was called into question.

4.2 Possibility epistemic modals in Javanese allow for a future temporal orientation

An additional part of this research question is that the target context in *Bill vs. the weather* supplies a future temporal orientation, where the relation between the temporal perspective (past) and the time of the event (*rain/snow/windy*) is set as future. Previous contexts with past temporal perspective had present temporal orientation ((2) above from von Fintel and Gillies 2008 as well as in the storyboard *Feeding Fluffy*, TFS Working Group 2012). As mentioned above, there is no reason to expect that an epistemic modal claim with a past temporal perspective might have any constraints with respect to the temporal orientation. Thus, one part of the research question is simply showing attestation of this interpretation in a given language.

Building on Condoravdi (2002), Rullmann and Matthewson (2018) propose that temporal orientation is supplied by an operator below the modal, usually aspect, while temporal perspective is supplied by an operator above the modal, usually tense. (See also Chen et al. 2017 for preliminary data from twelve languages.)

In the Paciran Javanese dialect, the predicate can be overtly marked with the prospective aspect auxiliary *ape* ‘PROSP’, as shown in (12) and (13) from recorded natural speech.¹⁶ A prospective aspectual marker indicates that the reference time precedes the event time (RT < ET) (cf. Klein 1994), locating the event in the future of some reference time (which may or may not coincide with the utterance time).¹⁷

¹⁶In the Central Javanese dialectal grouping, *arep* ‘will, want’ and *bakal* ‘future’ (Arps et al. 2000; Robson & Wibisono 2002) are used. The volitional interpretation of *arep* is not present in *ape*, and *bakal* is rarely used by Paciran Javanese speakers, except for in predictions such as by the *dukun* ‘shaman’. I set aside the markers *arep* and *bakal* for future semantic and cross-dialectal research.

¹⁷A proposed denotation of *ape* is defined in (ii), which takes a proposition and asserts that there is a temporal ordering in which the proposition occurs in the future of some reference time (following Abusch 1998; Jóhannsdóttir & Matthewson 2007):

(ii) $[[\text{APE}]]^{w,g,t_0} = \lambda P_{\langle i, st \rangle}. \lambda w. \lambda t. \exists t' [t < t' \& P(t')(w) = 1]$

- (12) Context: *Mrs. Z is saying goodbye to Mrs. S.*
 Ibuk **ape** konok [...] **ape** nge-lawat reng bek Muntisa
 mother PROSP thingy PROSP AV-visit.relative.of.deceased to with Muntisa
 iku loh. Gek **ape** lungo aku.
 DEM PRT just PROSP go 1SG
 ‘I am going to whatchamacallit ... I am going to pay a visit (out of sympathy) to Mrs. Muntisa.
 I am just going to go.’

- (13) Context: *Speech given at a women’s gathering (Ustadzah)*
 Pun n-duwe anak limo sek **ape** tambah maneh.
 although AV-have child five still PROSP add again
 ‘Even though you have five children you still are going to add another one.’

Evidence that this marker has prospective aspect semantics is based on its interaction with tense: when the time interval picked out is in the past (by a null pronominal tense), the ‘future past’ reading obtains, as shown in (14).¹⁸

- (14) Context: *Today is April 20.*
 Sak wulan kepungkor kepala sekolah ng-omong **ape** ono prei tanggal siji
 one month ago head school AV-say PROSP exist holiday date one
 april. Tapi gak sido.
 April but NEG go.ahead
 ‘One month ago, the school headmaster said that there would be a holiday on April 1st. But it never happened.’ (Chen et al. 2017:252)

Under the null hypothesis that temporal orientation is supplied by aspect, the prediction is that future temporal orientation in Paciran Javanese will be overtly indicated by *ape*. Here, we reconsider the elicited past epistemic possibility claims with *paleng* and *mungkin* in light of the future temporal orientation in (15) (cf. example (8)). In both cases, *ape* ‘PROSP’ is optional, but with a preference for *ape* by both speakers (indicated by the question marks before the parentheses around *ape*).¹⁹

- (15) Context: “*Why did you bring an umbrella yesterday?*” (Thumbnail Q)
 a. Paleng ??(**ape**) udan dino iki
 EPIS.POS PROSP rain day DEM
 ‘It might have rained that day.’ (Elicitation; Ibu Finaty Ahsanah)

¹⁸Other ways to overtly indicate future reference time in Paciran Javanese are with adverbials such as *seksok* ‘tomorrow; in the future’, *engko* ‘later; in the future’, or *sok mben* ‘in the future’.

¹⁹That is, in follow-up elicitation, the two speakers accept both sentences, but state a (slight) preference for the sentence with *ape*. In asking for a translation to Javanese, speakers always initially offer sentences with *ape*, but accept a version of the sentence without *ape* in follow-up elicitation, again with a preference for overt *ape*. I leave this preference aside for future research. These judgments differ from a similar example from Paciran Javanese speakers in Chen et al. (2017:254) in which *ape* is in fact required.

- b. Mungkin ?(ape) udan (wingi)
 EPIS.POS PROSP rain yesterday
 ‘It might have rained before.’ (Elicitation; Ibu Deti Salamah & Ibu Finaty Ahsanah)

The sentence with overt *ape* follows from the hypothesis: the semantics of *ape* as a prospective aspect supplies the future temporal orientation. However, what accounts for the future reading when *ape* is not overtly present? In this case, I assume that there is a null prospective aspect operator, which accounts for the future temporal orientation in (15).²⁰

To recap the findings, in the contexts in *Bill vs. the weather* targeting a past epistemic modal claim with future temporal orientation, the future orientation is supplied by the prospective aspect marker *ape* or its null counterpart in Javanese. I now turn to additional strategies that Paciran Javanese speakers used in these contexts. We will revisit the role of the prospective marker *ape* with evidential-like markers, one of the additional strategies employed.

4.3 Alternative strategies in Javanese for the target contexts in *Bill vs. the weather*

When testing for a semantic interpretation in a given language, using storyboards provides advantages over other tools because it allows the language consultant to freely generate strings without direct influence from the contact language (like translation is subject to) and without biasing the consultant to focus on specific target strings (like elicitation can) (cf. Burton & Matthewson 2015). Storyboards can also be useful in investigating the expressiveness of a language. Keenan (1974) has shown that strong effability, the idea that every proposition can be equivalently expressed across languages, where the propositions compared have the same assertion and the same presupposition(s), cannot be upheld as a language universal. Further cross-linguistic research has corroborated that there are gaps in strong effability, such as the lack of uniqueness or familiarity presuppositions in St’át’imcets determiners (Matthewson 1998) or the lack of circumstantial necessity modals in Nez Perce (Deal 2011).²¹ Thus, the flexibility of a storyboard allows the researcher to explore how a given language expresses a target semantic interpretation through both the narration and follow-up elicitation procedures. Furthermore, storyboards allow the researcher to easily replicate this tool with other consultants, which may generate different results across consultants. These results can be compared using follow-up elicitation.

The results of this storyboard from three speakers reveal that other strategies can be used in Javanese for these contexts: in addition to using an epistemic possibility modal (*paleng* or *mungkin*), other strategies are to use an evidential-like marker (Section 4.3.1), bare predicates plus *wingi* ‘yesterday; in the past’ (Section 4.3.2), or the expression *ndak* ‘or else, otherwise, lest’ (Section 4.3.3).

4.3.1 The use of evidential-like markers

In this section, I discuss the use of ‘evidential-like’ markers in the target contexts of *Bill vs. the weather* that include *ketok-e* ‘appear-DEF’, *bonak-e* ‘evidential-DEF’,²² *watak-e* ‘character-DEF’, and

²⁰I assume that there is a null pronominal tense in Javanese (with no restrictions, as bare predicates are compatible with any reference time; Vander Klok and Matthewson 2015), but this will not help in supplying future temporal orientation under the null hypothesis that tense supplies temporal perspective while aspect provides temporal orientation.

²¹See von Stechow and Matthewson (2008) for in-depth discussion on effability and translatability in the context of language universals in semantics.

jeke-ne ‘1SG.think-DEF’ in the dialect of Paciran Javanese. Since the precise semantic meanings of these markers have not yet been formally studied, I remain vague as to whether these markers are (a sub-type of) *epistemic modals* (which add to the propositional content of an utterance and are modals; that is, quantifiers over possible worlds; e.g., Matthewson, Rullmann and Davis 2007) or *speech act operators* (which do not contribute to the propositional content of an utterance and are non-modal; e.g., Faller 2002). For discussion of their morpho-syntax as adverbs including their shared suffix *-(n)e*, see Vander Klok (2012).

One difference among these markers is that *ketoke* requires direct perceptual evidence, while all other evidential-like markers discussed here are only felicitous with indirect evidence (such as inference, secondhand reports, or auditory/olfactory evidence). The main point here is to explore whether additional markers are felicitous in the contexts targeting an epistemic modal claim with past temporal perspective and future temporal orientation beyond independently-known epistemic modals in Javanese. However, as mentioned above, their felicity could be the result of independent properties, and we cannot conclude that an evidential-like marker that is compatible in these contexts is therefore an epistemic modal.²³

Table 1 summarizes the felicity judgments from three Paciran Javanese speakers for the epistemic modals (*paleng*, *mungkin*) discussed above in Section 4.1 as well as the evidential-like markers in Paciran Javanese, where # indicates infelicity. Focusing on the evidential-like markers, *bonake* is felicitous in contexts targeting a past possibility claim with future orientation, with acceptance from all three speakers. On the other hand, *ketoke* is consistently rejected in these contexts while *watake* and *jekene* receive variable judgments: two speakers reject these markers, while one speaker accepts them in a given target context (Thumbnail R).

Table 1: Summary of felicity judgments in *Bill vs. the weather* for Thumbnail (R)

Paciran Javanese	Ibu Finaty Ahsanah	Ibu Deti Salamah	Ibu Bahrul Ulum
<i>paleng</i> ‘EPIS.POS’	yes	#	-
<i>mungkin</i> ‘EPIS.POS’	yes	yes	-
<i>bonak-e</i> ‘evidential-DEF’	yes	yes	yes
<i>ketok-e</i> ‘appear-DEF’	#	#	#
<i>watak-e</i> ‘character-DEF’	yes	#	#
<i>jeke-ne</i> ‘1SG.think-DEF’	yes	#	#

Considering first *bona-ke* ‘evidential-DEF’, we have already seen in Section 3 that Ibu Deti Salamah uses this marker in each of the responses to *Why did you bring an umbrella? a jacket? a hat?* in (xxv), (xxvii), and (xxix). *Bonake* places restrictions on the source of evidence: this marker cannot be used with direct perceptual evidence (Vander Klok 2012). Example (xxvii) is repeated here; the temporal adverb *wingi* ‘yesterday; in the past’ overtly indicates the past tempo-

²²It is not known what the root of *bonake* is. *Bonak-* seems to be a bound root in Paciran Javanese and speakers cannot translate it. *Bonak-e/bonak* are not found in Standard Javanese references (cf. Arps et al. 2000; Robson & Wibisono 2002; Wedhawati et al. 2006; Robson 2014).

²³Of course, if it turns out that these evidential-like markers are in fact best analyzed as epistemic modals (with additional presuppositions), then these data (that are felicitous) show that other epistemic modals apart from *paleng* and *mungkin* allow for past temporal perspective and future temporal orientation in Paciran Javanese.

ral perspective here, but is optional when tested in follow-up elicitation. Ibu Ulum Bahrul and Ibu Finaty Ahsanah also accept *bonake* in this context in follow-up elicitation.²⁴

- (xxv) Context: “*What is the umbrella for, Bill?*”
 “Yo, **bonak-e** udan, **wingi**.”
 yes evidential-DEF rain yesterday
 ‘“Yeah, it might have rained yesterday.”’

We have also seen in Ibu Deti Salamah’s narrative that no overt marker is used to indicate future reference time in the epistemic contexts with past temporal perspective. Based on follow-up elicitation, it is also possible to overtly indicate future temporal orientation with the prospective aspectual marker *ape*. Both other speakers require this option for *bonake*, as shown in (16).

- (16) Context: *Colleague asks, “Why did you bring an umbrella yesterday?” Bill responds:*
- a. **bonak-e** (**ape**) udan wingi.
 evidential-DEF PROSP rain yesterday
 ‘It might have rained yesterday.’ (Elicitation; Ibu Deti Salamah)
 - b. **bonak-e** *(**ape** / **engko**) udan.
 evidential-DEF PROSP later rain
 ‘It might have rained yesterday.’ (Elicitation; Ibu Finaty Ahsanah)
 - c. **bonak-e** *(**ape**) udan koyok wingi-nan-e
 evidential-DEF PROSP rain like yesterday-NMLZ-DEF
 ‘It might have rained like in the past.’ (Elicitation; Ibu Bahrul Ulum)

In Section 4.2, I proposed that there is a null counterpart of the prospective marker given the optionality of *ape* with the epistemic modals *paleng* and *mungkin*. Under this assumption, the fact that *ape* ‘PROSP’ is required for these speakers is interesting, and shows that further work must be done to better understand the different speaker judgments with *ape*. On the other hand, if *bonake* (also) allows for a circumstantial modal base, this interpretation could potentially account for the case when *ape* ‘PROSP’ is not required for Ibu Deti Salamah: that modals with a circumstantial modal base do not require overt future temporal orientation marking is one strategy languages use with respect to Condoravdi’s (2002) Diversity Condition, according to which circumstantial modals can only occur with non-past temporal orientation (Chen et al. 2017). Given that the target contexts in *Bill vs. the weather* do not distinguish between a past epistemic or past counterfactual claim, and the kind of modal base of *bonake* allows for is currently unknown, this is put aside for future research.

Turning to *ketok-e* ‘see/appear-DEF’, Vander Kloek (2012) shows that *ketoke* requires direct evidence to be felicitous, in contrast to *bonake*. Comments on using *ketoke* in the target contexts in *Bill vs. the weather* are consistent with this requirement; Bill needs to directly observe the weather to use this marker: *Bill e ngasi metu, cerah toh mendung? Kapan mendung, nggawe ‘ketoke’ iso.*

²⁴That an overt past temporal expression is optional with *bonake* in this contexts is also confirmed with Ibu Ulum Bahrul and Ibu Finaty Ahsanah.

'Bill looked outside, is it clear or cloudy? If it's cloudy, you can use *ketoke*.'²⁵ All speakers rejected *ketok-e* 'appear-DEF' in the targeted contexts, such as shown in (17):

(17) Context: "*Why did you bring an umbrella yesterday?*" (Thumbnail Q)

- a. #**ketok-e** ape udan wingi.
 appear-DEF PROSP rain yesterday
 'It appeared that it would rain.' (Elicitation; Ibu Deti Salamah)
- b. #**ketok-e** ape udan dino iki.
 appear-DEF PROSP rain day DEM
 'It appeared that it would rain that day.' (Elicitation; Ibu Finaty Ahsanah)
- c. #**ketok-e** koyok wingi-nan-e ape udan.
 appear-DEF like yesterday-NMLZ-DEF PROSP rain
 'It appeared that it would rain like before.' (Elicitation; Ibu Bahrul Ulum)

With *watak-e* 'character-DEF' and *jeke-ne* '1SG.think-DEF', Ibu Deti Salamah and Ibu Bahrul Ulum find these markers infelicitous in the target contexts, while Ibu Finaty Ahsanah accepts both. Comments for *jekene* and *watake* suggest that the target contexts are not the best kinds of contexts to license these markers: for instance, *Jekene ape kan "mendung", tapi iki mou kan cerah...gak iso nek konteks iki, nek cerito iki gak iso*. 'Jekene will be when "it's cloudy", but in this case it's clear ... you can't use it in this context, in this story it's not possible' and *Iku apaan dek e ngerti saiki mendung* 'This is when he (=Bill) knows that it's cloudy now.' It is likely that these markers also place restrictions on the source of evidence, as suggested by their roots (*jeke* '1SG.think' and *watak* 'character'; Robson and Wibisono 2002).

If it is correct that the rejection of *bonake* and variable rejection of *watake* and *jekene* are due to their evidential restrictions conflicting with the nature of the contexts in *Bill vs. the weather*, these data are inconclusive in determining whether or not these markers are felicitous in a context expressing a possibility epistemic modal claim with past perspective and future temporal orientation. They may well be, but require a different context that is appropriate to their specific evidential requirements.²⁶

To summarize the findings on the evidential-like markers in Paciran Javanese, *bonake* is compatible in contexts targeting an epistemic modal claim with past temporal perspective and future temporal orientation. Further research is necessary to understand whether *bonake* is an epistemic modal or a speech act operator that is non-modal, or possibly a circumstantial modal. It is unknown whether *ketoke*, *watake*, and *jekene* are compatible with such contexts.

²⁵Interestingly, as one reviewer points out, the storyboard *Bill vs. the weather* actually doesn't explicitly mention the source of evidence. Yet, it seems that the assumption being made by the speakers is that Bill does not directly observe the weather, say, for instance, when he is packing his bag to leave for work. It seems that this is the most salient scenario given that (i) Bill still packed his bag with all these things when it was actually sunny outside that day and (ii) his reasoning is based on past weather events. From this perspective, the storyboard biases speakers towards an interpretation where the source of evidence is *indirect* rather than *direct*.

²⁶Thank you to an anonymous reviewer for clarifying this point.

4.3.2 The use of bare predicate plus *wingi* ‘yesterday; in the past’

In addition to independently-known epistemic modals and evidential-like markers, Paciran Javanese speakers also use bare predicates plus a form of *wingi* ‘yesterday; in the past’ in the target contexts. Specifically, in narrating the storyboard, Ibu Bahrul Ulum and Ibu Finaty Ahsanah both presented sentences without any marker that makes a modal or evidential claim in the target contexts in *Bill vs. the weather*.

These types of examples are illustrated here with the narration by Ibu Bahrul Ulum in (18)-(20). (See the next section for examples from Ibu Finaty Ahsanah.) In each case, the prior weather event/state is indicated with a form of *wingi* ‘yesterday; in the past’. Note that the root *wingi* in Javanese has free indexical shift to any time in the past, but its default or out-of-the-blue interpretation is the day before today (yesterday) (cf. footnote 7) and the nominalized form can only be interpreted as some time before yesterday.

- (18) Context: “*Nang lapo awakmu kok nggowo payung barang iku?!’*
‘Why did you bring an umbrella with?!’”

lha... kan **wingi-nan-e** kan udan
 PRT PRT yesterday-NMLZ-DEF PRT rain

‘Well, you know, it rained in the past.’

- (19) Context: “*Nang mbes? jaket gawe opo, jaket?... jaket...’*
‘And then? The jacket is for what, the jacket? The jacket...’”

lha trus kan gawe n-jaga-ni. **Wingi** lak yo iku seh... onok salju
 PRT then PRT make AV-guard-APPL yesterday PRT yes DEM PRT exist snow
 m-udun
 AV-come.down

‘Well, it is for protection. Before there was snow falling.’

- (20) Context: “*Tapi, sik capel gawe opo, capel? Lapo awakmu nggowo capel?’*
‘But, the cap is for what, the cap? Why did you bring the cap?’”

wingi-nan-e loh yo angin-e ra karu-karu-an... tek rambut-ku gak
 yesterday-NMLZ-DEF PRT yes wind-DEF NEG RED-clear-VBLZ so.that hair-my NEG
 mosak-m-asik maneh...
 RED-AV-mess.up again

‘In the past, well, yeah, the wind was crazy. It’s so that my hair wasn’t all over the place again.’

It seems that the fact of mentioning a prior event/state of rain, snow, or wind implicitly opens up the possibility of a future event/state of rain, snow, or wind. These data in Javanese show an alternative strategy without the overt use of an epistemic modal or an evidential-like marker.

4.3.3 The use of *ndak* ‘otherwise, or else, lest’

A final example of an alternative strategy in the target contexts in *Bill vs. the weather* is the use of *ndak* ‘or else, otherwise, lest’. In her narration, in addition to referring to a past instance of rain

and wind, Ibu Finaty Ahsanah also uses the expression *ndak* ‘or else, otherwise, lest’ in two cases in the context of a possible future instance of adverse weather, as shown in (21) and (22).²⁷ It is noteworthy that *ndak* is used in combination with the temporal adverb *engko* ‘later’, which overtly indicates a future reference time.

- (21) Context: “*Gawe opo nggowo payung?*”
 ‘What did you bring an umbrella for?’
 soale kan **gek-ngi** aku k-odan-an... dadi aku ng-gowo payung
 because PRT just-yesterday 1SG KE-rain-VBLZ become 1SG AV-bring umbrella
 siap-siap **ndak engko** udan maneh.
 RED-ready or.else later rain again
 ‘Because, well, recently I got rained on... so I brought an umbrella to be ready lest it rained again later.’

- (22) Context: “*Nang topine?*”
 ‘And the hat?’
 iku kan **gek-ngi-nan-e** rambut-ku gak karu-an kabeh... gara-gara
 DEM PRT just-yesterday-NMLZ-DEF hair-my NEG clear-VBLZ all RED-tumult
 angin-e gak karu-karu-an iku... trus aku lali gak ng-gowo topi,
 wind-DEF NEG RED-clear-VBLZ DEM then 1SG forgot NEG AV-bring hat
 mangka-ne ng-gowo topi... **ndak engko** angin-e ono ngono meneh.
 whereas-DEF AV-bring hat or.else later wind-DEF exist like.that again
 ‘Well, before my hair was not tidy at all, a tumultuous wind got it messed up, and I forgot to bring a hat, whereas this time I brought a hat lest there was wind like that again later.’

The descriptive meaning of *ndak* as ‘or else, otherwise, lest’ suggests that this expression has alternative semantics under current semantic analyses of disjunction (e.g., Alonso-Ovalle 2006). From this perspective, *ndak* plus the temporal adverb *engko* ‘later’ shows a different way to express possible future events in the past in Javanese.

4.3.4 Summary of alternative strategies

Put together, these various results highlight a main advantage of the storyboard method: it can reveal natural, alternative ways of expressing a certain concept other than asking a judgment based on pre-set sentences in elicitation. Ibu Deti Salamah’s narration revealed that the evidential-like marker *bonake* is one such felicitous alternative. As shown from the narration by Ibu Bahrul Ulum and Ibu Finaty Ahsanah, another alternative strategy is simply to indicate a past event, using a form of *wingi* ‘yesterday; in the past’ plus a bare predicate, as a way of opening up the possibility that such an event could have happened again. Another way in Paciran Javanese to indicate the possibility of a past event happening in the future is to use the expression *ndak* ‘or else, otherwise, lest’ plus *engko* ‘later’.

²⁷*Ndak* here is a reduced form of the verb *mundhak*, which also has the meanings ‘to increase, become greater’ and ‘to rise in rank’ (Robson & Wibisono 2002:499). *Ndak* used in Paciran Javanese is not the exclamative of disbelief (*a*)*ndak* (Robson & Wibisono 2002:40), which is found in Standard and Semarang Javanese varieties (Central Javanese).

5 Conclusion

Through the use of the storyboard *Bill vs. the weather*, the main research question was to investigate the availability of a past temporal perspective with possibility epistemic markers in a given language. The results from three speakers of East Javanese from Paciran, Indonesia, show that Javanese attests as another language which shows the availability of such readings, with the epistemic possibility markers *paleng* and *mungkin*.

However, this storyboard must be used in conjunction with other tests to confirm that the modals in question can indeed convey epistemic modality, such as a questionnaire on modality (Vander Klok 2014). The reason for this is first to validate that the marker(s) found in the target contexts is a modal element (and not, for instance, a non-modal element that is independently licensed in such contexts such as a speech act operator). The second reason is to rule out a possible past counterfactual reading in which the modal base is circumstantial.

Beyond the targeted readings for a possibility epistemic modal claim with past temporal perspective and future temporal orientation, it was found that alternative strategies were used in Javanese to invoke such readings. One strategy was to use ‘evidential-like’ markers such as *bonake*. Another strategy for some speakers is to not use any modal claim, but to simply refer to a past weather state, or in addition, to use *ndak* ‘or else, otherwise, lest’ plus the temporal adverb *engko* ‘later’ to explicitly refer to a possible future event in the past. These alternative strategies show that the target contexts did not necessarily invoke the use of an epistemic marker, and underline the advantages of a storyboard: the speakers can freely narrate the storyboard in their own words, in their own language and—in turn—linguists can learn more about the (im)possibilities in natural language.

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