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ON THE TEMPORAL INTERPRETATION OF EPISTEMIC MODALS:  
EVIDENCE FROM PALESTINIAN ARABIC

by

Alaa M. Sharif

A dissertation submitted to the Graduate Faculty in Linguistics in partial fulfillment of the requirements for the degree of Master of Arts, The City University of New York

2020

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This manuscript has been read and accepted by the Graduate Faculty in Linguistics in satisfaction of the thesis requirement for the degree of Master of Arts.

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## ABSTRACT

### ON THE TEMPORAL INTERPRETATION OF EPISTEMIC MODALS: EVIDENCE FROM PALESTINIAN ARABIC

by

Alaa M. Sharif

Advisor: Professor Samer Al Khatib

This thesis aims to contribute to the understanding of temporal interpretation of epistemic modals in Palestinian Arabic (PA), and develop a cross-linguistic analysis. The epistemic necessity modal *akeed* and the epistemic possibility modal *yimkin* in PA exhibit similar temporal configurations to English epistemic modals *must* and *might*, respectively. We argue for a unified underlying structure to account for the temporal configurations. The linearized combination of the epistemic modal, a silent present tense morpheme and an aspectual head morpheme derive either a present-oriented reading when the aspectual head is empty, or a future-oriented reading in presence of a silent prospective aspect. Further, interaction of these linearized combinations with the underlying viewpoint and lexical aspectual components set the constraints that block particular readings, including the bounded event constraint which blocks a present-oriented reading when the embedded predicate is associated with a perfective component. Thus, epistemic modals do not contribute directly to the temporal references, rather their interaction with the underlying tense and aspectual components is what determines the observed temporal configurations.

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# Contents

<b>List of Tables</b>	<b>viii</b>
<b>List of Figures</b>	<b>ix</b>
<b>1 Introduction and Background</b>	<b>1</b>
1.1 Introduction . . . . .	1
1.2 Overview of Modality . . . . .	2
1.3 Theories in Temporal Interpretation of modals . . . . .	4
1.3.1 Modals as temporal operators and quantifiers over possible worlds . .	5
1.3.2 Modals as atemporal quantifiers over possible worlds . . . . .	6
1.4 Aspect: Its definition and semantic contribution . . . . .	9
<b>2 Data from English and Palestinian Arabic</b>	<b>12</b>
2.1 Epistemic modals in English . . . . .	12
2.2 Epistemic modals in Palestinian Arabic . . . . .	15
2.2.1 Main types of Arabic sentences and the ‘root’ structure . . . . .	15
2.2.2 The prefix (b-) as an imperfectivity marker in PA . . . . .	16
2.2.3 Interaction of the imperfective marker (b-) with the embedded even- tuality in PA . . . . .	17
2.2.4 Temporal perspective and temporal orientation of epistemic modals in PA . . . . .	19

<b>3</b>	<b>Proposed Analysis and Implications</b>	<b>23</b>
<b>4</b>	<b>Conclusions and Future work</b>	<b>32</b>
	<b>Bibliography</b>	<b>33</b>

# List of Tables

1	Combinations and the associated readings . . . . .	27
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# List of Figures

1	Branching worlds . . . . .	7
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# Chapter 1

## Introduction and Background

### 1.1 Introduction

Modal expressions are widely used to convey a variety of notions such as obligations, duties, an agent's state of knowledge among many others. In addition to the well-established variations in type of modality and the associated modal readings, modals carry various temporal references deriving ambiguities as illustrated in (1). The state of happiness can hold true at the present moment, or at a time future to utterance time.

- (1) She might be happy (now/tomorrow)

This study aims to describe the temporal configurations of epistemic modals in Palestinian Arabic and English, and tackle the theoretical basis behind their derivation.

In the coming sections of this chapter, a brief background of modality and current theories of their temporal interpretation will be presented. In chapter 2, linguistic data of epistemic modalized claims from Palestinian Arabic and English will be reported. Finally, a unified analysis that accounts for our findings is proposed in chapter 3.

## 1.2 Overview of Modality

Modals are expressions of natural language that are used to express necessity and/or possibility. As described by Kratzer, modals are of different categories among which are auxiliary modals such as *must* and *might*, and adverbial modals as in *possibly* and *necessarily*. Regardless of their category, they share this notion of modality, and exhibit a necessity or a possibility *modal force* (Kratzer, 1977) (Kratzer, 1981). Additionally, modals carry multiple readings, which are also referred to as *modal flavors*. In her work, Kratzer aimed to unify the semantics of modal expressions which were treated to be ambiguous. This ambiguity is shown in (2) below. This example presents some readings of the necessity auxiliary modal *must* (Kratzer, 1977).

- (2) a. All Maori children *must* learn the names of their ancestors (*deontic flavor*)  
b. The ancestors of the Maoris *must* have arrived from Tahiti (*epistemic flavor*)

In (2a) *must* has a deontic reading and refers to either a set of rules or duties. On the other hand, in (2b) it has an epistemic reading and refers to the speaker's attitude or state of knowledge (epistemic state). In the aim of unifying the semantics of each modal expression, Kratzer based her analysis on the idea that modals are not ambiguous, but rather are context-dependent. This context is what Kratzer named *a conversational background*; which can be either inferred or stated explicitly by the adverbial phrase 'In view of ...'. For instance, what the sentence in (2a) actually conveys is: 'In view of what the duties are, Maori children  $\text{must}_{\text{neut}}$  learn the names of their ancestors'. On the other hand, sentence (2b) states that 'In view of what is known, the ancestors of the Maoris  $\text{must}_{\text{neut}}$  have arrived from Tahiti'. In each of these sentences, *must* is neutral or in other words unambiguous, the context however is different (Kratzer, 1977) (Kratzer, 1981).

Using possible world semantics, Kratzer analyzes modals as quantifiers over possible worlds, whose interpretation is relative to the foregoing conversational background that is context-dependent. This conversational background is a function (f) that maps possible

worlds to a set of propositions. These are worlds in which all contextually-relevant propositions hold true and are, therefore, worlds that are accessible from our actual world  $w$  comprising the *modal base* (MB). Specifically, epistemic *must* is analyzed as a universal quantifier over all possible worlds accessible from  $w$  and belong to an epistemic modal base determined by the conversational background; deontic *must* is a universal quantifier over all worlds accessible from  $w$  that belong to a circumstantial modal base -a modal base of worlds in which some relevant facts or circumstances hold true. (Kratzer, 1977) (Kratzer, 1981) (Nauze, 2008). In addition, deriving a deontic flavor is attributed to a second conversational background which is discussed below.

To account for the different modal flavors, Kratzer introduced a second conversational background; the *ordering source*. As the term implies, it sets an ordering of the worlds in the modal base restricting the accessible worlds to those closest to  $w$  based on a set of facts. For example, a deontic flavor is derived when the ordering source is based on some set of rules/duties. In addition to deriving the various modal interpretations, the ordering source was introduced to solve some problems in the standard analysis of modals we have just presented (Kratzer, 1981) (Kratzer, 1991). One of these problems is the well-known Karttunen’s problem (Karttunen, 1972), illustrated in (3).

- (3) a. John has left  
 b. John *must* have left (Karttunen (1972): 12)

According to basic intuition, sentence (3b) makes a weaker claim than sentence (3a). However, the standard modal analysis does not predict this intuition (Karttunen, 1972) (von Stechow and Gillies, 2010). Kratzer’s analysis of modals as doubly relative quantifiers; relative to the two conversational backgrounds (the modal base and the ordering source), captures the shared notion of possibility and necessity (Kratzer, 1991). Additionally, it offers a solution to Karttunen’s problem as the actual world  $w$  is not necessarily one of the closest worlds over which the modal quantifies (Kratzer, 1981) (Nauze, 2008). In this case *must* is still a universal quantifier, however, it becomes weaker by quantifying over the set

of worlds closest to the normal course of events in  $w$ , and not over all accessible worlds in the modal base (Kratzer, 1991). Interestingly, the ordering source is suggested to account for epistemic modals in Gitksan - a Tsimshianic language spoken in north-western British Columbia, Canada (Matthewson, 2011). A language which, unlike English, shows lexicalized variation of the modal force rather than modal flavor (Peterson, 2008).

Of note, the same holds for the possibility modal auxiliary *might*, the difference though is that the latter is an existential operator which quantifies over some of the closest possible worlds in the modal base. Below are the denotations of these modals based on Kratzer's analysis.

- (4) a.  $\llbracket \mathbf{must} \rrbracket^{g,t_0,w_0,f,h} = \lambda P \lambda t \lambda w. \forall w' [w' \in \text{BEST}_{h(w,t)}(\bigcap f(w,t)) \rightarrow P(t)(w')]^1$   
 b.  $\llbracket \mathbf{might} \rrbracket^{g,t_0,w_0,f,h} = \lambda P \lambda t \lambda w. \exists w' [w' \in \text{BEST}_{h(w,t)}(\bigcap f(w,t)) \& P(t)(w')]$

It is worth noting that other linguists argue that the weakness of *must* stems from the evidential signal that it carries rather than being relative to an ordering source. So in a sentence like the one in (3b) - 'John *must* have left' - the speaker knows that John left based on indirect evidence (von Stechow and Gillies, 2010). Either view is compatible with our claims in this thesis. Nevertheless, Kratzer's analysis will be adopted as it is considered the most influential analysis of modals (Nauze, 2008).

### 1.3 Theories in Temporal Interpretation of modals

Modalized sentences tend to exhibit various temporal references cross-linguistically. This section aims to present a brief background of the theoretical accounts of these temporal references.

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<sup>1</sup> $g$ : variable assignment function,  $t_0$ : utterance time,  $w_0$ : world of utterance,  $f$ : modal base,  $h$ : ordering source,  $\text{BEST}_{h(w,t)}(\bigcap f(w,t))$ : are the set of accessible worlds in the modal base that are closest to the actual world  $w$

### 1.3.1 Modals as temporal operators and quantifiers over possible worlds

The first theory presented here comes from work of Condoravdi (2002). In her work, Condoravdi aimed to investigate the contribution of modals to temporal references of modalized claims in English. Two terms of temporal reference are relevant in this account, one is *temporal perspective* which is the time at which the modal base is evaluated, the second is *temporal orientation* which refers to the relation between the temporal perspective and time of embedded eventuality instantiation. In her analysis, Condoravdi presents a unified temporal semantics of modals, where modals are both temporal operators and quantifiers over possible worlds. For epistemic modal auxiliaries of the present, including *must* and *might*, Condoravdi's account treats them to be in the scope of present tense in extensional contexts and zero tense in intensional contexts, therefore the modalized expressions get the perspective of the utterance time (present) (Condoravdi, 2002).

As for the temporal orientation of these modals, Condoravdi explained the observed role of aktionsart or lexical aspect of the embedded predicates in the temporal references. Lexical aspect refers to the type of eventuality of the embedded predicate. When the modal scopes above an eventive VP as in 'get sick', the temporal orientation is obligatorily future, while it is optionally future when scoping above a stative VP as in 'be sick'. This is illustrated in (5) below (Condoravdi, 2002).

- (5) a. She might get sick \*now/tomorrow (Future TO)  
b. She might be sick now/tomorrow (Present/Future TO)

Based on Condoravdi's analysis, modals contribute directly to the temporal orientation presented in (5). In addition to being quantifiers over possible worlds, they also function as temporal operators extending the time interval of eventuality instantiation and locate eventualities relative to reference time. This temporal relation, which she calls the AT relation, is temporal inclusion in case of eventives, and temporal overlap in case of statives.

In (6) is the proposed definition of the possibility modal *might* as an example, where P stands for property of eventuality,  $[t, -)$  is the time interval, from NOW to end of time, extended by the modal (Condoravdi, 2002).

$$(6) \quad \text{might}_{\text{MB}}: \lambda P \lambda w \lambda t \exists w' [w' \in \text{MB}(w, t) \& \text{AT}([t, -), w', P)]$$

Since the relation is temporal inclusion of the embedded eventive predicate within the extended time interval, the temporal orientation will be obligatorily future. On the other hand, the temporal relation in case of statives is overlap with the extended time interval, which allows for both a present- and a future-oriented reading.

In addition to a direct semantic contribution of modals, Condoravdi proposed that the type of modality is associated with particular temporal references. This generalization aimed to resolve the ambiguity of epistemic modals in the context of a future-oriented temporal reading as illustrated in example (7) below.

- (7) a. He might have the flu (now)  
 b. He might get the flu

The ambiguity of *might* in (7) is between an epistemic reading and a metaphysical one. The latter is available when the eventuality is instantiated at a future time, and it has to do with how the world may turn out to be (Condoravdi, 2002). The availability of a metaphysical reading is restricted to cases in which the issue is not settled, or in other words that its truth or falsity has not been determined yet. On the other hand, an epistemic reading is allowed when the issue is presupposed to be settled. This distinction is explained by the distinct underlying structure of possibilities between a fixed past and an open future represented by a “forward branching” world-time model which will be touched upon shortly.

### 1.3.2 Modals as atemporal quantifiers over possible worlds

Another theory comes from Werner (2006). Unlike Condoravdi’s approach, Werner suggests that “the temporal readings are associated with particular modal reading”, and that

modals are atemporal (Werner, 2006). Werner bases his analysis on the fact that the difference between non-epistemic and epistemic readings of a modal is the ontology of branching worlds, similar in this matter to Condoravdi’s approach. This organization of branching worlds together with his two principles; the disparity and non-disparity principles, are used to account for the different temporal readings.

Werner takes the non-epistemic modal base to be a totally realistic modal base as defined by Kratzer; a function that provides a unique description of the actual world  $w$  (Kratzer, 1981). Such a modal base consists of a set of branching worlds which diverge at speech time. In other words, these worlds are identical up to the speech time at which they branch presenting future uncertainty of unsettled facts. On the other hand, an epistemic modal base consists of sets of such branching worlds to reflect past and present uncertainty based on ignorance about settled facts (Werner, 2003) (Werner, 2006). Figure (1) below illustrates a set of branching worlds, some of which branch at  $t_1$ , and others which remain identical up to  $t_2$  at which they branch (Condoravdi, 2002).

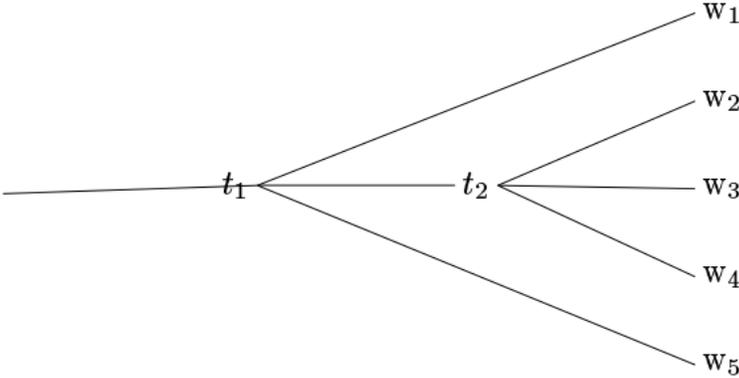


Figure 1: Branching worlds

To account for the temporal readings associated with the modal base, Werner introduces the disparity and non-disparity principles. The first is suggested by Werner to be part of the semantics of modals and ensures that a proposition ( $p$ ) is open with respect to the modal base, meaning that there is at least one world in which  $p$  holds and at least another

world in which it does not hold. Werner's second principle, on the other hand, entails that distinctions are restrictively made based on settled facts. A modal with a totally realistic modal base entails that distinctions are made based on unsettled facts. In this case, the non-disparity principle is violated, however, the disparity principle still holds and ensures a future orientation capturing the reported cross-linguistic tendency of such modals for future-oriented readings. In contrast, when the modal has an epistemic modal base, the non-disparity principle is not violated as distinctions are made based on settled facts ensuring a non-future orientation in this case. Notably, the role the disparity principle plays in this case is to make sure that  $p$  is not known by the speaker, capturing the difference between modalized claims and non-modal assertions (Werner, 2006).

In short, Werner's proposal makes use of general mechanisms to derive the TO, and accounts for the tendency of a future-oriented reading with non-epistemic modals.

It is worth noting that alternative accounts have been suggested to explain future-oriented readings. One example is work of Kratzer in which she argues for a covert prospective aspectual morpheme scoping below non-epistemic circumstantial modals giving rise to a future-oriented reading, and accounting for absence of actuality entailment in this case (Kratzer, 2011). Evidence of the contribution of a prospective aspect comes from languages like Gitksan, in which it is overtly expressed and is obligatorily present with non-epistemic modals (Matthewson, 2011) (Matthewson, 2013).

Notably, in addition to the prospective aspect there are other kinds of aspectual morphemes that can potentially contribute to the observed temporal configurations. It is easier to point out the role of such aspects in languages in which they are overtly expressed. In this thesis, the role the different aspectual operators play to derive the various temporal references will be investigated referring to data from Palestinian Arabic. But first, a brief background about aspect is necessary and will be presented in the coming section.

## 1.4 Aspect: Its definition and semantic contribution

Aspect is a linguistic category that describes temporal properties of eventualities, also known as situations. In addition, it presents a temporal point of view making part or all of the situation visible (Smith, 1997). Based on the two-component theory of aspectual meaning, there are two separate and independent components which contribute to this temporal information (Smith, 1997). The first component is known as situation aspect (Smith, 1994), also termed lexical aspect or aktionsart. The term “aktionsart” was first introduced by work of Agrell (1908) (Klein, 1994). This aspect is a conceptual component that represents the internal eventuality structure and its temporal schema giving rise to different types of situations; events and states. Events include different types of situations such as activities, accomplishments, and achievements. These types are determined by the verb constellation; the verb, its arguments, and any adverbials or other entities contributing to the temporal signature of the situation (Smith, 1994) (Smith, 1997). A detailed description of the different situation types have been presented in work of Vendler (1957) and Dowty (1979). Temporal features of the different eventualities from Vendler’s work will be touched upon in the next chapter. In the remainder of the thesis, the terms situations and eventualities are used interchangeably.

The second component is the viewpoint aspect; namely the perfective and imperfective viewpoints. The former presents situations as a whole and therefore reflects the whole time schema of the situation including its initial and final endpoints. The imperfective viewpoint, on the other hand, pertains to the internal constituency of a situation and presents part of that situation; an interval that does not include its endpoints (Comrie, 1976) (Klein, 1994) (Smith, 1994). Notably, the final endpoint can be either arbitrary as in activities like “run”, or natural as in accomplishments like “build a house” (Smith, 1997). This distinction results in a different entailment pattern which will be referred to shortly. Additionally, since states such as “know” and “love” are not dynamic, in other words they do not consist of successive stages, they are not compatible continuous tense (Vendler, 1957). Their temporal schema

does not involve the endpoints, the coming about and end of a state is not part of the state itself, making states by default compatible with the imperfective viewpoint. Dynamic events, however, require the continuous tense to be compatible with an imperfective viewpoint. Otherwise, they are presented as a bounded whole by the perfective viewpoint (Smith, 1997) (Klein, 1994). In English, the perfective viewpoint is not morphologically marked, while the imperfective viewpoint is either neutrally present in case of states, or marked by the auxiliary morpheme introducing the progressive imperfective viewpoint with eventives as in “she is running” (Smith, 1994) (Smith, 1997).

It is important to mention that neither situation aspect nor viewpoint aspect conceal the role each plays. This is supported by the entailment patterns of activities and achievements. For example, in case of activities if the imperfective sentence “Laila was running” is true, then the perfective sentence “Laila ran” holds true as well. However, in the case of accomplishments this entailment does not necessarily hold, as “Laila was building a house” does not entail “Laila built a house”. This difference results from the situation type which in turn is based on the temporal features of the eventualities as previously mentioned (Smith, 1997). Interestingly, some language acquisition studies showed that children do distinguish between states and events, they do not associate a continuous tense with states (Brown, 1973) (Smith, 1997), and that this distinction is not learned but rather cognitive-based (Aksu, 1978) (Smith, 1997).

It is worth noting that the foregoing viewpoint aspects set the relation between time of situation and reference time or also known as topic time (Klein, 1994). When these eventualities are embedded below modals, the reference (topic) time reflects the modal temporal perspective. In this context, the perfective viewpoint, which presents the eventuality as a bounded whole, requires that the situation time interval is included within the reference time interval (RTI). The imperfective viewpoint, however, requires the (RTI) to be included within the situation time interval, this is due to the fact that it presents or focuses part of the eventuality (Klein, 1994). Based on Klein’s work, Kratzer developed the following

denotations for the perfective (PFV) and imperfective (IMPF) viewpoints (Kratzer, 1998):

- (8) a.  $\llbracket \mathbf{PFV} \rrbracket = \lambda P \lambda t \lambda w. \exists e [P(e)(w) \& \tau(e) \subseteq t]$   
 b.  $\llbracket \mathbf{IMPF} \rrbracket = \lambda P \lambda t \lambda w. \exists e [P(e)(w) \& t \subseteq \tau(e)]$

The relation that these viewpoints set between the eventualities and reference time or TP bears a resemblance to the temporal orientation (TO) introduced by Condoravdi (Condoravdi, 2002). In fact, the role of the viewpoint aspects described by Klein and Kratzer is similar to the AT relation function which Condoravdi suggests to be part of the semantics of modals. Condoravdi based this relation on the deictic pattern of eventualities presented in work of Partee (1984). Advocating for a role of viewpoint aspect and situation aspect in the TO of modals entails that modals do not contribute directly to TO. No previous work has been done on Palesitnian Arabic regarding temporal configurations of modals. This thesis aims to describe these configurations with focus on epistemic modals in PA. Through a comparison to English data, it also aims to answer the following questions:

- Do epistemic modals contribute directly to the temporal interpretation of modalized claims?
- How do epistemic modals interact with tense and aspectual operators in the sentence? Does this interaction account for the observed temporal configurations?

# Chapter 2

## Data from English and Palestinian Arabic

### 2.1 Epistemic modals in English

As previously mentioned, modals in English are of a varying force. Some of them have universal force expressing necessity like English *must*. Others have existential force expressing possibility as in *might* (Kratzer, 1981). Modals also vary in flavor. For instance, *must* and *might* both have an epistemic reading (flavor), yet depending on the context they can induce other readings such as a deontic reading for *must* and a metaphysical reading for *might*. Based on Kratzer's analysis presented earlier, modals are not ambiguous and their associated readings are context-dependent (Kratzer, 1977) (Kratzer, 1981) (Kratzer, 1991).

Like other expressions in language, modals, including epistemic ones, interact with expressions of time and their embedded predicates. In this discussion, the terms temporal perspective (TP) and temporal orientation (TO), introduced by Condoravdi (2002) and presented earlier, are relevant and will be used throughout the thesis.

It has been argued that epistemic modals do not scope below tense and aspect, they scope above these functional projections and are at a higher position than non-epistemic modals

(Cinque, 1999). Proponents of this view claim that epistemic modals largely come with present TP, even when they carry past-tense marking (Condoravdi, 2002) (Stowell, 2004). This matter, however, is debated. Recently, Rullmann and Matthewson (2018) claimed that past-perspective readings are available in English and Dutch narratives, which they take to show that epistemic modals do occur in the scope of tense after all. This is argued for, as well, by von Fintel and Gillies (2008), as illustrated in example (9).

- (9) Sophie is looking for some ice cream and checks the freezer. There is none in there.  
 Asked why she opened the freezer, she replies:
- a. There *might* have been ice cream in the freezer.
  - b. PAST(*might*(ice cream in freezer))

In example (9), von Fintel and Gillies argue that the epistemic modal *might* can scope below the past morpheme and receives a past TP. This is because (9a) still holds true even if Sophie knows NOW that there is no ice-cream in the freezer. This is only possible if the sentence is uttered based on Sophie’s past epistemic state (von Fintel and Gillies, 2008).

A past temporal perspective of epistemic modals is claimed to exist, as well, in Norwegian (Eide, 2005). In addition, in other languages like Gitksan, modals can have past, present, or future temporal perspective. In this language past and present tense are context-dependent, while future tense is marked by the overt future marker ‘dim’, as shown in (10) below. (Matthewson, 2011)(Matthewson, 2013).

- (10) a. yugw-**imaa**-hl wis (Present/Past TP)  
 IMPF-**EPIS**-CN rain  
 ‘It might be raining.’ / ‘It might have been raining [based on my evidence at that time].’
- b. **dim** yugw-**imaa**-hl **dim** wis (Future TP)  
**FUT** IMPF-**EPIS**-CN **FUT** rain  
 ‘It will look like it’s going to rain.’

CN: common noun connective.

Whether the temporal perspective of modals, and specifically epistemic modals, in Palestinian Arabic can reflect the past epistemic state of the agent will be touched on in the following sections.

While the temporal perspective of a modal is determined by the tense scoping above it, its *orientation* seems to depend on a number of factors: the Aktionsart or lexical aspect of the embedded predicate (Condoravdi, 2002), the aspectual operators scoping under these modals, in addition to the modal flavor and force (Matthewson, 2011). The role each of these factors play will be explained in the following sections. Of note, temporal interpretation of epistemic modal claims is the focus of this paper, therefore, the role modal flavor and type of modality play will not be touched upon.

As mentioned in the previous chapter, it is generally accepted that epistemic modals allow for both present and future temporal orientation (Condoravdi, 2002) (Matthewson, 2011) (Rullmann and Matthewson, 2018) (Werner, 2006). More specifically, it is agreed that in case of an embedded stative predicate, the temporal orientation can either be present or future, whereas if the embedded predicate is eventive, specifically episodic nonprogressive eventives, the temporal orientation is obligatorily future (Ramchand, 2014) as shown in example (11) (Condoravdi, 2002).

- (11) a. He might get sick \*now / tomorrow. (\*Present TO / Future TO)  
b. He might be sick now / tomorrow. (Present TO / Future TO)

It is worth noting that the epistemic necessity modal *must*, unlike the possibility modal *might*, does not allow a future-oriented reading regardless of the embedded eventuality, a fact rarely discussed in the literature. When *must* scopes above statives, habitual eventives, and episodic progressive eventives only a present TO is allowed. However, when it scopes above episodic nonprogressive eventive predicates, as in ‘go’, its epistemic reading is blocked

allowing instead for a circumstantial deontic reading with a future temporal orientation. This discrepancy is illustrated in (12) and (13). (Ramchand, 2014)

- (12) a. John must be in his office. (Present TO / \*Future TO - *Epistemic reading*)  
b. John must go to the party. (\*Present TO / Future TO - *Deontic reading*)
- (13) a. John might be in his office. (Present TO / Future TO - *Epistemic reading*)  
b. John might go to the party. (\*Present TO / Future TO - *Epistemic reading*)

Now we turn to Palestinian Arabic (PA) to shed some light on temporal references of epistemic modal sentences, and point out any potential similarities and/or differences to English.

## 2.2 Epistemic modals in Palestinian Arabic

Before presenting data from Palestinian Arabic regarding the temporal perspective and orientation of epistemic modals, a brief introduction to the basic types of sentences in PA is necessary.

### 2.2.1 Main types of Arabic sentences and the ‘root’ structure

There are two types of complete (stand-alone) sentences in the Arabic dialects including PA; namely verbal and nominal sentences. Verbal sentences are sentences which contain a verbal predicate, while nominal sentences are those which contain nominal predicates yet are still complete and can stand alone (Ryding, 2005). In this thesis, we will focus on verbal sentences. In such sentences, the verb consists of three to five consonantal phonemes comprising the root, which holds the lexical meaning, in addition to inflectional morphemes whose role is to mark for gender, number, tense and other categories. For example in sentence (14) below, the root verb used is /ʔrf/ ‘know’ which is in this case inflected to mark agreement with the gender and number of the subject ‘Laila’ forming the inflected

verb /tʔraf/. The sentence is finite and refers to the present due to a silent present tense morpheme. The preceding (b-) will be discussed shortly as it plays an essential role in the temporal orientation of epistemic modal in PA.

- (14) Laila PRES.b-t-ʔraf e-ssir  
 Laila PRES.b-3SG<sub>FEM</sub>-know the-secret  
 ‘Laila knows the secret’

## 2.2.2 The prefix (b-) as an imperfectivity marker in PA

In various Arabic dialects, including Palestinian Arabic, the prefix (b-) precedes an inflected verb as in sentence (14) repeated in (15) below. An inflected verb like /t-ʔraf/ cannot stand alone or form a complete sentence. Its distribution is limited to being a complement of aspectual and modal predicates (Holes et al., 2018). It is also associated with a future inference as illustrated in (16).

- (15) Laila PRES.b-t-ʔraf e-ssir  
 Laila PRES.b-3SG<sub>FEM</sub>-know the-secret  
 ‘Laila knows the secret’

- (16) a. inno **y-raweh** badri fikra raaʔiʔa  
 For-him-to **3SG<sub>FEM</sub>-leave** early idea great  
 ‘For him to leave early (is) a great idea’ (Future TO)
- b. Yimkin **y-raweh** badri  
 Might<sub>EPIS</sub> **3SG<sub>MASC</sub>-leave** early  
 ‘He might leave early’ (Future TO)

Moreover, adding the prefix (b-) to an inflected verb like /t-lʔab/ ‘play’, generates the verb /b-t-lʔab/ which is analyzed as an indicative verb, describing an ongoing process and in other instances introducing a present habitual reading (Holes et al., 2018), as observed in sentences (17a) and (17b), respectively. This prefix combines with the silent present morpheme to form a complete (stand-alone) sentence, which suggests a potential role of (b-) in tense anchoring, assuming that a stand-alone sentence is one that includes a tense head.

- (17) a. Nour PRES.**b-t-lʕab** bi-saħa  
 Nour PRES.**b-3SG<sub>FEM</sub>-playing** in-the.yard  
 ‘Nour is playing in the yard’
- b. Shayma PRES.**b-t-lʕab** rijada kol yom  
 Shayma PRES.**b-3SG<sub>FEM</sub>-play** sports every day  
 ‘Shayma plays sports every day’

The different readings described in (17) are imperfective readings. It is, therefore, reasonable to suggest that (b-) marks imperfectivity. Additionally, in multiple languages including English, it has been reported that the imperfective viewpoint is compatible with stative verbs (Binnick, 2012). The same holds for Arabic as in (18) below.

- (18) Salma PRES.**b-t-ʔraf** el-ʒawab  
 Salma PRES.**b-3SG<sub>FEM</sub>-know** the-answer  
 ‘Salma knows the answer’

Whether (b-) is the imperfective aspectual operator or an agreement feature to an imperfective aspectual phrase, which it selects for, is not the focus of this thesis. For the rest of the thesis though, it will be referred to as an imperfectivity marker and will be glossed as ”IMPF” in the coming examples.

### 2.2.3 Interaction of the imperfective marker (b-) with the embedded eventuality in PA

As previously mentioned, embedded eventualities carry distinct temporal features giving rise to the different situation types (Vendler, 1957) (Dowty, 1979). Vendler’s classification of these eventualities is based on what he calls the “time schemata” of the verb, entailing the (in)compatibility of the eventuality with the continuous tense based on its durativity, whether it is (a)telic (having a culmination point or not), and whether it is a state, lasting for a period of time, or not. This division is illustrated in (19) below (Vendler, 1957).

- (19) a. Peter is pushing a cart (-state/-telic/durative = activity)

- b. Sarah is drawing a circle (-state/+telic/durative = accomplishment)
- c. Anna reached the summit (-state/+telic/instantaneous = achievement)
- d. Mary knows the answer (+state/-telic/durative = stative)

As observed in sentences (19b) and (19c), the difference between an accomplishment and an achievement eventuality is that the former is durative while the latter is instantaneous and is therefore incompatible with the continuous tense (Vendler, 1957). The eventualities in (19a, 19b, and 19c) are all eventive predicates which, if not in the progressive form, are assumed to be associated with a perfective viewpoint and can therefore be presented as a bounded whole (Kamp and Reyle, 1993) (Smith, 1997). An imperfective reading of these nonprogressive eventives is, therefore, not possible. This type of eventuality is expected to be incompatible with the imperfective marker in PA. This is indeed the case as shown in (20) below.

- (20) a. ʕali PRES.b-y-ʕsel e-ssyara  
 Ali PRES.IMPF-3SG<sub>MASC</sub>-washing the-car  
 ‘Ali is washing the car’ (Accomplishment)
- b. ʔibrahiiim PRES.b-y-urkod  
 Ibrahim PRES.IMPF-3SG<sub>MASC</sub>-runing  
 ‘Ibrahim is running’ (Activity)
- c. \*ʕali PRES.b-y-usal el-qimmeh  
 Ali PRES.IMPF-3SG<sub>MASC</sub>-reach the-summit  
 ‘Ali reaches the summit’ (Achievement)
- d. ʕabeer PRES.b-t-ʕraf el-ħaʔiiʔa  
 Abeer PRES.IMPF-3SG<sub>FEM</sub>-know the-truth  
 ‘Abeer knows the truth’ (State)

Notably, while episodic progressive eventives require the progressive morphology in English to get an imperfective reading and to be compatible with present tense (Dowty, 1979), in languages like German and Dutch these eventives in present tense have an “in-progress” interpretation which allows the imperfective reading (Sihwei et al., 2017). In PA, the imper-

fectivity marker (b-) introduces a progressive reading (Holes et al., 2018). This is illustrated in (21).

- (21) a. Het regen-t op dit moment  
 It rain-PRS.3SG at this moment  
 ‘It is raining right now’ (Dutch)
- b. Es regne-t in diesem Moment  
 It rain-PRS.3SG at this moment  
 ‘It is raining right now’ (German)
- (Sihwei et al. (2017): 244)
- c. b-t-shatti  
 IMPF-3SG<sub>FEM</sub>-rain  
 ‘It is raining’ (PA)

These observations are important to consider while studying the temporal configurations of epistemic modals in PA. Now, we will present some data from Palestinian Arabic illustrating the available temporal configurations.

## 2.2.4 Temporal perspective and temporal orientation of epistemic modals in PA

Examples of epistemic modals in PA are *yimkin*, epistemic *might*, and *akeed*, epistemic *must*. Epistemic modality, in PA, describes the current epistemic state of the speaker/agent at utterance time. In other words, the temporal perspective of these modalized claims is always present regardless of the temporal orientation; whether the embedded event precedes, coincides or follows the modal base evaluation time, as the sentences in (22) show.

(22) **Present TP with past TO (a), present TO (b), future TO (c):**

- a. yimkin sirfa-t e-ttari?  
 Might PAST.know-3SG<sub>FEM</sub> the-way  
 ‘She might have known the way’

- b. yimkin PRES.b-t-ıraf e-ttari?  
 Might PRES.IMPF-3SG<sub>FEM</sub>-know the-way  
 ‘She might know the way’
- c. yimkin t-ıraf e-ttari?  
 Might 3SG<sub>FEM</sub>-know the-way  
 ‘She might know the way’

Additionally, in PA a past tense morpheme scoping above epistemic modals is not possible, therefore a past temporal perspective is not allowed. This is clearly shown in (23) below. When the past morpheme “kan” precedes the modal as in (23a), the sentence is ungrammatical. However, when it is uttered after the modal, only a present TP of the modal sentence is allowed. A past TP is not available suggesting that underlyingly “kan” scopes below the modal in (23b).

- (23) a. \*Kaan-at yimkin/akeed ∅ bi-l Quds  
 PAST-3SG<sub>FEM</sub> might/must be in-the Jerusalem  
 “Intended translation: She might/must have been in Jerusalem”
- b. yimkin/akeed kan-at ∅ bi-l Quds  
 might/must PAST-3SG<sub>FEM</sub> be in-the Jerusalem  
 “She might/must have been in Jerusalem” (present TP)

Regarding the temporal orientation of epistemic modals *akeed* and *yimkin* in PA, a similar effect of the aktionsart of embedded predicates is observed as with English modals *must* and *might*. More specifically, in PA the epistemic possibility modal *yimkin* allows both a present- and a future-oriented readings when followed by a stative predicate as illustrated in (24a) and (24b), respectively. Whereas when it scopes above an episodic nonprogressive eventive predicate, only a future-oriented reading is allowed as shown in (25a) and (25b), respectively. These temporal references pattern with those of the English epistemic modal *might* in (13) repeated in (26) below.

(24) **Embedded stative predicate**

- a. **yimkin** PRES.b-y-iıraf e-ssir  
**might**<sub>EPIS</sub> PRES.IMPF-3SG<sub>MASC</sub>-know the-secret

- ‘He might<sub>EPIS</sub> know the secret’ (Present TO)
- b. **yimkin** y-iʃraf e-ssir  
**might<sub>EPIS</sub>** 3SG<sub>MASC</sub>-know the-secret  
‘He might<sub>EPIS</sub> know the secret’ (Future TO)
- c. **akeed** PRES.**b**-y-iʃraf e-ssir  
**must<sub>EPIS</sub>** PRES.**IMPF**-3SG<sub>MASC</sub>-know the-secret  
‘He must<sub>EPIS</sub> know the secret’ (Present TO)
- d. \***akeed** y-iʃraf e-ssir  
**must<sub>EPIS</sub>** 3SG<sub>MASC</sub>-know the-secret  
‘He must<sub>EPIS</sub> know the secret’ (\*Future TO)
- (25) **Embedded eventive predicate**
- a. \***yimkin** PRES.**b**-y-raweh el-yom  
**might<sub>EPIS</sub>** PRES.**IMPF**-3SG<sub>MASC</sub>-leave today  
‘He might<sub>EPIS</sub> leave today’ (\*Present TO)
- b. **yimkin** y-raweh el-yom  
**might<sub>EPIS</sub>** 3SG<sub>MASC</sub>-leave today  
‘He might<sub>EPIS</sub> leave today’ (Future TO)
- c. \***akeed** PRES.**b**-y-raweh el-yom  
**must<sub>EPIS</sub>** PRES.**IMPF**-3SG<sub>MASC</sub>-leave today  
‘He must<sub>EPIS</sub> leave today’ (\*Present TO)
- d. \***akeed** y-raweh el-yom  
**must<sub>EPIS</sub>** 3SG<sub>MASC</sub>-leave today  
‘He must<sub>EPIS</sub> leave today’ (\*Future TO)
- (26) a. John might be in his office. (Present TO / Future TO - *Epistemic reading*)  
b. John might go to the party. (\*Present TO / Future TO - *Epistemic reading*)
- (27) a. John must be in his office. (Present TO / \*Future TO - *Epistemic reading*)  
b. John must go to the party. (\*Present TO / Future TO - *Deontic reading*)

Similarly, the epistemic necessity modal *akeed* patterns with *must* when followed by a stative predicate, as it allows for a present temporal orientation. However, no such orientation

is permitted when *akeed* scopes above an episodic nonprogressive eventive predicate. This is illustrated in (24c) and (25c). Interestingly, the discrepancy between the possibility and necessity modal auxiliaries of English presented earlier, and repeated in (27) above, is also observed in the data from PA. In (24d) and (25d), a future temporal orientation of *akeed* with a non-finite complement is not possible, regardless of the type of the embedded eventuality. It is, however, important to note an essential difference between *akeed* and *must* regarding future temporal orientation. The former can deliver a future TO in the presence of an overt future tense marker, which is possible because *akeed* can combine with finite clauses. This difference will be touched upon towards the end of the thesis.

Finally, it is worth noting that, unlike English, a future oriented reading of an epistemic necessity claim with *akeed* does **not** take a deontic interpretation instead of an epistemic one, but rather renders the sentence ungrammatical, as is the case in (24d) and (25d) above. While a future-oriented reading disambiguates *must* for a deontic reading, it is incompatible with *akeed*. A deontic interpretation in PA requires the necessity modal *lazim* which, unlike *akeed*, combines with all types of eventualities, and when it does, the orientation is obligatorily future as illustrated in (28) below.

- (28) a. \* *akeed*    *y-ishtri*            *awaaʔi*  
           *must<sub>epis</sub>* 3SG<sub>MASC</sub>-buy clothes  
           ‘He must buy clothes
- b. ✓ *lazim*    *y-ishtri*            *awaaʔi*  
           *must<sub>deon</sub>* 3SG<sub>MASC</sub>-buy clothes  
           ‘He must buy clothes (Future TO)

## Chapter 3

# Proposed Analysis and Implications

Unembedded epistemic modals in PA refer to the present epistemic state of the speaker. PA epistemic modals cannot be embedded under a PAST morpheme, so, without higher attitude predicates, they appear to always have present perspective. In English, the temporal perspective of such modals is controversial, a past temporal perspective has been argued for by work of von Stechow & Gillies (2008), as previously mentioned.

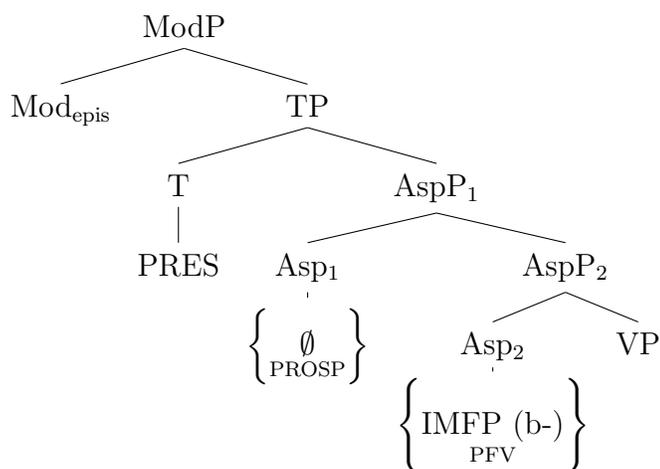
The Temporal orientation of epistemic modals in English and PA, on the other hand, is very similar. The Aktionsart of the embedded predicate has the same effect on the allowed temporal orientations. Specifically, when the epistemic possibility modals *might* and *yimkin* scope above a stative, a progressive eventive, or a habitual, both present and future-oriented readings are possible. English does not have any overt morphology that marks either reading. For example, “She might know” can be present-oriented, or future-oriented. In Arabic on the other hand, the present-oriented reading is morphologically marked by the imperfectivity marker (b-). Additionally, when the embedded predicate is an episodic nonprogressive eventive, the temporal orientation is obligatorily future. This orientation is allowed only in absence of the prefix (b-).

In case of the epistemic necessity modals *must* and *akeed*, no future-oriented readings are allowed regardless of the type of the embedded eventuality. However, a present-oriented

reading is induced when they scope above a stative, a progressive eventive or a habitual predicate, which is again morphologically marked in PA by the imperfectivity prefix (b-). Notably, presence of the imperfectivity marker (b-) blocks a future-oriented reading in PA.

Based on the similarities in the temporal configurations of epistemic modals in English and PA, we propose a common underlying structure deriving the temporal configurations presented above. The structure looks like the one in (29).

(29)  $\text{Modal}_{\text{EPIS}} > \text{PRES} > \text{Asp1} > \text{Asp2} > \text{VP}$



Adopting Cinque’s analysis of epistemic modal hierarchy (Cinque, 1999), these modals scope above tense which accounts for the present temporal perspective in PA even in the presence of a past tense morpheme. Following Abusch (1998) and Condoravdi (2002), we assume that epistemic modals directly pick up the utterance time as their temporal perspective.

Regarding temporal orientation of epistemic modals, there are a number of factors that play part in shaping it, namely the modal force, the silent present tense morpheme (PRES), the silent ordering aspect (Asp1), the inclusion viewpoint aspect (Asp2; (im)perfective), and the situation aspect or Aktionsart of the embedded predicate.

As discussed in the second chapter of this thesis, the verb constellations of the embedded predicates convey the situation type, and the aspectual viewpoint makes all or part of the situation visible. Specifically, the perfective aspect makes the situation visible as a whole, and requires the event to be included within the reference time, while the imperfective aspect

makes parts of the situation visible and puts the reference time within the situation time (Comrie, 1976) (Smith, 1994) (Klein, 1994) (Smith, 1997).

As illustrated earlier in the data, the imperfective aspectual marker (b-); proposed to be present covertly in English, can modify states and progressive eventives which are described to be unbounded ongoing situations (Smith and Erbaugh, 2005). On the other hand, nonprogressive eventives are bounded or closed situations (Smith and Erbaugh, 2005), or in other words they have initial and final endpoints as presented in the first chapter. Bounded situations are incompatible with the present temporal perspective (reference time) (Bennett and Partee, 1972) (Dowty, 1979) (Kamp and Reyle, 1993). In fact, they are assumed to be associated with a perfective component and are therefore presented as a whole (Comrie, 1976) (Smith, 1994) (Kamp and Reyle, 1993) (Smith, 1997) (Herweg, 1991). This is supported by work of Wurmbrand (2014) who proposes that the restrictions set by the perfective aspect in English determine the distribution of the nonprogressive eventives. Moreover, this was established as well for both matrix and embedded clauses in Serbian by work of Todorovic (2015). A detailed description of these restrictions and the associated distribution of nonprogressive eventives will be presented shortly.

To account for the PA and English data, we propose that the different readings of interest result from an ordered linearization of the following functional heads; the epistemic modal, the silent PRES morpheme, and the higher aspectual head (Asp1) shown in structure (29) above. The latter can either be empty potentially giving rise to present-oriented readings, or consist of a covert prospective morpheme (PROSP); which in turn orders the eventuality to a future time relative to the temporal perspective (reference time) delivering future-oriented readings. Additionally, the combination of these three heads with the aspectual viewpoint (Aps2) sets the constraints that produce our central findings.

The first constraint is the bounded event constraint, which will be referred to as constraint A. It blocks the combination of the present tense, a null Asp1 head and a perfective aspectual head as in (30) below.

- (30) \* ʕali PRES.PFV.y-ibni      beit  
 Ali PRES.PFV.3SG-build house  
 ‘Ali builds a house’

Constraint A entails that the temporal location of bounded events cannot be the present due to the fact that their bounds exceed the present moment (Smith, 2003) (Smith and Erbaugh, 2005). Therefore, they are shifted to an interval either in the past or the future by additional temporal information in the sentence (Smith and Erbaugh, 2005). In comparison to the minimal NOW interval, the shifted intervals are extended (Todorovic, 2015). This constraint was also referred to as punctuality constraint in earlier work of Giorgi and Pianesi (1997) (Smith and Erbaugh, 2005).

The second constraint, which will be referred to as constraint B, does not allow a future-oriented reading under the scope of an epistemic necessity modal, rendering the following combination NEC > PRES > PROSP not possible. An attempt to identify and explain the basis of this constraint will be touched upon towards the end of this chapter.

The third constraint, Constraint C, blocks the following combination: NEC/POSS > PRES > PROSP > IMPF. A predicate marked with the imperfectivity marker (b-) can scope under an empty Asp1 head to combine with the higher silent PRES head and derive a present TO. However, it cannot combine with a prospective aspectual morpheme. In fact, presence of the imperfectivity component (b-) blocks a future-oriented reading. The reason behind absence of a future-oriented reading in this case remains to be elucidated.

The combinations of the linearized heads in addition to the three constraints account for the data as presented in table (1) below.

Combination	Temporal orientation (TO)	Constraint(s)
NEC > PRES > $\emptyset$ > IMPF	present TO	–
NEC > PRES > $\emptyset$ > PFV	*	A
NEC > PRES > PROSP > IMPF	*	B, C
NEC > PRES > PROSP > PFV	*	B
POSS > PRES > $\emptyset$ > IMPF	present TO	–
POSS > PRES > $\emptyset$ > PFV	*	A
POSS > PRES > PROSP > IMPF	*	C
POSS > PRES > PROSP > PFV	future TO	–

Table 1: Combinations and the associated readings

(\* refers to blocked reading)

To illustrate how this analysis accounts for our findings, examples will be given for each combination in (34) below. The denotations of all example sentences are derived using the Kratzerian definitions of epistemic modals and viewpoint aspects presented in the first chapter (Kratzer, 1991) (Kratzer, 1998). The semantics of the PROSP aspectual morpheme is adopted from work of Rullmann and Matthewson (2018). The lexical entries are presented again in (31), (32), and (33).

$$(31) \quad \text{a. } \llbracket \mathbf{akeed} \rrbracket^{g,t_0,w_0,f,h} = \lambda P \lambda t \lambda w. \forall w' [w' \in \text{BEST}_{h(w,t)}(\bigcap f(w,t)) \rightarrow P(t)(w')]^2$$

$$\text{b. } \llbracket \mathbf{yimkin} \rrbracket^{g,t_0,w_0,f,h} = \lambda P \lambda t \lambda w. \exists w' [w' \in \text{BEST}_{h(w,t)}(\bigcap f(w,t)) \& P(t)(w')]$$

$$(32) \quad \text{a. } \llbracket \mathbf{PFV} \rrbracket^{g,t_0,w_0,f,h} = \lambda P \lambda t \lambda w. \exists e [P(e)(w) \& \tau(e) \subseteq t]$$

$$\text{b. } \llbracket \mathbf{IMPF} \rrbracket^{g,t_0,w_0,f,h} = \lambda P \lambda t \lambda w. \exists e [P(e)(w) \& t \subseteq \tau(e)]$$

$$(33) \quad \llbracket \mathbf{PROSP} \rrbracket^{g,t_0,w_0,f,h} = \lambda P \lambda t \lambda w. \exists t' [t < t' \& P(t')(w)]$$

$$(34) \quad \text{a. } \checkmark \text{ NEC} > \text{ PRES} > \emptyset > \text{ IMPF}$$

akeed      PRES.b-t-ħib                      im-ha  
must<sub>EPIS</sub> PRES.IMPF-3SG<sub>FEM</sub>-love mother-her

‘She must love her mother’

$$\lambda w. \forall w' [w' \in \text{BEST}_{h(w,t_0)}(\bigcap f(w,t_0)) \rightarrow \exists t_0 \& \exists e [\text{she.love.her mother}(e)(w') \& t_0 \subseteq$$

<sup>2</sup>g:variable assignment function, **t**<sub>0</sub>:utterance time, **w**<sub>0</sub>: world of utterance, **f**: modal base, **h**: ordering source

$\tau(e)]]$

Sentence (34a) is true in the actual world  $w$  if in every world  $w'$  accessible from  $w$ , there exists an eventuality of ‘loving her mother’ lasting for an interval of time within which the present reference time ( $t_0$ ) is included. This derives a present-oriented reading.

- b. \* NEC > PRES >  $\emptyset$  > PFV

akeed      PRES y-urkod  
must<sub>EPIS</sub> PRES 3SG<sub>MASC</sub>-run

‘He must<sub>epis</sub> run’

$\lambda w.\forall w'[w' \in \text{BEST}_{h(w,t_0)}(\bigcap f(w,t_0)) \rightarrow \exists t_0 \& \exists e[\text{he.run}(e)(w') \& \tau(e) \subseteq t_0]]$

Sentence (34b) is true in the actual world  $w$  if for every accessible world  $w'$ , there exists an eventuality of ‘him running’ which lasts for an interval of time included within the present reference time ( $t_0$ ).

This reading is blocked by the bounded event constraint (Constraint A). The temporal trace of the running eventuality cannot be included within the reference time ( $t_0$ ), as its bounds exceed that present moment.

- c. \* NEC > PRES > PROSP > PFV

akeed      PRES PROSP y-rawweh  
must<sub>EPIS</sub> PRES PROSP 3SG<sub>MASC</sub>-leave

‘He must<sub>epis</sub> leave’

$\lambda w.\forall w'[w' \in \text{BEST}_{h(w,t_0)}(\bigcap f(w,t_0)) \rightarrow \exists t'[t' > t_0 \& \exists e[\text{he.leave}(e)(w') \& \tau(e) \subseteq t']] ]]$

Sentence (34c) is true in the actual world  $w$  if for every world  $w'$  accessible from  $w$ , there exists an eventuality of ‘him leaving’ which is included in an interval of time ( $t'$ ) that follows reference time ( $t_0$ ).

This reading is blocked by constraint B. No future-oriented reading is allowed under the scope of an epistemic necessity modal.

- d. \* NEC > PRES > PROSP > IMPF

akeed PRES PROSP b-y-iʃraf e-ssir  
 must<sub>EPIS</sub> PRES PROSP IMPF-3SG<sub>MASC</sub>-know the-secret

‘He must know the secret’

$$\lambda w.\forall w'[w' \in \text{BEST}_{h(w,t_0)}(\bigcap f(w,t_0)) \rightarrow \exists t'[t' > t_0 \& \exists e[\text{he.know.secret}(e)(w') \& t' \subseteq \tau(e)]]$$

Sentence (34d) is true in the actual world  $w$  if in every world  $w'$  accessible from  $w$ , there exists an eventuality of ‘him knowing the secret’ that lasts for an interval which includes the time interval ( $t'$ ); an interval future to the reference time ( $t_0$ ).

This reading is blocked, however, by constraints B and C. An epistemic necessity modal cannot combine with a prospective morpheme, and the imperfectivity marker (b-) restricts a future-oriented reading, as previously mentioned.

- e. ✓ POSS > PRES >  $\emptyset$  > IMPF

yimkin PRES.b-y-ħib el-ʃamees  
 might<sub>EPIS</sub> PRES.IMPF-3SG<sub>MASC</sub>-like the-shirt

‘He might like the shirt’

$$\lambda w.\exists w'[w' \in \text{BEST}_{h(w,t_0)}(\bigcap f(w,t_0)) \& \exists t_0 \& \exists e[\text{he.like.theshirt}(e)(w') \& t_0 \subseteq \tau(e)]]$$

Sentence (34e) is true in the actual world  $w$  if there is a world  $w'$  accessible from  $w$  in which an eventuality of ‘him liking the shirt’ holds and lasts for an interval of time within which the present reference time ( $t_0$ ) is contained. This derives a present-oriented reading.

- f. \* POSS > PRES >  $\emptyset$  > PFV

yimkin PRES y-urkod  
 might<sub>EPIS</sub> PRES 3SG<sub>MASC</sub>-run

‘He might run’

$$\lambda w.\exists w'[w' \in \text{BEST}_{h(w,t_0)}(\bigcap f(w,t_0)) \& \exists t_0 \& \exists e[\text{he.run}(e)(w') \& \tau(e) \subseteq t_0]]$$

Sentence (34f) is true in the actual world  $w$  if there is a world  $w'$  accessible from  $w$ , in which an eventuality of ‘him running’ exists and lasts for an interval of time included within the present reference time ( $t_0$ ).



and so a present-oriented reading in this case is blocked by constraint A, the bounded event constraint. This aspectual shift has been reported with English stative predicates as well (Comrie, 1976).

Going back to constraint B, it is tempting to propose that it is an outcome of a requirement of epistemic necessity to derive the epistemic deficit from distinctions made based on settled facts only, which is similar to the non-disparity principle introduced by Werner (2006). This would ensure a present-oriented reading, as future uncertainty is based on unsettled facts. However, this reasoning does not hold in PA due to the fact that epistemic necessity modal *akeed* can scope over a finite complement with an overt future marker “rah” giving rise to a future-oriented reading as shown in (35).

- (35)    *akeed*    *rah*    *y-iiji*                    *bokra*  
           *must*<sub>EPIS</sub> *FUT* *3SG*<sub>MASC</sub>-*come* *tomorrow*  
           ‘It *must*<sub>epis</sub> be the case that he will come tomorrow’

Therefore, further work is definitely needed to better understand the basis of this constraint and constraint C as well.

Finally, it must be noted that the bounded event constraint might not fully account for the absence of a present-oriented reading when the embedded eventuality is an achievement. This is due to the fact that this situation type has an instantaneous temporal feature and is therefore not expected to suffer from this constraint. However, unlike Vendler’s analysis of achievements (Vendler, 1957), it has been argued that this type of eventuality appears in the progressive tense form, in which case its preliminary stages are described (Smith, 1994). A better understanding of the temporal schemata of achievements and their interaction with other aspectual components remains to be tackled.

# Chapter 4

## Conclusions and Future work

Through a comparison of temporal references of modalized sentences in English and Palestinian Arabic (PA), we intended to find a unified account for their derivation. Epistemic modals do not contribute directly to the associated temporal references. In fact, these modals interact with the embedded aspectual operators deriving the different temporal configurations. Based on data from PA, we proposed that the combination of the epistemic modal, the silent present tense morpheme, and an empty Asp1 head derives a present-oriented reading. However, this reading is blocked when the embedded predicate lacks an imperfective component, by the bounded event constraint. This constraint renders the embedded perfective eventualities incompatible with a present reference time. The combination of perfective eventualities with epistemic modals of the present is allowed by shifting time of eventuality to a future time. This shift is brought about by a prospective aspectual head scoping above these eventualities. However, in presence of the imperfectivity marker a future-oriented reading is not allowed. Further, this shift is blocked under the scope of the necessity epistemic modals. The nature of both this constraint and the constraint set by the imperfectivity marker (b-) in PA remains to be elucidated and will be tackled in future work.

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