TEMPORAL INTERPRETATION AND CROSS–LINGUISTIC VARIATION

A formal semantic analysis of temporal and aspectual reference in Hausa and Medumba

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Writing the final lines of my dissertation feels less awesome than it would if I could tell my dad about it. This thesis is dedicated to his memory.

List of Tables

List of Glossing Conventions

DEF	definite
DEM	demonstrative
DO	direct object
F	feminine
FOC	focus
FUT	future
HAB	habitual
INF	infinitive
IPFV	imperfective
ITER	iterative
M	masculine
NEAR	near past
NEG	negation
PERF	perfect
PFV	perfective
PL	plural
POT	potential
PREP	preposition
PRES	present
PROG	progressive
PRON	pronoun
PROSP	prospective
PRT	particle
PST	past
PTCP	participle
REM	remote past
REL	relative
SBJV	subjunctive
TOD	time of day

Chapter 1

Introduction

Most Indo–European languages obligatorily mark finite matrix clauses for tense, as illustrated in the examples in (1) from English.

(1) a. Nana **is** cooking beans. (present tense)
b. Nana **was** cooking beans. (past tense)

The fact that tense is fused with agreement in these languages has resulted in a special status of the category of *tense* in formal linguistic theory, as tense is often assumed to be the head of the syntactic clause (e.g. Chomsky 1981, 1995; Travis 1984; Pollock 1989; for a summary see Ritter & Wiltschko 2014). Although this assumption arguably makes tense a potential candidate for a component of Universal Grammar, much cross–linguistic semantic work has identified and investigated languages that do not overtly mark tense in their grammar (e.g. Bittner 2005, 2008, 2011, 2014 on Kalaallisut, Bohnemeyer 2002, 2009 on Yucatec Maya, Lin 2003, 2006, 2010; Smith & Erbaugh 2005 on Mandarin Chinese, Smith et al. 2003, 2007 on Navajo, Tonhauser 2011a on Paraguayan Guaraní). It seems fair to state as a result of these studies that the semantic category of tense is not a language universal (see also von Fintel & Matthewson 2008), but that there are languages which are genuinely tenseless in a sense to be defined in chapter 2. However, some studies on languages without overt tense morphology find that temporal interpretation in these languages is still semantically restricted by tense morphemes that are phonologically covert (e.g. Matthewson 2006 on St'át'imcets, Jóhannsdóttir & Matthewson 2008 on Gitksan[1]). These findings show that a decision as to whether or not a language is semantically tenseless requires careful and thorough investigation (for an overview of theoretical approaches to morphologically tenseless languages see Tonhauser 2015). The first part of this thesis[2] contributes to this line of research by in-

[1]This language can also be spelled "Gitxsan".

[2]Chapters 3 and 4 of this thesis are slightly adapted versions of what is published as Mucha (2013) (preceded by a shorter version in Mucha (2012), and building on elementary,

vestigating the Chadic language Hausa, arguing that Hausa does not encode tense in its grammar overtly or covertly.

Beside languages that do not grammatically encode any tense at all, there are languages with very fine–grained grammatical distinctions in the realm of temporality. However, by comparison with the relatively extensive literature on tenseless languages that has emerged in the last decade, in–depth studies on the formal semantics of *graded tense* are still relatively scarce. A very careful (though informal) investigation of the graded tense system of South Baffin Inuktitut is provided in Hayashi (2011) and Hayashi & Oshima (2015). Cable (2013) provides the first formal semantic account of graded temporality as instantiated in Gĩkũyũ (showing that the graded temporal morphemes in Gĩkũyũ are not actually tenses), and Bochnak & Klecha (to appear) contribute insights from Luganda. The second part of this thesis engages with this ongoing debate on the semantics of temporal marking in so–called "graded tense"–languages by providing a detailed formal analysis of graded tense marking in the Grassfields Bantu language Medumba. Moreover, the fact that tense marking is optional in Medumba provides grounds for comparing the interpretation of graded temporal markers in Medumba and languages with obligatory graded tense on the one hand, and comparison of the interpretation of temporally unmarked sentences in Hausa and Medumba, on the other.

1.1 Methodology

The data presented in this thesis come from original fieldwork by the author unless otherwise noted. The elicitation technique followed the standards established in Matthewson (2004),[3] i.e. language consultants were asked for judgments of acceptability, truth and felicity of sentences in the target language in particular contexts. In addition, in order to detect default interpretations the speakers occasionally saw sentences in isolation and were asked to judge their grammaticality or translate them into the metalanguage. Forms that were volunteered by a speaker in a particular context were usually tested in an acceptability judgment task with a different consultant. In what follows, some more details on the fieldwork settings are given for both languages separately.

The data from *Hausa* were elicited with four male speakers who all grew up with Hausa as a native language. The elicitation sessions took place between 2009 and 2012 in the Berlin area, English was used as a metalanguage throughout. Three of the consultants (including the main consultant who provided much data for the latest version) speak the dialect that is often

mostly informal research submitted as Mucha (2011)).

[3]For more recent and very helpful guidelines for semantic fieldwork see also Bochnak & Matthewson (2015) and Tonhauser & Matthewson (2015).

referred to as "Standard Hausa" (e.g. Newman 2000), the fourth consultant speaks the Southeastern dialect of Bauchi. Not all the data were tested with all four speakers, but the core data on which the central claims are based were checked with at least two consultants. The main consultant, who gave his judgment for every example presented in this thesis, has a background in linguistics. Overall, the judgments on Hausa were very consistent with little variation between speakers.

The data from *Medumba* rely on judgments from six native speakers (three male, three female) all in all, including two main consultants (both male). Of the two main consultants, one has a background in linguistics. He was consulted on matters of translation, orthography, and tone marking. His judgments were elicited as well, but double–checked with three other native speakers with no linguistics background. This fieldwork was conducted during two research visits to Yaoundé in 2013 and 2014. I used English as a metalanguage with the consultants whose language proficiency allowed it (i.e. with the main consultants) and French with the others. Additional data were elicited in 2015 with the second main consultant, a Medumba native speaker from Bangangté who is currently based in Berlin and has no background in linguistics. In these elicitations, contexts were presented in English and communication was mostly in German. His judgments were partly complemented by email–judgments from one or two other consultants. Variation in the Medumba data was higher than in the Hausa data.[4] Unless equivocalness is explicitly noted where the examples appear, all the judgments presented in this thesis meet the criteria listed in (2).

(2)
a. Where only one speaker was consulted, the judgment was replicated on a different occasion.
b. Where two or three speakers were consulted on the same item, their judgments concur.
c. Where more than three speakers were consulted on the same item, at least 75% of the consultants report the same judgment.

To depict the judgments, I use the symbol '#' to mark unacceptability of an otherwise well–formed sentence in a given context. By contrast, '*' marks context–independent unacceptability (which usually amounts to ungrammaticality). Very rarely, the symbol '?' is used to mark a sentence as degraded in a given context, while '??' should be read as 'bordering on (but not quite) unacceptable'. Note that '?' and '??' do not report that speakers' judgments diverge, but that individual speakers report that the given sentence is not unequivocally acceptable or unacceptable in the given con-

[4]One of the consultants in Yaoundé particularly often reported divergent judgments, which I attribute to the fact that she did not grow up in a Medumba–speaking community and supposedly never used Medumba as her primary language. No claims in the thesis are based solely or primarily on her judgments.

text. Target sentences that are not qualified by any of the above–mentioned symbols were judged as acceptable by my consultants.

The tone marking in the examples is adjusted to the simplifying conventions of the two languages as suggested by my linguist consultants, which happen to be oppositional. In the examples from Hausa, low tones are marked by ̀, and high tones remain unmarked (moreover, long vowels are marked by ̄). In Medumba, high tones are marked by ́, and low tones remain unmarked. Throughout, rising tones (̌) and falling tones (̂) are marked.

1.2 Outline and preview of the results

In order to provide a basis for the investigations into the temporal systems of Hausa and Medumba, *chapter 2 presents the basic theoretical notions of tense, aspect, and modality.* Since a major focus of this thesis is on the (non)–realization of tense in two under–researched languages, particular attention is payed to the definition and formal implementation of grammatical tense (section 2.2).

Chapter 3 is concerned with the interpretation of superficially tenseless sentences in Hausa. The main claim is that Hausa is a genuinely tenseless language. To prepare this argument, the chapter first introduces some general information on the language (3.2) and presents its TAM system as described in previous work (3.3). Then it briefly discusses covert tense in St'át'imcets (Salishan) as proposed in Matthewson (2006) and summarizes the predictions that a parallel approach to the temporal system of Hausa would make (3.4). These predictions are then systematically tested for Hausa with the result that temporal interpretation in Hausa is not restricted by covert tense (3.5). Instead, the temporal interpretations observed in Hausa are captured by an approach proposed in Smith et al. (2003, 2007), Smith & Erbaugh (2005), and Smith (2008), which pragmatically derives the temporal interpretation of tenseless sentences from aspect (3.6). Finally, section 3.7 provides evidence and arguments against an existing analysis of the Hausa relative perfective form as a past tense. Section 3.8 summarizes.

Chapter 4 deals with future marking in Hausa, and argues that it overtly realizes the two meaning components that are often attributed to future interpretation in natural language: universal quantification over possible worlds (modality) and future shifting of the event time relative to the reference time (prospective aspect). The future marker *zā* that was previously described as a future tense is proposed to be modal in meaning and the TAM marking with which it obligatorily co–occurs is reanalyzed as a prospective aspect. Among other things, this component of the analysis accounts for the observation that the future marker *zā* is incompatible with (other) aspectual markers.

Chapter 5 provides an analysis of past marking in Medumba. After a short introduction, section 5.2 provides some background information on the language and section 5.3 describes the TAM system based on previous work. After identifying the temporal domains of the past markers (5.4), they are differentiated from temporal adverbials in the language (5.5). As a basis of comparison, section 5.6 presents the analysis of temporal remoteness morphemes in Gĩkũyũ provided in Cable (2013). Section 5.7 provides the crucial data to be accounted for in this chapter, showing, among other things, that the past markers in Medumba behave differently from the Gĩkũyũ temporal markers in crucial respects. The analysis presented in section 5.8 proposes that past markers in Medumba have the meaning of quantificational tenses, and section 5.9 argues that this analysis accounts for the observed data more straightforwardly than a presuppositional tense analysis.

In chapter 6, sentences without tense marking in Medumba are analyzed along the same lines as tenseless sentences in Hausa. Section 6.2 presents the data illustrating the interpretative possibilities of temporally unmarked sentences in Medumba, and section 6.3 presents the analysis in decent brevity (given that the reader is already familiar with the account of Smith 2008 at that point). Finally, section 6.4 sketches an analysis of the morphemes that are associated with imperfective and present interpretation.

Chapter 7 discusses future interpretation in Medumba. In section 7.1, previous descriptions of the future marking system are presented and research questions for the chapter are summarized. Sections 7.2 – 7.5 deal with the general future marker *á'*, first introducing the empirical data, and then providing an analysis of the morpheme in which it encodes modality and co–occurs with a phonologically covert prospective aspect. This proposal is extended to "complex future markers", i.e. future forms that encode remoteness, in section 7.6. The chapter is summarized in 7.7.

Chapter 8 evaluates the results of the presented studies from a broader perspective on cross–linguistic variation. Section 8.1 summarizes some observed differences in temporal interpretation of tenseless sentences in Hausa and Medumba, and discusses whether or not Medumba should be considered a genuinely tenseless language. This discussion includes some of the languages without morphological tense for which semantic or pragmatic analyses have been provided, as for example St'át'imcets, Guaraní, and Mandarin Chinese. Section 8.2 aims at taking stock of cross–linguistic variation in the semantics of graded temporal markers, based on a comparison of the account proposed for Medumba with the few other semantic analyses of graded temporal systems that are available. Section 8.3 deals with cross–linguistic future interpretation in particular. The section summarizes commonalities of the proposed analyses of future marking in Hausa and Medumba, and explores the potential of the proposal to extend to other languages, considering English, Gitksan, and Greek.

Chapter 2

Theoretical background

2.1 The basic notions

Descriptively, the function of tense is to locate a situation relative to the utterance time on a time line. Past tense is hence often assumed to encode an anteriority relation between two time intervals, future tense a posteriority relation, and present tense simultaneity or overlap. To resume our example from the introduction, the English present tense in (1-a) locates the cooking event at speech time, while the past tense in (1-b) locates it before the speech time.

(1) a. Billy **is** cooking beans.
b. Billy **was** cooking beans.

As past perfect utterances illustrate, however, temporal interpretation seems to involve more than two times, cf. (2).

(2) When Marcus celebrated his fifth birthday, his father had (already) left.

This insight has led to the assumption (most often attributed to Reichenbach 1947), that temporal interpretation always involves *three* distinct times. Reichenbach considered them time points which he dubbed speech time (S), event time (E) and reference time (R). This three–way distinction makes it possible to identify the temporal structure of various temporal forms of English which Reichenbach uniformly refers to as *tenses*. The sentence in (2), for example, would be assigned the temporal structure E < R < S in Reichenbach's system. In prose, the speech point is preceded by the reference point specified by the temporal clause ("When Marcus celebrated his birthday..."), which is in turn preceded by the time of the event of Marcus' father leaving, i.e. the event point in Reichenbach's terms. Table 2.1 below gives a summary of some basic and complex temporal forms and the temporal order of reference time, event time and speech time that Reichenbach

assigns to them.

Past perfect	E – R – S
Simple past	E,R – S
Present perfect	E – S,R
Simple present	S,R,E
Simple future	S,R – E or S – R,E
Posterior future	S – R – E

Table 2.1: English tenses according to Reichenbach (1947)

This idea has been adopted and further refined many times since, especially in Klein (1994, 1995), where workable definitions of the three times involved in temporal interpretation are provided. Instead of reference point, speech point and event point, Klein uses the terms *topic time*, *time of utterance* and *time of situation*. As illustrated in (3), I will assume Klein's definitions of the three pertinent time intervals. However, I will diverge from Klein (1994, 1995) in terms of terminology and make use of the terms that have (to my understanding) become most popular in the literature on temporal semantics:

(3) a. Utterance time (UT) = The time at which the sentence under consideration is uttered
b. Event(uality) time (ET) = The time of the relevant situation/ eventuality
c. Reference time (RT) = The time span to which the speaker's claim is confined

In addition to UT, ET and RT, the term *evaluation time* (EvT) is sometimes used to refer to the time relative to which the truth conditions of a clause are evaluated. The evaluation time thus always corresponds to the utterance time in matrix clauses (see e.g. Cover & Tonhauser 2015).

Crucially, Klein (1994) uses Reichenbach's distinction to provide differentiating definitions of tense and aspect, which Reichenbach (1947) did not include in his considerations. Klein (1994, p.6) proposes that tense concerns the relation between the reference time and the utterance time of a sentence, while aspect relates the reference time to the eventuality time. Klein's main point, starting from Reichenbach's idea that tense does not relate a situation to the utterance time *directly* but via a contextually determined reference time, is that tense does not relate situation times and utterance times at all. Rather, the function of tense is to locate the time to which the speaker refers to the time at which she makes her utterance. Klein (1994) illustrates this idea with the stative sentence given in (4-b).

(4) Question by a judge: What did you notice when you looked into the room?

a. There was a book in the room.
b. The book was in Russian.

In Klein's terms, past tense in this sentence conveys the precedence relation between the time the speaker makes a claim about (which is specified by the temporal adjunct clause "when you looked into the room") and the utterance time. The perfect aspect in the example in (2) is associated with the precedence relation between the situation of the father leaving and the reference time. Based on Klein's insight that tense relates UT and RT and that aspect relates RT and ET,[1] we can define the standardly assumed temporal categories summarized in Table 2.2 below.

Tense	**Aspect**
Present: RT $\supseteq$ UT	Imperfective/Progressive: RT $\subseteq$ ET
Future: RT $>$ UT	Prospective: ET $>$ RT
Past: RT $<$ UT	Perfect: ET $<$ RT
	Perfective: ET $\subseteq$ RT

Table 2.2: Tense and aspect meanings according to Klein (1994)

To conclude this section, some basic ontological concepts that I assume in this thesis should be explicated. Following Bennett & Partee (1978); von Stechow (2009) and many others, time will be conceptualized as a set of closed time intervals (rather than moments) that can stand in the following relations:

(5) Relations of time intervals

a. $<$ (anteriority, "before")
b. $>$ (posteriority, "after")
c. O (overlap)
d. $\supseteq$ (inclusion)
e. $\supset$ (proper inclusion)

[1] This is informally described in other pertinent works as well. For instance, Comrie (1976, p.3) writes: "Aspects are different ways of viewing the internal temporal constituency of a situation.", and Chung & Timberlake (1985, p.213) state: "Aspect characterizes the relationship of a predicate to the time interval over which it occurs."

Logical representations are given in a typed λ–calculus with the following ingredients (see Heim & Kratzer 1998, Kratzer 2000):

(6) Semantic types and domains

a. e is the semantic type for entities, their domain is $D_e = D$
b. l is the semantic type for eventualities, their domain is D_l
c. i is the semantic type for temporal intervals, their domain is D_i
d. s is the semantic type for worlds, their domain is D_s
e. t is the semantic type for truth values, their domain is D_t
f. If σ and τ are semantic types, then $\langle \sigma, \tau \rangle$ is a semantic type. Nothing else is a semantic type.

(7) Variables

a. 'x' ranges over entities
b. 'e' ranges over eventualities
c. 't' ranges over temporal intervals
d. 'w' ranges over worlds
e. 'P' ranges over functions

'$[\![\ ]\!]$' is the function that assigns denotations to linguistic expressions. In the representations used for the original work in this thesis, the interpretation function is relativized to a context index c and a variable assignment g. Hence for any expression α, $[\![\alpha]\!]^{g,c}$ is the denotation of α with respect to the variable assignment g and the context index c (see Heim & Kratzer 1998; Kusumoto 1999). For presentational reasons and when referring to other studies, '$[\![\ ]\!]$' is sometimes relativized to a temporal parameter t, which then represents the time of evaluation. Building on these technical ingredients, the next section introduces different approaches to the formal implementation of tense along with some of their empirical problems.

2.2 The semantics of tense

2.2.1 The "classic" approach

The first analysis of tense in formal semantics was inherited from tense logic and is most often attributed to Prior (1967). On this account, tense is a sentential operator that manipulates times in the metalanguage and the interpretation of tense involves existential quantification over times. Tense thus introduces a new time and relates it to the original evaluation time which is represented by a temporal index (cf. Enç 1987, p.633). The meaning of a past operator applied to a proposition p would thus be roughly as in (8).

(8) $[\![\text{PAST (p)}]\!]^t = \exists \text{t'}\ [\text{t'} < \text{t} \ \&\ \text{p(t')}]$

Difficulties with this analysis mostly stem from the fact that, in the classic approach, tense manipulates time only in the metalanguage. Past tense under this analysis introduces a new evaluation time that stands in a precedence relation to the original evaluation time. Crucially, then, the original evaluation time is lost and the sentence can only be interpreted relative to the new temporal index (for discussion see Enç 1987; Kusumoto 1999). One problem that arises from this concerns sentences that are interpreted relative to more than one time. Enç (1986), for instance, points out that the temporal interpretation of noun phrases can be different from the tense of the sentence as illustrated by the example in (9).

(9) Every fugitive is now in jail. (Enç, 1986, p.409)

According to the classic approach, this sentence should be interpreted such that the individuals involved are fugitives and in jail at the same time (the utterance time), which is contradictory. However, the sentence also has a non-contradictory reading in which the subject is interpreted in the past ($\approx$ Every *former* fugitive is now in jail.). This reading is not compatible with the classic approach of tense as a sentence operator (even if it is a semantically vacuous one in present sentences like (9)), as Enç (1986) argues. An example of the same point for the past from Cresswell (1990) is given in (10).

(10) Some time ago, all my teachers were students.

In its most salient reading according to Cresswell, the sentence means that at some time in the past, the people who are *now* teachers were students (some time ago). This not only means that the denotations of the NP predicates are temporally relative, but in this particular case they are interpreted with respect to different time intervals (since those who are now teachers are not students anymore and when they were students they were not teachers yet). In the classic quantifier approach, this interpretation would require multiple indices with respect to which the NPs can be interpreted. This complication led to the assumption that the interpretation of tense involves representations of times in the object language. If time is not an index but an argument of predicates, the interpretation of (10), for instance, can be modeled such that the time argument of the NP "students" can be bound by the past adverbial, and that of "teachers" is interpreted relative to the utterance time, as sketched in (11).

(11) $\exists t\ [t < t_0\ \&\ \forall x\ [\text{teacher}(x)(t_0) \rightarrow \text{student}\ (x)(t)]]$ (Cresswell, 1990)

Some convincing empirical and theoretical arguments have since been brought forward in favor of time variables in the syntactic representation (Kusumoto, 1999, 2005) and a fully extensional system with time and world or situation variables in the syntax (e.g. Percus 2000, Schlenker 2006). More generally, the literature has identified quite a number of interpretations of the past tense that pose serious problems for an account as simple as the Priorian one.

One main argument against Priorian tense semantics put forth in Enç (1987) (among others) involves so–called "sequence of tense" (SOT) environments such as (12).

(12) John heard that Mary was pregnant. (Enç, 1987, p.635)

The crucial observation here is that the English sentence is ambiguous between a *double–shifted interpretation* according to which Mary's pregnancy temporally precedes the time of John hearing it, and a *simultaneous interpretation* (also called the SOT reading) where Mary is pregnant at the time John learns about her pregnancy. The two interpretations can be paraphrased as in (13).

(13) Interpretations of (12)
   a. John heard "Mary was pregnant." (shifted reading)
   b. John heard "Mary is pregnant." (simultaneous reading)

The problem for the classic Priorian quantifier analysis of tense is that it predicts only the double–shifted reading in (13-a), which is in fact not the preferred one in English according to many native speakers. Some authors (e.g. Comrie 1985, Ogihara 1989, 1995, 1996) offer a solution to this problem within the classic quantifier approach, defining a sequence of tense rule according to which a past tense morpheme is optionally deleted if it is in the scope of (i.e. locally c–commanded by) another past tense morpheme. This SOT rule must be subject to cross–linguistic variation, however. Japanese, for instance, has a present tense form in the embedded sentence to obtain the simultaneous reading and only allows the shifted reading if the embedded sentence is in the past (e.g. Ogihara 1989, 1995, 1996, Kubota et al. 2009). English and Japanese would then differ in that English has an SOT rule in its grammar and Japanese does not.

2.2.2 The pronominal approach

Enç (1987) criticizes the SOT rule as unrelated to any other grammatical rules and principles, and as stipulative since it seems to be reserved for the specific cases where morphological past is embedded under past. Following up on Partee (1973), Enç proposes an SOT theory which models tenses as syntactic variables that can be linked to superordinate tenses by syntactic

anchoring.[2]

It was Partee (1973) who first proposed a now widely adopted alternative for the classic quantifier analysis, a semantic proposal that Abusch (1988, 1997), Heim (1994) and Kratzer (1998) showed to be fruitful for the problems posed by embedded tense phenomena. Partee's main ideas are introduced first. Partee (1973) famously observed that tenses resemble pronouns in that they can have deictic, anaphoric and bound interpretations and should, therefore, be treated as variables rather than as quantifiers. Below, these uses are illustrated with some examples from the original paper.

Deictic uses The example in (14) illustrates the deictic use of a third person pronoun, which can be accompanied by a pointing gesture. First and second person pronouns, as Partee points out, are also (and even primarily) used deictically.

(14) *He* shouldn't be here. (Partee, 1973, p.602)

The deictic use of a past tense is shown in (15). Partee uses this example of a negated past tense sentence to argue that the traditional analysis of tense as an existential quantifier over times cannot be correct. According to Partee (1973), the classic approach makes the prediction that, depending on scope relations, (15) should mean that i) there is a time at which the speaker did not turn off the stove (if the existential quantifier scopes over the negative operator) or ii) there is no time at which the speaker turned off the stove (if negation scopes over the negative quantifier). Partee argues that the truth conditions described in i) are too weak and those in ii) are too strong and that the past tense in the sentence instead refers to a particular, contextually defined time interval.[3]

(15) I didn't turn off the stove. (Partee, 1973, p.602)

Anaphoric uses The sentence in (16) taken from (Partee, 1973, p.605) illustrates the anaphoric use of the pronoun *it* which refers back to the definite NP "the car".

(16) Sam took the car yesterday and Sheila took <u>it</u> today.

Partee observes that sentences like (17) make comparable cases for tenses since the past tense in the second conjunct anaphorically refers back to the

[2]The technical details of the syntactic account of Enç (1987) will not be depicted in detail here. The reader is instead referred to the original text as well as to Kusumoto (1999) for a very good summary.

[3]Based on later work on contextual restriction of quantifier domains (e.g. von Fintel 1994) the scope problem of the existential quantifier analysis can easily be fixed by inserting reference to the context into the meaning of past tense, as will be shown in the next section.

time interval specified by the adverbial "last Friday" in the first clause. The example in (18) illustrates the same anaphoric behavior where the antecedent (i.e. the contextual reference time in terms of Reichenbach) is a temporal clause.

(17) Sheila had a party last Friday and Sam got drunk.

(18) When Susan walked in, Peter left. (Partee, 1973, p.605)

Bound uses In the sentence given in (19), Partee argues, the present tense in the consequent of the conditional has to be treated as anaphoric to the present in the antecedent, because the immediate future interpretation induced by the combination of the future auxiliary *will* and the adverb *immediately* is relative to the event of Susan's arrival indicated by the antecedent rather than to the utterance time.

(19) If Susan comes, John will leave immediately. (Partee, 1973, p.605)

A similar point can be made with examples involving explicit quantification over times. The crucial proposal here is that tense is the variable quantified over by the adverbial *always* in (20) (from Partee 1973, p.606). (21) illustrates the parallel to bound uses of NP pronouns.

(20) When you eat Chinese food, you're always hungry an hour later.

(21) Every student spoke to the student in front of him.

These parallels in general and the bound use illustrated above in particular lead Partee (1973, p.606) to conclude that "it seems clear that explicit time variables are required, rather than tense operators alone. It may be that tense operators are appropriate for tense and aspect notions like future, progressive, and perfect, whereas variables are appropriate representations for the functions of the two tense morphemes *Past* and *Present*."

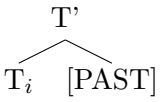
Heim (1994) and Kratzer (1998) make specific proposals for the implementation of pronominal denotations of tense morphemes that are summarized concisely in what follows. According to the pronominal approach used in many recent formal semantic studies, tense morphemes introduce presuppositions restricting the reference of a syntactically represented time variable. (22) shows the original denotation from Heim (1994) (where t_c is the utterance time):

(22) a. $[\![\text{present}_i]\!]^{g,c}$ is defined only if g(i) O t_c, in which case $[\![\text{present}_i]\!]^{g,c} = g(i)$.

b. $[\![\text{past}_i]\!]^{g,c}$ is defined only if $g(i) < t_c$, in which case $[\![\text{past}_i]\!]^{g,c} = g(i)$.

These lexical entries can be understood to formalize the suggestion of Klein (1994) that tense relates the reference time of a sentence to its utterance time. In (22), the reference time is the value *g(i)* that the contextual assignment function assigns to the indexed time variable given that its presupposition is satisified. Some more recent works explicitly decompose the pronominal and the presuppositional component of tense meaning under this analysis, as illustrated in (23) and (24) from Cable (2013). In this implementation, the TP is headed by an indexed temporal variable (T_i in (23)) that denotes the contextually provided reference time *g(i)*. This variable comes with a tense feature (in this case [PAST]) as its sister. The tense feature takes the temporal variable as its argument and imposes a presupposition on its range. Hence, the English tense features *past* and *present* denote partial identity functions over times.

(23)



(24) The semantics of tenses (Cable, 2013, p.233)

a. $[\![\mathrm{T}_i]\!]^{g,t} = \mathrm{g(i)}$
b. $[\![\mathrm{PAST}]\!]^{g,t} = [\lambda \mathrm{t'} : \mathrm{t'} < \mathrm{t}.\ \mathrm{t'}]$
c. $[\![\mathrm{PRS}]\!]^{g,t} = [\lambda \mathrm{t'} : \mathrm{t'} \supseteq \mathrm{t}.\ \mathrm{t'}]$

The distinction illustrated in (23) and (24) will turn out to be important in the discussion of tenselessness in Hausa. To give an outlook, I will propose in chapter 3 that while Hausa has a syntactically represented *tense variable* that can be bound or receive a value from a contextual assignment function, it does not have *tense features* akin to (24-b) and (24-c) that would restrict the value of this variable.

Besides providing a formal semantic implementation of Partee's intuition that tenses should be viewed as pronouns, Abusch (1997), Heim (1994) and Kratzer (1998) also apply the pronominal approach to SOT phenomena. Kratzer (1998) explicitly describes SOT as a further common property of pronouns and tenses that she refers to as "loss of interpretable features". Her main observation is that the sequence of tense phenomenon introduced above can be viewed as parallel to the "sloppy reading" of pronouns illustrated by the example given in (25) (which Kratzer 1998 attributes to Irene Heim). In this sentence, the pronoun in the relative clause is ambiguous between an indexical reading where *I* refers to the speaker and a "sloppy" variable interpretation where the pronoun receives its denotation from the contextual assignment function.

(25) Only I got a question that I understood. (Kratzer, 1998, p.92)

Kratzer states that, like pronouns, tenses in embedded contexts are sometimes not interpreted but seem to merely "agree" with the tense in the higher clause like in the example in (26) where the past tenses embedded under a future–oriented attitude verb get "later than UT" interpretations.

(26) Mary predicted that she would know that she was pregnant the minute she got pregnant. (Kratzer, 1998, p.92)

In order to account for cases where a past tense does not seem to be interpreted at all, Kratzer proposes a zero pronoun in the English tense paradigm, where "zero" means that the pronoun does not have any interpretable features at LF although it can be pronounced, provided it has an antecedent at PF. The zero tense gets the denotation in (27).

(27) $[\![\emptyset_n]\!]^{g,c} = \mathrm{g(n)}$ (Kratzer, 1998, p.101)

Unlike past and present tenses, the zero tense pronoun must be locally bound and does not carry a presupposition. Following important insights of Abusch (1988, 1997) on *de se* and *de re* interpretations of complements of attitude verbs, Kratzer assumes that attitude verbs take properties of times as their semantic arguments. In sentences like (26), this property of times is created by inserting an index which binds the zero tense pronoun. Thus the assumptions that attitude verbs semantically select for properties of times and that zero (tense) pronouns must be lambda–bound locally ensure that attitude verbs always embed sentences with zero tense pronouns which then receive their interpretation from the tenses of the embedding clauses.

Kratzer (1998) thus offers an elegant solution of the SOT problem making use of Partee (1973)'s proposal that tenses are pronouns. Going for a unified tense paradigm, she assumes that past and present tenses are pronouns as well, with lexical entries that are equivalent to those proposed in Heim (1994) shown in (22). However, in order to derive the "shifted" interpretation of embedded past sentences, but also acceptable past tense sentences without any previous discourse that could provide an antecedent for a pronominal past tense, Kratzer proposes that "the simple past in English [...] must be a way of spelling out perfect and present tense together." (Kratzer, 1998, p.107), at least sometimes. A pertinent example is given in (28). Kratzer (1998) observes that in an out of the blue context (i.e. one where no prior conversation has taken place), the English past tense in (28-a) is felicitous which is surprising under a pronominal account. The German past tense in (28-b), by contrast, behaves as expected of a strictly pronominal past in that it is infelicitous. Instead, the present perfect (28-c) has to be used in German.

(28) Context (from Kratzer 1998): Two people standing in front of a church, no prior conversation.

a. Who built this church? (English)
b. #Wer baute diese Kirche? (German)
who build.3SG.PST this church
Intended: "Who built this church?"
c. Wer hat diese Kirche gebaut?
who have3SG.PRES this church PTCP.build.PTCP
"Who has built this church?"

Hence, as also remarked by von Stechow (2009), Kratzer (1998) ultimately proposes an analysis in which morphological past tense in English is ambiguous between a pronominal past and a perfect aspect, since temporal shifting by quantification over times (or events) seems to be necessary at least in some cases.

2.2.3 Quantifiers and pronouns

As shown above, both the classic "Priorian" tense approach and the pronominal approach face challenges, e.g. concerning the interpretation of tense under attitude verbs. Since the data suggest that past tense in English might really be ambiguous after all, some recent approaches assume what one might call a "mixed" analysis of past tense, involving both temporal pronouns and existential quantification over times. Most notably, Kusumoto (1999, 2005) argues that past tense denotes an existential quantifier over times, in accordance with the classic approach in the spirit of Prior and Montague. In her analysis, however, tense quantifies over times in the object language (although limited to the time variable of the main predicate)[4] and she proposes a denotation for the past tense that maps predicates of times onto predicates of times as shown in (29).

(29) $[\![\text{PAST}]\!]^g = \lambda \text{P} \in \text{D}_{\langle i,\langle s,t\rangle\rangle}$ [λt$\in$D$_i$ [λw$\in$D$_s$ [there is a time t' such that t' < t and that P(t')(w) = 1]]] (Kusumoto, 2005, p.334)

Following Stowell (1995a,b), Kusumoto assumes that the PAST meaning above is encoded by a covert operator. This covert operator licenses the occurrence of past tense morphology by syntactically c–commanding it. The past tense morpheme itself denotes a variable of type i which the author assumes might be generated in the syntactic T head.

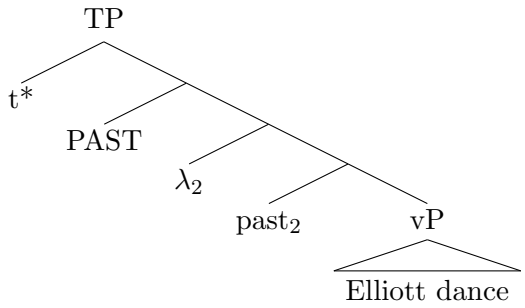
(30) $[\![\text{past}_2]\!]^g = \text{g}(2)$ (Kusumoto, 2005, p.334)

Hence, in a Stowell/Kusumoto–style approach, although tense itself is a variable, it obligatorily comes with a covert tense operator. In addition to that, Kusumoto assumes a time variable t* that represents the evaluation

[4] Enç (1986) already makes an argument in favor of quantification over times in the object language. Contrary to Kusumoto however, she assumes that noun phrases have their own time arguments.

time (i.e. the speech time) in the object language. The LF structure she assumes is given in (31).

(31)



The truth conditions for the sentence in (31) according to Kusumoto are very similar to those that a classic Priorian tense approach would yield, the only difference is that the evaluation time and world are arguments in the object language rather than indices in the metalanguage. This can be seen in (32).

(32) $[\![(31)]\!]^g$(t)(w) = 1 iff there is a time t' such that t' < t and Elliott dances at t' in w. (Kusumoto, 2005, p.335)

By contrast with a purely quantificational or a purely referential approach, that of Kusumoto accounts for the ambiguity of past tense in sequence of tense environments without assuming ambiguity or an SOT–rule. This is illustrated for the sentence in (33) by the two structures in (34) (all taken from Kusumoto (2005, p.335)).

(33) Tom said that Karen was dancing.

(34) a. [$_{TP}$ PAST λ_2 past$_2$ [$_{VP}$ Tom say that [$_{TP}$ **PAST** λ_3 past$_3$ [$_{VP}$ Karen be dancing]]]]

b. [$_{TP}$ PAST λ_2 past$_2$ [$_{VP}$ Tom say that [$_{TP}$ λ_3 past$_3$ [$_{VP}$ Karen be dancing]]]]

The first structure represents the shifted reading, triggered by the two PAST operators in the structure. In the second structure there is no PAST operator in the embedded clause. However, the past morphology is licensed non–locally by the PAST operator in the matrix clause. When computing the truth conditions for the simultaneous reading of (33), the second structure necessitates the insertion of a lambda–abstractor over the time variable in order to make the embedded clause the right argument for the propositional attitude verb "say", i.e. type $\langle i,\langle s,t\rangle\rangle$, as is also assumed in Kratzer's analysis. This is how the SOT problem can be handled by disentangeling tense morphology and (quantificational) tense meaning.

A similar approach is taken by von Stechow (2009) who gives the following (extensional) semantics for past tense. Notably, von Stechow adds a

contextual domain restriction variable (C) to the meaning of the past tense operator. This captures the problem originally brought up by the "stove"–example in Partee (1973) (cf. (15)) as well as Klein (1994)'s example in (4), i.e. it accounts for the fact that tense denotes a time that is provided by context. The present tense is assumed to denote the speech time (s* in von Stechow's ontology), although the author concedes that present has different denotations in other languages, e.g. non–past in German. Von Stechow's denotations for past and present are given in (35).[5]

(35) a. $[\![\text{PRESENT}]\!] = \text{s}^*$ (von Stechow, 2009)
b. $[\![\text{PAST}]\!] = \lambda\text{C}.\lambda\text{t}.\lambda\text{P}_{\langle i,t\rangle}.(\exists\text{t'})[\text{C(t')} \;\&\; \text{t'} < \text{s}^* \;\&\; \text{P(t')}]$

In order to grant a deictic interpretation of the past tense, von Stechow assumes (with Kusumoto) that the time argument slot of the past operator is always filled by the speech time in matrix clauses. When it comes to the derivation of SOT phenomena, von Stechow (2009) takes a similar approach to Kusumoto. In a nutshell, he replaces the past operator in the embedded clause by a temporal pronoun PRO which undergoes movement and creates a lambda–abstract in order to derive the argument for the attitude verb.[6]

This short comparison was supposed to illustrate that exactly what the denotation of a past tense should look like is far from clear. It seems that, in order to account for all the readings that (embedded) past tenses in English can get, some kind of division of labor between a pronominal and a time–shifting past tense must be assumed. This is made explicit in the analyses of Kusumoto (1999, 2005) and von Stechow (2009). Moreover, there is some psycholinguistic evidence that supports a tense/aspect ambiguity of past tense in English as proposed in Kratzer (1998). In particular, Dickey (2000) provides online data suggesting that the interpretation of a past tense form in English involves two distinct operations, namely i) finding an antecedent for a reference time variable in TP and ii) building a representation for aspect meaning. The finding that these two interpretation processes differ in timing, Dickey argues, is readily compatible with the theoretical assumption that the English past tense morpheme can spell out two different semantic tense/aspect combinations: past tense and (by assumption) perfective aspect or present tense and perfect aspect. This, of course, does not imply that past tense is ambiguous in such a way in all languages. On the contrary, I will propose in chapter 5 that the graded past tense morphemes in Medumba are most appropriately analyzed as unambiguous quantificational

[5]The author attributes the decomposition of tense into relative past and deictic present to Heim (1997).

[6]In order to derive the interpretations of embedded tenses, von Stechow uses a theory of feature transmission under semantic binding attributed to Heim (2005), and based on semantic binding as described in Heim & Kratzer (1998), which will not be laid out in detail here.

tenses along the lines of Kusumoto (1999, 2005).

2.2.4 What makes a language tenseless

As this dissertation is crucially concerned with the presence or absence of semantic tense in two languages that are severely under–researched in comparison with English, it also seems crucial to define on what grounds a language should be classified as tenseless. The literature on tenseless languages (see the introduction for references) often takes as point of departure the observation that, by contrast with most Indo–European languages, tense is not overtly marked in the languages under consideration.

The conclusion of whether or not a particular language encodes tense in its grammar and whether a certain mopheme has a tense meaning or not of course hinges on the definitions assumed. The lists in (36) and (37) show two proposals for tense definitions from the literature. Smith et al. (2003) follow up on ideas from Comrie (1985) and propose the following criteria for identifying tense morphemes:

(36) Tense criteria of Smith et al. (2003, p.180):
   a. Tenses are *inflectional verbal morphemes* that "participate in agreement, case assignment, and subjectivity, and the distinction between finite and non-finite clauses."
   b. Tenses are *obligatory* in the sense that they are required in all finite clauses.
   c. Tenses must have *temporality as their basic meaning*, i.e. the obligatory inflectional morpheme must express location in time.
   d. Tenses (can) have *secondary atemporal meanings*, e.g. counterfactuality.

Another set of criteria which is specifically designed to distinguish tense markers from aspect markers is proposed in Tonhauser (2006, p.29) and reproduced in (37) below.

(37) Criteria for distinguishing tense and aspect (from Tonhauser 2006):
   a. Grammatical aspect markers, but not tenses, may show restrictions with members of particular semantic classes.
   b. Grammatical aspect markers, but not tenses, may co–occur.
   c. Grammatical aspect markers, but not tenses, may encode a state change.
   d. Tenses, but not grammatical aspect markers, restrict the time of evaluation.
   e. Tenses, but not grammatical aspect markers, are anaphoric.

I will take most of the above criteria to be typical rather than necessary features of tense morphemes. The "inflectional morpheme" criterion in

(36-a) proposed by Smith et al. (2003), for instance, refers to the syntactic reflexes of tense observed in many Indo–European languages that motivated the special status of tense in generative linguistic theory. Like many other non–European languages, however, the languages considered in this thesis undermine the validity of this criterion since their morphology displays little or no agreement, case, or finiteness marking. However, in order to discern tense from temporal adverbials, I will adopt this criterion in a version that assumes tenses to be realized by grammatical morphemes, meaning that they head functional projections and are therefore typically bound to preverbal syntactic positions.

Smith et al. (2003)'s criteria in (36-c) and (36-d) are derived from Comrie's generalization that temporal meaning is "basic" to tense markers, which is intuitively appealing but too vague to make testable predictions. The tense/aspect criteria provided in Tonhauser (2006) are very helpful if applied with caution with respect to the conclusions drawn from them. I take (37-a) to mean that if a certain morphological marker shows restrictions in its combinability with certain eventuality types (e.g. stative predicates), this suggests that it is an aspect rather than a tense marker, while the absence of such restrictions does not allow any conclusions about its status. Similarly with respect to (37-b), if two temporal markers can co–occur, this suggests that at least one of them is aspectual (i.e. not both of them are tenses). Restrictions on co–occurrence between two morphemes, however, do not justify the conclusion that they are both tenses, but only that their semantic or syntactic properties are incompatible (e.g. perfective and imperfective/progressive are in complementary distribution in many languages). While state change (37-c) is a typical feature of only some specific aspects such as perfects or inchoatives and therefore also only provides suggestive evidence, Tonhauser's criteria in (37-d) and (37-e) play an important role in the definition of tense adopted in the empirical part of this thesis.

The criteria used in order to determine whether or not a language has tense in its grammar should be clear and empirically testable, starting from a well–defined notion of tense. To this end, the following investigations start from the theoretical background provided in the course of this section. It will be assumed that (in matrix clauses) tense restricts the relation between the utterance time and the reference time as proposed in Klein (1994). As described above, a popular way to implement this is a pronominal semantics for tense building on Partee (1973); Heim (1994); Abusch (1997); Kratzer (1998), which is also assumed in the case–studies that most crucially influenced the investigations reported in this thesis (i.e. Matthewson 2006 and Cable 2013). However, since I will argue in chapter 5 that data from Medumba suggest that the temporal morphemes in this language denote *quantificational* tenses, I assume that whether tense is quantificational

or pronominal is not just a matter of theoretical preference, but possibly subject to variation between languages. Therefore, my definition of tense includes both of these options for tense realization. The tense semantics adopted here are summarized in (38).

(38) Tense semantics assumed in this thesis:
   a. Tense relates the utterance time (or local evaluation time) of a sentence to its reference time (Klein, 1994), AND
      (i) Tenses denote presuppositional features that restrict the possible values of a syntactically represented (reference) time variable (Heim, 1994; Kratzer, 1998), OR
      (ii) Tenses denote (contextually restricted) existential quantifiers over times (Kusumoto, 1999, 2005; von Stechow, 2009).

If, in addition, we adopt the obligatoriness criterion for tense from (36-b), we arrive at a fairly narrow definition of what it means for a language to have tense (39).

(39) **Definition of a tensed language (narrow version):**
A language is tensed if *every finite clause* contains a grammatical morpheme (overt or covert) with the semantics in (38).

A broader definition would subtract the obligatoriness criterion and allow that tenses in the sense of (38) can be optional in a language. This would read as (40).

(40) **Definition of a tensed language (broad version):**
A language is tensed if it has grammatical morphemes with the semantics in (38).

Given the definitions above, a first step in deciding whether a language is tensed or tenseless would be to test whether every finite clause contains grammatical tense. This is not a trivial task since grammatical tenses can be phonologically covert (cf. Matthewson 2006, Jóhannsdóttir & Matthewson 2008). Chapter 3 investigates this question in Hausa.

If a language has overt grammatical markers that encode temporal precedence or coincidence, the challenge is to find out whether or not these markers denote tense, in order to decide whether the language is tensed in the sense of (40) (i.e. an "optional tense" language). This question is answered for Medumba in chapter 5. Section 8.1 resumes the criteria listed above and integrates the two languages under consideration here in a broader cross–linguistic picture.

2.3 Aspect

2.3.1 Grammatical aspect

A category closely related to *tense* is that of *aspect*. However, definitions of aspect suffer from some terminological confusion to be dissolved. One important terminological distinction to make is between *grammatical aspect* and *lexical aspect*. The two are sometimes subsumed under the term "aspect" since both, in some sense, describe the temporal contour of eventualities. The difference is whether these temporal event properties are expressed by dedicated grammatical devices or if they are inherent properties of particular predicates. Note that in this thesis the term *aspect* is used to mean *grammatical aspect* in the sense defined immediately below, while the inherent temporal properties of predicates are referred to as *lexical aspect*, *Aktionsart* (cf. Vendler 1967) or *eventuality/situation type* (cf. Smith 1997).

The purpose of this section is to make the distinction clear and, again, provide a definition of grammatical aspect that is sufficiently clear–cut to motivate the classifications of particular temporal morphemes in Hausa and Medumba in the following chapters. As mentioned before, I follow Klein (1994) and Kratzer (1998) in presuming that aspect denotes a relation between the eventuality time and the contextual reference time of a sentence. According to Klein (1994), imperfective aspect specifies inclusion of the contextually defined reference time in the running time of the eventuality, and perfective aspect encodes the opposite temporal relation. Kratzer (1998) provides a formal implementation of this idea and proposes that aspect heads map properties of events (i.e. VP–denotations) onto properties of times. The denotations that Kratzer (1998, p.107) suggests for perfective and imperfective aspect are the following:[7]

(41) a. $[\![\text{Imperfective}]\!]^{g,c} = \lambda \text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda \text{t}.\lambda \text{w}.\exists \text{e}\ [\text{t} \subseteq \tau(\text{e})\ \&\ \text{P}(\text{e})(\text{w}) = 1]$
b. $[\![\text{Perfective}]\!]^{g,c} = \lambda \text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda \text{t}.\lambda \text{w}.\exists \text{e}\ [\tau(\text{e}) \subseteq \text{t}\ \&\ \text{P}(\text{e})(\text{w}) = 1]$

Kratzer's definition of perfect aspect as shifting the eventuality time to the past of the reference time is given in (42-a) below. A prospective aspect encodes the inverse temporal ordering, i.e. the eventuality time following the reference time, as shown in (42-b).

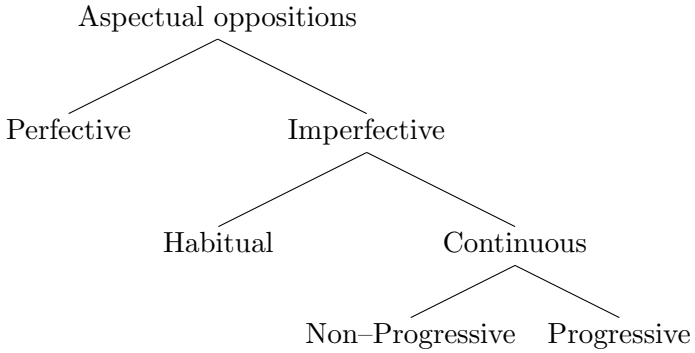
(42) a. $[\![\text{Perfect}]\!]^{g,c} = \lambda \text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda \text{t}.\lambda \text{w}.\exists \text{e}\ [\tau(\text{e}) < \text{t}\ \&\ \text{P}(\text{e})(\text{w}) = 1]$
b. $[\![\text{Prospective}]\!]^{g,c} = \lambda \text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda \text{t}.\lambda \text{w}.\exists \text{e}\ [\text{t} < \tau(\text{e})\ \&\ \text{P}(\text{e})(\text{w}) = 1]$

Note that the aspect denotations in (41) and (42) are simplifications in at least two respects. For one thing, the literature (most notably the typolog-

[7] Unlike Kratzer (1998), I adopt Krifka (1998)'s temporal trace function τ to represent eventuality times. According to Krifka's definition, τ is the function that maps every eventuality to its run time.

ical literature) has identified a number of more specific aspectual categories than the four given above. Comrie (1976), for instance, proposes the subdivision of imperfectivity in (43).

(43)



I agree with Comrie that imperfective aspect differs from an English–type progressive in that it can refer to ongoing as well as to habitual eventualities. Nevertheless, for the purpose of this thesis I will generalize the simplified imperfective denotation of Kratzer (1998) given in (41-a) to progressive aspect. Following the cross–linguistic studies of Dahl (1985) and Bybee et al. (1994), I take it there is no clearly identifiable distinction between continuous and progressive aspect.

Also with respect to perfect and perfective meanings, subdivisions (e.g. completive, resultative) have been made that are not crucial for the present study and not always very clearly motivated in the literature. As I proceed to the specific analyses of Hausa and Medumba, the particular aspectual markers in the respective languages are considered in more detail, as are the previous classifications from the descriptive literature. What should be clear is that throughout the study, I presume the aspectual denotations in (41) and (42) as a basis for cross–linguistic comparison.

The second simplification that should be pointed out concerns the concrete denotations of the aspects given above. They focus on only two properties of grammatical aspect markers: existential quantification over eventualities on the one hand, and the relation of eventuality times and reference times on the other. For pretty much all of the four aspects given above, additional meaning components have been identified in the literature. This is true especially for imperfective and progressive aspects. In particular, authors such as Dowty (1977), Landman (1992), and Portner (1992, 1998) have shown that the semantics of the English progressive must involve modal in addition to temporal meaning components. This can be illustrated by means of what is known as the "imperfective paradox". The imperfective paradox basically involves the observation of Dowty (1977) that with some predicates but not with others, the truth of a past progressive sentence entails

its simple past counterpart, as shown in (44) and (45) below.[8]

(44) Accomplishment (Dowty, 1977, p.45)

a. John was drawing a circle.

b. $\nrightarrow$ John drew a circle.

(45) Activity

a. John was pushing a cart.

b. $\rightarrow$ John pushed a cart.

Leaving the details of the problem aside, the crucial point is that (44-a) is intuitively judged as true even if no full circle ever comes into existence. This is even clearer in an example like (46).

(46) Max was crossing the street. (Portner, 1998, p.764)

Portner (1998) argues that this sentence is judged true also if Max gets hit by a bus which prevents him from reaching the other side of the street. The intuition that the authors formalize to account for this is that the meaning of the progressive derives truth conditions for (46) that do not require the completion of an event of Max crossing the street, but only the instantiation of an event that, had it proceeded normally, would have developed into a complete street–crossing event by Max. This means that the event in the progressive does not necessarily have to culminate in the actual world, but in a certain set of possible worlds (i.e. the most normal / "inertia" worlds in the account of Dowty), which is clearly a modal notion (to be defined in section 2.4 below). For illustration, the original proposal for the meaning of the English progressive as a temporal/modal sentence operator from Dowty (1977) is given in (47).

(47) Truth conditions for the English progressive (Dowty, 1977, p.57)
[PROG ϕ] is true at I and w iff there is an interval I' such that $I \subset I$' and there is a world w' for which ϕ is true at I' and w', and w is exactly like w' at all times preceding and inclining I.

Beside these accounts of the English progressive that involve quantification over possible worlds, there are also analyses of other languages, for example for Romance, that use universal quantification over events (Bonomi, 1997) or situations (Cipria & Roberts, 2001; Arregui et al., 2011, 2014) to capture the modal meaning components of the imperfective forms in the respective languages.

Similar to the progressive, there is certainly much more to be said about the meaning of perfect aspects cross–linguistically than the semantics in (42-a) (as Kratzer 1998 also points out). In some languages such as French

[8]The relevant distinction is basically between accomplishment and activity predicates, which will be defined in the next subsection on lexical aspect.

and German the morphological perfect form seems to be replacing the simple past forms (*passé simple* and *Präteritum*, respectively) in colloquial use, also the meaning of the English perfect is much more complicated than depicted here. Portner (2003) gives a comprehensive account of the different interpretations of the English perfect including the readings in (48).

(48) Interpretations of the English perfect (Portner, 2003, p.459/460)
   a. Mary has read *Middlemarch*. (resultative)
   b. The Earth has been hit by giant asteroids before (and it probably will be again). (existential)
   c. Mary has lived in London for five years. (continuative)
   d. The Orioles have won! ("hot news" perfect)

Again, Portner proposes a unified analysis of the readings above that involves a modal meaning component (in this case a presupposition).[9] It should be stressed that, by ignoring these modal meaning components in what follows, I do not call into question that the more complex analyses of imperfective and perfect markers are well–motivated and adequate. When reading the following study, however, the reader should keep in mind that the empirical and theoretical investigations focus on the temporal meaning components of aspect as well as on its function of existential quantification over eventualities,[10] and thus presume the grammatical aspect denotations of Kratzer (1998), while the existence of other meaning components are just mentioned in the sake of completeness. Having explicated the theoretical assumptions related to grammatical aspect, this is complemented by some considerations on lexical aspect immediately below.

2.3.2 Lexical aspect

This section is supposed to define lexical aspect (also *situation type, eventuality type* or *Aktionsart*), by contrast with grammatical aspect, as temporality encoded in the lexical meaning of predicates. The basic eventuality type distinction is between *events* and *states* (see e.g. Bennett & Partee 1978, Kamp & Reyle 1993, Condoravdi 2002, von Stechow 2009). The term *eventuality* is used to encompasses both.

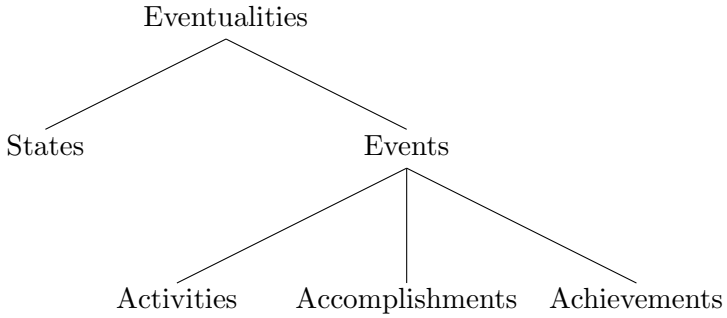
Vendler (1967)'s term "Aktionsarten" introduces a further distinction of events into *activities*, *accomplishments*, and *achievements*. The Vendlerian

[9] Section 2.4.4 as well as the analyses of future marking in Hausa and Medumba that will be proposed in this thesis make clear that there is a close link between prospective aspectuality and modality as well (although at no point will it be assumed that a prospective aspect in itself encodes modality).

[10] This generalization also disregards the fact that in some analyses aspects quantify over times rather than eventualities, which can account for aspect stacking (e.g. Matthewson 2012). In chapter 7 and in chapter 8 this will be taken into consideration and, among other things, the denotation of the English perfect in (42-a) will be revised to denote quantification over times.

classification is summarized in (49).

(49)



As a first approximation, the differences between these eventuality types can be described by means of the parameters given in (50):

(50) Distinctive parameters of lexical aspect meanings
- a. [+/- durative]: Is the eventuality durative or punctual?
- b. [+/- telic]: Does the eventuality have an inherent endpoint?
- c. [+/- dynamic]: Is the eventuality dynamic (i.e. Does it lead to a change of state and may have sub-events) or static?

In Table 2.3 below, the four predicate classes are illustrated with English examples and their corresponding features:[11]

AKTIONSART	dynamic	telic	durative	Example
STATE	–	–	+	*Mary knows French.*
ACTIVITY	+	–	+	*Mary is running.*
ACCOMPLISHMENT	+	+	+	*Mary is reading a book.*
ACHIEVEMENT	+	+	–	*Mary recognizes Julia.*

Table 2.3: Eventuality types according to Vendler (1967)

[11]Table 2.3 as well as (50) are adapted from Mucha (2011). Many similar summaries have been given in the literature, see e.g. Comrie (1976); Smith (1997); Murphy (2010).

The literature provides some basic diagnostics to distinguish the different eventuality types in English. For instance, stative verbs often cannot combine with progressive aspect as shown in (51) and (52).

(51) *Jenny is being tall.

(52) *Mike is knowing Paul.

As already mentioned in the last section, telic, but not atelic predicates display the "imperfective paradox" (Dowty, 1977). This is shown for the atelic (activity) predicate "run" and the telic (accomplishment) predicate "bake a cake" in (53).

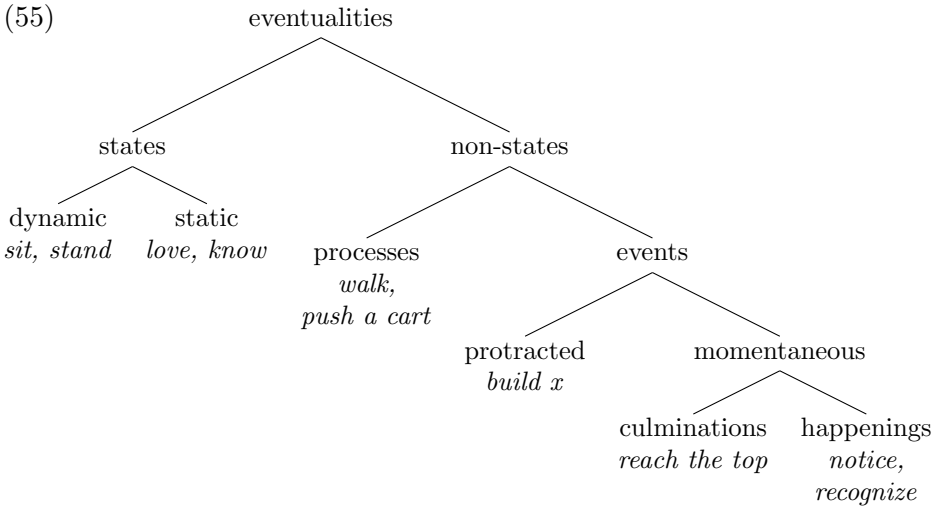
(53) a. Lisa was running
$\rightarrow$ Lisa ran.
b. Lisa was baking a cake.
$\nrightarrow$ Lisa baked a cake.

Atelic predicates (such as "run") but not telic predicates (such as "run a mile") are compatible with durative adverbials like "for an hour" (cf. Dowty 1979).

(54) a. Max was running for an hour.
b. *Max was running a mile for an hour.

It should be mentioned that Vendler's *Aktionsarten* as described above have sometimes been criticized for being language–specific and too crude to account for more subtle temporal differences between predicates. Bach (1986) offers a more fine–grained ontology of situation types which is depicted for the interested reader in (55).

(55)



In the cross–linguistic study to follow in the next chapters, it is the basic distinction between states and events that figures most prominently. The differences between eventive predicates that play a role in this thesis can easily be captured by referring to the more parsimonious classification of Vendler (1967). It might be helpful to mention, though, that what I refer to as *states* corresponds to "static states" in the classification of Bach (1986).

As mentioned above, the most crucial distinction in eventuality types is between events and states. From a cross–linguistic point of view, it is a common observation that states and events display some interesting differences in their temporal interpretation in general and their interaction with grammatical aspect in particular. For instance, it is typologically attested that stative predicates often receive present interpretations with perfective aspect (Bybee et al., 1994) and are often incompatible with progressives, as shown above for English. Interesting insights on the different behavior of stative and eventive predicates come from Kamp & Reyle (1993). They propose that eventive predicates (i.e. achievements, accomplishments and activities) all share the same temporal structure consisting of three phases: a preparatory phase (I), a culmination point (II), and a result state (III). The different event types only "differ with regard to the part(s) of this schema that are available as denotations for sentences in the simple past." (Kamp & Reyle, 1993, p.564). States, in their theory, lack this structure. This difference in temporal structure has implications for the interaction of eventuality types and grammatical aspect. In the case of events, the perfective can specify that certain phases of the eventuality (namely I and II for activities and accomplishments, but only II for achievements) are temporally included in the reference time.[12]

[12]Kamp & Reyle (1993) explicitly propose that activity predicates have the same temporal schema as achievements and accomplishments except that they do not have "natural" culmination points. Instead, a temporal bound has to be provided externally, for instance

States do not have a culmination point or a preparatory phase that leads up to it. In other words, they do not have a well–defined end or beginning and therefore cannot be claimed to be temporally included in a (reference) time interval or to be temporally bounded.

Altshuler & Schwarzschild (2013) advocate a very similar idea, namely inherent temporal unboundedness of stative predicates, as summarized in (56) (Altshuler & Schwarzschild, 2013, p.45):

(56) The Temporal Profile of Statives
For any tenseless stative clause ϕ, if ϕ is true at a moment m, then there is a moment m' preceding m at which ϕ is true and there is a moment m' [sic] following m at which ϕ is true.

If we accept that stative eventualities lack temporal structures and are inherently unbounded, we may ask how this observation can be formalized. Adapting ideas of Condoravdi (2002)'s AT–relation given in (57), I would like to propose that perfective aspect comes in two varieties.

(57) AT(t,w,P) =
a. $\exists$e [τ(e)(w) $\subseteq$ t & P(e)(w)] if P is eventive
b. $\exists$e [τ(e)(w) O t & P(e)(w)] if P is stative
c. P(w)(t) if P is temporal

As discussed in more detail in section 2.4.3, Condoravdi follows works on tense in dynamic semantics (Kamp & Rohrer, 1983; Partee, 1984; Kamp & Reyle, 1993) in assuming that eventualities should be subcatgorized into events and states, and that "the temporal relation for locating eventualities relative to the reference time depends on the type of eventuality: it is temporal inclusion for events and temporal overlap for states" (Condoravdi, 2002). Assuming this, the AT relation could be translated into the lexical entries for perfective aspect as in (58), leading to different temporal specifications depending on the eventuality type of the VP predicate.

(58) Modified lexical entries of perfective aspect (based on Kratzer 1998)
a. $[\![\text{PFV}]\!]^{g,c} = \lambda P_{\langle l,t\rangle}.\lambda t.\exists e\ [\tau(e) \subseteq t\ \&\ P(e)]$ if P is eventive
b. $[\![\text{PFV}]\!]^{g,c} = \lambda P_{\langle l,t\rangle}.\lambda t.\exists e\ [\tau(e)\ O\ t\ \&\ P(e)]$ if P is stative

This modification allows to capture the observation that in many languages including Hausa and Medumba sentences with stative predicates and perfective aspect receive (present) imperfective interpretations.[13]

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by the adverbial *for two hours* in (i).

(i) Yesterday morning Mary walked for two hours. (Kamp & Reyle, 1993, p.564)

[13] Bybee et al. (1994) mention several other examples of languages in which overt perfectives or completives combine with stative predicates to induce present interpretations

2.4 Modality

On a pre–theoretic level, modality can be defined as the category of meaning that allows speakers to talk about necessities and possibilities, i.e. situations that go beyond the actual (Portner 2009, Hacquard 2011). Portner (2009) distinguishes the following three types for categorizing the various means that natural language may use to express modality on different linguistic levels.

(i) *Sub-sentential* modality in Portner's categorization is associated with modal expressions within constituents smaller than a clause. This includes, for instance, modal adjectives and nouns (e.g. *possible, possibility*), attitude verbs (e.g. *believe*) and adjectives (*certain*), and verbal mood.

(ii) *Discourse modality* involves, for instance, clause types and performativity.

(iii) *Sentential* modality can be expressed in conditionals, generics, or habituals, but also by modal verbs (*have to*), adverbs (*maybe*) and auxiliaries (*must, can, might...*). Formal semantic theories typically focus on (iii).

2.4.1 Modals as quantifiers over possible worlds

The theory of modality adopted in this thesis is that of Kratzer (1977, 1981, 1991), recently published in an updated version as Kratzer (2012a). In a nutshell, Kratzer adopts the philosophical concept of possible worlds as representations of different states of affairs that can deviate from the actual world, and from modal logic the formalization of necessity ($\Box$) and possibility ($\Diamond$) as universal and existential quantification, respectively. The guiding idea is that in natural language, modal expressions such as the auxiliaries *must* and *may* semantically encode quantification over (sets of) possible worlds, and that the sets of possible worlds are restricted by an accessibility relation. However, the interpretation of many natural language modals is variable, as famously illustrated in Kratzer (1977), with examples like (59), where the interpretation of *must* can relate to duties (59-a), knowledge/information (59-b), dispositions (59-c), or wishes (59-d).

(59) Different readings of *must* (Kratzer, 1977, p.338)

a. All Maori chilren *must* learn the names of their ancestors.
b. The ancestors of the Maoris *must* have arrived from Tahiti.
c. If you *must* sneeze, at least use your handkerchief.
d. When Kahukura-nui died, the people of Kahungu said: Rakapaka *must* be our chief.

(*Engenni*, Edoid, Nigeria; *Palaung*, Mon-Khmer, China/Myanmar; *Mwera*, Narrow Bantu, Tanzania) as well as languages in which zero–marked perfectives yield present readings with stative predicates (*Ngambai*, Sara, Cameroon/Chad; *Nakanai*, Oceanic, Papua New Guinea).

Kratzer (1977) addresses this underspecification by treating modals like *must* as context–relative rather than ambiguous (as modal logic would have it). Kratzer proposes that, like other quantifiers, the modal has two arguments, a restrictor and a scope. While the latter is identified with the proposition that is the argument of the modal (its *prejacent*), the restrictor can be explicit (e.g. *In view of what is known...*), but is more commonly left implicit and inferred from the context of utterance. This is modeled by context parameters that Kratzer refers to as CONVERSATIONAL BACKGROUNDS (Kratzer, 1977). Formally, conversational backgrounds are functions from possible worlds to premise sets (i.e. sets of propositions, Kratzer 2012a, p.31). This is based on Lewis (1981)'s premise semantics, i.e. the idea that the semantics of modal verbs like *must* and *can* are related to logical consequence and logical compatibility, respectively, in the sense that "a proposition is necessary with respect to a premise set if it follows from it [...] a proposition is possible with respect to a premise set if it is compatible with it." (Kratzer, 2012a, p.9)

Propositions are formalized as sets of possible worlds. Truth relative to a possible world is hence defined as in (60) (cf. Kratzer 2012a, p.10, p.31).

(60) A proposition p is true in a world w in W iff $w \in p$.

If, as Kratzer proposes, a conversational backround is a function that assigns to each possible world a set of premises, e.g. the set of propositions that are (known to be) true in that world, modal elements themeselves can be viewed as expressing relations between conversational backgrounds and propositions (i.e. between their modal restrictions and their modal scope). Kratzer (2012a) proposes the following set of conversational backgrounds as relevant for the interpretation of modals.

(61) Realistic conversational background (Kratzer, 2012a, p.32)

> A realistic conversational background is a function f such that for any world w, $w \in \cap f(w)$. That is, f assigns to every possible world a set of propositions that are true in it.

(62) Totally realistic conversational background (Kratzer, 2012a, p.32,33)

> A totally realistic conversational background is a function f such that for any $w \in W$, $\cap f(w) = \{w\}$. That is, f assigns to any world a set of propositions that characterizes it uniquely.

(63) The empty conversational background (Kratzer, 2012a, p.33)

> The empty conversational background is the function f such that for any $w \in W$, $f(w) = \emptyset$. Since $\cap f(w) = W$ if $f(w) = \emptyset$, empty conversational backgrounds are also realistic.

(64) Informational conversational background (Kratzer, 2012a, p.33)

> An informational conversational background is a function f such

that for any w in the domain of f, f(w) represents the intentional content of some source of information in w.

(65) Stereotypical conversational background (Kratzer, 2012a, p.37)

A stereotypical conversational background is a function f such that for any world w, f(w) represents what is normal in w according to some suitable normalcy standard for w.

(66) Deontic conversational background (Kratzer, 2012a, p.37)

A deontic conversational background is a function f such that for any world w, f(w) represents the content of a body of laws or regulations in w.

Moreover, Kratzer (2012a, p.37) mentions *teleological* conversational backgrounds that are related to aims and *bouletic* conversational backgrounds that have to do with wishes.

A major innovation of Kratzer (1981) is that the theory of Kratzer (1977) is refined so as to account for the fact that natural languages express graded and comparative modality, an observation that forces the partition of realistic and normative conversational backgrounds (Kratzer, 2012a, p.38). Kratzer illustrates this with German sentences such as (67) in the context of an unsolved murder case.

(67) Der Gauzner-Michl kann eher der Mörder sein als der
The Gauzner-Michl can rather the murderer be than the
Kastenjakl.
Kastenjakl.
"Gauzner-Michl is more likely to be the murderer than Kastenjakl."

The problem with examples like (67) is that gradability in modals cannot be modeled with respect to just one conversational background. Given that conjectures such as (67) are based on evidence in the real world, the conversational background with respect to which (67) is evaluated would be a realistic one. However, none of the compared murder cases can be more or less compatible with the state of affairs in the real world, since possibility so defined is not a gradable notion. Kratzer argues that what makes one murder scenario more likely than another has to do with normativity, so it appears that two conversational backgrounds are at play here, a realistic one *and* a stereotypical one. Hence, Kratzer suggests that modals are interpreted relative to two conversational backgrounds. The first one is known as the MODAL BASE, a realistic conversational background in the murderer example in (67). As stated above, a conversational background is defined as a function applying to possible worlds, yielding a set of propositions. This is represented in a slightly more formal way (inspired by Hacquard 2011) for a realistic conversational background in (68).

(68) $f_{realistic}(w) = \{p : p \text{ is true in } w\}$

Since propositions are defined as sets of possible worlds, a common simplification when talking about modal bases is to turn this set of propositions into a set of possible worlds by intersecting the propositions. Hence, $\cap f(w)$ will be the set of worlds in which all the propositions in f(w) are true (cf. Portner 2009, Hacquard 2011). Since the modal base is conceptualized as a set of worlds, a second conversational background called the ORDERING SOURCE can impose an ordering on these worlds such that the more propositions from the ordering source are true in a particular world in the modal base, the closer it is to the ideal represented by the ordering source. This ordering is defined in Kratzer (2012a, p.39) as in (69):

(69) Inducing the ordering $\leq_A$

For all worlds w and z $\in$ W: w $\leq_A$ z iff $\{p{:}p \in A \text{ and } z \in p\} \supseteq \{p{:}p \in A \text{ and } w \in p\}$

Making the "limit assumption" for this kind of ordering in natural languages ensures that there always is a defined best set of highest ordered worlds. Portner (2009) introduced the BEST–operator that functions to pick out the set of highest ordered worlds, and the modal will then quantify over this set. Hence, the lexical meaning of modals can schematically be formalized as in (70-a) for the necessity modal *must* and in (70-b) for the possibility modal *can* (taken from Hacquard 2011):

(70) For any world w, and conversational backgrounds f and g

a. $[\![\text{must}]\!]^{w,f,g} = \lambda q_{<s,t>}.\ \forall w' \in \text{BEST}_{g(w)}\ (\cap f(w))\text{: } q(w') = 1$

b. $[\![\text{can}]\!]^{w,f,g} = \lambda q_{<s,t>}.\ \exists w' \in \text{BEST}_{g(w)}\ (\cap f(w))\text{: } q(w') = 1$
where $\text{Best}_{g(w)}(X)$ selects the most ideal worlds from X, given the ordering given by g(w)

As will become important in the later discussion of modality in future markers, this refinement weakens the notion of necessity, as Kratzer (2012a, p.40) points out. Necessity no longer means that a proposition must be true in all the accessible worlds, but only in the best ones with respect to the ordering.

Finally, let me add a remark on the coversational backgrounds listed in (61)–(66). Kratzer (1981) additionally proposes an *epistemic* conversational background, as the function that assigns to each world the set of propositions that are established knowledge in that world. However, in Kratzer (2012a), the author questions her original idea that epistemic and root modals are distinguished by epistemic and circumstantial conversational backgrounds, respectively, since both functions map onto sets of factual premises (Kratzer, 2012a, p.24). Hence, according to (Kratzer, 2012a, p.55), a valid hypothesis would be that modals invariably have realistic modal bases and that their particular flavors are distinguished by their ordering sources. This, however,

does not undermine the significance of the distinction between so–called "epistemic" modals and "root" modals, which will be discussed briefly in the next section.

2.4.2 The root vs. epistemic distinction

While Kratzer (2012a) concedes that root and epistemic modals might in fact not be associated with different modal bases, it has often been observed that epistemic modals and root modals seem to occupy distinct syntactic positions. A good illustration of this is the *Cinque hierarchy* (Cinque, 1999) in which epistemic modals scope over tense and aspect while root modals scope below the temporal projections. This is shown in a simplified version from Hacquard (2010) in (71).

(71) $\text{Mod}_{epis} > \text{Tense} > \text{Aspect} > \text{Mod}_{root}$

Hacquard (2006, 2009, 2010) has proposed some refinements of the Kratzerian theory that account for various differences between epistemic and root modals in their syntactic and semantic behavior. As Kratzer observed, some modal auxiliaries in languages like English are compatible with root modal and epistemic modal meanings depending on the context.[14] One of these auxiliaries is *must*. Hence, we can refer back to the examples given in (59) to illustrate the difference. *Must* in (72-a) (repeated from (59-a)) seems to be referring to a certain set of rules and hence is a typical instance of deontic necessity, which is a subcategory of root modality. The statement in (72-b) relies on evidence and knowledge, and thus exemplifies the epistemic use of *must*.

(72) Different readings of *must* (Kratzer, 1977, p.338)
   a. All Maori chilren *must* learn the names of their ancestors.
   b. The ancestors of the Maoris *must* have arrived from Tahiti.

Hacquard (2010, p.80) lists the following empirical differences between root and epistemic modals: Epistemic and root modals are anchored to different individuals. Epistemics are speaker–oriented, root modals are subject–oriented. They also differ in temporal anchoring such that epistemic modals are evaluated at the speech time (unless embedded under an attitude verb which then provides their evaluation time), while the evaluation time of root modals is provided by tense. Since full–fledged modal auxiliaries cannot be inflected in English, Hacquard (2010) illustrates these observations with *have to*. The time– and speaker/subject–orientation is indicated by

[14] This seems to be different in other languages, in particular in some indigenous languages of North America as for example St'át'imcets (Rullmann et al., 2008) where modals lexically specify their conversational backgrounds but are not lexically specified for encoding necessity or prossibility.

the bold–facing in the explicit conversational backgrounds.

(73) Epistemic modality (Hacquard, 2010, p.81)
*Given what **I** know **now**...* John had to be at home.

(74) Root modality (Hacquard, 2010, p.82)
*Given **Mary's** circumstances **then**...* Mary had to take the train to go to Paris.

Hacquard proposes to model these generalizations by relativizing modals to events rather than to worlds since events are naturally associated with their running times and their participants. Thus, modals can be anchored either to the speech event (which results in speaker and speech time anchoring), to an attitude event in the case of embedding (anchoring the modal to the attitude holder and the attitude time), or to the VP event (anchoring to the subject and the tense time) (Hacquard, 2010, p.82).

Hacquard (2006, 2009) also shows that epistemic and root modals show interesting differences in their interaction with aspect. Following Bhatt (1999), Hacquard observes that perfective, but not imperfective aspect displays an implicative effect, i.e. the proposition embedded under the modal must be true in the actual world if the aspect is perfective. This is referred to as *actuality entailment* and illustrated by examples such as (75) from French.

(75) (Im)perfectives and actuality entailments (Hacquard, 2009, p.280)
a. Jane pouvait traverser le lac à la nage, mais elle ne le fit jamais.
Jane can-past-impf cross the lake by swim, but she never do-past-pfv
"Jane could (was able to) swim across the lake, but she didn't do it."
b. Jane put traverser le lac à la nage, # mais elle ne le fit pas.
Jane can-past-pfv cross the lake by swim, # but she it do-past-pfv not.
"Jane could (was able to) swim across the lake, but she didn't do it."

According to Hacquard, actuality entailments come about if aspect outscopes the modal to the effect that the event to which it is relativized is anchored to the actual world. Since, due to their low syntactic positions, this is only possible with root modals, epistemic modals do not display this contrast as shown in (76).

(76) No actuality entailment with epistemics (Hacquard, 2010, p.89)
John put prendre le train, bien qu'il soit
John can-past-pfv take the train, even though it

possible qu'il ne l'ait pas pris.
is-SUBJ possible he didn't
"John may have taken the train, even though it's possible he didn't."

While Hacquard's observations are crucial for any thorough study of modality, they will not figure prominently in the cross–linguistic investigations to follow. Nonetheless, the work of Hacquard (2006, 2009, 2010) was sketched here also because it might help the reader to evaluate the analysis of the future in Medumba (chapter 7) as well as the cross–linguistic considerations on the interactions of future markers and aspect (chapter 8).

For the denotation of modals, I will assume the lexical entries given in (70) above, just with a slightly different notation. I use the abbreviations *MB* for modal base and *O* for ordering source. Portner's BEST–operator picks out the set of best worlds from the modal base. I assume an extensional system in which worlds and times are explicitly represented. If the modal scopes below tense, it has a reference time argument that will be filled by the temporal pronoun in T. The modal base and the ordering source are then relativized to times and worlds. Hence, the denotation of *must* and *can* come out as in (77-a) and (77-b), respectively.

(77) For any world w, modal base MB and ordering source O

a. $[\![\text{must}]\!]^{g,c} = \lambda P.\lambda t.\lambda w.\forall w'[w' \in \text{BEST}_{O_{(w),(t)}}(\text{MB}(w)(t)) \rightarrow P(t)(w')]$

b. $[\![\text{can}]\!]^{g,c} = \lambda P.\lambda t.\lambda w.\exists w'[w' \in \text{BEST}_{O_{(w),(t)}}(\text{MB}(w)(t)) \rightarrow P(t)(w')]$

2.4.3 Temporal properties of modals

Yet a different aspect of temporal–modal interaction is explored in the influential study of Condoravdi (2002). Condoravdi is mainly concerned with the temporal behavior of modals and how the temporal properties of modal auxiliaries correlate with their modal flavor. She makes a general distinction between "modals for the present" and "modals for the past". The former class includes elements like *must, might, should etc.*, i.e. modals that express necessity or possibility from the perspective of the utterance time. Modals for the past, for instance *must have, might have* and *should have*, refer to states of affairs in the past. Condoravdi furthermore distinguishes between the *temporal perspective* and the *temporal orientation* of modals. The temporal perspective, roughly, refers to the time at which the evidence for the use of the modal is evaluated, i.e. the time to which the modal base is relativized. The temporal orientation of a modal is the time at which the eventuality is temporally located. Hence, a simple modal sentence like (78) with an eventive predicate has a present temporal perspective and a future temporal orientation, since it expresses that, given present evidence, there is a possibility that Mira gets sick at some future time.

(78) Mira might get sick.

Condoravdi also shows that "modals for the past" are ambiguous. For instance, the sentence in (79) can have two distinct interpretations. On the first interpretation, which Condoravdi calls the *epistemic* reading, present evidence suggests the possibility that Marta left at a time in the past. In this case, the modal has a present temporal perspective and a past temporal orientation. On the second reading, there was a point in the past where the evidence available to the speaker was compatible with Marta leaving at some later time. Normally, this reading comes with an implication of counterfactuality, so Condoravdi calls it the *counterfactual* reading.

(79) Marta might have left.

One option to analyze the temporal behavior of modals, which is rejected by Condoravdi, is an ambiguity analysis in which modals encode their temporal properties in their lexical entries. In this kind of analysis, modals would encode quantification over worlds and times. The auxiliary *might*, for instance, would then come with the three different lexical entries in (80).

(80) *Might* in an ambiguity approach

a. Forward-shifting MIGHT^1_{MB} ϕ is true at $\langle$w,t$\rangle$ iff there exist w', t' such that w'$\in$ MB(w,t), t $\prec$ t' and ϕ is true at $\langle$w',t'$\rangle$

b. Non-shifting MIGHT^2_{MB} ϕ is true at $\langle$w,t$\rangle$ iff there is w' $\in$ MB(w,t) such that ϕ is true at $\langle$w',t'$\rangle$

c. Backward-shifting MIGHT–HAVE^1_{MB} ϕ is true at $\langle$w,t$\rangle$ iff there exist w', t' such that w'$\in$ MB(w,t), t' $\prec$ t and ϕ is true at $\langle$w',t'$\rangle$

Condoravdi also does not want to assume that the temporal properties of modals come from covert tense operators in the scope of the modal (as proposed for example in McCawley 1971). What Condoravdi (2002) argues instead is that, like in the version of modal meanings in (80) above, modals do in fact directly contribute their temporal orientation, but they are not ambiguous. She proposes that modals *expand* (rather than shift) the evaluation time into the future, as seen in the lexical entries given below for *might* and WOLL. The latter, following Abusch (1985, 1988, 1997) is taken to be the untensed modal underlying the morphemes *will* and *would*, which result from the combination of WOLL with present and past tense, respectively.

(81) The semantics of modals according to Condoravdi (2002)

a. MAY/MIGHT_{MB}: $\lambda P \lambda w \lambda t \exists w'$ [w' $\in$ MB(w,t) & AT([t,$_-$),w', P)]

b. WOLL_{MB}: $\lambda P \lambda w \lambda t \forall w'$ [w' $\in$ MB(w,t) & AT([t,$_-$),w', P)]

Based on these lexical entries and the AT–relation which was introduced in section 2.3.2 and is repeated below for convenience, Condoravdi explains the temporal orientation of modal auxiliaries.

(82) AT(t,w,P) =
  a. $\exists$e [τ(e)(w) $\subseteq$ t & P(e)(w)] if P is eventive
  b. $\exists$e [τ(e)(w) O t & P(e)(w)] if P is stative
  c. P(w)(t) if P is temporal

According to (82), eventive situations are characterized by a temporal inclusion relation between the eventuality time and the reference time, while in statives this temporal relation is overlap. Assuming, as Condoravdi does, that a present tense specifies that the reference time of a sentence is the utterance time ("now"), one gets the following truth conditions for stative and eventive modal sentences in (83) and (84), respectively.

(83) Truth conditions of a stative sentence (Condoravdi, 2002)
  a. He might be here.
  b. PRES(MIGHT$_{MB}$(he be here)): λw$\exists$w' [w'$\in$ MB(w,now) & $\exists$e [[he be here](w')(e) & τ(e,w') O [now,_)]]

(84) Truth conditions of an eventive sentence (Condoravdi, 2002)
  a. He might run.
  b. PRES(MIGHT$_{MB}$(he run)): λw$\exists$w' [w' $\in$ MB(w,now) & $\exists$e [[he run](w')(e) & τ(e,w') $\subseteq$ [now,_)]]

Thus Condoravdi accounts for the different temporal orientation opportunities of modals with reference to whether they combine with stative or eventive predicates. For the event sentence in (84), the temporal inclusion relation enforced by the eventive predicate type combined with present tense and the temporal contribution of the modal results in the requirement that the time of the eventuality be included in the interval extending from *now* to the end of time, i.e. the event must be in the future of the utterance time. In the case of the stative sentence in (83), the eventuality time is only required to overlap with the interval [now,_)], a requirement that is compatible with part of the state being temporally located before the utterance time, which leads to a present interpretation.

Finally, Condoravdi derives past–oriented modality like in (85) by assuming that the modal scopes over a perfect aspect (which is overtly realized in English), as exemplified in (85) below.

(85) Tuth conditions of a past–oriented eventive sentence
  a. He may have won.
  b. PRES(MAY$_{MB}$(PERF(he win)): λw$\exists$w' [w' $\in$ MB(w,now) & $\exists$t' [t' $<$ [now,_) & $\exists$e [[he win](w')(e) & τ(e,w') $\subseteq$ t']]]

The truth conditions in (85) above reflect the "epistemic" reading of modals for the past, i.e. the one with a present perspective and a past orientation. The counterfactual/metaphysical reading, Condoravdi proposes, results from scope reversal of the modal and the perfect operator as shown in (86).

(86) Truth conditions of the counterfactual sentence

a. He might have won.

b. PRES(PERF(MIGHT$_{MB}$(he win))): λw$\exists$w'$\exists$t'[t' < now & w' $\in$ MB(w,t') & $\exists$e [[he win](w')(e) & τ(e,w') $\subseteq$ [t',_)]]

As Condoravdi points out, this analysis receives support from German, where word order properties permit overt realization of the scope relation between the modal and the perfect aspect. Hence, (87-a), where the modal takes scope over the perfect, only allows for the epistemic interpretation. The sentence in (87-b), by contrast, shows the perfect auxiliary taking scope over the modal, resulting in the counterfactual reading.

(87) Epistemic vs. counterfactual in German
(Condoravdi 2002, my glossing)

a. Er könnte gewonnen haben.
he can.3SG.PRES.SBJV PTCP.win.PTCP have.INF
"He could have won." (epistemic reading)

b. Er hätte gewinnnen können.
he have.3SG.PRES.SBJV win.INF can.INF
"He could have won." (counterfactual reading)

In addition to the above analysis of the temporal behavior of modals, Condoravdi provides an account of its correlation with the kind of modal base that the respective modals select for. She argues that *metaphysical* modality, resulting in a predictive reading, is unavailable in cases where the prejacent is already settled in the actual world. This is the case whenever the property that a modal applies to is instantiated *at* or *before* the temporal perspective of the modal, i.e. when the modal scopes over a perfect operator (88-a) or a stative (88-b) (or stativized (88-c)) predicate.

(88) Non–metaphysical modality

a. Agata might have finished the marathon.

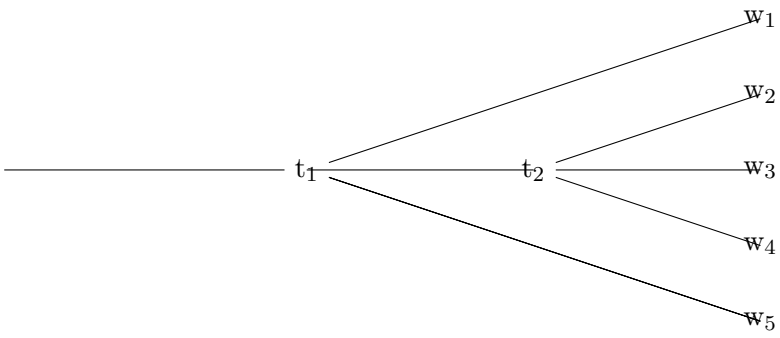
b. Agata might be sick.

c. Agata might be winning.

Condoravdi relates the idea of settledness to the notion of historical necessity in the Branching Times Model of Thomason (1984). The Branching Times Model is set up in T $\times$ W frames, defined as $\langle$W,T,<,$\approx\rangle$ (cf. Kaufmann 2005), i.e. as structures consisting of a nonempty set of worlds W, a non–

empty set of times T, a temporal precedence relation $<$ and an equivalence relation $\approx$. The basic idea behind the model is that at different points in time, there are different options of how things might turn out to be, represented by different possible worlds. Thus w $\approx_t$ w' stands for "w is a historical alternative to w' at t". Possibilities, however, diminish over time, hence if t $<$ t', then {w': w $\approx_{t'}$ w'} $\subseteq$ {w': w $\approx_t$ w'} (Thomason, 1984, p.139). This is illustrated in (89) (after Condoravdi 2002).

(89)



At t_1 in (89), all five worlds are historical alternatives of each other ($w_1 \approx w_2 \approx w_3 \approx w_4 \approx w_5$), i.e. they are all identical up to t_1. At t_2 the set of historical alternatives is diminished to w_2, w_3 and w_4. Thus the set of metaphysical alternatives to a given world decreases as times advances.

Metaphysical modality in Condoravdi's analysis involves a modal base consisting of historical alternatives, i.e. MB(w,t) = {w' : w $\approx_t$ w'} so that the worlds in the modal base are identical up to t but can differ at any later point. Based on this, Condoravdi formulates the diversity condition in (90).

(90) Diversity Condition (Condoravdi, 2002)

a. There is a w $\in$ cg and w', w" $\in$ MB(w,t) such that: AT([t,_),w', P) and $\neg$ AT([t,_),w", P)

The diversity condition results in the requirement that the P which the modal applies to may not be settled in the common ground at the temporal perspective time t; the common ground must contain P worlds and $\neg$P worlds. This is only possible if P is instantiated after t. Therefore, under Condoravdi's view, what she calls "non–root" modals like *might* can get a metaphysical interpretation only with future orientation, and they get an epistemic interpretation when they are not future–oriented.

Recently, Abusch (2012) has argued against the assumption of metaphysical modal bases, showing that metaphysical modality can and should be subsumed under circumstantial modality in the sense of Kratzer (1981,

1991). Abusch discusses counterfactual readings of modals for the past in which the modality involved cannot be metaphysical. She shows that it is problematic that metaphysical modality implies that w_0 and its alternatives must be exactly the same up to the time at which the modal is evaluated. This is exemplified by examples such as (91) (taken from Abusch 2012, p.277).

(91) Context: A couple lived in a house on the edge of town. There were two huge beautiful old trees in their front yard. In a summer storm, one of them was blown down. Fortunately, it fell away from the house onto the driveway, rather than towards the house onto the husband's office. When they looked at the broken trunk, they saw that it was rotted inside, so it had been a dangerous tree. The two trees had been of similar appearance and age.

a. *Husband's argument:* I might have been killed, because **the tree might have fallen onto my office**. Let's cut down the other tree. It might fall onto my office in another storm.

b. *Wife's argument:* We bought the house for the trees, and now you want to cut them down? Anyway, the tree guy told us that because of the location of the rot in the trunk, the tree could only fall away from the house. So **the tree could not have fallen onto your office**. There is no reason to cut down the other tree.

The crucial observation made by Abusch is that the two bold–faced sentences in (91-a) and (91-b) can both be judged as true in the given context although they are superficially contradictory, and although the wife and the husband seem to refer to the same situation. Abusch (2012, p.278) points out that the base world w_0 with respect to which the modal sentence must be evaluated projects a unique set of metaphysical alternatives as the modal base over which the modal would quantify, so that the contradictory sentences in (91-a) and (91-b) could not both be true under a metaphysical analysis. Abusch proposes instead that such counterfactual examples involve circumstantial conversational backgrounds in the sense of Kratzer (1981, 1991), i.e. a set of propositions that are true in the base world. As shown in section 2.4.1 above, the (circumstantial) modal base is the intersection of these propositions. The consistency of the two utterances of the wife and the husband in (91) is then captured by assuming that the two interlocuters refer to different modal bases since the wife pays attention to the exact location of the rot in the tree trunk (which determines that it cannot fall on the house), but the husband does not. In this scenario, the domain of the wife's modal statement is a proper subset of the domain of the husband's modal statement. This allows that the latter but not the former includes a world in which the tree falls on the house (Abusch, 2012, p.286).

The upshot of the discussion in Abusch (2012) is that, in order to account for counterfactual readings, a Branching Times Model formalized by means of metaphysical modal bases cannot straightforwardly capture the relevant intuitions, as opposed to an approach that makes use of circumstantial (or *realistic*, cf. Kratzer 2012a) modality which can be formulated so as to account for the observations. The next section is concerned with the question of what kind of modality (if any) is involved in future interpretations.

2.4.4 Modal and temporal components of the future

Probably one of the most long–standing debates in the literature on tense, aspect and modality is the notional status and the meaning of the future. Although the future is often descriptively integrated in the tense paradigm of a language, it contrasts with the past and the present in operating on eventualities that are not yet instantiated but rather fall into the domain of possible worlds, as for example Dowty (1977, p.62) points out. Jespersen (1992, p.260) describes the intuitive difference between the past and the present on the one hand and the future on the other hand as follows: "It is easy to understand that expressions for times to come are less definite and less explicit in our languages than those for the past: we do not know so much about the future as about the past and are therefore obliged to talk about it in a more vague way."

Nonetheless, some authors insist on maintaining the "tense" label for future–markers such as English *will*, either because of its dominant future–shifting function (Dahl, 1985) or because the modal component is attributed to an independent modal operator (Kissine, 2008). Others tend to classify it as a purely modal category (Bybee et al., 1994) or treat it as lexically ambiguous between a temporal and a modal meaning (Hornstein, 1993). Despite the different analytical approaches, however, there is noticeable consensus on the special conceptual status of the future and the undeniable smack of modality that comes with it (e.g. Comrie 1985; Smith 1978; Chung & Timberlake 1985; Enç 1996; Copley 2002, 2009 and many others). Since most of the arguments for modality in future meanings are based on English, this introductory part will focus on English and refer to future markers in other languages only where cross–linguistic generalizations have been deduced from their properties. In (92), I give some data taken from Kissine (2008), illustrating the observed uses of the English future marker *will*.

(92) Readings of the English future marker
   a. Mary will come. (future/prediction)
   b. Oil will float on water. (generic)
   c. Mary will be at the opera now. (epistemic)
   d. In winter, Mary will always wear a green coat.

(habitual/dispositional/volitional)

e. You will leave tomorrow by the first train. (deontic)

One of the main advocators of a modal approach to future *will* is Enç (1996). She argues against Comrie (1985)'s claim that predictions such as (92-a) make definite statements about future time and hence, according to Comrie, should not be assumed to make reference to alternative worlds. Enç (1996)'s response to this argument in favor of a temporal analysis of *will* is that definiteness is in fact compatible with modality, as illustrated by examples such as (93).

(93) It is *certain* that Susan is the winner. (Enç, 1996, p.348)

Enç (1996) also provides an answer to why *will* seems to obviously refer to future situations in some cases. She argues that the relevant mood here is prediction, which inherently involves futurity. One of her strongest arguments for treating *will* as a modal is that in the case of expressions whose modal status is uncontroversial, such as deontic *must* or *may*, the actual event is also temporally located in the future. This is illustrated in (94).

(94) Future-orientation of modals (Enç, 1996, p.349)

a. You must do 50 push–ups.

b. Sally may go to the party if she finishes her work.

Since Enç (1996) assumes future–shifting to be a common property of all intensional expressions, the fact that *will* shifts to the future does not necessarily mean that it is a future tense, but is compatible with the assumption that it is in fact a modal. An additional argument that Enç provides is that the English future does not pattern with the English past tense in *sequence of tense* contexts. Recall that in English, a past embedded under a past yields a reading in which the embedded eventuality is interpreted as simultaneous to the embedding sentence. The corresponding double future sentence, by contrast, does not allow for a simultaneous interpretation.

(95) Behavior of embedded past and future (Enç, 1996, p.350)

a. Mary said that she was tired. (shifted or simultaneous reading)

b. Mary will say that she will be tired. (only shifted reading)

Hence, Enç (1996) proposes that *will* is a predictive universal modal, with *may* as its (existential) dual, acknowledging that *may* is also the dual of deontic and epistemic *must*. Ultimately, Enç (1996, p.354) proposes that both *will* and deontic *must* are interpreted as in (96). The difference (which in the framework of Kratzer 1977, 1981, 2012a would be framed in terms of conversational backgrounds) is that while in the case of *must*, the worlds quantified over are those consistent with laws, rules etc., *will* quantifies over

the worlds consistent with predictions.

(96) MODAL[S] is true at <w,i> iff in every world w' accessible to w there is an interval i' such that i < i' and S is true at <w',i'>

A very detailed analysis of predictive forms of English (including the semantics of futurates) is given in Copley (2002, 2009). Copley also starts from the assumption that the future must involve some kind of modality, given its indeterminate conceptual nature. The real question, according to Copley, is what kind of modality is involved. The author proposes two general conceptual options:

1. If there is an actual future just as there is an actual past, any modality is epistemic and there is no special modality about future times that is not shared by non-future times
   ≈ There is a fact of the matter, we just don't know what it is

2. If there is no such fact of the matter about the future, the modality involved might be metaphysical (cf. Thomason 1984, Kaufmann 2005, Werner 2006)
   ≈ Future involves a kind of modality that is not available for non–future times

Copley (2002, 2009) seems to opt for a refined version of 2., assuming that the English future is a modal operator universally quantifying over "all the worlds that agree with the actual world up to the present: the metaphysically accessible worlds."(Copley, 2009, p.27). This modal base is then bouletically or inertially ordered. The two different orderings are described as follows: Copley proposes that, if a person utters a future sentence like (97), she has two possible reasons to do so.

(97) She will be there at 5 pm.

According to Copley, uttering (97) implies that the speaker believes that some facts about the world ensure that she will in fact be there; in this case the ordering source would be inertial. Here Copley adopts Dowty (1977)'s concept of *inertia worlds* and defines the inertial ordering as "The facts about the world that are inclined to remain true, all else being equal" (Copley, 2009, p.47). Otherwise, the speaker believes that someone will personally ensure that she will be there, which corresponds to bouletic ordering and presupposes that someone has the power and/or ability to make the relevant eventuality happen. The actual semantics that Copley provides for the English future is not very different from that proposed by Enç (1996) in that it assigns to the future marker a meaning that combines universal quantification over a set of possible worlds with semantic future shifting.

Finally, Giannakidou & Mari (2012a,b, 2013, 2015, to appear) make some proposals that will later be in the background of the analysis of Medumba as well as of the cross–linguistic considerations on the semantics of the future. Giannakidou and Mari show that in Greek and Italian, the respective future markers have an epistemic interpretation in which they are interchangeable with (the respective equivalents of) *must*. Hence, the authors subsume these elements as "Universal Epistemic Modals" (UEMs). They share the function of "epistemic weakening" which the authors define as a manifestation of commitment weakening (98).

(98) Commitment weakening (Giannakidou & Mari, to appear)

a. Commitment weakening is the creation of a non–veridical modal space

b. A modal space *M(i)* relative to an individual i is nonveridical with respect to a proposition p iff *M(i)* contains at least one $\neg p$ world.

c. Modal operators (including possibility and necessity modals) have the function to induce commitment weakening.

The analysis heavily relies on the concept of veridicality. Crucially, the authors make a distinction between *objective* veridicality and *subjective* veridicality. The definition of objective veridcality given in (99) is also sometimes referred to as factivity. According to this definition, an operator is verdical if it entails (the truth of) its argument.

(99) Objective veridicality (Giannakidou & Mari, to appear)

A function F is veridical iff Fp (at least) entails p; otherwise F is nonveridical.

According to the authors, the notion of metaphysical settledness (cf. Condoravdi 2002) can be formulated in terms of veridicality, with *veridical* corresponding to *metaphysically settled* and *nonveridical* corresponing to *metaphysically unsettled*. Veridicality can also be related to the realis/irrealis contrast that is often used in language descriptions in the sense that sentences identified as *realis* refer to facts and would therefore also be classified as veridical in this terminology.

Giannakidou and Mari contrast the established concept of *objective* veridicality with *subjective* veridicality, which is needed since veridicality judgments are relative to epistemic states of individuals (most commonly the speaker of the utterance). Truth relative to an epistemic state is then identified with *full commitment*. The definition of an epistemic state is given in (100), cited from Giannakidou (1999), and full commitment is defined as in (101) (taken from Giannakidou & Mari to appear).

(100) Epistemic state of an individual i

An epistemic state *M(i)* $\in$ *M* is a set of worlds associated with an individual *i* representing worlds compatible with what *i* knows or believes.

(101) Truth in an epistemic state (= full commitment)

A proposition p is true in an epistemic state M(i) iff M(i) $\subseteq$ p: $\forall$w[w $\in$ M(i) $\rightarrow$ w $\in$ {w'| p(w')}]

As far as past and present sentences are concerned, in this approach truth in the epistemic state of the speaker of a *p*–utterance requires that the speaker knows or believes that the actual world is such that *p* is true in it. Subjective veridicality can hence be defined as veridcality of epistemic states. A veridical epistemic state amounts to full commitment. A non-veridical epistemic state contains at least one $\neg p$ world. If all the worlds in the epistemic state are $\neg p$ worlds, Giannakidou & Mari (to appear) talk about *counter–commitment*, as for example in anti–veridical contexts such as negation or counterfactuals.

What makes a statement FUT(p) nonveridical is the fact that it allows for $\neg p$ worlds in the modal base, since it only quantifies over the set of best worlds that is determined by the ordering source. Therefore, a FUT(p) sentence asserts that all those worlds in the modal base that are most in line with common normalcy assumptions are *p* worlds, but it does not exclude that the actual world, which is in the modal base but not necessarily among the best worlds, is a $\neg p$ world. Therefore, Giannakidou & Mari (2015) term the modal base that the future modal quantifies over *non–homogenous*, since it contains *p* worlds as well as $\neg p$ worlds. According to the authors, all modals come with non–homogenous, nonveridical spaces (Giannakidou & Mari, 2012b), where a nonveridical space is defined as in (102) (from Giannakidou (1999), cited after Giannakidou & Mari (2012b)).

(102) Veridical and nonveridical modal space

a. A modal space (a set of worlds) W is *veridical* with respect to a proposition *p* just in case *all* worlds in W are *p*–worlds. (Homogeneity)

b. If there is at least one world in W that is a *non–p* world, *W* is nonveridical. (Non–homogenous space).

This is why future sentences are nonveridical in contrast to past and present statements. At the same time, Universal Epistemic Modals like *must* and *will* create a positive bias towards the truth of *p* in the actual world, asserting that in all the "normal" worlds *p* is true. This contrast with possibility modals such as *might* gives the impression that future sentences make definite statements about the actual world (Comrie, 1985).

At the end of their discussion of predictive and epistemic readings of future markers, Giannakidou & Mari (2015) conclude that "[...] in both cases

the speaker has incomplete knowledge about the actual world, in particular, she does not know whether the actual world will in fact be a p world. So, the so–called epistemic and predictive reading boil down to the same source, with present and past orientation for the former and future orientation for the latter." (Giannakidou & Mari, 2015, p.22)

In my analysis of the future, I will adopt this insight and assume that the crucial difference between the predictive and the epistemic reading of future markers comes down to the temporal orientation provided by aspectual or temporal operators, in parallel to what has been suggested for future orientation of other modals (Matthewson 2012, 2013, Kratzer 2012b, Chen et al. to appear). Along the lines of Giannakidou and Mari then, the meaning of future markers themselves will be assumed to be purely modal.

Chapter 3

Temporal reference without tense in Hausa

3.1 Introduction

In the recent formal semantics literature, there has been a lively debate on languages without obligatory overt tense morphology. A crucial question when it comes to the investigation of these languages is whether tense is realized covertly in their structure or not. In a study on the Salishan language St'át'imcets, Matthewson (2006) provides a formal analysis of a superficially tenseless language involving covert tense morphology. These findings could partly be replicated for Gitksan (Tsimshianic) by Jóhannsdóttir & Matthewson (2008). By contrast, languages such as Mandarin Chinese (Lin, 2003, 2006, 2010; Smith & Erbaugh, 2005), Navajo (Smith et al., 2003, 2007), and Yucatec Maya (Bohnemeyer, 2002, 2009) could fruitfully be analyzed as lacking tense in their structural representation. Tonhauser (2011a) explores how a tensed and a tenseless approach can account for temporal reference in Paraguayan Guaraní and ultimately concludes that a tenseless analysis of this language is preferable on conceptual as well as empirical grounds. The aim of the present study is to contribute to this debate by testing the hypothesis of covert tense morphology in Hausa (Chadic, Afro–Asiatic), a West African tone language spoken in Nigeria and the south of Niger.

Hausa qualifies as "tenseless" since superficially tenseless sentences (henceforth STSs, term adopted from Matthewson 2006) are formally underspecified with respect to the location of the reference time:

(1) Su-nà wàsā
3PL-IPFV play
"They are playing/(were playing)/(will be playing)."

Crucially, however, not all of these interpretations are equally natural since, as the pertinent data will show, aspect induces interpretational preferences.

In fact, the present tense reading of (1) is the default interpretation out of the blue. By contrast, future time reference is highly dispreferred in Hausa STSs in isolation. Matthewson (2006) accounts for the unavailability of future interpretations for STSs in St'át'imcets by assuming covert tense morphology that restricts temporal interpretation to past and present reference times, a hypothesis that will be tested (and ultimately rejected) for the case of Hausa.

3.2 The Hausa language

Hausa belongs to the Chadic phylum of the Afro–Asiatic language family and is spoken by approximately twenty-five million people, mostly in Nigeria and the south of Niger, but also in Benin, Burkina Faso, and Cameroon according to Lewis (2009). While formal semantic studies on Hausa are relatively rare (with the exception of Hartmann & Zimmermann 2007a,b and Zimmermann 2006), the language is very well described and the vast literature on Hausa and related Chadic languages is recorded in a comprehensive bibliography (Newman & Newman, 2012). A very informative formal study on the syntax of Hausa is provided in Tuller (1986). The major sources for descriptions used in this thesis are reference grammars such as Wolff (1993), Newman (2000) and Jaggar (2001). Theoretically oriented works that specifically target problems of temporal interpretation and that are also referred to in this thesis include Abdoulaye (2008) on the Hausa perfective forms, Abdoulaye (2001) on diachronic aspects of the future, as well as Schuh (2003) on the Hausa subjunctive, which will be of particular importance for the analysis of the future in Hausa proposed in chapter 4.

Let me now introduce some basic grammatical properties of the language. Hausa is a tone language with high, low, and falling tones. Following conventions established in the Chadist literature, the high tones in Hausa remain unmarked, low tones are marked by grave accents (ˋ), falling tones by circumflex accents (ˆ). Furthermore, vowel length is indicated by macrons (¯). The basic word order of Hausa is Subject–Verb–Object. As the issue of this thesis is the expression of temporal meaning, the following characteristics of the language are of particular importance: Tense/aspect properties are not marked directly on the verb, but on a preverbal pronoun–aspect–complex referred to as *PAC* in Newman (2000). This PAC consists of a weak subject pronoun (wsp) and a Tense/Aspect/Mood (TAM) marker (see example (1) above for a case of imperfective marking on a third person plural pronoun). Negation in Hausa is usually marked by the discontinuous negative marker *bàa ... ba*, although there are exceptions, as for example negative imperfective sentences which are marked by *bā* and negative subjunctives where

the prohibitive marker *kadà* is used. The example in (2) below[1,2] shows a sentence that illustrates the canonical SVO word order as well as negation in the perfective.

(2) Context question: Did the women cook fufu?

Ā'à, bà sù girkà tuwō ba.
no NEG 3PL.NEG.PFV cook fufu NEG
"No, they didn't cook fufu."

Newman (2000) and Jaggar (2001) take it that tense, aspect and mood in Hausa are "components of a single conjugational system. They do not serve as independent cross-cutting categories" (Newman, 2000, p.564). Contrary to that, Parsons (1960) distinguishes a Subjunctive mood from a set of "tenses", Gouffé (1963/1966) claims that the system is purely aspectual and Klingenheben (1928/1929) prefers the term "Aktionsarten". According to Abdoulaye (2008, p.15), Hausa is nowadays commonly analyzed as aspect–prominent. Obviously, no decision in that regard is made at this point since the issue is the investigation of the temporal system of Hausa and its possible tenselessness. Agnostic about its appropriateness, I will adopt the term "TAM marker" for the time being.

3.3 TAM categories in Hausa

In the following, the TAM categories standardly assumed for Hausa are introduced. As the aim of this investigation is theoretical rather than descriptive, I will focus on those forms that seem to be most well–motivated and relevant for the expression of temporal relations in spoken discourse. Thus, a number of other TAM forms that have only been assumed by a minority of scholars and have turned out to be much less prominent than others (or even totally absent) in spontaneous speech and translations, will be put aside for the purpose of this study. This includes the TAM markers referred to as the *Historicus* (Schubert, 1972; Wolff, 1993), the *Relative Continuous II/Focus Imperfective II* (Newman, 2000; Jaggar, 2001), the *Aorist/Neutral* (Wolff, 1993; Newman, 2000; Jaggar, 2001), the *Allative* (Newman, 2000; Jaggar, 2001) and the *Rhetorical* (Newman, 2000; Jaggar, 2001). The remaining TAM markers are:[3]

The *perfective*[4] form, consisting of heavy–syllable, H–tone morphemes functioning as portmanteau wsp + TAM forms, expresses that an event is

[1] This example was elicited by Mira Grubic.

[2] The weak subject pronouns are marked by morphologically different aspectual forms in negative contexts. These are not investigated in any detail in this thesis.

[3] The examples are taken from Schuh (2003).

[4] *Completive* in the terminology of Newman (2000).

viewed as bounded and perceived in its totality.

(3) **Sun** gudù
3PL.PFV run
"They ran."

The *imperfective*[5] indicates durativity of the event in question, but it also occurs in generic state descriptions and habituality environments. Morphologically, it consists of a light–syllable wsp plus the TAM marker *-nà* (Newman, 2000, p. 575).

(4) **Su-nà** gudù
3PL-IPFV run
"They are running."

Both of these forms have so-called "relative" (Tuller 1986; Newman 2000) or "focus" (Jaggar, 2001) counterparts that occur in relative clauses, questions and focus constructions. The relative perfective form illustrated in (5) is particularly relevant for the present investigation since there are studies that classify it as a past tense. Therefore this TAM form will be discussed separately in section 3.5.

(5) Hàwwa dà Binta **su-kà** yi wà̀sā
Hawwa and Binta 3PL-REL.PFV do play
"It was Hàwwa and Binta who played."

(6) Hàwwa dà Binta **su-kè** yi wà̀sā
Hawwa and Binta 3PL-REL.IPFV do play
"It is Hàwwa and Binta who are playing."

The *habitual* is marked by the morpheme *-kàn*. It denotes customary action and ongoing habits (Newman, 2000, p. 591).[6]

(7) **Su-kàn** gudù
3PL-HAB run
"They (usually) run."

The *subjunctive* TAM is morphologically unmarked. According to Newman (2000, p.591) and Jaggar (2001, p.184) it expresses modal meanings such as wishes, desires, purposes, obligations, intentions, instructions, proposals and the like. It occurs in a variety of different environments and is highly context–sensitive. Still, both authors distinguish it from another unmarked "Neutral" form. Schuh (2003) argues that all these occurrences of unmarked pronouns converge to one single category of "subjunctive" and that this form

[5] *Continuous* in the terminology of Newman (2000).

[6] Habituality is also associated with the imperfective form and some speakers prefer the use of the imperfective and do not seem to use the Habitual at all.

is compatible with so many different contexts because it bears no other inherent meaning than "dependent subsequent inception" (Schuh, 2003, p.21). As a result of the following investigations, this form will be reanalyzed as encoding prospective aspectuality (therefore, it is glossed as PROSP).

(8) **Sù** gudù
3PL.PROSP run
"They should run./Let them run!"

The so-called *future* TAM is addressed in detail in the empirical part of the chapter. As for morphology, the form consists of the morpheme *zā* which deviates from the other TAM markers in that it precedes the wsp which is always in the subjunctive form wherever *zā* occurs.

(9) **Zā sù** gudù
ZĀ 3PL.PROSP run
"They will run."

The *potential* is another form that can be used to express future time reference and it is therefore also called *future II*. Abdoulaye (2001, p.28) states that it is functionally redundant in actual conversation since there is no context in which the potential, but not the *zā*–form, can be used. Since for most of the speakers I consulted the form is so marginal that they did not have clear intuitions on its use, the potential will only be addressed in a short supplementary note in chapter 4.

(10) **Sâ** gudù
3PL.POT run
"They will surely run."

3.4 Covert tense in St'át'imcets

In this section, the option of analyzing superficially tenseless languages as tensed shall be explicated by expatiating on the approach to St'át'imcets taken by Matthewson (2006), which constitutes the first detailed formal account of a tenseless language involving the assumption of covert tense.

3.4.1 Past and present interpretations

Matthewson (2006) argues that, in the language under her concern, there is a covert TENSE morpheme differing from the English tense morphemes defined by Heim (1994) and Kratzer (1998) in that it is phonologically covert and semantically underspecified, but still restricts the relation of RT and UT. Against the background of a pronominal framework for tense, the core assumption of the tensed analysis is that a covert element in the syntac-

tic structure imposes restrictions on the RT variable, which then gets its value from the contextually available assignment function. This approach is appealing in so far as it facilitates a unified account of languages with and without overt tense morphology and hence suggests a cross–linguistic (possibly universal) category of tense. As described in the previous section, a PAST morpheme is taken to restrict RT to time intervals which precede UT. Analogously, Matthewson (2006) assumes that in St'át'imcets every finite clause contains a phonologically covert TENSE morpheme which restricts RT to precede or overlap with UT, excluding future time reference from superficially tenseless sentences. She gives the following lexical entry for TENSE in St'át'imcets:

(11) $[\![\text{TENSE}_i]\!]^{g,c}$ is only defined if no part of g(i) is after t_c. If defined, $[\![\text{TENSE}_i]\!]^{g,c}$ = g(i). (Matthewson, 2006, p. 680)

As for syntax, Matthewson assumes that the TENSE morpheme is located in the T head, which, in line with Kratzer (1998), she takes to be the sister of the aspect phrase. The assumption of a covert TENSE morpheme in St'át'imcets is based on the following observations: Most importantly, all STSs can in principle receive both a present and a past reading in St'át'imcets, as shown in (12).

(12) sáy'sez'-lhkan (Matthewson, 2006, p.676)
play-1SG.SUBJ
"I played/I am playing."

Aktionsart, i.e. the inner temporal structure of the predicate, induces nondeterministic interpretational preferences, as Matthewson (2006, p.676) points out. Accomplishment predicates favor past readings and states suggest present readings while activity predicates seem to be neutral in this respect. Generally, temporal adverbs can serve to disambiguate temporal reference, as would be expected. This is shown in (13) from Matthewson (2006, p.677).

(13) sáy'sez'-lhkan i-tsilkstásq'et-as
play-1SG.SUBJ when.PAST-Friday-3CONJ
"I played on Friday."

However, STSs cannot as easily express future time. Neither (12) nor (13) can refer to an event that takes place after the utterance time. Just adding a future adverb to a STS does not suffice to license a future reading but results in ungrammaticality, which the author takes to mean that the observed restriction is not merely pragmatic (Matthewson, 2006, p.677):

(14) *sáy'sez'-lhkan natcw/zánucwem
play-1SG.SUBJ one.day.away/next.year
Intended: "I will play tomorrow/next year."

For future time reference, a future marker is necessary, namely the enclitic *kelh*.

(15) sáy'sez'-lhkan kelh (Matthewson, 2006, p.678)
play-1SG.SUBJ kelh
"*I played./ *I am playing./ I will play."

The explanation is straightforward in this account. The covert TENSE morpheme restricts RT to be placed before or at UT. Hence, past and present readings are equally available for unmarked sentences, but future readings, i.e. UT preceding RT, are excluded. As Matthewson (2006) reports, aspect marking is available in St'át'imcets, but it does not determine the relation between RT and UT. Imperfective is obligatorily marked by the auxiliary *wa7* and, according to Matthewson (2006, p.683), all non–marked predicates are interpreted as perfective. Both unmarked (perfective) predicates and those marked for imperfective are described as freely allowing future interpretations with *kelh* as well as past and present interpretations without it. The fact that aspect morphology does not dictate the temporal location of the event is expected in this approach, because aspect is assumed to characterize the temporal structure of the event itself, leaving the location of RT to the context, aside from restrictions of covert tense. Further evidence for the existence of a covert TENSE morpheme in St'át'imcets is given in the following example from Matthewson (2006, pp. 681/682):

(16) Context (abridged): Your white friends Theresa, Charlie and Marie got drunk at the bar. Theresa threw up at 10 pm, Marie hasn't thrown up at all, Charlie is in the process of throwing up.

wat'k' kw s-Theresa múta7 s-Charlie
vomit DET NOM-Theresa and NOM-Charlie
"Theresa and Charlie threw up/are throwing up."

This sentence is suitable for describing both throwing up events at the same time, even though Theresa's vomiting is clearly located in the past and Charlie's is still going on at UT. Matthewson (2006) takes this to exclude the possibility that TENSE is ambiguous rather than semantically underspecified. That is to say that Stát'imcets does not possess a covert version of an English–like tense system with distinct PRESENT and PAST morphemes since, if it did, the sentence cited above would have to receive either a past or a present interpretation and could not refer to both events at the same time. Under Matthewson (2006)'s analysis, by contrast, the contextually provided RT interval can be large enough to cover both the present and the past throwing up event.

3.4.2 Future marking

In this section, the analysis of the St'át'imcets future marker *kelh* offered by Matthewson (2006) is outlined in brief for the sake of completeness but also in preparation of the future analysis for Hausa in chapter 4. Based on the observation that *kelh* is both sufficient and necessary for (relative) future time reference in St'át'imcets, Matthewson (2006) proposes that *kelh* is the overt spell–out of the temporal ordering predicate WOLL as originally proposed in Abusch (1985). According to Abusch, future *will* is obtained by the combination of WOLL and present tense, while WOLL plus past tense yields relative future *would*–interpretations. Accordingly, Matthewson (2006) assumes that *kelh* combines with the non–future TENSE morpheme, which picks out a past or present reference time. An immediate consequence of this assumption is that sentences containing the overt WOLL–predicate should freely allow *will* and *would* readings, since both past and present reference times are available. This is indeed the case in St'át'imcets, as Matthewson (2006, p.689) demonstrates:

(17) tsut tu7 kw s-Susan i ánwas-as xetspásq'et lhel
say tu7 DET NOM-Susan when.PAST two-3CONJ week from
lhkúnsa [kw-s lhwál-en-as kelh ta
now DET-NOM leave-DIR-3ERG kelh DET
kwtámts-s-a l-ku pála7 xetspásq'et]
husband-3SG.POSS-DET in-DET one week
"Susan said two weeks ago that she will leave her husband in one week from now/would leave her husband in one week from then."

The embedded sentence containing *kelh* is reported to be ambiguous between a future *will* reading where the leaving event is asserted to take place after the utterance time and a past future *would* reading where the leaving event is located in the future of a past reference time but before the time of utterance. Thus, *kelh* encodes aspectual ordering in the sense that it forces ET to follow RT and, in consequence of that, it always implies future–shifting but is still compatible with past RTs.

Besides that, sentences containing *kelh* do not allow for non–future modal readings. Although *kelh* is often translated into English as *might* (Matthewson, 2006, p.695), epistemic interpretations with *kelh* are only possible with future time reference, as the following example from Matthewson (2006, p.687) shows:

(18) Situation: Your friend asks you how many fish were in the net this morning, and you aren't quite sure of the number, but you know approximately. You say "It might have been five".
tsétsl'ekst k'a kelh
five(animal) APPAR kelh

"It might be five./*It might have been five." (future reading only)

A crucial facet of the tensed approach should be made clear at this point. Matthewson (2006, p.708) speculates that the behavior of languages such as St'át'imcets supports the universal semantic claim that future is not a tense category. Instead, morphemes typically referred to as "future tense" might be modal elements across languages. These modal elements carry important temporal implications, such as imposing ordering relations on RT and ET, which are, however, secondary to the modal meaning components.

3.4.3 Ingredients of a tensed approach

To summarize, the approach of Matthewson (2006) yields a number of lucid and strong predictions which can be deduced from the following proposals:

Proposal 1: Tense is a cross–linguistically relevant feature of the grammar. In languages such as St'át'imcets and Gitksan, the tense morpheme is realized covertly and restricts RT to precede or overlap with UT.

Proposal 2: Future time reference involves an event time–shifting modal operator which interacts with the covert tense morpheme. Thus, future itself is not a tense.

From these proposals, the following predictions can be derived:

Prediction 1: STSs can freely receive both past and present readings regardless of possible aspect marking.

Prediction 2: If there is a covert, underspecified tense morpheme, STSs can refer to present and past events at the same time.

Prediction 3: Future time reference requires overt grammatical marking.

Prediction 4: Relative future (*would*–) readings are possible with the future marker if a past RT is assigned to the RT variable.

Among these predictions, the most crucial one for this chapter is prediction 3. It says that, if the temporal system of Hausa involves a covert TENSE morpheme like St'át'imcets, this TENSE morpheme excludes future time reference from superficially tenseless sentences which should hence only receive past and present interpretations. In consequence of this semantic restriction, future time reference must always be marked overtly. Prediction 4 which is derived from proposal 2 will be investigated in chapter 4.

3.5 Covert tense in Hausa?

In this section, data is presented to investigate whether tense is encoded covertly in the structure of Hausa. The first question to ask is whether Hausa is a superficially tenseless language at all, i.e.: Can Hausa sentences receive different temporal interpretations? The answer is positive. For instance, the sentence in (19) marked for imperfective aspect and sentence (20) marked for perfective are both underspecified with respect to time reference:

(19) **Ta-nàà** wàsā
3SG.F-IPFV play
"She is/was/will be playing."

(20) **Sun** gyārà mōtàsà
3PL.PFV repair car.his
"They (have/will have) repaired his car."

The question is if and how possible temporal interpretations are restricted, i.e.: Is there a covert TENSE morpheme that forces RT to precede or overlap with UT in line with what has been argued for St'át'imcets and Gitksan? In order to test whether tense is encoded covertly in the grammar of Hausa, the predictions made by a tensed analysis are going to be tested one after the other. Since chapter 4 is dedicated to future time reference in particular, the present chapter focuses on predictions about utterances without future marking, specifically sentences with perfective or imperfective aspect. These predictions are repeated below for convenience:

(21) Predictions of a tensed approach:
   a. Grammatical aspect does not affect tense interpretation. Thus, STSs can freely receive both past and present readings regardless of aspect marking.
   b. If there is a covert, underspecified tense morpheme, STSs can refer to present and past events at the same time.
   c. Future time reference is not possible without overt grammatical marking.

3.5.1 Free past and present interpretations?

It was already shown that, in principle, both past and present readings are possible with Hausa sentences. According to the first prediction of the tensed approach, these interpretations should be freely available regardless of aspect marking. Recall that in Hausa, TAM–markers are obligatory on the weak subject pronoun and that the language is commonly considered

aspect–prominent. Thus, temporal boundedness[7] of events is conveyed by grammatical aspect primarily. These are the actual observations: First of all, aspect marking induces very clear and consistent default interpretations. Sentences marked for imperfective are interpreted in the present (22), while eventive sentences marked for perfective are interpreted in the past (23).

(22) Bashir **ya-nà̀** wà̀sā
Bashir 3SG.M-IPFV play
"Bashir is playing."

(23) Bashir **yā** yi wà̀sā
Bashir 3SG.M.PFV do play
"Bashir played."

These defaults are actually strong enough to clash with temporal adverbials in sentences presented out of the blue. Consequently, the presence of a temporal adverb contradicting the default interpretation makes these utterances less acceptable or at least confusing when they are presented without a discourse context. Native speakers tend to reject sentences containing imperfective aspect marking and a past adverb (24-b) as well as sentences containing perfective aspect and a present adverb (24-c). Imperfective sentences with present adverbs (24-a) and perfective sentences with past adverbs (24-d) are accepted without hesitation also without a specific context:

(24) a. **Ta-nà̀** wà̀sā yànzu
3SG.F-IPFV play now
"She is playing now."

b. ?**Ta-nà̀** wà̀sā jiyà
3SG.F-IPFV play yesterday
Intended: "She was playing yesterday."

c. ?Hàwwa **tā** dafà wākē yànzu.
Hawwa 3SG.F.PFV cook beans now
Intended: "Hàwwa has cooked beans now."

d. Hàwwa **tā** dafà wākē jiyà
Hawwa 3SG.F.PFV cook beans yesterday
"Hàwwa cooked beans yesterday."

Crucially, though, this holds only if the sentences are presented without context. Otherwise, the default can be overridden by contextual temporal information. In the example given below, the question asked by the interlocutor provides a past RT to which the answer of the speaker is anchored. Thus, a clause marked for imperfective can easily get a past interpretation. In (25-a), the RT is explicitly stated in a preposed adverbial clause,

[7]The term *boundedness* will be defined more precisely in section 3.6. For now, suffice it to say that an event is "bounded" when it is viewed in its totality.

which actually suffices to license a past interpretation of the imperfective. However, the reference to this past time can also remain implicit, as (25-b) illustrates.

(25) Context question: What was Hàwwa doing when Bashir entered the house yesterday?

a. Lōkàcîn dà Bashir ya zō jiyà, Hàwwa
When Bashir 3SG.M.REL.PFV come yesterday Hawwa
ta-nà̀ wà̀sā
3SG.F-IPFV play
"When Bashir came in yesterday, Hàwwa was playing."

b. Hàwwa **ta-nà̀** wà̀sā (jiyà)
Hawwa 3SG.F-IPFV play yesterday
"Hàwwa was playing (yesterday)."

Cognitive state predicates marked for perfective are ambiguous between a past and a present interpretation and get present readings by default.

(26) **Nā** tunà̀ sa̋rai.
1SG.PFV remember well
"I remember (him) quite well."

The observation that the perfective is compatible with present RTs and that the imperfective is compatible with past RTs indicates that these forms really encode aspect and that the preferred readings illustrated above are not hard–wired RT restrictions imposed by (covert) tense. For event predicates, the default past tense reading is more difficult to override. In certain contexts, however, perfective eventive sentences are compatible with a present reference time, resulting in a present perfect interpretation, as example (27) illustrates.

(27) Context question: I'm starving, is there anything to eat?

Hàwwa **tā** dafà wākē yànzu.
Hawwa 3SG.F.PFV cook beans now
"Hàwwa has cooked beans (finished cooking beans) just now."

Thus, the past RT is in fact context–dependent while the perfective interpretation is the core meaning of this TAM. The above data show that tense interpretations arise as strong but cancellable pragmatic inferences from grammatical aspect marking. Thus, the first prediction of the tensed approach is only partly borne out in Hausa. On the one hand, tense interpretation is not determined by aspect, i.e. perfective and imperfective aspects do not entail past and present interpretations, respectively, and past and present RTs are in principle available for both aspects. However, tense interpretation is not independent from viewpoint aspect, either, which

differentiates Hausa from St'át'imcets. While this finding allows no definite conclusions about the presence or absence of covert tense, at least it hints at the existence of differences between the mechanisms and strategies involved in temporal interpretations in the two languages. Notably, the fact that tense interpretation is strongly influenced by viewpoint aspect is more reminiscent of data from Mandarin Chinese (Smith & Erbaugh 2005; Lin 2006) or Navajo (Smith et al., 2003, 2007). In section 3.6 an analysis of the temporal system of Hausa will be provided that largely follows Smith & Erbaugh (2005) and Smith et al. (2003, 2007) and which accounts for the correlation between aspect and tense interpretation in terms of pragmatic inferences.

3.5.2 Simultaneous past and present interpretations?

The second prediction of Matthewson (2006)'s analysis is that, in a suitable context, it is possible for one sentence to refer to a past and a present event at the same time if the covert TENSE morpheme encodes non–future time reference and is thus semantically underspecified with regard to present and past interpretation. Here too, the data are not quite clear–cut. The sentence in (28) cannot encompass a past and a present event no matter whether the viewpoint aspect is perfective or imperfective. Consider the following felicity judgments and comments provided by my consultants:

(28) Context: For lunch, Hàwwa cooked beans and ate them. Audu is cooking beans for dinner right now. Is it appropriate to say:

a. #Hàwwa dà Audu **sun** dafà wākē yâu.
Hawwa and Audu 3PL.PFV cook beans today
Intended: "Hàwwa and Audu cook/cooked beans today."
Speaker comment: The reading is not suitable for Audu.

b. #Hàwwa dà Audu **su-nà** dafà wākē yâu.
Hawwa and Audu 3PL-IPFV cook beans today
Intended: "Hàwwa and Audu are/were/have been cooking beans today."
Speaker comment: The reading is not suitable for Hàwwa.

The judgments are very clear for this example. In a similar setting, however, the speakers' reaction was different:[8]

(29) Context: John and Peter only have one guitar so they have to take turns playing. John practiced for an hour and then gave the guitar to Peter, who is now playing. Can you say:

[8]Paul Newman (p.c.) pointed out to me that the verb *wàsā* was not a good choice in these items, but that the verb *kaɗà* would be more appropriate in the given context. I am grateful for this hint, but I left the example in the form in which it was accepted by my consultants in order not to distort the results.

a. **#Sun** yi wàsā (yâu).
3PL.PFV do play today
Intended: "They play/played today."

b. **Su-nà** yi wàsā (yâu).
3PL-IPFV do play today
Intended: "They are/were playing today."

In this setting, the imperfective sentence was accepted. When asked for a concrete background scenario, the speaker suggested the following context: John and Peter constitute a duo that performs every other day and during the usual performance, the guitar player changes. The sentence above could be uttered as a contrastive answer to the question "Did John and Peter play yesterday?". This description shows that the "playing"–scenario is reanalyzed as consisting of only one event which is located in the (extended) present time. Therefore, it becomes acceptable. If this kind of reanalysis is too far to seek, the discourse is infelicitous. The conclusion is that Hausa patterns with St'át'imcets in not having separate covert PAST and PRESENT morphemes. Otherwise we would expect that one of these morphemes restricts the RT location in (29-b) in a way that would make the utterance infelicitous in the given context. As (28-a) and (29-a) show, however, perfective aspect in Hausa excludes reference to events whose running times include the RT, i.e. events that are not completed. Thus, the Hausa data are explained if we assume that the contexts given above contradict the requirement of the perfective aspect that the eventuality be temporally bounded. That makes (28-a) unacceptable because the context description specifies that Audu is still cooking beans at the reference time (which here equals UT). Likewise, (29-a) is infelicitous because the event of Peter playing is still going on at RT according to the context description and this is contradictory to the semantic restriction of the perfective.

3.5.3 Obligatory future marking?

The data presented so far show that past and present readings are in principle available for perfective and imperfective aspect in Hausa (as would be predicted assuming a covert non–future TENSE morpheme) but that, contrary to what we find in St'át'imcets, tense interpretation is not independent of aspect. Rather, aspect induces clear preferences regarding tense interpretation to the effect that perfective sentences are interpreted in the past and sentences in the imperfective get present interpretations by default. In principle, though, aspect–induced preferences do not exclude the possibility of covert tense morphology. Therefore, that future time reference has to be marked overtly is the core prediction that needs to be tested in order to find out whether there is covert restriction of RT in Hausa. Thus, the vital question is whether future readings are excluded unless overtly marked by

grammatical means. If there is no covert morpheme restricting the location of RT semantically, unmarked sentences should be compatible with past, present and future RTs. At first sight, however, it looks as though future time reference always requires overt marking in Hausa as predicted by the tensed approach. When presented out of the blue, imperfective (30-a) as well as perfective (30-b) sentences combined with a future time adverb are unacceptable. This is in line with what is reported for St'át'imcets:

(30) a. **#Ta-nàà** wàsā gòbe.
3SG.F-IPFV play tomorrow
Intended: "She will be playing tomorrow."
b. #Hàwwa **tā** dafà wākē gòbe.
Hawwa 3SG.F.PFV cook beans tomorrow
Intended: "Hawwa will cook beans tomorrow."

On closer inspection, though, imperfective (31), (32) and perfective (33), (34) aspects are compatible with future time reference if a context is presented that provides a salient future RT. Crucially, this is true not only for subordinate, but also for unembedded matrix clauses in which the availability of a future reading could not be explained by a sequence of tense rule in the style of Ogihara (1996). Example (32) illustrates that a future reference time introduced into the discourse by a temporal adverbial can bring about future interpretations of imperfective sentences in Hausa in the same way as past RTs provided by the discourse context facilitate past interpretations.

(31) Context: You and your friends are planning to surprise your brother Ibrahim with a visit. Your friends ask you what Ibrahim will be doing when you arrive. You say:

Inàà zàtōn zā mù same shi **ya-nàà** aikì
1SG.IPFV expect ZĀ 1PL.PROSP find him 2SG.M-IPFV work
à gidā.
PREP house
"I guess he will be working in the house."
(lit. I expect that we will find him working in the house.)

(32) Context question: What will Bashir be doing when I come home tomorrow afternoon?

Bashir **ya-nàà** wàsā gòbe.
Bashir 3SG.M-IPFV play tomorrow
"Bashir will be playing tomorrow (...when you come home)."

(33) Context question: Am I supposed to feed the baby tonight?

Kàfin kà iso jàrirìn **yā** yi barci.
Before 2SG.M.PROSP arrive baby.DEF 3SG.M.PFV do sleep
"When you arrive, the baby will already be asleep."

(34) Context question: What time can I call you tonight?

Kàfin ƙarfè shidà, **nā** gamà aikìnā.
Before clock six 1SG.PFV finish work.my
"I will have finished my work by 6 o'clock."

Tonhauser (2011a) explores whether there is covert tense morphology in the superficially tenseless language Paraguayan Guaraní. Some basic data from this language shall be used for a short cross–linguistic comparison at this point. Tonhauser observes that Guaraní patterns with St'át'imcets in that most temporally unmarked matrix clauses are compatible with past and present, but not with future RTs. Consequently, the temporally unmarked form *Ajahu* can be used to answer a question about a past (35) and a present (36) but not a future (37) activity (Tonhauser 2011a, p.260, abridged).

(35) Context question: "What were you doing yesterday when I called you?"

A-jahu.
A1SG-bathe
"I was bathing."

(36) Context question: "What are you doing right now?"

A-jahu.
A1SG-bathe
"I am bathing."

(37) Context question: "What are you going to do tomorrow at 10?"

#A-jahu.
A1SG-bathe
Intended: "I am going to bathe."

Tonhauser (2011a) shows that it is in principle possible to analyze Guaraní as tensed although the language allows for future time reference without future marking in subordinate clauses as well as in certain matrix clause constructions. That, however, comes at the cost of stipulating additional interpretation rules ensuring that the non–future TENSE morpheme is not interpreted in these environments. In spite of the observed asymmetry between past, present and future interpretations in examples like (37), Tonhauser ultimately opts for a tenseless analysis of Guaraní rather than a tensed one for conceptual as well as for empirical reasons. Hausa, however, differs from both St'át'imcets and Guaraní in that it allows future time reference without future marking even for minimal matrix sentences. For illustration, (38)–(40) show parallel discourses in Hausa where all three RTs are available without special marking.[9]

[9]Note that Hausa sentences are never temporally unmarked in the way that the examples from Guaraní are. Since Hausa has obligatory aspect morphology, the examples in

(38) Context question: "What were Audu and Binta doing yesterday when you called them?"

Su-nà màganà.
3PL-IPFV talk
"They were talking."

(39) Context question: "What are Audu and Binta doing right now?"

Su-nà màganà.
3PL-IPFV talk
"They are talking."

(40) Context question: "What will Audu and Binta be doing when I come tomorrow morning?"

Su-nà màganà.
3PL-IPFV talk
"They will be talking."

Summarizing thus far, Hausa differs from St'át'imcets in that it does not restrict RT location semantically. Instead, much of the workload of temporal interpretation seems to be carried by aspect which is obligatorily marked in Hausa and facilitates pragmatic inferences about the time the speaker is referring to. Although future time reference with imperfective and perfective sentences is very marked out of the blue, it is readily available in appropriate contexts. If the grammar of Hausa encoded tense in a covert morpheme with a semantics similar to the St'át'imcets TENSE morpheme, we would expect the sentences in (31)–(34) and (40) to be ungrammatical since TENSE would presuppose that no part of RT be after the utterance time. Therefore, I do not assume restrictions on temporal reference imposed by covert tense morphology in Hausa.

3.6 An alternative proposal for Hausa

Since the tensed approach does not straightforwardly account for the data presented in the last subsection, and since viewpoint aspect seems to play a more central role in tense interpretation in Hausa than it does in St'át'imcets, an alternative approach should be investigated. Genuinely tenseless analyses were provided for Mandarin Chinese (Smith & Erbaugh 2005 see also Lin 2003, 2006, 2010,[10] Yucatec Maya (Bohnemeyer, 2002, 2009), Kalaallisut

(38)–(40) involve imperfective aspect. As was shown in this section, however, future RTs are also possible with perfective aspect.

[10]Matthewson (2006, pp.706/7) points out that Lin's analysis of Chinese is not genuinely tenseless since the lexical entries that Lin proposes for the aspectual markers *le* and *guo* amalgamate tense and aspect. I agree with this objection and acknowledge that, according to Lin's analysis, these aspectual morphemes seem to encode tense meaning. I am unable to judge whether this is correct or if a purely aspectual analysis like the one provided

(Shaer 2003, Bittner 2005, 2008, 2011), Navajo (Smith et al., 2003, 2007) and for Paraguayan Guaraní (Tonhauser, 2011a). What all these analyses have in common is that, in contrast to the tensed approach, they do not assume covert tense morphology in the representations of STSs in the respective languages. In order to account for the Hausa data, a discourse–oriented approach as suggested by Smith et al. (2003, 2007) for Navajo and by Smith & Erbaugh (2005) for Chinese turns out to be most appropriate. The central assumption is that the temporal location of events is pragmatically deduced from aspectual information.

This section will present the main ideas of this analysis and show how it accounts for the observations made about temporal interpretation in Hausa. The assumptions underlying the analysis are that (i) the principles of temporal interpretation in tenseless languages are pragmatic in nature, and (ii) "the basic pattern of temporal interpretation is deictic: the situations expressed in sentences are located in relation to speech time", as Smith & Erbaugh (2005, p.714) put it. The account relies heavily on the concept of *boundedness*. This term subsumes the aspectual information about the temporal structure of an event as it is conveyed by grammatical aspect and Aktionsart. The authors define it as follows: "Bounded situations are temporally closed, by implicit or explicit bounds (*ran, broke*); unbounded situations are ongoing, temporally open (*running, breaking*). Boundedness depends on both aspectual viewpoint and situation type" (Smith & Erbaugh, 2005, p.715). From the boundedness–properties of the event in question, its localization with respect to speech time can be deduced by aid of the following four principles of interpretation as given in Smith et al. (2007).

(41) **Bounded Event Constraint** (Smith et al., 2007, p.45)
Bounded events are not located in the present.

(42) **Deictic Principle** (Smith et al., 2007, p.44)
Situations are located with respect to speech time.

(43) **Simplicity Principle of Interpretation** (Smith et al., 2007, p.60)
Choose the interpretation that requires the least information added or inferred.

(44) **Temporal Schema Principle** (Smith et al., 2007, p.61)
Interpret zero marked clauses according to the temporal schema of the situation expressed.

Arguably, the Temporal Schema Principle in (44) is not relevant for Hausa as it is stated specifically to deal with what Smith et al. (2007) describe

in Smith & Erbaugh (2005) is more appropriate. Since I am convinced that the Hausa perfective aspect does not work like *le* and *guo*, I am not adopting Lin's analysis. However, as his account of sentences without the optional aspectual particles resembles that of Smith & Erbaugh (2005) and since the author himself claims Chinese to be tenseless, I list it among the tenseless analyses.

as "zero marked verb words", i.e. predicates that are unmarked for aspect. Since I argue that grammatical aspect is obligatorily marked in Hausa, the Temporal Schema Principle does not have any work to do. The remaining three principles will be taken as the basis for analyzing the Hausa data presented above.

Before dealing with the interpretation of unbounded eventualities further below, I will demonstrate how the properties of bounded events are derived. As shown in the preceding data section, bounded events get past interpretations by default, but they can also be located in the future given an appropriate discourse context. However, they seem to refuse present reference times unless the interpretation is present perfect. To make sense of this, let us have a closer look at the Bounded Event Constraint which is given in a more extensive formulation taken from Smith et al. (2003) in (45):[11]

(45) Bounded Event Constraint (BEC) (Smith et al., 2003, p.186)

> Bounded events are not located in the Present. Speakers follow a tacit convention that communication is instantaneous. The present perspective is incompatible with the report of a bounded event, because the bounds would go beyond the moment.

For concreteness, let me factor out the individual components that this informal constraint makes a claim about, namely the temporal boundedness of events, present tense interpretation and the instantaneous character of the moment of utterance:

(46) Components of the Bounded Event Constraint (BEC) in Hausa:

a. Temporal boundedness: [ET $\subseteq$ RT]
Temporal boundedness means that the running time of the event is included in the reference time. Since temporal boundedness is expressed by grammatical aspect in Hausa, this is a hard–wired semantic restriction in perfective sentences.

b. Present interpretation: [RT = UT]
In the case of a present interpretation of sentences containing event predicates, the reference time is identical to the utterance time.

c. Instantaneous UT: $\forall$t [t $\subseteq$ UT $\rightarrow$ t = UT]
Pragmatics dictates that speech acts are instantaneous, i.e. an

[11] Earlier versions of the BEC were formulated by Kamp & Reyle (1993), "The eventuality described by a present tense must properly include the utterance time n.") as well as Bennett & Partee (1978, p.68), "We regard a speech act as occurring at a moment of time and understand the assertion as being true at that moment [...].". Thanks to Lisa Matthewson for pointing this out to me.

interval t can only be a subinterval of the contextually defined utterance time if it equals the utterance time.

What the BEC captures is that, if a bounded event were to be interpreted in the present, it would be subject to the contradictory requirements in (46). If the perfective aspect requires the running time of the event to be included in the reference time, and if the utterance time is instantaneous, then the utterance time cannot be the reference time. As a consequence, the reference time must be shifted. Still, the BEC as formulated above allows for an exception. Bounded events in the present should be possible if the event itself is non–durative and can thus be equated with the utterance time. This prediction seems to be borne out as the following example from Newman (2000, p.570) (my glossing) with the punctual predicate *tàfi* (to go/to leave) illustrates:

(47) tô, **nā** tàfi kènan
well, 1SG.PFV leave then
"Well, I'm going./ I'm off now."

The BEC explains why in Hausa, durative eventive sentences marked for perfective are interpreted in the past rather than in the present as shown in example (23), repeated here as (48). The event of Bashir playing cannot reasonably be understood to fit inside the moment of utterance which is the default reference time. However, the perfective requires that the event time be included in the reference time. To resolve this problem, the sentence is interpreted with a (non–instantaneous) past RT.

(48) Bashir **yā** yi wàsā
Bashir 3SG.M.PFV do play
"Bashir played."

Furthermore, the BEC explains why sentences combining durative events, perfective aspect and present adverbs can maximally get present perfect interpretations, but no simple present readings.

(49) Context question: I am starving, is there anything to eat?
Hàwwa **tā** dafà wākē yànzu
Hawwa 3SG.F.PFV cook beans now
"Hàwwa has cooked beans (finished cooking beans) just now."

In this example, the sentence very literally gets a completive interpretation, i.e. it is interpreted as referring to the moment of completion (or what Kamp & Reyle (1993) call the "culmination point") of the event which is instantaneous and can thus be identified with the moment of utterance.

In (26) it was demonstrated that stative predicates such as *sanì* (know) and *tunà* (remember) can get present interpretations with the perfective aspect. This phenomenon is attested in many aspect languages and differentiates perfective aspects from past tenses (Bybee et al., 1994). I assume that the Bounded Event Constraint does not apply to stative predicates because the temporal relation required by the perfective depends on the situation type of the predicate. With stative predicates, the relevant temporal relation is overlap rather than inclusion (cf. Kamp & Reyle 1993; Condoravdi 2002), as explicated in the last chapter. Hence, in the case of states, the eventuality time need not be properly included in the reference time but must overlap with it, which supports a present interpretation. While the Bounded Event Constraint explains why bounded events are not located in the present, it is not yet clear why they should be located in the past rather than in the future. The Simplicity Principle of Interpretation is supposed to capture this default. Smith et al. (2007, p.60) make the following claim about past and future interpretations: "In terms of information conveyed, the past is simpler: it lacks the factor of uncertainty, or modality that is always associated with the future." Hence, following the Simplicity Principle, the hearer infers that the event in question has already been instantiated unless it is explicitly located in the future. Based on the Simplicity Principle and the Deictic Principle, which captures the empirical fact that UT is the preferred reference time, a pragmatic hierarchy can be established that ranks temporal interpretations with respect to their conceptual simplicity.

(50) **Hierarchy of Simplicity (HoS)**

a. RT = UT: Present time reference is the simplest kind of temporal reference since (i) an utterance situation always provides a time interval to which a RT variable can be anchored, namely the utterance time, and (ii) present interpretation requires no displacement of either the time or the world of evaluation.

b. RT < UT: Past time reference is more "complex" than present time reference since it requires displacement of the reference time from the concrete utterance situation.

c. RT > UT: Future interpretation also involves reference time shifting and is hence more complex than present interpretation. In contrast to past time reference, however, it adds the complication of modal displacement and thus increases the level of abstraction required for interpreting the utterance.

The Hierarchy of Simplicity also predicts that sentences marked for imperfective aspect are interpreted in the present by default as shown in (22), repeated here as (51), because present interpretation is ranked highest in the HoS and is therefore preferred over past and future interpretation.

(51) Bashir **ya-nà** wàsā
Bashir 3SG.M-IPFV play
"Bashir is playing."

Crucially, even though aspect marking is highly relevant for the temporal location of an event, the aspectual forms do not encode a relation between RT and UT. Thus, tense interpretation itself has to be pragmatically inferred. This accounts for the observation that the default readings can be overridden by contextual temporal information as demonstrated in example (52).

(52) Context question: What was Bashir doing when Ibrahim entered his house yesterday?
Lōkàcîn dà Ibrahim ya zō, Bashir
When Ibrahim 3SG.M.REL.PFV come, Bashir
ya-nà wàsā
3SG.M-IPFV play
"When Ibrahim came in, Bashir was playing."

The pragmatic principle capturing the effects of contextual information will simply be labeled *Contextual Reference Time Anchoring*.

(53) **Contextual Reference Time Anchoring**
Explicit temporal information may override pragmatic defaults. If the previous discourse context provides a RT alternative to the pragmatic default, this RT can serve as a temporal anchor for the time variable of the sentence.

Formally, this is to say that Hausa patterns with truly tensed languages in that its structure contains an open RT variable whose interpretation depends on a contextually defined assignment function. The crucial difference, however, is that the assignment of a value to this variable is not restricted by the semantics of tense morphemes, as it is in English or St'át'imcets.

Why would I assume a syntactic RT variable and thus abstain from making the stronger claim that tense is not present in the structure of Hausa at all? On the one hand, conceptual considerations motivate the decision to assume a time variable in the syntax. Schlenker (2006) points out several parallels between the means exploited by natural language in order to refer to individuals, times and possible worlds, for example in the realm of quantification, pronominal reference and definite descriptions. Aiming at a linguistic representation that reflects these symmetries, a fully extensional system in which individuals, times and worlds are represented explicitly seems favorable (see also Percus (2000), among others). Moreover, there are empirical observations that are more easily accounted for on the assumption of a reference time variable in the structure of Hausa. For instance, sentence

(54) is compatible with the following two context questions.

(54) Context question 1: Audu, you met Binta and Hàwwa yesterday, how were they doing?
Context question 2: Audu, you met Binta and Hàwwa yesterday. Did they tell you why they were in such a bad mood last week?

Hàwwa dà Binta sun cê sun gàji.
Hawwa and Binta 3PL.PFV say 3PL.PFV tired
"Hawwa and Binta said that they were tired."

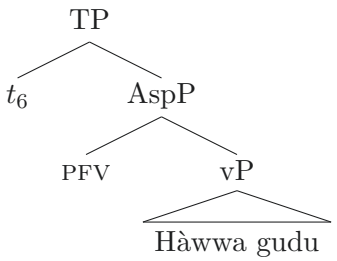
The SOT example in (54), like its English equivalent, is ambiguous between two readings. On the simultaneous interpretation triggered by context question 1, Hàwwa and Binta were tired at the time at which they said they were tired. On the shifted reading triggered by context question 2, Hàwwa and Binta were tired before they said it with no implication that they still are. This is accounted for under the assumption that the matrix clause and the embedded clause each contain a time variable: The simultaneous reading arises if both variables get the same value under binding. The shifted reading arises if the time interval denoted by the embedded RT variable precedes the interval denoted by the matrix RT variable. Although the question of whether an unrestricted time variable is represented in the structure of Hausa deserves more investigation, I will for now assume that RT is represented in the syntax and that what differentiates Hausa from a language like English or St'át'imcets is that the reference of this variable is not semantically restricted by tense features.[12] For illustration, the derivation of the perfective sentence in (55) with the LF in (56) is given in (57).

(55) Hàwwa tā gudù
Hawwa 3SG.F.PFV run
"Hàwwa ran."

[12]The data in (54) provide suggestive empirical support rather than a conclusive argument. While an intensional analysis of tense could certainly capture the data, e.g. by positing multiple indices, I think it would run into more serious problems. Additional evidence comes from interactions of tense and quantifiers. The sentence in (i-a), constructed after Cresswell (1990), most naturally means that all my current teachers are former students, suggesting that the denotations of the predicates are determined relative to two distinct time intervals, which can plausibly be represented by temporal variables in the LF in (i-b) (where t_0 is the utterance time):

(i) a. Dâ duk mālàmaina dālìbai nē.
Formerly all teachers.my students PRT
"Some time ago, all my teachers were students."
b. $\exists t\ [t < t_0\ \&\ \forall x\ [\text{teacher}(x)(t_0) \rightarrow \text{student}\ (x)(t)]]$

(56)



(57) a. $[\![\text{vP}]\!]^{g,c} = \lambda\text{e}.\lambda\text{w}.\ [\text{run(e)(w)} \ \&\ \text{agent(Hawwa)(e)(w)}]$

b. $[\![\text{AspP}]\!]^{g,c} = [\![\text{PFV}]\!]^{g,c}\ ([\![\text{vP}]\!]^{g,c})$
$= [\lambda\text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{e}\ [\text{P(e)(w)} \ \&\ \tau\text{(e)} \subseteq \text{t}]]\ (\lambda\text{e}.\lambda\text{w}.\ [\text{run(e)(w)} \ \&\ \text{agent(Hawwa)(e)(w)}])$
$= \lambda\text{t}.\lambda\text{w}.\exists\text{e}\ [\text{run(e)(w)} \ \&\ \text{agent(Hawwa)(e)(w)} \ \&\ \tau\text{(e)} \subseteq \text{t}]$

c. $[\![\text{TP}]\!]^{g,c} = \lambda\text{w}.\exists\text{e}\ [\text{run(e)(w)} \ \&\ \text{agent(Hawwa)(e)(w)} \ \&\ \tau\text{(e)} \subseteq \text{g(6)}]$
$\approx$ There is an event of Hàwwa running, and the time of this event is included in the contextually provided reference time g(6).

3.7 A past tense in Hausa?

The final part of this chapter is concerned with the TAM marker that is referred to as the "relative completive" form by Newman (2000) and as "focus perfective" by Jaggar (2001). In previous work on the temporal system of Hausa, it has been claimed that the focus perfective has past tense–like properties. One probable reason for this is the general semantic similarity between past and completive/perfective meanings as they both tend to denote past time events. However, the claim of actual past tense meaning has (to my knowledge) only been made for the focus perfective, not for the general perfective form in Hausa. Recall that the focus perfective has a limited distribution; it mainly occurs in relative, wh- and focus contexts (Newman, 2000, p.572 ff.). Supposedly, an important motivation for ascribing past tense properties to the focus perfective is that it is also the TAM form predominantly used in narrative discourse, i.e. for reporting events and narrating stories, as in the following example taken from Jaggar (2001, p.163), (my glossing):

(58) ...**mu-kà** būɗè ƙōfàř, **mu-kà** yi saurī, sai wani
1PL-FOC.PFV open door 1PL-FOC.PFV do haste, then some
mùtûm **ya** būɗè mîm ...**mu-kà** yi saurī,
man 3SG.M.FOC.PFV open 1SG.IO 1PL-FOC.PFV do haste
mu-kà jē, **mu-kà** būɗè...
1PL-FOC.PFV go 1PL-FOC.PFV open
"...we openend the car door and moved quickly, then some man

opened it for me... and we moved quickly and went and opened it..."

Newman (2000) states that the label "preterite" might actually be a more suitable term for this TAM. Semantically, the focus perfective is supposed to be "more punctual and specific than the Completive, the difference being comparable, in some respects, to the difference between a simple past and a present perfect" (Newman, 2000, p.573). The narrative use also motivates the choice of the labels "Historicus" by Wolff (1993) and "aorist" by Parsons (1960). However, the most specific proposal for analyzing the Hausa focus perfective TAM as a simple past was made by Abdoulaye (2008). He states that this TAM marker is ambiguous between three different meanings: a basic perfective, a perfective augmented with a special time–referencing function but without speech time orientation, and a true simple past (Abdoulaye, 2008, p.1). The author provides a diachronic analysis to account for this postulated ambiguity. He does not claim that Hausa is a fully tensed language, but he proposes that it is in a stage of transition from an aspect–oriented to a tense–oriented system. His claim is that, in narrative sequences as well as in main clauses of "dialogical discourse" (which is the term used by Abdoulaye (2008, p.36) for direct communication between individuals), the focus perfective paradigm encodes a past rather than a perfective meaning, because it is restricted to past time reference in these contexts.

I think that this analysis is disputable on empirical grounds. Firstly, some of Abdoulaye's own arguments are not conclusive. For instance, Abdoulaye (2008, p.39) asserts that "[...] the Relative Perfective in main clauses of dialogical discourse has a strict past time reference." He employs the sentences in (59) to illustrate differences between the use of the focus perfective on the one hand (59-a) and the general perfective on the other (59-b):

(59) a. Dà sāfe sun tāshì haɾ̃ **su-kà** karyà̀.
PREP morning 3PL.PFV rise even 3PL-FOC.PFV breakfast
"Earlier in the morning they did wake up and even had breakfast."

b. Dà sāfe sun tāshì (*haɾ̃) **sun** karyà̀.
PREP morning 3PL.PFV rise even 3PL.PFV breakfast
"Earlier in the morning they did wake up and had breakfast."

The focus perfective in the second clause of (59-a) is claimed to encode a specific time for the event of having breakfast, which is used as evidence for the reality of the event of waking up (hence the possibility of using *haɾ̃*).[13]

[13]It is not quite clear to me how exactly the licit occurrence of *haɾ̃* is supposed to follow from the use of the focus perfective. A possible alternative explanation of the data in (59) not discussed in Abdoulaye (2008) is that the presence of *haɾ̃* in the interpretation of "even" in (59-a) requires a focus environment, which enforces the use of the focus perfective form (for a discussion of the focus sensitivity of *even* in English see e.g. Rooth

According to Abdoulaye, the use of the TAM form that he refers to as "Simple Past" has the effect of presenting the two events as closely related temporally while they are merely reported in the case of (59-b), where both clauses are marked for general perfective aspect and *haɾ̃* cannot be used. Thus, the reported disparities between the sentences containing the perfective and the focus perfective amount to differences of specificity and emphasis on temporal connection, but not of temporal reference (Abdoulaye, 2008, p.35). The claim that the focus perfective is perceived to be more specific is supported by Jaggar (2001, 2006) and also by Newman (2000). Still, that does not make it a past tense.

Secondly, the judgments of my consultants provide empirical evidence against the claim that "the Relative Completive [...] cannot be used in main clauses to refer to non–past events" (Abdoulaye, 2008, p.39). In conversations involving cognitive state predicates and relative or focus environments which trigger relative marking, the focus perfective is used to express present states. The following dialogue was provided by a native speaker as a spontaneous translation:

(60) a. Wà **ya** san wannàn mùtûm?
who 3SG.M.FOC.PFV know this man
"Who knows this man?"

b. Yan mātā nē **su-kà** san wannàn mùtûm.
young women PRT 3PL-FOC-PFV know this man
"It is the women who know this man."

Here, an English present tense discourse was translated with the use of the focus perfective form. One has to note that verbs of cognitive states such as *sanì* (to know) are particular in this regard, since, as in many other languages, they are incompatible with imperfective/progressive aspect. Even so, according to Bybee et al. (1994, p.92), a typical characteristic of completives/perfectives is that, with stative predicates, they signal present states by default, while past morphemes can only signal past states. Actually, this is one of the few clear criteria that help distinguish these two categories and it is straightforwardly applicable to the example given above. If the focus perfective were a past tense, its meaning should restrict the RT to the past and it should not be employed in a spontaneous translation of English present tense sentences even in stative sentences. Also when combined

1985). Note that *haɾ̃* can also mean "until" and in this interpretation is in principle licit in structures like (i) (taken from (Newman, 2000, p.133), my glossing) that are similar to (59-b) in having two general perfective clauses. In (59-b), this interpretation seems to be excluded by the punctuality of the predicate *tāshì* (wake up).

(i) Sun yi aikì haɾ̃ sun gàji
3PL.PFV do work until 3PL.PFV tired
"They worked until they got tired."

with event predicates, the behavior of the focus perfective contradicts the assumption that it is a past tense since it gets present perfect interpretations and thus can refer to non–past times, as (61) shows.

(61) Context: For the last weeks, Zainàb had her parents in her house for a visit. You promised to come and see them, but you never got around to doing it. You tell Zainàb that you want to see her parents now, but she tells you that it is not possible:

YANZÙ, **su-kà** tàfi gidā.
now, 3PL-FOC.PFV go home
"Now, they have (already) gone home."

In this example, the adverb *yanzù* is focused, triggering the focus aspect on the pronoun. The adverb marks the present RT relative to which the event of going home is located. Just like in the case of the English present perfect, therefore, the reference time corresponds to the utterance time and what is in the past (or rather completed at the reference time) is the event time. Thus, the temporal interpretation of (61) exactly parallels that of sentences containing a present adverb and general perfective aspect (cf. (27)). If the focus perfective were a past tense marker, by contrast, it should make (61) ungrammatical as the present RT introduced by *yanzù* should clash with the past RT presupposed by the past tense.

A final (suggestive) empirical argument against analyzing the focus perfective as a past tense morpheme is that it is impossible in isolated sentences, i.e. it needs either a relative or a focus environment as in the example seen above, or a narrative context as the following comment made by a consultant illustrates:

(62) **#Su-kà** gyārà mōtàta.
3PL-FOC.PFV repair car.my
Intended: "They repaired my car."
Speaker comment: This sentence cannot stand on its own, it needs a context, for example ...sai sukà gyārà mōtàta... (...and then they repaired my car)

To sum up the empirical arguments against a past tense analysis of the focus perfective: (i) The empirical basis as provided in Abdoulaye (2008) is partly inconclusive. (ii) We find occurrences of the focus perfective form without past time reference with stative (60) and eventive (61) predicates. (iii) The focus perfective is only licit in specific environments; in all other cases we get past time reference without the focus perfective. Thus, the empirical facts at my disposal suggest that a past tense analysis of the focus perfective form is untenable.

One remaining question is why the focus form rather than the general perfective form occurs in narrative contexts and I tentatively propose an

explanation along the following line of reasoning: The definition of a narrative, as Abdoulaye (2008, p.33) explicates, is to report a series of temporally sequenced events. The meaning of the perfective only makes sure that an event is viewed in its totality. For an event to be reported, though, it must already have taken place. Therefore, it is the narrative context in combination with the perfective meaning, not the meaning of the focus perfective marker as such, that forces past time interpretation.

Jaggar (2006) provides an analysis according to which the focus perfective is used in narratives for the same reason for which it is used in focus constructions, i.e. it serves the discourse–pragmatic function of *foregrounding*. More precisely, it is supposed to convey the most communicatively prominent and focal new information in order to push the narrative forward (Jaggar, 2006, p.102). While the general/focus contrast is not going to be investigated further in this work, an analysis along these lines appears to be much more plausible. Given the overall similarity of perfective and simple past meanings, moreover, a unified semantics of the focus perfective is conceptually preferable to an ambiguity approach. Therefore, although the focus perfective TAM might differ from the general perfective in its discourse–related functions, I will not consider it ambiguous between perfective and past meanings, but instead regard it as a single aspectual category.

3.8 Summary

Summarizing so far, the following generalizations can be made about time reference in Hausa:

1. Different temporal interpretations are in principle available for Hausa STSs.
   → Hausa is (at least superficially) tenseless.

2. Perfective and imperfective aspect marking induce default interpretations in accordance with the Bounded Event Constraint, the Deictic Principle and the Simplicity Principle (Smith, 2008).
   → Grammatical aspect influences the temporal location of events.

3. Default interpretations induced by aspect can be overridden by contextual information.
   → Grammatical aspect does not entail tense interpretations. Rather, RT location is pragmatically inferred from it.

4. Future time reference does not always require an overt future marker. Thus, all possible relations between RT and UT are in principle available for finite sentences in Hausa.

→ There is no covert tense morpheme restricting the location of RT to past or present semantically.

5. The relative perfective form does not restrict the reference time to the past.
   → There is no overt past tense in Hausa.

In conclusion, this chapter presented a pragmatic–oriented approach along the lines of Smith & Erbaugh (2005) and Smith et al. (2003, 2007) to account for temporal interpretation in Hausa. The study shows that temporal reference in Hausa arises in conformity with the assumptions of these tenseless approaches and that the hypothesis of a covert tense morpheme in the structural representation of Hausa makes wrong predictions with respect to future time reference. The overall conclusion is that the location of RT with respect to UT is not specified in the grammatical system of Hausa. I proposed that Hausa has a hybrid system in which the reference time is structurally represented as a variable but the assignment of this variable is not semantically restricted by overt or covert tense morphology. Nonetheless, the conclusion that Hausa is tenseless is premature in view of the purported future marker *zā*. In order to answer the question of whether Hausa is a tenseless language, a closer look has to be taken at the morpheme associated with future time reference, which is the purpose of the next chapter.

Chapter 4

Future marking in Hausa

The nature of future time reference is an issue of lively debate in the literature. The reason for this controversy is that reference to future events has been argued to imply modality as well as temporality. A closer look at future time reference in Hausa will reveal another instance of a future–shifting morpheme that does not encode tense as defined in Klein (1994). Instead, it will be shown that the grammatical form primarily associated with future time reference in Hausa expresses a combination of modality and aspectual time–shifting. This proposal is reminiscent of analyses provided for future markers in St'át'imcets (Matthewson 2006, Rullmann et al. 2008) and Paraguayan Guaraní (Tonhauser, 2011a,b). For instance, the future morpheme *kelh* in St'át'imcets is analyzed as a future–shifting modal operator on the basis of the following empirical findings:

1. The modal operator *kelh* future–shifts the event time rather than the reference time. Therefore, relative future "would"–readings should be possible with *zā* if it encodes a similar meaning.

2. The event time shifting is obligatory, thus non–future modal readings are not possible; the occurrence of the future marker always entails relative futurity.

Tonhauser (2011b) provides similar insights on the morpheme *-ta* in Paraguayan Guaraní. The Guaraní future marker resembles *kelh* in that it can express relative futurity from the perspective of past and present reference times, unlike English *will*, which is replaced by the auxiliary *would* in case of past RTs. In addition to its modal meaning component, *-ta* entails relative future shifting.

The aim of this section is to describe the behavior of the Hausa future morpheme and to add this new evidence to the cross–linguistic descriptions and analyses of future markers, in particular those provided in Matthewson (2006) and Tonhauser (2011b). Interestingly, the compositional meaning

of the future in Hausa is particularly transparent since the two meaning components of future interpretation are encoded in two distinct morphemes, namely the modal operator *zā* and a prospective aspect. In previous works on Hausa, however, the morpheme *zā* is commonly analyzed as a future tense marker. Therefore, in order to establish the claim that Hausa is in fact tenseless, section 4.1 will present data to show that the Hausa future form involves modal meanings as well as event time shifting, but, crucially, does not shift the reference time. Section 4.2 illustrates that *zā* is incompatible with perfective and imperfective aspect, an observation which so far had to remain unexplained under the assumption that *zā* encodes tense and the low tone on the wsp encodes subjunctive mood. In section 4.3, I will spell out my proposal and relate it to the results of some previous cross–linguistic studies on future marking.

4.1 The behavior of the Hausa future form

First of all, let me introduce some general properties of the future marker. As aforementioned, *zā* precedes the weak subject pronoun which then always carries a low tone. According to Newman (2000, p.584) and Jaggar (2001, p.194), *zā* can also be separated from the weak subject pronoun by another modal element, for instance by the modal particle *fa* in (1) (from Jaggar 2001, p.194, my glossing).

(1) [zā *fa* mù] dāwō jìbi.
ZĀ FA 1PL.PROSP return the.day.after.tomorrow
"We will indeed return the day after tomorrow."

In the elicitations conducted for this study, virtually every spontaneous translation of English future sentences into Hausa contained the combination of *zā* and the low tone on the subject pronoun, so that it seems sound to consider this the most prominent form for expressing future time reference in the language. Although in the descriptive works on Hausa, *zā* is usually taken to be a future tense, (e.g. Newman 2000; Abdoulaye 2001), Jaggar (2001, p.194) concedes that "the Future, affirmative and negative, is used to express both tense (future time) and modal (attitudinal) distinctions".

The central question to answer in order to clarify whether *zā* is a tense morpheme is whether it is compatible with past RTs, since, according to Klein (1994), a future tense is supposed to locate the reference time of a sentence after its utterance time. If Hausa does not specify tense in its grammar, and the future form has a meaning that is similar to that of *kelh* and *-ta*, the prediction would be that it allows for relative future readings in which the event is located at a time prior to UT. The following example shows that this is indeed the case:

(2) À shèkarà ta 2003 mahàifāna sun yàřda **zā sù**
PREP year PREP 2003 parents.my 3PL.PFV agree ZĀ 3PL.PROSP
tàfi Amerika à shèkaràř gàba.
go Amerika PREP year in.front
"In 2003 my parents agreed that they would go to the USA the year after."

In this sentence, a past RT is introduced by the sentence–initial adverb. The clause marked by *zā* refers to a time interval after RT but before UT. Thus, *zā* is not a tense element in the definition of Klein (1994) as it does not define a precedence relation between UT and RT.

At the same time, the diagnosis that future shifting of the event time is entailed by the future markers of St'át'imcets and Paraguayan Guaraní seems to be valid for Hausa as well. Just like St'át'imcets *kelh* and Guaraní *–ta*, but unlike English will, the Hausa future form does not allow non–future modal readings as the examples below illustrate for epistemic possibility (3) and epistemic necessity (4):

(3) Context question: Why are Ibrahim and Bello not at home?
#Wataƙīlà **zā sù** wurin aikì yanzù.
Perhaps ZĀ 3PL.PROSP PREP work now
Intended: "They might be at work right now."
(no present reading possible)

(4) Context question: I have just seen Bello in his office. I was told he is sick, so why is he at work?
#Lallè **zâi** yi lāfiyà yâu.
Necessarily ZĀ.3SG.M.PROSP do health today
Intended: "He must be well (lit. do health) today."
(no present readings possible)

As will be shown more clearly in what follows, the behavior of the Hausa future matches that of *–ta* in Paraguayan Guaraní as described in Tonhauser (2011b), in that it encodes the modal meanings of intention and prediction. Tonhauser (2011b, p.213) defines the relevant modal meanings as follows:

> Utterances with the modal meaning of intention convey an agent's mental state of intending to make a proposition be true at a time in the future; the intender is committed to do what she can to make the proposition true [...] with predictions the speaker asserts that the proposition will be true at a time in the future: the speaker expresses that, given her epistemic state, she is committed to the truth of the proposition at a future time.

As long as one of these meanings is involved, the future form is compatible with present or past adverbials. The sentence in (5) expresses a person's

intention to start washing the dishes. The intention itself is located at the present RT given by the adverb *yanzu*. The dish–washing event is located at a time after this RT.

(5) **Zā tà** wankè kwānukà̀ yanzu.
zĀ 3SG.F.PROSP wash dishes now
"She will wash the dishes now."

Generally, in futurate contexts expressing a present intention to initiate an action in the near future (cf. Copley 2009), the future is also used in spontaneous translations of English present progressive clauses.

(6) English sentence: "Àsabe is leaving for school now."
Translation: Àsabe **zā tà** tàfi makaf̌antā yanzù.
Asabe zĀ 3SG.F.PROSP go school now

Contrary to that, epistemic readings like the one intended in (3) and (4) involve a supposition about a state at a present time and are thus not expressible with the future form. Moreover, out of the blue, the future is incompatible with past adverbs:

(7) ***Zā tà** wankè kwānukà̀ jiyà.
zĀ 3SG.F.PROSP wash dishes yesterday
Intended: "She would wash the dishes yesterday."
Speaker comment: "*zā* clashes with *jiyà*"

However, if the context suggests that a prediction or an intention is expressed, *zā* readily co–occurs with past time adverbs. The following sentence was given as a spontaneous translation:

(8) Context: It is Monday and you remember the past weekend. You had planned a trip for Sunday, but the weather forecast had predicted rain and it was very cloudy and dark outside. So you canceled your trip and stayed at home. In the end, not a drop of rain came down. You say:
Jiyà **zā à** yi ruwā, àmmā bà à yi ba.
Yesterday zĀ 4.PROSP do rain but NEG.PFV do NEG
"Yesterday, it was going to rain, but then it didn't."

This sentence illustrates that (just like the Guaraní future marker *-ta*) past predictions made with utterances containing *zā* can get counterfactual readings if they turn out to be wrong. Past counterfactual sentences seem to be possible with *zā* also if intention is expressed:

(9) Ìdan su-kà tàmbàyē ni, **zân** yàf̌da.
if 3PL-FOC.PFV ask me zĀ.1SG.PROSP agree

"If they had asked me, I would have agreed."

These examples show that the future form does not shift the reference time. The impression is that the primary meaning of the *zā*–form is modal. I will argue below that the morphological form of the weak subject pronoun (i.e. the low tone) which obligatorily comes with *zā* encodes future shifting of the event time while the reference time, as argued in section 3.5, is semantically unrestricted.

4.2 Complementary distribution with aspect

An interesting puzzle is that the alleged future marker *zā* seems to be incompatible with perfective and imperfective aspect morphology. As already shown, the morpheme *zā* is not suffixed to the weak subject pronoun like the other TAM markers, but it precedes the wsp which is then always marked for the so–called "subjunctive" form, i.e. a low tone. Any other TAM marking on the wsp combined with *zā* results in ungrammaticality. It is important to note that this kind of incompatibility has not been attested in St'át'imcets or Guaraní, an observation which suggests that the meaning of the morpheme *zā* is not entirely parallel to that of *kelh* or *-ta*. To give an example, the question is why constructions like the following are ungrammatical:

(10) a. ***Zā ta-nà*** wàsā gòbe.
ZĀ 3SG.F-IPFV play tomorrow
Intended: "She will be playing tomorrow."

b. ***Zā tā*** yi wàsā gòbe.
ZĀ 3SG.F.PFV do play tomorrow
Intended: "She will have played tomorrow."

In order to explain these incompatibilities, the following path will be taken: *zā* is forced to co–occur with the "subjunctive" because the latter is the only TAM marker that is semantically compatible with the semantics encoded by *zā*. This proposal is inspired by Schuh (2003)'s unified analysis of the subjunctive in Hausa. Schuh describes the interpretation of the subjunctive as "dependent subsequent inception". Thus, it does not in itself express mood. Instead, the subjunctive signals that an event will have its inception subsequent to the moment of speaking or to an event expressed in a superordinate clause. The temporal or modal interpretation of the event represented by the subjunctive is dependent on that of the superordinate clause or operator (Schuh, 2003, p.20). The author illustrates this claim with sentences such as the following:

(11) Dōlè sù gudù (Schuh 2003, p.20, my glossing)
must 3PL.PROSP run
"They must run."

In this sentence, the superordinate operator *dōlè* introduces modal necessity and requires a subjunctive complement. The event described must be instantiated after RT. I will propose below that this semantic dependence on a superordinate operator can be formalized in terms of an open event variable, which differentiates the subjunctive from all other aspects and makes it the only suitable TAM marker in clauses containing *zā*. The syntactic combination of the modal marker *zā* and the "subjunctive" is thus analyzed as introducing the future–oriented modal meanings of intention and prediction. The subjunctive itself does not introduce any modal force but only "subsequent inception" and is therefore most appropriately analyzed as a prospective aspect as it induces the temporal shifting that comes with the *zā* + *prosp* future form.[1]

4.3 Analysis of the Hausa future form (*zā* + *prosp*)

In this section, the semantics of future time reference in Hausa are spelled out. The analysis will partly lean on the previous works by Matthewson (2006) and Tonhauser (2011b) and will ultimately enable a comparison of Hausa *zā* + *prosp* and the future–shifting elements of St'át'imcets and Guaraní, arguing that the modal and aspectual meaning components encoded conjointly in *kelh* and *-ta* are realized by separate morphemes in the Hausa future marker. I presuppose the modality framework of Kratzer (1981, 1991, 2012a) which was introduced in chapter 2, assuming that modal expressions are operators quantifying over a contextually determined modal base, i.e. a conversational background consisting of a set of accessible possible worlds that can in addition be restricted by another conversational background serving as an ordering source. In my analysis of the future marker of Hausa, I will adopt the recent insight of Kratzer (2012a) that "We can now hypothesize that both root and epistemic modals have realistic modal bases. If all modals are either root or epistemic, it follows that all modals have realistic modal bases. Potentially non–realistic conversational backgrounds must then function as ordering sources" (Kratzer, 2012a, p.55). Thus, the relevant meanings of intention and prediction that I assume for the Hausa future form are only distinguished by their specific ordering sources, namely bouletic and inertial orderings in the sense of Copley (2009). Thus, if the speaker is confident that the agent of the sentence or some other contextually defined animate actor is able to bring about the truth of a proposition in the future and is committed to doing so, we are dealing with a bouletic ordering source and the resulting meaning will be

[1] Schuh (2003) does not explicitly analyze the subjunctive as a prospective aspect. However, his characterization of the interpretation of the subjunctive corresponds exactly to the meaning of prospective aspectuality, e.g.: "the event expressed by the Subjunctive has its inception subsequent to a time implied by context" (Schuh, 2003, p.26).

intention. If, on the other hand, the speaker is confident that certain contingent facts about the world entail the truth of a proposition, the ordering will be inertial and the modal meaning prediction. Since the interpretations of *zā* + *prosp* seem to correspond to those of English *will* and Guaraní *–ta*, I follow the analyses of these future markers in assuming that their meaning involves universal quantification over possible worlds (see e.g. Enç 1996, Copley 2009 for English, Rullmann et al. 2008 for St'át'imcets, Tonhauser 2011b for Guaraní). In Hausa, it is the free morpheme *zā* that encodes this modal meaning component which can be illustrated by the following examples:

In (12-a), we see the future form in its usual function, i.e. making a prediction about an event in the future. In (12-b), the explicit expression of uncertainty in the preceding clause is meant to enforce a possibility reading which cannot be expressed with the universally quantifying future form. Therefore, the sentence is ungrammatical. To express a *might*–reading, an additional modal element must be inserted (12-c).

(12) Context question: It's Sunday, so is Hàwwa going to have anything special for lunch?

a. Ta-kàn dafà wākē nē, àmmā à yâu **zā tà**
3SG.F-HAB cook beans PRT but today ZĀ 3SG.F.PROSP
dafà shinkāfā
cook rice
"She usually cooks beans, but today she will cook rice."

b. *Bàn sanì ba, àmmā à yâu **zā tà** dafà
NEG.1SG.PFV know NEG but today ZĀ 3SG.F.PROSP cook
shinkāfā
rice
Intended: "I don't know, but she might cook rice."

c. Bàn sanì ba, àmmā mai yìyuwā à yâu **zā**
NEG.1SG.PFV know NEG but perhaps today ZĀ
tà dafà shinkāfā
3SG.F.PROSP cook rice
"I don't know, but she might cook rice."

The reason why the morpheme *zā* has traditionally been referred to as a future tense is that, in combination with the "subjunctive" TAM marker, it is the most common means to express future temporality in Hausa. The fact that *zā* cannot combine with any other aspect was observed by many scholars working on Hausa, but so far it remained unexplained. I would like to argue that the subjunctive makes a crucial semantic contribution to the meaning of the "future" form, namely that it adds a future shift of ET relative to RT to the modal meaning of *zā*. Consequently, these meanings need to be factored out. Following Schuh (2003), I will assume that the subjunc-

tive expresses "dependent subsequent inception". More precisely, it shifts the running time of some possible event (τ(e)) to the future of a contextually available reference time t and is, therefore, reanalyzed as a prospective aspect. Crucially for the analysis, this prospective aspect is deficient. Recall that, according to Kratzer (1998), aspect involves existential quantification over events. The Hausa prospective differs from the other aspects in that it has an open event variable. This open variable is reflected in the empirical fact that the temporal and modal interpretation of the event expressed by the subjunctive depends on that of the superordinate clause or operator, as emphasized in Schuh (2003, p.20). The lexical entry for the prospective is given in (13).

(13) $[\![\text{PROSP}]\!]^{g,c} = \lambda P_{\langle l,\langle s,t\rangle\rangle}.\lambda e.\lambda t.\lambda w.\ [P(e)(w)\ \&\ \tau(e) > t]$

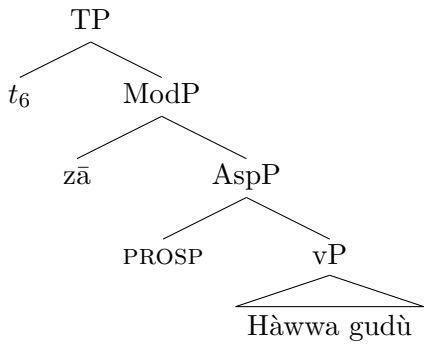
Existential quantification over the event variable is introduced by the modal operator *zā*. According to the lexical entry for *zā* in (14), it denotes a universal quantifier over a presupposed realistic modal base which can be restricted by a bouletic or inertial ordering source.

(14) *Zā* presupposes a realistic modal base and an inertial or bouletic ordering source. If defined:
$[\![\text{zā}]\!]^{g,c} = \lambda P_{\langle l,\langle i,\langle s,t\rangle\rangle\rangle}.\lambda t.\lambda w.\forall w'[w' \in \text{BEST}_{O_{(w),(t)}}(\text{MB}(w)(t)) \rightarrow \exists e\ [P(e)(t)(w')]]$

For reasons to be discussed immediately below, *zā* takes as its argument an aspect phrase headed by the prospective. Therefore it has to be located higher in the structure where it introduces existential closure of the open event variable. For illustration, the LF structure of sentence (15) is given in (16) and its denotation is calculated in (17). As discussed in chapter 3, I assume that some syntactic slot is providing an unrestricted time variable t which is assigned its value by the assignment function g. Since Hausa does not encode any semantic restriction on the relation between RT and UT (i.e. no tense in the sense of Klein 1994), g can in principle assign past, present or future RTs to the variable depending on context.

(15) Hàwwa zā tà gudù.
Hawwa ZĀ 3SG.F.PROSP run
"Hàwwa will run."

(16)



(17) a. $[\![\text{vP}]\!]^{g,c} = \lambda\text{e}.\lambda\text{w}.[\text{run(e)(w)} \;\&\; \text{agent(e)(w)} = \text{Hàwwa}]$

b. $[\![\text{AspP}]\!]^{g,c} = [\![\text{PROSP}]\!]^{g,c}\ ([\![\text{vP}]\!]^{g,c})$
$= \lambda\text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda\text{e}.\lambda\text{t}.\lambda\text{w}.[\text{P(e)(w)} \;\&\; \tau\text{(e)} > \text{t}]\ (\lambda\text{e}.\lambda\text{w}.\ [\text{run(e)(w)} \;\&\; \text{agent(e)(w)} = \text{Hàwwa}])$
$= \lambda\text{e}.\lambda\text{t}.\lambda\text{w}.[\text{run(e)(w)} \;\&\; \text{agent(e)(w)} = \text{Hàwwa} \;\&\; \tau\text{(e)} > \text{t}]$

c. $[\![\text{ModP}]\!]^{g,c} = [\![\text{zā}]\!]^{g,c}\ ([\![\text{AspP}]\!]^{g,c})$
$= \lambda\text{P}_{\langle l,\langle i,\langle s,t\rangle\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\forall\text{w'}[\text{w'} \in \text{BEST}_{O_{(w),(t)}}\ (\text{MB(w)(t)}) \rightarrow \exists\text{e}\ [\text{P(e)(t)(w')}]]\ (\lambda\text{e}.\lambda\text{t}.\lambda\text{w}.[\text{run(e)(w)} \;\&\; \text{agent(e)(w)} = \text{Hàwwa} \;\&\; \tau\text{(e)} > \text{t}])$
$= \lambda\text{t}.\lambda\text{w}.\forall\text{w'}[\text{w'} \in \text{BEST}_{O_{(w),(t)}}\ (\text{MB(w)(t)}) \rightarrow \exists\text{e}\ [\text{run(e)(w')} \;\&\; \text{agent(e)(w')} = \text{Hàwwa} \;\&\; \tau\text{(e)} > \text{t}]]$

d. $[\![\text{TP}]\!]^{g,c} = \lambda\text{w}.\forall\text{w'}[\text{w'} \in \text{BEST}_{O_{(w),(g(6))}}\ (\text{MB(w)(g(6))}) \rightarrow \exists\text{e}\ [\text{run(e)(w')} \;\&\; \text{agent(e)(w')} = \text{Hàwwa} \;\&\; \tau\text{(e)} > \text{g(6)}]]$
$\approx$ In all worlds w' that are accessible from the ordering O on the modal base MB at the contextually provided reference time g(6) there is an event of Hàwwa running and the time of this event is subsequent to g(6).

Now, the incompatibility of *zā* with any other TAM than the prospective finds an explanation. Following Kratzer (1998), I assume that aspect markers are operators mapping properties of events onto properties of times, thereby quantifying existentially over the event variable. As a result, aspect phrases with perfective or imperfective heads denote properties of times, i.e. they are of the semantic type $\langle i, \langle s, t\rangle\rangle$. *Zā*, however, requires an argument of type $\langle l, \langle i, \langle s, t\rangle\rangle\rangle$ (i.e. a relation between events and times), which is the semantic type of an aspect phrase headed by the prospective. The incompatibility of *zā* with "Kratzer–type" aspect markers thus reduces to an instance of type mismatch since *zā* can only combine with a "deficient" aspect phrase that provides an open event variable.

4.4 Cross–linguistic comparison

This section discusses how the formal expression of future–oriented readings in Hausa relates to the formal analyses of future markers provided

for St'át'imcets and Guaraní in particular. A more general cross–linguistic overview including data from Medumba will follow in the last chapter of this thesis, in section 8.3.

Tonhauser (2011b) and Matthewson (2006) analyze the morphemes *-ta* (Paraguayan Guaraní) and *kelh* (St'át'imcets) as future–oriented modals, i.e. grammatical markers encoding a modal presupposition and, given that this presupposition is fulfilled, introducing an event time subsequent to the reference time at which the proposition in question is true. Tonhauser proposes the following lexical entry for *-ta*:

(18) *–ta* presupposes an epistemic modal base with a stereotypical ordering source or a circumstantial modal base with an ordering source that specifies the agent's intentions. If defined:
-ta : S/S_{rad} : $[[\lambda P_{\langle\omega,\langle\iota,\tau\rangle\rangle}$ [$\forall$w' $\in$ bet(MB,OS, $\langle$w*,rt$\rangle$) $\rightarrow$ $\exists$t' (rt $<$ t' & P(w')(t'))]]

In Rullmann et al. (2008), the semantics of the future marker *kelh* as a combination of modality and relative future shifting (described informally in Matthewson 2006) is formalized in a similar way: *kelh* presupposes a circumstantial modal base and introduces universal quantification over possible worlds as well as a time subsequent to the local reference time at which the proposition it applies to is true. In addition to that, the semantics of *kelh* involve a choice function f which picks out a subset of possible worlds in the modal base. Thus the authors formalize the variability of quantificational force of modal elements in St'át'imcets. If the choice function selects the whole modal base (i.e. if it denotes the identity function), the meaning of *kelh* corresponds to that of *will* in English. If the choice function picks out a proper subset of the modal base, then the meaning of *kelh* corresponds to English future–oriented *might*.

(19) Semantics of *kelh* (future): (Rullmann et al., 2008, p.341)
$[\![\text{kelh}]\!]^{c,w,t}$ is only defined if c provides a circumstantial modal base B.
$[\![\text{kelh}]\!]^{c,w,t} = \lambda f_{\langle st,st\rangle}.\lambda p_{\langle s,\langle i,t\rangle\rangle}.\forall$w'[w'$\in$ f(B(w)(t)) $\rightarrow$ $\exists$t'[t $<$ t' & p(w')(t')]]

As argued in the preceding section, the meaning components of universal modality and event time shifting encoded in the future markers of St'át'imcets and Paraguayan Guaraní are involved in future marking in Hausa as well. What is more, these two meaning components are encoded by separate formal markers. The shifting of ET with respect to RT is contributed by the "subjunctive" in Hausa. It thus encodes prospective aspectuality or what Schuh (2003) calls "dependent subsequent inception". Matthewson (2006) shows that *kelh*, like other modals in St'át'imcets, differs from modal elements in English in that it lexically specifies the con-

versational background while leaving quantificational force up to context. Accordingly, *kelh* is compatible with circumstantial, but not with epistemic modal bases. Here, Hausa *zā* patterns with English *will* and Guaraní *–ta* in lexically specifying its quantificational force but not its conversational background. Moreover, future marking in Hausa is incompatible with imperfective and perfective aspect, a restriction which is unattested in St'át'imcets and Guaraní and which is due to the fact that the time shifting in Hausa future marking is contributed by a deficient prospective aspect which maps properties of events onto relations of events and times. In this way, the phrase headed by the prospective can serve as an argument of the modal operator *zā*, in contrast to other aspect phrases which denote properties of times.

It has to be emphasized that the combination of the meaning components contributed by *zā* and the prospective are commensurate to the semantics of *-ta* as suggested by Tonhauser (2011b) and thus provide further cross–linguistic evidence supporting analyses of future markers in terms of a combination of modal and aspectual meaning components. Moreover, there is a very interesting parallel between the future marking strategies in Hausa and Gitksan. Matthewson (2012, 2013) reports that Gitksan has a prospective aspect morpheme *dim* which is responsible for future time reference in general and the future–orientation of modals in particular. Interestingly, similar ideas were developed by Kratzer (2012b) who proposes a covert prospective aspect for future–oriented modals in English. Above, I argued that the future meanings of intention and prediction in Hausa involve such a prospective aspect morpheme as well. Matthewson (2012) proposes a cross–linguistic typology distinguishing between languages in which prospective aspect is realized overtly (Blackfoot, Gitksan) or covertly (English, St'át'imcets) and optionally (English, Blackfoot) or obligatorily (Gitksan, St'át'imcets). In this typology, Hausa arguably patterns with Blackfoot and Gitksan in realizing prospective aspect overtly in a low tone on the subject pronoun. Very preliminary evidence suggests that prospective aspect is obligatory on circumstantial modals in Hausa as well. If the analysis above is on the right track, *zā* is a modal operator that always requires prospective aspect. Another operator of this kind might be *sai* which, in contrast to *zā*, is specified for deontic ordering sources and hence seems to be the equivalent of deontic *must* or *should* in English.[2]

(20) Sai (*zā) sù tàfi.
SAI ZĀ sù tàfi.
"They must/should go."

[2] *Sai* differs from *zā* in that it is also compatible with other aspects. However, it only gets modal interpretations in combination with the prospective. Otherwise, *sai* obtains exclusive meanings like "only" or "except for" (Grubic & Mucha, 2012, 2013). At any rate, more research is needed to explore modality in Hausa.

4.5 Some open issues

In the proposed analysis, *zā* existentially quantifies over the open event variable of the prospective aspect. This accounts for the observation that *zā* always co–occurs with this form. The reverse, however, does not hold, i.e. the prospective aspect can occur without *zā*. As seen in example (20) above, other circumstantial modals like *sai* can scope over the prospective and specify its interpretation. Moreover, the prospective can occur without any overt modal operator. In this case, it is usually interpreted as a command, as illustrated in (21) and (22).

(21) Kà biyā!
2SG.M.PROSP pay
"Pay!"

(22) Sù tàfi!
3PL.PROSP go
"Let them go!"

I would like to propose that with occurrences of bare prospective, there is a modal imperative operator OP_{Imp} as proposed in Schwager (2011) and Kaufmann (2012) which scopes over the prospective aspect, giving the bare prospective its imperative interpretation. I will assume that this operator has a lexical entry similar to that of *zā*, i.e. it expresses modal necessity and existential quantification over events but with different restrictions on the conversational background. More precisely, "it is required that the addressee be an authority on the relevant sort of necessity" (Schwager, 2011, p.56). The further requirement of OP_{Imp}, namely that the time of the commanded event must not be prior to the reference time, is guaranteed by the meaning of the prospective.

Another interesting issue is that the proposed analysis of the future in Hausa, in combination with the claim from chapter 3 that reference times can in principle be located in the past, present or future depending on context, predicts an additional reading for sentences with *zā* + *prosp*. In particular, sentences with *zā* + *prosp* should allow for temporal interpretations in which the speaker locates the event at a future reference time, which is prior to the predicted or intended eventuality (i.e. UT < RT < ET). That is, in a discourse like (23), the speaker would be in the pre–state of leaving. For such a minimal discourse, this prediction is not borne out. Thus, the answer in (23) is interpreted as meaning that the speaker will go to school at 3pm, not that she is in the pre–state at 3pm and will actually leave later.

(23) Context question: What will you do at 3pm?
Zân tàfi makaɗantā
ZĀ.1SG.PROSP go school

"I will go to school."
Not: "I will be (in the pre–state of) going to school."

I do not believe, however, that this refutes the above analysis of the future marker. Rather, interpretations of this kind are unavailable due to reasons of plausibility. Future statements are predictions about future events that are most naturally based on evidence the speaker has at the time of the utterance. In example (23), the modal base on which the intention of going to school is based is the set of worlds compatible with the present circumstances. As the relevant circumstances in the future are unknown to the speaker and since the modal base of *zā* is relativized to the local evaluation time, it is very seldom that *zā* can be combined with future RTs so as to get the double future shift intended here. We can observe, however, that it is possible in a context setting which suggests that the speaker has the relevant information to relativize the modal meaning of *zā* to a future modal base.

(24) Context: Hàwwa would like to marry Bello, but she is very uncertain because he has not proposed to her, yet. So she is going to a fortune teller to ask her for advice. The fortune teller agrees that Bello is very changeable. She says:

Yâu, sam bà **zâi** aurē kì ba.
Today not.at.all NEG ZĀ.3SG.M.PROSP marry 2SG.F.DO NEG.
Gȍbe **zâi** àurē kì a
Tomorrow ZĀ.3SG.M.PROSP marry 2SG.F.DO PREP
wàshègàrī.
the.following.day.
"Today, he will not (be going to) marry you at all. Tomorrow, he will (be going to) marry you right the next day."

In (24), the speaker is a fortune teller and therefore (supposedly) has evidence about future worlds that is not normally available to speakers. Based on the special evidence she has about the future, she can make predictions about events subsequent to the future RT restricted by tomorrow. Thus, prospective aspectuality is in principle compatible with future RTs, but non-future RTs are preferred as modal evaluation times.

4.6 A note on the *potential*

As mentioned above, there is another form that can be employed to convey future meaning, namely the potential TAM which is marked by a falling tone on the weak subject pronoun. Abdoulaye (2001) assigns the label "old future" to it and observes that all its possible meanings are also covered by the *zā* + *prosp* future form with the effect that the potential is not actually used

in spoken language anymore. Also in my elicitations, the potential was not volunteered in translations and speakers show some variation as to whether they accept the potential at all. Those who accept it confirm the description provided by Jaggar (2001, p.201) that the potential "is less assertive than the Future." Thus, the form might be usable for some speakers when the uncertainty of a prediction is to be emphasized. Since, however, the potential does not seem to be used naturally anymore, the judgments of my consultants are too unstable and inconsistent for me to make sufficiently reliable claims about its meaning. Based on the available judgments, though, I dare the following conjecture: Since the potential is usually translated as *might*, it seems to introduce a different modal strength than *zā*, namely existential quantification over possible worlds. It seems to differ from the *zā* + *prosp* future form in that it does not entail futurity as shown in example (25).[3]

(25) Context: You know that it has been raining all day and the water level is exceptionally high. So you suspect that right now, the river is not passable.

Kòɡîn bà **yâ** ɓ̀ètàru ba
river.DEF NEG 3SG.M.POT pass NEG
"The river might not be passable." (present reading ok)

This difference is expected if the obligatory time shift that comes with the future form is encoded in the prospective aspect. The potential occurs in the same structural position as the aspect markers of Hausa and its interpretation shows no dependency on superordinate operators. Furthermore, it is in complementary distribution with *zā*. Therefore, I speculate that it maps a property of events to a property of times like all other aspect markers, though it is special in adding a modal meaning component. The exact semantics of the form, however, I have to leave for further research.

4.7 Summary

Matthewson (2006) and Tonhauser (2011b) propose that the future markers in the languages under their concern are operators combining modal quantification with relative future shifting of ET. It was shown that the morphological form mainly associated with future interpretation in Hausa encodes a meaning that is similar to that of the future markers of St'át'imcets and Paraguayan Guaraní, i.e. it involves a modal and an aspectual meaning component resulting in the future–oriented interpretations of intention and prediction. Interestingly, these two meaning parts are realized in two separate morphemes in Hausa. The so–called "future–marker" *zā* is analyzed

[3]The sentence is taken from Newman (2000, p.587). However, the appropriateness of the utterance in the given context was tested with a native speaker.

as a modal operator expressing universal quantification over possible worlds as well as existential quantification over events. A prospective aspect with which *zā* obligatorily co–occurs contributes the event time shifting. Crucially, the temporal meaning component of *zā* + *prosp* does not specify or restrict the relation between RT and UT, leading to the ultimate conclusion that Hausa does not encode tense.

Chapter 5

Past interpretation and *graded tense* in Medumba

5.1 Introduction

As mentioned before, in the past decade the debate on the semantics of tense and aspect has benefited greatly from a number of studies on the temporality of under–studied languages, e.g. Bittner (2005, 2011), Bohnemeyer (2002, 2009), Lin (2003, 2006, 2010), Smith & Erbaugh (2005), Smith et al. (2003, 2007), Matthewson (2006), Tonhauser (2011a), Lee & Tonhauser (2010). Most of these studies, including the first part of this thesis that deals with Hausa, are concerned with how temporal interpretation proceeds in languages that differ from the familiar Indo–European tense/aspect systems in not having overt morphological tense marking. Studies dealing with more fine–grained *graded tense* systems are more sparse but intriguing in their contributions to the overall cross–linguistic picture (see Hayashi 2011, Cable 2013, Bochnak & Klecha to appear).

This second part of the thesis is concerned with Medumba, a Grassfields Bantu language that at first sight looks like a textbook example of a graded tense language, i.e. it has grammatical markers that not only indicate past or future, but also temporal remoteness. What distinguishes Medumba from other Bantu languages like Gĩkũyũ (Cable, 2013) and Luganda (Bochnak & Klecha, to appear), however, is that in Medumba the temporal remoteness morphemes are optional in the sense that not every finite clause needs temporal marking in order to be grammatical. Focusing on past interpretations, the present chapter aims at a formal semantic analysis of the temporal remoteness markers in Medumba.

The chapter is structured as follows: Section 5.2 introduces some basic properties of the Medumba language and section 5.3 gives a short and informal overview of two existing descriptions of the Medumba past markers. In section 5.4, the temporal domains covered by the respective morphemes are

specified. Section 5.5 differentiates between the temporal markers and genuine temporal adverbials. Section 5.6 provides a summary of Cable (2013), the first detailed formal analysis of graded temporal markers in Bantu, which serves as a point of comparison throughout the study of the Medumba temporal markers. Against this background, section 5.7 presents the data and generalizations that motivate the proposed analysis of the temporal morphemes provided in 5.8. Section 5.9 elaborates on the proposal by defending it against an alternative presuppositional analysis. In section 5.10 some supplemental remarks on the syntactic ordering restrictions of the temporal markers are added. A summary is given in section 5.11.

5.2 The Medumba language

Medumba (in the Medumba orthography: mədʉ́mbà ≈ "I say that") belongs to the Grassfields Bantu branch of the Niger Congo language family. It is spoken by approximately 210,000 people from the francophone Western Region of Cameroon, mainly in the towns and villages of Bangangté, Bahoc, Bamena, Bangoulap, Bazou, Tonga, Badounga, and Bakong (Kouankem, 2012, p.20). The language is also sometimes called "Bamileke–Medumba" with reference to the Bamileke people by whom it is spoken or as "Bangangté", referring to the geographic centre of the Medumba speaking community in Cameroon.

To the best of my knowledge, literature on the Medumba language in general and its temporal system in particular is rather sparse. Beside some typological work on temporal properties of the Bantu languages in general (Nurse, 2003, 2008) or on the systems of closely related languages (Hyman, 1980), I have access to two PhD dissertations dealing with Medumba: Nganmou (1991), which is explicitly concerned with the tense/aspect system of the language, and the more recent work of Kouankem (2012), which only treats the tense system as a side issue, but gives very helpful insights into the general system. These works will be my major sources for the general description of Medumba in this chapter and the starting point of my own theoretical investigations. Most theoretically oriented work I am aware of mainly concerns the morpho–phonology and the interesting tone system of the language (e.g. Voorhoeve 1965, Danis et al. 2012, Franich et al. 2012). The following overview will necessarily be somewhat incomplete and cursory in the sense that it focuses on just some properties of the language that are of general interest or play an indirect part in the context of temporality that I am concerned with.

Medumba has a relatively complex tone system. A typical feature of Grassfields Bantu according to Nurse (2008) that can also be found in Medumba is the loss of final vowels leading to CVC syllables and, therefore, a widespread presence of floating tones. Kouankem (2012, p.36), citing

Tondji (1979), argues for five basic tones in Medumba (high ´, mid ¯, low `, falling ˆ and rising ˇ), but she adds that the existence of a basic falling tone is controversial.[1]

The basic word order of all Grassfields languages including Medumba is SVO, hence the syntax is predominantly head–initial, e.g. possessive and demonstrative adjectives, genitive phrases and relative clauses all follow their head nouns (Watters, 2003, p.248). Focus in Medumba can be marked morphologically by the focus marker *á* which occurs before the focused element, but also by reduplication (Kouankem, 2012, p.62). Most importantly for the following study, tense/aspect is marked by preverbal morphemes as exemplified in (1) for a simple (near) past sentence.

(1) Louise fə nɛ́n ntɑ́n
Lousie PST go market
"Louise went to the market (recently)."

It will be crucial for what follows that Medumba allows for sentences without overt temporal or aspectual marking. In these cases, eventive predicates are generally interpreted in the perfect(ive) or past as illustrated in (2). (Cognitive) state predicates, by contrast, are interpreted in the present as shown in (3).

(2) a. Bú ná ŋkwún
they cook beans
"They cooked beans."
b. Bú zí
they sleep
"They slept."
c. Bú nɛ́n ŋwá'ni
they go school
"They went to school."

(3) Marie bɔ̌ Patrick
Marie hate Patrick
"Marie hates Patrick."

Negation is expressed with the preverbal morpheme *kə̀*. *Ká* is the morpheme used for imperfective marking, but the two are distinguished by tone (low tone on the negation marker and high tone on the imperfective marker). Canonically, the negation particle is located above aspect, but below the other temporal morphemes as shown in (4).

(4) a. Patrick fə kə ká náb zə mútwa
Patrick PST NEG IPFV repair his car

[1] As stated in chapter 1, the low tone is not marked in Medumba transcriptions, in contrast with Hausa orthography.

"Patrick was not repairing his car (recently)."

After this very brief general introduction, the rest of this chapter deals exclusively with the past markers and how they are analyzed most appropriately. First of all, the paradigm of Medumba past markers is presented as described in the available literature.

5.3 Previous descriptions of the past morphemes

Existing descriptions of the temporal system of Medumba (Nganmou 1991, Kouankem 2012) state that Medumba has a graded system with up to eight different past tense markers. The two accounts that are available, however, differ greatly in the exact meaning they assign to the respective morphemes. In fact, they do not even agree on which morphemes exist. In the following, I list the purported past markers of Medumba and their respective interpretations according to Nganmou (1991) and Kouankem (2012).[2] A summary of these two accounts of the alleged past tense markers in Medumba is given in Table 5.1 below.[3]

(5) Louise ∅ nén ntɑn
Louise go market
Nganmou (1991): -
Kouankem (2012): "Louise has (just) gone to the market."

(6) Louise **yɔ̄g** nén ntɑn
Louise YɔG go market
Nganmou (1991): -
Kouankem (2012): "Louise has gone to the market (during the day)."

(7) Louise **cág** nén ntɑn
Louise CAG go market
Nganmou (1991): "Louise went to the market (one day later than expected)."
Kouankem (2012): "Louise went to the market (this morning)."

(8) Louise **zí** nén ntɑn
Louise ZI go market
Nganmou (1991): "Louise went to the market (a few days later than expected)
Kouankem (2012): "Louise went to the market (during the night)."

(9) Louise **fə** nén ntɑn
Louise Fə go market

[2]The examples are mine, but the translations reflect the meanings assigned to the past morphemes by the respective authors.

[3]The table is adapted from Zimmermann (2013).

Nganmou (1991): “Louise went to the market (today).”
Kouankem (2012): “Louise went to the market (yesterday).”

(10) Louise **lo** nɛ́n ntɑ̀n
Louise LO go market
Nganmou (1991): “Louise went to the market (yesterday).”
Kouankem (2012): -

(11) Louise **lú** nɛ́n ntɑ̀n
Louise LU go market
Nganmou (1991): -
Kouankem (2012): “Louise went to the market (last week).”

(12) Louise **ná’** nɛ́n ntɑ̀n
Louise NA’ go market
Nganmou (1991): “Louise went to the market (at least 2 days ago)”
Kouankem (2012): “Louise went to the market (≈ last month).”

(13) Louise **lû** nɛ́n ntɑ̀n
Louise LU go market
Nganmou (1991): -
Kouankem (2012): “Louise went to the market (a long time ago).”

Morpheme	Kouankem 2012	Nganmou 1991
∅	immediate past	—
yɔ̄g	today	—
cág	this morning	x + 1 day (rel.)
zí	last night	x + a few days (rel.)
fə	yesterday	today
lò	—	yesterday
lú	last week	—
ná’	last month	≥ 2 days ago
lû	remote	—

Table 5.1: Previous accounts of past markers in Medumba

Except for the morpheme *lò* listed by Nganmou (1991), which was neither produced nor recognized by any of my consultants and hence will be ignored in what follows, all the markers listed above could be elicited and analyzed, although two of them will receive special attention for reasons to be clarified below. The newly obtained fieldwork data presented in the following will motivate the claim that the temporal markers listed above form two groups that differ in their interpretation and in their syntactic distribu-

tion. To be more precise, the proposal is that the morphemes *yɔ̄g*, *cág* and *zí* should be grouped together as *time of day markers* while the morphemes *fə, lú, ná' and lû* are *past remoteness markers*. The main goal of the next sections is to motivate and develop a formal analysis of the morphemes in the past paradigm of Medumba. Ultimately, I will argue that all of the temporal markers denote existential quantification over time intervals and map properties of times onto properties of times. The temporal remoteness morphemes in particular are always interpreted deictically in matrix clauses[4] and hence encode tense in the sense of Kusumoto (1999, 2005) and von Stechow (2009).

5.4 The temporal domains of the past morphemes

This section provides an informal overview of the temporal domains of the past morphemes, which is useful since the results of my elicitations partly differ from the generalizations made in the previous literature.

First of all, it is crucial to note certain asymmetries between those morphemes that seem to refer to a time interval within the day on the one hand, and those that seem to actually denote past remoteness, on the other. I will refer to the elements of the first class, i.e. *zí*, *cág* and *yɔ̄g*, as *time of day markers* and gloss them as TOD. The second class includes the near past morphemes *lú* and *fə* as well as the remote past morphemes *ná'* and *lû* which are glossed as NEAR and REM, respectively. One important observation is that, while within the respective groups the markers are incompatible as shown in (14), time of day markers can be combined with remoteness markers as demonstrated in (15).

(14) a. *Mə **ná' lû** nɛ́n ntɑn
I REM REM go market
Intended: "I went to the market (some time ago)."

b. *Mə *yɔ̄g cág* nɛ́n ntɑn
I TOD TOD go market
Intended: "I went to the market (today in the morning)."

(15) a. Mə **ná'** *cág* nɛ́n ntɑn
I REM TOD go market
"I went to the market (some time ago in the morning)."

b. Mə **fə** *yɔ̄g* nɛ́n ntɑn
I NEAR TOD go market
"I went to the market (recently during the day)."

[4]The time of day markers can be interpreted non–deictically when combined with a remoteness marker, cf. (15).

Crucially, the examples in (15) show that the meanings of *zí*, *cág* and *yɔ̄g* are not deictic in the strict sense that they always have to refer to the day of utterance as claimed e.g. in Kouankem (2012). By contrast, they can refer to time intervals within days in the near or remote past if they co–occur with a past morpheme.

Moreover, the time of day markers and the remoteness markers comes from future contexts. Interestingly, the time of day markers, but not the near and remote past markers co–occur with the future marker *á'* as shown in (16).

(16) a. Mə á' *yɔ̄g* nɛ́n ntɑn
I FUT TOD go market
"I will go to the market (this afternoon)."
b. *Mə á' **fə** nɛ́n ntɑn
I FUT NEAR go market
Intended: "I will go to the market (soon)."

Having established this asymmetry, the following simple contexts reveal which morphemes can be used to refer to specific temporal domains. The morphemes given in the examples are the only ones compatible with the respective context; all others are illicit.

(17) Context: Elise went to the market at **2 a.m. this morning**. Now it is evening, and Elise says:
Mə (fə/lú) **zí** nɛ́n ntɑn
I NEAR TOD go market
"I went to the market."

(18) Context: Elise went to the market at **9 a.m. this morning**. Now it is evening, and Elise says:
Mə (fə/lú) **cág** nɛ́n ntɑn
I NEAR TOD go market
"I went to the market."

(19) Context: Elise went to the market at **2 p.m. today**. Now it is evening, and Elise says:
Mə (fə/lú) **yɔ̄g** nɛ́n ntɑn
I NEAR TOD go market
"I went to the market."

(20) Context: Elise went to the market **yesterday**, she says:
Mə **fə/lú** nɛ́n ntɑn
I NEAR go market
"I went to the market."

(21) Context: Elise went to the market **three days ago**, she says:

Mə **fə/ná'/lû** nɛ́n ntɑ́n
I NEAR/REM go market
"I went to the market."

(22) Context: Elise went to the market **a week ago**, she says:

Mə **ná'/lû** nɛ́n ntɑ́n
I REM go market
"I went to the market."

(23) Context: Elise went to the market **a month ago**, she says:

Mə **ná'/lû** nɛ́n ntɑ́n
I REM go market
"I went to the market."

Based on the data given above, we can tentatively state the following temporal domains for the past morphemes in Medumba:[5]

(24) Temporal domains of the temporal morphemes:

a. *zí*: night/very early morning (≈ until sunrise)
b. *cág*: morning (≈ sunrise until noon)
c. *yɔ̄g*: day/afternoon (≈ noon until sunset)
d. *lú*: near past (≤[6] one day before the reference day)
e. *fə*: near past (≤ a few days before the reference day)
f. *ná'/lû*:[7] remote past (≥ a few days before the reference day)

As a first approximation, we can make the following generalizations concerning the interpretation of the past morphemes in Medumba: (i) *ná'*, *lû*, *lú* and *fə* seem to encode remoteness distinctions in the past and (ii) *yɔ̄g*, *cág* and *zí* restrict the time of day that the sentence refers to.

5.5 The past markers are not temporal adverbs

One analytical possibility I want to discard right away is that the Medumba temporal morphemes are in fact just temporal adverbials. A plausible argument in favor of this kind of approach would be that the morphemes are not

[5]The fact that in some of the contexts several markers are licit suggests that their meaning is vague and that the time intervals they cover are not strictly delimited. For a systematic account of vagueness in temporal remoteness morphemes I refer the reader to the work of Bochnak & Klecha (to appear) on Luganda. I will leave the question of vagueness in the denotations of the Medumba markers for future research.

[6]I use this symbol to mean "at most" and the symbol ≥ to mean "at least".

[7]My consultants all agree that the meanings of *ná'* and *lû* are very similar or even identical. My elicitations did not reveal any context in which one but not the other could be used. Although speakers report slight subjective differences in the remoteness encoded by the two, these reports are not consistent and not reflected in the data, so I will ignore them here.

obligatory. As demonstrated in (25), Medumba allows for sentences without any overt temporal marking.

(25) Nana ná cəŋ
Nana cook food
"Nana (has) cooked food."

Despite the fact that an analysis as plain temporal adverbials would easily capture the optionality of the past morphemes, it should not be adopted for Medumba for the following reasons: Beside the temporal morphemes, Medumba also has genuine adverbials that convey similar or (pretty much) identical meanings. Generally, the adverbials can be combined felicitously with the temporal morphemes. However, speakers report a slight feeling of redundancy in case of combining a time of day marker with an adverbial like in (27). This is not the case for the remoteness markers (26), possibly because the meaning of the adverbial is more specific than that of the near past morpheme.[8]

(26) Marie (fə) ntə́m nsi **ŋkɔg**
Marie NEAR fall down yesterday
"Marie fell yesterday."

(27) Marie (cág) ntə́m nsi **ŋkʉbdjʉ**
Marie TOD fall down morning
"Marie fell in the morning."

Adverbials like *ŋkɔg* or *ŋkʉbdjʉ* only occur in the sentence–initial or sentence–final positions that are typical for temporal adverbials in other languages as well (cf. Cinque 1999, p.87), but they are banned from IP-internal positions as shown in (28) and (29).

(28) a. **ŋkɔg** Marie ntə́m nsi
b. Marie ntə́m nsi **ŋkɔg**
c. *Marie **ŋkɔg** ntə́m nsi

(29) a. **ŋkʉbdjʉ** Marie ntə́m nsi
b. Marie ntə́m nsi **ŋkʉbdjʉ**
c. *Marie **ŋkʉbdjʉ** ntə́m nsi

The temporal morphemes show the opposite distribution. In contrast to the adverbials, they cannot occur sentence–initially or sentence–finally, but are bound to their preverbal positions as demonstrated in (30) and (31).

(30) a. ***fə** Marie ntə́m nsi
b. *Marie ntə́m nsi **fə**
c. Marie **fə** ntə́m nsi

[8]Medumba does not seem to have an adverbial meaning "recently".

(31) a. *__cág__ Marie ntə́m nsi
b. *Marie ntə́m nsi __cág__
c. Marie __cág__ ntə́m nsi

Furthermore, the temporal markers differ from adverbials in that they cannot be used as fragment answers to inquiries after times. In (32), we see that adverbials easily serve as fragment answers. For the past morphemes this is not possible as illustrated in (33).

(32) Question: When did Marie fall?
a. ŋkɔg
"Yesterday."
b. ŋkʉbdjʉ
"In the morning."

(33) Question: When did Marie fall?
a. *fə
Intended: "Yesterday/Recently."
b. *cág
Intended: "In the morning."

According to Merchant (2004) (see also Merchant et al. 2013), fragment answers are instances of sluicing, i.e. a phrase is moved to the left periphery and the clause itself is deleted. Thus for (33), we would get structures such as in (34).

(34) Question: When did Marie fall?
a. [$_{CP}$ ŋkɔg ~~[$_{TP}$ Marie ntəm nsi]~~]
b. [$_{CP}$ ŋkʉbdjʉ ~~[$_{TP}$ Marie ntəm nsi]~~]

I assume that this kind of structure is not possible with the remoteness markers because, unlike syntactically adjoined adverbs, they cannot be topicalized to SpecCP since they are functional heads rather than phrases.[9]

Let me summarize the arguments against an adverbial adjunct analysis for the past morphemes in Medumba: Unlike actual temporal adverbs in Medumba, the temporal morphemes i) cannot be topicalized or right-adjoined, ii) can and must occur in a preverbal position, iii) cannot serve as fragment answers. Based on these observations I presume that the temporal markers should be kept apart from adjoined temporal adverbials. Given that they syntactically resemble functional elements in the preverbal domain

[9] In principle, sluicing theory should also allow head–movement of the temporal markers to C_0 followed by deletion of the TP. However, fragment answers such as (33) are also problematic for phonological reasons since function words are phonologically "invisible" (Truckenbrodt 1999, Selkirk 1984) and therefore C–heads phonologically cliticize to their right (Sato & Dobashi 2012) and cannot stand on their own. I thank Julia Bacskai–Atkari for helpful discussion of this issue.

(i.e. tense and aspect markers in other languages), we can hypothesize that they should also be treated as such semantically. In the following I will develop and motivate a formal analysis for the past morphemes in Medumba. Although the last section illustrated an informal distinction between time of day markers and past remoteness markers, the argumentation will start from the assumption that all the temporal markers can be given a unified semantic analysis and that the differences we observe come down to the temporal domains that are covered by the respective markers.

5.6 Temporal remoteness morphemes in Gĩkũyũ

This section is supposed to set the stage for comparing the semantics of the Medumba temporal markers to the temporal remoteness morphemes (TRMs, term adopted from Cable 2013) in Gĩkũyũ, a Narrow Bantu language of Kenya, for which a detailed analysis is proposed in Cable (2013). For reasons of presentation and comparability, the discussion on Medumba will focus on the morphemes *fə* and *ná'* which are most commonly used for marking near past and remote past in Medumba, respectively. However, unless stated otherwise, the time of day markers pattern with the remoteness markers in all relevant respects. Table 5.2 below gives an outlook on some crucial empirical differences revealed by a comparison of some pertinent data in the two languages.

The remoteness markers...

...in **Medumba**...	...in **Gĩkũyũ**...
- pick out *distinct* time intervals.	- pick out *nested* intervals.
- are *optional*.	- are *obligatory*.
- only express *past* remoteness.	- express *past or future* remoteness.
- are the only past markers.	- co–occur with (past) tense.
- have relative readings under attitudes.	- do not get relative readings.

Table 5.2: Gĩkũyũ and Medumba remoteness morphemes: Differences

In a nutshell, Cable (2013)'s proposal is that Gĩkũyũ has tenses that modify the reference time *and* "temporal remoteness morphemes" (TRMs) modifying the event time in a similar, i.e. in a presuppositional, manner. The distinction is illustrated in the example given in (35) below. In (35-a), for instance, the verb is marked for past imperfective by the suffix *-aga* (glossed as **PST.IMP**) and for "currentness" by the affix *-kũ-* (glossed as **CUR**). For completeness, (35-b) and (35-c) illustrate the form and meaning contributions of the other two past remoteness distinctions in Gĩkũyũ, namely the near past (glossed as **NRP**) and the remote past (glossed as **REMP**), respectively.

(35) Past in Gĩkũyũ (Cable, 2013, p.223)

a. Mwangi nĩe**kũ**in**aga**
Mwangi nĩ-a-**kũ**-in-**aga**
Mwangi ASRT-3sgS-**CUR**-dance-**PST.IMP**
"Mwangi was dancing (within the day)."

b. Mwangi nĩa**ra**in**aga**
Mwangi nĩ-a-**ra**-in-**aga**
Mwangi ASRT-3sgS-**NRP**-dance-**PST.IMP**
"Mwangi was dancing (before today, but recently)."

c. Mwangi nĩ**ā**in**aga**
Mwangi nĩ-a-**a**-in-**aga**
Mwangi ASRT-3sgS-**REMP**-dance-**PST.IMP**
"Mwangi was dancing (some time ago, not recently)."

A crucial ingredient of Cable's analysis is that the Gĩkũyũ temporal remoteness morphemes in fact do not really differ in temporal remoteness but in specificity. The *near* and *current* remoteness markers impose more or less specific temporal restrictions on the event variable while the *remote* marker denotes an identity function on events. The concrete lexical entries taken from Cable (2013) (where ∞ stands for "overlap") are given in (36).

(36) The semantics of TRMs in Gĩkũyũ (Cable, 2013, p.254)

a. $[\![\text{REM}]\!]^{g,t} = [\lambda \text{e: e}]$
b. $[\![\text{NEAR}]\!]^{g,t} = [\lambda \text{e: T(e)} \infty \text{ REC(t). e}]$
c. $[\![\text{CUR}]\!]^{g,t} = [\lambda \text{e: T(e)} \infty \text{ day surrounding t. e}]$

This approach is based on the following theoretical assumptions made by the author: Following Heim (1994), Kratzer (1998) and much subsequent work, Cable assumes that the reference time is represented syntactically as an indexed time variable (T_i) in the head of the TP projection, and that the value of this variable is restricted by semantic tense features with the denotations given in (37) (given here in the notation of Cable 2013; see also chapter 2 of this thesis).

(37) The semantics of tense (Cable, 2013, p.233)

a. $[\![T_i]\!]^{g,t} = g(i)$
b. $[\![\text{PAST}]\!]^{g,t} = [\ \lambda t' : t' < t.\ t'\ ]$
c. $[\![\text{PRES}]\!]^{g,t} = [\ \lambda t' : t' \subseteq t.\ t'\ ]$

Moreover, Cable (2013) assumes that Davidsonian event pronouns are syntacially projected as the specifier of the aspect phrase, bear a pronominal index, and are obligatorily bound by an existential quantifier in the syntax.[10] Hence, in Cable's approach, it is not grammatical aspect that closes

[10]This contrasts with the aspect denotations of Kratzer (1998) where existential quantification over events is encoded in the semantics of aspect directly. The lexical entries of

off the event pronoun, and imperfective, perfective and perfect aspect are formalized as in (38).

(38) The semantics of aspect according to Cable (2013, p.235)[11]

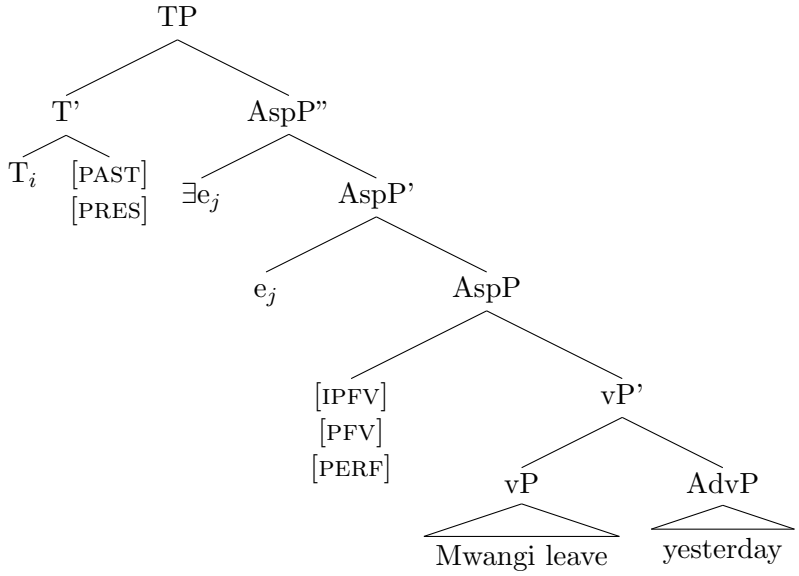
a. $[\![\text{IMP}]\!]^{g,t} = [\lambda \text{P}_{<\epsilon t>} : [\lambda \text{e} : [\lambda \text{t'} : \text{T(e)} \supseteq \text{t'} \ \& \ \text{P(e)} \ ] \ ] \ ]$

b. $[\![\text{PRV}]\!]^{g,t} = [\lambda \text{P}_{<\epsilon t>} : [\lambda \text{e} : [\lambda \text{t'} : \text{T(e)} \subset \text{t'} \ \& \ \text{P(e)} \ ] \ ] \ ]$

c. $[\![\text{PERF}]\!]^{g,t} = [\lambda \text{P}_{<\epsilon t>} : [\lambda \text{e} : [\lambda \text{t'} : \text{T(e)} < \text{t'} \ \& \ \text{P(e)} \ ] \ ] \ ]$

The structure in (39) (including the adverbial adjunct *yesterday*) summarizes the syntactic assumptions made in Cable (2013).

(39) The syntax of tense and aspect (Cable, 2013, p.234)



Evidence for the analysis of the temporal remoteness morphemes given in (36) comes from the following observations: As discussed in Cable (2013) and also in Hayashi (2011), a pertinent question with regard to languages that grammatically mark temporal remoteness is what happens when speakers are ignorant of the time at which a situation takes place. Interestingly, speakers of Gĩkũyũ make use of the remote past form in these cases. Cable illustrates this with examples such as the following where only the remote

aspectual heads according to Kratzer (1998) were presented in chapter 2 and are repeated in (i). In this notation, l is the semantic type of events and $\tau(e)$ is the temporal trace function of Krifka (1998), where Cable (2013) uses ϵ and T, respectively.

(i) The semantics of aspect according to Kratzer (1998, p.107)

a. $[\![\text{IPFV}]\!] = \lambda \text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda \text{t}.\lambda \text{w}.\exists \text{e} \ [\text{t} \subseteq \tau(\text{e}) \ \& \ \text{P(e)(w)} = 1 \ ]$

b. $[\![\text{PFV}]\!] = \lambda \text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda \text{t}.\lambda \text{w}.\exists \text{e} \ [\tau(\text{e}) \subseteq \text{t} \ \& \ \text{P(e)(w)} = 1 \ ]$

c. $[\![\text{PERF}]\!] = \lambda \text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda \text{t}.\lambda \text{w}.\exists \text{e} \ [\tau(\text{e}) < \text{t} \ \& \ \text{P(e)(w)} = 1 \ ]$

[11] Cable (2013) glosses perfective aspect as PRV and imperfective aspect as IMP.

past, but neither the near past nor the current past are acceptable:

(40) Context (abridged): Your friends bought a new TV but you don't know when. You report:

a. Nĩm**ā**gũrire TV njeru!
ASRT-3plS-**REMP**-buy-**PST.PRV** TV new
"They bought a new TV."

b. #Nĩma**ra**gũrire TV njeru!
ASRT-3plS-**NRP**-buy-**PST.PRV** TV new
"They bought a new TV."

c. #Nĩmagũrire TV njeru!
ASRT-3plS-**CUR**-buy-**PST.PRV** TV new
"They bought a new TV."

A similar phenomenon is reported for South Baffin Inuktitut (SB) by Hayashi (2011). In SB, the morpheme (*-lauq*) primarily functions as a pre–hodiernal past marker, but it is also used in "ignorance"–contexts. Hence, Hayashi analyzes it as a general past tense.

(41) Context (abridged): Tom left a message on your answering machine but you don't know when, how would you say "Tom phoned."?

Tom uqaala-**lauq**-tuq (Hayashi, 2011, p.48)
Tom call-lauq-Part3s
"Tom phoned."

Furthermore, Cable (2013) reports that speakers of Gĩkũyũ have to use the most precise remoteness marker that is compatible with their knowledge (cf. *The TRM Specificity Principle*, Cable 2013, p.247). Thus, when a speaker knows that the TV was bought within the last two days (the temporal domain of the near past), but does not know whether it happened during the day of utterance (the temporal domain of the current past), speakers must use the near past marker to the exclusion of both the remote and the current past. This observation is illustrated in (42) from Cable (2013, p.242/3).

(42) Context (abridged): Your friends bought a new TV but you don't know when exactly they bought it. However, it must have been today or yesterday.

a. Nĩma**ra**gũrire TV njeru!
ASRT-3plS-**NRP**-buy-PST.PRV TV new
"They bought a new TV!"

b. #Nĩmagũrire TV njeru!
ASRT-3plS-**CUR**-buy-PST.PRV TV new
Intended: "They bought a new TV!"

c. #Nĩmā**ra**gũrire TV njeru!
ASRT-3plS-**REMP**-buy-PST.PRV TV new
Intended: "They bought a new TV!"

Cable takes this as indirect evidence for the presuppositional meaning of the Gĩkũyũ TRMs. He captures data like (41) by referring to the Principle of *Maximize Presupposition* (originally due to Heim 1991) which provides a neat account of why speakers must use the most informative remoteness marker that is consistent with their knowledge state if the meaning contribution of the remoteness markers is presuppositional. Cable's formulation of *Maximize Presupposition* is given in (43) below.

(43) *Maximize Presupposition (MP)* (Cable, 2013, p.259)
a. LF_1 and LF_2 are identical, except that LF_1 contains lexical item α and LF_2 contains lexical item β.
b. The domain of $[\![\alpha]\!]$ is a strict subset of the domain of $[\![\beta]\!]$.
c. A speech act using either LF_1 or LF_2 would be licit in context.
If all these conditions hold, then the speech act must be made with LF_1, not LF_2.

This principle explains why Gĩkũyũ speakers must use the strongest TRM that is compatible with their knowledge, i.e. why, for instance, they cannot use the remote past form in the sentence in (42). Cable also provides evidence for the second central ingredient of his analysis, namely that the Gĩkũyũ TRMs restrict eventuality times rather than reference times. One example of this is given in (44), taken from Cable (2013, p.269):

(44) Situation: Mwangi has been telling us for a while that he intends to travel to New York. **Today**, we went to his house to say goodbye, but unbeknownst to us at the time, he had already left **yesterday**.
Rĩiria tũkinyire gwake, Mwangi
when 1plS-CUR-arrive-P.PRV his, Mwangi
nĩarathiĩte
ASRT-3sgS-**NRP**-go-**PERF**
"When we arrived at his (house), Mwangi had already left."

The context and the *when*–clause specify that the reference time is on the day of utterance and thus in the temporal domain of the current past. Crucially, the main clause has a near past morpheme; the current past would be infelicitous. Cable argues that, if the temporal marker in the main clause modified the reference time, we would expect current past morphology because the reference time is in the current past. Since what we actually find is near past, however, the temporal remoteness morphemes modify the event time.

In what follows, I present various data from Medumba that should illus-

trate similarities and differences between the languages and shed some light on the semantics of the temporal markers in Medumba. These data show that, contrary to what has been proposed for Gĩkũyũ, the temporal markers of Medumba are best analyzed as existential quantifiers over times rather than as presuppositional event modifiers.

5.7 Past marking in Medumba: The crucial data

5.7.1 Remoteness markers do not mark future remoteness

A first difference we find between the remoteness markers of Gĩkũyũ and those of Medumba is that the latter cannot be used to mark future–oriented remoteness. In contrast to the Gĩkũyũ TRMs (and the Medumba time of day markers, cf. (45-a)), their co–occurrence with the future morpheme *á'* in the same clause is ruled out as repeated below.

(45) a. Mə á' *yɔ̄g* nɛ́n ntɑn
I FUT TOD go market
"I will go to the market (this afternoon)."
b. *Mə {á' **fə**} / {**fə** á'} nɛ́n ntɑn
I {FUT NEAR} / {NEAR FUT} go market
Intended: "I will go to the market soon."

The example in (45-b) contrasts with (46) from Gĩkũyũ, which illustrates that the morpheme *-kũ* that is used for current past is also used to specify current future event time location.

(46) Current future in Gĩkũyũ (Cable, 2013, p.228)
Mwangi nĩe**kũ**ina
Mwangi nĩ̃-a-**kũ**-∅-in-a
Mwangi ASRT-3sgS-**CUR-FUT**-dance-FV
"Mwangi will dance (within the day; or soon)."

This observation is crucial in so far as it suggests that past orientation is part of the meaning of the Medumba remoteness markers, contrary to what we find in Gĩkũyũ, where the remoteness markers co–occur with morphological forms that encode tense meaning.

5.7.2 Remote past picks out a distinct time interval

Medumba differs from Gĩkũyũ and South Baffin Inuktitut in that remoteness markers are not allowed in situations where the speaker does not know when the event in question took place. This is true for the near past (47-a), but also for the remote past (47-b), by contrast with Gĩkũyũ and South Baffin. Instead, a temporally unmarked form (47-c) is used in Medumba.

(47) Context (adapted from Cable 2013): You want to report that your friend Nana bought a new TV, but you don't know when he bought it.

a. #Nana **fə** ʒʉn zə télé nswó
Nana NEAR buy his TV new
"Nana bought a new TV."

b. #Nana **na'** ʒʉn zə télé nswó
Nana REM buy his TV new
"Nana bought a new TV."
Speaker comment: With *ná'* it's not possible because I don't know that it was long ago.

c. Nana ʒʉn zə télé nswó
Nana buy his TV new
"Nana bought a new TV."

What is more, the remote past marker is also illicit in contexts where the speaker knows that the relevant interval spans both the remote and the recent past as (48-a,b) show; only the unmarked form (48-c) is allowed.

(48) Context (adapted from Cable 2013): You are visiting your friend Nana, who you haven't seen in weeks. There is a brand new TV in his living room. You are not sure when he bought the TV. However, it is Friday evening and you know that Nana always does his shopping on Friday. So it could only have been **earlier today**; or **a week ago** or **more than a week ago** (on any other Friday). You want to ask when he bought it:

a. #O **ná'** ʒʉn yi télé lə́ á sʉ?
you REM buy your TV here when
Intended: "When did you buy this TV?"

b. #O **fə** ʒʉn yi télé lə́ á sʉ?
you NEAR buy your TV here when
Intended: "When did you buy this TV?"

c. O ʒʉn yi télé lə́ á sʉ?
you buy your TV here when
"When did you buy this TV?"

The past markers (specifically the remote past in (49-a)) can also not be used to report two events one of which is in the near past and the other in the remote past. Again, a temporally unmarked form (49-c) must be used in Medumba.[12]

[12]This is in contrast with a comparable example from Gikũyũ (Cable, 2013, p.246) where the more inclusive near past morpheme can be used to report two events one of which is located in the near, the other in the current past, while the current past marker is illicit (i).

(49) Context: Marie went to the market **yesterday** and **a week ago**. What did she buy?

a. #A **ná'** ʒʉn cəŋ bu nzwə.
she REM buy food and cloth
Intended: "She bought food and clothes."
Speaker comment: Works only for "a week ago"

b. #A **fə** ʒʉn cəŋ bu nzwə.
she NEAR buy food and cloth
Intended: "She bought food and clothes."
Speaker comment: Works only for "yesterday"

c. A ʒʉn cəŋ bu nzwə.
she buy food and cloth
"She bought food and clothes."

It seems reasonable to conclude from the data above that in Medumba, the meanings of the morphemes do not just differ in specificity. Rather, they seem to pick out different (albeit overlapping) intervals. In particular, since the morpheme *ná'* really denotes remote past rather than general past or an identity function on times or events, its use is unacceptable in (47) through (49).

5.7.3 No *Maximize Presupposition* effects in Medumba

Besides showing that the meaning of the remote past marker does not include the meaning of the near past, the examples given in the last subsection illustrate that temporally unmarked sentences are licit in Medumba, meaning that the Medumba temporal morphemes are optional. Interestingly, this is also true in situations where the speaker actually has the crucial temporal information to motivate the use of a specific temporal morpheme. Still, in such a situation, the speaker is free to use the unmarked form and the temporal morpheme is optional (although some speakers prefer its use for preciseness). At the same time, the temporal marker whose temporal specification contradicts the context is excluded as we would expect. Illustrations are given for a remote past context in (50) and for a recent past context in (51).

(50) Context (adapted from Cable 2013): You are visiting your friend Nana. There is a new TV in his living room. You are not sure when

(i) a. Mwangi nĩ-a-**ra**-teng'er-ire ira na ũmũthĩ
Mwangi ASRT-3sgS-**NRP**-run-**PST.PRV** yesterday and today
"Mwangi ran today and yesterday."

b. *Mwangi nĩ-a-teng'er-ire ira na ũmũthĩ
Mwangi ASRT-3sgS-**CUR**-run-**PST.PRV** yesterday and today
Judgment: Ill–formed sentence, no sensible interpretation.

he bought the TV, but when you visited him a week ago, the TV was already there, so Nana must have bought the TV **more than a week ago**. You report to your brother:

a. Nana **ná'** ʒʉn zə télé nswó.
   Nana REM buy his TV new
   "Nana bought a new TV."
b. Nana ʒʉn zə télé nswó.
   Nana buy his TV new
   "Nana bought a new TV."
c. #Nana **fə** ʒʉn zə télé nswó.
   Nana NEAR buy his TV new
   Intended: "Nana bought a new TV."

(51) Context (adapted from Cable 2013): You are visiting your friend Nana, who you haven't seen since yesterday. There is a brand new TV in his living room. You are not sure when he bought the TV. It could have been **yesterday** or **just a few minutes ago**; but not any other time. You report to your brother:

a. #Nana **ná'** ʒʉn zə télé nswó.
   Nana REM buy his TV new
   Intended: "Nana bought a new TV."
b. Nana ʒʉn zə télé nswó.
   Nana buy his TV new
   "Nana bought a new TV."
c. Nana **fə** ʒʉn zə télé nswó.
   Nana NEAR buy his TV new
   "Nana bought a new TV."

According to Cable (2013), all Gĩkũyũ sentences are marked for remoteness. The remoteness markers differ in specificity and speakers have to use the most specific form that is consistent with their knowledge. This observation, as the author shows, is explained by the principle of *Maximize Presupposition* under the assumption that the meaning of the remoteness markers is presuppositional. However, the examples in (50) and (51) show that restrictions of this kind are not at work in Medumba. This optionality is potentially problematic if we assume the morphemes to have presuppositional meaning. This point will be taken up again in section 5.9.

5.7.4 The temporal morphemes and τ(e)

Another issue to explore is whether the Medumba temporal morphemes modify the *eventuality time* (τ(e)) of a sentence like their Gĩkũyũ counterparts. When applying the test for eventuality time vs. reference time modification in (44) proposed in Cable (2013) to comparable data in Medumba, we find similar results. In the example in (52), the context as well as the

when–clause provide a near past reference time (the temporal domain of *fə*) and the event time of the main clause is in the remote past (thus in the temporal domain of *ná'*). Following Cable's argument, this would suggest that the remote past *ná'* in the main clause modifies the event time.

(52) Context: Recently, Jean considered visiting Douala. **Today**, we went to say goodbye but we didn't know he had already left **a week ago**.

a. ŋgəlaŋ bəg **fə** sə'ə lá Jean **ná'** yă că
time we NEAR come PRT Jean REM already leave
"When we arrived at his house, Jean had already left."

b. #ŋgəlaŋ bəg **fə** sə'ə lá Jean **fə** yă că
time we NEAR come PRT Jean REM already leave
Intended: "When we arrived at his house, Jean had already left."

There is a crucial difference between Gĩkũyũ and Medumba in these sentences, however. In the Gĩkũyũ sentence in (44), the verb is inflected for perfect aspect, which induces a temporal past shift of the event time (which is then presuppositionally restricted by the remoteness morpheme). In Medumba, however, there is no additional time shifter in the sentence. The meaning of the preverbal element *yă* is "already", as argued in section 5.7.5 below. Hence, the time shift in the main clause is induced by the temporal marker *ná'* in the example in (52-a). This is also illustrated in (53) below, where the same sentence without the time–shifter *ná'* is infelicitous in the given context.

(53) Context (adapted from Cable 2013): Recently, Jean considered visiting Douala. **Today**, we went to say goodbye but we didn't know he had already left **a week ago**. Back home, we tell our friends:

#ŋgəlaŋ bəg **fə** sə'ə lá Jean yă că
time we NEAR come PRT Jean already leave
Intended: "When we arrived at his house, Jean had already left."

Since the leaving event in the main clause is actually in the remote past, the time must be shifted to the remote past rather than the near past, which excludes (52-b).

It is also revealing to investigate the behavior of the morphemes in the opposite case, i.e. when an eventuality is located in the near past of a remote past reference time which is specified by a *when*–clause. In (54) below, the contextually given reference time (the time of Marie arriving at Maurice's house) is in the remote past. The eventuality time (Maurice's leaving time) is one day earlier. Hence the eventuality time is in the near past of the reference time, but in the remote past of the utterance time. As

the example in (54) shows, the near past marker *fə* in the main clause is excluded when the reference time is set to a remote past time, also if the context makes clear that the event time is in the near past of that reference time. In this case, the temporal marking in the main clause corresponds to the reference time.

(54) Context: **Three weeks ago**, Marie went to Bangangté to visit her friend Maurice. When she arrived at his house, she was told that Maurice had already left **the day before**. Her mother reports:

a. #ŋgəlaŋ Marie **ná'** sə'ə lá Maurice **fə** (yă) că
time Marie REM come PRT Maurice NEAR already leave
Intended: "When Marie came, Maurice had already left."

b. ŋgəlaŋ Marie **ná'** sə'ə lá Maurice **ná'** (yă) că
time Marie REM come PRT Maurice NEAR already leave
"When Marie came, Maurice had already left."

Conceding that it is very difficult to determine whether some element modifies event times or reference times, Cable (2013, p.265 ff.) provides more data suggesting that the Gĩkũyũ temporal morphemes modify the event time. However, these other data involve either future uses of the remoteness morphemes or the use of perfect aspect. For language–internal reasons, neither of these diagnostics is available in Medumba.[13] Hence, I have to conclude that the data at my disposal do not allow any definite conclusions as to whether the Medumba temporal markers relate to the event time or to the reference time of a sentence. What (54) above shows instead is that the meaning of the temporal markers does not relate the event time and the reference time of a clause to each other, since *fə* in (54-a) above cannot shift the event time relative to the remote past reference time.

Rather, the meaning of the morphemes seems to obligatorily relate to the utterance time in examples like (52-b) and (53). Also when the reference time is shifted to the remote past by a context question rather than by a *when*–clause, the markers cannot be interpreted relative to the contextually given reference time but must be interpreted deictically, as shown for the near past marker *fə* in (55) and the time of day marker *cág*, which can only be interpreted non–deictically when it co–occurs with a remoteness marker, in (56).[14]

(55) Context question: You visited your friend Marie **last week** for a whole day. What had she done **the day before**?

a. #Marie **fə** nɛn ŋwa'ni (li' zə tɔk lə).
Marie NEAR go school day that pass PRT

[13] As shown in 5.7.1, the Medumba remoteness markers cannot be used in future contexts. In section 5.7.5, I will propose that Medumba does also not have a time–shifting perfect aspect.

[14] I am grateful to two anonymous reviewers of NaLS for their help in clarifying this.

Intended: "Marie had gone to school the day before."
Speaker comment: This needs *na'* rather than *fə*.

b. Marie **ná'** nɛn ŋwa'ni (li' zə tɔk lə).
Marie REM go school day that pass PRT
"Marie went/had gone to school the day before."

(56) Context question: You visited your friend Marie **last week** for a whole day. What did she do **in the morning**?

a. #á **cág** nɛn ŋwa'ni (ŋkʉbdjʉ).
she TOD go school morning
Intended: "She went to school (in the morning)."

b. á **ná' cág** nɛn ŋwa'ni (ŋkʉbdjʉ).
she REM TOD go school morning
"She went to school (in the morning)."

To sum up: I take it that the data above provide evidence that the Medumba temporal markers must be interpreted deictically in unembedded sentences. I do not assume, however, that they are restricted to modifying either the event time or the reference time. Rather, the proposal in section 5.8 will be that the semantics of the temporal markers introduces a new time that always relates to the utterance time in matrix clauses.

Another observation that seems relevant in this regard is that all the morphemes mentioned can co–occur with the morpheme *kə́* which is most adequately analyzed as an imperfective aspect marker. The data below show that the remoteness markers as well as the time of day markers co–occur with the imperfective aspect and always precede it syntactically (57). The reversed order is ungrammatical (58).

(57) Context question: What was Evelyne doing?

a. Evelyne **ná'** *kə́* ná cəŋ
Evelyne REM IPFV cook food
"Evelyne was cooking food (some time ago)."

b. Evelyne **cág** *kə́* ná cəŋ
Evelyne TOD IPFV cook food
"Evelyne is/was cooking food (in the morning)."

(58) Context question: What did Evelyne do?

a. *Evelyne *kə́* **cág** ná cəŋ
Evelyne IPFV TOD cook food
Intended: "Evelyne is/was cooking food (in the morning)."

b. *Evelyne *kə́* **ná'** ná cəŋ
Evelyne IPFV REM cook food
Intended: "Evelyne was cooking food (some time ago)."

Evidence for the imperfective semantics of *kə́* comes from examples such as (59) and (60) below. *Kə́* is felicitous if the context requires an imperfective interpretation (59) and infelicitous if a perfective interpretation is triggered (60).

(59) Context question: What were the kids doing when you left the house?

Bú (fə) *kə́* (n)ná ŋkwún
they NEAR IPFV cook beans
"They were cooking beans."

(60) Context question: What did the kids do?

#Bú (fə) *kə́* (n)ná ŋkwún
they NEAR IPFV cook beans
Intended: "They cooked beans."

Following Kratzer (1998) and much subsequent work (and ignoring modal meaning components), I assume that imperfective aspect encodes existential quantification over the VP eventuality and introduces a time argument slot which is related to the running time of the eventuality τ(e) by inclusion (cf. chapter 2). Hence, *kə́* has the denotation in (61).

(61) $[\![\text{kə́}]\!]^{g,c} = \lambda P_{\langle l,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists e\ [\tau(e) \supseteq t\ \&\ P(e)(w)]$

Assuming the standard semantics of imperfective aspect in (61), the observation that remoteness markers and time of day markers precede the imperfective marker *kə́* suggests that the temporal morphemes themselves are not quantifiers over events. I will argue that the overt imperfective in Medumba alternates with a covert perfective aspect that also allows us to account for the observed past interpretations with eventive predicates. Although the interpretation of tenseless sentences will be discussed in more detail in chapter 6, as a sidenote I want to direct the reader's attention to the fact that the past morpheme in (59) is optional in this context, illustrating that also tenseless imperfective sentences in Medumba can receive past interpretations in the presence of a contextual reference time in Medumba.

5.7.5 Excursion: Grammaticalized "already" in Medumba

As the data in the preceding section show, the temporal inventory of Medumba contains an additional temporal element in its preverbal domain, namely the morpheme *yă*. In order to give a comprehensive account of the temporal inventory in the past domain, it is therefore crucial to correctly identify the meaning of the particle *yă* and the role it plays in relative past sentences such as (52-a). The speakers I consulted all translate *yă* as *déjà/already*, but an alternative analysis would have it as a perfect aspect since these two meanings are arguably very hard to distinguish on empirical grounds (cf.

Vander Klok & Matthewson (2015) on the Javanese auxiliary *wis*). Note that if this were the case, it would be *yă* which encodes the past shift in the main clauses of sentences such as (52-a) and (54-b). Initial support for an analysis of *yă* as a perfect aspect comes from simple tests parallel to those applied to the past markers in section 5.5 above, which suggest that *yă* should be treated as a functional head rather than as an adverbial. The example in (62), for instance, shows that *yă* cannot occur in the sentence periphery but only pre–verbally. It can also not be used in isolation as a fragment answer as illustrated in (63).

(62) Context: You are coming home from work and you really don't feel like cooking. You are lucky: Your daughter greets you proudly and says:

a. *Mə fə ná cəŋ **yă!**
I NEAR cook food YA
Intended: "I (have) cooked already.", corrected to:

b. Mə fə **yă** ná cəŋ!
I NEAR YA cook food
"I (have) already cooked food."

(63) Context: You want to visit your friend Marie before school. When you arrive, she is not there anymore. Her mother tells you that Marie has left for school, you are surprised and say:

*Yă?
YA
Intended: "Already?"

By analogy with the argumentation about the past markers in section 5.5, I tentatively conclude from data such as (62) and (63) that *yă* is a functional element rather than an adverbial adjunct and in this respect patterns with perfect aspect in English rather than with *already*.

Nevertheless, when looking at the semantics of *yă*, cumulative evidence suggests that its meaning is in fact *already* (or very close to it) rather than that of back–shifting perfect.

Firstly, assuming that there is a covert perfective operator in every Medumba sentence that is not overtly marked for imperfective (as will be motivated in chapter 6), and that *yă* means *already*, we would expect that, when *yă* is added to a bare (perfective) sentence, the temporal/aspectual meaning of the sentence should be roughly the same and that both should be appropriate to answer questions formulated in the (English) perfect. If, on the other hand, *yă* had an aspect meaning, we would expect that it is the only or at least the preferred means of answering questions triggering the perfect. The example in (64), however, shows that the bare unmarked sentence is the most suitable answer in this context and the answer containing *yă* is judged as marked. I assume this is due to the fact that none of

the implicatures that are typically evoked by *yǎ* (e.g. earliness or surprise, cf. Löbner 1989, 1999) is triggered in this context.

(64) Context: Marie is not here. Where has she gone?

a. Marie nɛ́n ntɑn
Marie go market
"Marie has gone to the market."

b. ?Marie **yǎ** nɛ́n ntɑn
Marie YA go market
Intended: "Marie has gone to the market."
Speaker comment: A little weird in this context. It means 'She has already gone'.

Another piece of evidence against analyzing *yǎ* as a back–shifting aspect comes from examples in which the context is constructed such that the utterance time, the reference time and the event time all coincide, excluding a precedence relation between eventuality time and reference time. The considered interval is instantaneous as indicated by the respective time specifications ("7 o'clock" and "8.30 sharp"), excluding an "extended now" interpretation as well. The examples given in (65) and (66) illustrate that *yǎ* is licit in these contexts where the occurrence of a perfect aspect would be unexpected.

(65) Context: You and your mother have planned to go to the market in the morning. You know that you should go early before all the food is gone. **At 7 o'clock**, you say to your mum:

Lŭ sí mâ, a **yǎ** bʉ nyam sambŏ
get up mother it already be clock seven
"Hurry up, Mum, it's already seven o'clock!"

(66) Context: Today is your 30th birthday. Your time of birth was 8.30pm, so your whole family is gathering in the evening to count down to the exact minute you turn 30. **At 8.30 sharp**, your mother says:

Mɛn nɑm, o **yǎ** bʉ guʒə gamtat
child my, you already be year thirty
"My child, now you are already thirty!"

The point to be made is that under any analysis of *schon/already* that I am aware of (König, 1977; Löbner, 1989, 1999; van der Auwera, 1993; Mittwoch, 1993; Krifka, 2000), *already* does not in itself introduce past shifting, contrary to a perfect aspect in the sense assumed here, and that Medumba *yǎ* does not past–shift, either.

A final observation that favors an *already*–analysis of *yǎ* is that *yǎ* is illicit with predicates that lexically exclude the possibility of a prior change

of state. According to Löbner (1989, 1999), German *schon* (the equivalent of English *already*) is impossible in sentences like (67-a) since *already(p)* presupposes a prior change of state from $\neg p$ to p. Mittwoch (1993) argues that a prior change of state is not necessary for the use of *already* and that the unacceptability of (67-a) stems from the pragmatic contrast component of *schon/already*. Either way, since the predicate *young* is incompatible with the presupposition of *schon/already*, (67-a) is illicit, by contrast with (67-b).

(67) a. #Sie ist schon jung. (German, after Löbner 1989)
she is already young
#"She is already young."
b. Sie ist schon alt.
she is already old
"She is already old."

The example given in (68) illustrates the same point for Medumba *yă*.

(68) a. #a **yă** bʉa mɛn
she already be child
#"She is already young." (lit. #"She is already a child.")
Speaker comment: This doesn't make sense, only for the opposite (old)."
b. a **yă** yʉɛnə
she already old
"She is already old."

Since the examples given above might also be somewhat marked with a perfect aspect out of the blue, the more complex example in (69) below, which is located in the past, shows the contrast more clearly. We see that the correct continuation of the context sentence contains only a remote past marker (69-a), while both the combination of the remote past morpheme and *yă* (69-b) and the version that only contains *yă* (69-c) are unacceptable. Note that, if *yă* denoted perfect aspect meaning, the sentence in (69-b) would be the equivalent of a past perfect and therefore should be acceptable in this context.

(69) Context: Nana is the oldest person in his village and he tells a lot of stories to the younger people. He especially likes to tell about the initiation ceremony that is traditionally celebrated in his community to welcome young men into adulthood. After he had his ceremony, he was finally considered a grownup. However, before the ceremony...
a. Nana **ná'** bʉa mɛn
Nana REM be child
"Nana was a child."

b. #Nana **ná' yă** bʉa mɛn
Nana REM YA be child
Intended: "Nana had been a child."
c. #Nana **yă** bʉa mɛn
Nana YA be child
Intended: "Nana had been a child."

I conclude from these data that the meaning of the Medumba particle *yă* corresponds to that of English *already* rather than to that of a perfect aspect although it syntactically behaves like a functional head. This is not unheard–of. Comrie (1985) reports that a number of Bantu languages are attested to "have a tense, in the strict sense of a single grammatical category, which indicates that a situation holds at one segment of the time line but does not hold at certain other segments of the time line" (Comrie, 1985, p.53). Comrie refers to Ashton et al. (1951) for specific examples from Luganda, where the grammatical prefix *-kya* has the meaning of "still" as illustrated in (70).

(70) ente tu–**kya**–gi–n–oonya (Luganda, Comrie 1985, p.53)
cow we–still–it–seek
"We are still looking for the cow."

Moreover, Nurse (2008, p.145) reports that out of the representative set of 100 Bantu languages whose tense/aspect systems are explored in the book, 56 have a grammaticalized version of this "still–tense". He also shows that Haya (Narrow Bantu, Tanzania) has different morphological forms that seem to differ in that one morphologically encodes an "already"–meaning while both have a perfect/anterior interpretation.[15]

(71) a. tu-∅-guz-îre (Haya, Nurse 2008, p.158)
"We have bought."
b. tw-**áá**-guz-ire
"We have already bought."

In conclusion, it seems that there is cross–linguistic variation in whether languages spell out "already"–like meanings as adverbs or as functional heads.[16]

Although it does not bear much on the following analysis, a few words about the semantics of *yă* for concreteness' sake: I propose to adopt Löbner (1989, 1999)'s analysis of the German particle *schon*, which he explicitly

[15]Nurse (2008) does not give any glosses for these examples which I therefore cannot provide, either. The translations are his.

[16]See also Cinque (1999) for the idea that adverbs like "already" in Indo–European languages are specifiers of functional projections. Under this approach, the variation would be in whether a language phonologically realizes the head (e.g. Medumba) or the specifier (e.g. English) of this functional phrase.

proposes to extend to English *already*. Hence, I will assume the following meaning components for the Medumba particle *yǎ* applied to an evaluation time t_e and a proposition P:

(72) Meaning components of *yǎ(t_e, P)*:
  a. Assertion: P(t_e) is true.
  b. Presupposition: There is a phase of not–P starting before t_e and up to t_e at most one change between not–P and P has occurred.
  c. Possible implicatures:
     i) *Earliness* (relatively early change from not–P to P)
     ii) *Contrast* (anticipation of not–P)
     iii) *Contiguity* (t_e is temporally close to the point of change from not–P to P)

Details of the analysis notwithstanding, the upshot of the above discussion is that the particle *yǎ* semantically behaves like English *already* with the semantics given in (72) rather than like an aspectual time shifter. This is in line with the intuitions of my consultants and with the fact that neither of the previous works on Medumba (Nganmou, 1991; Kouankem, 2012) lists *yǎ* among the tense or aspect particles.

5.7.6 Interpretation under attitude and report verbs

An interesting observation to add is that Medumba past morphemes do not allow for "sequence of tense" readings (e.g. Ogihara 1996, Enç 1987), i.e. they pattern with languages like Hebrew (Sharvit, 2003), Russian and Japanese (Ogihara, 1996; Kusumoto, 1999; Kubota et al., 2009; von Stechow & Grønn, 2013a) in not allowing for simultaneous readings when embedded under another past marker. To remind the reader of the relevant phenomenon, a typical SOT example from English is given in (73) below. The sentence can get a simultaneous interpretation that can be paraphrased as (73-a), and a shifted interpretation that corresponds to (73-b).

(73) Louise said that she was tired.
  a. Louise said: "I am tired." (simultaneous reading)
  b. Louise said: "I was tired." (shifted reading)

In Medumba, the shifted reading is the only possible interpretation when a past marker such as *ná'* is embedded under a report or attitude verb (here *cúb*, "say"). In order to get the simultaneous reading, the temporal morpheme in the embedded clause has to be deleted. This is illustrated in (74), where the context induces a simultaneous reading and the embedded past marker is illicit. The example in (75) illustrates the opposite case where the context triggers the shifted reading. Here the past marker in the

embedded sentence is highly preferred or even obligatory.

(74) Context question: You went to visit Louise and Marie **a week ago**, right? Did they tell you why they were in such a bad mood **that day**?

a. #Bú **ná'** cúb mbə bú **ná'** búut
they REM say that they REM tired
Intended: "They said (a week ago) that they were tired (that day)."

b. Bú **ná'** cúb mbə bú búut
they REM say that they tired
"They said (a week ago) that they were tired (that day)."

(75) Context question: You went to visit Louise and Marie **a week ago**, right? Did they tell you why they were in such a bad mood **two weeks ago**?

a. Bú **ná'** cúb mbə bú **ná'** búut
they REM say that they REM tired
"They said (a week ago) that they were tired (two weeks ago)."

b. #Bú **ná'** cúb mbə bú búut
they REM say that they tired
Intended: "They said (a week ago) that they were tired (two weeks ago)."

The examples in (76) and (77) below show that the observation also holds for the near past marker *fə*.

(76) Context question: You went to visit Louise and Marie **yesterday**, right? Did they tell you why they were in such a bad mood **yesterday**?

a. Bú **fə** cúb mbə bú búut
they NEAR say that they tired
"They said (yesterday) that they were tired (yesterday)."

b. #Bú **fə** cúb mbə bú **fə** búut
they NEAR say that they NEAR tired
Intended: "They said (yesterday) that they were tired (yesterday)."

(77) Context question: You went to visit Louise and Marie **yesterday**, right? Did they tell you why they were in such a bad mood **the day before**?

a. #Bú **fə** cúb mbə bú búut
they NEAR say that they tired
Intended: "They said (yesterday) that they were tired (the day before yesterday)."

b. Bú **fə** cúb mbə bú **fə** búut
they NEAR say that they NEAR tired
"They said (yesterday) that they were tired (the day before yesterday)."

The examples above demonstrate that the Medumba temporal markers cannot receive simultaneous interpretations when they are embedded under report verbs. At the same time, the examples do not unambiguously show whether the temporal markers must be interpreted relative to the utterance time like in unembedded contexts or if their interpretation can be relative to the matrix evaluation time (von Stechow, 1995; Ogihara, 1996; Abusch, 1997; Kubota et al., 2009; Cable, 2015a).

Making a semantic distinction between near past and remote past, Medumba allows straightforward testing of this question with constructions involving near past embedded under remote past. As it turns out, there are plenty of examples showing that this configuration is felicitous and yields relative interpretations of the near past. Consider, for instance, (78).

(78) Context: You visited Louise **last week**, right? Where were her kids?

a. ??Louise **ná'** cúb mbə bú **ná'** nén ŋwá'ni
Louise REM say that they REM go school
"Louise said that they had gone to school (some time ago)."
Speaker comment: Implausible if it's about going to school.

b. Louise **ná'** cúb mbə bú **fə** nén ŋwá'ni
Louise REM say that they NEAR go school
"Louise said that they had gone to school (a short time ago)."

c. Louise **ná'** cúb mbə bú **cág** nɛ́n ŋwá'ni
Louise REM say that they CAG go school
"Louise said that they had gone to school (in the morning)."

In (78), the near past in the embedded clause is possible and in fact preferred for reasons of plausibility (which suggests that the embedded remote past in (78-a) is interpreted relative to the matrix evaluation time as well). Moreover, (78) shows that relative readings are possible not only with the near past marker (78-b) but also with the time of day marker *cág* (78-c). Note also that if the near past marker *fə* were obligatorily interpreted with respect to the utterance time, (78-b) should be unacceptable.[17] The sentences

[17] With stative predicates such as "[be] tired", this relative near past shifting does not seem to be as easily available, as shown in (i). The context in (i) specifies that the matrix time (the attitude holder's 'now' in the sense of Abusch 1997) is in the remote past of the utterance time and the embedded situation is temporally located in the near past of the matrix time. Still, the remote past is preferred by my consultants while the use of the near past is judged as odd. At this point, I can only speculate that the contrast with eventive predicates is related to the inherent unboundedness of the state predicates, which

in (79) through (81), this time with the attitude predicate *kwádə* ("think, believe"), present more evidence that the near past marker *fə* embedded under remote past gets relative interpretations.

(79) Context: **Last week** when you came home your kids looked very proud. They said they had a surprise for you and the house smelled like food. What did you think?

Mə **ná'** kwádə mbə bún **fə** ná cəŋ
I REM think that kids NEAR cook food
"I thought that the kids had cooked food (recently)."

(80) Context: **Last week** you woke up from your nap and went outside to get your clothes from the line. The sun was shining, but the clothes were all wet. What did you think?

Mə **ná'** kwádə mbə mbəŋ **fə** lu
I REM think that rain NEAR fall
"I thought that it had rained (recently)."

(81) Context: **Last week** when you visited Nana he looked very tired and was still in his pajamas. What did you think?

Mə **ná'** kwadə mbə Nana **fə** lô
I REM think that Nana NEAR rise
"I thought that Nana just got up."

This subsection illustrated that the Medumba past remoteness morphemes, when embedded under past–marked attitudes, only receive shifted readings but no simultaneous interpretations. This property differentiates them from English past morphemes and links them to non–SOT languages such as Japanese. Moreover, the data show that the remoteness morphemes are not obligatorily interpreted relative to the utterance time in this specific construction. Cable (2015a) presents data suggesting that this is different in Gĩkũyũ and other graded tense languages.[18] I will argue in section 5.9 that both of these properties suggest that the Medumba markers should be

might make a near past shift relative to a remote past difficult, and leave this question for further research.

(i) Context question: You went to visit Louise and Marie **a week ago**, right? Did they tell you why they were in such a bad mood **the day before that**?

a. ??Bú **ná'** cúb mbə bú **fə** búut
they REM say that they NEAR tired
Intended: "They said that they were tired."

b. Bú **ná'** cúb mbə bú **ná'** búut
they REM say that they REM tired
"They said that they were tired."

[18]The other languages mentioned in Cable (2015a) are Chishona, Luganda (both Central Bantu) and South Baffin Inuktitut as analyzed in Hayashi (2011).

analyzed as existential quantifiers over times rather than as presuppositional tense features.

5.7.7 Summarizing the data

Before presenting the analysis of the Medumba temporal markers, let me summarize their main properties that have been identified in the sections above:

(82)
a. Only the time of day markers, but not the remoteness markers, have future uses.
b. The remoteness morphemes pick out distinct time intervals.
c. The remoteness morphemes are optional and do not display *Maximize Presupposition* effects.
d. The temporal morphemes receive shifted interpretations relative to the matrix evaluation time in attitude complement clauses.
e. The temporal morphemes are interpreted relative to the utterance time in matrix clauses.
f. They co-occur with (imperfective) aspect which they syntactically precede.

Let me also point out that the properties in (82-a) through (82-d) differentiate the temporal markers in Medumba from the TRMs in Gĩkũyũ: The Medumba remoteness morphemes do not have future–oriented uses but are always used in past–oriented environments and pick out distinct rather than more or less specific temporal intervals. Moreover, the Medumba markers are optional in two ways: Firstly, sentences are grammatical without the temporal markers. Secondly, the temporal markers are optional even when the speaker has the necessary temporal information to specify the time. The Medumba markers also differ from the TRMs in Gĩkũyũ in their interpretation in attitude complements.

I interpret the generalizations in (82) as follows: (82-a) suggests that Medumba remoteness morphemes such as *fə* and *ná'* have past interpretation as part of their meaning, i.e. they do not only encode remoteness, but *past* remoteness. The observations in (82-b) and (82-c) discourage an analysis of the remoteness morphemes as presuppositional identity functions on times (Heim, 1994; Kratzer, 1998) or events (Cable, 2013). While a presuppositional analysis might not be strictly speaking ruled out by the data presented in sections 5.7.2 and 5.7.3, the observation that the Medumba past morphemes do not give rise to *MP* effects differentiates Medumba from Gĩkũyũ. Consequently, the indirect argument that Cable (2013) makes in favor of a presuppositional analysis of the Gĩkũyũ TRMs is not applicable

to the Medumba temporal markers.[19] Finally, the generalizations in (82-e) and (82-f) suggest that the temporal markers are not aspects since they co–occur with an imperfective marker and are always interpreted deictically in matrix clauses. The next section presents a proposal that accounts for the generalizations in (82).

5.8 The proposal

I propose that the above observations are most appropriately accounted for if the temporal morphemes in Medumba are uniformly analyzed as existential quantifiers over times. As the lexical entries in (83) through (88) below show, the Medumba temporal morphemes under this approach take semantic arguments of type ⟨i,⟨s,t⟩⟩ (the type of aspect phrases) and further specify the temporal relation expressed by imperfective or perfective aspect without changing the semantic type of their argument. Hence they are modifiers and therefore optional from the perspective of compositionality. The lexical entries for all the temporal morphemes investigated are as follows:[20]

(83) $[\![\text{cág}]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists t'$ [t' overlaps the *morning* of the day(s) associated with t & P(t')(w)]

(84) $[\![\text{yɔ̄g}]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists t'$ [t' overlaps the *afternoon* of the day(s) associated with t & P(t')(w)]

(85) $[\![\text{zí}]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists t'$ [t' overlaps the *nighttime* of the day(s) associated with t & P(t')(w)]

(86) $[\![\text{lú}]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists t'$ [t' precedes t by $\leq$ two days & P(t')(w)]

(87) $[\![\text{fə}]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists t'$ [t' precedes t by $\leq$ a few days & P(t')(w)]

(88) $[\![\text{lû, ná'}]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists t'$ [t' precedes t by $\geq$ a few days & P(t')(w)]

For the sake of completeness, the lexical entries I assume (following Kratzer 1998 and many others) for the imperfective morphemes *kə́* and the phonologically unrealized perfective aspect are repeated in (89) and (90), respectively.

(89) $[\![\text{kə́}]\!]^{g,c} = \lambda P_{\langle l,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists e$ [τ(e) $\supseteq$ t & P(e)(w)]

[19] Section 5.9 presents additional arguments in favor of an operator analysis as opposed to a pronominal one.

[20] As is commonly done, I assume that temporal quantifiers (like any other quantifiers) are contextually restricted. Von Stechow (2009) makes this assumption explicit by adding a domain restriction variable C to the denotation of the past operator in (i) (repeated from chapter 2), while the denotations of the Medumba past markers in (83)–(88) are simplified in this respect.

(i) $[\![P]\!] = \lambda C.\lambda t.\lambda Q_{\langle i,t\rangle}.(\exists t')[C(t') \,\&\, t' < s^* \,\&\, Q(t')]$ (von Stechow, 2009, p.150)

(90) $[\![\emptyset\text{–PFV}]\!]^{g,c} = \lambda P_{\langle l,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists e\ [\tau(e) \subseteq t\ \&\ P(e)(w)]$

The approach adopted here follows recent implementations of tense as a quantifier over times such as Kusumoto (1999, 2005) and von Stechow (2009) (see also von Stechow & Grønn 2013a,b). Under this analysis tenses are relative in the sense that they have an open time argument slot and hence map properties of times onto properties of times as do the meanings of the Medumba markers in (83) through (88). For comparison, the lexical entry of a past operator according to Kusumoto (2005) is repeated in (91).

(91) $[\![\text{PAST}]\!]^g = \lambda P{\in}D_{\langle i,\langle s,t\rangle\rangle}\ [\lambda t{\in}D_i\ [\lambda w{\in}D_s\ [$there is a time t' such that t' < t and that P(t')(w) = 1]] (Kusumoto, 2005, p.334)

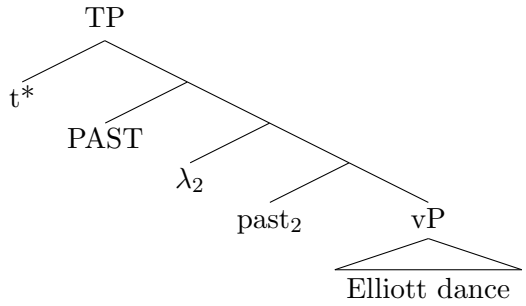
To remind the reader of Kusumoto's framework which was introduced in chapter 2, let me repeat its key properties. Following Stowell (1995a,b), Kusumoto assumes that the PAST meaning above is encoded by a covert operator. This covert operator licenses the occurrence of past tense morphology by syntactically c–commanding it. The past tense morpheme itself denotes a variable of type i which the author assumes might be generated in the syntactic T head.

(92) $[\![\text{past}_2]\!]^g = g(2)$ (Kusumoto, 2005, p.334)

Hence, in a Stowell/Kusumoto–style approach, although tense itself is a variable, it obligatorily comes with a covert tense operator. In order to create the right argument type for the operator, the variable is bound by a λ–operator. In addition to that, Kusumoto assumes a distinguished time variable t* in the syntactic structure that denotes the speech time (s* in Kusumoto's terminology and t_c in the one adopted here) and fills the argument slot of tense operators. The resulting LF structure is given in (94).

(93) $[\![t^*]\!]^{g,c}$ = the speech time provided by the context, s* (Kusumoto, 2005, p.336)

(94)



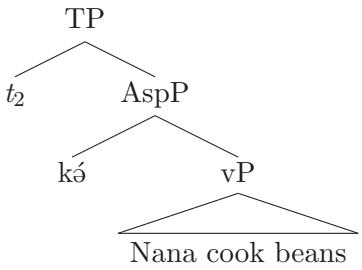
I adopt a modified version of (94) for Medumba. I assume (with Kusumoto) that an indexed temporal pronoun is represented in the syntax (t_2 in (96) below). In Medumba, however, this variable can be free and receive a

value from the contextual assignment function, and it is not phonologically realized. In effect, tenseless sentences in Medumba are assigned the same LF as their tenseless counterparts in Hausa (cf. chapter 3). Thus we can account for the fact that Medumba sentences can receive past interpretations also without a past marker if the context provides a past reference time. This is illustrated with the LF of (95) in (96), the minimal structure that I assume for tenseless sentences. The resulting truth conditions are given in (97).[21]

(95) Context question: What was Nana doing when you left the house?

Nana *kə́* (n)ná ŋkwún
Nana IPFV cook beans
"Nana was cooking beans."

(96)



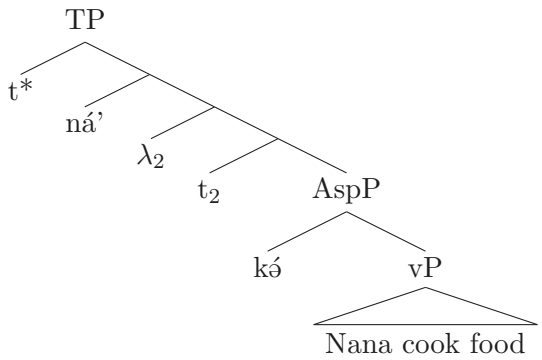
(97) $[\![(95)]\!]^{g,c} = \lambda w.\exists e\ [\tau(e) \supseteq g(2)\ \&\ \text{cook(beans)(e)(w)}\ \&\ \text{agent(e)(w)} = \text{Nana}]$

I also follow Kusumoto in assuming that the time variable can be abstracted over by inserting a lambda binder, thus creating a suitable argument for the temporal operator which is of type $\langle\langle i, \langle s, t\rangle\rangle, \langle i, \langle s, t\rangle\rangle\rangle$. While the PAST operator in Kusumoto's analysis for English is covert, in Medumba past shifting is overtly encoded by morphemes such as *ná'* and *fə*. In unembedded clauses, their temporal argument slot is filled by the deictic temporal pronoun t*, granting interpretation relative to the utterance time. This is illustrated with the derivation of the remote past imperfective sentence in (98) given below.

[21] Obviously, this analysis makes the prediction that, like in Hausa, future interpretations are also available given a contextually salient future reference time. Medumba, however, patterns with languages like Paraguayan Guaraní (Tonhauser, 2011a) where unmarked future interpretation is licensed in a variety of constructions, but not in minimal dialogues such as (95), where only past or present interpretations are possible (see also Bochnak (2015) for similar observations in Washo). In Medumba, this is further complicated by the fact that present progressive is preferably expressed by the dedicated morpheme *cwɛ́d* (cf. chapter 6). The relevant constructions are discussed in section 7.5 and the question of whether or not Medumba qualifies as a tenseless language is discussed in section 8.1. Following the proposals made by Tonhauser (2011a) and Bochnak (2015) for the languages under their concern, I assume that superficially tenseless sentences in Medumba do not have covert non–future tense in the sense of Matthewson (2006).

(98) Nana **ná'** kə́ ná cəŋ
Nana REM IPFV cook food
"Nana was cooking (some time ago)."

(99)



(100) a. $[\![\text{VP}]\!]^{g,c} = \lambda\text{e}.\lambda\text{w}.$ [cook(e)(w) & agent(e)(w) = Nana]

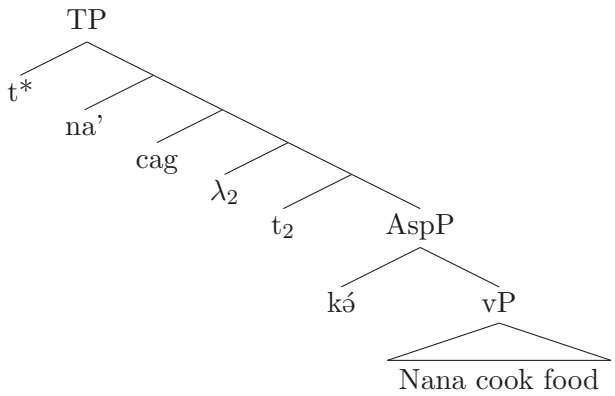
b. $[\![\text{AspP}]\!]^{g,c} = [\![\text{kə́}]\!]^{g,c}$ ($[\![\text{VP}]\!]^{g,c}$)
$= [\lambda\text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{e}\,[\tau(\text{e}) \supseteq \text{t}\ \&\ \text{P}(\text{e})(\text{w})]](\lambda\text{e}.\lambda\text{w}.$ [cook(e)(w) & agent(e)(w) = Nana])
$= \lambda\text{t}.\lambda\text{w}.\exists\text{e}\,[\tau(\text{e}) \supseteq \text{t}$ & cook(beans)(e)(w) & agent(e)(w) = Nana]

c. $[\![\text{TP}]\!]^{g,c} = [\![\text{ná'}]\!]^{g,c}([\![\text{AspP}]\!]^{g,c})([\![\text{t*}]\!]^{g,c})$
$= [\lambda\text{P}_{\langle i,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{t'}$ [t' precedes t by $\geq$ a few days & P(t')(w)]]
$(\lambda\text{t}.\lambda\text{w}.\exists\text{e}\,[\tau(\text{e}) \supseteq \text{t}$ & cook(beans)(e)(w) & agent(e)(w) = Nana])(t_c)
$= [\lambda\text{t}.\lambda\text{w}.\exists\text{t'}$ [t' precedes t by $\geq$ a few days & $\exists\text{e}\,[\tau(\text{e}) \supseteq \text{t'}$ & cook(e)(w) & agent(e)(w) = Nana]]](t_c)
$= \lambda\text{w}.\exists\text{t'}$ [t' precedes t_c by $\geq$ a few days & $\exists\text{e}\,[\tau(\text{e}) \supseteq \text{t'}$ & cook(e)(w) & agent(e)(w) = Nana]]
$\approx$ There is a time t' preceding the utterance time t_c by at least a few days and t' is temporally included in the run time of an event of Nana cooking

As was illustrated in section 5.7.4 above, the time of day modifiers behave like the remoteness morphemes in that they are interpreted deictically in unembedded sentences. Hence, they also have to be syntactically located above the bound reference time variable. I assume the structure in (102) for the example in (101), which derives the truth conditions in (103).

(101) Nana **ná' cág** kə́ ná cəŋ
Nana REM TOD IPFV cook food
"Nana was cooking (some time ago in the morning)."

(102)



(103) $[\![(101)]\!]^{g,c}$ = λw.∃t' [t' precedes t_c by ≥ a few days & ∃t" [t" overlaps the *morning* of the day(s) associated with t' & ∃e [τ(e) ⊇ t" & cook(e)(w) & agent(e)(w) = Nana]]]

The Medumba past markers are thus analyzed as *optional relative tenses*. They are *optional* since no tense marker is required to make a Medumba sentence grammatical. They are *relative* in the sense that they are interpreted with respect to the matrix evaluation time when embedded under attitude and report verbs, and they are *tenses* in the sense of time shifters (cf. von Stechow & Grønn 2013a) relating to the utterance time in matrix clauses.[22] Now, having proposed an analysis, the next section provides some additional discussion of why the Medumba temporal markers should be analyzed as quantificational rather than as pronominal tenses.

5.9 Arguments against a presuppositional analysis

In an earlier account of the Medumba temporal system, Mucha & Zimmermann (to appear) conjecture that the Medumba remoteness markers are presuppositional tenses in the sense assumed by Heim (1994), Kratzer (1998) and many others for "English–type"–languages. In one implementation of this approach (see the lexical entries in (37)), the reference time is formally represented as a variable that ranges over temporal intervals and the tense features PAST and PRESENT encode presuppositions restricting the possible reference time values. Under an analysis where the Medumba remoteness markers encode presuppositional tense features in this sense, their meaning would differ from that of the English past tense only in that an additional remoteness restriction is encoded in the presupposition. Below I give the lexical entries that the respective remoteness morphemes would receive if analyzed as identity functions:

[22]This kind of analysis is not unprecedented in the literature on Grassfields languages. Hyman (1980) describes graded tenses in the closely related Grassfields language Bamileke–Dschang as having relative meaning.

(104) $[\![\text{ná', lû}]\!]^{g,c} = \lambda t : t \text{ precedes } t_c \text{ by } \geq \text{a few days. } t$

(105) $[\![\text{fə}]\!]^{g,c} = \lambda t : t \text{ precedes } t_c \text{ by } \leq \text{a few days. } t$

(106) $[\![\text{lú}]\!]^{g,c} = \lambda t : t \text{ precedes } t_c \text{ by } \leq \text{two days. } t$

Another presuppositional analysis that is in principle conceivable for Medumba would be along the lines of what Cable (2013) proposes for Gĩkũyũ as presented in section 5.6. Under this analysis, the remoteness markers impose presuppositions on the location of the eventuality time rather than on the reference time of a sentence.

I believe, however, that the Medumba data pose some serious challenges to a presuppositional analysis of the temporal morphemes that do not arise under a quantifier approach. One argument that has already been mentioned concerns the optionality of the Medumba past markers and is discussed in section 5.9.1.

5.9.1 Optionality and *Maximize Presupposition*

If specificity effects like those observed for Gĩkũyũ in Cable (2013) provide evidence for a presuppositional analysis of the Gĩkũyũ remoteness markers, the fact that in Medumba the least specific unmarked form seems to be licit even if the exact time specification is known to the speaker can be regarded as an argument against a presuppositional analysis of the Medumba past markers. The empirical reason is that the unspecific general form should be excluded by the principle of *Maximize Presupposition* (MP) if we adopt a very general formulation like that of Chemla (2008) given in (107) (for other formulations see e.g. Singh 2011, Schlenker 2012 and also (43) from Cable 2013):

(107) Maximize Presupposition (Chemla, 2008, p.142)

> Among a set of alternatives, use the felicitous sentence with the strongest presupposition.

The *MP* principle was introduced by Heim (1991) to account for the infelicity of indefinite determiners in contexts where the uniqueness condition of the definite determiner is satisfied like in (108) (constructed after Heim 1991, p.514).

(108) a. #A weight of our tent is under 2kg.
b. The weight of our tent is under 2kg.

In (108), *MP* operates as follows: The sentences in (108-a) and (108-b) are alternatives for each other in the sense that they have the same assertive content. The determiner *the* carries a uniqueness presupposition that *a* lacks. This presupposition is satisfied in (108) because items such as tents have one and only one weight. Hence, by virtue of *MP* the presuppositional variant

in (108-b) must be used. The same reasoning works for other presuppositional elements such as repetitive/additive particles like *again* or *too* which presuppose that an eventuality of the same kind as the one in its scope has already been reported earlier (Amsili & Beyssade, 2010; Eckardt & Fränkel, 2012). If the context supports the presupposition, the particles are often obligatory as the following examples from Chemla (2008, p.144) illustrate.[23]

(109) Context: John, a teacher with a very bad hand writing, has just written an exercise on the blackboard. When he is finished he reads it aloud to make sure everyone can copy it down properly. A student may not hear it all very well and ask:

a. *Can you read that word?
b. Can you read that word again?

(110) a. *I had tea and John had tea.
b. I had tea and John had tea too.

The upshot is that, by analogy with examples such as (109) and (110), if the meaning of the past markers were presuppositional, *MP* should force the presence of a remote or near past marker if the context supports it.

We have already seen that this prediction is not borne out for past marking in Medumba. An example of this is repeated in (111) where the remote past marker *ná'* is optional, and both (111-a) and (111-b) are appropriate utterances in the given context.

(111) Context: You are visiting your friend Nana. There is a new TV in his living room. You are not sure when he bought the TV, but when you visited him a week ago, the TV was already there, so **Nana must have bought the TV more than a week ago**. You report to your brother:

a. Nana **ná'** ʒʉn zə télé nswó
Nana REM buy his TV new
"Nana bought a new TV!"
b. Nana ʒʉn zə télé nswó
Nana buy his TV new
"Nana bought a new TV!"

Note that this is not necessarily a knockout argument against a presuppositional analysis of the temporal morphemes. Bochnak (2015) argues that with optional past tense in Washo, although its meaning is presuppositional, *MP* is not triggered because unmarked sentences and past–marked sentences differ in their syntactic structure in that one has a tense feature and the other

[23]The judgments are given in Chemla's notation, therefore the examples in (109-a) and (110-a) are marked with '*' although they are clearly not ungrammatical. According to native speakers' judgment, they should be marked as '?' in the notation used here.

does not. Therefore, Bochnak proposes, they are not alternatives in the relevant sense as they do not involve comparable LF structures. Of course, the same point could be made for the Medumba examples in (111) under an analysis where (111-a) can be said to have a more complex LF structure than (111-b) since it has an additional tense feature realized by *ná'*. Singh (2008) makes the same point for the additive particle *too* and argues that the reason that *too* does in fact give rise to *MP* effects is that it competes with the "∼"–operator of Rooth (1992), to the effect that the structures with and without *too* have the same syntactic complexity and hence qualify as alternatives to be compared by *MP*.[24]

In this context, however, it is also interesting to look at determiners in Slavic, which are grammatically optional. Data from Šimík (2015) suggest that the demonstrative determiner *ten* in Czech gives rise to *MP* effects. As illustrated in (112) and (113) below, the demonstrative determiner is obligatory if its presupposition of circumstantial uniqueness[25] is fulfilled, suggesting that *MP* applies to optional elements in some cases.

(112) Context: There is a single magazine on your desk (among other things). You are searching the desk for a pencil and I know there is one hidden under the magazine. I'm telling you:

Jedna (tužka) je pod **#(tím)** časopisem.
one (pencil) is under DEM magazine
"There is one/a pencil under the magazine."

(113) Context: You are holding a book. I want to take a look at it, so I tell you:

Ukážeš mi prosím tě **#(tu)** knihu?
show.2sg me please you DEM book
"Will you show me the book please?" (Czech, Šimík 2015)

In conclusion, it is questionable whether temporally unmarked sentences and sentences marked for (near or remote) past are relevant alternatives to be compared by *MP*. However, I do consider it a potential plus of the quantificational analysis that it does not predict obligatoriness of the temporal morphemes in the relevant contexts to begin with.

5.9.2 Tense in attitude contexts

The second argument in favor of a quantifier analysis for the Medumba tense markers is that it accounts more easily for their behavior under attitude and report verbs. As shown in section 5.7.6, temporal markers embedded under attitudes are interpreted relative to the local evaluation time (term adopted

[24] Thanks to Ryan Bochnak (p.c.) for pointing this out to me.

[25] *Circumstantial uniqueness* contrasts with *inherent uniqueness* and is defined as uniqueness that is not predictable from the situation.

from Kubota et al. 2009). Therefore, they allow for relative interpretations of the embedded tenses (114) but not for simultaneous interpretations of the matrix eventuality and the embedded eventuality (115).

(114) Context: When you visited your friend Louise **last week**, she told you that she had cooked **a few hours earlier**. Now, you want to describe what Louise said last week:

Louise **ná'** cúb mbə a **fə** ná cəŋ
Louise REM say that she NEAR cook food
"Louise said that she cooked."

(115) Context: You went to visit Louise and Marie **a week ago**, right? Did they tell you why they were in such a bad mood **that day**?

a. #Bú **ná'** cúb mbə bú **ná'** búut
They REM say that they REM tired
"They said that they were tired."

b. Bú **ná'** cúb mbə bú búut
They REM say that they tired
"They said that they were tired."

These observations follow directly if we assume that the Medumba remoteness markers *fə* and *ná'* are overt past–shifters in an LF structure like (102) above.

Under a purely referential approach to tense (Abusch, 1997; Heim, 1994), simultaneous readings in SOT contexts are derived by abstraction over the time variable in the embedded clause, creating a property of times which is the type required for the argument of attitude and report verbs. In the analysis of Medumba proposed here, this is the structure we obtain without past markers in the embedded clause[26] as illustrated in (116).

(116) $[_{TP}$ t* **na'/fə** λ_3 t_3 $[_{AspP}$ ∅–PFV $[_{VP}$ they say that $[_{TP}$ λ_2 t_2 $[_{AspP}$ ∅–PFV $[_{VP}$ they (be) tired]]]]]]

The shifted reading is derived straightforwardly as well when a second past shifter is present in the embedded clause.[27]

(117) $[_{TP}$ t* **na'/fə** λ_3 t_3 $[_{AspP}$ ∅–PFV $[_{VP}$ they say that $[_{TP}$ **na'/fə** λ_2 t_2 $[_{AspP}$ ∅–PFV $[_{VP}$ they (be) tired]]]]]]

It is pointed out in von Stechow (2009) and von Stechow & Grønn (2013a), but also in Kratzer (1998) that, while a purely referential analysis of tense

[26] Again, I follow Kusumoto (1999, 2005) in assuming insertion of a λ–binder to create the right type for the attitude complement.

[27] Referring to Percus (2000), Kusumoto (2005, p.339) proposes that t* does not occur (or can be bound) in attitude complements. See also Ogihara (1996, p.211), where the occurrence of speech time–oriented indexicals in intensional arguments of attitude verbs is explicitly ruled out.

accounts straightforwardly for simultaneous interpretations under attitude and report verbs in languages like English, existing pronominal accounts seem to have difficulties with the shifted interpretation of past tense under attitudes.[28]

At the same time, Kubota et al. (2009), who essentially adopt a quantificational analysis of past tense following Ogihara (1996), argue that it is to be expected that tenses occurring inside attitude complements should always get relative interpretations. They compare the behavior of tenses in Russian, Japanese and English in the contexts of temporal adjunct clauses (TACs) and propositional attitude complements (PACs) and observe that in Russian as well as in Japanese, past embedded under past in PACs only allows for shifted readings. They propose an underlying constraint that tenses occurring in the complements of attitude verbs cannot be interpreted with reference to the utterance time since the attitude holder "does not necessarily have access to the utterance event in which his/her mental attitude is reported" with the consequence that "cross–linguistically, the local evaluation time of a PAC invariably is the matrix event time" (Kubota et al., 2009, p.313). They assume with Gennari (1999, 2001, 2003) that the simultaneous interpretation of past–under–past in PACs is actually an implicature that is available in English since present–under–past does not allow for a purely overlapping interpretation due to the deictic meaning of the English present tense. In Russian and Japanese, by contrast, the simultaneous reading of past–under–past PACs is blocked since the intended reading can be expressed by the present–under–past configuration. The point of the matter is that the Medumba data presented above show exactly the behavior that is expected of quantificational tenses embedded under attitude and report verbs.

What is more, in pronominal approaches focusing on English (Abusch, 1997; Heim, 1994), the shifted reading is derived by assuming that the past tense, by virtue of being a pronoun, undergoes 'res–movement out of the embedded clause to an argument position of the attitude verb where it is

[28] Details aside, both Kratzer (1998) and von Stechow (2009) essentially assume ambiguity of the English past tense between a pronominal and a time–shifting semantics. The issue was recently addressed by Heim (2015), who sketches an approach in which the meaning of (English) past tense is pronominal but not indexical. Instead, past is interpreted relative to an index i which is shifted by attitude verbs (i).

(i) $[\![\text{PAST}]\!]^{c,i} = \lambda t\text{: } t < t_i\text{. } t$ (Heim, 2015)

As far as I can see, this analysis makes the same predictions for tense under attitudes as a quantificational analysis and would thus derive the readings observed in Medumba. However, it would not account for the other arguments against a pronominal analysis brought forward in this section, such as the lack of MP effects, the infelicity of past in "before"–clauses, and its felicity without contextual reference times and as answers to "when"–questions.

not bound by a λ–operator. Cable (2015a) discusses an interesting consequence of this assumption for graded tense languages. He presents data from the Narrow Bantu languages Gĩkũyũ, Luganda and Chishona as well as from South Baffin Inuktitut (Inuit), showing that more recent past forms embedded under more remote past are not possible since the past tenses can only be interpreted relative to the utterance time, not relative to the matrix evaluation time. This is illustrated in example (118) from Gĩkũyũ (Cable, 2015a).

(118) Context: Yesterday, your friend Mwangi said "I danced today." You'd like now to describe what he said yesterday.

a. Mwangi araugire atĩ
Mwangi AgrS-**NPST**-say-PRV that
nĩa**ra**inire.
ASRT-AgrS-**NPST**-dance-PRV
"Mwangi said that he danced."

b. *Mwangi araugire atĩ
Mwangi AgrS-**NPST**-say-PRV that
nĩainire.
ASRT-AgrS-**CPST**-dance-PRV
"Mwangi said that he danced."

Cable (2015a) concludes from the unacceptability of (118-b) that the current ($\approx$ hodiernal) past cannot be interpreted relative to the matrix evaluation time, and from the acceptability of (118-a) that the felicitous embedded near ($\approx$ hesternal) past is interpreted relative to the utterance time. This restriction to deictic interpretations contrasts with embedded future in the considered languages which *can* be interpreted relative to the matrix evaluation time. Cable (2015a) proposes that this interesting contrast follows from the assumption that (graded) past has a pronominal semantics while future is a time shifting operator. Following Abusch (1997) and Heim (1994), he assumes that pronominal tenses can undergo res–movement into the main clause where they are interpreted relative to the utterance time.[29] The relevant LF for the sentence in (118-a) is given in (119).

(119) $[_{TP}$ [T_1 NPST] Mwangi $[_{VP}$ said [T_2 NPST] $[_{CP}$ that $[_{TP}$ t_2 he $[_{VP}$ danced]]]]] (Cable, 2015a, p.20)

Coming back to Medumba, note that the ungrammatical Gĩkũyũ sentence in (119-b) is directly comparable to the Medumba example in (114),

[29]Moreover, one of the core ingredients of Cable (2015a)'s proposal is a universal preference for temporal *de re* readings formulated as follows: "If sentence S has a 'temporal *de re*' LF, and that LF would be true (if defined), then sentence S can only be interpreted under the 'temporal *de re*' LF." (Cable, 2015a, p.19). Cable also discusses potential problems of a res–movement analysis. See also Percus & Sauerland (2003).

which is in fact acceptable. Examples such as (114) show that the near past marker *fə* in Medumba can be interpreted relative to the remote past matrix evaluation time.

Again, this relative reading is straightforwardly derived under an analysis of the temporal markers as quantificational time shifters. The sentence in (114) has the LF in (120) which results in a relative past interpretation.

(120) [$_{TP}$ t* **na'** λ_3 t$_3$ [$_{AspP}$ ∅–PFV [$_{VP}$ Louise say that [$_{TP}$ **fə** λ_2 t$_2$ [$_{AspP}$ ∅–PFV [$_{VP}$ she cook]]]]]

Beside the lack of *MP* effects and the obligatory past shifting of the remoteness markers under attitudes, there is further suggestive evidence that the Medumba temporal markers should be analyzed as quantifiers over times rather than as partial identity functions imposing presuppositions, one being the infelicity of past tense in *before*–clauses.

5.9.3 Infelicity of past tense in *before*–clauses

In the context of tense embedding it is also interesting to note that Medumba patterns with Japanese in that it does not allow past marking in *before*-clauses, by contrast with languages such as English and Polish.[30] A relevant example is given in (121). While the near past marker in the main clause is optional but licit, a past marker in the temporal clause is unacceptable (121-b).

(121) Context question: Did Nana and Maurice meet each other at the party yesterday?

a. ŋga, Nana **(fə)** că ká Maurice sə'ə
no, Nana NEAR leave before Maurice come
"No, Nana left before Maurice came."

b. *ŋga, Nana **(fə)** că ká Maurice **fə** sə'ə
no, Nana NEAR leave before Maurice NEAR come
Intended: "No, Nana left before Maurice came."

According to Sharvit (2014), past tense in *before*–clauses is banned in Japanese precisely because past tense is quantificational, as opposed to English and Polish where past is pronominal. Simplifying considerably, the reasoning goes as follows. Sharvit assumes a meaning of *before* along the lines of Beaver & Condoravdi (2003) which is given in a simplified version from Sharvit (2014, p.267) in (122).

(122) 'q before p' is true iff some q–time precedes the first p–time.

[30] In terms of Kubota et al. (2009), this observation shows that in Medumba, like in Japanese, embedded tense is generally interpreted relative to the matrix evaluation time. Under this assumption, *before* and past tense impose contradictory requirements on the ordering of the respective situations.

Combined with a quantificational past tense in the *before*–clause, this results in (123).

(123) 'q before PAST(p)' is true iff q precedes the first time t such that there is a time t' that precedes t such that p(t')

Crucially, the definition in (122) presupposes that *there is* a first p–time. Sharvit argues that, assuming that the time axis is dense,[31] the meaning in (123) results in a presupposition failure because there is no first time t in the required sense (since, due to density, there will always be a time t" "intervening" between t and t'). Crucially, the problem lies in the existential quantifier in the scope of *before* in (123), without it, the "first p–time" simply refers to the leftmost moment where p is true. This is the case in pronominal past languages like English, where past tense in *before*–clauses is felicitous.

5.9.4 Felicity without contextual RT

Another suggestive argument concerns the felicity of past markers in out–of–the–blue settings. Note that in the most common formulations of the presuppositional analysis, the meaning of a past morpheme presupposes that the context provides a time interval that adheres to the presupposed condition. Hence we might expect that the morphemes cannot be used if the context does not provide an appropriate reference time (cf. Kratzer 1998).[32] The examples in (124) and (125) show that this prediction is not borne out in Medumba. In (124), the context is constructed such that no past reference time is provided. The possible time of Elise leaving is part of the speaker's guess rather than part of the common ground. Still, the version containing the near past marker in (124-a) as well as the one with the remote past in (124-b) are acceptable answers.

(124) Context: You meet your friend and he asks you where Elise is. You are not sure, but you suspect:

a. (Mu'djʉ) Elise **fə** nɛ́n Douala
maybe Elise NEAR go Douala
"Maybe Elise went to Douala."

b. (Mu'djʉ) Elise **ná'** nɛ́n Douala
maybe Elise REM go Douala
"Maybe Elise went to Douala."

The example in (125) below, illustrating the same point, is constructed after Kratzer (1998). Kratzer argues that the fact that the English sentence in

[31] For any m1, m2 ∈ t such that m1 < m2: there is a m3 ∈ t such that m1 < m3 and m3 < m2. (Sharvit, 2014, p.269)

[32] Note that some authors (Cable, 2015b; Sharvit, 2014) assume for English that existential closure can apply to the T–head, thus generating an indefinite semantics for the past tense in cases like (125-a).

(125-a) is felicitous out of the blue suggests that the English past tense is not presuppositional in all its uses but can also spell out a combination of present tense and perfect aspect. This is in contrast with the German past in (125-b) which behaves as expected of a pronominal past tense since it is infelicitous without a contextually provided past interval. (125-c) shows that Medumba patterns with English in this respect which supports an indefinite analysis.

(125) Context: Nana and Marie are standing in front of a church, quietly admiring the masterwork of architecture. Out of the silence, Nana asks:

a. Who built this church? (English)
b. #Wer baute diese Kirche? (German)
who build.PST this church
Intended: "Who built this church"?
c. Wo zə'a **na'** yən cursi li? (Medumba)
who PRON REM build church this
"Who built this church?"

A final piece of evidence suggesting that the Medumba temporal markers are indefinite/quantificational rather than presuppositional is that, at least for some speakers,[33] they can introduce times by way of answering *when*–questions as illustrated in (126) for time of day markers and remoteness markers.

(126) Context question: When did Marie go to the market?

a. Marie **cág** nɛ́n ntɑn
Marie TOD go market
"Marie went to the market in the morning."
b. Marie **zí** nɛ́n ntɑn
Marie TOD go market
"Marie went to the market at night."
c. Marie **fə** nɛ́n ntɑn
Marie NEAR go market
"Marie went to the market recently."
d. Marie **ná'** nɛ́n ntɑn
Marie REM go market
"Marie went to the market a long time ago."

[33]These data are subject to variation. When I first tested these, two of my consultants rejected examples with *fə* or *na'* on the grounds that they are not precise enough (therefore different results are reported in Mucha & Zimmermann to appear), but they accepted them on later occasions. The judgments given in (126) stem from my main consultant who generally accepts discourses of this kind without hesitation.

To conclude, I propose that the temporal markers in Medumba should be analyzed as quantificational tense operators rather than as presuppositional tense features, since the overall picture that arises from the observations summarized in (127) is captured more straightforwardly in a quantifier approach.

(127) a. No *Maximize Presupposition* effects
b. Obligatory shift under attitudes
c. Relative readings under attitudes
d. Infelicity in "before"–clauses
e. Felicity without a contextually given reference time
f. Felicity in answers to "when"–questions

5.10 A note on syntactic ordering

Before concluding this chapter, I would like to briefly comment on the syntactic ordering of the temporal morphemes. Note that the approach taken above retains a symmetric analysis of the time of day markers and the temporal remoteness markers in the sense that they are of the same semantic type. From a purely compositional point of view, therefore, they should be freely combinable. We noted earlier, however, that the remoteness markers must syntactically precede the time of day markers.

Despite their common modifier type, these ordering restrictions on the temporal morphemes are not too surprising since we find similar ordering restrictions in the realm of adjectival NP modification (see e.g. Vendler 1968, Sproat & Shih 1991). Intuitively, we can make sense of the syntactic ordering SHIFT < TIME OF DAY < ASPECT in very general terms: the broader the temporal domain, the greater the syntactic distance from the predicate. Grammatical aspect, which is obligatory on the present approach, directly modifies the event variable of the verb and therefore must be adjacent to it. In the terminology of Klein (2009) and others, aspect specifies the "inner temporal structure" of an eventuality. Time of day modifiers locate events within a salient subinterval on the time line, namely the day, which is made salient by the natural circle of day and night. The past remoteness morphemes (as well as the future marker) have the full time line as their temporal domain. They situate the eventuality to the past or future of the local evaluation time and therefore provide the broadest and most general temporal modification. In fact, this also makes sense in terms of semantic composition. If we were to compute the truth conditions of the (ungrammatical) sentence with reversed remoteness and time of day markers in (128), we actually find that the meaning contribution of the time of day marker becomes close to vacuous.

(128) *Marie cág fə ná cəŋ
Marie TOD NEAR cook food
= λw.∃t" [t" overlaps the morning associated with t_c & ∃t' [t' precedes t" by ≤ a few days & ∃e [τ(e) ⊆ t' & cook(e)(w) & agent(e)(w) = Marie]]]
≈ Marie cooked beans in the near past of the morning before the utterance time

The reason for this is that the meanings of the past remoteness markers are not clear cut. For instance, *fə* does not specify that the asserted time is exactly two days, or one day, or a few hours before the evaluation time, but just that it is located sometime within a few days before the time relative to which *fə* is interpreted. Therefore, it does not make much difference whether the evaluation time for *fə* is the utterance time or the morning preceding the utterance time.

5.11 Summary

Let me briefly summarize the results of this chapter. One outcome of the discussion of the temporal (past) morphemes in Medumba is that they can be subdivided into one class of past remoteness markers and one class of time of day markers. The distinction is motivated by the fact that they differ from each other in their meaning contribution (past remoteness versus a temporal restriction to a particular time of day), and the observation that they are subject to co–occurrence and ordering restrictions. It was also demonstrated that all of the morphemes differ from temporal adverbials in their syntactic distribution as well as in not being licit as fragment answers. Crucially, they also differ from temporal remoteness morphemes in Gĩkũyũ in that they are optional, the near and remote markers are restricted to past interpretations, and in that they do not support a presuppositional account. The analysis that seems to capture the data most appropriately is one in which all the temporal morphemes are optional temporal operators that quantify over times but do not change the semantic type of their arguments as they map properties of times onto properties of times. The optionality of the tense operators naturally leads to the question of how sentences *without* these tense markers are interpreted. This issue is addressed in chapter 6.

Chapter 6

Tenseless sentences, aspect and present interpretation

This chapter deals with the interpretation of temporally unmarked sentences in Medumba. The main goal is to demonstrate how the range of possible readings as well as temporal defaults can be derived by the same aspect–based pragmatic theory that was referred to in the analysis of temporal interpretation in Hausa (cf. chapter 3). This is preceded by a short overview of the aspectual markers that get a mention in the works of Nganmou (1991) and Kouankem (2012). Another topic of this chapter is the semantics of the morphemes that are used to express (present) imperfective marking. Although this issue cannot be settled once and for all in this thesis, the empirical behavior as well as a proposal for the lexical entries of the morphemes will be sketched.

6.1 Previous descriptions of aspect marking

To prepare the reader for the discussion to follow, the inventory of aspectual markers in Medumba is summarized briefly in this section on the basis of the existing literature. Based on Nganmou (1991), Kouankem (2012) lists the following aspectual forms in Medumba:

(1) An inchoative form (*yɔ̆g nə́ tú'də̀*)

Nŭmí **yɔ̆g nə́ tú'də̀** nə́ băg ncwɛ̀n (Kouankem, 2012, p.56)
numi just to start to cut wood
"Nami has just started to cut the wood."

(2) A completive morpheme (*myàgtə̆*)

à **myàgtə̆** nə̀ băg ncwɛ̀n (Kouankem, 2012, p.56)
he finish to cut wood
"He has finished cutting the wood."

As can be seen from the translations, the constructions in (1) and (2) both involve aspectual verbs ("start" and "finish") and will hence not be regarded aspects proper.

(3) A durative/progressive/imperfective morpheme *kə́*, which is complemented by a dedicated negative form *bə́* (example from Nganmou 1991, p.171, glosses and translation adapted)

a. à ná' **kə́** nsìán ŋwà'nì ŋgə̀láŋ mə cú ndá lá
he REM IPFV read book when I enter house DEF
"He was reading when I entered the house."

b. à ná' kə̀ **bə́** ndʉ' nà
she REM NEG IPFV dig farm
"She was not digging the farm./She did not usually dig the farm."

(4) A habitual morpheme (*nŭm*)

nɑmi **nŭm** mbɑg ncwɛ̀n (Kouankem, 2012, p.57)
nami HAB cut wood
"Nami usually cuts the wood."

(5) An iterative morpheme (*mbɛ̀n*)

à **mbɛ̀n** mbɑg ncwɛ̀n (Kouankem, 2012, p.57)
he ITER cut wood
"He has cut the wood again."

In addition, Nganmou (1991, p.177) list the morpheme *cwɛd* as a progressive morpheme, while Kouankem (2012) prefers to call it a present tense.

(6) A (present) progressive morpheme *cwɛd*

Julia **cwɛd** (n)ná bán
Julia PRES.PROG prepare couscous
"Julia is preparing couscous."

Nganmou (1991, p.151) also identifies a "present tense", namely the morpheme *nə* that can also be shortened to a preverbal nasal or a floating tone on the following verb. Unfortunately, Nganmou does not systematically show that *nə* actually denotes present tense and its status is tricky. As will become important later, the same prefix forms infinitives.[1]

[1]Nganmou (1991) allots a tonal distinction to the two morphemes, namely a high tone to the tense morpheme and a low tone to the infinitival prefix. I could not find this distinction in my own data, where the prefix in both cases is associated with a low tone. Moreover, in its shortened form the morpheme also resembles the preverbal nasal *n–* that is used to mark serial verb constructions (SVCs) in examples like (i) (adapted from Kouankem & Zimmermann 2013). Since I have not systematically investigated SVCs, I will leave for future research whether the *n-* marker in these constructions can be included in a unified analysis.

In (7) I give an example for the present use taken from Nganmou (1991, p.111).

(7) The "present morpheme" (*nə*-)
à nə́ zíə́
he pres sleep
"He is sleeping."

Since the aspectual paradigm is not the focus of the present study on Medumba, I will not consider the aspect markers in the same detail as the past morphemes in chapter 5. However, since I am interested in the interpretation of sentences that do not bear tense markers, and since the study on Hausa has shown that aspect is a major factor in how "tenseless" clauses are interpreted, especially the distinction between perfective and imperfective aspect matters. As the overview above shows, imperfective aspect marking is realized by several different morphemes in Medumba, some of which seem to be specialized to (present) progressive or habitual uses. For simplification, I focus on the contrast between unmarked (perfective) sentences and sentences marked by (what I analyze as) the general imperfective marker *kə́* when it comes to the interpretation of tenseless sentences. In section 6.4, however, I provide a short discussion of the morphemes *nŭm*, *cwɛd*, and *nə* in addition.

6.2 Past and present default interpretations

The following sections is concerned with the interpretation of temporally unmarked sentences in Medumba. I will sketch a pragmatic account parallel to what has been argued for Hausa in chapter 3. Since the details of the analysis have already been explicated, I simply refer the reader to the considerations there as well as to the original studies on tenseless languages, in particular Smith & Erbaugh (2005), Smith et al. (2003, 2007) and Lin (2006). Let me introduce the crucial data first. Recall that in Medumba, bare eventive predicates are generally interpreted in the (perfective) past (cf. "immediate past" in Kouankem 2012) as illustrated in (8). (Cognitive) state predicates, on the other hand, receive present interpretations by default as shown in (9).

(8) a. Bú ná ŋkwún
they cook beans
"They (have) cooked beans."

(i) Nɑmí ʒʉ cəŋ **n**–juə́lə
Nami eat food SM-full
"Nami ate and was full."

b. Bú zí
they sleep
"They (have) slept."
c. Bú nɛ́n ŋwá'ni
they go school
"They went to school."

(9) Marie bǒ Patrick
Marie hate Patrick
"Marie hates Patrick."

Among languages that allow for temporally unmarked sentences, we seem to find two different default patterns of temporal interpretation. On the one hand, there are languages whose default temporal interpretation (in the absence of grammatical aspect) depends on the telicity of the predicate. Therefore, this class has been labeled *telicity–dependent* (Bohnemeyer & Swift, 2004). The generalization is that in telicity–dependent languages telic eventualities (i.e. accomplishments and achievements in the sense of Vendler 1967) get past interpretations by default while atelic eventualities (states and activities) are interpreted in the present. Two tenseless languages that have been thus described are Mandarin Chinese (Lin 2006, Smith & Erbaugh 2005) and Navajo (Smith et al. 2003, Smith et al. 2007). The second class are *dynamicity–dependent* languages in the terminology of Bohnemeyer & Swift (2004). This class includes languages where stative predicates get default present interpretations and all event predicates are interpreted in the past by default. Citing Welmers & Welmers (1968), Déchaine (1993) calls this the *factative effect*.[2] Besides English and many Kru and Kwa languages of Africa, this class includes Medumba. But where do the defaults come from? Déchaine (1993, p.571) proposes that the difference lies in the temporal boundedness of events and the contrasting unboundedness of stative predicates. Her idea is that events, since they are temporally bounded (i.e. they have a beginning and an end), cannot be properties of the utterance time and therefore have to be "stativized" by being viewed as an "actual history" which gives rise to a past interpretation. A similar approach based on the notion of *boundedness*[3] is taken in some works that analyze temporally unmarked sentences in telicity–dependent languages. They, however,

[2]Thanks to Camela Toews for pointing me to this reference.

[3]The notion of *boundedness* I refer to here is that of Smith & Erbaugh (2005, p.715) that was introduced in chapter 3: "Bounded situations are temporally closed by implicit or explicit bounds [...]; unbounded situations are ongoing, temporally open." These bounds are implicit in telic predicates, where a perfective viewpoint can be pragmatically derived from the situation type, this is *pragmatic boundedness*. Grammatical perfective aspect makes the temporal bounds explicit and thus enforces *semantic boundedness*. Assuming a phonologically covert perfective aspect morpheme in Medumba amounts to saying that temporal boundedness of events is always determined semantically by grammatical aspect in this language.

assume that telic predicates are inherently bounded and atelic predicates (i.e. states and activities) are inherently unbounded and thus explain the default pattern in telicity–dependent languages like Chinese (Smith & Erbaugh 2005).

I will not assume that activity predicates like *sleep, run, read* etc. are inherently bounded in Medumba and unbounded in Chinese or Navajo. As already indicated in the last chapter, I propose that Medumba has a covert perfective aspect operator which, besides quantifying over the event variable, makes events temporally bounded since it ensures that the event time is included in the reference time.[4] Some authors (e.g. Arregui 2007, Wurmbrand 2014) have proposed the same for English, following Bennett & Partee (1978)'s observation that English sentences without overt morphological aspect marking obtain perfective interpretations. For Medumba, Kouankem (2012, pp.55,56) at least implicitly makes this assumption as well. This analysis predicts that unmarked sentences with event predicates cannot obtain imperfective interpretations, which is in fact the case in Medumba as the following examples illustrate. In (10) for instance, the context question triggers a progressive answer which can only be given with an overt imperfective marker as shown in (11).

(10) Context question: What were the kids doing when you left the house?

a. #Bú (fə) ná ŋkwún
they NEAR cook beans
Intended: "They were cooking beans."

b. #Bú (fə) zí
they NEAR sleep
Intended: "They were sleeping."

c. #Bú (fə) nɛ́n ŋwá'ni
they NEAR go school
Intended: "They were going to school."

(11) Context question: What were the kids doing when you left the house?

a. Bú (fə) *kə́* (n)ná ŋkwún
they NEAR IPFV cook beans
"They were cooking beans."

b. Bú (fə) *kə́* (n)zí
they NEAR IPFV sleep
"They were sleeping."

c. Bú (fə) *kə́* (n)nɛ́n ŋwá'ni
they NEAR IPFV go school

[4]Recall that in chapter 2 I proposed that for *stative* predicates the temporal relation specified by the perfective aspect is overlap rather than inclusion.

"They were going to school."

Present progressive interpretations are marked morphologically as well. Medumba has a morpheme that is preferably used in present progressive contexts, namely *cwɛn/cwɛd* (12-a). The prefix *nə-*, which can also be shortened to a preverbal nasal or a floating tone on the verb (cf. Nganmou 1991), also licenses present interpretations (12-b). Although somewhat dispreferred by my consultants, the general imperfective marker *kə́* also seems to be usable to express present progressive (12-c). A completely unmarked form, however, cannot be used for present reference with event predicates as shown in (12-d).

(12) Context question: What are the kids doing?

a. Bú **cwɛd** ná ŋkwún
they CWƐD cook beans
"They are cooking beans."

b. Bú **nə**ná ŋkwún
they NƏ.cook beans
"They are cooking beans."

c. ?Bú **kə́** ná ŋkwún
they IPFV cook beans
"They are cooking beans."

d. #Bú ná ŋkwún
they cook beans
Intended: "They are cooking beans."

Not only progressive, but also habitual interpretations, which are often associated with imperfectivity, are incompatible with unmarked predicates and require an additional marker, normally *nŭm* for present habitual readings (13) and *kə́* for past habitual readings (14).

(13) Context question: What does Marie usually eat?

a. #Marie ʒʉ bɔ̌
Marie eat fufu
Intended: "Marie eats fufu."

b. Marie nŭm ʒʉ bɔ̌
Marie NUM eat fufu
"Marie eats fufu."

(14) Context question: What did Marie usually eat?

a. #Marie (ná') ʒʉ bɔ̌
Marie REM eat fufu
Intended: "Marie used to eat fufu."

b. Marie (ná') kə́ ʒʉ bɔ̌
Marie REM IPFV eat fufu

"Marie used to eat fufu."

In section 6.4, I will sketch an analysis of the morphemes used for imperfective interpretation. My main point here is that all phonologically unmarked sentences in Medumba receive a perfective interpretation and that imperfective must always be marked. Descriptively however, the data suggest that *cwɛn/cwɛd* and *nə-* are progressive markers restricted to present contexts and that *nŭm* is their habitual counterpart. *Kə́* is a general imperfective marker whose use in present contexts is blocked by the other markers. Table 6.1 below summarizes the use of the imperfective morphemes.

IPFV interpretation	Past	Present	Future
Progressive	*kə́*	cwɛd / nə-	*kə́*
Habitual	*kə́*	nŭm	*kə́*

Table 6.1: The use of imperfective markers in Medumba

6.3 Analysis of past and present defaults

I propose to account for the default interpretations of temporally unmarked sentences in Medumba in a way similar to what has been argued for Hausa in chapter 3 as well as for other tenseless languages such as Chinese or Navajo. Hence, I once more adopt the approach taken in Smith & Erbaugh (2005), Smith et al. (2003) and Smith et al. (2007), summarized in Smith (2008). As laid out in more detail earlier, this theory allows us to derive the default interpretations of tenseless sentences in Medumba from three pragmatic principles,[5] the *Deictic Principle*, the *Bounded Event Constraint* and the *Simplicity Principle of Interpretation* repeated below in the version of Smith (2008, p.231).

(15) **The Deictic Principle (DP)**
Speech Time is the central orientation point for language. The Present time is located at Speech Time, the Past precedes it, and the Future follows it.

(16) **The Bounded Event Constraint (BEC)**
Bounded situations may not be located in the Present.

(17) **The Simplicity Principle of Interpretation (SP)**
Choose the interpretation that requires the least information to be added or inferred.

[5]Like in Hausa, Smith (2008)'s *Temporal Schema Principle*, which accounts for aspectual defaults derived from *Aktionsart* properties of the predicate, is not relevant in Medumba since grammatical aspect is obligatory under my analysis.

The Deictic Principle and the Simplicity Principle together ensure that, unless independent factors prevent it, situations are located at the speech time, which requires no displacement of either the time or the world of evaluation. In consequence, unbounded eventualities, i.e. states and events marked for imperfective viewpoint aspect, are interpreted in the present by default. The Simplicity Principle also captures the observation that event predicates get past rather than future interpretations by default. Again, this hinges on the assumption that future interpretation involves modality in addition to temporal shifting which makes it less "simple" than past interpretation (cf. Smith & Erbaugh 2005, Smith et al. 2007). The Bounded Event Constraint, which has was formulated earlier in Bennett & Partee (1978) and Kamp & Reyle (1993), accounts for the default past interpretation of eventive predicates. Assuming that there is a covert perfective aspect operator in all Medumba sentences that are not overtly marked for imperfective, this perfective aspect requires that the running time of the VP–event be included in the reference time. Present interpretation would mean that the reference time is identified with the utterance time and this is where the Bounded Event Constraint kicks in. Since the utterance time is instantaneous, it cannot include the running time of a durative eventuality, or, as Smith et al. (2003, p.186) put it, "Speakers follow a tacit convention that communication is instantaneous. The present perspective is incompatible with the report of a bounded event, because the bounds would go beyond the moment."

As shown above, stative predicates get present interpretations in Medumba, contrary to event predicates. This very robust generalization keeps me from positing a covert past tense operator which would of course also be a conceivable account for default past interpretations. Cross–linguistically, the combination of stative predicates and perfective aspect often yields default present interpretations (cf. Bybee et al. 1994), as was also observed for Hausa in chapter 3. Recall that the reason for this lies in different temporal requirements of perfective aspect depending on the situation type of the predicate it applies to, namely temporal inclusion for events and temporal overlap for states (Kamp & Reyle 1993, Condoravdi 2002). Therefore, perfective aspect does not make stative predicates temporally bounded; the eventuality time is not required to be included in, but merely to overlap with the utterance time. Being unbounded, they hence get a default present interpretation which is the simplest interpretation in the sense that it requires no displacement of either the time or the world of evaluation (based on the Simplicity Principle). The interaction of situation type and perfective aspect to derive past and present interpretations is summarized in Table 6.2 below.

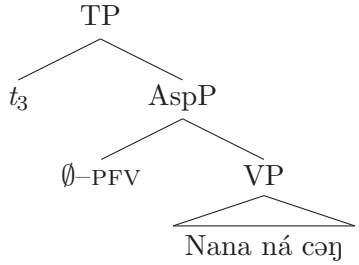
Situation type	Event	State
Perfective aspect	ET $\subseteq$ RT	ET O RT
RT location	RT $\neq$ UT (BEC), RT $<$ UT (SP)	RT = UT (SP, DP)

Table 6.2: Situation type, perfective aspect and RT location

For the sake of completeness, the interpretation of the temporally unmarked sentence in (18) with the LF in (19) is shown in (20). Just like in the imperfective tenseless sentence presented in the last chapter, I assume that in this case the reference time variable in the TP projection remains free to receive a value from the contextual assignment function. Moreover, I assume that, in out of the blue contexts, the default reference time is t_c (the utterance time), by virtue of the Simplicity Principle and the Deictic Principle. In a perfective sentence like (18), however, this assignment is excluded by the Bounded Event Constraint, i.e. since the perfective requires the eventuality to be included in the reference time, the reference time cannot be identified with the instantaneous utterance time. Therefore, the reference time is shifted, resulting in a past interpretation.

(18) Nana ná cəŋ
Nana cook food
"Nana (has) cooked (food)."

(19)



(20) a. $[\![\text{VP}]\!]^{g,c} = \lambda\text{e}.\lambda\text{w}.\ [\text{cook(e)(w)} \ \&\ \text{agent(e)(w)} = \text{Nana}]$

b. $[\![\text{AspP}]\!]^{g,c} = [\![\emptyset\text{–PFV}]\!]^{g,c}\ ([\![\text{VP}]\!]^{g,c})$
$= [\lambda\text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{e}\ [\tau(\text{e}) \subseteq \text{t} \ \&\ \text{P(e)(w)}]]\ (\lambda\text{e}.\lambda\text{w}.\ [\text{cook(e)(w)} \ \&\ \text{agent(e)(w)} = \text{Nana}])$
$= \lambda\text{t}.\lambda\text{w}.\exists\text{e}\ [\tau(\text{e}) \subseteq \text{t} \ \&\ \text{cook(e)(w)} \ \&\ \text{agent(e)(w)} = \text{Nana}]$

c. $[\![\text{TP}]\!]^{g,c} = \lambda\text{w}.\exists\text{e}\ [\tau(\text{e}) \subseteq \text{g(3)} \ \&\ \text{cook(e)(w)} \ \&\ \text{agent(e)(w)} = \text{Nana}]$
$\approx$ There is an event of Nana cooking and the running time of this event is included in the contextual reference time g(3)
$\rightarrow$ Due to the Bounded Event Constraint, g(3) is not identified

with t_c but shifted to the past

d. $[\![(18)]\!]^{g,c} \approx$ There is an event of Nana cooking whose running time is included in a past reference time

The sentence in (18) above parallels the examples of perfective/completive sentences in Hausa that were presented in chapter 3, the only difference being that the grammatical perfective aspect is not overtly realized in Medumba. As already mentioned, Medumba displays a further parallel to Hausa and many other languages, namely that in sentences that contain a stative predicate, the perfective aspect does not impose an inclusion relation between ET and RT that would lead to a violation of the Bounded Event Constraint.

As suggested in the discussion on Hausa and in the introductory part in section 2.3.2, this is due to the following properties that distinguish stative predicates from eventive ones:

1. Eventive predicates (i.e. achievements, accomplishments and activities) share the same temporal structure consisting of three phases: a preparatory phase (I), a culmination point (II), and a result state (III). (Kamp & Reyle, 1993, 557ff.)

2. States lack this structure. They do not have a well–defined end or beginning (cf. Altshuler & Schwarzschild 2013) and therefore cannot be claimed to be temporally included in a (reference) time interval.

In section 2.3.2, I proposed to formalize this observation by means of an adaptation of Condoravdi (2002)'s AT–relation which would give us the lexical entries for perfective aspect in (21) that incorporate interpretational differences depending on the event/state distinction.

(21) a. $[\![\text{PFV}]\!]^{g,c} = \lambda P_{\langle l,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists e\,[\tau(e) \subseteq t \;\&\; P(e)(w)]$ if P is eventive

b. $[\![\text{PFV}]\!]^{g,c} = \lambda P_{\langle l,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists e\,[\tau(e)\ O\ t \;\&\; P(e)(w)]$ if P is stative

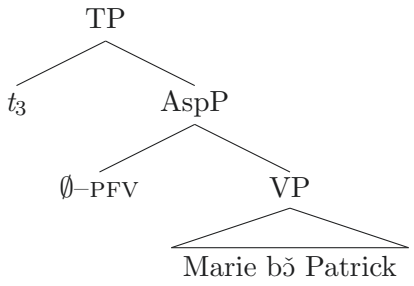
Again, this modification allows to capture the observation that sentences with stative predicates and perfective aspect receive present imperfective interpretation. Below I give the derivation of the stative sentence in (22) with the LF in (23) for illustration.[6]

[6]Given the data presented here, another conceivable approach would be that the relevant difference in Medumba is between stage level (SL) and individual level (IL) predicates (e.g. Diesing 1992 assumes that "love" and "hate" are IL predicates), that only SL predicates, but not IL predicates have a Davidsonian event argument (Kratzer, 1995) and that therefore aspect could not restrict the running time of IL–eventualities. There are at least two empirical reasons not to follow this line of reasoning: i) The relevant difference in Medumba is really between stative and eventive predicates. Unambiguously SL stative predicates like "(be) tired" pattern with IL states like "know". ii) For most speakers, the stative predicates are compatible with imperfective/progressive aspect markers. Under

(22) Context question: How does Marie feel about Patrick?

Marie bɔ̌ Patrick
Marie hate Patrick
"Marie hates Patrick."

(23)



(24) a. $[\![\text{VP}]\!]^{g,c} = \lambda\text{e}.\lambda\text{w}.$ [hate(Patrick)(e)(w) & agent(e)(w) = Marie]

b. $[\![\text{AspP}]\!]^{g,c} = [\![\emptyset\text{–PFV}]\!]^{g,c}$ ($[\![\text{VP}]\!]^{g,c}$)
$= [\lambda\text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{e}\,[\tau(\text{e})\ \text{O}\ \text{t}\ \&\ \text{P(e)(w)}]]\ (\lambda\text{e}.\lambda\text{w}.$ [hate(Patrick)(e)(w) & agent(e)(w) = Marie])
$= \lambda\text{t}.\lambda\text{w}.\exists\text{e}\,[\tau(\text{e})\ \text{O}\ \text{t}\ \&$ hate(Patrick)(e)(w) & agent(e)(w) = Marie]

c. $[\![\text{TP}]\!]^{g,c} = \lambda\text{w}.\exists\text{e}\,[\tau(\text{e})\ \text{O}\ \text{g(3)}\ \&$ hate(Patrick)(e)(w) & agent(e)(w) = Marie]
$\approx$ There is an eventuality of Marie hating Patrick and this eventuality temporally overlaps the contextually given reference time g(3)
$\rightarrow$ g(3) is identified with t_c, resulting in a present interpretation

d. $[\![(22)]\!]^{g,c} \approx$ Marie hates Patrick at t_c

As the derivation above illustrates, temporally unmarked sentences in Medumba can be analyzed in a way reminiscent of interpretative strategies found in genuinely tenseless languages.

6.4 Excursion: Multiple imperfective marking

As shown in the previous section, non–default present interpretations with eventive predicates arise by means of morphological marking in Medumba. Having analyzed the temporal particles that are associated with past interpretations in chapter 5, an obvious question is what the meanings of the particles associated with present interpretation are. As for the morpheme *kɔ́*, I have suggested that it encodes general imperfective in the sense of Kratzer (1998), i.e. existential quantification over events and inclusion of

the analysis assumed here, this suggests that they denote properties of eventualities and can also co–occur with the covert perfective.

the reference time in the eventuality time. The purpose of this section is to give a short overview of the markers associated with imperfective interpretation in Medumba. However, as the focus of this study is the analysis of the system of graded past and future markers as well the pragmatic interpretation of temporally unmarked sentences, this will not be much more than a rather brief excursus for completeness's sake. It partly relies on descriptions provided in Nganmou (1991) and complements them with my own data.

6.4.1 A proposal for *cwɛd* and *nŭm*

The preverbal particle *cwɛd* is the morpheme that is primarily used to obtain present progressive readings with eventive predicates in Medumba. Some illustrating data are given in (25).

(25) Context question: What are the kids doing?

a. Bú **cwɛd** nɛ́n ŋwá'ni
they CWɛD go school
"They are going to school."

b. Bú **cwɛd** ná ŋkwún
they CWɛD cook beans
"They are cooking beans."

Sentences with *cwɛd* are illicit in unembedded non–present contexts (26) as well as in habitual environments (27).

(26) Context question: What were the children doing when you left the house?

#Bú **cwɛd** ná ŋkwún
they CWɛD cook beans
Intended: "They were cooking beans."

(27) Context question: What does Patrick usually do after lunch?

#Patrick **cwɛd** zí
Patrick CWɛD sleep
Intended: "Patrick (usually) sleeps."

Moreover, *cwɛd* differs from *kə́* in not being compatible with past marking (28-b).

(28) Context question: What was Evelyne doing when you visited her?

a. Evelyne ná' **kə́** ná cəŋ
Evelyne REM IPFV cook food
"Evelyne was cooking food."

b. *Evelyne ná' **cwɛd** ná cəŋ
Evelyne REM CWɛD cook food
Intended: "Evelyne was cooking food."

Cwɛd is also not compatible with the future marker *á'*, in contrast with *kə́*. This is true for future shifting (29) as well as for present–oriented epistemic readings (30).

(29) Context: I want to go to Nana's place tomorrow at 11. What do you think he will be doing?

a. Nana á' **kə́** ná cəŋ
Nana FUT IPFV cook food
"Nana will be cooking food."

b. *Nana á' **cwɛd** ná cəŋ
Nana FUT CWɛD cook food
Intended: "Nana will be cooking food."

(30) Context: Roger is coming home from work and is surprised that he does not find his children playing in front of the house. Then he realizes that his spouse is already preparing dinner, so he can guess what the kids are doing.

a. Bú á' **kə́** widə má yúb
they FUT IPFV help mother their
"They will be helping their mother."

b. *Bú á' **cwɛd** widə má yúb
they FUT CWɛD help mother their
Intended: "They will be helping their mother."

At least for some speakers,[7] *cwɛd* is felicitous in combination with the general imperfective marker *kə́* (31).

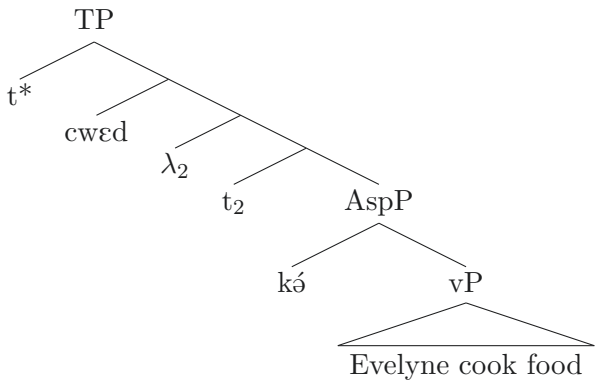
(31) Context question: What is Evelyne doing?

Evelyne **cwɛd** kə́ ná cəŋ
Evelyne CWɛD IPFV cook food
"Evelyne is cooking food."

The fact that *cwɛd* expresses present progressive meaning provokes the question of whether it should be treated as a tense or an aspect marker. The observation that it can be combined with the overt imperfective *kə́* but not with past or future marking suggests the former. Hence, I propose that LF structures containing *cwɛd* have the same structure as past–marked sentences, so that (31) would get the LF in (32).

[7] I consulted three speakers on this example, and two of them judged it as good.

(32)



The denotation I propose for *cwɛd* could be labeled as "imperfective present tense". According to the preliminary denotation in (33), *cwɛd* patterns with the past markers analyzed in the last chapter in that it introduces a time by existential quantification and specifies that this time includes the evaluation time. That is the imperfective component. Like the past markers, *cwɛd* always takes the speech time pronoun t* as its temporal argument, which results in an obligatory present interpretation.

(33) The meaning of *cwɛd* (to be revised)

$$[\![\text{cwɛd}]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists t' \; [t' \supset t \; \& \; P(t')(w)]$$

A theoretical option to account for the fact that *cwɛd* is restricted to progressive (as opposed to habitual) readings is provided by Ferreira (2004).[8] Based on an interval semantics, Ferreira proposes that habitual and progressive interpretations of general imperfective markers can be unified under the general imperfective meaning. The characteristic progressive and habitual interpretations arise depending on whether the denotation of the argument of the imperfective consists of (a set of) singular (34-a) or plural intervals (34-b). In Ferreira's proposal, these arguments are VPs denoting properties of times, in the framework assumed here, VPs denote properties of events.[9] Nonetheless; we can straightforwardly adapt Ferreira's analysis because the *cwɛd* marker takes an aspect phrase as its argument, which does in fact denote a property of times. A change to Ferrerira's proposal is that aspect phrases (rather than VPs) can denote sets of singular or plural intervals.

(34) $[\![\text{AspP}_{sg}]\!] = \{i_1, i_2, i_3\}$

a. $[\![\text{AspP}_{pl}]\!] = \{i_1 \oplus i_2, i_1 \oplus i_3, i_2 \oplus i_3, i_1 \oplus i_2 \oplus i_3\}$

[8] This approach is inspired by the study of Renans (2015) on imperfective aspect in Ga (Kwa, Niger Congo). Renans proposes that Ga has a general imperfective marker (–ɔ) which, however, only gets habitual interpretations due to the presence of a specific progressive aspect form.

[9] In Ferreira (2005), it is also assumed that VPs denote sets of events rather than times and the same analysis is spelled out in an event semantics framework.

According to Ferreira, if the imperfective operator quantifies over singular intervals, this results in a progressive reading. If plural intervals are quantified over, the resulting reading is habitual. In the case of a habitual interpretation, the imperfective does not quantify over a single interval but over a sequence of intervals, resulting in truth conditions under which no VP event must actually be ongoing at the time of evaluation. Crucially for our purposes, Ferreira also suggests that imperfective operators may encode a lexical specification for plural or singular arguments, which restricts their use to habitual and progressive, respectively.

(35) Imperfective operators (Ferreira, 2004, p.80)

a. $[\![\text{Imp}_{sg}]\!] = \lambda P_{sg}.\lambda t.\exists t'\ [t' \supseteq t\ \&\ P(t')]$

b. $[\![\text{Imp}_{pl}]\!] = \lambda P_{pl}.\lambda t.\exists t'\ [t' \supseteq t\ \&\ P(t')]$

The lexical entry in (35-a) is that of an imperfective marker that selects for sets of singular intervals and hence only allows for progressive interpretations. Its habitual counterpart selecting for a set of plural intervals is given in (35-b). Following this idea, the use and interpretation of *cwɛd* can be modeled by assigning it an imperfective semantics containing a restriction that its first argument denote a singular set of intervals. Thus, a lexical entry like (36) could capture that *cwɛd* has the specific function of marking progressive in present contexts.[10]

(36) The meaning of *cwɛd*

a. $[\![\text{cwɛd}]\!]^{g,c} = \lambda P_{sg}.\lambda t.\lambda w.\exists t'\ [t' \supset t\ \&\ P(t')(w)]$

It might also be interesting to put the analysis of *cwɛd* as a present imperfective in diachronic perspective. Notably, the approach sketched above

[10] A justified worry is that, in the cases where *cwɛd* occurs without *kɔ́*, my claims from the last section force me to assume that *cwɛd* co–occurs with a covert perfective aspect. The perfective counterpart of (31) then gets the truth conditions in (ii).

(i) Context question: What is Evelyne doing?

a. Evelyne *cwɛd* ná cəŋ
Evelyne CWƐD cook food
"Evelyne is cooking food."

(ii) $[\![\text{(i-a)}]\!]^{g,c} = \lambda w.\exists t'\ [t' \supset t_c\ \&\ \exists e\ [\tau(e) \subseteq t'\ \&\ \text{cook}(e)(w)\ \&\ \text{agent}(e)(w) = \text{Evelyne}]]$

As (ii) shows, the truth of the sentence in (i-a) requires that the time interval introduced by *cwɛd* includes both the utterance time and the running time of the cooking event. Intuitively, this derives the interpretation that the cooking time includes the utterance time. The truth conditions are in principle also compatible with a scenario where t_c and $\tau(e)$ are disctinct, non–overlapping intervals both included in t'. However, since under this interpretation (i-a) would be highly uninformative (it would tell the hearer absolutely nothing about the temporal location of the eventuality), the correct interpretation should follow from Gricean maxims in competition with the unmarked form and the future–marked form.

is in line with the cross–linguistic observation that progressive markers in a language are often restricted to a particular time reference, according to Comrie (1976) and Bybee et al. (1994) who mention Dutch and Spanish as examples.

A diachronic generalization that the marker *cwɛd* accords with is that progressive markers often develop from locative notions that which are very frequently used in the language (Bybee et al., 1994; Heine, 1994). In Medumba, *cwɛd* is the word for "field", i.e. the place where Medumba speakers traditionally spent most of their time. According to Heine (1994) and Bybee et al. (1994), prominent locative expressions are among the most common diachronic sources of progressive cross–linguistically. It therefore seems reasonable to assume that the locative *cwɛd* developed into a present progressive marker following the "Location schema" represented in (37-a) from Heine (1994). The other schemas are also given for completeness.

(37) Diachronic sources of progressives (Heine, 1994, p.269)

a. **Location Schema:** "X is at Y" ≈ "he is at/in/on eat-ing"
b. Action Schema: "X does Y" ≈ "he does eat-ing"
c. Equation Schema: "X is a Y" ≈ "he is (an) eating (one)"
d. Manner Schema: "X stays in a Y manner" ≈ "he stays in an eating manner"
e. Accompaniment Schema: "X is with Y" ≈ "he is with eat-ing"
f. Sequence Schema: "X V1 X V2" ≈ "he stays and eats"

Since *cwɛd* is dedicated to expressing present progressive specifically, another morpheme is used to express (present) habituality, namely *nŭm*, as shown in (38).

(38) Context question: What does Marie usually eat?

Marie nŭm ʒʉ bɔ̌
Marie NUM eat fufu
"Marie eats fufu."

The morpheme *nŭm* shows the opposite distribution of *cwɛd* in so far as it does not allow for progressive readings (39). However, just like *cwɛd*, *nŭm* cannot be used to answer questions with past time reference as illustrated in (40).

(39) Context question: What is Patrick doing at the moment?

#Patrick nŭm zí
Patrick NUM sleep
Intended: "Patrick is sleeping."

(40) Context question: When he was young, Patrick had a lot of habits that he has now given up. What did he usually do after lunch?

#Patrick (ná') nŭm zí
Patrick REM NUM sleep
Intended: "Patrick used to sleep."

By extension, the present habitual marker *nŭm* could get the same lexical entry as *cwɛd* except that it selects for plural sets of intervals which restricts its use to present *habitual* interpretations. Hence, *nŭm* would get the denotation in (41).

(41) The meaning of *nŭm*
$[\![\text{nŭm}]\!]^{g,c} = \lambda P_{pl}.\lambda t.\exists t' \; [t' \supset t \; \& \; P(t')]$

Having sketched the use as well as a potential proposal for an analysis of the present imperfective morphemes *cwɛd* and *nŭm*, the next paragraph is concerned with an alternative means of referring to events that are ongoing at the utterance time, namely constructions involving the preverbal affix *nə-*.

6.4.2 A proposal for *nə–*

As for the preverbal marker *nə-*, recall that Nganmou (1991) claims that it is a present tense marker, although she does not systematically show that its meaning actually is present tense, but only that it can be used with present interpretation. Nganmou's claim is compatible with my data in so far as some of my consultants accept sentences with *nə-* or its shortened forms (*n–* or just a floating tone on the verb) in present contexts. The reading obtained in these cases is present progressive just like with the morpheme *cwɛd*, e.g. in (42).

(42) Context question: What are the kids doing?
a. Bún **nə**nɛ́n ŋwá'ni
kids NƏ.go school
"The kids are going to school."
b. Bún **nə**ná ŋkwún
kids NƏ.cook beans
"The kids are cooking beans."
c. Bún **nə**(n)zí
kids NƏ.sleep
"The kids are sleeping."

As demonstrated in (43), the *nə-* marker is incompatible with past progressive interpretations, also if it is combined with the imperfective marker as in (43-b) or a past remoteness morpheme as in (43-c).

(43) Context question: What were the kids doing when you left the house?

a. #Bún **nə**ná ŋkwún
kids Nə.cook beans
Intended: "The kids were cooking beans."

b. #Bún ká **nə**ná ŋkwún
kids IPFV Nə.cook beans
Intended: "The kids were cooking beans."

c. #Bún fə **nə**ná ŋkwún
kids NEAR Nə.cook beans
Intended: "The kids were cooking beans."

There are data, however, that cast doubt on the hypothesis that *nə–* is a present tense marker. For one thing, *nə–* patterns with *cwɛd* in being incompatible with habitual contexts as shown in (44).

(44) Context question: What does Patrick usually do after lunch?
#Patrick **nə**(n)zí
Patrick Nə.sleep
Intended: "Patrick sleeps."

Stative predicates, which get present interpretations by default, can occur with *nə–* without any apparent change in meaning.

(45) Context question: Louise is Patrick's sister-in-law. Does she like him?
Həŋ, Louise (**nə**)kɔ̌ Patrick
yes, Louise (Nə.)love Patrick
"Yes, she loves Patrick!"

In order to give a plausible account of the meaning of the *nə-* marker, the most prominent use of the morpheme should be taken into serious consideration. As already mentioned, *nə-* is primarily involved in forming sentences that would be translated into English as gerunds or infinitive constructions, suggesting that predicates with *nə* are in fact non–finite, nominalized forms. Illustrations for these uses are given in (46).[11]

(46) a. á kɔ̌ **nə̀**kə́b ncwɛ́n (Nganmou, 1991, p.93,94)
he love Nə.cut wood
"He loves cutting wood."

b. **nə̀**f*α* ńt*α*g mɛ́n bwɔ̌
Nə.give advice child good
"Giving advice to the child is good."

[11] As mentioned at the beginning of the chapter, Nganmou (1991) assumes ambiguity between the infinitive and the "present tense" morpheme, which is based partly on tonal differences between the morphemes that I was unable to confirm in my elicitations. Hence, I will propose (a sketch of) a unified account.

c. á sə̀'ə́ **nə̀**lòʔə́ mɛ́n
he come Nə.take child
"He has come to take the child."

d. numí swá' ńsí **nə̀**cwíttə́ cum
Numi descend ground Nə.collect plums
Numi descended to collect the plums."

e. mwɛ́lí yă bód **nə̀**tág í
parent.his already tired Nə.counsel him
"His parents are already tired of counseling him."

Let me consider the nominalization cases in particular. The analysis of sentences with *nə–* that I want to propose is exemplified by means of the example in (47).

(47) mɛn myàgtə **nə̀**zhʉ zhú (Nganmou, 1991, p.169)
child finish Nə.eat thing
"The child has finished eating."

Following proposals in Portner (1992) and Beck & von Stechow (2014) for *ing*–nominalizations in English, I assume that *nə̀*–nominalizations are generalized (existential) quantifiers over events that undergo quantifier raising in cases like (47). Beck & von Stechow (2014) use the example in (48) (with the overt universal quantifier "every") for illustration.

(48) Bill heard every singing of the Marseillaise by Orin.

According to Beck & von Stechow (2014), verbs like "hear" are of type ⟨l,⟨e,⟨l,t⟩⟩⟩ with the denotation in (49).

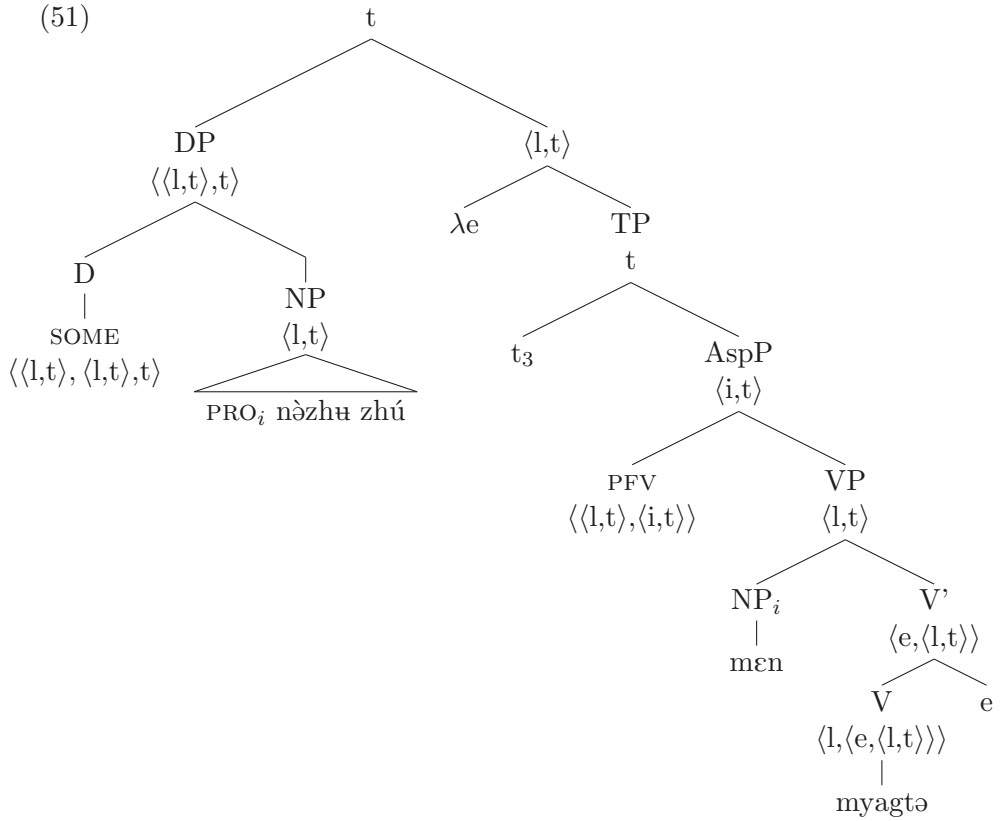
(49) ⟦hear⟧ = λe'.λx.λe. e' is a hearing of e by subject x
(Beck & von Stechow, 2014)

Returning to the Medumba sentence in (47), I assume accordingly that the verb *myàgtə* ("finish") has the denotation in (50), i.e. it relates an eventuality e to an individual x and the event of e finishing, e'. (51) shows the LF of (47).[12]

(50) ⟦myàgtə⟧ = λe'.λx.λe. e' is the event of x finishing e

[12]The architecture used here is a slightly adapted version of Beck & von Stechow (2014). For comparability and ease of presentation, world variables are omitted.

(51)



I assume with with Beck & von Stechow (2014) that the nominalizing element (phonetically realized as *-ing* in English and as *nə-* in Medumba) turns the verb (in this case *zhʉ*, "eat") into a noun. The object of the verb *myàgtə* ("finish") is a generalized quantifier over events. In the example discussed here the Q-determiner is covert, but it can also be overt (as in Beck & von Stechow's example). I assume the semantics in (52) for the covert quantifier in (52).[13]

(52) $[\![\text{SOME}]\!] = \lambda P_{\langle l,t\rangle}.\lambda R_{\langle l,t\rangle}.\exists e\ [P(e)\ \&\ R(e)]$

As demonstrated in (51), the quantifier DP is raised out of the object position and the trace saturates the verb's first event argument place. In the second step of the derivation, the individual argument slot of the verb is saturated by the denotation of the subject DP, which (in the case considered here) is co–indexed with the covert pronoun (PRO) that saturates the

[13]This is a simplification in so far as, often times, nominalizations get universal or generic interpretations. This problem relates to the more general discussion of how we should deal with underspecified or variable force of quantifiers, e.g. in the realm of modal expressions (Rullmann et al., 2008; Peterson, 2010; Deal, 2011; Bochnak, to appear). The simplification assumed here is in line with approaches that assume underlying existential quantification for modal quantifiers with variable force (Peterson, 2010; Deal, 2011).

argument slot of the nominalized verb. Above the VP, aspect is projected, introducing a time argument slot which is filled by the free reference time variable in the head of the TP phrase. Above the TP, λ–abstraction over the event variable in the object position creates a property of events, i.e. a suitable argument for the generalized quantifier. The truth conditions of (51) come out as in (53).

(53) $[\![(52)]\!]^{g,c} = \lambda P_{\langle l,t\rangle}.\lambda R_{\langle l,t\rangle}.\exists e\,[P(e)\ \&\ R(e)]\ ([\lambda e.\text{eat(thing)(the child)(e)}])$
$(\lambda e.\exists e'\,[\tau(e') \subseteq g(3)\ \&\ e' \text{ is the event of the child finishing } e])$
$= 1$ iff $\exists e\,[\text{eat(thing)(the child)(e)}\ \&\ \exists e'\,[\tau(e') \subseteq g(3)\ \&\ e' \text{ is the event of the child finishing } e\ ]]$
$[\![(52)]\!]^{g,c}$ = true iff there is an event e of the child eating and there is an event e' of the child finishing the eating event e and e' is included in the contextual reference time g(3)

I would like to propose that the more marginal present progressive uses of *nə-* can be derived from the same GQ analysis. In the "progressive" cases, the VP is headed by a covert verb ("DO") that relates eventualities to individuals (and hence is of type $\langle l,\langle e,t\rangle\rangle$).[14] The denotation of "DO" is given in (54).

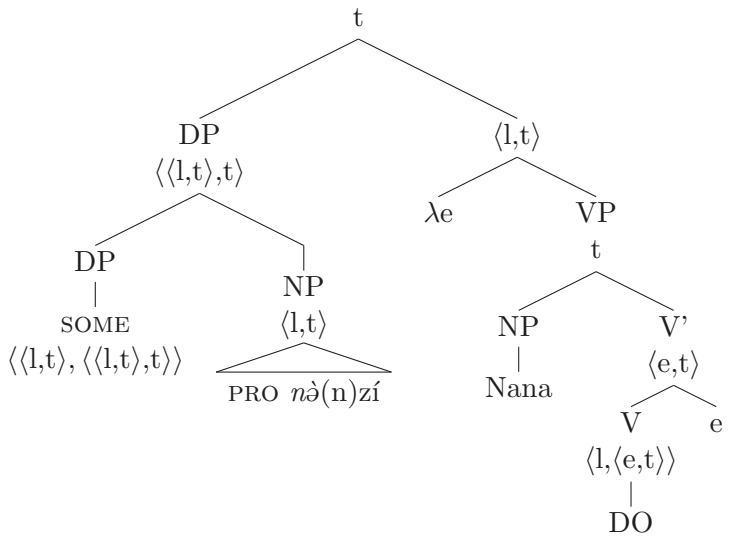
(54) $[\![\text{DO}]\!] = \lambda e.\lambda x.$ e is an eventuality involving the agent x

Since the only eventuality argument of the covert verb is saturated by the variable in the object position, the lambda abstractor is inserted right above the VP to create an event property. I propose that the present progressive interpretation of these constructions is an effect of their reduced structure. It is due to the fact that sentences like (56) do not contain any aspect or tense representations that their truth is always evaluated relative to the utterance time. Since the event variable is already bound above the VP, projecting aspect and tense on top of it would not give us an appropriate argument for the generalized event quantifier. For illustration, the LF and the truth conditions of (55) are given in (56) and (57), respectively.

(55) Nana *nə̀*(n)zí
Nana NÀ.sleep
"Nana is sleeping."

[14] The lexical entry of "DO" is reminiscent of the semantic function of the VOICE head according to Kratzer (1996), since it effectively introduces the argument slot for the agent individual in the sentence (thanks to Malte Zimmermann for pointing this out to me). As a side note, Hallman (2004) proposes that English "do" actually plays the role of VOICE in English *do so*–constructions.

(56)



(57) $[\![(56)]\!]^{g,c} = \lambda P_{\langle l,t\rangle}.\lambda R_{\langle l,t\rangle}.\exists e$ [P(e) & R(e)] ([λe.sleep(e)] (λe.e is an eventuality involving the subject Nana])
= 1 iff ∃e [sleep(e) & e is an eventuality involving the subject Nana]
$[\![(56)]\!]^{g,c}$ = true iff there is an event of Nana sleeping (at t_c)

This approach to the meaning of the *nə*–form can be related to some well–known generalizations concerning the diachronic paths involved in the development of progressive markers. Most notably, nominalization of some sort seems to be involved in the development of progressives in many cases (Bybee et al., 1994; Heine, 1994) and it is nominalization that is marked by the *nə*-prefix in Medumba. Hence, rather than analyzing it as a present tense, *nə*– should be related to the *–ing* suffix in English.

Moreover, Comrie (1976) remarks that nominal structures with *–ing* in English also typically indicate simultaneity between the eventualities denoted by the nominalized VP and the matrix VP. In an analysis such as the one alluded to here, this is made sense of by the assumption that the two event properties are related by a covert quantifier, with maximally one tense/aspect projection in the sentence. If no temporal structure is projected like in the example in (56), the resulting reading is present progressive. If this generalization is correct, it might actually extend to other languages as well. In German, for instance, the bare infinitival form of a verb can be used to answer questions in the present (58), but not in the past (59).[15]

(58) Context question: Was macht Jana gerade?
(What is Jana doing right now?)
Schlafen. (German)
sleep.INF

[15]Many thanks to Daniel Gutzmann for bringing these data to my attention.

(59) Context question: Was hat Jana gestern Abend gemacht?
(What did Jana do last night?)

#Schlafen. (German)
sleep.INF

The difference between German and Medumba would then be only that German does not have covert 'DO' (and therefore cannot realize the infinitive in (58) with a subject).[16] I should emphasize once more that also in Medumba, the reduced structure in (55) is a rather marginal one and that the *cwɛd*–form is the preferred way to express present progressive in Medumba. Moreover, it seems reasonable to assume that the two constructions are related. The example in (60) below was elicited with a consultant who actually finds the reduced form with *nə-* in (60-a) slightly marked. The answers in (60-b) and (60-c) are the alternatives volunteered by the consultant with the comment that (60-c) is the most "correct" one that "older speakers would use".

(60) Context question: What is Nana doing?

a. ?Nana **nə**ná cəŋ
Nana NƏ.cook food
"Nana is cooking food."

b. Nana **cwɛd** ná cəŋ
Nana CWƐD cook food
"Nana is cooking food."

c. Nana bʉ **cwɛd nə**ná cəŋ
Nana be CWƐD NƏ.cook food
≈ "Nana is in the state of cooking food."

As the reader will notice, the most explicit variant in (60-c) contains both *cwɛd* and *nə-* as well as an overt auxiliary verb and hence more directly relates to the "location schema" that I conjectured is the diachronic source of the *cwɛd*–progressive. Thus, it appears that both ways in which present progressive can be expressed in colloquial Medumba evolved as reduced versions of this more explicit form that is most accurately translated as "(to) be in the state of V–ing".

[16] Arguably, the overt realization of the dummy verb, which then, however, comes with tense marking and agreement, is marginally possible in spoken language (i).

(i) Context question: Was macht Jana gerade?
(What is Jana doing right now?)

?Jana tut schlafen.
Jana do.3SG.PRES sleep.INF
"Jana is sleeping."

6.5 Summary

The first part of this short chapter demonstrated how the temporal interpretation of sentences that are not marked for tense can be captured by the same pragmatic account that was proposed to analyze tenseless sentences in Hausa. This requires the assumption that all finite sentences in Hausa are marked for aspect, with perfective being phonologically covert, which is motivated by the observation that all imperfective uses of Medumba sentences have to be morphologically marked. Given this, the pragmatic account of Smith (2008) successfully derives default interpretations from aspect in Medumba as well. However, there are some important differences between Medumba and Hausa concerning the interpretation of sentences without tense marking which will be discussed in chapter 8.

The second part of the chapter briefly considered the semantics of the markers that are used for imperfective and present interpretation with eventive predicates. In this realm, a lot has to be left open for further research, and the proposals sketched in section 6.4 certainly call for more empirical testing. The gist of this section is that Medumba has a rich inventory of temporal markers not only for past, but also for present interpretation, which do not lend themselves easily to a clear distinction between aspect and tense meaning. The next chapter explores the inventory of future marking in Medumba, which is similarly elaborate.

Chapter 7

Future interpretation in Medumba

This chapter provides an analysis of future marking and future interpretation in Medumba, and its structure roughly parallels that of previous chapters. The first section 7.1 describes the inventory of future markers based on previous literature and introduces some questions that I will attempt to answer in the course of the chapter. Section 7.2 presents the crucial empirical data. In sections 7.3, 7.4 and 7.5 an analysis for the general future marker *á'* as well as for the licensing of future interpretation in Medumba is developed. Section 7.6 analyzes the remoteness distinctions in the realm of future interpretation, and section 7.7 summarizes.

7.1 Previous accounts of the future morphemes

This section gives a short informal overview of the future forms identified by the two available descriptions of temporal markers in Medumba (Nganmou 1991, Kouankem 2012) and what meanings these authors assign to the respective forms. Like in the case of past morphology, we do not find thorough agreement with respect to the number and the concrete meanings of the future forms except for the compund forms *á' cág* and *á' zí*. A summary is provided in Table 7.1.

(1) Louise **á'** nέn ntɑn
Louise FUT go market
Nganmou (1991): "Louise will go to the market (today)."
Kouankem (2012): "Louise will go to the market (some time in the future)."

(2) Louise **á' ghʉ** nέn ntɑn
Louise FUT go market
Nganmou (1991): -

Kouankem (2012): "Louise will go to the market (today)."

(3) Louise **á' yɔ̄g** nɛ́n ntɑn
Louise FUT go market
Nganmou (1991): -
Kouankem (2012): "Louise will go to the market (today, after noon)."

(4) Louise **á' cág** nɛ́n ntɑn
Louise FUT go market
Nganmou (1991): "Louise will go to the market (tomorrow)."
Kouankem (2012): "Louise will go to the market (tomorrow)."

(5) Louise **á' zí** nɛ́n ntɑn
Louise FUT go market
Nganmou (1991): "Louise will go to the market (in the distant future)."
Kouankem (2012): "Louise will go to the market (in the distant future)."

Morphological form	Kouankem (2012)	Nganmou (1991)
á'	general/indefinite future	today
á' ghʉ	today	-
á' yɔ̄g	today (after noon)	-
á' cág	tomorrow	tomorrow
á' zí	distant future	distant future

Table 7.1: Descriptive accounts of future markers in Medumba

As the reader will have noticed, the complex future forms are expressed by combining the morpheme á' with the morphemes *cág*, *yɔ̄g* and *zí* that I proposed to analyze as time of day modifiers in chapter 5.[1] This observation as well as the analyses presented for future marking in Hausa and past marking in Medumba raise the following questions which I will try to answer in this chapter:

1. What is the meaning of the morpheme *á'*?
   (a) Does it involve modal, temporal and/or aspectual meaning components?
   (b) How does it relate to the morphemes associated with past interpretation in Medumba?

[1] In the chapter on future I will again exclude one form from my considerations, namely *á' ghʉ*. The reason is that I could not collect reliable data on this form since my consultants judged it as marginal and never produced it. In contrast to *lò*, which was excluded from the discussion of past markers in chapter 5, they did however recognize it and described its interpretation as something like immediate future.

(c) How does it relate to future markers in other languages?

2. What are the meanings of the complex future markers?
   (a) What are their exact temporal domains and interpretations?
   (b) Do they carry remoteness meanings?
   (c) Can their interpretation be derived compositionally from the meaning of *á'* and the meaning of the time of day markers?

7.2 The behavior of the future marker *á'*

When trying to describe the meaning of the morpheme that is most commonly associated with future interpretation in Medumba, and having in mind the properties of future morphemes in languages like Hausa and Guaraní, an obvious first question is whether the future–shifting associated with the Medumba future marker is relative (and in what sense). As example (6) illustrates, relative uses of *á'* seem to be possible only if *á'* is syntactically embedded under a past sentence. An illustration is given below, where the embedded form in (6-a) is used to express a past intention, but the unembedded form in (6-b) is illicit.

(6) Context: Linda wanted to go to the market **yesterday** but then her child got sick and she had to stay at home; she says:
   a. á **fə** mbʉ zə mə **á'** nɛ́n ntɑ̂n (ndá'ndjɨ mbə mə kə
      it NEAR be that I FUT go market (but that I NEG
      mbɛ́n nɛn).
      again go)
      "I was going to go to the market (but I didn't go)."
   b. #mə **á'** nɛ́n ntɑ̂n (ndá'ndjɨ mbə mə kə mbɛ́n nɛn).
      I FUT go market (but that I NEG again go)
      Intended: "I was going to go to the market (but I didn't go)."

The contrast in (6) suggests that a contextually given past reference time alone is not sufficient to license a "future–in–the–past" reading with *á'*. Another example illustrating the same point is given in (7).

(7) Context: Elise is surprised because she saw Marie with a cast on her arm. You know how that happened, and you explain it to Elise: Last time you saw Marie, which was **two weeks ago**, she told you that she had just consulted a fortune teller who predicted that Marie would fall and break her arm. You say to Elise:
   a. ŋgab bô yă tɔgə́ mbá á **ná'** mbʉ zə Marie **á'** ntəm
      week two already pass that it REM be that Marie FUT fall
      nsi lá
      down PRT

"Two weeks ago, Marie was going to fall down."

b. #ŋgab bô yǎ tɔgə́ mbá Marie **á'** ntəm nsi
week two already pass that Marie FUT fall down
Intended: "Two weeks ago Marie was going to fall down."

The data in (6) and (7) suggest that the future–shifting associated with *á'* can be relative, but not relative to a contextually given reference time, much like the past shifting encoded by the remoteness markers discussed in chapter 5. To give an outlook, in section 7.5 I will in fact argue that the future shifting associated with examples like (6) and (7) comes from a covert time shifting operator that is a (relative) tense in the same way as the past shifting operators are. In this sense, I will propose a symmetric analysis of the past and the future in Medumba.

Let me now investigate the possibility of non–future modal readings. Contrary to what was observed in Hausa, the Medumba future marker *á'* allows for present epistemic interpretations. This seems to be possible whenever the predicate is stative like *(be) in the room* in (8) or if it is "stativized" by an imperfective aspect like *(be) helping their mother* in (9-a). Eventive sentences with *á'* but without imperfective marking such as (9-b) cannot receive present epistemic interpretations. The reader should note the interesting parallel with the contrast between present and past interpretations, namely that the present–oriented epistemic reading is only possible if an imperfective marker (in this case *kə́*) is there. In previous examples, this was explained by the presence of a default perfective operator in the Medumba aspect phrase since an eventive sentence in the perfective would exclude a present interpretation. An analysis of this contrast in the future domain will be given in section 7.5.

(8) Context: You want to visit your friend Elodie. When you arrive at her house, you see that the light is on, so you say:

Elodie **á'** mbʉ cum ntu' ndá
Elodie FUT be in piece house
"Elodie must be in her room."

(9) Context: Roger is coming home from work and is surprised that he does not find his children playing in front of the house. Then he realizes that his spouse is already preparing dinner, so he can guess what the kids are doing.

a. Bú **á'** kə́ widə má yúb
they FUT IPFV help mother their
"They will be helping their mother."

b. #Bú **á'** widə má yúb
they FUT help mother their
Intended: "They will be helping their mother."
Speaker comment: "This sounds like an order."

The data in (8) and (9) suggest that the future marker encodes epistemic modal meaning, or is at least compatible with it, and that future shifting is not entailed by the use of *á'*. This last point sets the Medumba future marker apart from the Paraguayan Guaraní marker *–ta* and the Hausa future form *zā* + *prosp*. Recall that according to Tonhauser (2011b), *–ta* has relative future shifting as part of its lexical meaning. In the Hausa future form, I argued, obligatory relative future shifting comes from a prospective aspect form with which the morpheme *zā*, which has often been labeled a "future tense marker" in the previous literature on Hausa, obligatorily co–occurs. In my analysis, the morpheme *zā* itself does not encode any future shifting at all, but only quantification over possible worlds, i.e. modality (and quantification over events which was motivated on compositional grounds in section 4.3).

A possible hypothesis at this point is that Medumba *á'* is similar to Hausa *zā* in that it encodes modality but not time shifting, which provokes the question what modal interpretations *á'* is compatible with. Recalling that the future markers of Guaraní and Hausa are mainly associated with the inherently future–oriented modal meanings of prediction and intention, the data from Medumba suggest that *á'* is less restrictive in this respect. For starters, we find that the usual "simple future" readings of prediction and intention (cf. Copley 2009) are compatible with the use of *á'*. This is illustrated for prediction in (10) and for intention in (11).

(10) Context question: What will the weather be like later?

mbəŋ **á'** lú
rain FUT fall
"It will rain."

(11) Context question: What will you do later?

mə **á'** náb yɑ̄m mutwá
I FUT repair my car
"I will repair my car."

The Medumba future marker is also compatible with deontic necessity readings, as (12) and (13) illustrate.

(12) Context: Célestine would like to go out with her friends but her mother reminds her of her obligations:

wú **á'** ná cəŋ
you FUT cook food
"You have to cook!"

(13) Context: Vanessa wants to talk about something delicate to her brother. She thinks it would be better if his children didn't listen, so she says to him:

bú **á'** nɛ́n kɑ
they FUT go first
"First they have to go."

In light of the gradability of grammatical temporal relations in past environments that we find in Medumba, another important observation is that no remoteness restriction seems to be encoded in the meaning of the future morpheme *á'*, as is illustrated by the fact that *á'* is compatible with temporal frame adverbials of any remoteness from immediate future to distant future (14). This supports the description provided by Kouankem (2012) that *á'* is a general future marker and contradicts that of Nganmou (1991) which states that *á'* denotes hodiernal ("today") future.

(14) Context question: When will Alice go to Cameroon?

a. Alice **á'** nɛ́n cameroun **ndɔ̌(li)**
Alice FUT go cameroon now
"Alice will go to Cameroon now."

b. Alice **á'** nɛ́n cameroun **sɛn(i)**
Alice FUT go cameroon today
"Alice will go to Cameroon today."

c. Alice **á'** nɛ́n cameroun **nəmndjʉ**
Alice FUT go cameroon tomorrow
"Alice will go to Cameroon tomorrow."

d. Alice **á'** nɛ́n cameroun **mu' ŋgab**
Alice FUT go cameroon other week
"Alice will go to Cameroon next week."

e. Alice **á'** nɛ́n cameroun **ŋwə zə a sə lə**
Alice FUT go cameroon month that it come PRT
"Alice will go to Cameroon next month."

f. Alice **á'** nɛ́n cameroun **ŋgo mu'**
Alice FUT go cameroon year other
"Alice will go to Cameroon next year."

7.3 Toward a modal analysis of *á'*

The discussion in chapter 3 revealed that in many (superficially) tenseless languages, future interpretation of unmarked sentences is very restricted.[2] In accordance with this observation, the simple example in (15), where the context provides a future reference time, suggests that unmarked sentences in Medumba cannot get future readings and that the morpheme *á'* is necessary for future interpretation.

(15) Context question: What will Nana and Serge do tomorrow?

[2]This issue will be addressed again in chapter 8.

a. Bu **á'** ná ŋkwún (nəmndjʉ)
they FUT cook beans tomorrow
"They will cook beans tomorrow."
b. #Bu ná ŋkwún (nəmndjʉ)
they cook beans tomorrow
Intended: "They will cook beans tomorrow."

Consider, by contrast, the parallel past example given in (16), where the past morpheme *fə* is optional. Under the present analysis, this is due to the temporal default of the bare perfective sentence [They ∅-PFV cook beans], which is past.

(16) Context question: What did Nana and Serge do yesterday?
a. Bu **fə** ná ŋkwún (ŋkɔg)
they NEAR cook beans yesterday
"They cooked beans yesterday."
b. Bu ná ŋkwún (ŋkɔg)
they cook beans yesterday
"They cooked beans yesterday."

A lesson from the pragmatic theory of Smith et al. (2007) is that future reference must be marked because it can never arise as a default interpretation. Moreover, examples such as (15) suggest that (superficially) tenseless sentences in Medumba cannot refer to contextual future times in Medumba as easily as they can in Hausa. This, however, does not have to mean that future is always semantically encoded by the element that is most naturally used to express it. For Medumba, I would like to argue that the "future marker" *á'* does not in itself encode future or prospective meaning, but indicates the occurrence of a covert future–shifter.

In her short cross–linguistic overview of natural language future markers, Tonhauser (2011b) observes that their semantics differ in whether they do or do not entail future shifting. There seems to be one class of future markers that import future meaning at every occurrence; this class includes the Guaraní future marker *-ta* (Tonhauser, 2011b), the St'át'imcets future marker *kelh* (Matthewson, 2006; Rullmann et al., 2008) as well as the Hausa future form *zā + prosp* (chapter 4 of this thesis). On the other hand, many future markers like English *will* (e.g. Smith 1978, Enç 1996), Turkish *-(y)EcEk* (Yavaş, 1982) and German *werden* (e.g. Vater 1975; Zifonun et al. 1997) do not seem to entail future shifting in all their uses, as evidenced by present–oriented epistemic or dispositional uses. In what follows, I present an analysis of future in Medumba which, as I propose in chapter 8, might be extendable to other languages in a way that accounts for this systematic difference between natural language future markers observed in Tonhauser (2011b).

Coming back to future marking in Medumba, the data presented in (15) above suggest that *á'* is a dedicated future marker. On closer scrutiny, however, the presence of the marker *á'* is not strictly speaking necessary for future interpretation. Other modal elements such as the adverb *mu'djʉ*, which is the most natural way to express epistemic possibility in Medumba, allow future interpretation without the future marker. This observation suggests that *á'* is not a future shifter, but only one among several morphemes that license future interpretation. In a bare sentence with neither *á'* nor *mu'djʉ* in it, future interpretation seems to be excluded, in accordance with the observation in (15). All this is illustrated in (17) below. Note that the context in which (17) is presented (adapted from Tonhauser 2011a) is designed specifically to elicit a prospective time shift (i.e. a future event is predicted based on evidence at a present reference time), rather than for a contextual reference time anchoring to the future.

(17) Context: A farmer is looking at the clouds, he says:

a. mbəŋ **á'** lú
rain FUT fall
"It will rain."

b. **mu'djʉ** mbəŋ ndú
maybe rain fall
"It might rain."

c. #mbəŋ ndú
rain fall
Intended: "It will rain."

Interestingly, future marking seems to be dispensable in negated sentences, as illustrated for a stative and an eventive predicate in (18) and (19), respectively.

(18) Context: Marie has had a very hard time lately. She worked a lot and did not sleep very much. How will she be doing when I visit her tomorrow?

Marie kə mbʉ məbwô
Marie NEG be good
"Marie will not be well."

(19) Context: You and your spouse are discussing who will do what in the house today. You don't like cooking, so you say:

Mə kə ná cəŋ
I NEG cook food
"I won't cook."

Let me summarize the main characteristics of the future marker *á'* that seem to be relevant for determining future semantics in Medumba:

(20) a. Sentences with *á'* are compatible with several (epistemic and root) modal interpretations
b. Certain semantic operators (e.g. modal elements) can trigger future shifting in the absence of *á'*
c. Sentences with *á'* allow for present (epistemic) interpretations
d. Sentences with *á'* seem to allow present epistemic readings (only) with stative or imperfective predicates

In light of these observations, the semantics I would like to propose for *á'* is that of a very general universal modal with no temporal meaning components:[3]

(21) $[\![\text{á'}]\!]^{g,c} = \lambda P_{\langle s,t\rangle}.\lambda w.\forall w'[w' \in \text{BEST}_{O_{(w)}}(\text{MB}(w)) \rightarrow P(w')]$

On a purely descriptive level, the presence of an identifiable prospective aspect form in Hausa, i.e. a (tonal) marker that has the semantics of event time shifting to the future, is a crucial difference to Medumba, which does not have overt prospective marking (unless we assume that prospective aspectuality is the meaning of *á'*, which, given the empirical observations made above, strikes me as implausible). Hence, assuming that *á'* is a modal marker that often comes with future orientation in the absence of an overt prospective aspect marker, we have to explain the origin of the future orientation, if it is not encoded in the meaning of *á'*. I suggest that, just like the Hausa predictive modal *zā*, *á'* always combines with a future shifting element, which is covert in Medumba. The proposal presented in the next section is that the Hausa future form (as opposed to the Medumba future form) is incompatible with present epistemic readings because Hausa obligatorily marks aspect but does not allow for aspect stacking, so that every finite Hausa sentence is marked for exactly one aspect (namely prospective in the case of future marking) while in Medumba different temporal/aspectual combinations are possible (e.g. future/prospective plus imperfective).

Hence, the idea is that the tense/aspect system of Medumba also includes a future shifter, but that it is covert. As aforementioned, Matthewson (2012, 2013) shows that in Gitksan, future orientation always involves an overt prospective aspect morpheme. This might suggest that, cross–linguistically, future orientation is never encoded in the semantics of modals directly, but always arises from a prospective aspect (see also Chen et al. (to appear)). Variation between languages would then be in whether this prospective aspect is realized overtly and whether it is obligatory with circumstantial modals. Kratzer (2012b) makes a similar proposal for English, where the prospective aspect that gives future orientation to modals is covert

[3] I assume universal quantificational force mainly by analogy with other analyses of natural language future markers (e.g. Enç (1996) and Copley (2009) for English *will*). Some of my data suggest that *á'* displays variable force effects, which should be investigated in future research.

and optional. (In fact, the alert reader might already have noticed that the semantic behavior of the Medumba future marker is not very different from that of its presumed English counterpart *will*.)

If Medumba were like Hausa under my analysis, a covert prospective aspect would alternate with the overtly marked imperfective and the perfective, which is also covert. I believe, however, that this approach is not very attractive for Medumba since future–marking co–occurs with imperfective marking (with *kə́*), resulting in a future progressive interpretation or a present epistemic reading as demonstrated in section 7.2. If sentences containing *á'* and *kə́* are ambiguous between a present imperfective and a future imperfective interpretation, as the data suggest, the prospective and the imperfective cannot be in complementary distribution. In this respect, Medumba seems to pattern with English, since English also allows to combine its overt aspectual forms, i.e. the perfect and the progressive like in (22) below.

(22) Sarah has been working for 10 hours.

Recall that in chapter 5 it was argued that the overt Medumba morpheme that most often occurs in classic perfect environments, *yə̌*, in fact means "already", and that, in consequence, Medumba does not have an English–type perfect aspect. However, Medumba has two types of temporal markers that encode near and remote past shifting and specification of a time of day, respectively. Interestingly, the future modal *á'* is incompatible with near and remote past markers such as *fə* and *ná'*. Hence, if *á'* were a modal that is completely temporally neutral, one would expect that the examples in (23-a) and (24-a) should be possible and result in a past–oriented epistemic interpretation in the sense of Condoravdi (2002). In order to express past-oriented modality, however, more complex embedding structures like (23-b) and (24-b) must be used.

(23) Context: Claude tells you that he and Marie had a fight yesterday. You are very surprised since normally Marie is a very calm and gentle person. You conclude:

a. *Marie **á'** **fə** ndjâ ka' ncʉ
Marie FUT NEAR angry really heart
Intended: "Marie must have been very angry."

b. a **á'** mbʉ zə Marie **fə** ndjâ ka' ncʉ
it FUT be that Marie NEAR angry really heart
"Marie must have been very angry."
lit.: "It will be that Marie (had) a very angry heart."

(24) Context: Marie participated in a race yesterday. Today she looks very happy, so you suspect:

a. *Marie **á'** **fə** cá ŋkɔg
Marie FUT NEAR win yesterday
Intended: "Marie must have won yesterday."

b. a **á'** mbʉ zə Marie **fə** cá ŋkɔg
it FUT be that Marie NEAR win yesterday
"Marie must have won yesterday."
lit. "It will be that Marie has won yesterday."

These examples suggest that the future modal *á'* might in fact not be completely neutral regarding its temporal orientation since it is incompatible with the near and remote past markers, just like the Hausa modal *zā* is incompatible with progressive, perfective or habitual aspect. Below I want to argue that *á'* is really just a modal, but always combines with a covert future shifter, the lexical entry of which is given in (25).

(25) $[\![\emptyset\text{–FUT}]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists t'\ [t' > t\ \&\ P(t')(w)]$

Notably, assuming a division of labor between the modal *á'* and a covert future shifter in Medumba is empirically pretty much indistinguishable from one in which both modality and future shifting are encoded in the meaning of *á'*. However, it seems that examples such as (17-b) with future orientation but without the *á'*–marker, more of which will follow in the next section, support a separation of modality and future–shifting. Additional arguments for this variant will also come from the distribution of complex future markers in section 7.6.

7.4 Deriving the readings of *á'*

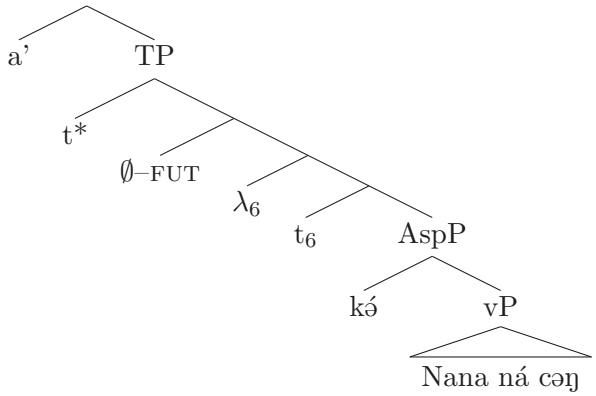
As shown above, eventive predicates with the future modal *á'* in Medumba allow for present epistemic readings if they are also marked for imperfective. At the same time, *á'* is incompatible with past morphemes such as *fə* and *ná'*. One way to model this is to assume that *á'* always selects for the covert future shifter defined in (25), if we can show that the present epistemic interpretation can still be derived. Immediately below, I demonstrate that the truth conditions of an event sentence with the imperfective marker *kə́*, the *á'*–marker and a covert prospective aspect are in fact weak enough to allow for both present epistemic (progressive) and future progressive interpretations. Consider the simple future imperfective in (26).

(26) Nana á' kə́ ná cəŋ
Nana FUT IPFV cook food
"Nana will be cooking."

I propose that the covert future shifter occupies the same structural position as overt past markers such as *fə* and *ná'*. Again, this is in line with

quantificational approaches (most notably von Stechow 2009) that propose a symmetric analysis of past, perfect and future which are uniformly analyzed as time shifters.[4] Hence, we get a similar LF as in the past cases, except that the modal operator *á'* scopes over the covert time shifter. Again, the open time slot of the time shifter is filled by the deictic speech time pronoun t*.[5]

(27)



(28) a. $[\![\text{vP}]\!]^{g,c} = \lambda\text{e}.\lambda\text{w}.[\text{cook(food)(e)(w)} \;\&\; \text{agent(e)(w)} = \text{Nana}]$

b. $[\![\text{AspP}]\!]^{g,c} = [\![\text{kə́}]\!]^{g,c}\,([\![\text{vP}]\!]^{g,c})$
$= [\lambda\text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{e}\,[\tau(\text{e}) \supseteq \text{t} \;\&\; \text{P(e)(w)}]](\lambda\text{e}.\lambda\text{w}.[\text{cook(food)(e)(w)} \;\&\; \text{agent(e)(w)} = \text{Nana}])$
$= \lambda\text{t}.\lambda\text{w}.\exists\text{e}\,[\tau(\text{e}) \supseteq \text{t} \;\&\; [\text{cook(food)(e)(w)} \;\&\; \text{agent(e)(w)} = \text{Nana}]$

c. $[\![\text{TP}]\!]^{g,c} = [\![\text{∅–FUT}]\!]^{g,c}([\![\text{AspP}]\!]^{g,c})([\![\text{t*}]\!]^{g,c})$
$= [\lambda\text{P}_{\langle i,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{t'}\;[\text{t'} > \text{t} \;\&\; \text{P(t')(w)}]](\lambda\text{t}.\lambda\text{w}.\exists\text{e}\;[\tau(\text{e}) \supseteq \text{t} \;\&\; \text{cook(food)(e)(w)} \;\&\; \text{agent(e)(w)} = \text{Nana}])(\text{t}_c)$
$= \lambda\text{t}.\lambda\text{w}.\exists\text{t'}\;[\text{t'} > \text{t} \;\&\; \exists\text{e}\;[\tau(\text{e}) \supseteq \text{t'} \;\&\; \text{cook(food)(e)(w)} \;\&\; \text{agent(e)(w)} = \text{Nana}](\text{t}_c)$
$= \lambda\text{w}.\exists\text{t'}\;[\text{t'} > \text{t}_c \;\&\; \exists\text{e}\;[\tau(\text{e}) \supseteq \text{t'} \;\&\; \text{cook(food)(e)(w)} \;\&\; \text{agent(e)(w)} = \text{Nana}]]$

d. $[\![(26)]\!]^{g,c} = [\![\text{a'}]\!]^{g,c}([\![\text{TP}]\!]^{g,c})$
$= [\lambda\text{P}_{\langle s,t\rangle}.\lambda\text{w}.\forall\text{w'}\;[\text{w'} \in \text{BEST}_{O_{(w)}}(\text{MB(w)}) \rightarrow \text{P(w')}]]$
$(\lambda\text{w}.\exists\text{t'}\;[\text{t'} > \text{t}_c \;\&\; \exists\text{e}\;[\tau(\text{e}) \supseteq \text{t'} \;\&\; \text{cook(food)(e)(w)} \;\&\; \text{agent(e)(w)} = \text{Nana}]])$
$= \lambda\text{w}.\forall\text{w'}\;[\text{w'} \in \text{BEST}_{O_{(w)}}(\text{MB(w)}) \rightarrow \exists\text{t'}\;[\text{t'} > \text{t}_c \;\&\; \exists\text{e}\;[\tau(\text{e}) \supseteq \text{t'} \;\&\; \text{cook(food)(e)(w')} \;\&\; \text{agent(e)(w')} = \text{Nana}]]]$
≈ In all the best worlds in the modal base, there is a time after

[4] von Stechow (2009) assigns a future–shifting semantics to the English future marker *will*. As will become clear in chapter 8, I take it that, in parallel to Medumba, *will* is a modal and the future shifter is phonologically covert.

[5] Like in the case of past shifters, we have to assume that t* can be bound in the scope of a higher tense to derive the relative uses of the future form in embedded contexts (cf.von Stechow 2009).

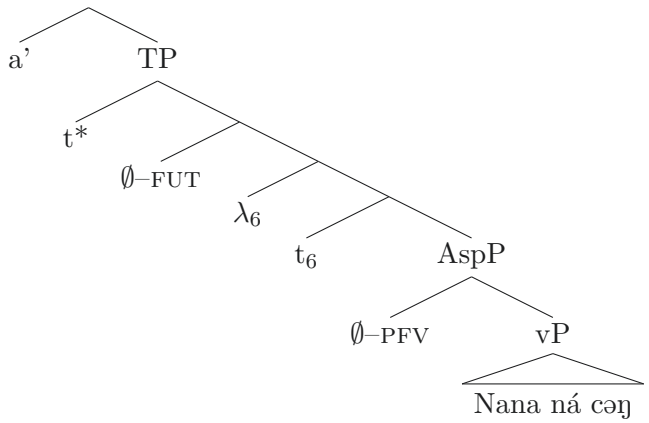
t_c which is included in the running time of an event of Nana cooking

The truth conditions derived in (28) require that the event of Nana cooking is ongoing at some future time interval. Given that time intervals can be as short as instantaneous moments, in any reasonably conceivable case in which an eventuality includes the utterance time (≈ present interpretation of (26)), it will also be true that there is a time in the future, however short, which is included in the time of the cooking event. Hence, the truth conditions of imperfective sentences with *á'* and a covert future shifter are compatible with present epistemic readings, although future imperfective is the most natural interpretation.

Consider now the same sentence without the imperfective marker in (29). The proposed account would presume that the structure contains a covert future shifter as well as a covert perfective aspect, as in the LF given in (30).

(29) Nana á' ná cəŋ
Nana FUT cook food
"Nana will cook."

(30)



The truth conditions will be the same as in the imperfective example in (28) above except that the temporal inclusion relation between the prospective time and the event time is reversed. This difference is crucial for the present discussion, however, as the reader can see in the truth conditions in (31) (where the temporal conditions are underlined for illustration).

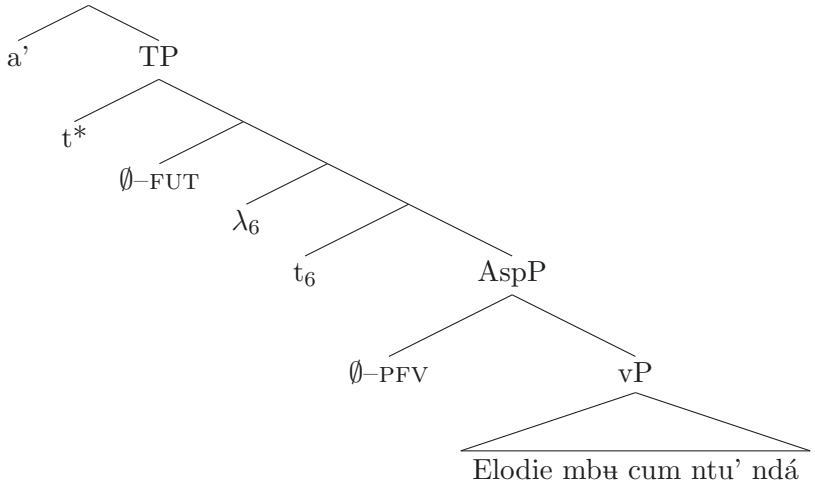
(31) $[\![(29)]\!]^{g,c} = \lambda w.\forall w'\ [w' \in \text{BEST}_{O_{(w)}}(\text{MB}(w)) \rightarrow \underline{\exists t'\ [t' > t_c\ \&\ \exists e\ [\tau(e) \subseteq t'}\ \&\ \text{cook(food)(e)(w')}\ \&\ \underline{\text{agent(e)(w')} = \text{Nana}]]]}$
≈ In all the best worlds in the modal base there is a time after t_c which includes the running time of an event of Nana cooking

The truth conditions require that the event of Nana cooking be included in the time interval introduced by the future shifter, which is not compatible with the cooking event including the utterance time itself and hence leads to an obligatory future shift.

Recall that for stative predicates, I adopted the idea that statives require an overlap relation between reference time and eventuality time rather than an inclusion relation, and that the contrast between perfective and imperfective aspect is therefore neutralized. For illustration, consider the sentence in (32) which was used earlier to demonstrate present epistemic readings with the *á'*–marker. The truth conditions are given in (34), again with the crucial temporal difference underlined.

(32) Elodie á' mbʉ cum ntu' ndá
Elodie FUT be in piece house
"Elodie must be in the room."

(33)



(34) $[\![(32)]\!]^{g,c}$ = λw.∀w' [w' ∈ $\text{BEST}_{O_{(w)}}$(MB(w))→
∃t' [t' > t_c & ∃e [τ(e) O t' & [be]in the room(e)(w') & agent (e)(w')=
Elodie]]]
≈ In all the best worlds in the modal base there is a time t' after t_c that overlaps with the time of Elodie being in the room

These truth conditions require that in all of the best worlds in the modal base, there is a time interval after the utterance time that *overlaps* the eventuality (in this case the state) of Elodie being in her room. Since, as pointed out earlier with reference to Altshuler & Schwarzschild (2013), stative predicates are inherently unbounded in the strictest sense, i.e. every moment at which a state holds is preceded and followed by another moment at which the state holds, it is always true that, if a stative eventuality holds at the utterance time, it will also hold at some time after the utterance time,

which is what the truth conditions in (34) require.

The consequence of this insight is that, in Medumba, we can capture the descriptive generalization that the *á'*–marker is incompatible with past–shifters by positing that it always co–occurs with a covert future shifting element, and at the same time we can derive the fact that *á'* is used to express present–oriented modality. In the next section, I want to compare the Medumba future shifter to that of Hausa and illustrate why the Hausa future form does not allow for present epistemic readings although the composition of future marking (i.e. a universal modal combining with a future shifting element) is similar. The reason for this, I argue, is not in the meaning of the respective future forms, but in the different temporal/aspectual architecture of the two languages. Moreover, I will present a more general account of the semantic dependency of the future in Medumba, which might also extend to other languages where the future–shifting element is covert and/or semantically dependent on superordinate operators.

7.5 Completing the analysis

The modal analysis of the Medumba future marker *á'* proposed in section 7.3 leads to an obvious question: If, as I argue, future marking in Medumba parallels future marking in Hausa in that a purely modal morpheme selects for a future–shifting element, how do we explain that in Medumba, but not in Hausa, the future form is compatible with present epistemic interpretations? In Medumba, as shown in the derivations in section 7.4, the fact that imperfective sentences with *á'* can get future progressive and present epistemic interpretations is derivable from the combination of the future shifter and imperfective aspect. In Hausa, by contrast, grammatical temporal relations are exclusively encoded in aspect, which is marked overtly and obligatorily, as I argued in the first part of this thesis. At the same time, Hausa does not allow for aspect stacking. One consequence of this is that in Hausa, prospective aspect will never combine with an imperfective marker and will always directly modify the eventuality time of a sentence. In Medumba, by contrast, we find past and future–shifting elements above the aspect projection that introduce new times into the discourse. To get a sense of the relevant difference, compare the lexical entries I assume for the prospective in Hausa (35), which is defective in that it does not quantify over the VP event, and the covert future in Medumba (36), which encodes quantification over times rather than eventualities, which is supposed to account for the observation that it can be stacked on top of imperfective aspect (36). It should also be noted that, following von Stechow (2009), whether we refer to the Medumba future shifter as future (tense) or prospective (aspect) is merely a terminological choice as far as the lexical entry in (36) is concerned. In this theory, after all, there is no semantic difference between future and

prospective meaning.[6]

(35) The Prospective aspect in Hausa

$$[\![\text{prosp}]\!]^{g,c} = \lambda P_{\langle l,\langle s,t\rangle\rangle}.\lambda e.\lambda t.\lambda w\ [\underline{\tau(e) > t}\ \&\ P(e)(w)]$$

(36) The Future in Medumba

$$[\![\emptyset\text{–FUT}]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\underline{\exists t'\ [t' > t}\ \&\ P(t')(w)]$$

I would like to propose that the underlined difference in time specification between the future–shifting elements in Hausa and Medumba explains why present epistemic readings can never be expressed with the prospective in Hausa: The Hausa prospective always directly applies to the VP–denotation and therefore specifies that the eventuality time itself follows the reference time. Since in Hausa, the prospective is in complementary distribution with the other aspects, present epistemic readings will always be expressed with imperfective (for events) or perfective (for states), to the exclusion of the prospective which is reserved for future–oriented interpretations. The Medumba future–shifter, by contrast, is always stacked on top of imperfective or perfective aspect and hence its interpretation depends on this event time specification.

What this idea does not immediately account for is *why* the Medumba future modal *á'* seems to always co–occur with the future–shifting element and not, for instance, with the overt past shifters. Recall that in Hausa, the prospective was described as semantically dependent, which motivated an analysis under which the prospective is defective and encodes only aspectual time shifting but not quantification. The future modal *zā* was then given a denotation that requires exactly the semantic output of the prospective aspect denotation as its argument, which also captured its inability to co-occur with other aspects.

Interestingly, in Medumba we also observe that future–orientation is "dependent" in the sense that it seems to be available only in certain semantic environments, suggesting a cross–linguistic core of this phenomenon. For this reason, I will present an account of the occurrence restrictions on the future–shifter in Medumba which is slightly different from my analysis of Hausa but it is, I believe, also more principled. First, let me review the observations: In section 7.2, I showed that future–orientation in Medumba is also possible without the *á'*–marker. A crucial contrast was demonstrated in (17) repeated below as (37), where future interpretation seems possible with *á'* and with the possibility modal *mu'djʉ*, but not in the bare sentence in (37-c).

(37) Context (taken from Tonhauser 2011a): A farmer is looking at the clouds, he says:

[6] In chapter 8 below I will actually propose that English has a covert future shifter with the semantics in (36), dubbing it a prospective aspect.

a. mbəŋ **á'** lú
rain FUT fall
"It will rain."

b. **mu'djʉ** mbəŋ ndú
maybe rain fall
"It might rain."

c. #mbəŋ ndú
rain fall
Intended: "It will rain."

Furthermore, the approach should somehow incorporate the incompatibility of the future modal *á'* with the past shifters which was illustrated with examples such as (24), repeated below as (38).

(38) Context: Marie participated in a race yesterday. Today she looks very happy, so you suspect:

a. *Marie **á'** **fə** cá ŋkɔg
Marie FUT NEAR win yesterday
Intended: "Marie must have won yesterday."

b. a **á'** mbʉ zə Marie **fə** cá ŋkɔg
it FUT be that Marie NEAR win yesterday
"Marie must have won yesterday."
lit. "It will be that Marie has won yesterday."

I will assume that modals like *á'* and *mu'djʉ* do not carry the temporal shift in their semantics, but they can indicate a shift induced by a silent future shifter. In this way I would like to reconcile the generalization of Smith et al. (2003, 2007) that future interpretation must always be marked since it never arises as default, with the observation that many modal markers often but not always come with future–orientation. Hence, while modal markers are one (and perhaps the most frequent) means to indicate futurity, they do not themselves encode any future shifting. In this context, it is also important to realize that, in my analysis of Medumba, the general prospective is not phonologically realized, as opposed to its past–oriented counterparts. Its modifying semantics differentiates it crucially from the covert perfective aspect that I assume to head every aspect phrase that is not headed by an overt imperfective marker, since the (im)perfective has the additional function of binding the eventuality variable. My point is, in short: If there is a covert future–shifter in the structure, its presence must somehow be indicated, i.e. it must be licensed, for example by an overt modal. This licensing requirement, however, seems to be characteristic of future shifting and prospective aspectuality across the board, as I will explicate in what follows.

Much recent work has addressed the question of whether modals encode future orientation in their meaning or if future orientation is contributed by a prospective aspect that can be phonologically covert or overt depending on a particular language system (see Enç 1996; Condoravdi 2002; Kratzer 2012b; Matthewson 2012; Chen et al. to appear).

A related approach turns this argument around by saying that future and prospective are, in a way, inherently modal. Obviously, this is not a new idea but probably has its conceptual origins in the observation (often attributed to Aristotle) that future sentences such as (39-a) cannot be assigned a truth value at the utterance time (in violation of the *Law of the Excluded Middle*), contrary to the sentences in (39-b) and (39-c) which are true or false at the time at which they are uttered.

(39) a. There will be a sea–battle tomorrow.
b. There was a sea–battle yesterday.
c. There is a sea–battle going on right now.

Giannakidou (2014b) (referring to Giannakidou & Zwarts 1999) describes this difference between future and non–future sentences by means of veridicality.[7] While PAST(p) and PRES(p) sentences are only compatible with the truth of p and are therefore veridical, FUT(p) is nonveridical in that it allows for $\neg p$–worlds.[8]

I would like to make use of this idea by proposing that the covert future–shifter in Medumba (and potentially in other languages) requires a nonveridical environment to be licensed, i.e. an environment specifying that the eventuality in question is not necessarily instantiated in the actual world. In the cases that are most often associated with future orientation, nonveridical contexts will be created by modal operators (including the "future" modal *á'*), indicating that the conversation evolves around possibilities or necessities. However, the Medumba data at my disposal also reveal some other nonveridical contexts in which covert future–shifting seems to be licensed. For instance, like in English and other languages, unmarked future interpretation is licensed in the antecedent of indicative conditionals (40) (example adapted from Tonhauser 2011a).

(40) Context: Alice is hanging her clothes up for drying, her brother says:

[7] For a definition see chapter 2, section 2.4.4.

[8] One of Giannakidou's arguments is that the future licenses negative polarity items, as illustrated in (i-b). It must be noted, though, that these judgments (cited from Giannakidou 2014b), have been called into question by native speakers of English that I consulted.

(i) a. At the dinner tonight, Nicholas will eat anything.
b. *At the dinner last night, Nicholas ate anything.

mbəŋ lû mbə á á' lú num ndzwə́ cú
rain fall that it FUT fall PREP dress your
"If rain falls, it will fall on your dress."

Other nonveridical environments where future orientation seems to be licensed without the *á'*–marker are questions (41) and imperatives (42).

(41) Context: This year Mary is always cooking rice.

Wú kwádə mbə **á ná kə ŋgo mu'**?
you think that she cook what year other
"What do you think she will cook next year?"

(42) Context: Patrick's car has been broken for ages, Julianne is fed up and tells him:

Nabtə́ yu mutwá!
repair your car
"Repair your car!"

Moreover, the nonveridicality approach captures the otherwise puzzling observation that future readings do not seem to require an *á'*–marker in negated sentences, by contrast with their positive counterparts. This is illustrated by the very similar examples in (43) and (44).

(43) Context: You and your spouse are discussing who will do what in the house today. You don't like cooking, so you say:

Mə kə ná cəŋ
I NEG cook food
"I will not cook."

(44) Context question: What will the kids do later?

#Bú ná ŋkwún
they cook beans
Intended: "They will cook beans."

To sum up, I adopt the idea of Giannakidou (2014b) that future–oriented environments are nonveridical and I propose to account for the data observed in Medumba by generalizing that the optional covert future shifter is only licensed in nonveridical environments such as negation, questions, imperatives, the antecedents of conditionals and the scope of modal operators. While plain, semantically unembedded declarative sentences do not receive future interpretations in Medumba, the nonveridical environments just mentioned allow for prospective time shifting. In cases where the prospective meaning to be expressed is prediction or intention, the modal operator that licenses the prospective aspect will most commonly be *á'*. However, this is not because *á'* encodes future but because its modal meaning is underspecified with respect to conversational backgrounds, i.e. *á'* is compatible

with an inertial/stereotypical ordering source that, in combination with a future–shifter, results in "simple" predictive future readings. On superficial examination, this makes *á'* look like a future tense marker. This approach does not immediately account for the fact that *á'* is incompatible with past aspectual modifiers such as *fə* and *ná'* unless we assume that, because *á'* is the default modal operator to license the covert future shifter, this has become its primary function and therefore it *only* occurs with the future shifter. This would make *á'* a kind of "host" for the future,[9] an assumption I propose to adopt.

Finally, in order to draw a more comprehensive picture of how future marking works in Medumba, the next section will be concerned with what I have been calling "complex future markers", i.e. combinations of the *á'*–marker and the TIME OF DAY markers *zí, cág* and *yɔ̄g*.

7.6 Analyzing the complex future markers

As noted several times earlier, one of the most obvious differences between the past remoteness morphemes *ná', lû, lú* and *fə* and the time of day markers cág, yɔ̄g and *zí* is in their co–occurrence restrictions with the future morphemes. In (45) below, a relevant example is repeated to remind the reader that the near and remote past markers are incompatible with *á'* while the time of day markers combine with it to evoke more concrete future interpretations.

(45) a. Mə á' *yɔ̄g* nɛ́n ntɑn
I FUT TOD go market
"I will go to the market (this afternoon)."
b. *Mə á' **fə** nɛ́n ntɑn
I FUT NEAR go market
Intended: "I will go to the market soon ."

Recall that just like with the bare time of day markers, the previous descriptions in Nganmou (1991) and Kouankem (2012) characterize the complex future forms as deictic tenses that unequivocally relate to the utterance time. Example (46) below repeats the temporal domains of the three complex future markers according to Kouankem (2012):

(46) Temporal domains of complex future markers (Kouankem, 2012)
a. á' yɔ̄g ≈ this afternoon
b. á' cág ≈ tomorrow
c. á' zí ≈ remote future

[9]Something along these lines was suggested to me by Angelika Kratzer (p.c.) about English *will* hosting a covert prospective aspect, albeit without any implications about *will* having a modal semantics.

Just like in combinations of past shifters and time of day markers, the interpretation of time of day markers in combination with *á'* is not necessarily deictic, but easily relates to time intervals other than UT. This is illustrated for *á' yɔ̄g* in (47), for *á' cág* in (48) and for *á' zí* in (49).

(47) Context: Today Marie will cook fufu **during the day**. What is she going to prepare **next Wednesday**?

(Nsigha zə á sə' lə) Marie **á' yɔ̄g** ná ŋkwun
Wednesday that it come PRT Marie FUT TOD cook beans
"Marie will cook beans (during the day)."

(48) Context: Today Marie will cook fufu **in the morning**. What is she going to prepare **next Wednesday**?

(Nsigha zə á sə' lə) Marie **á' cág** ná ŋkwún
Wednesday that it come PRT Marie FUT TOD cook beans
"Marie will cook beans (in the morning)."

(49) Context: **Tonight** Marie will cook fufu. What is she going to prepare **next Wednesday**?

(Nsigha zə á sə' lə) Marie **á' zí** ná ŋkwún
Wednesday that it come PRT Marie FUT TOD cook beans
"Marie will cook beans (during the night)."

These examples show not only that the complex future markers allow for non–deictic interpretations of the time of day markers, they also suggest that the interpretations can be derived straightforwardly from the combination of the meaning of *á'*, the covert future–shifter and the time of day markers since the latter seem to be doing the same thing here as in non–future contexts: They determine at what time of day the event (in this case the event of *Marie cooking beans*) occurs.

This cannot be the whole story, however. Another important observation is that in contexts like the ones given above, some of the time of day morphemes can occur together. An example is given in (50), which some speakers actually prefer over the sentence presented in (47).

(50) Context: Today Marie will cook fufu **during the day**. What is she going to prepare **next Wednesday**?

Marie **á' zí yɔ̄g** ná ŋkwún
Marie FUT TOD cook beans
"Marie will cook beans (during the day)."

The doubling of the time of day markers in the future occurs primarily with the form *á' zí*, but it is also possible with *á' cág*, as exemplified in (51).

(51) Context: I just told you that I will go to Cameroon **tomorrow afternoon**. You pass the news on to your friend:

Anne **á' cág yɔ̄g** nɛ́n cameroun!
Anne FUT TOD go cameroon
"Anne will go to Cameroon (tomorrow afternoon)!"

If the time of day markers in (50) and (51) always had the meaning proposed in chapter 5, the sentences should be infelicitous because the time of day modifiers *zí* and *yɔ̄g* in (50) and *cág* and *yɔ̄g* in (51) impose contradictory (or rather nonsensical) temporal requirements on the interpretation of the sentence. In sentences with two time of day markers such as (50) and (51), however, *á' cág* and *á' zí* seem to have just the meanings that Nganmou (1991) and Kouankem (2012) propose for them, namely "tomorrow" and "remote future", respectively.

I conclude from this that *cág* and *zí* have additional meanings specifying near and remote future shifting, and hence they alternate with the covert general future shifter that I proposed causes the future shift in general future sentences with *á'*. To make this proposal more concrete, I give the two alternating meanings of the future marker *zí* below. *Zí*$_1$ is the time of day marker that is already familiar from past contexts. *Zí*$_2$ is a remote future shifter, i.e. the future counterpart of the past remoteness markers *ná'* and *lû* (cf. chapter 5).

(52) $[\![\text{zí}_1]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists t'$ [t' overlaps the *nighttime* of the day(s) associated with t & P(t')(w)]

(53) $[\![\text{zí}_2]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists t'$ [t' follows t by $\geq$ a few days & P(t')(w)]

In the case of *cág*, the future shifter *cág*$_2$ is not a perfect mirror of the near past markers *fə* and *lú*, since it really seems to be used specifically for events that occur on the following day, just like Nganmou (1991) and Kouankem (2012) describe it.[10] This is illustrated with the sentence in (54) which shows that, in contrast to the near past shifters *fə* and *lú*, *á' cág* cannot be used to predict events on the same day. What is more, (54) also shows that *a' cág* cannot encode a simple combination of modality and time of day meaning, but that some future time shifting must be involved. Otherwise, (54) should be acceptable as an intention (semantic contribution of *á'*) that Roger had in the morning (semantic contribution of *cág*).

(54) Context: In the morning Roger makes a plan to repair his car today. He says:

#Mə **á' cág** náb yɑ̄m mutwá lá
I FUT repair my car PRT
Intended: "I will repair my car."

[10] Given the description in Kouankem (2012) and the sparse judgments of my consultants, the morpheme *ghʉ̄* as in the complex future form *á' ghʉ̄* might be the best candidate for a near or immediate future marker, but in the absence of conclusive data, I leave this as a mere conjecture.

Speaker comment: Well–formed, but not good in this context, it must be tomorrow.

For the sake of completeness, the meaning of the time of day marker *cág*$_1$ is also repeated in (55) in addition to the denotation of the future–shifting version *cág*$_2$ in (56).

(55) $[\![\text{cág}_1]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists t'$ [t' overlaps the *morning* of the day(s) associated with t & P(t')(w)]

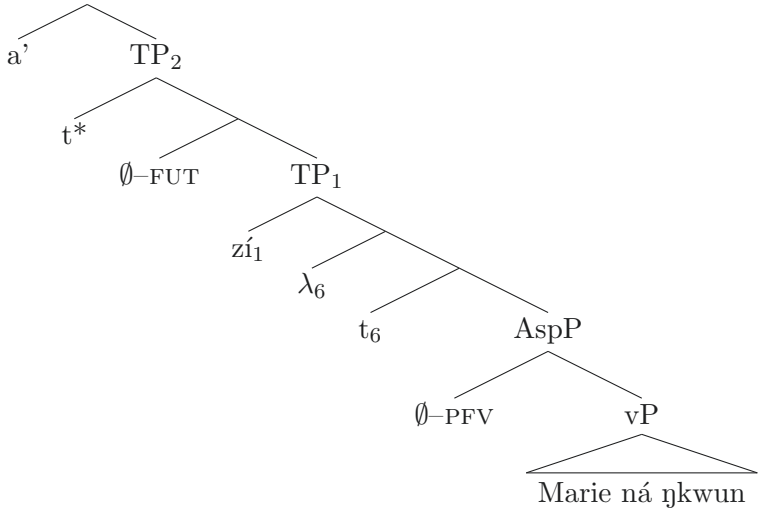
(56) $[\![\text{cág}_2]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists t'$ [t' $\subseteq$ day after t & P(t')(w)]

Against this background we are now in a position to provide some exemplifying derivations of the truth conditions of sentences such as (57), with the interpretations in (57-a) and (57-b).

(57) Marie **á' zí** ná ŋkwún
Marie FUT cook beans
a. "Marie will cook beans (at night)." or
b. "Marie will cook beans (in the remote future)."

As predicted by the analysis above and as shown in the examples, (57) is ambiguous depending on whether it includes an instance of the time of day–marker *zí*$_1$ or the remote prospective marker *zí*$_2$. This is captured by the two different structures in (58) and (60) and the corresponding truth conditions given below the structures.

(58) LF-structure of reading (57-a)[11]



[11]The distinction between TP_1 and TP_2 is intended to make the derivation more comprehensible.

(59) a. $[\![\text{vP}]\!]^{g,c} = \lambda\text{e}.\lambda\text{w}.[\text{cook(food)(e)(w) \& agent(e)(w)= Marie}]$

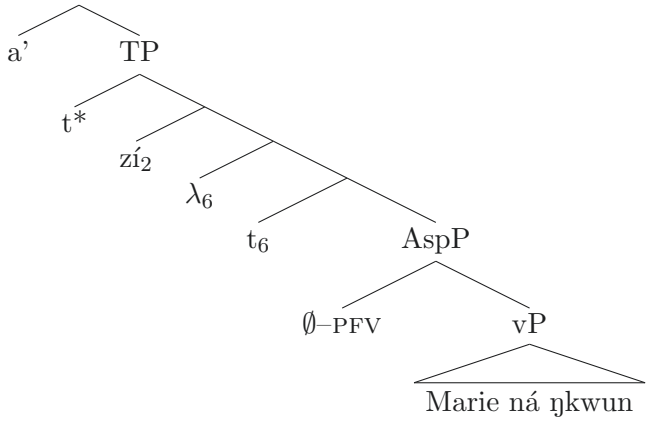
b. $[\![\text{AspP}]\!]^{g,c} = [\![\emptyset\text{–PFV}]\!]^{g,c}([\![\text{vP}]\!]^{g,c})$
$= [\lambda\text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{e}\ [\tau(\text{e}) \subseteq \text{t \& P(e)(w)}]](\lambda\text{e}.\lambda\text{w}.[\text{cook(food)(e) \& agent(e)=Marie}])$
$= \lambda\text{t}.\lambda\text{w}.\exists\text{e}\ [\tau(\text{e}) \subseteq \text{t \& cook(food)(e)(w) \& agent(e)(w) = Marie}]$

c. $[\![\text{TP}_1]\!]^{g,c} = [\![\text{zí}_1]\!]^{g,c}([\![\text{AspP}]\!]^{g,c})$
$= [\lambda\text{P}_{\langle i,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{t'}\ [\text{t' overlaps the } \textit{nighttime} \text{ of the day(s) associated with t \& P(t')(w)}]](\lambda\text{t}.\lambda\text{w}.\exists\text{e}\ [\tau(\text{e}) \subseteq \text{t \& cook(food)(e)(w) \& agent(e)(w) = Marie}])$
$= \lambda\text{t}.\lambda\text{w}.\exists\text{t'}\ [\text{t' overlaps the } \textit{nighttime} \text{ of the day(s) associated with t \& } \exists\text{e}\ [\tau(\text{e}) \subseteq \text{t' \& cook(food)(e)(w) \& agent(e)(w) = Marie}]]$

d. $[\![\text{TP}_2]\!]^{g,c} = [\![\emptyset\text{–FUT}]\!]^{g,c}([\![\text{TP}_1]\!]^{g,c})[\![\text{t*}]\!]^{g,c}$
$= [\lambda\text{P}_{\langle i,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{t''}\ [\text{t''} > \text{t \& P(t'')(w)}]](\lambda\text{t}.\lambda\text{w}.\exists\text{t'}\ [\text{t' overlaps the } \textit{nighttime} \text{ of the day(s) associated with t \& } \exists\text{e}\ [\tau(\text{e}) \subseteq \text{t' \& cook(food)(e)(w) \& agent(e)(w) = Marie}])(\text{t}_c)$
$= [\lambda\text{t}.\lambda\text{w}.\exists\text{t''}\ [\text{t''} > \text{t \& } \exists\text{t'}\ [\text{t' overlaps the } \textit{nighttime} \text{ of the day(s) associated with t'' \& } \exists\text{e}\ [\tau(\text{e}) \subseteq \text{t' \& cook(food)(e)(w) \& agent(e)(w) = Marie}]]](\text{t}_c)$
$= \lambda\text{w}.\exists\text{t''}\ [\text{t''} > \text{t}_c \text{ \& } \exists\text{t'}\ [\text{t' overlaps the } \textit{nighttime} \text{ of the day(s) associated with t'' \& } \exists\text{e}\ [\tau(\text{e}) \subseteq \text{t' \& cook(food)(e)(w) \& agent(e)(w) = Marie}]]$

e. $[\![(57\text{-a})]\!]^{g,c} = [\![\text{a'}]\!]^{g,c}([\![\text{TP}_2]\!]^{g,c})$
$= [\lambda\text{P}_{\langle s,t\rangle}.\lambda\text{w}.\forall\text{w'}\ [\text{w'} \in \text{BEST}_{O_{(w)}}(\text{MB(w)}) \rightarrow \text{P(w)}]](\lambda\text{w}.\exists\text{t''}\ [\text{t''} > \text{t}_c \text{ \& } \exists\text{t'}\ [\text{t' overlaps the } \textit{nighttime} \text{ of the day(s) associated with t'' \& } \exists\text{e}\ [\tau(\text{e}) \subseteq \text{t' \& cook(food)(e)(w) \& agent(e)(w) = Marie}]]])$
$= \lambda\text{w}.\forall\text{w'}\ [\text{w'} \in \text{BEST}_{O_{(w)}}(\text{MB(w)}) \rightarrow \exists\text{t''}\ [\text{t''} > \text{t}_c \text{ \& } \exists\text{t'}\ [\text{t' overlaps the } \textit{nighttime} \text{ of the day(s) associated with t'' \& } \exists\text{e}\ [\tau(\text{e}) \subseteq \text{t' \& cook(food)(e)(w') \& agent(e)(w') = Marie}]]]]$
$\approx$ In all best worlds in the modal base there is an event whose running time is included in a time t' which overlaps the night of a day at t'' where t'' is in the future of the utterance time t_c

(60) LF-structure of reading (57-b)



(61) a. $[\![\text{vP}]\!]^{g,c} = \lambda\text{e}.\lambda\text{w}.[\text{cook(food)(e)(w) \& agent(e)(w)= Marie}]$

b. $[\![\text{AspP}]\!]^{g,c} = [\![\emptyset\text{–PFV}]\!]^{g,c}([\![\text{vP}]\!]^{g,c})$
$= [\lambda\text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{e}\,[\tau(\text{e}) \subseteq \text{t} \,\&\, \text{P(e)(w)}]](\lambda\text{e}.\lambda\text{w}.[\text{cook(food)(e) \& agent(e)=Marie}])$
$= \lambda\text{t}.\lambda\text{w}.\exists\text{e}\,[\tau(\text{e}) \subseteq \text{t} \,\&\, \text{cook(food)(e)(w)} \,\&\, \text{agent(e)(w)} = \text{Marie}]$

c. $[\![\text{TP}]\!]^{g,c} = [\![\text{zí}_2]\!]^{g,c}([\![\text{AspP}]\!]^{g,c})(\text{t*})$
$= [\lambda\text{P}_{\langle i,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{t'}\,[\text{t' follows t by} \geq \text{a few days \& P(t')(w)}]]$
$(\lambda\text{t}.\lambda\text{w}.\exists\text{e}\,[\tau(\text{e}) \subseteq \text{t} \,\&\, \text{cook(food)(e)(w)} \,\&\, \text{agent(e)(w)} = \text{Marie}])(\text{t}_c)$
$= [\lambda\text{t}.\lambda\text{w}.\exists\text{t'}\,[\text{t' follows t by} \geq \text{a few days} \,\&\, \exists\text{e}\,[\tau(\text{e}) \subseteq \text{t'} \,\&$
$\text{cook(food)(e)(w)} \,\&\, \text{agent(e)(w)} = \text{Marie}]](\text{t}_c)$
$= \lambda\text{w}.\exists\text{t'}\,[\text{t' follows t}_c \text{ by} \geq \text{a few days} \,\&\, \exists\text{e}\,[\tau(\text{e}) \subseteq \text{t'} \,\&$
$\text{cook(food)(e)(w)} \,\&\, \text{agent(e)(w)} = \text{Marie}]]$

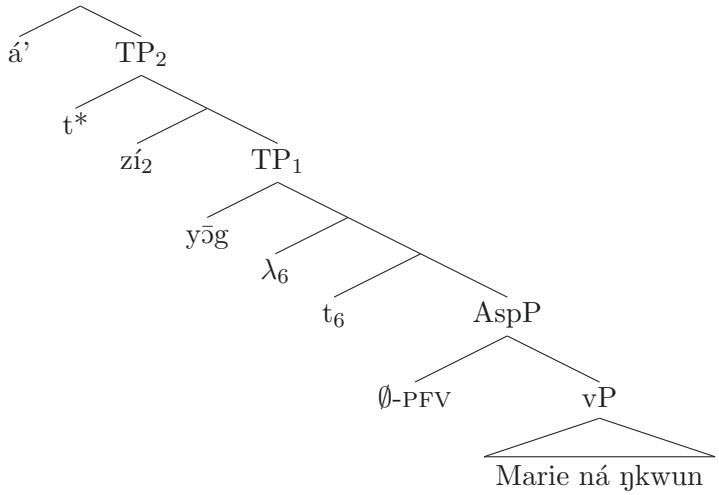
d. $[\![\text{(57-b)}]\!]^{g,c} = [\![\text{a'}]\!]^{g,c}([\![\text{TP}]\!]^{g,c})$
$= [\lambda\text{P}_{\langle s,t\rangle}.\lambda\text{w}.\forall\text{w'}\,[\text{w'} \in \textsc{best}_{O_{(w)}}(\text{MB(w)}) \rightarrow \text{P(w')}]]$
$(\lambda\text{w}.\exists\text{t'}\,[\text{t' follows t}_c \text{ by} \geq \text{a few days} \,\&\, \exists\text{e}\,[\tau(\text{e}) \subseteq \text{t'} \,\&\, \text{cook(food)(e)(w)} \,\&\, \text{agent(e)(w)} = \text{Marie}]])$
$= \lambda\text{w}.\forall\text{w'}\,[\text{w'} \in \textsc{best}_{O_{(w)}}(\text{MB(w)} \rightarrow \exists\text{t'}\,[\text{t' follows t}_c \text{ by} \geq \text{a few days} \,\&\, \exists\text{e}\,[\tau(\text{e}) \subseteq \text{t'} \,\&\, \text{cook(food)(e)(w')} \,\&\, \text{agent(e)(w')} = \text{Marie}]]]$
$\approx$ In all best worlds in the modal base there is an event of Marie cooking food whose running time is included in a time t' that is at least a few days after the utterance time t_c

As the truth conditions above show, (57) under the remote future reading is true if in all best worlds in the modal base there is a remote future interval that includes an event of Marie cooking. To complete the paradigm, (63) shows the LF structure of the sentence in (50) repeated here as (62) with two time of day markers.

(62) Marie **á' zí yɔ̄g** ná ŋkwún
Marie FUT cook beans

"Marie will cook beans (during the day)."

(63)



(64) a. $[\![\text{vP}]\!]^{g,c} = \lambda\text{e}.\lambda\text{w}.[\text{cook(food)(e)(w) \& agent(e)(w)= Marie}]$

b. $[\![\text{AspP}]\!]^{g,c} = [\![\emptyset\text{–PFV}]\!]^{g,c}([\![\text{vP}]\!]^{g,c})$
$= [\lambda\text{P}_{\langle l,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{e}\ [\tau(\text{e}) \subseteq \text{t \& P(e)(w)}]](\lambda\text{e}.\lambda\text{w}.[\text{cook(food)(e) \& agent(e)=Marie}])$
$= \lambda\text{t}.\lambda\text{w}.\exists\text{e}\ [\tau(\text{e}) \subseteq \text{t \& cook(food)(e)(w) \& agent(e)(w) = Marie}]$

c. $[\![\text{TP}_1]\!]^{g,c} = [\![\text{yɔ̄g}]\!]^{g,c}([\![\text{AspP}]\!]^{g,c})$
$= [\lambda\text{P}_{\langle i,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{t'}\ [\text{t' overlaps the } \textit{afternoon} \text{ of the day(s) associated with t \& P(t')(w)}]](\lambda\text{t}.\lambda\text{w}.\exists\text{e}\ [\tau(\text{e}) \subseteq \text{t \& cook(food)(e)(w) \& agent(e)(w) = Marie}])$
$= \lambda\text{t}.\lambda\text{w}.\exists\text{t'}\ [\text{t' overlaps the } \textit{afternoon} \text{ of the day(s) associated with t \& } \exists\text{e}\ [\tau(\text{e}) \subseteq \text{t' \& cook(food)(e)(w) \& agent(e)(w) = Marie}]]$

d. $[\![\text{TP}_2]\!]^{g,c} = [\![\text{zí}_2]\!]^{g,c}([\![\text{TP}_1]\!]^{g,c})([\![\text{t*}]\!]^{g,c})$
$= [\lambda\text{P}_{\langle i,\langle s,t\rangle\rangle}.\lambda\text{t}.\lambda\text{w}.\exists\text{t''}\ [\text{t'' follows t by} \geq \text{a few days \& P(t'')(w)}]]$
$(\lambda\text{t}.\lambda\text{w}.\exists\text{t'}\ [\text{t' overlaps the } \textit{afternoon} \text{ of the day(s) associated with t \& } \exists\text{e}\ [\tau(\text{e}) \subseteq \text{t' \& cook(food)(e)(w) \& agent(e)(w) = Marie}]])(\text{t}_c)$
$= [\lambda\text{t}.\lambda\text{w}.\exists\text{t''}\ [\text{t'' follows t by} \geq \text{a few days \& } \exists\text{t'}\ [\text{t' overlaps the } \textit{afternoon} \text{ of the day(s) associated with t'' \& } \exists\text{e}\ [\tau(\text{e}) \subseteq \text{t' \& cook(food)(e)(w) \& agent(e)(w) = Marie}]]](\text{t}_c)$
$= \lambda\text{w}.\exists\text{t''}\ [\text{t'' follows } \text{t}_c \text{ by} \geq \text{a few days \& } \exists\text{t'}\ [\text{t' overlaps the } \textit{afternoon} \text{ of the day(s) associated with t'' \& } \exists\text{e}\ [\tau(\text{e}) \subseteq \text{t' \& cook(food)(e)(w) \& agent(e)(w) = Marie}]]]$

e. $[\![(62)]\!]^{g,c} = [\![\text{a'}]\!]^{g,c}([\![\text{TP}_2]\!]^{g,c})$
$= [\lambda\text{P}_{\langle s,t\rangle}.\lambda\text{w}.\forall\text{w'}\ [\text{w'} \in \text{BEST}_{O_{(w)}}(\text{MB(w)}) \rightarrow \text{P(w')}]](\lambda\text{w}.\exists\text{t''}\ [\text{t'' follows } \text{t}_c \text{ by} \geq \text{a few days \& } \exists\text{t'}\ [\text{t' overlaps the } \textit{afternoon} \text{ of the}$

day(s) associated with t" & ∃e [τ(e) ⊆ t' & cook(food)(e)(w) & agent(e)(w) = Marie]]])
= λw.∀w' [w' ∈ BEST$_{O_{(w)}}$(MB(w)) → ∃t" [t" follows t_c by ≥ a few days & ∃t' [t' overlaps the *afternoon* of the day(s) associated with t" & ∃e [τ(e) ⊆ t' & cook(food)(e)(w') & agent(e)(w') = Marie]]]]
≈ In all best worlds in the modal base there is an event of Marie cooking whose running time is included in a time t' that overlaps the afternoon of the day associated with a time t" which follows the utterance time t_c by at least a few days

The main proposal of this section is that the morphemes *zí* and *cág* are ambiguous between a time of day meaning which also occurs in past contexts and a future–shifting meaning under which they alternate with the covert general future shifter. This account predicts that in future "ignorance" contexts that require an indefinite prospective time shift in a declarative sentence, the simple future form with *á'* should be chosen over the complex forms (while the unmarked form is ruled out because it is veridical, see section 7.5). This parallels the observation that near or remote past markers cannot be used in past contexts if the speaker is ignorant of the exact time that is being talked about. The example in (65) illustrates that the prediction is borne out by the future data.

(65) Context (adapted from Cable 2013): You know that Sylvie is planning a trip to Paris soon, but you have no idea when she will be leaving. It could be today for all you know, but it could also be several days from now. You report to your friend:

a. Sylvie **á'** nɛ́n Paris
   Sylvie FUT go Paris
   "Sylvie will go to Paris."

b. #Sylvie nɛ́n Paris
   Sylvie go Paris
   Intended: "Sylvie will go to Paris."

c. #Sylvie **á' yɔ̄g** nɛ́n Paris
   Sylvie FUT go Paris
   Intended: "Sylvie will go to Paris."

d. #Sylvie **á' cág** nɛ́n Paris
   Sylvie FUT go Paris
   Intended: "Sylvie will go to Paris."

e. #Sylvie **á' zí** nɛ́n Paris
   Sylvie FUT go Paris
   Intended: "Sylvie will go to Paris."

For the sake of completeness, it should be added that the proposed account predicts other co–occurrences that my consultants in actuality re-

ject. Specifically, given the ambiguity analysis of *zí* and *cág* provided above, we would expect that the respective homophonous prospective remoteness markers and the time of day markers can co–occur with each other. The example in (66), however, illustrates for *cág* that these sentences are unacceptable.

(66) Context: I just told you that I will go to Cameroon **tomorrow morning**. You pass the news on to your friend:

*Anne **á' cág cág** nén cameroun!
Anne FUT TOD go cameroon
Intended: "Anne will go to Cameroon (tomorrow morning)!"

I do not have a very strong explanation for this apart from the speakers' presumed aim to be precise and unambiguous (recall that they always have the opportunity to use genuine adverbials to specify temporal location). It is also conceivable that the two meanings of *cág* and *zí* are competing on some diachronic level and are therefore banned from co–occurrence. In fact, the ambiguity observed in the Medumba morphemes *cág* and *zí* seems to reflect a grammaticalization process of semantic bleaching and syntactic "climbing" that is familiar from grammaticalization paths observed cross–linguistically. To give an example, Ijbema (2002) argues based on the hierarchy of functional projections advocated by Cinque (1999) that grammaticalization of modal, temporal and aspectual elements correlates with their position in the syntactic tree. A concrete example provided by Ijbema is the Dutch modal verb *moet*, which, similar to its English equivalent *must*, is compatible with both epistemic and deontic interpretations. Following Cinque (1999) and many other authors in assuming different structural positions for root and epistemic modals (see also Hacquard 2006, 2009, 2010), Ijbema proposes that *moet* is an example of a modal element that grammaticalized from a lexical verb to a deontic modal and now is at a stage of further grammaticalization into an epistemic modal. This grammaticalization process correlates with syntactic climbing in Cinque's hierarchy, which is repeated in (67) in the reduced version of Hacquard (2010, p.86).

(67) $\text{Mod}_{epist} > \text{Tense} > \text{Aspect} > \text{Mod}_{root}$

Since grammaticalization is assumed to be a gradual process and since a lexical item can express more than one meaning at a particular stage of language development, grammaticalization is also supposed to account for synchronic variation between the epistemic and the deontic meanings of the modal element. Ijbema (2002) also notes that similar observations have been made when it comes to the development of temporal/aspectual markers. In accordance with what we observe in Medumba, the author states that aspect markers "either originate as main verbs or they are derived from other aspect

markers"(Ijbema, 2002, p.23).[12] The markers under consideration here, i.e. *zí* and *cág*, are both derived from lexical verbs and are apparently now in transition from more concrete (time of day) markers to more abstract temporal shifters.

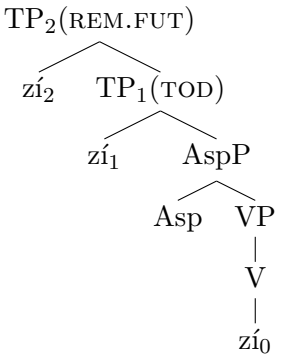
As the reader might remember, the lexical verb *zí* has the meaning of "to sleep", illustrated again in (68). As I assume the lexical verb to be the diachronic source of the aspectual markers referred to as $zí_1$ and $zí_2$, I label the "sleep"–meaning of the morpheme $zí_0$ and provide its lexical entry for completeness in (69).

(68) Context question: What did the kids do?
Bú zí
they sleep
"They (have) slept."

(69) $[\![\text{zí}_0]\!]^{g,c} = \lambda x.\lambda e.\lambda w.\ [\text{sleep}(e)(w)\ \&\ \text{agent}(e)(w) = x]$

Hence, in the first step of grammaticalization, *zí* acquired the meaning of "nighttime", this is the meaning that was labeled *time of day* and that occupies some semantic middle ground between modification and tense/aspect meaning. The second grammaticalization step, I propose, is that from a more concrete time of day marker to that of a more abstract future remoteness morpheme. The tree structure below is supposed to illustrate schematically the syntactic "climbing" of the three different *zí*–morphemes in the course of the grammaticalization process.

(70)



For the other ambiguous morpheme *cág*, my conjecture about grammaticalization paths would basically be the same. Although the diachronic path is not quite so obvious, the aspectual markers $cág_1$ and $cág_2$ presumably derive from the verb "to accompany". According to the intuitions of my consultants, this verb is now strongly associated with activities that take

[12] One familiar example of this second stage is semantic bleaching of an aspectual marker from a more specific progressive to a more general imperfective meaning (see also Bybee et al. 1994; Deo 2015).

place early in the morning, like going to the market, leaving the house together in order to go to work and so forth. This verb was then bleached into just specifying the time of day corresponding to the temporal context in which it was mostly used (this property of grammaticalization is called *persistence* in Ijbema 2002), and then further developed into the more general meaning of "tomorrow".[13]

To conclude, the data presented in this section suggest that some, but not all occurrences of the combination of the future modal *á'* and the time of day markers are as transparent as my earlier analyses of the respective items would predict. The interpretations of *cág* and *zí* which do not correspond to their time of day meanings, as well as co–occurrences of the markers, suggest that these two morphemes are indeed ambiguous.

7.7 Summary

Summarizing the chapter on future interpretation in Medumba, I want to take up the questions initially suggested as guidelines for investigating the future in Medumba. The question that was introduced as (1c), namely how the future marker *á'* relates to future markers in other languages, will be postponed to the next chapter which is concerned with cross–linguistic variation. The remaining questions are repeated below with a summary of the answers proposed above:

1. What is the meaning of the morpheme *á'*?

   (a) Does it involve modal, temporal and/or aspectual meaning components?

   Answer: Under the proposed analysis, the meaning of *á'* is purely modal, but it obligatorily combines with a future–shifter which can be a covert general future or an overt near or remote future marker.

   (b) How does *á'* relate to the morphemes associated with past interpretation in Medumba?

   Answer: When *á'* is combined with the time of day–markers *cág*, *yɔ̄g* and *zí*, the combination results in either compositionally transparent future time of day readings or in more idiosyncratic future remoteness readings (in the case of *á' cág* and *á' zí*). By contrast, *á'* cannot be combined with the past shifters *fə*, *lú*, *lû* and *ná'*. My proposal for an account of these observations is that *á'* always combines with a future shifter which can be

[13] The latter meaning change is rather intuitive, since when using the time of day marker $cág_1$ in a prospective context, in most contexts the morning the speaker talks about will that of the next day.

realized as a covert general future or an overt future, namely *cág* for "tomorrow" or *zí* for remote future. The primary function of *á'* is that of a default host for the (covert) general future, which always needs to be licensed by a nonveridical (e.g. modal) operator.[14]

2. What are the meanings of the complex future markers?

   (a) What are their exact temporal domains and interpretations?

   Answer: The two morphemes *cág* and *zí* are analyzed as ambiguous between a time of day and a future–shifting meaning, which accounts for the fact that they can sometimes co–occur in combination with the *á'*–marker as well as for the observed ambiguity between the complex future forms *á' cág* ("tomorrow" vs "morning in the future") and *á' zí* ("remote future" vs. "night in the future").

   (b) Do they carry remoteness meanings?

   Answer: It appears that two of them do. In accordance with the descriptions of Nganmou (1991) and Kouankem (2012), *á' cág* and *á' zí* get the meanings of "tomorrow" and "remote future", in addition to the future–oriented time of day readings that my analysis of *cág* and *zí* in past contexts would predict. The plain future marker *á'*, however, does not have any remoteness component (contra Nganmou 1991), and in my account merely encodes modality.

   (c) Can their interpretation be derived compositionally from the meaning of *á'* and the meaning of the time of day markers?

   Answer: Yes, apart from the idiosyncratic interpretations of *á' cág* and *á' zí* referred to above which, as far as I can see, necessitate an ambiguity analysis. This ambiguity, I proposed, is a synchronic state in a semantic bleaching process from lexical verb meaning to the relatively concrete time of day meaning in a first step and to a more general future remoteness meaning in a second step. This development from lexical to more functional meanings is presumably reflected in the respective syntactic positions occupied by the different instances of *cág* and *zí* and in line with generative grammaticalization theories.

[14] An important issue that has not been addressed is whether *á'* is necessary to license the near and remote future interpretations of *cág* and *zí*. The reason is that the data at my disposal are not conclusive in this respect. Two of the five speakers I consulted actually use the markers *cág* and *zí* alone as future markers, for the others, *cág* and *zí* without *á'* only get past time of day interpretations. My conjecture is that these judgments reflect different stages in the diachronic development of the morphemes.

To conclude, the empirical observations on the Medumba future forms presented above as well as the ingredients of the analysis proposed to account for them can be summarized as follows: The presence of the so-called "future marker" *á'* is neither necessary nor sufficient for future interpretation. Moreover, several nonveridical operators besides the *á'*–marker can trigger future shifting. This double dissociation has motivated my proposal that not only is *á'* not a future tense in the sense of Klein (1994), it does not in itself encode any future shifting at all. Instead, it always co–occurs either with a covert, general future, or with one of the markers *zí* or *cág*, which, in combination with *á'*, have additional specific future remoteness meanings. A further interesting question that was only briefly touched upon in this chapter is how the behavior of the Medumba future marker relates to future interpretation in Hausa and other languages for which future interpretation has been analyzed. This issue is addressed in the last section of the following chapter on cross–linguistic variation.

Chapter 8

Cross–linguistic considerations

This chapter is intended to conclude the dissertation and integrate the presented results on temporal interpretation in Hausa and Medumba into a broader cross–linguistic picture. In section 8.1, I first draw some conclusions as to whether the two languages should be classified as "tenseless" given the analyses presented in the previous chapters and the criteria for tense that were introduced in chapter 2. Then I briefly relate the findings to some other analyses proposed for languages without (obligatory) overt tense morphology and sketch a cross–linguistic overview of tenseless languages. In section 8.2 I compare Medumba to the (few) other graded tense languages that have been analyzed in a formal semantic framework and section 8.3 specifically considers future time reference from a cross–linguistic perspective.

8.1 Tenselessness cross–linguistically

8.1.1 Comparing Hausa and Medumba

Before drawing some final conclusions about the status of Hausa and Medumba, let me repeat the definition of tense (1) that was given in chapter 2 as well as what was proposed as a definition for a tensed language in the narrow (2) and the broad (3) version.

(1) Tense semantics assumed in this thesis:
   a. Tense relates the utterance time (or local evaluation time) of a sentence to its reference time (Klein, 1994), AND
      (i) Tenses denote presuppositional features that restrict the possible values of a syntactically represented (reference) time variable (Heim, 1994; Kratzer, 1998), OR

(ii) Tenses denote (contextually restricted) existential quantifiers over times (Kusumoto, 1999, 2005; von Stechow, 2009).

(2) **Definition of a tensed language (narrow version):**
A language is tensed if *every finite clause* contains a grammatical morpheme (overt or covert) with the semantics in (1).

(3) **Definition of a tensed language (broad version):**
A language is tensed if it has grammatical morphemes with the semantics in (1).

The main point of chapter 3 was to show that Hausa does not encode tense overtly or covertly in its grammatical system. The central argument motivating this conclusion was that tenseless sentences in Hausa, which are always marked for aspect, can receive past, present, and future interpretations if a suitable reference time is provided by the context. The relevant data (adapted from Tonhauser 2011a) are repeated below for convenience.

(4) Context question: What were Audu and Binta doing yesterday when you called them?
Su-nà màganà (Hausa)
3PL-IPFV talk
"They were talking."

(5) Context question: What are Audu and Binta doing right now?
Su-nà màganà (Hausa)
3PL-IPFV talk
"They are talking."

(6) Context question: What will Audu and Binta be doing when I come tomorrow morning?
Su-nà màganà (Hausa)
3PL-IPFV talk
"They will be talking."

Data of this kind, it was argued, provide conclusive evidence showing that unembedded imperfective clauses such as (4), (5), and (6) come without tense in the sense of (1). Hence, Hausa is not a tensed language in the strict sense of (2). Moreover, I argued against previous descriptions which classified the relative perfective form as a past tense and the morpheme *zā* as a future tense. If these proposals are correct, then Hausa also does not have tense under the more permissive definition in (3). It was proposed that all grammatical morphemes that show up on the weak subject pronouns in Hausa are aspectual in nature (with the possible exception of the potential, which seems to have modal meaning). In conclusion, Hausa is a language

without grammatical morphemes that encode tense in the definition of (1).

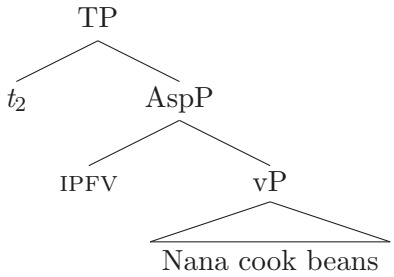
Chapter 5 and chapter 6 demonstrated that Medumba allows for temporally unmarked sentences and that the temporal morphemes in the language are optional. This invites the conclusion that Medumba, despite its large inventory of temporal morphemes, is a tenseless language in the sense that its grammar allows for genuinely tenseless sentences. In section 6.3 it was indeed claimed that unmarked sentences in Medumba are interpreted in the same way as unmarked sentences in Hausa. The proposal was that, in the absence of optional temporal operators, Medumba sentences are interpreted relative to a reference time variable which can be freely assigned a value from the contextual assignment function. This assignment is indirectly restricted in sentences containing durative, dynamic (event) predicates and a perfective aspect (which is the covert default aspect in Medumba, I argued). These perfective event sentences cannot get (durative) present interpretations due to the Bounded Event Constraint (Smith, 2008). Tenseless *imperfective* sentences, however, are assigned the LF in (8) and the truth conditions in (9) in both Medumba (7-a) and Hausa (7-b). Hence, we would expect the same interpretative options for these sentences.

(7) Tenseless imperfective sentences in Medumba and Hausa

a. Nana kə́ ná ŋkwún (Medumba)
Nana IPFV cook beans
"Nana is/was cooking beans."

b. Nana ya–nà dafà wākē (Hausa)
Nana 3.SG.M–IPFV cook beans
"Nana is/was cooking beans."

(8)



(9) $[\![(8)]\!]^{g,c} = \lambda w.\exists e\ [g(2) \subseteq \tau(e)\ \&\ cook(beans)(e)(w)\ \&\ agent(e)(w) = Nana]$

One factor that complicates the comparison between Hausa and Medumba is their different inventories of imperfective marking. Since Hausa only has one general imperfective form, imperfective sentences receive present interpretations by default as predicted by the theory of Smith (2008). The imperfective Medumba sentence in (7-a) is actually interpreted in the past by default, which contradicts Smith's *Simplicity Principle*. However, this

can be explained by the fact that Medumba has the dedicated present imperfective forms illustrated in chapter 6, which impede the use of the general imperfective in present contexts.

Another difference between the languages is that in minimal examples like (4) – (6) where reference times are indicated by context questions, Medumba bare imperfective sentences behave differently from their Hausa counterparts. As demonstrated in the examples below, an imperfective sentence without tense marking is a felicitous answer to a present (10) or a past (11), but not to a future question (12).

(10) Context question: What are the kids doing?

Bú kə́ ná ŋkwún
they IPFV cook beans
"They are cooking beans."

(11) Context question: What were the kids doing (when you left the house)?

Bú kə́ ná ŋkwún
they IPFV cook beans
"They were cooking beans."

(12) Context question: What will the kids be doing (when you come home)?

#Bú kə́ ná ŋkwún
they IPFV cook beans
Intended: "They will be cooking beans."

Data of this kind have led some authors (e.g. Matthewson 2006, Jóhannsdóttir & Matthewson 2008, Cable 2015b) to assume that the languages under their concern have a covert presuppositional non–future tense morpheme, which captures the ban on future interpretation without explicit future marking. Restrictions of the kind shown in (12) have also been reported for the languages Paraguayan Guaraní by Tonhauser (2011a) and Washo by Bochnak (2015). Nonetheless, these authors come to the conclusion that the respective languages should be analyzed as genuinely tenseless because unmarked future interpretation of matrix clauses *is* actually possible in a variety of constructions. As we already know, this is the case in Medumba as well, where the relevant contexts include modal environments, questions, negated sentences, imperatives, and the antecedents of conditionals.[1] Recall that in chapter 7 these contexts were proposed to license a covert future operator by virtue of nonveridicality. Since the occurrence of the covert future shifter under the analysis proposed here requires binding of the reference

[1] Tonhauser (2011a, p.272) reports that unmarked matrix questions and negated sentences are not compatible with future interpretation in Paraguayan Guaraní, by contrast with Medumba.

time variable, the proposal and the reported data would still be compatible with an approach under which (only) superficially tenseless sentences are restricted by a covert non–future tense (Matthewson, 2006), which would account for the data in (10) – (12). Alternatively, one could follow Tonhauser (2011a) and assume that Medumba patterns with Paraguayan Guaraní in that it does not make absolute future antecedent reference times contextually available except in a number of specific environments.

As far as I can see, the data at my disposal do not justify a definite decision between these analytical options in Medumba. Tonhauser (2011a) demonstrates in great detail that both types of analyses are viable options for Paraguyan Guaraní, but she ultimately favors a tenseless analysis for conceptual reasons. As for Medumba, I have proposed that the data presented in the preceding chapters are most accurately captured if we assume a quantificational semantics for past tense as well as a covert future shifter and a covert perfective aspect. In terms of conceptual plausibility, therefore, it strikes me as unattractive to assume a covert non–future tense for unmarked sentences in addition, but this is, of course, an entirely theory–internal argument. The decision would bear on the question of whether Medumba is to be classified as a tensed language in the narrow sense of (2) or in the looser sense of (3), i.e. whether semantic tense is optional in Medumba or not. The analysis of Medumba presented here does not involve a covert non–future tense, but it is stuck for a satisfying explanation of the unacceptability of (12). Therefore the restriction on future interpretations without future markers across languages deserves a few more words.

8.1.2 Some remarks on restricted future time reference

According to Tonhauser (2011a), languages seem to have a general preference for what she calls the *eventuality time option* when it comes to future interpretation. That is to say, while many languages have quantificational prospective (event) time shifters, I know of no formally described language with a future marker that restricts temporal reference to the future by presupposition (and hence would be the counterpart of a presuppositional past). Recall that also in Hausa, the use of the prospective future form is very much preferred by speakers in future contexts and future reference with non–prospective forms is highly context–dependent. Hence, it is worth considering the possibility that future reference in Hausa is similarly restricted as it is in languages like Medumba, Paraguayan Guaraní and Washo, and that the observed difference in the availability of future readings stems from the grammatical fact that prospective and imperfective aspect are in complementary distribution in Hausa. If a speaker of Hausa wants to refer to an ongoing event in the future, she can use grammatical aspect to mark it for being in progress *or* for being located in the future, but not both (in one clause). Since the event time option is not available

in the case of imperfective aspect marking, one could argue, Hausa is more liberal than other languages in allowing for future reference time anchoring. This provokes the question of what disadvantages future time reference in many languages that allow for temporally unmarked sentences. The data from Medumba, Hausa, Paraguayan Guaraní (Tonhauser, 2011a), and Washo (Bochnak, 2015) suggest that preference for non–future reference is a graded phenomenon. Hence, for some of these languages an analysis involving a covert non–future tense might be too restrictive, whereas it makes the right predictions for St'át'imcets (Matthewson, 2006) or Gitksan (Jóhannsdóttir & Matthewson, 2008).

In the present thesis, restrictions on future interpretation were related to general, conceptually based pragmatic principles as proposed in Smith et al. (2003, 2007); Smith & Erbaugh (2005); and Smith (2008). These principles refer to the widely shared intuition that past and present situations are in some way more accessible than future situations since the latter always come with a smack of uncertainty. While initially appealing, this approach is problematic in so far as any cross–linguistic difference in the availability of future reference would have to be located on the conceptual level rather than in the grammar of the respective language, which clearly is an undesirable result.[2]

In order to find this kind of variation we do not have to look very far. German, for instance, freely uses the present/non–past form to refer to future situations (13-a); the future–marking modal auxiliary "werden" (13-b) is entirely optional.[3]

(13) Context question: What do you think that Sarah will do tomorrow at 8 a.m.?

a. Da geh-t sie zur Arbeit.
Then go-3SG.NON–PAST she to.DEF work
"(Then) she will go to work."

b. Da wird sie zur Arbeit geh-en.
Then will.3SG.NON–PAST she to.DEF work go-INF
"(Then) she will go to work."

The fact that German non–past tenses like in (13-a) are naturally used to refer to both future and present situations in spite of a future form being available seems to violate Smith (2008)'s pragmatic principles. Clearly, we do not want to conclude from this that German does not prefer simple interpretations over more complex ones or that the future for speakers of German or Hausa is in some way more definite or certain than for speakers of Medumba or Paraguayan Guaraní. Hence, in the end it might be

[2]For interesting discussion of this point I thank Angelika Kratzer, Ryan Bochnak, Vera Hohaus and Kilu von Prince.

[3]The judgments are based on introspection.

more plausible to assume with Tonhauser (2011a) that languages tend to provide grammatical markers with modal and/or prospective semantics to mark future interpretation, and that they vary in how freely they provide contextual future reference times. The exact source of this variation remains to be investigated in future research.

8.1.3 Concluding tenselessness

When taking stock of cross–linguistic variation in languages that allow for temporally unmarked matrix clauses, I do not attempt an exhaustive summary of semantic analyses of tenseless languages. A very informative overview has recently been provided by Tonhauser (2015), to which the interested reader is referred. However, even if we confine our overview to some showcase languages that were considered more closely in this thesis, classifying them in a typology of tense(lessness) is not trivial. In Table 8.1 below, "tensed" languages are defined as in (2), i.e. languages that have obligatory semantic tense (quantificational or presuppositional). Besides many Indo–European languages such as English, this class includes St'át'imcets in the analysis of Matthewson (2006). As discussed above, Medumba would belong to this class if we referred to a covert non–future tense to account for the restrictions on unmarked future interpretation. "Optional tense" languages are languages that are tensed by the definition given in (3). In the analysis proposed in this thesis, Medumba is an example of this class, and so is Washo in the analysis of Bochnak (2015). Smith (2008) refers to this class as "mixed temporal languages" and gives Navajo as an example. As becomes clear in this classification, the status of being an "optional tense language" hinges on two properties, namely i) whether or not a language is analyzed to have covert tense, and ii) whether or not the optional temporal markers in the language are actually analyzed as contributing tense semantics. Because of ii), Mandarin Chinese is classified as a tenseless language in Smith & Erbaugh (2005) and Smith (2008), but must be regarded an optional tense language in the analysis of Lin (2003, 2006) who adds a tense semantics to the lexical entry of the optional aspectual particles in the language.[4] Tenseless languages would be languages that have no dedicated tense markers, but maximally contain grammatical time shifters whose meanings are clearly aspectual, like Hausa in the present analysis and Paraguayan Guaraní according to Tonhauser (2011a).

To complement this typology, the next section summarizes some insights on cross–linguistic variation in *graded tense* languages.

[4] As pointed out to me by Lisa Matthewson, a tensed analysis of Mandarin Chinese has recently been proposed by Sun (2014).

Classification	Languages
Tensed	English, St'át'imcets, [**Medumba**]
Optional Tense	**Medumba**, Washo, Navajo, Mandarin (Lin, 2006)
Tenseless	**Hausa**, Guaraní, Mandarin (S&E, 2005)

Table 8.1: Languages with and without tense

8.2 (Graded) Tense cross–linguistically

Chapter 5 of this dissertation provided an analysis of graded past markers in Medumba. Although descriptions and analyses of graded tense systems are sparse in the formal semantic literature, this section makes an attempt to integrate Medumba into the cross–linguistic picture evolving from the existing work on graded tense.

Exposing the past marking of Medumba to closer scrutiny has revealed some interesting differences between its temporal morphemes and i) presuppositional tenses as we know them from Indo–European languages like German and English on the one hand, and ii) the temporal markers analyzed in previous work on graded tense languages on the other. One finding was that, within the Medumba paradigm, a distinction must be made between grammatical markers that introduce a time and locate it within the day/night cycle and others which encode near or remote past time. This bisection is reminiscent of a proposal made by Hayashi (2011) and Hayashi & Oshima (2015) for South Baffin Inuktitut (SB). Both works propose that the tense system of SB involves a distinction between primary tenses and secondary tenses, where the primary tenses (the morphemes *–qqau* and *–lauq*), denote a distinction between hodiernal and pre–hodiernal past with a rigid cut–off point. The secondary tense morphemes (*–lauqsima* and *–kainnaq/–rataaq*) are reported to have more specific and subjective meanings, roughly "just/recently" and "long ago". Hayashi & Oshima (2015) motivate their status as "secondary tenses" by the observation that "their frequencies of occurrence are much lower than those of *-qqau* and *-lauq*" and "they provide more specific temporal information than is minimally required by the grammar" (Hayashi & Oshima, 2015, p.794).

By contrast with the distinction I proposed for Medumba, the partition of past markers in SB is not motivated by co–occurrence restrictions. Judging from the descriptions given by the author(s), the tense morphemes in SB are all in complementary distribution. In fact, the data suggest that the distant past marker *–lauqsima* and the recent past markers *–kainnaq/–rataaq* might in fact just be more specific alternatives to the pre–hodiernal past marker *–lauq* and the hodiernal past marker *-qqau*, respectively, as the authors themselves indicate. Since the distinction between two tense layers

in SB seems to be based on cognitive grounds rather than on their syntactic or semantic behavior, my analysis and theirs are hard to compare. However, the lesson to learn from the investigation of the temporal systems of Medumba and SB is that graded tense systems have to be scrutinized carefully with respect to whether the temporal markers actually form a uniform paradigm (as was previously claimed for Medumba). Although the authors do not provide a formal semantic analysis for the past markers in SB, Hayashi & Oshima (2015) as well as Cable (2015a) indicate that the behavior of the past morphemes patterns with that of the temporal remoteness morphemes in Gĩkũyũ in important respects such as their behavior in in embedded environments and in "ignorance contexts".

Cable (2013) proposes that the temporal remoteness morphemes of Gĩkũyũ denote (restricted) identity functions over events and thereby impose presuppositions on the location of the eventuality time relative to the utterance time. An important motivation for this analysis is the observation that the remote past has to be used in contexts where the speaker is ignorant of *when* the event in question occurred. In general, the speaker has to use the most specific temporal marker compatible with her knowledge, which Cable (2013) explains by referring to the principle of *Maximize Presupposition*. However, recent work on embedded tenses in Gĩkũyũ presented in Cable (2015a) treats the Gĩkũyũ temporal markers as presuppositional tenses rather than as event time modfiers, suggesting that the jury is still out on the exact semantics of the Gĩkũyũ temporal remoteness markers. Chapter 5 of this thesis argued against adopting either of these analyses for Medumba based on data suggesting that the semantics of the Medumba markers is not presuppositional. Rather than as presuppositional reference time or event time modifiers, the past morphemes of Medumba are analyzed as quantifiers over time intervals, in a framework adapted from Kusumoto (1999, 2005). In earlier work, however, Mucha & Zimmermann (to appear) propose a presuppositional analysis of the Medumba tenses as well, an analysis that is revised here after closer scrutiny of the behavior of the morphemes, e.g. in embedded contexts.

Besides the present work on Medumba and the above–mentioned studies on South Baffin and Gĩkũyũ, interesting work in progress is being done on Luganda (Bochnak & Klecha, 2015, to appear). Bochnak & Klecha (to appear) focus on an aspect of graded tense systems that has not been treated in the present thesis. They show that graded tenses in Luganda display the same characteristics of vagueness as other gradable expressions (e.g. adjectives), and they treat the temporal morphemes as presuppositional tenses. Newer work (Bochnak & Klecha, 2015) focuses on the observation that tenses in Luganda can be stacked on top of each other, suggesting that their meaning is of a modifier type (as are the meanings of the Medumba markers according to the analysis in chapter 5). The summary in (14) below illustrates the different formal analyses of graded temporal markers in the

three languages for which formalizations have been proposed, and lists the lexical entries for the near/recent/current past morphemes in the respective accounts.

(14) Proposed analyses for the Medumba "near past"

a. $[\![\text{fə}]\!]^t = \lambda$t': t' precedes t by one day or less. t
(Mucha & Zimmermann, to appear)

b. $[\![\text{fə}]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists$t' [t' precedes t by $\leq$ a few days & P(t')(w)] (chapter 5 of this thesis)

(15) Proposed analyses for the Gĩkũyũ "current past"

a. $[\![\text{CUR}]\!]^{g,t} = [\lambda$e: T(e) ∞ day surrounding t. e] (Cable, 2013)

b. $[\![\text{T}_i \text{ CPST}]\!]^{w,t,g}$ = g(i), if g(i) $<$ t and g(i) is within the day surrounding t (Cable, 2015a)

(16) Proposed analyses for Luganda "recent past"

a. $[\![\text{REC.PST}]\!]^t = \lambda$t': close(t,t') $\prec$ s(close) & t' $<$ t. t'
(Bochnak & Klecha, to appear)

b. $[\![\text{REC}_7]\!]^g = \lambda P.\lambda t.$ [P(g(7)) $<_{v.near}$ t]
(Bochnak & Klecha, 2015)

The overview in (14) – (16) should be treated with caution since it is a snapshot of (partly unpublished) work in progress. What the examples are supposed to illustrate, however, is that some crucial research questions on the semantics of graded tense are still awaiting an answer, for instance the exact semantics of past remoteness markers. The temporal markers of Medumba, Gĩkũyũ and Luganda have each received one analysis according to which they have the presuppositional tense meaning that is relatively well–established for English due to the works of Abusch (1997), Heim (1994), and Kratzer (1998). However, this analysis has also been called into question in each of these graded tense languages listed above in favor of an analysis as quantificational tense (Medumba, this thesis), event time restrictors (Gĩkũyũ, Cable 2013), or temporal modifiers (Luganda, Bochnak & Klecha 2015). Thus the diverging proposals in (14) – (16) illustrate that the obvious differences in specificity between graded temporal morphemes and general past tense markers in better–studied languages invite us to (re–)open the question of how temporality is encoded and how much cross–linguistic variation there is in the semantics of tense. Chapter 5 has touched upon some possible points of cross–linguistic variation in graded tense languages, and they are repeated in (17) below.[5]

(17) Empirical variation in graded temporal morphemes

a. Optionality, semantics of the "remote past"

[5]These matters were discussed and refined at the SIAS summer institute 2015 in Berlin, and I want to thank the participants, especially Ryan Bochnak and Vera Hohaus.

b. Co–occurrence/stacking
c. Relative readings under attitudes (Cable, 2015a)

As already discussed in section 8.1, languages differ in whether they encode tense obligatorily or optionally (or not at all), hence also graded tense morphemes can be grammatically optional (17-a), as is the case in Medumba. Presumably, this property bears on the much discussed question of whether or not a "remote past"–marker in a graded tense language can be used in ignorance contexts.[6] Cable (2013) shows extensively that the remote past is used in ignorance contexts in Gĩkũyũ, where temporal remoteness marking is obligatory. This is also true for South Baffin, although punctual predicates can get past readings without past marking in this language. However, Hayashi & Oshima (2015) analyze these sentences as bearing present tense, which is ∅–marked. Given this, tense marking is obligatory in SB as well. The data from Medumba suggest that if a language allows for unmarked past, speakers will use it if they do not have the necessary information to specify the time by means of a remoteness marker. More research on languages with optional graded tense is necessary to test this generalization, though. In short, there is reason to suppose a direct correlation between the optionality of past marking in a graded tense language and the meaning of its "remote past" form (i.e. whether it has a general past semantics or actually encodes remoteness).

If a language has several grammatical morphemes conveying past meaning, it might in principle be possible for these morphemes to co–occur with each other, as stated in (17-b). Graded tense languages differ in whether they allow stacking (e.g. Luganda and, to a certain degree, Medumba) or not (e.g. South Baffin Inuktitut). If past markers can be stacked, this encourages an analysis which assigns them a modifier type, as proposed for the Medumba markers in chapter 5 of this thesis and the Luganda markers in Bochnak & Klecha (2015). By contrast, we would not expect stacking of grammatical morphemes that encode presuppositional features of variables, unless they restrict different variables as is the case with tenses (restricting temporal pronouns) and temporal remoteness morphemes (restricting event pronouns) in Gĩkũyũ according to Cable (2013).

Finally, Cable (2015a) proposes that a semantic difference between pronominal past tense and quantificational future semantics is reflected in the interpretative possibilities of the past and future markers in attitude contexts. More concretely, pronominal past tense when embedded under attitudes undergoes *res* movement and is therefore always interpreted relative to the utterance time (if a *de re* construal is possible). In languages that only have general past tense, this generalization is hardly testable since, if an eventuality is in the past of a past attitude, it will always be in the past

[6] This correlation was also suggested to me by Seth Cable (p.c.).

of the utterance time as well. In graded tense languages, however, if a near past marker must be interpreted relative to the utterance time under attitudes, it should not allow for relative readings when embedded under an attitude verb that is marked for remote past.[7] If future, on the other hand, has a quantificational, (relative) time shifting rather than a pronominal semantics as is widely assumed, it should allow for interpretation relative to the matrix past time. This is in fact what Cable (2015a) shows for Gĩkũyũ. While Cable argues that this interesting contrast in graded tense languages provides additional evidence for the (cross–linguistic) asymmetry between past and future semantics, I have proposed that this diagnostic actually reveals cross–linguistic variation in the semantics of graded past tenses. In Medumba, as demonstrated in chapter 5, graded pasts embedded under attitudes are interpreted relative to the matrix attitude time. This finding, I argued, supports an analysis of the Medumba graded pasts in which they encode quantificational time shifting like future markers do. Hence, variation in graded tense languages actually provides support for a hypothesis that was recently made in Sharvit (2014) on the basis of cross–linguistic variation in the tense marking of *before*–clauses: Tense languages vary with respect to whether their past tenses are pronominal or quantificational. In other words, if English (pronominal past tense) and Japanese (quantificational past tense) exemplify this variation in the realm of non–graded tense languages, as Sharvit (2014) argues, it is very well conceivable that the same contrast is displayed in the class of graded tense languages by, for instance, Gĩkũyũ (pronominal past tense) and Medumba (quantificational past tense).

I want to point out explicitly that the pronominal and the quantificational approach are extremely hard to distinguish on empirical grounds. It seems that both analyses have been extended with auxiliary assumptions such that they can account for most of the crucial data observed in (non–graded) tense languages. As was briefly mentioned in chapter 5, some of the existing analyses assume ambiguity of past tense morphology in English to account for indefinite readings and shifted readings in embedded clauses under a pronominal approach (Kratzer, 1998), or for the simultaneous reading in embedded clauses under a quantificational approach (von Stechow, 2009; von Stechow & Grønn, 2013a). In a "purely" quantificational account, the referential nature of the past tense is commonly captured by assuming contextual domain restriction (von Fintel, 1994; von Stechow, 2009; Altshuler & Schwarzschild, 2013), to account for Partee (1973)'s famous "stove" examples (see chapter 2). Simultaneous readings in sequence of tense environments are usually captured by an SOT rule in a quantifier analysis along the lines of Ogihara (1989, 1995, 1996).

[7] As Cable (2015a) also points out, Abusch (1997)'s *Upper Limit Constraint* (ULC) predicts that near past embedded under (more) remote past in report/attitude sentences is infelicitous in any context since the ULC excludes "later than matrix"–interpretations (term adopted from Kusumoto 2005) of the embedded tense.

In order to account for indefinite readings of a presumably *pronominal* past, some authors assume free existential closure of the temporal pronoun (Sharvit, 2014; Cable, 2015b), and shifted embedded past requires *res* movement and an additional "Upper Limit Constraint" that prevents the derivation of unattested readings (Abusch, 1997; Heim, 1994) or non–deictic interpretation relative to a shiftable index (Heim, 2015). It seems that semantic theory building that is based purely on judgments from native speakers of Indo–European languages has come to its limits with regard to this question, since hardly any empirical argument can be made that would clearly favor one approach over the other. At the same time, studies such as Sharvit (2014) as well as chapter 5 of the present thesis suggest that the distinction between quantificational and pronominal past is an empirically relevant parameter of cross–linguistic variation rather than just a matter of theoretical preference. In addition to more cross–linguistic investigation, therefore, the issue calls for experimental work. For instance, if tense meanings are presuppositional, tense markers should show reflexes in online processing that have been demonstrated for other presupposition triggers (Schwarz, 2007; Chemla, 2009; Tiemann et al., 2011). Simultaneous readings under attitude verbs (if available in a particular language) should require additional processing effort under an approach that treats tense as a time shifter (e.g. the application of an SOT rule), but not under an approach that treats tense as a pronoun, which can simply be bound. This avenue of research was opened a while ago (see for example Dickey 2000) but has not developed much in the last decade, and hence offers some potential for future work.

The analysis provided for Medumba in this thesis differs from many other works on temporality in that it proposes a parallel semantics between past and future tense in the sense that both of them involve quantification over times (as opposed to a distinction between pronominal past and quantificational future). This is not to say, however, that past and future marking are completely symmetrical in Medumba. I argued in chapter 7 that Medumba has a covert general future shifter which does not have a past counterpart in the language and must be licensed by a dedicated modal marker or some other nonveridical operator. Remoteness distinctions in the future are expressed by means of remoteness markers that are homonymous with and (presumably) diachronically related to the morphemes that denote time of day–meanings in past contexts. In general, most semantic studies of graded tense languages ignore certain complications in the area of future interpretation or deal only with graded past in the first place, which seems legitimate given the relatively small body of literature to build on. However, closer inspection of future marking in graded tense languages might provide valuable insights on the semantics of the future cross–linguistically. After all, there is a long–standing debate on whether future semantics across languages is modal or temporal, or both, and which of these meaning components are se-

mantically hard–wired in the meaning of particular future markers. Graded tense languages add the factor of remoteness, thus promising more intricate and potentially revealing divisions of labor realized in future marking strategies. For instance, we would predict that if both modality and future shifting are necessary semantic ingredients of future interpretation, some graded tense language with a particularly transparent system might encode modality, future–shifting, and remoteness in three different markers.

Having summarized some general implications of the presented work for the cross–linguistic picture of graded tense languages, the next section elaborates on future interpretation in particular.

8.3 Future interpretation cross–linguistically

In the following cross–linguistic considerations on future marking, I want to come back to the observation made by Tonhauser (2011b) that was already alluded to in section 7.3. Tonhauser defines two criteria around which the meanings of natural language future markers seem to vary. The first one is the range of modal interpretations they are compatible with and the second is whether or not they entail (prospective) future shifting. Tonhauser points out that the Guaraní future marker *-ta* patterns with the St'át'imcets future marker *kelh* (Rullmann et al., 2008) as far as the second parameter is concerned. Both of these future markers seem to entail future shifting, as evidenced by the fact that they are incompatible with non–future modal readings. As demonstrated in chapter 4, the same is true for the Hausa future form. However, I also argued for Hausa that the dedicated future marker *zā* obligatorily co–occurs with a prospective aspect form. Thus the two meaning components of modality and prospective time shifting that are combined in the semantics of St'át'imcets *kelh* and Guaraní *-ta* according to the analyses of Rullmann et al. (2008) and Tonhauser (2011b) are disentangled in the Hausa future form.

Medumba, on the other hand, patterns with Turkish (Yavaş, 1982) and many Indo–European languages in that its future marker allows for non–future readings, which is most often illustrated by reference to present epistemic interpretations. I proposed that the meaning of the Medumba future marker *á'* is purely modal and that, although Medumba does not have an audible prospective aspect form and although *á'* allows for present–oriented epistemic interpretations, it always co–occurs with a prospective aspect as well. This is motivated by the observation that Medumba *á'* cannot co–occur with past–shifting operators, but builds complex forms with the time of day markers, resulting in remoteness–specific future meanings. The difference in the availability of non–future modal readings is explained by the different aspectual architectures of Hausa and Medumba. Hausa does not allow for aspect stacking but obligatorily specifies the grammatical aspect of a sen-

tence. For this reason, aspect (including the prospective, crucially) always directly modifies the eventuality time. Since imperfective, perfective and prospective aspect are in complementary distribution in Hausa, prospective aspect will never be used to express present–oriented modality, and since the future modal *zā* always selects for prospective aspect, it is incompatible with present or past interpretations. In Medumba, by contrast, the future shifter is always stacked on top of perfective or imperfective aspect, and thus introduces a new time rather than modifying the eventuality time. In the case of the covert general prospective that does not encode remoteness, this results in truth conditions that are compatible with both future and present modality, as demonstrated in section 7.3. A cross–linguistic prediction that could be deduced from this analysis is that in any language, the aspectual architecture determines whether or not future markers allow for non–future interpretations. However, the analysis must be applied on a case–by–case basis. In section 8.3.1, I want to illustrate how an analysis along the lines of the account of Medumba in chapter 7 could potentially be extended to English, and in section 8.3.2, I sketch a cross–linguistic overview. The proposals crucially build on prior work on the temporal orientation of modals, especially recent studies such as Matthewson (2012, 2013) on Gitksan and Kratzer (2012b) on English, as well as the cross–linguistic work of Chen et al. (to appear).

8.3.1 Extending the analysis to English

As stated above, English patterns with Medumba in marking future by means of a modal auxiliary (*will*) which is compatible with non–future modal readings.[8] The existing literature on the English future forms is extensive, and I will not review it in detail here. Most importantly for present purposes, many accounts of the English future marker attribute some modal meaning component to *will* (e.g. Enç 1996; Copley 2002, 2009; Klecha 2014); others argue that its meaning is purely temporal (e.g. Kissine 2008; Salkie 2010). In this short excursion, I will follow the first approach.

In parallel to what was proposed for Hausa and Medumba in the present dissertation, I want to argue that the temporal behavior of *will* can be derived from the distribution of aspect if we accept the assumptions in (18-a–c), some of which have already been mentioned in this work and all of which have been independently motivated in the literature:

(18) a. In English, progressive and perfect aspect are projected in distinct aspect layers (see for example Radford 1997, Beck & von Stechow 2014). The progressive is in complementary distribution with a covert perfective; the perfect is in complementary

[8] I will not consider the *be going to*–future form. For comparison of the two and an analysis see Copley (2002, 2009).

distribution with a covert prospective.

b. The meaning of future markers such as *will* is modal (Enç, 1996).

c. The perfective aspect requires the time of an event to be included in a contextual reference time (RT) (Klein 1994, Kratzer 1998). For stative predicates, it only requires temporal overlap (Kamp & Reyle 1993, Condoravdi 2002).

Note that only (18-a) is an English–specific property while (18-b) and (18-c) are potentially universal. The present analysis suggests that variation in (18-a), rather than lexical variation in the meaning of future markers, is the source of different temporal behavior of future markers across languages.

The English future marker *will* is compatible with non–future epistemic interpretations. However, in English like in Medumba, only state predicates and events with imperfective/progressive aspect marking allow for these readings, in opposition to bare event predicates. This is illustrated in (19).[9]

(19) Context: Your sister is coming to your house to visit. Your daughter Alex is staying in her room and your sister asks you why, but you can only guess:

a. Alex will be busy. (state)

b. Alex will be working. (event marked for progressive)

c. #Alex will work. (unmarked event, only future reading)

As already mentioned before, it has also been observed that ongoing present readings cannot be obtained with simple present sentences in English; they require progressive aspect marking as illustrated in (20) below.

(20) Context: Your sister asks you what your daughter is doing at the moment. You say:

a. She is reading a book.

b. #She reads a book.

This kind of observation has led some scholars to make the same assumption for English that I have been making for Medumba, namely that of a covert perfective aspect in the grammar (e.g. Arregui 2007; Wurmbrand 2014). Like in my proposal for Medumba (and for Hausa, where the perfective is overt), this perfective aspect excludes a present progressive interpretations in (20-b) since a perfective present would require the instantaneous utterance time to include a durative event, which is not possible (Bennett & Partee 1978, see also the *Bounded Event Constraint*). What is more, the contrast in (21) shows that also in future contexts, progressive marking is necessary

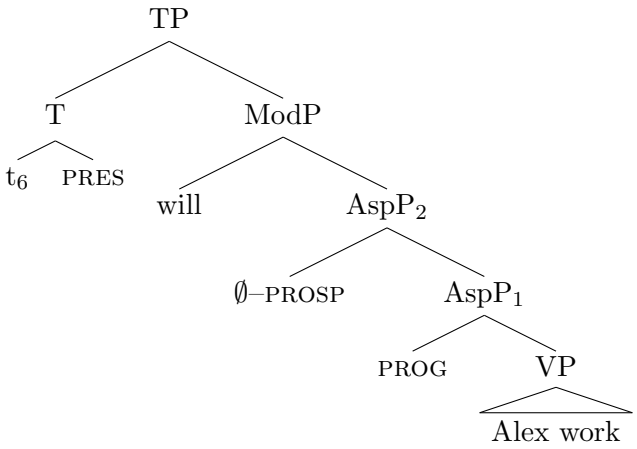
[9] I thank Joseph DeVeaugh–Geiss for his judgments.

if the context specifies that the reference time is punctual. This, I would like to argue, indicates that also future sentences like (21-b) contain a covert perfective aspect.

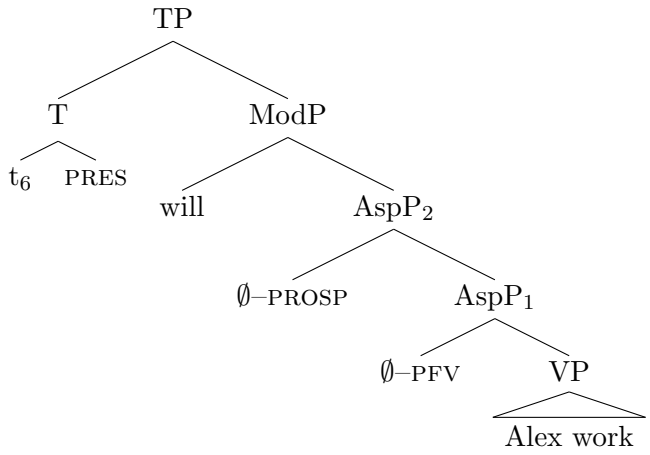
(21) Context question: Can I meet Alex tomorrow at 6 p.m. sharp?
   a. No, Alex will be working.
   b. #No, Alex will work.

Applying the Medumba analysis to English, the obligatory future meaning of *will* with eventive predicates as well as the observation in (21) follow compositionally if we assume the structure in (22) for future progressives like (19-b) and (23) for plain future sentences like (19-c):

(22)



(23)



Assuming for English the perfective semantics in (24), the prospective semantics in (25), and the future modal semantics for *will* in (26), we arrive at the truth conditions in (27) for (19-c).

(24) $[\![\emptyset\text{–PFV}]\!]^{g,c} = \lambda P_{\langle l,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists e\ [\tau(e) \subseteq t\ \&\ P(e)(w)]$ (Kratzer 1998)

(25) $[\![\emptyset\text{–PROSP}]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists t'\ [t' > t\ \&\ P(t')(w)]$[10]

(26) $[\![\text{will}]\!]^{g,c} = \lambda P_{\langle i,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\forall w'[w' \in \text{BEST}_{O_{(w),(t)}}(\text{MB}(w)(t)) \rightarrow P(t)(w')]$

(27) $[\![(19\text{-c})]\!]^{g,c}$ is only defined if g(6) O t_c. If defined:
$= \lambda w.\forall w'\ [w' \in \text{BEST}_{O_{(w)(g(6))}}(\text{MB}(w)(g(6))) \rightarrow \exists \mathbf{t'}\ [\mathbf{t'} > \mathbf{g(6)}\ \&$
$\exists \mathbf{e}\ [\tau\mathbf{(e)} \subseteq \mathbf{t'}\ \&\ \text{work}(e)(w')\ \&\ \text{agent}(e)(w') = \text{Alex}]]]$

The truth conditions in (27) require that there be a future time that includes the running time of the event of Alex working, which is incompatible with a present construal. For the progressive sentence in (19-b), the only difference is that Asp_1 hosts a progressive aspect (28)[11] instead of a perfective, while Asp_2 is still specified for prospective. The truth conditions then come out as in (29).

(28) $[\![\text{PROG}]\!]^{g,c} = \lambda P_{\langle l,\langle s,t\rangle\rangle}.\lambda t.\lambda w.\exists e\ [\tau(e) \supseteq t\ \&\ P(e)(w)]$ (Kratzer 1998)

(29) $[\![(19\text{-b})]\!]^{g,c}$ is only defined if g(6) O t_c. If defined:
$= \lambda w.\forall w'\ [w' \in \text{BEST}_{O_{(w)(g(6))}}(\text{MB}(w)(g(6))) \rightarrow \exists \mathbf{t'}\ [\mathbf{t'} > \mathbf{g(6)}\ \&$
$\exists \mathbf{e}\ [\tau\mathbf{(e)} \supseteq \mathbf{t'}\ \&\ \text{work}(e)(w')\ \&\ \text{agent}(e)(w') = \text{Alex}]]]$

The truth conditions specified in (29) only require that there be a time after the present reference time (i.e. the utterance time t_c) which is included in the time of Alex working. Given that this time interval can be an instant that is located right after t_c, (29) is compatible with the eventuality time including *both* the utterance time and the time introduced by the prospective aspect operator. Thus, the observed underspecification between present and future readings of sentences like (19-b) is predicted.

For stative predicates, the argumentation parallels that proposed for Medumba. The perfective/progressive contrast does not apply to stative predicates in the same way it does to events, since for states the relevant temporal relation between eventuality time and reference time is overlap rather than inclusion. Hence, it is predicted that stative predicates pattern with progressive events in allowing for present epistemic readings. For the sake of completeness, the truth conditions of the stative sentence in (19-a), repeated below as (30), are provided in (31).

(30) Context: Your sister is coming to your house to visit. Your daughter Alex is staying in her room and your sister asks you why, but you

[10] It was pointed out to me that I might actually have to assume weak posteriority ($\leq$) rather than strong posteriority ($<$) for the English prospective in order for the analysis to go through, since otherwise it makes wrong predictions for sentences that contain temporal adverbials. I concede that the interaction of aspect and temporal adverbials does not receive much attention here and leave the question of whether the English prospective should be defined involving weak posteriority for future research.

[11] Recall from chapter 2 that I am setting aside the modal meaning components of the progressive. For detailed modal analyses of the progressive in English see Dowty (1977), Landman (1992), and Portner (1998).

can only guess:

Alex will be busy.

(31) $[\![(31)]\!]^{g,c}$ is only defined if g(6) O t_c. If defined:
$= \lambda w.\forall w'$ [w' $\in$ BEST$_{O_{(w)(g(6))}}$(MB(w)(g(6))) $\rightarrow$ $\exists$**t' [t' > g(6) &**
$\exists$**e** [τ**(e) O t'** & busy(e)(w') & agent(e)(w') = Alex]]]

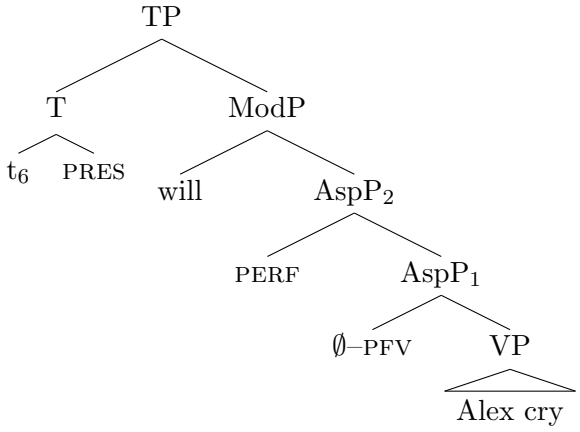
Again, the temporal component of these truth conditions only requires that the time where Alex is busy overlaps the time introduced by the prospective and, here again, if we assume with Altshuler & Schwarzschild (2013) that stative eventualities are inherently (temporally) unbounded, there will always be a part of the state of Alex being busy that temporally overlaps a time interval after the reference time (which in the above case coincides with the utterance time).

Under this kind of approach, past–oriented modal interpretations in English will arise if Asp_2 is specified for perfect rather than prospective and if Asp_1 has a covert perfective aspect, e.g. in the eventive sentence in (32) which would have the LF structure in (33) and the truth conditions in (34).

(32) Context: Your sister is coming to your house to visit. When she sees your daughter, she remarks that her eyes look red and swollen and she wants to know what happened, you suppose:

Alex will have cried.

(33)



(34) $[\![(32)]\!]^{g,c}$ is only defined if g(6) O t_c. If defined:
$= \lambda w.\forall w'$ [w' $\in$ BEST$_{O_{(w)(g(6))}}$(MB(w)(g(6))) $\rightarrow$ $\exists$**t' [t' < g(6) &**
$\exists$**e** [τ**(e)** $\subseteq$ **t'** & cry(e)(w') & agent(e)(w') = Alex]

These truth conditions correctly predict that in all possible worlds in the modal base there is a time before the (present) reference time that includes an event of Alex crying. In parallel to the prospective case the stative counterpart of (32) in (35) can be interpreted so as to overlap with the present reference time as expected under the truth conditions in (36).

(35) Context: You and your friends haven't heard from Alex in quite a long time, one of your friends has an idea about the reason:

Alex will have been busy.

(36) $[\![(35)]\!]^{g,c}$ is only defined if g(6) O t_c, if defined:
$= \lambda w.\forall w'$ [w' $\in$ BEST$_{O_{(w)(g(6))}}$(MB(w)(g(6))) $\rightarrow$ $\exists$**t' [t' < g(6) &** $\exists$**e** [τ**(e) O t'** & busy(e)(w') & agent(e)(w') = Alex]]]

As with the prospective, the truth conditions of the perfect stative sentence require a temporal overlap of the state of Alex being busy with the time introduced by the perfect, which will always be fulfilled since in all worlds where Alex is busy at the reference time g(6), she will also be busy at some time before g(6). Note that as it stands, the proposed analysis does not predict the second reading of (32), namely the "past in the future" interpretation triggered by the context in (37).

(37) Context: Your sister wants to come to your place tonight and take some photos of your daughter Alex. Since Alex will be vaccinated in the evening and since you know that she always cries after vaccinations, you tell her it's a bad idea because:

Alex will have cried.

This reading will be a problem for any account that follows Reichenbach's distinction between eventuality time, reference time and utterance time, and also assumes that the future is aspectual. The reason is that in future perfect sentences such as (37) it is the *reference time* that is in the future, and the perfect aspect induces a past shift of the eventuality time relative to this future RT. This is how Reichenbach (1947, p.290) explicitly defines the future perfect: UT < ET < RT.

One possible way of solving this is to assume a different meaning of the present tense than I did in the truth conditions given above (which is the one proposed by Heim (1994) and which restricts the RT of a sentence to overlap with its UT). More specifically, one could adopt the proposal of Sauerland (2002) that present tense in English is vacuous and that restrictions on the occurrence of present tense can be explained by Heim (1991)'s *Maximize Presupposition* principle. This would remove the presupposition from the truth conditions of (32) and yield the truth conditions given in (38), thus allowing that the context shifts the reference time to the future ("this evening" in the case of (37)).

(38) $[\![(32)/(37)]\!]^{g,c} = \lambda w.\forall w'$ [w' $\in$ BEST$_{O_{(w)(g(6))}}$(MB(w)(g(6))) $\rightarrow$ $\exists$**t'** **[t' < g(6) &** $\exists$**e** [τ**(e)** $\subseteq$ **t'** & cry(e)(w') & agent(e)(w') = Alex]]]

Sauerland's proposal of vacuous present tense is not uncontroversial (for a counterargument see Thomas 2015). However, what Sauerland (2002)

argues against is the present tense in English carrying a non–past presupposition, a proposal he attributes to Abusch (1997).[12] However, even if we assumed a lexical entry of the English present tense which involves a non–past presupposition, the future perfect reading in (37) could be derived, since a future RT would be possible. Hence, either of the present tense semantics in (39) would work for the present account.

(39) Present tense in English

a. $[\![\text{PRES}]\!]^{g,c} = \lambda t.\ t$ (no presupposition)

b. $[\![\text{PRES}]\!]^{g,c} = \lambda t : \neg(t < t_c).\ t$ (non–past presupposition)

8.3.2 Cross–linguistic implications

What I hope to have shown in the last section is that an aspect–based analysis of the temporal readings of English *will* in parallel to what I proposed for Medumba is viable. However, the suggested analysis implies that both in Medumba and in English, prospective aspect is covert and the future marker *á'* in Medumba must in fact co–occur with this prospective aspect. In chapter 7, I proposed to make sense of this by alluding to Smith et al. (2007)'s generalization that future interpretations do not usually arise as defaults in natural language. Therefore, if future shifting in a language is encoded by a covert operator, the presence of this operator has to be licensed. In Medumba, I argued, the relevant licensing condition is non–veridicality in the sense of Giannakidou (2014b). The element *á'* under this analysis is a "future marker" quite literally, i.e. it indicates semantic future shifting, but it encodes modality and thus creates a non–veridical environment for the future shifter. It was also noted that this analysis is hardly empirically distinguishable from an approach under which *á'* directly encodes future shifting. However, separating prospectivity from the meaning of *á'* has the advantage that it accounts for a wide variety of contexts in which future interpretation in Medumba is attested without *á'* and without a contextual future reference time, for instance in out-of-the-blue questions and in contexts with present RTs (cf. section 7.5). Since these examples seem to require some kind of time shifting, this time shifting was proposed to come from a covert future shifter.

The analysis of future interpretation with *will* in English parallels this approach in that it strives for full compositionality. The covert prospective aspect I assume for English is semantically identical to its counterpart in Medumba. The architectures of the two languages differ, however. In Medumba, the covert future shifter is analyzed as a (relative) tense rather

[12] I find it difficult to pin Abusch (1997) down to a concrete proposal for a lexical entry of present tense, since the author also seems to assume overlap as the relevant temporal relation in places. Abusch (1997, p.41) does, however, presume a $\neg <$ – semantics for present tense.

than as an aspect, its LF position is assumed to be in the same (high) slot as that of the past markers, and *á'* is a high–scoping modal. English *will* differs from Medumba *á'* in that it can combine with the back–shifting counterpart of the covert prospective, i.e. with the perfect, and hence does not obligatorily co–occur with the covert prospective. In that sense, its distribution is less restricted than that of *á'*. The covert prospective in English, I would argue, must also be licensed, but the licensing condition on the English prospective is modality rather than non–veridicality. Therefore, in English we get future–shifting in a subset of the environments that license future–shifting in Medumba, namely in the scope of modals (40-a), in imperatives (40-b), and in the antecedents of condtionals (40-c), but not in negation (40-d) or questions (40-e).

(40) Future licensing in English

a. Tina might win tomorrow.
b. Repair your car tomorrow!
c. If you help your sister tomorrow, she will be grateful.
d. #Mary does not feel well tomorrow.
e. ??What do you think Mary cooks tomorrow?[13]

Recall from chapter 4 that a similar assumption was made for the prospective aspect in Hausa based on proposals in Schuh (2003). There it was argued that the Hausa prospective ("subjunctive" in Schuh's terminology) is defective in the sense that it must be licensed by a covert modal operator scoping over it. Technical details aside, we can derive from this the following overview of future meaning in Hausa, Medumba, and English.

	English	Medumba	Hausa
FUT–modal	*will*	*á'*	*zā*
Co–occurrence	PROSP/PERF	PROSP	PROSP
	+ PROG/PFV	+ IPFV/PFV	–
FUT–shifting	covert	covert	overt
Licensing	modal	nonveridical	modal

Table 8.2: Future marking in English, Medumba, Hausa

Table 8.2 gives an overview of what a decompositional analysis of future marking could look like in English and the two languages investigated in this thesis. The approach is crucially inspired by works of Matthewson (2012, 2013), Kratzer (2012b) and also Chen et al. (to appear). Chen et al. (to appear) provide an extensive cross–linguistic overview of 12 typologically

[13] Joseph de Veaugh–Geiss who provided these judgments reports that this example improves with a specific intonation that possibly indicates contrasting (e.g. with a sentence about what Mary cooked today).

diverse languages, showing how the temporal orientation of modals can be derived compositionally from different tense/aspect configurations. The approach taken to future meaning in the present thesis basically extends this assumption to future modality, assuming that some modals (like English *will*, Medumba *á'* and Hausa *zā*) are more or less specialized to expressing predictive modality in combination with a future shifter. The Null Hypothesis that Chen et al. (to appear) assume in the realm of modality is given in (41).

(41) Modals and Temporality: The Null Hypothesis
   a. The temporal perspective[14] of modals is provided by tense (or its functional equivalent).
   b. The temporal orientation of modals is provided by viewpoint and lexical aspect.

An exception to this is that circumstantial modals only occur with non–past temporal orientation due to Condoravdi (2002)'s *Diversity Condition* (see chapter 2 of this thesis). Another systematic deviation from (41) can be observed in languages where epistemic modals always scope high above tense (e.g. Blackfoot, Atayal, SENĆOTEN in their sample). In these languages (according to Chen et al. to appear), the temporal perspective of the modal is always present, and past temporal orientation needs embedding. This is the case with the modal *á'* in Medumba as well. Given the comprehensiveness of the overview provided in Chen et al. (to appear), I will not recite all their data here. Instead, I restrict myself to reporting some interesting observations from two more languages, namely Gitksan (Matthewson, 2012, 2013) and Greek (Giannakidou & Mari, to appear, 2015), and integrate them into the cross–linguistic picture that was sketched based on Hausa, Medumba, and English.

One interesting property of **Gitksan** (Tsimshianic) is that, like Hausa, it has an overt prospective aspect marker, the morpheme *dim*. Even more interesting for the discussion of temporal properties of modals cross–linguistically is that *dim* overtly contributes the future orientation of modals and thus the Null Hypothesis cited in (41) is spelled out particularly clearly in Gitksan. Modals that are lexically specified for circumstantial flavor[15] always co–occur with *dim*, which invariably makes them future–oriented. This is illustrated for the modal *da'a<u>k</u>hlxw* in (42) (from Matthewson 2013).

[14] To remind the reader of the terminology introduced by Condoravdi (2002): The *temporal perspective* of a modal is the time at which the evidence for the use of the modal is evaluated, i.e. the time to which the modal base is relativized. The *temporal orientation* is the time at which the eventuality is temporally located.

[15] Matthewson (2013) shows that modals in Gitksan are lexically specified for their conversational background, and that quantificational force is specified for circumstantial, but not for epistemic modals.

(42) da'a<u>k</u>hlxw-i-s Henry #(dim) jam-t
CIRC.POS-TRA-PN Henry #(FUT) cook-3SG.II
"Henry is able to cook." / "Henry was able to cook."

Epistemic modals, by contrast, can occur without the prospective marker, but in this case only allow for non–future orientation (43). With *dim* their interpretation is also invariably future–oriented (44) (from Matthewson 2013, contexts omitted).

(43) yugw=imaa/ima'=hl wis
IMPF=EPIS=CN rain
"It might have rained." / "It might be raining." / ≠ "It might rain (in the future)."

(44) yugw=imaa/ima'=hl dim wis
IMPF=EPIS=CN FUT rain
≠ "It might have rained." / ≠ "It might be raining." / "It might rain (in the future)."

These observations in Gitksan have important bearings on the issue of temporal orientation of modals cross–linguistically. Recall from chapter 2 that future–oriented modals like *can, might*, and *must* in English could either be analyzed as encoding their temporal orientation directly (Enç, 1996; Condoravdi, 2002)[16] or as combining with a future shifter (e.g. a prospective aspect) that provides their future orientation (Kratzer, 2012b). Encoding future–orientation of modals overtly with *dim*, Gitksan provides strong cross–linguistic evidence for the latter view.[17]

With respect to the analysis of the future that I have been arguing for, we might expect to find future interpretation to be realized in a similar way in Gitksan as it is in Hausa, i.e. that the modal and the temporal components of future interpretation are both overtly encoded. However, according to Matthewson (2012, 2013), what we actually find is that *dim* is both necessary and sufficient for future interpretation, as shown in (45).

(45) *(dim) limx=t James t'aahlakw (Matthewson, 2013)
FUT sing=DM James tomorrow
"James will sing tomorrow."

[16] Condoravdi (2002) could be read as a hybrid between a lexical and a compositional approach since it provides unified lexical entries for the modals and derives future– and present–orientation from lexical aspect. Since, however, modals are assumed to expand the evaluation time forward, I take it they lexically encode future orientation.

[17] It has to be noted that the data discussed in Chen et al. (to appear) are compatible with the assumption of cross–linguistic variation in this respect. Crucially, the authors find languages (e.g. St'át'imcets) where prospective aspect is encoded overtly but provides future–orientation only to epistemic modals, suggesting that circumstantial modals lexically encode their future–orientation.

Transferring this to the discussion on English, Hausa and Medumba above, it seems that in Gitksan the prospective does not have to be licensed by a modal or a non–veridical operator. This might not even be surprising in a language that *overtly* realizes future orientation, although it contrasts with the observation that in Hausa the overt prospective must be licensed. Recall, however, that the necessary licensing of prospectivity in Hausa was attributed to an idiosyncratic deficiency in the semantics of the prospective. Against the background of this analysis, it would not necessarily be expected that other languages converge with Hausa in this respect. Taking the data from Gitksan at face value, the conclusion is that future shifting does not have to be licensed and, more importantly, that future interpretation does not (or not necessarily) involve modality. There is a caveat, however. According to Matthewson (2013), *dim* is not only used for plain predictive future sentences, but also for expressing circumstantial necessity (46).

(46) dim hajiswa-'y (Matthewson, 2013)
FUT sneeze-1SG.II
"I have to sneeze."

What is more, Matthewson (2013) also reports deontic uses of *dim*, as shown in (47).

(47) Context: I tell you that Bob stole a book from the store.
dim ap guuxws mak̲-d-i-s Bob
FUT EMPH back give-T-TRA-PN Bob
"He has to give it back."

Matthewson (2013) mentions two possible explanations for this range of interpretations of sentences with (plain) *dim*. Either examples like (46) and (47) are in fact plain future statements and the modal interpretations arise via inferences, or there is a covert modal element occurring in plain *dim*–sentences. If we adopted the latter assumption, Gitksan would be the complementary case of English and Medumba in that the temporal component of the future is realized overtly while the modal one is covert.

Recall also that I proposed to account for the possibility of what most scholars refer to as "(present) epistemic" interpretations of future markers by reference to the aspectual architecture of a given language. More concretely, I proposed that in English, Hausa and Medumba, future marking always comes with a modal and a temporal component, but that the temporal component is covert in English and Medumba. The fact that only Hausa does not allow for present epistemic interpretations was attributed to the fact that Hausa does not allow for aspect stacking so that the prospective can never co–occur with an imperfective marker. The formal analysis of Gitksan modal sentences with *dim* provided in Matthewson (2012) suggests that it

not only matters if a language marks grammatical aspect and if aspect can be stacked, but also *how* aspects can be stacked. Matthewson (2012) reports that, like English and Medumba, Gitksan allows for overt co–occurrence of prospective and imperfective aspect. Therefore, both aspects are formalized as quantifiers over times with an $\langle\langle i,\langle s,t\rangle\rangle,\langle i,\langle s,t\rangle\rangle\rangle$ modifier type (like the meaning that I proposed for the future shifters of English and Medumba). Existential quantification over the event variable is encoded in a bleached aspect head (48-a). The lexical entries of the prospective marker *dim* and the imperfective morpheme *yukw*, cited from Matthewson (2012, p.438), are given in (48-b) and (48-c).

(48) a. $[\![\text{ASP}]\!] = \lambda P_{\langle ev,st\rangle}\ \lambda t\ \lambda w.\ \exists e\ [P(e)(w)\ \&\ \tau(e) = t]$
b. $[\![dim]\!] = \lambda P{\in}D_{\langle i,st\rangle}\ \lambda t\ \lambda w.\ \exists t'\ [t < t'\ \&\ P(t')(w) = 1]$
c. $[\![yukw]\!] = \lambda P{\in}D_{\langle i,st\rangle}\ \lambda t\ \lambda w.\ \exists t'\ [t' \supseteq t\ \&\ P(t')(w) = 1]$

Given what I proposed earlier, I would expect that the combination of prospective and imperfective in Gitksan is compatible with a present epistemic interpretation, which does not seem to be the case as illustrated in example (44) above. However, the truth conditions that Matthewson (2012) gives for a prospective imperfective sentence (with epistemic modality) suggest that in Gitksan, it is the prospective aspect that attaches to the VP (more precisely to $[\![\text{ASP}]\!]([\![\text{VP}]\!])$). Hence the prospective aspect shifts the eventuality time to the future of the time introduced by the imperfective, which includes the reference time. The truth conditions of (44) provided in Matthewson (2012, p.438) are given in (49).

(49) $[[ima('a)_{\text{MB}}\ yukw\ dim\ \text{asp}\ wis]] = \lambda t\ \lambda w\ \exists w'\ [w' \in \text{MB}(w,t)\ \&\ \exists t'\ [t' \supseteq t\ \&\ \exists t''\ [t' < t''\ \&\ \exists e\ [[\text{it rains}](w')(e)\ \&\ \tau(e) = t'']]]]$

By contrast with the truth conditions in (49), my proposal for Medumba and English implies that imperfective and (covert) perfective always apply to the VP, and that the prospective has to be stacked on top, with the effect that the prospective never directly modifies the eventuality time. Therefore, if my interpretation of Matthewson (2012) is correct, the compositional order of prospective and imperfective aspect could explain the difference between Gitksan on the one hand, and English and Medumba on the other hand, even if all of these languages allow for aspect stacking.

To conclude this cross–linguistic part, I want to briefly draw the reader's attention to **Greek**. Modern Greek (and Italian) as described by Giannakidou & Mari (2012b,a, 2013, to appear, 2015) are among the languages that allow for non–future interpretations with future marking (like English and Medumba, but unlike Hausa and Gitksan). According to Giannakidou & Mari (to appear), in Greek the *predictive* interpretation with the future marker arises in combination with a temporal form which the authors dub

"perfective non-past" (PNP). This is illustrated by the example in (50) from Giannakidou & Mari (to appear).

(50) O Janis tha ftasi avrio.
the John FUT arrive.PNP.3sg tomorrow.
"John will arrive tomorrow."

Giannakidou (2009) defines the meaning of nonpast as in (51) below.

(51) $[\![\text{nonpast}]\!] = \lambda P\ \lambda t\ P((t,\infty))$ (Giannakidou, 2009, p.1899)

The nonpast in Greek hence denotes an open interval which licenses a future interpretation with future adverbs, but doesn't force it. Giannakidou also argues that the time variable of the Greek nonpast must be interpreted as a bound variable. It must be "licensed" by a nonveridical particle (Giannakidou & Mari, 2012b, p.257) and one possible licenser, according to Giannakidou, is the future particle *tha*. It licenses the defective nonpast by supplying the utterance time as a reference time, i.e. as a left boundary to the open interval denoted by the nonpast.

Giannakidou and Mari also report that the Greek future systematically receives epistemic present interpretations when it is combined with stative predicates as in (52) or with imperfective nonpast (53).

(52) I Ariadne tha ine arrosti (Giannakidou & Mari, 2015)
the Ariadne FUT be.3sg sick
"Ariadne must be sick."

(53) I Ariadne tha troi tora
the Ariadne FUT sleep.ipfv.non–pst.3sg now
"Ariadne must be sleeping now."

In order to get past–oriented epistemic readings, the Greek future particle *tha* can be combined with the perfective past (PP) form, illustrated in (54) below (from Giannakidou & Mari 2012b, p.258).

(54) I Ariadne tha kimithike (orin apo dyo ores).
the Ariadne FUT sleep.PP.3sg before two hours
"Ariadne must have fallen asleep two hours ago."

Hence, Greek fits into the cross–linguistic picture as follows: As Giannakidou & Mari (2015) make explicit, Greek patterns with Gitksan in making the compositionality of future interpretation and prospectivity obvious. Predictive future readings only arise in Greek if the future modal *tha* is combined with perfective non–past, which has the meaning in (51). This perfective non–past, under their analysis, behaves like the Hausa prospective in that it is defective and must be licensed by a modal/nonveridical particle like *tha*. The future modal *tha* differs from the future modals of Hausa, Medumba,

and English under my analysis in that it does not obligatorily co–occur with a future–shifter, but the future shifter under *tha* is in complementary distribution with an imperfective non–past and a past marker.

A concluding conjecture: If the line of reasoning proposed here is on the right track, it can also account for attested variation *within* the class of languages that allow for non–future epistemic interpretations with future modals. As stated by Giannakidou & Mari (2015) and confirmed by English native speakers I consulted, purely epistemic readings with English *will* are much harder to obtain than with its counterparts in Greek and Italian, and *will* seems to have some kind of future flavor in all its uses.[18] Under the present account, this can be related to the assumption that English *will* is always prospective and the present epistemic reading is a secondary effect in the sense that it does not contradict the truth conditions, as shown in section 8.3.1. In Greek, by contrast, there is no future–shifting at all in a sentence like (53), which makes a present reading much more natural.

In summary, this thesis provides analyses of future marking in Hausa and Medumba which assume that in both languages the prospective time shifter has to be licensed by an operator scoping over it. In Hausa, this is because the prospective is semantically defective. A similar proposal was made for Greek by Giannakidou & Mari (2015). In Medumba and in English, future shifters have to be licensed by overt operators because they are covert and the languages must indicate future shifting somehow because of its marked status. Alternatively, a language can overtly mark the prospective component of future interpretation with a covert modal scoping over it, as might be the case in Gitksan (Matthewson, 2012, 2013). Languages differ with respect to the degree to which future marking is compatible with present readings (cf. Tonhauser 2011b). I proposed to account for this by referring to the aspectual architecture of the language. If a future modal always occurs with a future shifter which is in complementary distribution with other aspects, present readings are excluded. This is the case in Hausa. If a future modal always occurs with a future shifter, but this future shifter can be stacked on top of imperfective aspect, present readings are predicted to be possible but restricted or slightly marked. This analysis was proposed for Medumba and extended to English (with the difference that English *will* can be combined with a perfect as well). If a future modal freely combines with any temporal/aspectual operator in its scope, but if these cannot be stacked, we expect that present interpretations are available and natural with a combination of the future modal and imperfective aspect, but excluded with a combination of the future modal and the prospective or its

[18] Besides my colleague Joseph De Veaugh–Geiss, I am grateful for judgments from and discussion with participants of the SIASSI 2015 and of SuB 20. Systematic testing of this generalization is desirable, but left for future research.

equivalent. Judging from the data presented in Giannakidou (2014a), this might be the case in Greek. Table 8.3 below provides an updated summary of the section.

	English	Medumba	Hausa	Greek	Gitksan
FUT–modal	*will*	*á'*	*zā*	*tha*	covert(?)
Co–occurrence	PROSP/PERF +PROG/PFV	PROSP +IPFV/PFV	PROSP –	PNP/PST/INP –	IPFV/PFV +PROSP
FUT–shifting	covert	covert	PROSP	PNP	*dim*
Readings	fut, pst, (pres)	fut, (pres)	fut	fut, pst, pres	fut
Licensing	modal	nonveridical	modal	nonveridical?	–

Table 8.3: Cross–linguistic variation in future marking

Chapter 9

Summary

The preceding chapters attempt to provide some new insights on the cross–linguistic variation of tense/aspect systems by analyzing two typologically unrelated African languages. The first part of the thesis argues that the Chadic language Hausa does not encode tense in its grammar overtly or covertly. Chapter 3 systematically investigates whether superficially tenseless Hausa encodes covert non–future tense (cf. Matthewson 2006), with the result that temporal interpretation in Hausa is not restricted in that way. The temporal readings observed in tenseless sentences in Hausa are captured by an approach proposed in Smith et al. (2003, 2007), Smith & Erbaugh (2005), and Smith (2008), which derives temporal interpretation of tenseless sentences from the aspectual distinctions in the language by means of pragmatic principles: The *Bounded Event Contraint* which states that eventualities that are temporally bounded events are not interpreted in the present, *The Deictic Principle* which makes sure that situations are located with respect to speech time, and the *Simplicity Principle* according to which speakers are required to choose the (temporal) interpretation which requires the least additional assumptions or inferences. The chapter also provides empirical evidence and theoretical arguments against an existing analysis of the Hausa relative perfective as a past tense which was proposed in the previous literature (Abdoulaye, 2001).

Chapter 4 shows that future marking in Hausa overtly realizes the two meaning components that are often attributed to future interpretation in natural language: universal quantification over possible worlds (modality) and future shifting of the event time relative to the reference time (prospective aspect). The future marker *zā* that was previously described as a future tense is proposed to be modal in meaning and the TAM marking with which it obligatorily co–occurs is reanalyzed as a prospective aspect. Among other things, this component of the analysis accounts for the observation that the future morpheme *zā* is incompatible with (other) aspectual markers. The account further establishes the result that Hausa is a genuinely tenseless

language since, as often observed for natural language future markers (e.g. Rullmann et al. 2008, Tonhauser 2011b, Giannakidou & Mari 2015), future in Hausa involves modality and aspect rather than tense in the Kleinian sense. The main results of the study on Hausa can thus be summarized as in (1).

(1) Temporal interpretation in Hausa

a. Tenseless sentences in Hausa are not restricted by covert tense. Temporal interpretation without tense is inferred from a combination of semantic aspect, modality, lexical temporal elements (e.g. adverbials), and general pragmatic principles.

b. The future marker *zā* does not have tense meaning, it is a modal.

c. *Zā* always combines with a low tone on the following subject pronoun, which is analyzed as a prospective aspect (contra previous descriptions), thereby triggering predictive future interpretations.

Besides languages that do not grammatically encode any tense at all, there are languages that diverge from the Indo–European pattern in making even more fine–grained tense distinctions than past, present and future. The second part of the thesis addresses the semantics of temporal marking in *graded tense* languages by providing a formal account of graded tense marking in Medumba (Grassfields Bantu). Chapter 5 analyzes the Medumba past markers and compares their behavior to that of temporal remoteness morphemes in Gĩkũyũ as analyzed in Cable (2013), which is the first detailed formal analysis of graded tense. In chapter 6, sentences without tense marking in Medumba are analyzed along the same lines as tenseless sentences in Hausa, referring to the pragmatic principles proposed in Smith (2008). Moreover, an analysis of the morphemes that are associated with imperfective and present interpretation in Medumba is sketched. Chapter 7 discusses future interpretation in Medumba and relates it to the analysis of future in Hausa from chapter 4. Both languages are argued to express future with a combination of modality and future time shifting, but they differ in their LF architecture as well as in the concrete semantics of the prospective time shifter, which, moreover, is encoded overtly in Hausa and covertly in Medumba. The proposal for the simple future form in Medumba is then extended to "complex future markers", i.e. future forms that encode remoteness. The results of the study of graded tense in Medumba are summarized in (2).

(2) Temporal interpretation in Medumba

a. Graded past markers in Medumba denote quantificational past operators in the sense of Kusumoto (1999, 2005) (modulo certain adaptions of the theory), with the addition of a remoteness

specification.

b. Morphologically tenseless sentences in Medumba can be analyzed by means of the same assumptions about aspect and pragmatic reasoning that were referred to in the analysis of Hausa. However, the theory of Smith (2008) accounts for Hausa more straightforwardly than for Medumba, where certain additional assumptions about covert aspect and restricted future interpretation are necessary.

c. Future marking in Medumba involves an overt future modal *á'* that obligatorily co–occurs with a covert prospective time shifter or with overt prospective time shifters that come with a remoteness specification.
   (i) The covert prospective is licensed in the scope of non–veridical operators. This is how the distribution of future readings in Medumba is accounted for.
   (ii) The overt time shifters are realized by the same morphemes that act as *time of day* markers both in past and future environments and are thus analyzed as ambiguous.

Chapter 8 evaluates the results of the presented studies from a broader perspective on cross–linguistic variation. It discusses whether or not Medumba should be considered a genuinely tenseless language and relates this discussion to some of the languages without morphological tense for which semantic or pragmatic analyses have been provided, as for example St'át'imcets (Matthewson, 2006), Guaraní (Tonhauser, 2011a), and Mandarin Chinese (Lin, 2006; Smith & Erbaugh, 2005). Moreover, the chapter aims at taking stock of cross–linguistic variation in the semantics of graded temporal markers, based on a comparison of the account proposed for Medumba with the few other semantic analyses of graded temporal systems that are available. It also deals with cross–linguistic future interpretation in particular. The section summarizes commonalities of the proposed analyses of future marking in Hausa and Medumba, and explores the potential of the proposal to extend to other languages, considering English, Gitksan (Matthewson, 2012, 2013), and Greek (Giannakidou, 2009; Giannakidou & Mari, 2012b, 2013, 2015). The more general results of the thesis that concern cross–linguistic variation in tense/aspect systems are summarized in (3).

(3) Contributions to the cross–linguistic picture

a. So–called "graded tense" languages vary in whether their graded temporal markers are optional or obligatory, whether they are in complementary distribution or can be combined, whether they occur in both past or future contexts or not, and how they are interpreted in attitude complement clauses. These empirical differences bear on the semantic analysis that capture the data

observed in a particular language most adequately. Hence, the typological class of "graded tense" languages does not constitute a uniform paradigm.

b. In languages that allow them, morphologically tenseless sentences seem to generally disadvantage future interpretations, but there are differences in whether future reference times are semantically excluded (St'át'imcets, Matthewson 2006), not made contextually available (Paraguayan Guaraní, Tonhauser 2011a, possibly Medumba), or contextually available but never chosen as defaults (Hausa).

c. The data on future interpretation in Hausa and Medumba supports existing evidence that future marking in natural language involves the meaning components of modality and prospective time shifting. However, languages vary in whether they overtly realize the modal meaning component, the future–shifting component, or both. Whether or not a (modal) future marker allows for non–future interpretations depends on the aspectual architecture of the respective language.

In conclusion, the present work demonstrates that we find quite a number of cross–linguistic differences in the domain of temporal and aspectual reference. For instance, languages can realize grammatical tense as presuppositional features on pronouns or as quantificational time shifters, overtly or covertly, or not at all. Tenses can be strictly deictic, shiftable under embedding, or relative to a contextual reference time, thus blurring the distinction between tense and aspect. Aspect as well can be overt or covert, it can be stacked in some languages but not in others, and it interacts with modality in the realm of future interpretation and in other domains that were hardly even touched upon in this thesis (e.g. the imperfective paradox and actuality entailments). This variation makes semantic fieldwork on tense and aspect a great challenge, but the fieldworker has help. Specifically, Cover & Tonhauser (2015) provide clear and concrete guidelines for theoretically–informed semantic fieldwork on temporal reference and even list the relevant diagnostics for the fieldworker to use. Hence it is to be hoped that future research of this kind combined with psycholinguistic work will shed some more light on the concrete meaning contributions of tense and aspect, their interaction with modality, and the role of context.

Bibliography

Abdoulaye, Mahamane L. 2001. The grammaticalization of zâa "be going to" future. *Journal of African Languages and Linguistics* 22. 1–32.

Abdoulaye, Mahamane L. 2008. Perfectivity and time reference in Hausa. *Linguistic Discovery* 6. 15–39.

Abusch, Dorit. 1985. *On verbs and time*. Amherst, MA: University of Massachusetts dissertation.

Abusch, Dorit. 1988. Sequence of Tense, Intensionality and Scope. In *Proceedings of the 7th West Coast Conference on Formal Linguistics (WCCFL 7)*, The Stanford Linguistics Association.

Abusch, Dorit. 1997. Sequence of tense and temporal de re. *Linguistics and Philosophy* 20. 1–50.

Abusch, Dorit. 2012. Circumstantial and temporal dependence in counterfactual modals. *Natural Language Semantics* 20. 273–297.

Altshuler, Daniel & Roger Schwarzschild. 2013. Moment of change, cessation implicatures and simultaneous readings. In Emanuel Chemla (ed.), *Proceedings of Sinn und Bedeutung 17*, 45–62.

Amsili, Pascal & Claire Beyssade. 2010. Obligatory presupposition in discourse. In Peter Kühnlein, Anton Benz & Candace L. Sidner (eds.), *Constraints in discourse, pragmatics and beyond*, Amsterdam, Philadelphia: John Benjamins.

Arregui, Ana. 2007. When aspect matters: the case of *would*–conditionals. *Natural Language Semantics* 15. 221–264.

Arregui, Ana, Maria Luisa Rivero & Andrés Salanova. 2011. Imperfectivity: capturing variation across languages.

Arregui, Ana, María Luisa Rivero & Andrés Salanova. 2014. Cross-linguistic variation in imperfectivity. *Natural Language & Linguistic Theory* 32. 307–362.

Ashton, E.O., E. M. K. Mulira, E. G. M. Ndawula & A. N. Tucker. 1951. *A Luganda grammar*. London: Longmans, Green & Co.

van der Auwera, Johan. 1993. 'Already' and 'still': Beyond duality. *Linguistics and Philosophy* 16. 613–653.

Bach, Emmon. 1986. The algebra of events. *Linguistics and Philosophy* 9. 5–16.

Beaver, David & Cleo Condoravdi. 2003. A uniform analysis of *before* and *after*. In R. Young & Y. Zhou (eds.), *Proceedings of Semantics and Linguistic Theory (SALT) 13*, 37–54. CLC Publications.

Beck, Sigrid & Arnim von Stechow. 2014. Events, times and worlds – an LF architecture. Ms., University of Tübingen.

Bennett, Michael & Barbara Partee. 1978. *Toward the logic of tense and aspect in English*. Blackwell.

Bhatt, Rajesh. 1999. *Covert modality in non-finite contexts*: University of Pennsylvania dissertation.

Bittner, Maria. 2005. Future discourse in a tenseless language. *Journal of Semantics* 22. 339–388.

Bittner, Maria. 2008. Aspectual universals of temporal anaphora. In Susan Rothstein (ed.), *Theoretical and crosslinguistic approaches to the semantics of aspect*, Amsterdam: John Benjamins.

Bittner, Maria. 2011. Time and modality without tenses or modals. In Monika Rathert & Renate Musan (eds.), *Tense across languages*, Tübingen: Niemeyer.

Bittner, Maria. 2014. *Temporality: Universals and variation*. Malden,MA: Wiley Blackwell.

Bochnak, M. Ryan. 2015. Past time reference in a language with optional tense. Ms., University of Manchester.

Bochnak, M. Ryan. to appear. Variable force modality in Washo. In *Proceedings of NELS 45*, .

Bochnak, M. Ryan & Peter Klecha. 2015. Temporal remoteness and relativity. Unpublished abstract.

Bochnak, M. Ryan & Peter Klecha. to appear. Temporal remoteness and vagueness in past time reference in Luganda. In *Selected Proceedings of ACAL 45*, .

Bochnak, M. Ryan & Lisa Matthewson. 2015. *Methodologies in semantic fieldwork*. Oxford University Press.

Bohnemeyer, Jürgen. 2002. *The grammar of time reference in Yukatek Maya*. Munich: Lincom Europa.

Bohnemeyer, Jürgen. 2009. Temporal anaphora in a tenseless language: The case of Yucatec. In Wolfgang Klein & Ping Li (eds.), *The expression of time*, Berlin: Mouton de Gruyter.

Bohnemeyer, Jürgen & Mary Swift. 2004. Event realization and default aspect. *Linguistics and Philosophy* 27. 263–296.

Bonomi, Andrea. 1997. Aspect, quantification and when–clauses in Italian. *Linguistics and Philosophy* 20. 469–514.

Bybee, Joan, Revere Perkins & William Pagliuca. 1994. *The evolution of grammar: Tense, aspect and modality in languages of the world*. Chicago: The University of Chicago Press.

Cable, Seth. 2013. Beyond the past, present and future: towards the semantics of 'graded tense' in Gĩkũyũ. *Natural Language Semantics* 21. 219–276.

Cable, Seth. 2015a. Graded tenses in complement clauses: Evidence that future is not a tense. Talk given at the Semantics of African, Asian and Austronesian Languages (AAA) 2, University of Potsdam.

Cable, Seth. 2015b. The Tlingit decessive and discontinuous past: The curious implicatures of optional past tense. Ms., University of Massachusetts. Accessed from http://ling.auf.net/lingbuzz/002517.

Chemla, Emmanuel. 2008. An epistemic step for anti–presuppositions. *Journal of Semantics* 25. 141–173.

Chemla, Emmanuel. 2009. Presuppositions of quantifed sentences: Experimental data. *Natural Language Semantics* 17. 299–340.

Chen, Sihwei, Vera Hohaus, Meagan Louie, Lisa Matthewson, Hotze Rullmann, Ori Simchen, Clair T. Turner & Jozina Vander Klok. to appear. Past possibility cross-linguistically. In Ana Arregui, María Luísa Rivero & Andrés Salanova (eds.), *Modality across Syntactic Categories*, Oxford: Oxford University Press.

Chomsky, Noam. 1981. *Lectures on Government and Binding*. Dordrecht: Foris.

Chomsky, Noam. 1995. *The Minimalist Program*. Cambridge, MA: MIT Press.

Chung, Sandra & Alan Timberlake. 1985. Tense, Aspect and Mood. In Timothy Shopen (ed.), *Language typology and syntactic description*, vol. 3, 202–258. Cambridge: Cambridge University Press.

Cinque, Guglielmo. 1999. *Adverbs and functional heads.* Oxford: Oxford University Press.

Cipria, Alicia & Craige Roberts. 2001. Spanish *Imperfecto* and *Preterito*: Truth Conditions and Aktionsart Effects in a Situations Semantics. *Natural Language Semantics* 8. 297–347.

Comrie, Bernard. 1976. *Aspect.* Cambridge: Cambridge University Press.

Comrie, Bernard. 1985. *Tense.* Cambridge: Cambridge University Press.

Condoravdi, Cleo. 2002. Temporal interpretation of modals: Modals for the present and for the past. In David Beaver, Stefan Kaufmann, Brady Clark & Luis Casillas (eds.), *The construction of meaning*, 59–88. Stanford: CSLI Publications.

Copley, Bridget. 2002. *The semantics of the future.* Cambridge, MA: MIT dissertation.

Copley, Bridget. 2009. *The semantics of the future.* New York: Routledge.

Cover, Rebecca & Judith Tonhauser. 2015. Theories of meaning in the field: temporal and aspectual reference. In M. Ryan Bochnak & Lisa Matthewson (eds.), *Methodologies in semantic fieldwork*, 306–349. Oxford University Press.

Cresswell, Maxwell J. 1990. *Entities and indices.* Dordrecht: Kluwer.

Dahl, Östen. 1985. *Tense and aspect systems.* Oxford: Blackwell.

Danis, Nick, Jonathan Barnes & Catherine O'Connor. 2012. Downstep and Contour Formation in Medumba. In *Proceedings of the 42nd Annual Conference on African Linguistics (ACAL)*, 23–31.

Deal, Amy Rose. 2011. Modals without scales. *Language* 87. 559–585.

Déchaine, Rose-Marie. 1993. *Predicates across categories: Towards a category-neutral syntax.* Amherst: University of Massachusetts dissertation.

Deo, Ashwini. 2015. The semantic and pragmatic underpinnings of grammaticalization paths: The progressive to imperfective shift. *Semantics and Pragmatics* 8. 1–52.

Dickey, Michael W. 2000. *The processing of tense.* Amherst: University of Massachusetts dissertation.

Diesing, Molly. 1992. *Indefinites* Linguistic Inquiry Monographs. Cambridge, Massachusetts: MIT Press.

Dowty, David. 1977. Towards a semantic analysis of verb aspect and the English imperfective progressive. *Linguistics and Philosophy* 1. 45–77.

Dowty, David. 1979. *Word meaning and montague grammar*. Dordrecht: Reidel.

Eckardt, Regine & Manuela Fränkel. 2012. Particles, *Maximize Presupposition* and discourse management. *Lingua* 122. 1801–1818.

Enç, Mürvet. 1986. Towards a referential analysis of temporal expressions. *Linguistics and Philosophy* 9. 405–426.

Enç, Mürvet. 1987. Anchoring conditions for tense. *Linguistic Inquiry* 18. 633–657.

Enç, Mürvet. 1996. Tense and Modality. In Shalom Lappin (ed.), *The Handbook of Contemporary Semantic Theory*, London: Blackwell.

Ferreira, Marcelo. 2004. Imperfectives and plurality. In R.Young (ed.), *Proceedings of Semantics and Linguistic Theory (SALT) 14*, 74–91.

Ferreira, Marcelo. 2005. *Event quantification and plurality*. Cambridge, MA: Massachusetts Institute of Technology dissertation.

von Fintel, Kai. 1994. *Restrictions on quantifier domains*. Amherst: University of Massachusetts dissertation.

von Fintel, Kai & Lisa Matthewson. 2008. Universals in semantics. *Linguistic Review* 25. 139–201.

Franich, Kathryn, Catherine O'Connor & Jonathan Barnes. 2012. Tonal Merger in Medumba (Bamileke) Nouns. In *Proceedings of the 42nd Annual Conference on African Linguistics (ACAL)*, 32–46.

Gennari, Silvia. 1999. Embedded present tense and attitude reports. In *Proceedings of Semantics and Linguistic Theory (SALT) 9*, 91–108.

Gennari, Silvia. 2001. Tense, aspect and aktionsart in Spanish and Japanese. In *Maryland Working Papers in Linguistics, vol. 11*, 60–84. Maryland: University of Maryland College Park.

Gennari, Silvia. 2003. Tense meaning and temporal interpretation. *Journal of Semantics* 20. 35–71.

Giannakidou, Anastasia. 1999. Affective dependencies. *Linguistics and Philosophy* 22. 367–421.

Giannakidou, Anastasia. 2009. The dependency of the subjunctive revisited: Temporal semantics and polarity. *Lingua* 119. 1883–1908.

Giannakidou, Anastasia. 2014a. The futurity of the present and the modality of the future: a commentary on Broekhuis and Verkuyl. *Natural Language and Linguistic Theory* 32. 1011–1032.

Giannakidou, Anastasia. 2014b. The prospective as nonveridical: polarity items, speaker commitment, and projected truth. In D.G. Gilberts & J. Hoeksema (eds.), *The Black Book. Feestschrift for Frans Zwarts*, 101–124.

Giannakidou, Anastasia & Alda Mari. 2012a. The future in Greek and Italian: an evidential analysis. In *Proceedings of the Chicago Linguistic Society 48*, .

Giannakidou, Anastasia & Alda Mari. 2012b. The future of Greek and Italian: An epistemic analysis. In *Proceedings of Sinn und Bedeutung 17*, 255–270.

Giannakidou, Anastasia & Alda Mari. 2013. A two dimensional analysis of the future: modal adverbs and speakers bias. In *Proceedings of the 19th Amsterdam Colloquium*, 115–122.

Giannakidou, Anastasia & Alda Mari. 2015. The future in Greek and Italian: objective and subjective dimensions. Ms. University of Chicago and Institut Jean Nicod, CNRS. Accessed from http://home.uchicago.edu/ giannaki/papers.html, August 27, 2015.

Giannakidou, Anastasia & Alda Mari. to appear. Future and universal epistemic modals: reasoning with non–veridicality and partial knowledge. In Joanna Blaszczak, Anastasia Giannakidou, Dorota Klimek-Jankowska & Krzysztof Mygdalski (eds.), *Mood, Aspect and Modality: What is a linguistic Category?*, Chicago University Press. Accessed from http://home.uchicago.edu/ giannaki/papers.html.

Giannakidou, Anastasia & Frans Zwarts. 1999. Aspectual properties of temporal connectives. In Amalia Mozer (ed.), *Proceedings of the 3rd International Conference on Greek Linguistics*, 104–113. Athens: Ellinika Grammata.

Gouffé, Claude. 1963/1966. Les problemes de l'aspect en haoussa. I-Introduction. Le problème de l'aoriste et de l'accompli II. In *Comptes rendus du groupe linguistique d'études chamito-sémitiques [GLECS] 10*, 151–165.

Grubic, Mira & Anne Mucha. 2012. Explaining the modal readings of Hausa *sai* (= "only"). Paper presented at Modality@OttawaU, April 2012.

Grubic, Mira & Anne Mucha. 2013. If *only* means *must*: Analyzing the modal meanings of the Hausa exclusive particle *sai* and its use in conditionals. Poster presented at the International Congress of Linguistics in Geneva, July 2013.

Hacquard, Valentine. 2006. *Aspects of modality.* Cambridge, MA: Massachusetts Institute of Technology dissertation.

Hacquard, Valentine. 2009. On the interaction of aspect and modal auxiliaries. *Linguistics and Philosophy* 32. 279–315.

Hacquard, Valentine. 2010. On the event relativity of modal auxiliaries. *Natural Language Semantics* 18. 79–114.

Hacquard, Valentine. 2011. Modality. In Claudia Maienborn, Klaus von Heusinger & Paul Portner (eds.), *Semantics: An International Handbook of Natural Language Meaning*, 1484–1515. Berlin: Mouton de Gruyter.

Hallman, Peter. 2004. Constituency and agency in VP. In *Proceedings of the 23rd West Coast Conference on Formal Linguistics (WCCFL)*, 304–317.

Hartmann, Katharina & Malte Zimmermann. 2007a. Exhaustivity marking in Hausa: a reanalysis of the particle nee/cee. In Enoch Oladé Aboh, Katharina Hartmann & Malte Zimmermann (eds.), *Focus Strategies in African Languages*, 241–263. Berlin, New York: Mouton de Gruyter.

Hartmann, Katharina & Malte Zimmermann. 2007b. In place - out of place? In Kerstin Schwabe & Susanne Winkler (eds.), *On information structure, meaning and form: Generalizing across languages*, 365–403. Amsterdam: Benjamins.

Hayashi, Midori. 2011. *The structure of multiple tenses in Inuktitut.* Toronto: University of Toronto dissertation.

Hayashi, Midori & David Oshima. 2015. How multiple past tenses divide the labor: The case of South Baffin Inuktitut. *Linguistics* 53. 773–808.

Heim, Irene. 1991. Artikel und Definitheit. In Arnim von Stechow & Dieter Wunderlich (eds.), *Semantics: An International Handbook of Contemporary research*, Berlin: De Gruyter.

Heim, Irene. 1994. Comments on Abusch's theory of tense. In Hans Kamp (ed.), *Ellipsis, tense and questions*, Amsterdam: University of Amsterdam.

Heim, Irene. 1997. Tense in compositional semantics. MIT lecture notes.

Heim, Irene. 2005. Features on bound pronouns. Ms. Cambridge, Mass.

Heim, Irene. 2015. Embedded referential tense. Talk given at the STECHOW workshop at Sinn und Bedeutung 20, University of Tübingen.

Heim, Irene & Angelika Kratzer. 1998. *Semantics in Generative Grammar*. Oxford: Blackwell.

Heine, Bernd. 1994. Grammaticalization as an explanatory parameter. In William Pagliuca (ed.), *Perspectives on Grammaticalization* (Current Issues in Linguistic Theory 109), 255–287. Amsterdam, Philadelphia: John Benjamins.

Hornstein, Norbert. 1993. *As time goes by*. Cambridge, MA: MIT Press.

Hyman, Larry. 1980. Relative time reference in the Bamileke tense system. *Studies in African Linguistics* 11. 227–237.

Ijbema, Aniek. 2002. *Grammaticalization and infinitival complements in Dutch*: University of Leiden dissertation.

Jaggar, Philip J. 2006. The Hausa Completive tense-aspect used in wh-/focus constructions and historical narratives: A unified account. Supplement to Studies in African Linguistics.

Jaggar, Philipp J. 2001. *Hausa*. Amsterdam: John Benjamins.

Jespersen, Otto. 1992. *The philosophy of grammar*. Chicago: University of Chicago Press.

Jóhannsdóttir, Kristin M. & Lisa Matthewson. 2008. Zero-marked tense: The case of Gitxsan. In *Proceedings of NELS 37*, Amherst, MA: GLSA.

Kamp, Hans & Uwe Reyle. 1993. *From Discourse to Logic*. Dordrecht: Kluwer.

Kamp, Hans & Christian Rohrer. 1983. Tense in texts. In Arnim von Stechow Rainer Bäuerle, Christoph Schwarze (ed.), *Meaning, Use, and Interpretation of Language*, 250–269. Berlin, New York: Walter de Gruyter.

Kaufmann, Magdalena. 2012. *Interpreting imperatives*, vol. 88 Studies in Linguistics and Philosophy. New York: Springer.

Kaufmann, Stefan. 2005. Conditional truth and future reference. *Journal of Semantics* 22(3). 231–280.

Kissine, Mikhail. 2008. Why *Will* is not a modal. *Natural Language Semantics* 16. 129–155.

Klecha, Peter. 2014. Diagnosing Modality in Predictive Expressions. *Journal of Semantics* 31. 443–455.

Klein, Wolfgang. 1994. *Time in language*. London: Routledge.

Klein, Wolfgang. 1995. A time–relational analysis of Russian aspect. *Language* 71. 669–695.

Klein, Wolfgang. 2009. How time is encoded. In Wolfgang Klein & Ping Li (eds.), *The expression of time*, Berlin: Mouton de Gruyter.

Klingenheben, August. 1928/1929. Die Tempora Westafrikas und die semitischen Tempora. *Zeitschrift für Eingeborenensprachen* 19. 241–268.

König, Ekkehard. 1977. Temporal and non-temporal uses of *schon* and *noch* in German. *Linguistics and Philosophy* 1. 173–198.

Kouankem, Constantine. 2012. *The syntax of the Medumba determiner phrase*. Yaounde: University of Yaounde I dissertation.

Kouankem, Constantine & Malte Zimmermann. 2013. Focus in serial verb constructions. Ms., University of Yaoundé I and University of Potsdam.

Kratzer, Angelika. 1977. What "must" and "can" must and can mean. *Linguistics and Philosophy* 1. 337–355.

Kratzer, Angelika. 1981. The notional category of modality. In H. J. Eikmeyer & H. Rieser (eds.), *Words, Worlds and Contexts*, Berlin, New York: De Gruyter.

Kratzer, Angelika. 1991. Modality. In Arnim von Stechow & Dieter Wunderlich (eds.), *Semantik: Ein internationales Handbuch der zeitgenössischen Forschung*, 639–650. Berlin: De Gruyter.

Kratzer, Angelika. 1995. Stage–level and individual–level predicates. In Gregory N. Carlson (ed.), *The generic book*, 125–175. Chicago: University of Chicago Press.

Kratzer, Angelika. 1996. Severing the external argument from its verb. In Johan Rooryck & Laurie Zaring (eds.), *Phrase structure and the lexicon*, 109–137. Dordrecht: Kluwer.

Kratzer, Angelika. 1998. More Structural Analogies Between Pronouns and Tenses. In Devon Strolovitch & Aaron Lawson (eds.), *Proceedings of Semantics and Linguistic Theory (SALT) 8*, 92–110.

Kratzer, Angelika. 2000. Building Statives. In *Proceedings of the 26th Annual Meeting of the Berkeley Linguistics Society*, 385–399. Berkeley.

Kratzer, Angelika. 2012a. *Modals and Conditionals*. Oxford: Oxford University Press.

Kratzer, Angelika. 2012b. What "can" can mean. Lecture notes LOT winter school, Tilburg.

Krifka, Manfred. 1998. The origins of telicity. In Susan Rothstein (ed.), *Events and grammar*, vol. 70 Studies in Linguistics and Philosophy, 197–235. Springer Netherlands.

Krifka, Manfred. 2000. Alternatives for aspectual particles. In *Proceedings of the 26th Annual Meeting of the Berkeley Linguistics Society*, .

Kubota, Yusuke, Jungmee Lee, Anastasia Smirnova & Judith Tonhauser. 2009. The cross-linguistic interpretation of embedded tenses. In *Proceedings of Sinn und Bedeutung 13*, 307–320.

Kusumoto, Kiyomi. 1999. *Tense in embedded contexts*. Amherst, MA: University of Massachusetts dissertation.

Kusumoto, Kiyomi. 2005. On the quantification over times in natural language. *Natural Language Semantics* 13. 317–357.

Landman, Fred. 1992. The progressive. *Natural Language Semantics* 1. 1–32.

Lee, Jungmee & Judith Tonhauser. 2010. Temporal interpretation without tense: Korean and Japanese coordination constructions. *Journal of Semantics* 27. 307–341.

Lewis, David. 1981. Ordering semantics and premise semantics for counterfactuals. *Journal of Philosophical Logic* 10. 217–234.

Lewis, M. Paul (ed.). 2009. *Ethnologue: Languages of the World, Sixteenth edition*. Dallas, Texas: SIL International. Online version: http://www.ethnologue.com/.

Lin, Jo-Wang. 2003. Temporal reference in Mandarin Chinese. *Journal of East Asian Linguistics* 12. 259–311.

Lin, Jo-Wang. 2006. Time in a language without tense: the case of Chinese. *Journal of Semantics* 23. 1–53.

Lin, Jo-Wang. 2010. A tenseless analysis of Mandarin Chinese revisited: a response to Sybesma 2007. *Linguistic Inquiry* 41. 305–329.

Löbner, Sebastian. 1989. German *schon-erst-noch*: An integrated analysis. *Linguistics and Philosophy* 12. 167–212.

Löbner, Sebastian. 1999. Why German *schon* and *noch* are still duals. *Linguistics and Philosophy* 22. 45–107.

Matthewson, Lisa. 2004. On the methodology of semantic fieldwork. *International Journal of American Linguistics* 70. 369–415.

Matthewson, Lisa. 2006. Temporal semantics in a superficially tenseless language. *Linguistics and Philosophy* 29. 673–713.

Matthewson, Lisa. 2012. On the (non-) future orientation of modals. In Ana Guevara Aguilar, Anna Chernilovskaya & Rick Nouwen (eds.), *Proceedings of Sinn und Bedeutung 16*, 431–446.

Matthewson, Lisa. 2013. Gitksan modals. *International Journal of American Linguistics* 79. 349–394.

McCawley, James. 1971. Tense and time reference in English. In Charles Fillmore & Terence Langendoen (eds.), *Studies in linguistic semantics*, 97–113. New York: Holt, Rinehart, and Winston.

Merchant, Jason. 2004. Fragments and ellipsis. *Linguistics and Philosophy* 27. 661–738.

Merchant, Jason, Lyn Frazier, Charles Clifton Jr. & Thomas Weskott. 2013. Fragment answers to questions: A case of inaudible syntax. In Laurence Goldstein (ed.), *Brevity*, 21–35. Oxford: Oxford University Press.

Mittwoch, Anita. 1993. The relationship between *schon/already* and *noch/still*: A reply to Löbner. *Natural Language Semantics* 2. 71–82.

Mucha, Anne. 2011. *The Tense–Aspect–Mood system of Hausa*: University of Potsdam MA thesis.

Mucha, Anne. 2012. Temporal reference in a genuinely tenseless language: The case of Hausa. In Anca Chereches (ed.), *Proceedings of Semantics and Linguistic Theory (SALT) 22*, 188–207.

Mucha, Anne. 2013. Temporal interpretation in Hausa. *Linguistics and Philosophy* 36. 371–415.

Mucha, Anne & Malte Zimmermann. to appear. TAM–coding and temporal interpretation in West African languages. Crosslinguistic approaches to Tense, Aspect and Mood. Chicago University Press.

Murphy, M Lynne. 2010. *Lexical meaning*. Cambridge University Press.

Newman, Paul. 2000. *The Hausa language*. New Haven: Yale University Press.

Newman, Paul & Roxana Ma Newman. 2012. *Online bibliography of Chadic and Hausa linguistics*. DEVA, Institute of African Studies, University of Bayreuth.

Nganmou, Alise. 1991. *Modalité verbales. temps, aspect et mode en Medumba*. Yaounde: University of Yaounde I dissertation.

Nurse, Derek. 2003. Aspect and tense in Bantu languages. In Derek Nurse & Gérard Philippson (eds.), *The Bantu Languages*, London: Routledge.

Nurse, Derek. 2008. *Tense and aspect in Bantu*. Oxford: Oxford University Press.

Ogihara, Toshiyuki. 1989. *Temporal reference in English and Japanese*. Austin: University of Texas dissertation.

Ogihara, Toshiyuki. 1995. The semantics of tense in embedded clauses. *Linguistic Inquiry* 26. 663–679.

Ogihara, Toshiyuki. 1996. *Tense, attitudes, and scope*. Dordrecht: Kluwer.

Parsons, Frederick W. 1960. The verbal system in Hausa. *Afrika und Übersee* 44. 1–36.

Partee, Barbara. 1973. Some structural analogies between tenses and pronouns in English. *The Journal of Philosophy* 70. 601–609.

Partee, Barbara. 1984. Nominal and temporal anaphora. *Linguistics and Philosophy* 7. 243–286.

Percus, Orin. 2000. Constraints on some other variables in syntax. *Natural Language Semantics* 8. 173–229.

Percus, Orin & Uli Sauerland. 2003. On the LFs of attitude reports. In *Proceedings of Sinn und Bedeutung 7*, 228–242.

Peterson, Tyler. 2010. *Epistemic modality and evidentiality in Gitksan at the semantics–pragmatics interface*. Vancouver: University of British Columbia dissertation.

Pollock, Jean-Yves. 1989. Verb movement, universal grammar, and the structure of IP. *Linguistic Inquiry* 20. 365–424.

Portner, Paul. 1992. *Situation theory and the semantics of propositional expressions*. Amherst, MA: University of Massachusetts dissertation.

Portner, Paul. 1998. The progressive in modal semantics. *Language* 74. 760–787.

Portner, Paul. 2003. The (temporal) semantics and (modal) pragmatics of the perfect. *Natural Language Semantics* 26. 459–510.

Portner, Paul. 2009. *Modality*. OUP Oxford.

Prior, Arthur. 1967. *Past, present and future.* Oxford: Oxford University Press.

Radford, Andrew. 1997. *Syntactic theory and the structure of English.* Cambridge: Cambridge University Press.

Reichenbach, Hans. 1947. *Elements of symbolic logic.* New York: Macmillan.

Renans, Agata. 2015. Imperfective in Ga (Kwa). In Eva Csipak & Hedde Zeijlstra (eds.), *Proceedings of Sinn und Bedeutung 19*, 501–518.

Ritter, Elizabeth & Martina Wiltschko. 2014. The composition of INFL. *Natural Language & Linguistic Theory* 32(4). 1331–1386.

Rooth, Matts. 1985. *Association with focus.* UMass. Amherst: Graduate Linguistics Student Association.

Rooth, Matts. 1992. A theory of focus interpretation. *Natural Language Semantics* 1. 75–116.

Rullmann, Hotze, Lisa Matthewson & Henry Davis. 2008. Modals as distributive indefinites. *Natural Language Semantics* 16. 317–357.

Salkie, Raphael. 2010. Will: tense or modal or both? *English Language and Linguistics* 14. 187–215.

Sato, Yosuke & Yoshihito Dobashi. 2012. Functional categories and prosodic phrasing in English: evidence from that-trace effects and pronominal object shift. National University of Singapore & Niigata University, available at http://ling.auf.net/lingbuzz/001499.

Sauerland, Uli. 2002. The present tense is vacuous. *Snippets* 6. 12–13.

Schlenker, Philippe. 2006. Ontological symmetry in language: A brief manifesto. *Mind & Language* 21. 504–539.

Schlenker, Philippe. 2012. Maximize presupposition and Gricean reasoning. *Natural Language Semantics* 20. 391–429.

Schubert, Klaus. 1972. Zur Bedeutung und Anwendung der Verbalparadigmen im Hausa und Kanuri. *Afrika und Übersee* 55. 1–49.

Schuh, Russell G. 2003. The functional unity of the Hausa and West Chadic Subjunctive. *UCLA working papers* 9. 17–42.

Schwager, Magdalena. 2011. Imperatives and tense. In Renate Musan & Monika Rathert (eds.), *Tense across languages*, 37–58. Tübingen: Niemeyer.

Schwarz, Florian. 2007. Processing presupposed content. *Journal of Semantics* 24. 373–416.

Selkirk, Elisabeth. 1984. *Phonology and syntax: The relation between sound and structure*. Cambridge: MIT Press.

Shaer, Benjamin. 2003. Toward the tenseless analysis of a tenseless language. In *Proceedings of SULA 2*, 138–156.

Sharvit, Yael. 2003. Embedded tense and universal grammar. *Linguistic Inquiry* 34. 669–681.

Sharvit, Yael. 2014. On the universal principles of tense embedding: The lesson from *Before*. *Journal of Semantics* 31. 263–313.

Šimík, Radek. 2015. The semantics of the Czech demonstrative *ten*. Paper presented at *Formal Approaches to Slavic Linguistics (FASL) 24*, New York University, May 10, 2015.

Singh, Raj. 2008. *Modularity and locality in interpretation*. Cambridge, MA: Massachusetts Institute of Technology dissertation.

Singh, Raj. 2011. Maximize presupposition! and local contexts. *Natural Language Semantics* 19. 149–168.

Smith, Carlota S. 1978. The syntax and interpretation of temporal expressions in English. *Linguistics and Philosophy* 2. 43–99.

Smith, Carlota S. 1997. *The parameter of aspect*, vol. 43 Studies in Linguistics and Philosophy. Springer Science & Business Media.

Smith, Carlota S. 2008. Time with and without tense. In Jacqueline Guéron & Jacqueline Lecarme (eds.), *Time and Modality: Studies in Natural Language and Linguistic Theory*, 227–249. Dordrecht: Springer.

Smith, Carlota S. & Mary S. Erbaugh. 2005. Temporal interpretation in Mandarin Chinese. *Linguistics* 43. 713–756.

Smith, Carlota S., Ellavina Perkins & Theodore Fernald. 2003. Temporal interpretation in Navajo. In *Proceedings of SULA 2*, 175–192.

Smith, Carlota S., Ellavina Perkins & Theodore Fernald. 2007. Time in Navajo: Direct and indirect interpretation. *International Journal of American Linguistics* 73. 40–71.

Sproat, Richard & Chilin Shih. 1991. The cross-linguistics distribution of adjectival ordering restrictions. In Carol Georgopoulos & Roberta Ishihara (eds.), *Interdisciplinary approaches to language: Essays in honor of S.–Y. Kuroda*, Dordrecht: Kluwer.

von Stechow, Arnim. 1995. On the proper treatment of tense. In Teresa Galloway & Mandy Simons (eds.), *Proceedings of Semantics and Linguistic Theory (SALT) 5*, 362–386.

von Stechow, Arnim. 2009. Tenses in compositional semantics. In Wolfgang Klein & Ping Li (eds.), *The expression of time*, Berlin: Mouton de Gruyter.

von Stechow, Arnim & Atle Grønn. 2013a. Tense in adjuncts part 1: Relative clauses. *Language and Linguistics Compass* 7. 295–310.

von Stechow, Arnim & Atle Grønn. 2013b. Tense in adjuncts part 2: Temporal adverbial clauses. *Language and Linguistics Compass* 7. 311–327.

Stowell, Tim. 1995a. The phrase structure of tense. In J. Rooryck & L. Zaring (eds.), *Phrase Structure and Lexicon*, 277–291. Dordrecht: Kluwer.

Stowell, Tim. 1995b. What do the present and past tenses mean? In P. Bertinetto, V. Bianchi, J. Higginbotham & M. Squartini (eds.), *Temporal reference, aspect, and actionality. vol. 1: Semantics and syntactic perspectives*, 381–396. Torino: Rosenberg and Sellier.

Sun, Hongyuan. 2014. *Temporal construals of bare predicates in Mandarin Chinese*: Leiden University dissertation.

Thomas, Guillaume. 2015. The present tense is not vacuous. *Journal of Semantics* 32. 685–747.

Thomason, Richmond H. 1984. Combinations of tense and modality. In *Handbook of philosophical logic*, 135–165. Springer.

Tiemann, Sonja, Mareike Schmid, Nadine Bade, Bettina Rolke, Ingo Hertrich, Hermann Ackermann, Julia Knapp & Sigrid Beck. 2011. Psycholinguistic evidence for presuppositions: On-line and off-line data. In *Proceedings of Sinn und Bedeutung 15*, 581–597.

Tondji, Simen. 1979. Variation phonétique en Medumba. Mémoire de D.E.S., Université de Yaoundé.

Tonhauser, Judith. 2006. *The temporal semantics of noun phrases: Evidence from Guaraní*: Stanford University dissertation.

Tonhauser, Judith. 2011a. Temporal reference in Paraguayan Guaraní, a tenseless language. *Linguistics and Philosophy* 34. 257–303.

Tonhauser, Judith. 2011b. The Paraguayan Guaraní future marker *-ta*: formal semantics and cross–linguistic comparison. In Monika Rathert & Renate Musan (eds.), *Tense across languages*, 207–231. Tübingen: Niemeyer.

Tonhauser, Judith. 2015. Cross–linguistic temporal reference. *Annual Review of Linguistics* 1. 129–154.

Tonhauser, Judith & Lisa Matthewson. 2015. Empirical evidence in research on meaning. Ms., The Ohio State University and University of British Columbia.

Travis, Lisa. 1984. *Parameters and effects of word order variation.* Cambridge, MA: Massachussets Institude of Technology dissertation.

Truckenbrodt, Hubert. 1999. On the relation between syntactic phrases and phonological phrases. *Linguistic Inquiry* 30. 219–255.

Tuller, Laurice A. 1986. *Bijective relations in universal grammar and the syntax of Hausa.* Los Angeles: University of California dissertation.

Vander Klok, Jozina & Lisa Matthewson. 2015. Distinguishing *already* from perfect aspect: a case study of Javanese *wis*. *Oceanic Linguistics* 54. 172–205.

Vater, Heinz. 1975. Werden als Modalverb. In JP Calbert & Heinz Vater (eds.), *Aspekte der Modalität*, Tübingen: Narr.

Vendler, Zeno. 1967. *Linguistics in Philosophy.* Ithaca: Cornell University Press.

Vendler, Zeno. 1968. *Adjectives and nominalizations.* The Hague, Paris: Mouton.

Voorhoeve, Jan. 1965. The structure of the morpheme in Bamileke (Bangangté dialect). *Lingua* 13. 319–334.

Watters, John R. 2003. Grassfields Bantu. In Derek Nurse & Gérard Philippson (eds.), *The Bantu languages*, 225–256. New York: Routledge.

Welmers, William E. & Beatrice F. Welmers. 1968. *Ìgbo: a learner's manual.* Los Angeles: UCLA.

Werner, Tom. 2006. Future and non–future modal sentences. *Natural Language Semantics* 14. 235–255.

Wolff, H. Ekkehard. 1993. *Referenzgrammatik des Hausa.* Münster: LIT.

Wurmbrand, Susi. 2014. Tense and aspect in English infinitives. *Linguistic Inquiry* 45. 403–447.

Yavaş, Feryal. 1982. Future reference in Turkish. *Linguistics* 20. 411–429.

Zifonun, Gisela, Ludger Hoffmann, Bruno Strecker & Joachim Ballweg. 1997. *Grammatik der deutschen Sprache.* Berlin, New York: Walter de Gruyter.

Zimmermann, Malte. 2006. Adverbial quantification and focus in Hausa. In *Proceedings of Sinn und Bedeutung 10*, 453–467.

Zimmermann, Malte. 2013. *Will, were* and *would be*: Categorical and non–categorical TAM-coding in West African and beyond. Talk given at the TRAIT workshop, University of Wroclaw.

Selbständigkeitserklärung

Hiermit erkläre ich, dass ich bei der Abfassung der vorliegenden Arbeit alle Regeln guter wissenschaftlicher Standards eingehalten habe. Weiter erkläre ich, dass ich die vorliegende Arbeit selbständig verfasst und keine Hilfe Dritter in Anspruch genommen habe.

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