Aspect, Modality, and Tense in Badiaranke

by

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Abstract

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Most formal analyses of the semantics of tense, aspect, and modality (TAM) have been developed on the basis of data from a small number of well-studied languages. In this dissertation, I describe and analyze the TAM system of Badiaranke, an Atlantic (Niger-Congo) language spoken in Senegal, Guinea, and Guinea-Bissau, which manifests several cross-linguistically unusual features. I develop a new semantic proposal for Badiaranke TAM that explains its distinctive properties while also building on the insights of earlier analyses of TAM in more commonly studied languages.

Aspect in Badiaranke has two initially surprising features. First, the perfective is used to talk not only about past events (as expected), but also about present states (not expected). Second, the imperfective is used to talk not only about ongoing or habitually recurring eventualities (as expected), but also about future and epistemically probable eventualities, as well as in consequents of conditionals and counterfactuals (not expected). I develop a modal explanation of these patterns, relying on the distinction between settled pasts and branching futures (Dowty 1977, Kaufmann *et al.* 2006) as well as Kratzer's (1981, 1991b) proposal for contextually varying *modal bases* and *ordering sources*. I also describe and analyze a number of other aspects in Badiaranke whose distribution and semantics are affected by those of the perfective and imperfective. On my treatment, Badiaranke aspect is inextricably with modality.

Tense is less central to Badiaranke than aspect, in the sense that all Badiaranke sentences are marked for aspect, but not all are marked for tense. Nonetheless, Badiaranke has two distinct past tense suffixes. I argue that both suffixes express a type of *discontinuous past* tense (in the sense of Plungian and van der Auwera (2006)); specifically, they shift *perspective time* into the past and implicate that the eventuality is no longer relevant at some later time. The difference between the two is modal: one appears in irrealis environments (where the eventuality is not necessarily realized in the matrix world of evaluation) while the other appears in realis environments.

Because of the modal nature of Badiaranke aspect, aspect interacts in interesting ways with modal verbs, which themselves take aspect marking in this language. For epistemic modals, aspect on the modal itself makes no detectable semantic difference, while aspect

on the modal's complement affects modal *orientation* (in the sense of Condoravdi (2002)). For deontic modals, perfective marking triggers the presupposition that the subject is capable of carrying out the action, while imperfective marking expresses simple permission (or obligation). I show that my semantics for Badiaranke aspect, together with well-founded assumptions about the relative scopes of aspect and modality, successfully accounts for these interactions between modal verbs and aspect.

The dissertation is intended to be of interest both to formal semanticists, in that it contributes evidence about the semantics of TAM cross-linguistically, and to Africanists and typologists, in that it describes in detail part of the grammar of an under-described African language.

To my parents and Aliza,
who have supported me since day one,
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Abbreviations

1	First person
2	Second person
3	Third person
AFF.DECL	Affirmative declarative marker
BEN	Benefactive
CAUS	Causative
COMP	Complementizer
COND	Conditional
COP	Copula
DEM	Demonstrative
DET	Determiner
DETRANS	Detransitivizer
EMPH	Emphasis
HABIT	Habitual
IMPF	Imperfective
INDEP	Independent pronoun
IMPER	Imperative
INF	Infinitive
INTENS	Intensifier
INSTR	Instrumental
IRR	Irrealis
INTERJ	Interjection
LOC	Locative
NARR	Narrative morphology
NEC	Necessity
NEG	Negative
NMLZ	Nominalizer
NPERF	Non-perfective
NSBJ	Non-subject
P	Preposition
PASS	Passive
PERF	Perfective
PL	Plural
PLUR	Pluractional
POSS	Possessive
POSSIB	Possibility
PROG	Progressive
Q	Polar question
QUOT	Quotative

RECIP	Reciprocal
REDUP	Reduplication
REL.HABIT	Habitual marker in subject relative clauses, focus constructions, and wh-questions
REL.IMPF	Corresponding imperfective marker
REL.PERF	Corresponding perfective marker
REP	Repetitive
REVERS	Reversive
SG	Singular
SBJ	Subjunctive/hortative
TOP	Topic
VENT	Ventive

Transcriptions use IPA.

Contents

Chapter 1

Introduction

1.1 Goals and motivation

The overarching aim of this dissertation is to bridge the gap between two disparate strands of research. In the formal semantics literature, much has been written about tense, aspect, and modality (TAM) and the interactions between these three categories, but this research has focused primarily on a particular aspectual or modal phenomenon in a single well-studied language. Previous work on the interaction of modality and aspect, for instance, has focused largely on the imperfective, and especially the progressive subtype of imperfective in English. Perusal of this literature leads one to wonder about the extent to which such theories apply to languages with very different TAM systems. The descriptive literature, meanwhile, has devoted more attention to lesser-studied languages, but many grammars leave the discussion of TAM – especially modality – sketchy at best. This spotty record means that using existing language descriptions to test analyses in the formal theoretical literature is frustratingly difficult, not only due to the rampant terminological inconsistencies (see Sasse (2002), who lays out these irregularities in the aspectual domain), but also because most grammars devote little to no attention to modality (as opposed to mood), let alone discussing tense-modality and aspect-modality interactions.

In this dissertation, I unite these two schools of research by describing and analyzing the TAM system of Badiaranke, a poorly documented, little described Atlantic (Niger-Congo) language, with special attention to the semantic ties between the TAM categories. I discuss problems the Badiaranke data present for previous generalizations about TAM and look at how the semantics of Badiaranke TAM forces us to modify such analyses. We will see that none of the three TAM categories can be analyzed in isolation: both tense and aspect have a modal component in Badiaranke, while modal semantics depends heavily on both tense and aspect. My fieldwork data on Badiaranke provide an opportunity to bridge the theory-description divide. An in-depth description and analysis of (part of) a little-described, nearly-undocumented minority language, from a family that has received relatively scant attention from linguists, carries inherent value, both from a descriptive or typological standpoint and

from a theoretical one.

   This dissertation, then, is motivated by the vast, but often unrealized, potential of linguistic theory and linguistic description to inform and improve one another. On the theoretical front, the value of the present study is to discover what one under-described language, Badiaranke, can contribute to greater linguistic theory. If the goal of linguistics is to understand the human capacity for language, then linguistic theory must be built on reliable data from a wide range of languages, including under-studied languages like Badiaranke, with their potential to challenge the conventional wisdom. On the flip side, it is the formal theoretical literature on better-studied languages that provides the foundation for my analysis of the complex Badiaranke data. Thus, the dissertation aims to contribute to our scant, but growing, body of knowledge on the semantics of under-studied languages.

   In addition to these broader implications, my work here is driven by language-specific motivations. Aspect – particularly perfective and imperfective aspect – is so central to Badiaranke that it is impossible to adequately describe the language without addressing how aspect works in it. Even a cursory investigation of Badiaranke aspect reveals its inextricability from tense and modality, so that all three categories must be considered for a sufficiently comprehensive account of any one of them. Once modality's role in the semantics of aspect has been acknowledged, the question arises how modal verbs interact with aspectual marking. Furthermore, tense marking plays a pivotal role in the semantics of modality in Badiaranke, and the language has two past tense allomorphs whose distribution is, I will argue, modally determined. For these reasons, in the chapters that follow, I provide a comprehensive description and analysis of each of the three TAM categories in Badiaranke.

1.2   About TAM

All three categories – tense, aspect, and modality – have received confusing, sometimes even contradictory, definitions over the past few decades. Tonhauser (2006) surveys the literature and argues that the wildly diverse definitions of TAM can be boiled down to the commonalities in (1)-(3).

(1)   TENSE: a relation between times, one of which is the perspective time

Tonhauser (2006:15)

(2)   ASPECT: an operation on eventuality descriptions

Tonhauser (2006:20)

(3)   MODALITY: the relation between the actual world and the worlds of evaluation

Tonhauser (2006:22)

In other words, tense positions two times with respect to each other (expressing a relation of pastness, present-ness, or futurity); aspect says something about the state or event described

(often, but not always, conveying information about the eventuality's position with respect to a certain time); and modality is used to talk about non-actual states of affairs (expressing a relationship between possible worlds). Thus in English, the distinction between *I eat pie* and *I ate pie* is one of tense; the difference between *I ate pie* and *I was eating pie* is one of aspect; and *Sarah might have eaten the pie (but I'm not sure)* illustrates one type of modality, i.e. epistemic possibility.

Despite the seemingly straightforward nature of (1)-(3), the semantics of each one of these categories has engendered decades (even centuries) of debate, both within and across languages. Further complicating matters, it has become clear that the semantics of all three categories can differ greatly in different language families, e.g. aspect in Slavic (Terras 1960, Forsyth 1972, Timberlake 1985, Akimova 1992, among many others) vs. aspect in many Niger-Congo languages (Nussbaum *et al.* 1970, Welmers 1973, Childs 1995, Osam 2008, among others), absolute vs. relative tense systems (Comrie 1985), weak vs. strong necessity modals (von Fintel and Iatridou 2008), modals that can express the full range of modal meanings vs. those that are more restricted (Gevorgyan-Ninnes 2008), and so on. Nonetheless, the more theoretically-oriented literature, which defines how many linguists think about these categories, has drawn broad conclusions based on a relatively small number of languages, while descriptions of other languages often adopt the terminology and even assume the analyses of TAM found in the theoretical literature, without considering the applicability of these analyses to the particular language of interest. In Chapter 2, I review the ways these categories have been defined and analyzed in the semantics literature; in the remainder of the dissertation, I investigate the extent to which commonly assumed treatments of tense, aspect, and modality can inform our understanding of the relevant categories in Badiaranke.

A major theme of this dissertation is the *interdependence* of tense, aspect, and modality in Badiaranke. Indeed, semantic connections have often been noted in other languages between tense and modality (e.g. Enç 1996, Condoravdi 2002, Stowell 2004) and between aspect and modality (e.g. Fleischman 1995, Portner 1998, Hacquard 2006), not to mention the affinity between certain aspects and certain temporal interpretations (as discussed by Bybee *et al.* (1994)). In the most extreme cases, it can be difficult to draw clean lines between tense, aspect, and modality, or to identify a single category to which a given phenomenon belongs. We will see that Badiaranke is such a language, particularly with respect to the very modal nature of its aspectual system (Chapters 3-4). We will also look at the role of aspect in the semantics of Badiaranke's two modal verbs (Chapter 6), as well as the modal distinctions between tense morphemes and the semantic function of tense morphology in clauses with modal verbs (Chapter 5).

1.3   About Badiaranke

Badiaranke is a member of the Tenda group of the Atlantic subfamily of Niger-Congo. The language is spoken in southern Senegal, Guinea, and Guinea-Bissau; according to Ethnologue

(Gordon, Jr. 2005), there are around 12,000 Badiaranke speakers divided among these three countries, although the actual numbers are probably higher. Lexically, Badiaranke has been heavily influenced by Mandinka and Malinke, Mande languages which are dominant in the region, and to a lesser extent by Fula (Fulacounda and Pular Fuuta), the dominant Atlantic language in that zone. Most Badiaranke speakers in Senegal are fluent in a Fula dialect as well as Mandinka or Malinke.

Previously published work on Badiaranke includes a list of 280 words included by Koelle (1854) in his *Polyglotta Africana*, an article by Wilson (1984), and a very good French-Badiaranke lexicon, (Meyer 2001), as well as a book of Badiaranke stories in French translation (Meyer 1995). Koelle's list, while an invaluable source of comparison with over a hundred other African languages, contains certain inaccuracies of transcription and translation: for instance, [dʒ] and [tʃ], which contrast phonemically (e.g. *ka-dʒaf-e* 'to rain' vs. *ka-tʃaf-e* 'to braid'), are transcribed identically, while the glosses of verb forms are often imprecise with respect to tense/aspect and person (e.g. Koelle's *kantemanánde*, which he glosses as 'I buy' or 'I sell', literally means 'I bought it' (*kãtə-mã-nã de* = buy-1sg.PERF-3sg.NSBJ AFF.DECL)). Wilson (1984) compares his own data with those of Koelle in a brief article about Badiaranke and a related language, Biafada; the author posits some interesting historical hypotheses but also makes slightly inaccurate claims. He states, for instance, that Badiaranke has entirely lost the consonant mutation characteristic of Atlantic languages (1984:62); this property actually persists in deverbal nouns in Badiaranke, e.g. *sadʒ-* 'clap one's hands' → *ma-tadʒ-i* 'clapping of the hands'. Meyer's excellent lexicon, meanwhile, provides illustrative example sentences as well as cultural notes, but it is quite difficult to access and has not been widely distributed.

As far as grammatical description is concerned, there exist two sources: a book about the language's phonology and syntax (Ducos 1971) and an unpublished grammatical sketch (Brown and Logdon 1994) by members of the New Tribes Mission. While providing a useful glimpse of the language, Ducos (1971) is problematic for several reasons. In addition to being couched in the theoretical framework of Martinet, making it inaccessible to many modern linguists, Ducos's description is misleading in many respects, in both the phonological and syntactic domains. Her "minimal pairs," for instance, consist primarily of single syllables that are never spoken in isolation; she makes no mention of geminate consonants, which are contrastive in Badiaranke; and she makes no distinction between simple declarative sentences and focus constructions. The book provides little information about morphology, limited syntactic information, and no semantic analysis. The sketch by Brown and Logdon (1994), meanwhile, constitutes a valuable source of Badiaranke words and sentences, as well as a good description of the basic morphology, syntax, and grammatical categories, although I would dispute some of their morpheme-level glosses; unfortunately, this sketch is almost entirely inaccessible, existing only in a handful of hard copies and in an antiquated electronic format. A companion New Tribes Mission sketch of the phonetics and phonology is similarly unpublished and difficult to obtain.

The data and analysis in this dissertation are based on my fieldwork in and around Paroumba, Senegal (Department of Velingara, Kolda Region) between 2004 and 2008, as

well as in Sounkoutou, Guinea (Prefecture of Koundara, Boké Region) in 2008.[1]

Figure 1.1: Location of Paroumba

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[1]The maps in Figures 1.1-1.2 are taken from Hammond World Atlas Corp (n.d) and UN Department of Peacekeeping Operations (2004), respectively.

Figure 1.2: Location of Sounkoutou

The data discussed here come from three sources: elicitation, texts, and naturally occurring conversation. The context of utterance is listed after each example, together with the source in my notes and a number corresponding to the consultant (e.g. an entry like "(7.2, #1, elicitation)" means that the sentence was transcribed on page 2 of notebook 7 and was uttered by consultant #1 during elicitation). Elicitation sessions in Senegal were conducted in Pulaar, another dialect of Fula; Pulaar's derivational morphology is similar to Badiaranke's and its inflectional morphology somewhat less so. Stories in Senegal and all data in Guinea were obtained using Badiaranke itself.

1.4   Road map

The remainder of this dissertation is structured as follows. In Chapter 2, I synthesize the literature on the semantics of and interactions between aspect, tense, and modality. I first provide an overview of possible world semantics and introduce the now-standard treatment of modality put forth by Kratzer (1981, 1991b), which will be critical in the analyses of both aspect and modality in Badiaranke. I then discuss several views on what tense means, including early "quantificational" approaches by logicians, Reichenbachian (Reichenbach 1947) and neo-Reichenbachian (Klein 1994) analyses, and "referential" approaches that draw parallels between tenses and pronouns. Moving on to aspect, I review typologies of lexical aspect (or situation type), as well as several different frameworks for grammatical aspect: interval semantics, (neo-)Reichenbachian analyses (which fall under the interval semantics umbrella), event semantics, and "viewpoint"-based analyses like that of Smith (1997). I then discuss previously noted connections between aspect and modality, including the categories' deictic nature and dependence on a subjective "viewpoint," as well as aspect-specific links to modality, such as the famous *imperfective paradox* (Dowty 1977, 1979) and the *actuality entailment* that is triggered by perfective marking on root modals in Romance and other languages (Hacquard 2006). Finally, I lay out several ties that have been observed between tense and modality, including the importance to both of evaluation time, scopal interactions between the two, and the modal distinction between *settled* pasts and *branching* futures (Dowty 1977, Kaufmann *et al.* 2006).

My discussion of Badiaranke itself begins in Chapter 3, where I describe and analyze the two most pervasive aspectual categories in the language, the perfective and imperfective. I argue that these two Badiaranke aspects cannot be adequately analyzed either by conventional viewpoint analyses (e.g. Smith 1997), or within a neo-Reichenbachian model (e.g. Klein 1994). Two types of Badiaranke data are problematic for these theories. First, the perfective marks not only completed events (as expected) but also present states (unexpected). Second, the imperfective marks not only in-progress and habitually recurring eventualities (as expected), but also future eventualities, eventualities described in consequents of conditionals and counterfactuals, and epistemically probable eventualities (unexpected). I argue for a partially modal analysis, built around the notion of branching worlds. The Badiaranke perfective asserts that the eventuality is realized in all *metaphysical alternatives* to the base world – those identical to the base world up to and including perspective time – within a certain time interval; the imperfective asserts that the eventuality is realized in some other set of accessible worlds within a certain interval.

While the perfective and imperfective are central enough to Badiaranke that they merit their own chapter, the language possesses several other aspectual categories. In Chapter 4, I describe these other aspects, which include a prospective, a dedicated habitual, a periphrastic progressive, and a category that apparently emphasizes change of state, which I term *transitional*. I also include in this chapter a discussion of *narrative morphology* (NM), the marking on certain sequences of clauses, because at first glance one type of NM seems

to appear in perfective clauses and the other in imperfective clauses; ultimately, however, I argue that the semantics of NM is more modal than aspectual. I discuss all these categories for completeness: their omission would yield an overly simplistic view of Badiaranke's very complex aspectual system. Since, however, these more minor aspects play less of a role in the subsequent discussion of tense and modality, the analysis I provide is less formal and detailed than that of the perfective and imperfective in Chapter 3.

Chapter 5 introduces and analyzes the marking of tense. Overt tense marking is usually not required in Badiaranke, due to the semantics of aspect in the language and the way each aspect maps to certain temporal interpretation. Nonetheless, the language has not one but two past tense suffixes, -*ako*- and -*akəd*-. I argue that both suffixes mark a kind of *discontinuous past*, in the sense of Plungian and van der Auwera (2006); specifically, they shift perspective time for their clause into the past of the previously established perspective time. The difference between them is *modal*: -*akəd*- is the irrealis counterpart to -*ako*-, appearing in environments where the eventuality described is asserted to be realized in a set of worlds potentially excluding the matrix evaluation world.

While Chapter 5 ties in with the temporal facet of Badiaranke aspect, Chapter 6 picks up on its modal properties. The heavily modal analysis of aspect in Chapter 3 raises the question of how aspect marking affects the semantics of clauses containing one of Badiaranke's modal verbs, *mən*- (possibility) and *tʃoːm(əd)*- (necessity). Focusing on *mən*-, I tackle three mysteries: (i) why the semantics of epistemic *mən*- is unaffected by aspect on the modal itself; (ii) why non-root modals' *orientation* – the position of perspective time (from which possibility is assessed) with respect to evaluation time (at which the proposition might come true) – is determined by aspect on the modal's complement; and (iii) why perfective aspect on deontic *mən*- triggers what I call an *ability presupposition*, i.e. the interpretation that the subject is not only permitted to carry out the action, but is in fact capable of doing so. I show that these puzzling facts all fall out from a straightforward composition assuming Kratzer's (1981, 1991b) treatment of modal expressions and the analysis of Badiaranke aspect in Chapter 3.

Finally, in Chapter 7, I summarize my findings about Badiaranke TAM, consider their cross-linguistic implications, and lay out an agenda for future research.

My analysis of Badiaranke builds upon decades of research by other linguists on the semantics of modality, aspect, and tense. I begin now, in Chapter 2, by providing an overview of the relevant literature.

Chapter 2

Overview of the theoretical issues

The interrelatedness of aspect, modality, and tense has often been noted in the literature. In this chapter I synthesize a number of semantic connections between the categories that have been pointed out by other authors, as well as interdependencies that have not, to my knowledge, been explicitly noted, but that emerge from a careful comparison of the literature on tense, aspect, and modality. Before embarking on that discussion, I define in §2.1 what is intended by the three terms; in §2.2 I summarize some influential analyses of these phenomena that have been advocated in previous literature.

2.1   Terminological definitions

There is disagreement in the literature regarding the proper usage of two related terms: *mood* and *modality*. Lyons (1983:94) treats modality as a "functional, or pragmatic, category" – which in some but not all cases is also a semantic (truth-conditional) one – and mood as the morphological expression of modality. Mood, in Lyons' terminology, pertains to sentences, and modality to utterances. This usage is superficially inconsistent with Kratzer's (1981, 1991b) and others' analyses of the modality of sentences, as well as logical treatments of modality as a sentence-level operator (§2.2.1); on the other hand, it reflects the role of discourse context in Kratzer's analysis of modality, in which both the modal base and the ordering source are contextually determined (see §2.2.1.2 below). Similarly, Bybee *et al.* (1994) define modality as a set of *semantic* categories, including obligation, probability, necessity, possibility, and desire, while mood, for them, is a morphological category, distinguishing subjunctive, imperative, optative, conditional, and matrix declarative clauses. For Palmer (2001), who provides a broad typological overview of modality and mood, the former has to do with degrees or sources of certainty; he divides modal categories into *propositional* modality, which includes epistemics and evidentials, and event modality, which reflects "the speaker's attitude towards a potential future event" (whether it is desirable, obligatory, possible, etc.) (2001:7-8). Mood, for Palmer, is divided into *realis* (in which the speaker is willing to assert the event as actually occurring) and *irrealis* (in which the speaker views

the event as potential (hypothetical), but not certain), or *subjunctive* vs. *indicative*; the two types of distinction differ syntactically as well as typologically (only subjunctive/indicative systems occur in tense-marking languages).

In the first part of the dissertation, I focus on the semantic category of modality, leaving morphological mood distinctions aside until discussing tense in Chapter 5. I assume that modality has to do with possibility, probability, and necessity, but that these gradations can belong to different types of modality, e.g. epistemic (related to what is known), doxastic (related to what is believed), deontic (related to obligation), metaphysical (related to absolute probabilities and possibilities), and so on.

As for tense, most authors (e.g. Bennett and Partee 1972, Comrie 1985) assume that it positions an eventuality with respect to a reference time, usually the time of utterance. Others, e.g. Klein (1994), however, argue that tense positions the time being talked about, and not the time of the eventuality itself, with respect to a reference interval. I will argue in Chapter 5 that neither treatment works as such for Badiaranke, but Klein's treatment comes closer to accounting for the facts in that language.

Analyses also differ as to whether they treat tense as *quantificational* (expressing existential quantification over times), *referential* (referring directly to times), or *predicative* (expressing a relationship between times) (cf. Ogihara 2007). In this dissertation I will argue for a predicative treatment of Badiaranke tense.

As with modality and tense, the definition of aspect is controversial and complex, despite its being a fundamental grammatical category. In interval semantics accounts (§2.2.4.1), aspect is rarely, if ever, given a coherent definition; in general, however, that framework considers aspect to express the temporal relationship between an interval having a certain property (described by a predicate or sentence) and some other interval. For (neo-)Reichenbachian theories (§2.2.4.2), aspect is the relationship between some "reference time" (a moment or interval) and the time of the eventuality being described (whereas tense is analyzed as the relationship between eventuality time and time of utterance, or (according to Klein 1994) reference time and time of utterance). A strict event semantics framework (§2.2.4.3) does not lend itself easily to a simple definition of aspect; perhaps one could define it, in that framework, as a way of indicating that an eventuality is completed, in progress (or developing), or iterated at a given time (and, in some accounts, in a given world). Chung and Timberlake (1985), who acknowledge the importance of both events and intervals, treat aspect as a category relating the event described by the predicate to the interval it occupies. For viewpoint analyses (§2.2.4.4), aspect is speakers' way of making part or all of an eventuality "visible"; it is the metaphorical perspective that a speaker chooses to take with respect to the eventuality s/he is describing.

In the present work, I will take as a jumping-off point the neo-Reichenbachian analysis of Klein (1994), who treats aspect as a grammatical category relating the time spanned by an eventuality (TSit, in Klein's terms) to the time being talked about, or Topic Time (TT). It will be seen, however, that a strictly temporal definition of aspect cannot adequately capture the Badiaranke facts, which will require a semantics incorporating modality.

2.2 Analyses of modality, aspect, and tense

2.2.1 The semantics of modality

As is also the case with tense and aspect, the earliest modern mentions of modality were in the logical tradition, where modality was treated as a sentential operator, i.e. a function from propositions to propositions. The necessity operator is symbolized as □, and the possibility operator as ◊. Logicians like Prior (1957, 1967) and Montague (1973) have traditionally been concerned with *alethic* modality, a type that expresses probability from an omniscient or objective standpoint. This type of modality is, however, uncommon in natural language, where modality usually reflects the knowledge, beliefs, demands, etc. of some particular individual(s) (Lyons 1983). Nonetheless, even in modern semantic (as opposed to logical) analyses, modality is still sometimes treated as sentence-level operator, e.g. by Condoravdi (2002) and by von Fintel and Iatridou (2007). Treating modality as a sentential operator has the advantage of capturing modality's ability to interact scopally with other sentential operators, such as tense (as in Condoravdi 2002, Hacquard 2006) and negation (as in von Fintel and Iatridou 2007).

2.2.1.1 Possible worlds

The single most important theoretical concept in modern analyses of modality is that of *possible worlds*, proposed originally by Hintikka and Kripke in the 1960's. Since their introduction, possible worlds have proved to be indispensable in every semantic analysis of modality, as well as in a number of analyses of progressive aspect, such as those of Dowty (1977, 1979), Landman (1992), and Portner (1998).

Hintikka (1962) develops the notion of a *model set*, which is a set of consistent (non-contradictory) propositions which describe "a possible state of affairs" (Hintikka 1962:41). These possible states of affairs are also called *possible worlds*, ways the world could conceivably be; a possible world is defined by the set of propositions that are true in it. In possible world semantics, propositions are functions from possible worlds to truth values, outputting the truth value 1 for a given possible world iff the proposition is true in that world. Hintikka calls a set of (descriptions of) possible worlds (including the actual one) a *model system*. If a model describing a possible world is consistent, then it will be embeddable in a model system; in other words, there must exist at least one other possible alternative world to that one.

Sentences about an individual's knowledge or beliefs introduce a set of possible worlds, those in which the known or believed propositions are true. In *epistemic* propositions – ones about what is known by one or more individuals – the accessible possible worlds are ones in which the attitude holder knows the same things as in the base world (and since one can only know something that is true, the known propositions themselves are true in all the epistemically accessible worlds as well). Hintikka (1962) argues that a similar semantics can be ascribed to belief: the doxastically accessible worlds, i.e. those compatible with what the

attitude holder believes in the actual world, are ones in which the attitude holder has the same beliefs as in the base world. However, doxastic modality differs from epistemic modality in one crucial respect. If an individual knows a certain proposition, that proposition is true in the actual world (the actual world is one of the worlds included by the proposition); but an individual's belief in a certain proposition is no guarantee that the proposition is true in the world in which the individual believes it.

Possible worlds have proved fundamental in our understanding of pragmatics as well as of semantics. The *context set* (Stalnaker 1999a) is the set of possible worlds compatible with all the propositions in the *common ground*; the common ground consists of those propositions taken for granted by both speaker and hearer at that point in the discourse. Roberts (1998) argues that the goal of (most) discourse is to find out what the actual world is like, by means of reducing to one the number of worlds compatible with the common ground, that is, the propositions accepted either explicitly or implicitly by the discourse participants; if this is so, then all discourse is inherently modal, involving as it does comparison of and gradual elimination of possible worlds. The *presuppositions* of a sentence reflect the possible worlds that need to be in play at the time the sentence is uttered in order for the utterance to be felicitous; these are either worlds in the common ground, or, in the case of *presupposition accommodation*, worlds in the context set that can be easily added to the common ground. If, for instance, it is accepted among the discourse participants that there is no king of France, the sentence *If the king of France has a son, the king's son is bald* (Heim 1990) will be infelicitous because its presupposition, that there is a (unique) king of France, is incompatible with the worlds in the context set, in which there is no king of France; the assertion in the sentence thus cannot be admitted to the context set, and its utterance would derail the conversation.

My analysis of Badiaranke aspect, in addition to that of explicitly modal phenomena in the language, will rely on a possible world semantics. In particular, I will draw upon the now-standard view of modality put forth by Kratzer (1981, 1991b).

2.2.1.2 Kratzer's theory of modality

Kratzer (1981, 1991b) develops a highly influential analysis of modality in all its flavors, which has been adopted, with occasional slight modifications, by virtually every semanticist working on modality since. This analysis builds on and improves the one in Kratzer (1977), which itself convincingly demonstrates that the various types of modality – epistemic, deontic, etc. – can be assigned a uniform semantics.

Kratzer (1977) argues that the semantics of modal verbs like *must* and *can* involves (usually implicitly) a "relative modal phrase" meaning *must in view of* or *can in view of*, each of which takes two arguments: a qualifier (also often implicit) like *what is known, what is best for us*, etc., and the proposition that on the surface contains the modal. Assuming a possible worlds semantics, she argues that *must in view of* is a function from pairs (f, p) to propositions, where f is the *what is known* phrase or its counterpart, and p is the proposition which forms the second argument of the modal. For each possible world, f picks out the set

of known propositions in that world. Kratzer shows that a simple system of logical necessity and possibility is not sufficient for natural language: an analysis in which *must (in view of)* picks out exactly those worlds in which p follows logically from f, while *can (in view of)* picks out those worlds in which p is compatible with f, runs into the problem that *any* proposition follows logically from an inconsistent set of propositions, while *no* proposition is compatible with such a set (hence, with respect to an inconsistent set of propositions, any proposition with *must* should come out to be true, while any proposition with *can* should come out as false). Instead, she argues, modality targets the set X of all consistent subsets of the propositions in $f(w)$, e.g. what is known in w. The sentence with *must* is true in those worlds in which every subset of X has a superset, still contained in X, of which the proposition p is a logical consequence; *can* is true in worlds where there is some subset of X for which p is compatible with every one of its supersets.

In her 1981 paper, Kratzer develops what is now the standard theory of modality.[1] She argues that there are three basic components to any modal expression. The first is the *modal force* or *modal relation*, which determines the strength of the assertion (e.g. necessity vs. possibility). The other two components are types of *conversational background*: the *modal base* and the *ordering source*. The modal base consists of the *accessible* worlds, $\cap f(w)$, ones in which the relevant propositions are true (e.g. for epistemic modality, the modal base for a given world w consists of the worlds in which the propositions that make up *what is known* in w are also true); in other words, the modal base is a function from worlds to worlds, outputting for each base world the worlds that are accessible from it. The ordering source is a set of propositions that orders the worlds in terms of "goodness," that is, how closely they adhere to the ideal set up by the ordering source. "A world w is at least as close to the ideal A as a world z if, and only if, all propositions of A which are true in z, are true in w as well" (Kratzer 1981:47). Different types of modality differ in the type of modal base as well as the type of ordering source. Certain kinds, such as epistemic modality, have a *realistic* modal base (which includes facts that are true in the base world); in such cases, the modal base always includes the world of evaluation. Other kinds of conversational background are *epistemic* ("in view of what is known"), *stereotypical* ("in view of the normal course of events"), *deontic* ("in view of what is required"), *teleological* ("in view of a certain goal"), and *empty* (no limiting propositions); all of these conversational backgrounds may serve either as the modal base or as the ordering source.

Kratzer (1991b) shows how this analysis can handle a range of problems, including con-

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[1]Kratzer's 1981 revision of her 1977 analysis is motivated by the following shortcoming of the latter: for some types of modality, such as that expressing desire, the maximally consistent subsets of the propositions in $f(w)$ may be inconsistent with each other. In such a case, a proposition expressing possibility in view of what is desired should be false – but Kratzer (1977) would predict it to be true, as long as there exists at least one maximal subset of propositions for which the desired proposition is true. In Kratzer's example, she wants both to become mayor of her town and not to go to the pub regularly. However, in all possible worlds in which the relevant circumstances hold, only worlds where she goes to the pub regularly are worlds where she becomes mayor. Thus *(In view of the circumstances,) it is possible that I don't go to the pub regularly and still will become mayor* should be false. But in Kratzer's 1977 system, the modal proposition comes out, wrongly, as true, because the two things the speaker wants are not in themselves inconsistent.

ditionals and graded modality (e.g. *be more likely*). She notes that the traditional division between root and non-root (epistemic) modality corresponds, in her analysis, to the distinction between modals with a circumstantial modal base ("in view of the relevant facts") and those with an epistemic modal base ("in view of what is known").

Kratzer's (1981, 1991b) theory of modality has met with minimal disagreement in the literature – surely one of the few times in the history of linguistics that an analysis has been so widely accepted. Suggested improvements have taken the form of minor tweaks rather than searing criticism. MacFarlane (2003) and von Fintel and Gillies (2005), for instance, raise the following problematic scenario: a speaker says that a certain proposition p might (epistemically speaking) be true (e.g. *John might be in Boston)*, but later discovers that p was definitely not true at the earlier time of utterance (because John was not in Boston). If epistemic modality really picks out the worlds compatible with what the speaker (or evaluator) knows at the time, then in this scenario, the speaker who finds out that p is in fact false should be able to defend his or her earlier statement, saying that s/he was right because s/he spoke according to his or her knowledge at the earlier time. In reality, however, the speaker who later finds out that p is false will tend to say that s/he was *wrong* when s/he said it might be true. MacFarlane (2003) takes a *relativist* approach to this problem, arguing that the truth of epistemic utterances is evaluated based on what the listener (or the evaluator) knows at the time of *assessment*, not at the time of utterance.[2] Von Fintel and Gillies (2005) provide convincing arguments against a relativist view; instead, they argue that the knowledge relevant for computing the modal base is not just that of the speaker, but rather the *distributed knowledge* of all the members of the contextually relevant group. Since the speaker does not necessarily have access to all of this knowledge, or even know at the moment of utterance all the members of that group, what could be intended as an epistemic evaluation with respect to the knowledge of the speaker or a larger group could later be responded to as though it had been made with respect to all the knowledge distributed over the members of a larger group.

2.2.1.3 Subjective and objective modality

Lyons (1983) draws a distinction between *subjective* and *objective* modality in both the epistemic and deontic realms. Subjective modality involves the personal judgment of the speaker in the case of epistemic modality, or the speaker's own authority in the case of deontic modality; objective modality involves a statement of probability based on known facts in the case of epistemic modality, and rules of a third-party authority for deontic modality. Lyons assumes that objective, but not subjective, modality, is propositional in nature, i.e. subjective modality does not have truth-conditional effects. Subjective modality is claimed to be more basic, and more universal cross-linguistically, than the objective type.

Papafragou (2006) takes up Lyons' subjective-objective distinction but argues, contra Lyons, that both types are truth-conditional; the only difference is whose knowledge is

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[2]Indeed, he goes so far as to argue that the truth of *all* assertions should be evaluated on this relativistic basis.

included in the epistemic modal base. Following von Fintel and Gillies (2004) (an earlier version of their 2005 paper), she defines epistemic modality with respect to a context, a world-time index, and a group of contextually defined individuals. A proposition containing an epistemic modal is evaluated for the worlds compatible with the knowledge of *each member* of that group. The "subjective" interpretation of modals arises, she argues, when the group is limited to the speaker, and the time of evaluation is the moment of utterance – that is, the statement is evaluated with respect to what the speaker knows at the moment of utterance. When more individuals than the speaker are included, the "objective" interpretation arises instead.

Having reviewed some fundamental concepts and theories of modality, I now turn to tense.

2.2.2   The semantics of tense

2.2.2.1   Tense in logic (the quantificational approach)

The earliest modern treatments of tense were developed in the logical and philosophical traditions, rather than in analyses of natural languages. A theory of tense is necessary for logic because of the way that tense affects truth conditions (and therefore truth values) of sentences (Binnick 1991:242-3); that is, a proposition (like *Max sees a frog*) may be true at one time (at which Max has a frog in his line of vision) but not at others.

The classic logical treatment of tense is that of Prior (1957, 1967). Prior analyzes tense as a sentential operator – that is, a function from propositions to propositions, operating on untensed sentences. The Priorian tense operators are listed in (1), with a simple example of their application given in (2).

(1)   a. F:= 'It will be the case that'
       b. G:= 'It will always be the case that'
       c. P:= 'It has been the case that'
       d. H:= 'It has always been the case that'

(2)   a. Luna perused *The Quibbler* upside-down.[3]
       b. P(Luna peruse *The Quibbler* upside-down)

In this system P and F express existential quantification over past and future times, respectively, while G and H are their universal counterparts. That is, if p is a proposition, then Pp means "there exists some past time such that p at that time," and Hp means "for all past times, p."

While they may provide a sufficient treatment of tense for the purposes of formal logic, the Priorian tense operators cannot adequately capture the complex semantics of tense phenomena in natural languages. In fact, Prior's system does not even capture the semantics of simple past tense, which Partee (1973, 1984) and others have argued places the occurrence of

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[3]All examples involving characters from the Harry Potter books are of my own invention.

an eventuality at a particular, discourse-salient time in the past (see §2.2.2.3 below), rather than expressing existential quantification like Prior's P operator. In addition, a number of authors (e.g. Montague 1973, Binnick 1991, Portner 2003) have argued such existential quantification to be a component of the present perfect, not the simple past.

A minor objection sometimes raised against Prior's system is that he omits an operator for the present tense, which is assumed to make no contribution to meaning. Arguably, insofar as natural languages have a distinct present tense form, and insofar as the present makes a semantic contribution, there should be a formal translation of that into the logical language (Binnick 1991:244). (Contra the latter assumption, however, Sauerland (2002) argues that the present tense is semantically vacuous.) However, were there no other problems with Prior's theory, this objection could be easily overcome by adding a present tense operator.

A far more serious problem is the many possible combinations of Priorian tense operators that are never found in natural language. Most problematic is the tense operators' infinite iterability, the counterpart of which is unattested in natural language (Binnick 1991:244). For instance, a Priorian analysis of English would predict that there should be a way to express the future of the perfect of a perfect of a future, and so on. Similarly, the Priorian system predicts a distinction between futures ($F(p)$) and futures of futures ($F(F(p))$), which is not reflected in many, if any, languages. There is no evidence for such unlimited iteration either in the morphosyntax, or in the semantics, of natural languages. Another theory of tense is therefore needed for natural language.

In the past twenty or so years, the temporal interpretation of subordinate clauses – especially in intensional contexts – has become the primary testing ground for theories of tense, since many competing theories are able to account for the simpler interpretations of tense in matrix clauses (as argued by Enç (1987)). In this more complicated syntactic environment, it has been shown, Priorian tense logic fails to make the correct predictions. In particular, Enç (1987) shows that Prior can predict only the *shifted*, and not the *simultaneous*, reading of past tense in a clause embedded under past tense, as in (3).

(3) Mrs. Weasley said that Ron was sick with spattergroit.
   a. SHIFTED READING: Mrs. Weasley claimed that Ron was ill before the time of her statement.
   b. SIMULTANEOUS READING: Mrs. Weasley claimed that Ron was ill at the time of her statement.

Prior would have to treat such as examples as (loosely): P(Mrs. Weasley say (P(Ron be sick with spattergroit))), predicting the only interpretation to be that Ron's sickness was in the past of Mrs. Weasley's speech act. In addition, the Priorian system is unable to account for the effect of the embedded predicate's Aktionsart (a.k.a. lexical aspect; see §2.2.3.1 below) on the temporal interpretation of its clause. As illustrated in (4), if the embedded predicate is eventive, only the shifted reading is available:

(4) Harry swore that Voldemort killed Cedric.

    a. SHIFTED READING (available): Harry swore that Voldemort had killed Cedric at an earlier time.

    b. SIMULTANEOUS READING (unavailable): Harry swore that Voldemort was killing Cedric at that very moment.

Nor can Prior account for the double access construal of present tense embedded under past, as in (5), where the signs of the ostensible spattergroit disease are interpreted as holding both at some past time of the Death Eaters' belief, and at the time of utterance:

(5) The Death Eaters believed that Ron has spattergroit.

Additional problems with applying Prior's analysis to natural language include Prior's inability to account for non-canonical uses of tense, such as the frequent use of past tense in conditionals and counterfactuals (discussed by, e.g., James 1982, Iatridou 2000, Declerck 2005). In addition, despite being a quantificational (existential) theory of tense, Prior's fails to capture the observation (made by, e.g., Partee 1984, Bonomi 1995) that if past tense denotes existential quantification, the domain of quantification cannot be all of past time, but rather must be limited in some way, either overtly by adverbs, or implicitly by the context. Finally, Prior (like many later authors) treats future and past as parallel, ignoring the modal dimension of the future (see §2.3.3), which some (e.g. Enç 1996) have argued is not even a tense in English, but rather a purely modal category.

    Montague (1973), like Prior, approaches tense (and modality) from the logical tradition. He treats both tense (future, present, and present perfect) and modality (necessity) as quantificational sentential operators; his analysis is therefore essentially Priorian, with the trivial difference that Montague uses H (for 'have') rather than P for Prior's past (really perfect) operator.[4] This treatment thus suffers the same deficits as Prior's with respect to tense in natural language, such as its inability to capture the semantics of past (rather than perfect) tense in English, which Bennett and Partee (1972) and Partee (1973, 1984) argue makes an assertion about a contextually specified time, rather than existentially quantifying over all of past time. Montague does not really argue for his "rules of tense and sign"; he stipulates that one can form a sentence with any tense (a sentential operator) and any polarity, with the tense-polarity combinations listed individually. Nonetheless, Montague (1973) lays the groundwork for much subsequent work in formal semantics, including with respect to tense and modality. Montague's most significant advance over Prior (1957, 1967) (and Reichenbach (1947), whose work is discussed below) is his incorporation of tense into an intensional semantics – one in which the meaning of expressions is relativized to a world and a time of utterance, in addition to a set of entities, a linear ordering on time, and an assignment function which assigns values to variables.

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[4]Bach (1980) argues, contra Montague, that tenses and negation are not sentence-level operators, but rather VP operators, drawing on evidence that tense and negation cannot scope over conjoined VPs without periphrastic work-arounds.

2.2.2.2 (Neo-)Reichenbachian analyses

Reichenbach (1947) develops a highly influential, though brief, analysis of English "tense" (including some aspects). In Reichenbach's system, each "tense" is defined by a tripartite relation of precedence or simultaneity between three points in time: the moment of speech (S), the time of the event (E), and a reference point, or the time from which the event is (metaphorically) perceived (R). Implicitly Reichenbach treats all three as punctual, although clearly most eventualities, including utterances themselves, span more than a single moment in time. (Reichenbach never precisely defines R, offering only the intuition that in some cases, R is the temporal location of another event, perhaps denoted by an adverbial.) Reichenbach's proposed representations for the English "tenses" are listed in Table 2.1. (Commas indicate simultaneity; X – Y indicates that X precedes Y.)

Table 2.1: Reichenbach's tenses (Reichenbach 1947:297)

"Tense"	**Relationship of E, S, and R**
Simple past	E, R – S
Simple present	S, R, E
Simple future	$\left\{ \begin{array}{l} S - R, E \\ S, R - E \end{array} \right\}$
Present perfect	E–S, R
Past perfect	$\left\{ \begin{array}{l} E - R - S \\ S - E - R \end{array} \right\}$
Future perfect	$\left\{ \begin{array}{l} S, E - R \\ E - S - R \\ R - E - S \end{array} \right\}$
Posterior past	$\left\{ \begin{array}{l} R - S, E \\ R - S - E \end{array} \right\}$
Posterior future	S–R–E

As Reichenbach himself observes, this system allows more combinations of E, R, and S than there are traditional "tenses" in English. He argues that nine of these are semantically distinct, but that two different relations are all expressed by the "posterior past" (future in the past) and three others by the "anterior future" (future perfect); in addition, he claims that there are two logically distinct types of future, which, however, are both expressed with the simple future morphology. Later authors (e.g. Comrie 1981, Klein 1994) have disputed this feature of Reichenbach's system, arguing that a more accurate treatment would be provided by dividing Reichenbach's tripartite relation into two bipartite relations: one between R and S, which would capture tense distinctions, and one between R and E, to encapsulate aspect distinctions.

Although Reichenbach's analysis predates that of Prior (1957, 1967), it is framed more in the context of natural language, possibly accounting for its subsequent popularity. For instance, Reichenbach takes a stab at the interpretation of tense in a running narrative, simplistic though his account may seem after the development of Discourse Representation Theory and work therein. Yet Reichenbach suffers from many of the same fundamental problems as Prior, e.g. the inability to account for sequence of tense and double access readings, as well as for non-canonical uses of tense; and when natural language data and logic conflict, Reichenbach forces his data to conform to formal representations instead of the reverse: inconsistencies between his three-point representations and natural languages (esp. English) are treated as deviations from "original" tenses. He claims, for instance, that (6b) would be more correct than (6a) (1947:296), but (6b) would surely not be uttered by any native speaker of English.

(6) a. I shall take your photograph when you come.
     b. I shall take your photograph when you will come.

Comrie (1981) argues that the redundancies in Reichenbach's system could be eliminated by separating E-R relations (aspect) from R-S relations (tense), and by relating E directly to S only in the case of the three simple tenses. In his 1985 book, Comrie develops this view further and investigates it in a typological light. In the case of absolute tense – i.e., tense expressing a deictic relation between events and the moment of speech – Comrie argues that a simple two-parameter theory is sufficient (optionally including a third parameter of distance from the deictic center, necessary for some languages): tense locates an eventuality ("event") in time directly, without mediation of an R time. For relative tenses, including the perfect, Comrie reintroduces an R parameter, which mediates the relationship of E and S.

2.2.2.3 Referential theories of tense

The general approach of Prior, Reichenbach, and Montague to tense has been termed *quantificational* (Ogihara 2007), since they treat future and past (really perfect) tense as expressing existential quantification over future or past times, respectively. (For instance, *Kreacher spat at Harry* would be paraphrased as "There exists a time before the time of utterance such that Kreacher spat at Harry at that time.") Bennett and Partee (1972) similarly analyze the simple past and simple future as involving existential quantification; unlike Montague, however, they argue that this quantification is restricted to a definite interval of time, and specify that it asserts the existence of some subinterval within that definite interval at which the simple present version of the sentence would be true. (See §2.2.4.1 below for more on Bennett and Partee's interval semantics proposal.)

In contrast to quantificational theories, *referential* theories of tense, first suggested by Partee (1973) and more fully developed in Partee (1984), argue that tenses refer directly to times (and can be bound by other tenses or temporal expressions much as pronouns can

be bound by nominal antecedents).[5] Partee (1973, 1984) points out a number of previously unnoted parallels between nominal anaphora (pronouns) and tense. Tense, she argues, is anaphoric in the sense that it can refer to a time specified earlier in the discourse. Partee shows that past tense always refers to a specific, salient time, be it overtly specified (e.g. by an adverbial phrase) or inferable from context; this argument provides strong incentive to abandon a strictly quantificational treatment of tense.[6] In addition, like pronouns, tense can be used deictically, i.e. with a non-linguistic antecedent; her famous example, *I didn't turn off the stove*, is a statement by the speaker about failure to turn off the stove at a certain salient time, e.g. when she recently left the house, and not a claim that she has never turned off the stove in her life. Other parallels that Partee points out between tense and pronouns include: (1) the ability to take both definite antecedents (e.g. an explicitly specified time) and indefinite ones (as in *sometime during the night*); (2) the ability to be used as bound variables (another phenomenon for which sentential operator analyses are inadequate), so that *Every woman believes that she is happy* is parallel to *Whenever Mary telephoned, Sam was asleep*; and (3) the ability to occur in the consequent clauses of conditionals in a way parallel to donkey pronouns with a non-referential antecedent (as in *If Mary telephoned on a Friday, it was (always) Peter that answered*).

Partee's analysis, while novel in its introduction of a referential theory of tense, clearly owes a debt to Reichenbach; this blending of Reichenbach and Discourse Representation Theory (Kamp 1981) also characterizes the aspectual work of Hinrichs (1986) and Smith (1997). The treatment of tense as anaphoric, bound from the outside, requires one to look beyond the clause-limited concern of traditional operator theories; from there, it is a natural leap to discourse-level concerns and therefore to DRT.

The referential theory of tense is taken to its logical extreme by Enç (1987), who develops a theory of "anchoring conditions" for tense, parallel to nominal Binding Theory. Such anchoring conditions are required, she argues, by the interpretation of tense in subordinate clauses, which cannot be correctly predicted by sentential operator theories, and which are crucially dependent on syntactic structure. Enç shows that in complement clauses, a morphologically past tense stative predicate embedded under a past matrix tense can have either a shifted or simultaneous reading, while Priorian theories would predict only the former. In the shifted reading, the embedded state is understood as prior to the matrix event time and not necessarily to utterance time ((3a) above); in the simultaneous reading, the embedded state is understood as overlapping the past matrix event time ((3b) above). Contra proposals that the simultaneous reading is a result of PF addition of past morphology, Enç demonstrates that present tense in complement clauses has a double access reading ((5) above), and not the shifted reading; if past morphology in the complement clause were added at PF, and absent at LF, then embedded past and embedded present should have the same readings,

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[5]A referential theory of tense is not incompatible with a quantificational analysis of modality (treating modality as an operator expressing quantification over worlds). Enç (1996), for instance, assumes a referential theory of tense, but argues that modality is still best represented as a sentential operator.

[6]Partee's observations apply to past tense only; she assumes future *will* to be modal, rather than temporal, in English.

counter to fact. However, in relative clauses, both present and past tense are interpreted indexically with respect to speech time, being independent of a past tense in the matrix clause, as illustrated in (7)-(8).

(7) We spoke to the man who was crying. (Enç 1987:638, example 16)
→ Only available reading: we spoke at some past time to the man who was crying at some past time (perhaps, or perhaps not, while we were speaking to him.)

(8) John insulted the man who is walking towards us. (Enç 1987:638, example 19)
→ Only available reading: John insulted, at some past time, the man who is walking towards us right now.

Enç argues that tenses denote time intervals, that they receive indices, and that – like pronouns – they can corefer or be ordered with respect to one another. Crucially, before LF, tenses have to be "anchored," receiving their reference either deictically, from the speech time, or else from a higher, coindexed tense. As in Binding Theory, temporal antecedents are required to c-command their dependents. She argues that the syntactic notions of government and binding, together with the indexing possibilities of temporal arguments, account for the various data discussed above. In the case of temporal anaphora, the interval denoted by a dependent may be included in that of the antecedent. To derive the behavior of embedded present tense, Enç claims that present tense complement clauses raise out of the scope of a matrix past tense at LF.

In more recent work, Demirdache and Uribe-Etxebarria (2007) provide a modern variation of Enç's binding-based proposal for the semantics of tense in embedded clauses. Their explanation relies on three principles. The first is that times, like pronouns, are anaphors, meaning that subordinate times can get their reference in two ways: either by coreference with another time, which means the two intervals are coextensive, or by binding, i.e. the higher time introduces an interval which is then coindexed with the time in question. The second principle is what they call TC-economy (Temporal Computation Economy), an optimality condition that requires every part of a "temporal derivation" to contribute some identifiable meaning. The third principle is TCSS (Temporal Constraint on Semantic Subordination), which requires the temporal interpretation of a subordinate clause to proceed in such a way that the times about which the subordinate and matrix clauses make an assertion – the "assertion times" – end up being ordered with respect to one another. Together, these premises successfully predict the semantics of embedded tense in both complement clauses and relative clauses.

Abusch (1997) similarly attempts a referential analysis of tense, with tense in subordinate clauses being bound by a higher tense. Unlike Enç, however, Abusch focuses on the "binding" of tense within an intensional context by a higher tense outside the intensional context. She argues that an extensional (*de re*) theory – in which past tense always refers to a time preceding the time of utterance – is unable to account for complex data like (9), in which *having their last meal together* is marked with past tense, despite referring to a time following the time of utterance.

(9)   John decided a week ago that in ten days at breakfast he would tell his mother that
      they were having their last meal together.

(Abusch 1997:18, example 34)

To solve this problem, Abusch offers an *intensional* theory of tense. Each clause has a local evaluation time, with respect to which the local tense is positioned by judicious use of indices; Abusch's central principle is the "Upper Limit Constraint," which states that (past) tense cannot denote a time later than its local evaluation time. Combined with a *de re* semantics for tense, and assumption of LF movement of present tense clauses embedded under past tense, the Upper Limit Constraint allows Abusch to account for double access readings as well as for sequence of tense phenomena. Abusch's theory represents two recent trends in tense semantics: the gradual integration of the tense and modality domains, and the seeking of syntactically-based solutions to fundamentally semantic phenomena.

The proposal of von Stechow (1995), who argues against referential theories, Reichenbachian theories, sentential operators, *and* quantificational treatments of tense, is similar to Abusch's, in that he dispenses with an extensional treatment of tense in complements of attitudes, in favor of an analysis in which tense in such complement clauses as a bound variable. Like Abusch (1997), von Stechow argues that modality plays an instrumental role in the interpretation of such clauses; unlike Abusch, he argues that when identical to the higher, binding tense, tenses in embedded intensional contexts are deleted at LF.

2.2.2.4 Predicative theories of tense

In predicative analyses of tense, tenses are argued to be not anaphors, but predicates expressing relations between two times (e.g. time of utterance and time of the situation). The semantics of the tense "predicate" itself is a relation – precedence, inclusion, etc. Many such analyses (e.g. Stowell 1995, 2004, Zagona 1995) focus on complex syntactic solutions (rather than semantic ones), involving null categories, LF movement, and lack of transparency between morphology and syntax (and semantics). Two recent examples of the predicative approach are Demirdache and Uribe-Etxebarria (2007) (discussed briefly above) and Stowell (2007).[7] Both Stowell (2007) and Demirdache and Uribe-Etxebarria (2007) argue that English tenses are predicates taking two arguments, a reference time in their specifier and an event time as a complement; the tenses themselves denote relationships of precedence, overlap, or subsequence between those two times. Syntactically, both paper treat these times as "Zeit phrases" or ZPs, the temporal equivalent of a DP. As in his 1995 paper, Stowell (2007) argues that TP is headed by the true tense, PAST or PRESENT, which is actually null in English; the morphological past and present are actually, he claims, Z heads. To derive the complex array of subordinate tense interpretations, which depend on subordinate

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[7]Demirdache and Uribe-Etxebarria (2007)characterize their own approach as referential. In fact, it (like the analysis of Stowell (2007))is both referential – in that they draw a clear parallel between temporal and nominal anaphora – and predicative – in that tenses are treated not as *referring* to times, but rather expressing a relationship between time arguments.

clause type as well as on both matrix and subordinate tense, Stowell argues that past is a "Past Polarity Item," in that it must be c-commanded (locally or otherwise) by a PAST; in contrast, present is a "Past Anti-Polarity Item," i.e. it cannot be c-commanded by PAST at LF.

Having completed our whirlwind tour of analyses of modality and tense, let us turn to the third TAM category, aspect.

2.2.3 The semantics of aspect

In order to develop an adequate semantics of aspect in natural language, it is necessary to recognize the interaction of lexical semantics with the semantics of grammaticalized aspectual distinctions. In §2.2.3.1, I review some work on aspect at the lexical level.

2.2.3.1 Situation type

Numerous authors, including (but certainly not limited to) Bennett and Partee (1972), Bache (1995, 1997), Dowty (1977, 1979, 1986), and Smith (1997), have argued or assumed that a thorough understanding of grammatical aspect requires that a second type of aspect, variously known as *lexical aspect*, *Aktionsart*, *situation aspect*, or *situation type*, be taken into account.[8] Whereas grammatical aspect is superimposed on the lexical content and, according to authors like Comrie (1976) and Smith (1997), reflects a speaker's "subjective" choice about how to portray an eventuality (or "situation"), situation type is part of the lexical semantics of the verb and its arguments and is therefore objective.[9] Although situation type is an inherent property of predicates, it often interacts with the availability and/or semantics of grammatical aspect, and therefore will be fundamental in my discussion of grammatical aspect in Badiaranke.

Vendler (1957) argues for, and lays out the fundamental properties of, four basic verb classes in English: states, activities ("processes"), accomplishments, and achievements. Vendler assigns verbs to these classes based on a series of diagnostics. States generally do not accept progressive ("continuous") aspect, while processes and accomplishments do; this is because only the latter two classes are *dynamic*, evolving in time.[10] Regarding accomplishments vs. activities, Vendler draws the following distinctions: (1) accomplishments are telic, while activities are atelic; (2) activities can answer the question "for how long," while accomplishments answer "in how long"; (3) if activities are true within a time period, then

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[8]Sasse (2002) points out that while aspectual categories are generally conceded to be relevant down to the lexical level, some authors, e.g. Vlach (1981), Herweg (1991), and Verkuyl (1993), treat the type of "aspectuality" present at the lexical level and that at the grammatical level as fundamentally indistinct, simply different manifestations of a single semantic notion.

[9]Verkuyl (2005) prefers the term "propositional aspect," which, unlike "lexical aspect," takes into account the role that subjects and adjuncts can play in determining situation type.

[10]The property of *dynamicity* will turn out to be critical in the semantics of imperfective aspect in Badiaranke, particularly with respect to its habitual subtype; see Chapter 3 below, where I argue that the derived state produced by habituals, unlike ordinary underived states, is in fact dynamic.

they are true at every subperiod of that period (what Bennett and Partee (1972) would later term the *subinterval property*), while this property does not hold of accomplishments. For Vendler, achievements are the punctual equivalent of states, since neither achievements nor states involve dynamic processes; achievements answer the question "at what time," while stative ones answer "for how long." Habituals are treated as derived states, assigning as they do a characteristic, long-lasting property to their subject.

Later authors, such as Declerck (1979), Verkuyl (1993), and Smith (1997), have refined the taxonomy of Aktionsart categories, as well as arguing for an enlargement of the categories to which Aktionsart is attributed. Dowty (1977) treats Aktionsart as a property of VPs, already an expansion of Vendler's Aktionsart domain; Declerck (1979), criticizing Dowty (1977), proposes that all of a verb's arguments, not just the verb and its objects, need to be taken into account when calculating Aktionsart, which is thus a property of propositions. While Declerck (1979) maintains the conventional terminology and categorial terms, Verkuyl (1993, 2005) offers a more radical modification. Verkuyl argues that verbs have no aspect in and of themselves; rather, he claims, features of the verb as well as of its arguments combine to yield "propositional aspect" (Verkuyl 2005).[11] In particular, for a sentence to have "terminative aspect" (similar to what most authors call telicity), the verb must be [+ADD TO], meaning that it indicates movement (possibly metaphorical) of a Theme along a path from a Source to a Goal; and all arguments of the verb must be [+SQA], i.e. "specified quantity of A," meaning that they express a finite, specific amount of the type of entity they denote (e.g. *three sandwiches*, but not *sandwiches*, is [+SQA]). If any of the components fail to meet these requirements, the clause's aspect is durative (i.e. atelic) rather than terminative.[12] Although the more radical facets of Verkuyl's proposal have not been widely adopted, it is now generally accepted that Aktionsart is a property of the verb together with its arguments – what Klein (1994) calls the "lexical content" of a proposition, and Smith (1997) calls the "verb constellation."

Recent work on Aktionsart differs from Vendler's proposal in two additional ways, both exemplified by Smith's (1997) discussion of *situation type*, her own term for the phenomenon. The first is the systematic definition of all the situation types in terms of a uniform set of features. In the system of Smith (1997), each situation type differs from the others in the value of one or more of the features of duration, telicity, and dynamism: states are durative, atelic, and static, while activities are durative, atelic, and dynamic (the opposite of static); accomplishments are durative, telic, and dynamic, and achievements are instantaneous, telic, and dynamic. The other common addition to Vendler's taxonomy is a fifth category, semelfactives, which denote instantaneous, atelic, and dynamic – and often multiply repeated – events, e.g. coughing or knocking on a door; semelfactives are either the instantaneous counterpart of activities, or the atelic counterpart of achievements.[13]

Despite some tweaking of the categories and their definition, the need for some sort of lexical, or propositional, aspect in analyses of grammatical aspect is now generally (though

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[11]Verkuyl's 1993 book updates a similar proposal in his 1972 dissertation.

[12]See Sasse (2002) for an incisive criticism of Verkuyl's system.

[13]Rothstein (2008), however, argues that semelfactives are actually telic.

not universally) accepted. The reason is that lexical aspect interacts with grammatical aspect, in at least three ways. First, certain lexical aspects are generally incompatible with certain grammatical ones; statives, for instance, usually disallow progressive morphology in English (*I am knowing French). Second, grammatical aspect can coerce a predicate from its basic lexical aspect into a derived one. For instance, when the progressive is used with statives, it indicates an unstable state with the potential for change (Chung and Timberlake 1985:217), as in *Draco is being good today*; and when a durative adverbial like for three days is added to a semelfactive like *hiccoughed*, the semelfactive becomes an activity: *After he was hit by a hiccoughing jinx, Crabbe hiccoughed for three days.* And third, in viewpoint analyses of grammatical aspect (§2.2.4.4), according to which its role is to make "visible" all or part of an eventuality, the grammatical aspect needs access to the internal structure of the eventuality itself, i.e. the information characterized by lexical aspect.

The exact relationship of lexical to grammatical aspect, however, remains controversial, as discussed exhaustively by Sasse (2002). Due to their overlapping semantic domain, having to do with telicity and boundedness, the boundary between lexical and grammatical aspect is often blurred. Herweg (1991) exemplifies the tendency to confuse perfectivity (grammatical aspect) with telicity (lexical aspect). Claims that the habitual (grammatical aspect) is a derived stative (stativity being a type of lexical aspect) (e.g. Aksu-Koç 1995, Lenci 1995, Smith 1997), and that the progressive (grammatical aspect) is a derived stative (Vlach 1981, Parsons 1989) or process (Lyons 1983) similarly blur the lines between the two types of aspect. Bache (1995, 1997) argues that the two do need to be distinguished, as does Smith (1995, 1997) in her "two-component theory."

2.2.4 Theories of aspectual semantics

Two major schools of thought in modern work on aspect – the interval semantics (§2.2.4.1) and event semantics (§2.2.4.3) approaches – grew out of the philosophical and logical traditions, but place more emphasis than early logical treatments (e.g. Reichenbach 1947, Montague 1973) on how properties of time intervals (in interval semantics) or eventualities (in event semantics) are talked about in natural language. Adherents of a third major school of thought, viewpoint-based analyses (§2.2.4.4), treat aspect as reflecting a speaker's temporal "viewpoint" on an eventuality.

2.2.4.1 Interval semantics

The framework of interval semantics was introduced by Bennett and Partee (1972), who argue that a formal semantics of "tense" (including aspect) in natural language needs to make reference to intervals of time, not just points of time as in Reichenbach (1947) and other logical treatments. (Bennett and Partee claim that the truth of a sentence is evaluated at a moment (i.e., a singleton interval) for all tenses and aspects other than the simple present; in later analyses assuming an interval semantics framework, in contrast, truth is usually evaluated at an interval of time.) In interval semantics, eventualities are properties of time

intervals, rather than being ontological primitives, directly manipulated by the semantics, as they would be in event semantics (see §2.2.4.3 below).

Bennett and Partee (1972) propose interval semantics analyses of the simple past and future tenses, as well as the progressive and perfect aspects. The semantics is stipulated for each tense or aspect, by paraphrasing a meaning for a sample sentence containing it. There is no discussion of how the morphosyntax corresponds to the semantic pieces of a given definition, or the semantic components that different aspects have in common; the future, present, and past perfects, for instance, are all defined completely independently. Bennett and Partee's analysis has the disadvantage, from a formal semantics standpoint, of not being compositional, and therefore (as the authors note in their 1978 postscript) leaving open the question of how the tenses and aspects should be represented formally, and whether a sentential operator analysis is tenable. Furthermore, many of their tense/aspect definitions rely crucially on the presence of explicit time adverbials; it is not clear how their semantics would deal with the absence of such adverbials in many sentences. As an example, consider Bennett and Partee's analysis of the progressive, given in (10):

(10)   "*John is building a house* is true at I if and only if I is a moment of time, there exists an interval of time I' such that I is in I', I is not an endpoint for I', and *John builds a house* is true at I'" (Bennett and Partee 1972:13).

The authors mention, but don't resolve, the fact that this example sentence can be true even if John might never finish building his house – that is, the modal facet of the progressive that gives rise to the imperfective paradox (see §2.3.2.2 below). The perfect is distinguished from the past, in their analysis, only in that the former, the present moment must be included in the interval over which existential quantification is carried out.

Bennett and Partee also incorporate lexical aspect into their innovative system. They divide predicates into just three aspectual types, each of which they define in terms of how the interval spanned by the entire eventuality relates to its subintervals. States and activities (subinterval predicates) have the *subinterval property*: if a sentence asserting a certain state or activity is true at a given interval, it is true at every subpart of that interval. In contrast, non-stative, non-subinterval predicates – corresponding to Vendler's accomplishments and achievements – are not true at any subinterval of the interval at which they are true. (However, progressives of non-subinterval verbs are claimed to have the subinterval property, foreshadowing later claims that progressives are either derived states or derived processes.) The parallelism of Bennett and Partee's analyses of lexical aspect on the one hand, and grammatical aspect on the other, paves the way for an integrated treatment of the two types of aspect and their interaction.

Other work in interval semantics

Later work in interval semantics goes beyond the foundation laid by Bennett and Partee (1972) in three fundamental ways. First, it tends to investigate in detail one particular aspect, usually the progressive or the perfect (a tendency seized upon by Herweg (1991), according to

whom interval semantics accounts can adequately explain only stative eventualities, including the derived statives of progressives or the result state of perfects). Second, since Dowty (1977), the inseparability of modality from the semantics of certain aspects, especially the progressive, has been a running theme in the interval semantics literature. And third, interval semantics accounts later than Bennett and Partee (1972), like most of modern semantics, are basically compositional; this compositionality reaches even into the sub-lexical level in Dowty's (1977) generative semantics-style analysis of the progressive.

One of the most successful applications of interval semantics has been to the problem known as the *imperfective paradox*, first raised by Dowty (1977).[14] The problem is that with activities, the past progressive entails the simple past (on its perfective reading), e.g. *John was pushing a cart* entails *John pushed a cart*; but with accomplishments, this entailment does not hold: *John was drawing a circle* does not entail *John drew a circle*. Put differently, if the semantics of accomplishment predicates includes a change of state – so that for an eventuality to be the drawing of a circle, a circle must come into existence – how is it that we can use the progressive of an accomplishment to refer to only some subpart of the process phase of the accomplishment, without the entailment that the change of state occurs?

Dowty (1977, 1979) proposes two slightly different solutions to the imperfective paradox, with the shared innovation of analyzing the progressive *modally* – that is, as making an assertion not only about the actual world but also about possible evolutions of that world.[15] The modal analysis is motivated by the observation that the progressive of an accomplishment does not entail the result state, but only entails that the result state is a "*possible* outcome" (1977:57). His analysis relies on interval semantics, in that he considers the truth of a progressive sentence at an interval to depend on the truth of its non-progressive counterpart in a superinterval of that interval. Dowty's 1977 version of his analysis uses the concept of *branching time*, or *branching futures*: there are a number of ways the world could develop in the future of a given interval, and each of these possible futures is represented as a line branching off from the linear past. For the progressive to be true, argues Dowty, the interval for which the progressive clause is asserted must be part of a larger interval on at least one of the future branches. The set of all branches – past, present, and future – containing an interval is the *history* of that interval; the progressive is true iff for some set of branches in the history of that interval, there exists some interval of which the original interval is a subpart such that the untensed proposition is true within the larger interval. On his 1979 refinement of this analysis, Dowty specifies that the worlds in which the event in progress over the relevant interval continues to fruition, which he terms *inertia worlds*, are those worlds that are identical to the actual world up to the end of the relevant interval; after that, everything continues "normally" in the inertia worlds, without any surprises, such that

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[14]The phenomenon would perhaps more accurately be termed the *progressive paradox*, as work on it has focused on the specifically progressive aspect in English.

[15]I call such analyses "modal" because they treat modality as an essential component of the semantics of aspect. They have also been called "intensional," since they argue that the progressive cannot be analyzed extensionally – as referring to extensions of expressions in the actual world – but rather relies on *intensions*, functions from possible worlds to the denotation of the expression in those worlds.

the non-progressive version of the statement becomes true. In the actual world, however, the non-progressive statement might never become true.

Various authors since, pointing out a number of problems with Dowty's claims, have proposed modifications of his basic theory, while still adhering to the interval semantics framework and a modal analysis. Landman's (1992) analysis is designed to deal with the following problem, first raised by Vlach (1981): that *Max was crossing the street* is judged to be true even if there is a bus speeding toward the unfortunate Max, so fast that in all the inertia worlds *à la* Dowty, in which everything proceeds as expected, Max is squashed flat and never makes it across the street. This is the problem of probable interruption. Like Dowty, Landman argues that the progressive relates an interval in the actual world to a superinterval in some possible worlds; unlike Dowty, Landman argues that the relevant worlds are not those in which everything continues as *expected*, but rather those in which the event is not interrupted. If the event in progress during the relevant interval comes to completion in the actual world, it is not necessary to look beyond the actual world. If, however, it is interrupted in the actual world, one looks at a world similar to the actual world in all respects except for whatever causes the interruption, to see if the event continues in that next world. This looking ahead to the closest possible world in which the event is not interrupted can recur as many times as needed to find a world in which the event is completed, as long as the next closest world is "reasonable," i.e. not too far-fetched (thereby ruling out examples like *Mary was wiping out the Roman army*). Landman does not formalize the notions of "closest world" or "reasonableness," leaving his proposal, too, open to later criticism and modification. Landman's is not strictly an interval semantics account, since it relies on the concept of an event that can be followed from world to world, rather than events being simply properties of times. The same is true of Portner's (1998) analysis of the English progressive, which takes the best insights of Dowty (1977, 1979) and Landman (1992) and embeds them in Kratzer's formal theory of modality. The imperfective paradox and solutions to it will be discussed in more detail in §2.3.2.2 below.

Modal analyses of the progressive – which dominate the recent literature – have tended to be, at least to some extent, based on interval semantics assumptions. On the other hand, in some influential analyses, events themselves, or properties thereof, play a crucial role. I will discuss event semantics, another major school of thought in analyses of aspect, after first discussing another analytical trend: blending the technical tools suggested by Reichenbach (1947) with the conceptual advantages of interval semantics.

2.2.4.2   Neo-Reichenbachian analyses

The Neo-Reichenbachian school of thought takes its inspiration from Reichenbach (1947) (see §2.2.2.1 above). While many of Reichenbach's categories would be labeled as tenses even today, the perfect is at least partly aspectual, both in the viewpoint sense discussed in §2.2.4.4 below (the perfect depicts an eventuality as "viewed" from a time later than that spanned by the eventuality itself) and in the neo-Reichenbachian sense I discuss in the present section (it relates a reference time – e.g. the present moment in the case of the present perfect

– to the time spanned by an eventuality). But the perfect is also partly temporal, in that in English, at least, the perfect is always marked with present, past, or future tense, accounting for its consideration in tense logic. In Reichenbach's (1947) analysis, perfects indicate that E (event time) precedes R (reference time). For Reichenbach, the present perfect differs from the simple past only in the position of R: simultaneous with E (and before S) in the case of the past, but simultaneous with S (and after E) in the case of the present perfect. This simplistic distinction between perfect and simple past has been contested in the ample literature about the perfect in subsequent decades (see §2.3.2.2 below).

A number of authors, such as Comrie (1976), Klein (1992, 1994), and Hatav (1993), have developed theories of aspect that blend interval semantics assumptions with a modernized version of Reichenbach's (1947) system. Whereas Reichenbach's original proposal defined every tense/aspect in terms of the three time points E, R, and S, neo-Reichenbachian proposals tend to separate the E-R relation (aspect) from the R-S or E-S relation (tense), and to treat these parameters as intervals rather than points of time. Here I discuss in some detail the analysis of Klein (1992, 1994), as an example of a well-worked-out neo-Reichenbachian, interval semantics-based analysis, in which all aspects are defined strictly in terms of the relationship between the reference interval and the interval spanned by the eventuality.

Klein improves upon Reichenbach's system in two key ways. First, he splits the Reichenbachian ternary relations between points in time into sets of binary relations between three periods of time: Time of Utterance (TU); Topic Time (TT), i.e. the time about which the sentence makes an assertion (or a question, etc.); and the Time of the Situation (TSit). In so doing, Klein both draws a formal distinction between tense and aspect, which Reichenbach (1947) blurs together, and eliminates much of the ambiguity and redundancy to which Comrie (1981) objects in Reichenbach's system. Second, consistent with interval semantics assumptions, Klein defines the reference time TT and the situation time TSit as intervals of time. Aspect, Klein argues, expresses relations of inclusion, overlap, and precedence between the TT and TSit intervals. His four aspectual definitions are shown in (11), where INCL means "is included in" and AT means "is partly included in."

(11) Klein's definitions of aspects (Klein 1994:108)
    TT INCL TSit: IMPERFECTIVE
    TT AT TSit: PERFECTIVE
    TT AFTER TSit: PERFECT
    TT BEFORE TSit: PROSPECTIVE

Klein assigns to each aspect a graphic representation of these set relations; the precise semantics of aspect in a given utterance depends in part on the Aktionsart of the "lexical content." In Klein's system, there are three Aktionsarten, distinguished by how many states a lexical content encodes: permanent states are *0-state lexical contents*, temporary states and activities are *1-state lexical contents*, and lexical contents involving a change of state (telic predicates) are *2-state lexical contents*.

Klein's analyses of the perfective and imperfective of a 1-state lexical content are sketched in (12), where dashes represent TSit and brackets represent TT.

(12)   a. Perfective: TSit overlaps with, and ends within, TT (TSit AT TT)

      – – – –[– – –   ]   (Klein 1994:109)

      b. Imperfective: TT is fully included in TSit (TT INCL TSit)

      – – – –[– – –]– – –   (Klein 1994:102)

For 2-state lexical contents, Klein gives the representations in (13), where dashes represent the initial state (the "source state," or SS) and plus signs symbolize the final state (the "target state," or TS).

(13)   a. Perfective: TSit overlaps with change of state from SS to TS

      – – – –[– – – + + +]+ + +   (Klein 1994:106)

      b. Imperfective: TT is fully included in SS

      – – – –[– – –] – – – + + + +   (Klein 1994:106)

Essentially, this analysis reduces aspectual distinctions to different choices of Topic Time.

Other neo-Reichenbachian analyses using interval semantics include Mittwoch's (1995) analysis of the English perfect, which, she argues, involves two intervals corresponding to Reichenbach's E – one for the event, one for the resulting state, the latter overlapping with R. Similarly, Kiparsky (2002) provides a neo-Reichenbachian, interval-based analysis of the multiplicity of meanings attributed to the English perfect: existential (*I've done X before*), universal (*I've always known that X*), resultative (*He has left*), recent past (*The president has been assassinated*), and stative present (*I've got something...*). Kiparsky argues that it is necessary to consider not only the traditional Reichenbachian times of E, R, and S (which he treats as intervals), but also the internal structure of the eventuality being reported. Telic eventualities, he argues, consist of two parts: the process leading up to the change of state (e) and the state resulting from completion of the change (r); together the time spans of these two sub-eventualities make up the overall temporal trace of the event, ε. By adjusting the relations of overlap and inclusion between e and r on the one hand, and E, R, and S on the other – which he represents in schematic diagrams – Kiparsky is able to derive all the right readings for these perfect subtypes. I will save several other, more pragmatically-based analyses of the perfect for §2.3.2.2 below, where I discuss connections between aspect and modality.

Neo-Reichenbachian treatments have been argued by some to be too simplistic. Timberlake (1985), for instance, concludes that a neo-Reichenbachian (interval-based) semantics is inadequate for Russian; that language, he argues, require a fourth interval, P, to represent the time the eventuality would span if it reached completion. This complication leads Timberlake (1985) to abandon Reichenbach in favor of an analysis incorporating modality, in the form of world-time pairs. Similar considerations will cause me to incorporate modality into my analysis of Badiaranke, whose aspectual patterns flout a strictly neo-Reichenbachian approach.

In the next section, I discuss the major theoretical framework competing with interval semantics, namely event semantics.

2.2.4.3   Event semantics

The basic premise of event semantics is that events are semantic primitives, on a par with times and individuals, and can be quantified over and referred to in discourse. Event semantics is sometimes referred to as (neo-)Davidsonian semantics, since it was Davidson (1967) who made the seminal arguments in favor of including reference to events in the semantics. Davidson (1967) argues that a proper analysis of "action sentences" – i.e. sentences with an agent, or eventive sentences – requires quantification over and direct reference to events. Among other arguments, he points out (a) the possibility of referring with a pronoun (e.g. *it*) to the entire event denoted by a sentence, (b) the ability of his analysis to account for the entailment relations that hold between sentences with varying numbers of arguments and modifying adjuncts (e.g. *I flew my spaceship to the Morning Star* is ($\exists$x) (Flew(I, my spaceship, x) & To(the Morning Star, x)), and entails *I flew my spaceship*), where x is an event variable. Parsons (1989) provides additional arguments in favor of event semantics, including its ability to account for (a) implicit and explicit quantification over events (as in phrases like *In every burning . . .*); and (b) the variation between implicit (*After they sang*) and explicit (as in *After the singing of . . .*) reference to events. In neo-Davidsonian updates to Davidson's basic framework (e.g. Giorgi and Pianesi 1995, Kratzer 1996), all predicates (not only eventive ones) have an event argument of this sort.

Davidsonian (and neo-Davidsonian) theories thus contrast with those of authors for whom events are merely properties of time intervals, notably Montague (1973), whose translation of a fragment of English, including some tense and modality, into a logical language laid the foundation for much formal semantics work on TAM, and authors in the interval semantics tradition (e.g. Bennett and Partee 1972, Dowty 1977). Whereas in interval semantics, aspects and tenses directly express relations between certain time intervals, event semantics treats these times not as primitives, but as temporal traces of certain eventualities; even the time of utterance is sometimes treated as the temporal trace of the utterance eventuality itself.[16]

In formal representations of semantic structure, event semantics adds an additional argument to any given predicate. For instance, intransitive verbs were traditionally considered one-place predicates and transitive verbs two-place predicates; in (neo-)Davidsonian analyses, in contrast, intransitive verbs have two arguments – an event argument and a subject argument, transitive verbs have three, and so on. In some neo-Davidsonian work, e.g. Parsons (1980, 1985), the property of events denoted by the verb is predicated of the event variable alone, while each thematic role is predicated separately of the appropriate entities with respect to the event, e.g. *Brutus stabbed Caesar with a knife* would be represented as

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[16]Naturally, there are subdivisions within event semantics itself, as well. Higginbotham and Pianesi (2000) provide an overview of philosophical disagreements about events in the literature, e.g. *universalist* theories (a recurring property of a time interval is a recurrence of the same event) vs. *particularist* theories (each recurrence of such a property is really a distinct event), and theories that treat events as *thick* (an event occupies the totality of a given region of space-time) vs. ones that treat them as *thin* (multiple events can span the same chunk of space-time).

$\exists e$(Stabbing(e) & Subject (Brutus, e) & Object (Caesar, e) & Instrument (knife, e)) (there is some event such that the event is a stabbing, the subject of the event is Brutus, the object of the event is Caesar, and the instrument of the event is a knife) (Higginbotham and Pianesi 2000:20). This contrasts with the original proposal of Davidson (1967), in which the event argument is not the *only* argument of the verb, but rather an *additional* one.

Bach (1980), in an early event semantics proposal, argues that untensed VPs denote sets of events, while tensed ones involve quantification over events. Since events are treated as primitives in such accounts, the role of non-eventive predicates (states and activities) is called into question; Bach (1980) proposes that processes (i.e. activities) are distinguished by their *additive* nature (a process, if continued, just makes a prolonged version of the same process), while events, but not processes, are *indivisible* (the event semantics equivalent of lacking the subinterval property). (Herweg (1991), who deems interval semantics incapable of adequately analyzing events, levies the reverse criticism on event semantics, which he considers inadequate in its treatment of states.)

To understand the difference between event semantics and interval semantics analyses of aspect, let us look at three typical event semantics analyses of the same aspect focused on above: the English progressive.

Vlach (1981), though he supports the idea of inertia worlds in principle, objects to the specific "topological" treatment of Dowty (1977), according to which the time at which a progressive sentence is true is evaluated with respect to the interval at which the non-progressive version is true. He raises two main objections to Dowty's analysis. The first, also levied at Bennett and Partee (1972), is that the simple fact that a non-progressive sentence is true at an interval does *not* entail that the progressive equivalent is true at every subpart of that interval; e.g. if *Max build a house* is true in 1972, it is not the case that *Max is building a house* is necessarily true during one particular month of 1972 (Vlach 1981:281). The second is that by inserting normality into his definition of inertia worlds, Dowty (1977, 1979) is unable to account for eventualities in which by all reasonable criteria, it would *not* be normal for the event to continue until the non-progressive sentence is true. For example, if Max is halfway across the street and a bus is approaching him at high speed from only a few feet away, Dowty would have to predict *Max is crossing the street* to be false, since in all the inertia worlds Max will get hit by the bus; and yet according to our intuitions, it is perfectly possible to say *Max was crossing the street (when the bus hit him).* Vlach's alternative solution is based on the status of progressives as derived statives (according to his definition of stativity). He proposes that the progressive involves a *process* (although, in the spirit of Landman (1992:1), one can object that this is not particularly explanatory); in particular, "Prog[ϕ] if and only if Stat[Proc[ϕ]] goes on" (Vlach 1981:287).[17] "Process" is defined differently for each situation type, e.g. for accomplishments it refers to the process that "leads to the truth of" the non-progressive sentence (1981:288). Unfortunately, this strategy is not quite so straightforward for achievements, making Vlach's proposed solution less than convincing, though his objections are reasonable.

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[17]Vlach assumes that both tense and aspect are sentential operators.

Parsons (1989) is, in some ways, the polar opposite of Dowty (1977, 1979), Landman (1992), and Portner (1998). In addition to being based in event semantics rather than interval semantics, Parsons' analysis is purely extensional where the others' are intensional. His proposal also blurs the distinction between lexical and grammatical aspect, since it argues the distinction between non-progressive and progressive aspect, when applied to an accomplishment, to be the same as that between eventive predicates on the one hand, and states and processes on the other. Events, which are necessarily telic, are argued to have two components: an initial part in which the event is developing, and a culminating portion in which the telos has been reached. Non-progressive event sentences, Parsons argues, involve a relation *Culminate*, which is applied to an event-time pair: $Cul(e, t)$ means that the event represented by e culminates at time t. In contrast, the progressive of an event involves a different relation, *Hold*, also involved in states and processes: $Hold(e, t)$ means that a non-eventive eventuality holds at the given time, or that the development portion of a telic event is going on at the given time.[18] The imperfective paradox is, ostensibly, resolved: the progressive of an activity entails the non-progressive when evaluated at the same time, because both are represented identically, with *Hold*; but the progressive of an accomplishment does not entail its non-progressive counterpart because $Hold(e, t)$ does not entail $Cul(e, t)$. On this analysis, the truth of a progressive sentence rides only on what an eventuality looks like at a single moment of time; it does not require one to look at the eventuality's evolution over time, much less at future developments in multiple possible worlds. To avoid intensionality, Parsons is forced to accept both partial events and unfinished objects as instantiations of the same type of entity as their completed counterparts; thus an unfinished house, once started, can be referred to as a house, and *be building a house* may refer to an event of building an unfinished house.

Higginbotham (2004), like Parsons (1989), takes an event semantics approach to the English progressive, assuming that verbs have an event argument. Higginbotham, however, manages to avoid the more troublesome features of Parsons' analysis by incorporating modality. He argues that the progressive denotes a relationship between events and properties of events, such that the event has the property described by the predicate in the inertia world(s). He also argues, contra Parsons, that accomplishment roots are themselves telic, even without the Culminate relation. In the end, Higginbotham – like Landman (1992), Bonomi (1997), and Portner (1998) – concludes that evaluation of the truth or falsity of a progressive statement is inextricable from contextual considerations. Higginbotham (2004) thus demonstrates that despite its frequent affiliation with interval semantics, modality is not incompatible with event semantics.

I next discuss a third major school of thought regarding aspect, namely viewpoint analyses.

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[18]Neither *Cul* nor *Hold* are defined formally in Parsons (1989).

2.2.4.4 Aspect as viewpoint

Viewpoint-based analyses of aspect do not fit neatly under the interval semantics or event semantics label, although they often have more in common with the former. The fundamental claim of the viewpoint approach is that grammatical aspect is a subjective category, whose primary role is to make all or part of a situation "visible"; grammatical aspect is the "viewpoint" (or "frame") from which the speaker chooses to depict the situation s/he is asserting.

Analyses based on viewpoint tend to be less formal than the other theories discussed above, often steering away from logical formulae. Perhaps as a consequence, much work on the typology and diachrony of aspect (e.g. Comrie 1976, Bybee *et al.* 1994, Bybee and Dahl 1989), as well as descriptive work on individual languages (e.g. Abangma 1985, Gasser 1988), tends to adopt the assumptions and terminology of the viewpoint school. The two most influential works in this tradition are unquestionably Comrie (1976) and Smith (1997).

Comrie (1976:4) defines the *perfective* as an aspect that depicts a situation "as a completed whole" or "from the outside." He emphasizes that the perfective treats a situation as *complete*, but not necessarily *completed*: a perfective clause may describe a non-past event, one that has not been completed by utterance time, as long as it portrays the situation "as a single unanalysable whole" (1976:3). With the *imperfective*, in contrast, a speaker positions him- or herself along the part of the timeline spanned by the situation, then describes the situation as it looks from that perspective. From that situation-internal position, the speaker can talk about the development of the situation or a subpart of the situation. As Comrie (1976:4) puts it, imperfectives "make explicit reference to the internal temporal constituency of a situation" or show it "from the inside." In *habituals*, a subtype of imperfective, what is portrayed "from the inside" is the time period characterized by the situation's recurrence, not an individual occurrence of that situation; the habitual describes a situation that is repeated regularly over the course of some time interval, such that its repetition is a defining trait of that time period (Comrie 1976:27-28). Non-habitual imperfectives form the category of *continuous* aspect, divisible into statives and progressives of non-statives. In addition to these aspects, Comrie devotes significant attention to the perfect and its multiple readings; he acknowledges that though it is not exactly a tense, the perfect does not conform easily to the viewpoint treatment of aspect.

Comrie does not offer a formal theory of aspectual semantics per se; he focuses instead on aspect's functions, typology, and morphological expression cross-linguistically. His treatment of aspect is therefore compatible with any of the formal frameworks discussed here – event semantics, interval semantics, or (neo-)Reichenbachian approaches. In its direct reference to situations, Comrie's discussion is akin to event semantics approaches; on the other hand, in his metaphor of speakers' positioning themselves along a timeline, and his analysis of habituality as expressing a characteristic of a time period, Comrie is compatible with interval semantics, as well.

Comrie warns against confusing perfectivity with punctuality; similarly, he stresses that while the perfective does depict the end of a situation, this endpoint is not privileged by the

perfective in any way. Despite these admonishments, a number of authors have attempted to assimilate perfectivity to telicity, since both, on the viewpoint analysis, have to do with the boundaries, or endpoints, of situations. Lindstedt (1995) argues that cross-linguistic differences in the distribution of perfective vs. imperfective can be explained if perfectivity can refer to two types of boundedness: *material boundedness*, in which the situation reaches its "natural end point" (Lindstedt 1995:97), and *temporal boundedness*, in which the situation comes to an end for external reasons. In Slavic, he argues, the perfective indicates both material *and* temporal boundedness, while in Romance, it expresses only the latter. (Lindstedt's distinction between material and temporal boundedness corresponds to Smith's (1995) distinction between intrinsic and independent, or externally imposed, boundedness, with the former, but not the latter, involving a change of state.) This connection between material boundedness of the situation and perfectivity in Russian may explain Chung and Timberlake's (1985:219) statement that perfectives can apply only to telic predicates. In a similar vein, Verkuyl (2005) asks whether the propositional aspect feature of "terminativity" (a.k.a. telicity) can be merged with the viewpoint feature of perfectivity, concluding that although this conflation is not possible in Romance, in English and other Germanic languages it might be.

The major recent contribution to viewpoint theory is that of Smith (1997). Smith develops a "two-component theory," in which the two types of aspect – lexical aspect (in her terms, *situation type*) and grammatical aspect (what she calls *viewpoint aspect*) – interact systematically to yield the overall aspect of an utterance. She argues for three types of viewpoint aspect – perfective, imperfective, and neutral – each defined in terms of which part(s) of the interval spanned by the situation are included in the interval corresponding to the viewpoint; and five situation types – states, activities, accomplishments, achievements, and semelfactives – each defined in terms of the parameters enumerated in §2.2.3.1 above (e.g. activities are dynamic, atelic, and durative). Situation types are determined not by the verb alone, but by the verb and its arguments, which together she calls the "verb constellation." However, a given verb constellation may have, in addition to a basic situation type, various derived ones into which it can be coerced, e.g. by adverbial expressions.

Smith represents viewpoints and the situations themselves within the Discourse Representation Structures of Discourse Representation Theory; a DRS represents the mental model that listeners construct, and includes all the entities, the situations, and the relationships between them that arise within a discourse (Smith 1997:142). Smith argues that sentences introduce a "situation entity" [e] (145), which is inherently associated with a situation type. The viewpoint aspect introduces a time interval [I]. Both the situation entities and the viewpoint intervals can be referred to and positioned with respect to each other, as well as to other intervals and situations, including the moment of speech (introduced into the DRS by a separate temporal entity); speakers can thus both express the ordering of events and choose a viewpoint with which to portray them. The endpoints of the situation are introduced as indexed time variables, whose relationship to the viewpoint interval is specified within the DRS, according to what the viewpoint aspect is; e.g. if the viewpoint is perfective, both endpoint times will be elements of the viewpoint interval. Truth is evaluated by looking for

appropriate times within the model (consisting of individuals, situations, times, and mapping from situations to times, as exist at the moment of utterance) at which the relations between intervals represented in the DRS hold.[19]

Smith's definitions of viewpoint aspect in terms of intervals, together with her assumptions about the relation between viewpoint aspect and situation type, force her into some surprising conclusions. For instance, Smith assumes that simple tenses in English express perfective aspect. Given this assumption, the simple past or present of a stative (*I liked that movie*; *Mary loves John*) should be perfective, but such sentences clearly do not "show" the endpoints of the relevant states; Smith stipulates that this is because endpoints are simply not part of the "temporal schema" of states. She also has to conclude that the habitual in English, when expressed by the simple present (*I walk to school*), is perfective (1997:111), a conclusion which clashes with her characterization of the habitual as a derived stative (1997:33, 111).

Having concluded my overview of various theories of modality and aspect, I now turn to the relationships between these categories.

2.3   Interrelatedness of tense-aspect-modality

2.3.1   Aspect-modality connections: Displacement and the deictic factor

The most basic property shared by both aspect and modality may be that of *displacement*: together with tense, aspect and modality are what enable speakers to talk about eventualities "beyond the here and now" (Hacquard 2006:11, citing Hockett 1966). Aspect – as traditionally conceived – allows speakers to position themselves and their hearers in time with respect to an eventuality, to talk about an eventuality that extends beyond the present or may not include it at all, or to discuss it as it looks from some time interval not identical to the moment of speech. Similarly, modality enables speakers not to limit themselves to statements about actual eventualities, and to talk instead about possible or probable alternative realities, ways the world could be or could have been. Just as speakers use aspect to portray eventualities from a non-actual viewpoint, so modality allows them to discuss the probability, possibility, or necessity that a certain eventuality could (have) come to pass – more than is observable from the actual world and time of the speaker.

On the flip side of displacement, any utterance needs to be anchored to a certain context, including who the speaker is, the time of speech, and what the actual world seems to be to that speaker at that time. The connection to a time from which the attitude holder views (or depicts) the world manifests itself in the semantics of both modality and aspect. In modal semantics, it is critical to take into account both that absolute or objective possibilities,

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[19]Although Smith explicitly assumes an interval semantics framework, she goes back and forth between event semantics and interval semantics terminology (e.g. "Perfective viewpoints *focus a situation* in its entirety.... Imperfective viewpoints *focus an interval* that excludes endpoints" (1997:62, emphasis added)).

necessities, and so on change with time and place, and that the attitude holder's *evaluation* of them also changes according to what information is available to that person at those times and places. Condoravdi (2002) refers to the time from which (given the appropriate modal base and ordering source) an eventuality is judged to be possible, probable, or necessary is referred to as *perspective time.* The role of perspective time in modal semantics is in certain ways parallel to that of viewpoint in viewpoint-based analyses of aspect, or of Topic Time or reference time in (neo-)Reichenbachian ones: both modal perspective time and aspectual reference or topic time provide, in metaphorical terms, the position from which the probability of an eventuality (in modality) or the eventuality itself (in viewpoint analyses of aspect) is assessed or viewed. Just as perspective time is the time (at a certain world) from which the attitude holder assesses the likelihood of an eventuality, so viewpoint aspect provides the temporal standpoint from which the speaker portrays the eventuality s/he is talking about.

The explicit role of viewpoint in viewpoint-based theories of aspect (e.g. Comrie 1976, Smith 1997) was discussed in §2.2.4.4, as was the viewpoint associated with perfective and imperfective aspects. Recall that according to viewpoint analyses, grammatical aspect serves to make "visible" all or part of a situation; theories of this type treat situations metaphorically as one-dimensional spatial entities, occupying a stretch along a timeline. A speaker can position him- or herself at any point along this stretch of time, either along the line spanned by the situation or at some point beyond it. It is Smith (1997) who makes this metaphor explicit with the term *viewpoint aspect*, suggesting that the role of grammatical aspect is to show what the speaker can "see" from his or her chosen position on the timeline.

Despite its centrality in many analyses of aspect, viewpoint is not a formally adequate theory in and of itself, though it is sometimes treated as such.[20] As Klein pithily observes, "...there is little doubt that [these] metaphors express an important intuition about aspect; but they are hard to make precise. Situations, that is, events, actions, processes, states,

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[20]In fact, even the most loyal proponents of viewpoint theories, such as Comrie and Smith, do not consider viewpoint to be the *only* component to aspectual semantics. Rather, viewpoint is the grammatical, subjective counterpart to the relatively fixed, objective lexical aspect. This dichotomy, unsurprisingly, is not quite as clean as one would like. A key area of overlap is that a speaker may choose, by judicious inclusion or exclusion of adverbials (a classic test for telicity), or by inserting or omitting quantifiers (one of Verkuyl's (1993) ingredients for terminativity), to tweak the so-called lexical (or, more appropriately here, propositional) aspect, as in (i) and (ii), respectively.

(i) a. Cho walked yesterday.   *Activity*
     b. Cho walked to Hogsmeade yesterday.   *Accomplishment*
(ii) a. Neville ate chocolate frogs and pumpkin pasties.   *Activity*
     b. Neville ate three chocolate frogs and six pumpkin pasties.   *Accomplishment*

Smith (1995) calls the problem raised by sentences like these a "bounding paradox": what causes the transformation from unbounded (atelic) to bounded (telic) is the very test that is used to test for boundedness. It is this paradox that motivates her to distinguish between intrinsic and independent boundedness (see §2.2.4.4 above). Given the ease of manipulating lexical or propositional aspect, however, its "objectivity" is questionable.

do not have an inside or an outside, like a house or a tomato" (1994:29). Viewpoint is a good metaphor to reflect how people talk about times and eventualities, but viewpoint-based definitions of aspect can make very few predictions – and to the extent they can (e.g. states should be marked with the imperfective; bounded events in the future should take perfective aspect), they make the *wrong* predictions for certain languages, such as Badiaranke, where states take the perfective by default and all future eventualities the imperfective. In addition, because it treats aspect as a matter of how a speaker perceives or portrays the eventuality itself, in the actual world, viewpoint cannot on its own account for the modal aspects of aspect, such as the correlation between conditionals and imperfective aspect in many languages (as in Badiaranke; see also Iatridou (2000) on Greek).

It is not only viewpoint-based theories of aspect in which viewpoint plays a role; a similar notion also manifests itself, however implicitly, in neo-Reichenbachian and interval semantics analyses of aspect. (Neo-)Reichenbachian analyses all inherently rely on the notion of viewpoint, although many do not refer to it as such: in viewpoint terms, the R (reference time) of Reichenbach (1947), or the Topic Time of Klein (1992, 1994), is simply the time point (in earlier treatments) or interval (in later ones) from which the speaker is "viewing" the situation. Even for Reichenbach (1947), who does not distinguish between tense and aspect, the viewpoint time R is included in every "tense." R does not play an active role in Reichenbach's simple tenses, in which it is simultaneous with E (event time), but the "anterior" and "posterior" tenses – i.e. the perfects, future in the past, and future in the future – are systematically distinguished by whether R, essentially the time from which the situation is "viewed," follows (as in the anteriors) or precedes (as in the posteriors) event time. In addition, a strictly Reichenbachian analysis of the simple present – simultaneity of S, R, and E – fits well with the viewpoint conception of aspect, according to which a situation overlapping with the present moment is always viewed imperfectively (there is no way to "see" it from the outside, since the speaker is in the middle of its temporal span). The dependence on R is not unproblematic, however: it is hard to find a definition of R independent from definitions of the aspects themselves. Ideally, one would be able to pinpoint a reference, or viewpoint, interval by independent means, and then show that when an event is temporally positioned in a certain way with respect to that time, a certain aspect is used. This is indeed the case in sentences with R-modifying adverbs. In many clauses, however, where the only evidence for R's temporal location is the aspect itself, the definition of aspect in terms of R and E becomes somewhat circular. A similar problem arises for Chung and Timberlake's (1985) characterization of aspect as positioning situations with respect to an "event frame" (in addition to expressing change or lack thereof). Calling the reference time a "frame" appeals to viewpoint notions, as though aspect is giving a snapshot of the event; but as with Reichenbach's R, it is not specified how one knows what this frame is in the absence of temporal adverbs.

Similarly, although Klein (1994) talks primarily about overlap, inclusion, etc. of one time period with respect to another, his insights can be rephrased so as to reflect those of the viewpoint-based analyses he criticizes. In the perfective, the speaker chooses TT such that TSit ends within TT; if an eventuality is completed within TT, it can be talked about

as a "complete whole" with respect to that TT. "Unbounded" (imperfective) aspects are those in which the speaker chooses a TT fully included in TSit (though this definition is too restrictive for the Badiaranke imperfective (Chapter 3)); in such cases, the eventuality will be, in metaphorical terms, viewed from inside (Klein 1994:108).

In accounts of aspect couched in interval semantics, the counterpart to speaker's viewpoint is the interval (or, for Bennett and Partee (1972), the moment) of time at which the sentence is asserted to be true. This is *not* necessarily the interval of which the eventuality described is a property: rather, it is the (possibly singleton) interval whose temporal positioning with respect to the interval characterized by the eventuality distinguishes between aspects. For Bennett and Partee's definition of progressive aspect, for example ((10) above), the singleton interval I at which the progressive sentence is true falls within a larger interval I' at which its non-progressive equivalent, which describes the completed eventuality, is true; this interval I is essentially the temporal viewpoint from which the overall eventuality is regarded in uttering a sentence with progressive aspect.

The perspective time for modality and the viewpoint or reference time for aspect are fundamentally alike in that both provide a subjectively speaker-dependent, or attitude-holder-dependent, view of an eventuality that also has an objective, absolute chance of occurring (or having occurred) in the case of modality, or an absolute time span – and, for progressives, an absolute likelihood of completion beyond the viewpoint time – in the case of aspect. The parallels run deeper, in that the choice of viewpoint is sometimes inflexible in both domains: when the perspective time is simultaneous with, or overlapping, the moment of utterance, as in "modals for the present" in the terminology of Condoravdi (2002) (see §2.3.3 below), the limits on information accessible at perspective time reflects the actual limits on information available to the speaker. Similarly, when the viewpoint interval includes or equals the time of utterance – that is, when the speaker is talking about a presently ongoing or developing eventuality – the only way s/he can do so with any certainty is by viewing it "from the inside"; what happens after the moment of utterance is at best a matter of speculation on probabilities (hence the role of modality in analyses of imperfective aspect).

This division between viewpoints that are subjectively chosen and those that are imposed on the speaker by external factors turns out to be crucial in a number of analyses of modal (and/or temporal) phenomena that ride on the distinction between settled pasts and unsettled or unknowable futures (see §2.3.3 below). What matters in such analyses (e.g. James 1982, Condoravdi 2002, Kaufmann *et al.* 2006, Werner 2006) is what is and is not in the past of, and therefore settled by, the modal perspective time. Condoravdi (2002), followed by Stowell (2004), draws a fundamental distinction between true epistemic and metaphysical modality, corresponding closely to Lyons' (1983) distinction between subjective and objective modality; epistemic modality has to do with what an individual or group of individuals knows, whereas metaphysical modality has to do with objective possibilities. With modals for the present, such as *could, may, might*, and *should*, metaphysical uncertainty entails epistemic uncertainty: since the future with respect to utterance time is not yet settled, the speaker cannot be certain epistemically any more than metaphysically. In contrast, with modals for the past, such as *could have, may have, might have*, and *should*

have, the future to which metaphysical modality applies is a future-in-the-past, which has become part of the settled past by utterance time; metaphysical uncertainty with respect to a past perspective time is therefore compatible with epistemic certainty at utterance time. In other words, talking about metaphysical possibilities with respect to a perspective time simultaneous with utterance time forces a speaker into a position of epistemic uncertainty, in a way that possibilities in the future of a past perspective time do not. On the flip side, the type of modality restricts the choice of perspective time. In particular, metaphysical, but not epistemic, modality is able to scope under past tense (Stowell 2004), accounting for the absence of epistemic modals with a past perspective time in Condoravdi's paradigm (2002:63): epistemic modality can only make a statement about past or future possibilities as assessed from the time of utterance, whereas metaphysical probability can be made to vary by sliding the perspective time backwards from the time of utterance.

In fact, the impact of indexical perspective on modal semantics extends beyond the notion of perspective time. In Stalnaker's (1999b) semantics for belief, the attitude holder's subjective view of reality at a given time also plays an important role. Stalnaker approaches the puzzle of why it is possible that someone can believe a certain proposition, yet simultaneously not believe a second proposition that is, from a logical or omniscient perspective, "necessarily equivalent" (i.e. both propositions have the same truth value in any given world). Stalnaker argues that in fact, the sentences are not truly equivalent in the relevant context, because the truth value of a proposition in a given possible world depends on the (potentially nonidentical) world in which the utterance is actually made (or interpreted). "The same sentence type, with the same meaning, used in different contexts may determine different propositional concepts" (Stalnaker 1999b:122), where a propositional concept is a function from worlds to functions from worlds to truth values. Stalnaker shows that to understand or evaluate the truth of a sentence of the form *X believes that Y*, listeners imagine what the world would be like in order for the belief to be true in all possible worlds as evaluated from that world: that is, interpreting a sentence about belief involves putting oneself in the believer's shoes – taking his or her viewpoint – and imagining the world as it looks from that point of view. This semantics for belief, like centered worlds and acquaintance relations, exemplifies the dependence of modality not only on the world from whose perspective the attitude holder makes modal judgments, but also on the way s/he perceives the world s/he occupies.

Chung and Timberlake (1985) point out a less transparent connection between aspect and modality. I have already discussed the ties between modal perspective time and aspectual viewpoint. Chung and Timperlake observe that in addition, the actual world in the modal domain – the world from which the other possible worlds are considered, and the facts/knowledge/beliefs in which determine the other possible worlds under consideration – is parallel to the time from which an eventuality is viewed in the temporal and aspectual domains – the speaker's now, in simple tenses. The same basic insight underlies Iatridou's (2000) argument for an ExclF feature in counterfactuals, which can pick out either the worlds other than the world (assumed to be) occupied by the speaker, or the times other than the now of the speaker. Looked at in this way, the indexical nature of modality is brought to

the fore: the base, or actual, world depends on the attitude holder as well as time of the attitude, as is particularly evident in epistemic and doxastic modality.

In addition to these parallels between aspect and modality in general, specific aspects also interact in interesting ways with certain types of modality. In §2.3.2, I discuss some of these aspect-specific interactions.

2.3.2 Aspect-specific links to modality

There is abundant evidence, both empirical and theoretical, of the interdependence of aspect and modality. On the empirical side, it has been noted for various languages that certain modal environments require the use of a particular aspect, or that the semantics of modals is affected by the choice of aspect. On the theoretical end, the semantics of various aspects have been argued to involve modality. I first discuss some relevant empirical observations in §2.3.2.1, then turn in §2.3.2.2 to proposals regarding the role of modality in the semantics of particular aspects.

2.3.2.1 Empirical connections

One type of empirical evidence for a link between aspect and modality comes from the *actuality entailment*, a phenomenon in various languages, such as French and Italian, in which the choice of aspect on modal verbs affects the semantics of the modals' complements. Specifically, when certain modals are marked with perfective aspect, the resulting sentence entails that the complement of the modal did in fact occur in the actual world; when imperfective aspect is used instead, no such entailment results (Delfitto 2004, Hacquard 2006). Hacquard (2006) discusses in detail the actuality entailments in French, in which past perfectives of root (non-epistemic) modals entail that the complement of the modal actually occurred (14); this entailment of realization in the actual world does not arise with (past) imperfectives (15) or with epistemic modals (16).[21]

(14) Pour aller au   zoo, Jane a   pu   prendre le   train.
      for   to.go to.the zoo Jane have can.PAST.PERF to.take the train.

'To go to the zoo, Jane was able.PERF to take the train.' (Hacquard 2006:13, example 1)

*'. . . but she didn't take the train to the zoo.'

(Only reading: She actually did take the train to the zoo.)

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[21] As with epistemic modals, the actuality entailment does not arise with "true (addressee-oriented) deontics" (Hacquard 2006:24).

(15) Pour aller au   zoo, Jane pouvait   prendre le   train.
     for   to.go to.the zoo Jane can.PAST.IMPF to.take the train.

     'To go to the zoo, Jane was able.IMPF to take the train.' (Hacquard 2006:13, example 2)
     ✓...'but she didn't take the train to the zoo.'
     ✓...'and she did take the train to the zoo.'

(16) Darcy a   pu   aimer Lizzie.
     Darcy can.PAST.PERF to.love Lizzie

     'Darcy could have loved Lizzie' (epistemic). (Hacquard 2006:24, example 18a)
     ...'but maybe he didn't.'

In Chapter 6 we will see evidence of a similar – but distinct – effect in Badiaranke, where perfective-marked deontic *mən-* (which expresses permission) presupposes the ability of the addressee in the actual world to carry out the action described; this presupposition disappears when imperfective aspect is used instead.

Along similar lines, Delfitto (2004) observes that in Italian sentences where either the imperfective or the perfective is acceptable, the choice of perfective entails that the eventuality actually happened; in contrast, if the imperfective (on its habitual reading) is chosen, the sentence can be true even if the eventuality never actually happened (but could have, given the appropriate circumstances). Delfitto's data suggest an extension of the actuality entailment beyond sentences with explicit modals, and into the aspects themselves; indeed, Delfitto concludes that the (past) imperfective in Italian has a modal component on its habitual reading, as well as on its progressive one. This conclusion, too, is in keeping with my analysis of the Badiaranke imperfective in Chapter 3 below.

A second type of empirical evidence for the interrelatedness of aspect and modality comes from languages in which various kinds of modal semantics are expressed via aspectual morphology, or alternatively, certain modal categories obligatorily co-occur with certain aspectual ones. A number of Atlantic languages, including Pulaar, Badiaranke, Wolof (Nussbaum *et al.* 1970:360), Balanta (Fudeman 1999:94), Kisi (Tucker Childs p.c.) and Mani (Tucker Childs p.c.), optionally or obligatorily use the imperfective to express futurity, a category argued by, *inter alia*, Enç (1996), Copley (2005), and Werner (2006) to be more modal than temporal, at least in English (§2.3.1 above). Rukai (Austronesian) similarly uses the imperfective to place an eventuality in the future (Bybee *et al.* 1994:278), while Central Pomo expresses futurity by combining imperfective aspect with irrealis mood (Mithun 1995).

Although I have drawn a distinction between mood and modality, with irrealis falling in the former category, it is worth mentioning – since the notion of (ir)reality implies a comparison of actual and possible worlds – that imperfective aspect often displays an affinity with irrealis mood crosslinguistically. Fleischman (1995) raises the question of why some languages, like Bargam (Papuan), mark habitual clauses as irrealis, and similarly, other languages (e.g. Bulgarian) use identical morphology to mark habitual aspect and certain irrealis categories. She points out that habitual is "the aspect of generic, non-referring

expressions," which, like irrealis mood, can indicate a *"lack of belief in or lack of commitment to* the reality, realization, or referentiality of an event or sequence of events predicated in an utterance" (1995:522). In other words, Fleischman treats irrealis mood as making a claim not only about the reality of an eventuality, but also its specificity.

Other authors have investigated the affinity between imperfective and irrealis mood. Ippolito (2004) investigates imperfective conditionals and other modal uses of the imperfective in Italian, although her conclusion – that the *imperfetto* implicates that the speaker no longer knows the proposition to be true, but used to – cannot account for some of the *imperfetto*'s modal functions, notably its uses in polite utterances and dream contexts. Like Italian, Modern Greek requires use of the imperfective in the irrealis context of conditional antecedents (Iatridou 2000); the use of imperfective aspect in "hypothetical" environments like antecedents (e.g. in French) or consequents (e.g. in Cree) of conditionals is also common crosslinguistically (James 1982). In some languages, from the Australian language Mangarayi (Merlan 1981) to Turkish (Aksu-Koç 1995), identical morphology is used to express irrealis mood and imperfective aspect. Indeed, Aksu-Koç (1995) reports that in Turkish, a number of morphemes serve to express both aspectual and modal functions. Perfect aspect and quotative evidentiality are marked identically, as are habitual or generic aspect on the one hand and probability or necessity on the other; moreover, individual-level states are expressed the same way as strong possibility or certainty. Aksu-Koç argues that diachronically, it was the common semantics of stativity that served as a link between aspect and modality.

2.3.2.2   Theoretical connections

On the theoretical front, a number of authors have argued that the semantics of various aspects inherently involves modality. I begin with the most famous case, that of the *imperfective paradox* raised by progressives of accomplishments.

Modality and the imperfective

The imperfective paradox: Modality and the progressive. As discussed in §2.2.4 above, the imperfective paradox – the problem that the past progressive of an accomplishment fails to entail the corresponding simple past, which asserts that the change of state was achieved – has led many authors to analyze progressive aspect as involving modal semantics. In the solutions offered by Dowty (1977, 1979), Landman (1992), Portner (1998), and Higginbotham (2004), among others, the English progressive expresses not just that a certain process is ongoing in the actual world, but also that, in the worlds most likely to develop out of the actual world as it is viewed from the given time interval, the change of state described by the predicate is realized. While differing in the details of their implementation, these proposals have in common the belief that the semantics of what has been conventionally deemed an aspect can in fact not be analyzed without incorporating the modal notions of

probability and possible worlds.[22]

Recall that according to Dowty (1977, 1979), Landman (1992), and Portner (1998), the interval referred to by the progressive sentence is part of a larger interval in which the non-progressive sentence would be true, not necessarily in the actual world, but in one or more of the most probable continuations of the actual world – the inertia worlds, in Dowty's (1979) terms. These proposals differ largely in how they define the inertia worlds. For Dowty (1977), the non-progressive is simply required to be true in at least one of the possible branching futures.[23] In his 1979 refinement, Dowty argues that the inertia worlds are ones where everything proceeds "normally." Landman (1992) defines an inertia world ("continuation branch") counterfactually, as a world in which the event would continue to completion if whatever interrupted it in the actual world (if there is such an interruption) had not occurred; in addition to introducing event semantics assumptions (see below), Landman's proposal also differs from Dowty's in focusing attention on the potential continuation of the event itself, and not of everything in the world.

Portner's (1998) paper not only incorporates the advantages and eliminates the more problematic aspects of previous analysis, but also integrates the considerable advantages of Kratzer's (1981, 1991b) theory of modality. In the case of the English progressive, argues Portner, the modal base is a circumstantial one, consisting of the known facts in the actual world that are relevant to the event as it is described by the progressive clause (or the worlds in which those facts are true); he calls this set Circ(e). The ordering source is composed of all the propositions that must hold in order for the event not to be interrupted. The inertia worlds, in Portner's analysis, are the best worlds in which all the propositions in Circ(e) are true and the event as described is not interrupted. In highlighting a particular property of the event, the event description determines which facts are included in Circ(e).

In addition to their criteria for selecting inertia worlds, modal solutions to the imperfective paradox also differ as to whether they assume an event semantics, an interval semantics, or some combination of the two. While Dowty's semantics is strictly interval-based, the analyses of Landman (1992) and Portner (1998) make crucial reference to events as well as to intervals. Landman phrases some of his claims in terms of intervals, but also argues that for a progressive clause to be true, the *event* it asserts to hold in the actual world must be recognizable as an instantiation of the event type described by the predicate; in addition, Landman's analysis involves stopping and continuations of *events*. At the opposite extreme from Dowty in this regard are Bonomi (1997) and Higginbotham (2004), who build their analyses strictly within event semantics. Higginbotham (2004), as discussed above in §2.2.4.3, essentially translates Landman's and Portner's analyses into an event semantics framework. Bonomi (1997), meanwhile, argues that progressive sentences are evaluated with respect to the possible events of which the events-in-progress they describe could be a part,

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[22]The work cited here has focused on the progressive in English, but the central claims most likely apply to progressives in other languages as well.

[23]Dowty (1977) is responding at least in part to Bennett and Partee (1972), who analyze no tenses or aspects modally, not even the future, and whose semantics for the progressive leaves the imperfective paradox unaddressed.

and also with respect to the stereotypical conversational background, similar to Portner's non-interruption ordering source. Whether the progressive is judged as true therefore depends not only on the actual state of affairs, but also on which concomitant facts are taken into account.

In general, each modal analysis of the imperfective paradox improves upon previous ones within the same framework. For instance, Landman's and subsequent analyses eliminate the following problematic prediction made by Dowty (1977, 1979). Suppose that an event in progress over an interval I ends up being completed later, despite the fact that at I, the probability that I will be completed is extremely low. Dowty's analysis predicts that in such a scenario, the progressive should be false at I, because in all inertia worlds, where everything proceeds as is "normal," the event is not completed. Problematically, as Landman puts it, this prediction is not always correct, because "our world is sometimes a miracle world" (1992:15). Post-Dowty (1979) accounts also successfully deal with the reverse problem raised by Vlach (1981), wherein an event is interrupted in the actual world as well as in all inertia worlds, yet the progressive is judged to be true (the *Max crossing the street* example). Another problem, pointed out by Bonomi (1997), is that without any reference to events, and some restriction requiring that the process spanning the smaller interval be a part or stage of the event spanning the larger one, Dowty would predict that *John is dying* should be true in every interval during John's life: certainly in every inertia world, any interval during John's life is part of a larger interval at which *John dies* is true.

Landman (1992) also leaves open a number of problems, which are raised and repaired by Bonomi (1997) and Portner (1998). Bonomi (1997) discusses scenarios where the goal of the event in progress has not been determined, e.g. in a situation in which Leo is driving along but has not yet decided which of three French cities to drive to, *Leo is going to Metz*, *Leo is driving to Paris*, and *Leo is going to Besançon* are all false in Dowty's framework; on Landman's analysis, in contrast, the problem is that in a situation where Leo thinks he is going to Metz but ends up having to change his plans and go to Besançon, *Leo is going to Metz* comes out false and *Leo is going to Besançon* true (because on the continuation branch, the event ends at Besançon). An additional problem is what Bonomi calls the "Multiple Choice Paradox": in a situation in which Leo is driving along but has not yet decided which of three French cities to drive to, *Leo is driving to Metz* is false at a time when he has not yet decided, but the next day, after Leo has in fact decided to go to, and ended up in, Metz, *At X time yesterday Leo was driving to Metz* is true (Bonomi 1997:181ff). Bonomi argues that all these problems can be solved by taking into account the viewpoint with respect to which the speaker is evaluating the event (see §2.3.1 above), together with a part-of relation between events.

Portner (1998), too, offers some criticism of Landman (1992). The primary problems he notes are that Landman's analysis analyzes the modality involved in progressives completely differently from analyses of all other modal phenomena; that Landman never gives an independent way of judging what is "reasonable"; and that despite Landman's appeal to counterfactuals in his definition of "continuation branches," counterfactuality has never been analyzed in a way parallel to Landman's use of it. One might add the related criticism

that Landman's treatment of counterfactuals is fairly simplistic, since counterfactuals also involve a comparison between possible worlds (as in, e.g., Lewis (1973)). In defense of Landman, however, the difficulty of drawing a precise line between worlds that are reasonable and worlds that are not may appropriately reflect the fuzzy intuitions people often have when faced with the more elaborate progressive examples.

The importance of taking modality into account when analyzing the progressive is highlighted by Parsons' 1989 attempt at a strictly extensional analysis of that aspect. In order to avoid modality altogether, Parsons is forced to stipulate semantic primitives for which there is no independent evidence. Although Parsons raises some valid objections to intensional accounts, the mutual independence of his two relations *Cul* and *Hold* is not necessarily a good thing: since *Cul* and *Hold* are both primitives, neither entails the other, but it would seem that in fact $Cul(e, t)$ should entail $Hold(e, t')$, where t' precedes t. Furthermore, by failing to define *Cul* and *Hold* in any formal or independent way, Parsons runs the risk of circularity: $Hold(e, t)$ is said to mean, for an eventive e, that e "is in development at t" (Parsons 1989:220) – in other words, that the event is in progress – while the progressive is argued to mean simply that at some time t, the event described by the predicate Holds.

Modality and other imperfective subtypes. While more attention has been paid to the progressive-modality connection, some authors have also pointed out semantic interrelatedness between modality and other subtypes of imperfective aspect, namely habituals and generics. As noted by Chung and Timberlake (1985), among others, any claim that a given eventuality recurs habitually involves a reference, be it implicit or explicit, not only to developments of the actual world, but also to potential developments in certain other possible worlds; habituals express tendencies, i.e. *probabilities* of repetition. Similarly, Aksu-Koç (1995) attributes morphological overlap between modality and habituality to the "predictive quality" of habituals; and Lenci (1995) argues that non-quantificational habituals (those lacking a quantificational adverbial) assert only the *possibility* of recurrence, not that the event necessarily recurs in the actual world. Delfitto's (2004) argument that in its habitual meaning, the (past) imperfective in Italian can be used to talk about an eventuality that never occurred in the actual world, but could have if the conditions had been right – in other possible worlds – provide additional support for such claims.

Similar observations have been made about generics (of which, according to Dahl (1995), habituals are a subcategory): generics make a statement about idealized tendencies, properties characteristic of, though not universally applicable to, a certain class of individuals or events. A generic assertion is (often) not limited to any particular time (or place), instead describing a state of affairs that holds across all time; it is therefore *timeless* (Dahl 1995) and, in fact, semantically similar to individual level statives (Smith 1997:33). Because such permanent states are understood to hold not just at a given interval, but for all times, no matter how the world may develop, the semantics of generics – as well as of other individual-level states – has been argued to involve necessity across possible worlds (Aksu-Koç 1995:276).

While many authors have made remarks in passing about the modal nature of habituals, Ferreira (2004) successfully explains *why* it is that for a habitual sentence to be true,

the predicate need not hold at the moment of utterance, nor must the eventuality ever be repeated in the actual world. Ferreira argues that both progressives and habituals involve an IMP(erfective) operator, which scopes under tense but over the VP. Time intervals may be either *singular* – i.e. consisting of one continuous stretch – or *plural* – consisting of two or more non-contiguous intervals. He treats VPs as functions from time intervals to truth values. Some VPs are specified to have a singular operator, which takes as input the set of intervals denoted by the VP (or its characteristic function) and outputs only the singular intervals in that set; others have a plural operator, which takes the same input but outputs only the plural intervals. Ferreira argues that the progressive operator is simply IMP_{sg}, i.e. it can operate only on singular VPs, denoting singular (continuous) intervals, while the habitual operator, IMP_{pl}, selects only plural VPs. In certain languages (e.g. English) the two are distinct, while in others there is a general IMP operator that can have either meaning. Ferreira demonstrates that Portner's (1998) modal analysis not only is consistent with his own analysis of the progressive, but also can be straightforwardly extended to the habitual.

Modality and the perfective

Despite the far greater attention toward the modality of the imperfective, analyses of the perfective often include some (usually implicit) modality. In claiming that a given eventuality is terminated or completed within a given time interval in the actual world, the perfective refers, however implicitly, to potential developments (or lack thereof) of the eventuality in later possible worlds. The notions of "endpoint" and "completion" are inherently modal, in two respects. First, if the eventuality is complete in the actual world, then it will also have been completed in any possible continuations of the actual world. More importantly, in evaluating the truth of a perfective clause, one must consider the eventuality as it stands at the end of TT (in a Kleinian/neo-Reichenbachian framework), or its ultimate status in the viewpoint interval (in viewpoint/interval semantics terms), and compare the event within that interval to its continuation in other possible worlds; this modal comparison is necessary in order to know that further evolution of the eventuality would not make it *more* complete.

In boundedness terms, use of the perfective indicates that the eventuality does not extend beyond its "visible" boundaries even in other possible worlds. This link between inherent boundedness of a situation (type) and perfectivity is particularly salient in the discussion of "implicit boundedness" by Smith (1995) and of "material boundedness" by Lindstedt (1995); both argue, in essence, that certain types of eventualities have an inherent endpoint, and that the perfective in some languages indicates that this inherent endpoint has been reached. In other languages, however, the perfective indicates only that the eventuality has been brought to an end, possibly by some force extrinsic to the eventuality. The "external" (Smith 1995) or "temporal" (Lindstedt 1995) bound may be imposed before an implicit bound is reached, in which case, arguably, one has to look at the eventuality's continuation in other possible worlds in order to determine what kind of eventuality it is.

Looked at in this way, even the most extensional analyses of aspect, such as that of Parsons (1989), involve modality. Despite his claims to the contrary, Parsons' culminate/hold

distinction is inherently modal at this level: in order to know whether an accomplishment has culminated or is still in progress (involving Hold), one needs to look beyond both the actual moment and the actual world; otherwise, there would be no way of judging whether the eventuality could evolve further. For instance, a speaker who utters *Dudley is eating a bowl of cereal*, in using the progressive, indicates that Hold pertains to the cereal-eating event – i.e. that the cereal-eating is still "in development" – at utterance time; this can be so only if there is still (at the time of utterance) cereal in the bowl, and therefore the *possibility* of Dudley's continuing to eat cereal. In contrast, in asserting that the event of eating cereal from the bowl has culminated, the perfective sentence *Dudley ate a bowl of cereal* indicates that by the end of the relevant time, there is no more cereal left in the bowl, and hence no *possibility* of the event's continuation. Even if Dudley decides to eat more cereal after that time, his additional consumption cannot possibly be part of the same event of eating-a-(single-)bowl-of-cereal.

A different perfective-modality connections appears in languages that demonstrate the reverse of the patterns discussed in §2.3.2.1 above. In Slavic languages like Russian, perfective presents (as opposed to the imperfective, as in Atlantic languages) are used in sentences about the future (Forsyth 1972, Terras 1960), which arguably has modal semantics (see §2.3.1 above). The perfective present in Russian can also be to express habitual aspect, whose modal qualities were reviewed above. In a related phenomenon, some languages, such as Tagalog, suggest a correlation between non-actual modality and perfective aspect (Chung and Timberlake 1985:256); this correlation, again, reverses the pattern found in Badiaranke and other languages where non-actualization is tied to the imperfective and actualization to the perfective.

Modality and the perfect

Several accounts of perfect aspect rely on presupposition and discourse context – notions that, according to authors like Stalnaker (1999b), Heim (1990) and Roberts (1998), are inherently modal (see §2.2.1.1 above). Inoue (1979) seeks a unified analysis of the superficially polysemous perfect, and in particular of the "lifetime effect," which rules out sentences like *Einstein has visited Princeton* if Einstein is dead. She argues that to be felicitous, a present perfect sentence must provide information about a current topic of discourse which, when phrased as a proposition, describes a situation with the potential to be repeated as of the time of utterance. Thus *Princeton has been visited by Einstein* is acceptable if spoken today, because the passive form indicates that events at or visits to Princeton, and not actions of Einstein, are the topic of conversation. The proposition denoted by the present perfect sentence and the proposition which defines the current discourse topic are related, Inoue claims, by an entailment relation; however, she never spells out what this relation is, and the idea that a present perfect sentence must "exemplify or explain" the current topic of discourse is similarly vague. Inoue's proposal falls into the general category of *current relevance* theories of the perfect, which claim that the basic meaning of the perfect is the eventuality's ongoing relevance (to the present, in the present perfect, or to another reference

time, in future and past perfects), usually in the form of a persisting state resulting from an earlier event (see Binnick 1991:100-104). Other current relevance treatments include those of Moens and Steedman (1988), Bybee *et al.* (1994), and Portner (2003).[24]

Portner (2003), taking Inoue's (1979) pragmatic proposal as a jumping-off point, argues that a perfect sentence must be at least a partial answer to a question which is raised by a discourse topic. The oft-noted current relevance flavor of the present perfect arises, he claims, when the topical question has to do with causation of a state that could arise from the situation asserted in the perfect sentence. A second pragmatic ingredient, he argues, is the XN (extended now) Presupposition of the Present Tense: present tense sentences imply that the event occurs during the extended now (a time interval reaching backwards from the time of utterance). This explains the troublesome incompatibility of the present perfect with past time adverbials, which Klein (1992) calls the "present perfect puzzle." Portner, unlike Inoue, also proposes a semantic explanation of many properties of the English perfect, including the observation that when applied to statives, the perfect suggests that the state still obtains. His neo-Reichenbachian proposal takes the form of the Temporal Sequencing Principle: "For any tenseless clause ϕ, reference time r, and event e, (i) if ϕ is not stative: $\|\phi\|^{r,e}$ implies that e precedes r; and (ii) if ϕ is stative: $\|\phi\|^{r,e}$ implies that e either precedes or overlaps r" (Portner 2003:484).

Klein (1992), like Portner (2003), provides a part-semantic, part-pragmatic explanation of the present perfect puzzle. As in his 1994 book, Klein (1992)x argues that the present perfect indicates that two relations hold between time intervals: TT (Topic Time) includes TU (Time of Utterance), and TT follows TSit (Time of the Situation). As for the pragmatics, Klein argues that expressions may be *p-definite* (their exact position on the timeline being specified), *b-definite* (their exact boundaries being specified), both, or neither. The present perfect puzzle, he argues, arises from the pragmatic P-Definiteness Constraint, which prohibits specifying the temporal position of both TT and TSit.

Katz (2003), aiming to derive the P-Definiteness Constraint from independent principles, proposes a pragmatics similar to Portner's. According to Katz, the present perfect carries a modal presupposition, namely that at utterance time, there is still a possibility that at some later time, the eventuality may recur. Crucially, he assumes that sentence-final adverbs count as part of the "event predicate"; thus in a sentence like *John has taken out the trash yesterday*, the problem is that *take out the trash yesterday* does not describe an event which could recur after utterance time.

In every major grammatical aspect, then, there are critical semantic connections with modality. One might go so far as to say that it is impossible to develop an adequate semantic analysis of either aspect or modality without taking account of the other.

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[24]The problem with current relevance analyses is that it is hard to pin down what, exactly, constitutes "relevance." Smith (1997:107), analyzing the perfect in a typical CR style, argues that perfects "ascribe to . . . subjects a property that results from their participation in the prior situation." Such definitions are highly problematic, however, for atelic eventualities, which are also compatible with the perfect; in such cases the relevant "property" is defined so loosely as to make the definition vacuous (e.g., in *John has danced already*, the property would presumably be that of having danced).

2.3.3 Tense-modality connections

In this section I lay out a number of commonalities and interactions between tense and modality, including the notions of *evaluation time* and *perspective time*; scopal interactions; the role of *settledness* (an inherently modal concept) in tense; and the frequent affinity between past tense and irrealis mood.

2.3.3.1 Evaluation time and perspective time

Following Condoravdi (2002), I use the terms *evaluation time* and *perspective time* to refer to two distinct times. *Evaluation time* is the time at which an eventuality must be realized in order for the sentence asserting realization of that eventuality to be true; for instance, in the sentence *Ravenclaw will play Gryffindor in the Quidditch match tomorrow*, the evaluation time is the time at which the future Quidditch match will take place. *Perspective time*, in contrast, is the time *from* which truth of the proposition is evaluated; in the Quidditch example, which consists of a simple declarative clause, perspective time is simply utterance time. Both evaluation time and perspective time have played an especially useful role in understanding phenomena at the intersection of tense and modality. Here I discuss three of these phenomena: the modality involved in the English future "tense" (e.g. Enç 1996, Werner 2006), the semantic effect of tense marking on modals (Condoravdi 2002), and the semantics of tense in intensional contexts (Abusch 1997).

The semantics of future tenses, particularly English *will*, is a major issue in the interface between modality and tense. In logical treatments of tense (Reichenbach 1947, Prior 1957, 1967, Montague 1973), the future was assumed to be exactly parallel to past tense. This parallelism, modulo the difference in semantics for the past (existential or indefinite for Prior, definite for Bennett and Partee) was maintained by Bennett and Partee in their 1972 proposal for interval semantics; Partee (1973), however, already departs from this view, treating English as a two-tense system and *will* as a present tense modal. While Comrie (1989) and Kissine (2008) staunchly defend the existence of future tenses, and the temporal semantics of *will* in particular, many authors have argued that *will* has partly or even primarily modal semantics, and some have insisted that it is not a tense at all. The suspicion that *will* expresses modality in addition to, or instead of, tense arises from a number of observations, including the fact that diachronically, the futurate use of *will* grew out of its modal use to indicate desire or willingness (Bybee and Dahl 1989:63, 90), and the fact that in at least some contexts, *will* can still be used with more or less modal overtones (as in *Will you marry me?*, or *By now Voldemort will have reached Hogwarts*).

Comrie (1989) defends the conventional view of futures as tenses rather than modal categories, arguing that the mere fact that a category also has modal semantics does not mean that it is not a future tense. Regarding the diachronic evidence, he argues that while future time reference develops from morphology originally expressing desiderative and deontic modality, epistemic modality tends to develop out of the future uses rather than the reverse. Comrie strikes down a number of "non-arguments" that there is no such thing as

a future tense, including the lesser certainty of future events (the fact that future events are less certain does not mean language has to encode them that way); the fact that future is marked formally in a different way than other tenses (there is no necessary one-to-one correspondence between semantic category and morphological expression); and the fact that "future" forms often encode some sort of modality in addition to simple future time reference (future time reference is still a core part of modal uses of the future).

Taking an even stronger stance than Comrie, Kissine (2008) argues that it is neither the case that English *will* is sometimes a modal, nor that *will* always contains some modal element in its semantics. Kissine's first tactic involves showing that analyses of *will* as expressing deontic or epistemic necessity run into logical contradictions, or at least absurd conclusions, especially when *will* is embedded under a matrix clause expressing possibility. His second strategy is twofold. First, appealing to work by Kratzer on conditionals and quantifiers in consequents (whose domain of quantification is restricted by the antecedent), and by Stalnaker on common ground and other pragmatic principles, he argues that all assertions without an explicit quantifier or modal – including assertions with *will* – involve an implicit epistemic necessity operator. Second, he appeals to Gricean maxims and other pragmatic principles to explain away the modal connotations that have been attributed to some uses of *will*. He argues that, instead, the semantics of *will* is fully temporal: quite simply, it extends the evaluation time of the proposition it scopes over from the time of utterance into the infinite future. "$Will(p)$ is true at the utterance time t iff there is an interval $i_1 \subseteq [t, \infty]$ such that it is true that p at i_1" (Kissine 2008:141).

Enç (1996) argues, contra Comrie, that the so-called "future" in English is fully modal, and not temporal at all. She points out several clearly modal uses of *will*: its ability to express epistemic modality (as in *Snape will have mixed the potion by now*) and "dispositional necessity" (Enç 1996:348) (as in *Boys will be boys*). These parallels are not in themselves fully convincing evidence that *will* is not also temporal; more convincingly, however, Enç also shows that in two diagnostics, *will* patterns unlike past tense: in sequence of tense contexts (17) and when scoping over an embedded present tense (18). In the latter case, Enç demonstrates that matrix *will* behaves like other modals instead of like past tense.

(17) a. Mary said that she was tired. (Enç 1996:350, example 18)
      SHIFTED READING (available): Mary's statement was about her tiredness at some previous time.
      SIMULTANEOUS READING (available): Mary's statement was about her tiredness at the time of her speaking.

   b. Mary will say that she will be tired. (Enç 1996:350, example 19)
      SHIFTED READING (available): Mary's predicted statement will be about her tiredness at some time later than that statement.
      SIMULTANEOUS READING (unavailable): Mary's predicted statement will be about her tiredness at the time she makes her statement.

(18)   a. Sarah claimed that she is the best candidate. (Enç 1996:352, example 23)
          DOUBLE ACCESS READING: Sarah's claim is about her being the best candidate
          both at the past time of her claim, and at the time (18a) is uttered.

       b. Mary may say that she is in charge. (Enç 1996:353, example 29)
          SIMULTANEOUS READING (not double access): Mary's potential claim is about
          her being in charge at the (future) time she makes the claim.

       c. Sarah will claim that she is the best candidate. (Enç 1996:353, example 25)
          SIMULTANEOUS READING (not double access): Sarah's predicted claim is about
          her candidacy at the future time when she makes the claim.

Based on these data, Enç argues that *will* is modal, a sentential operator like other
modals (but unlike tenses, which, on her analysis, are referential). Note, however, that (17)
is missing the modal slot of the paradigm in (18), which would have shown that the behavior
of *will* is not completely parallel to that of other modals; compare (19) with (17) above.

(19)   a. Mary may say that she may be drunk.[25]
          SHIFTED READING (available): Mary's potential speculation is about her inebri-
          ation at some later time, e.g. at a party the following evening.
          SIMULTANEOUS READING (available): Mary's potential speculation is about her
          inebriation at the time of speculation.

To account for the incontrovertible temporal overtones of *will*, as well as other modals
in sentences like (18b), Enç ends up claiming, surprisingly, that all temporal semantics in
general (specifically, a shift in the evaluation time, the time for which the sentence is asserted
to be true) comes from the semantics of modals and not from tenses. Specifically, she claims
that a sentence with a modal operator is true at a world w and time interval i if and only
if in every accessible world w' there is a later interval i' in at which the non-modal sentence
is true (Enç 1996:354).

As with all declarative sentences, those with modal expressions are true at some times
and false at others; their truth depends not only on worlds, but also on the time when they
are uttered and on perspective time. As discussed by MacFarlane (2003) and by von Fintel
and Gillies (2005), the speaker of an epistemic statement (in which the modal base consists
of worlds compatible with what a certain individual(s) knows) might later acquire new
knowledge that alters his or her opinion about the truth of the modal statement. Similarly,
the truth value of a sentence involving doxastic modality (in which the modal base consists
of worlds compatible with someone's beliefs) may vary as the attitude holder's beliefs change
over time. Accordingly, the truth of a modal utterance must be evaluated with respect to a
world-time pair (and other indexical components).

Like Enç (1996), Condoravdi (2002) proposes that all non-root modals extend the time
of evaluation forward, into the infinite future of the time of evaluation; in Condoravdi's
case, this claim is motivated by the availability of future readings in what she calls "modals

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[25]I have used *drunk* here instead of *tired* for pragmatic reasons – Mary would be expected to be certain
whether she is tired *at* the time of the potential future utterance.

for the present," but not in "modals for the past," in English. Modals for the present include *may, must, might, should*, and *ought to*; in modals for the past, a modal of the present is followed by the perfect morpheme *have* (e.g. *should have, might have*). The *time of evaluation* – i.e. the time at which the eventuality in the proposition over which the modal scopes may/must/should hold or occur – determines what Condoravdi calls modal *orientation* (i.e. whether the modal looks forward into the future, or back into the past). For modals for the present and for some modals for the past, the evaluation time is in the future (or present) of *perspective time*, i.e. the time at which the attitude holder evaluates possibility, necessity, etc. of whatever flavor. For other modals for the past, the evaluation time is some time in the past of utterance time, and therefore in the past of perspective time. The two types of modals differ in terms of both the temporal and the modal readings they can receive. Regarding tense, modals for the present can have either a future or present reading – that is, evaluation time can either follow or overlap with utterance time – while modals for the past are only compatible with past frame adverbials; regarding modality, both types can receive an epistemic reading, but only modals for the past can have counterfactual readings (how the world could have evolved, but didn't), while only modals for the present can have future metaphysical ones (relating to ways the world might still evolve). The possibility of counterfactual readings only in modals for the past falls out from two main factors: a model of branching worlds which are identical up to the point in time where they branch, namely the perspective time, and the fact that only modals for the past allow a past perspective time. At the past perspective time, there were multiple branching worlds in which events could have taken one course or another at the then-future evaluation time; but by the time of utterance, all but one of these worlds has been eliminated, leading to the counterfactual interpretation of modals for the past with a past perspective time.[26]

In another modal analysis of English *will*, Werner (2006) treats *will* as a future-oriented modal rather than as a future tense; in Werner's case, he derives the future interpretation of *will* from a semantic constraint tied to the limitations imposed by the information available at *perspective* time (the moment of utterance in the examples he considers). Werner terms this constraint the *Disparity Principle*: there must be some identifiable difference between worlds in the modal base, since the proposition under the modal cannot be universally true or universally false in all the worlds in the modal base (or else a modal would not be used). The Disparity Principle, together with an assumption of branching worlds, explain the future interpretations of root modals: modals involve a totally realistic modal base up to the time of speech, after which the possible worlds diverge. By the Disparity Principle, the worlds in the modal base are required to differ from each other in some way; by the assumption of branching futures, these worlds differ from each other only after the moment of utterance –

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[26]It is interesting to note that even *future* counterfactuals, whose existence is argued for by Iatridou (2000), require the use of modals for the past in English, as in *Helen might have come to the party tonight, but she had to fly suddenly to Mexico* (spoken at noon on the day of the party). In such cases, the crucial time when all the worlds in which Helen might later come to the party are eliminated is the past moment when Helen learned she had to take a trip; as a result, a modal for the past, and not a modal for the present, must be used.

which is essentially the perspective time for this particular type of modal in matrix clauses. A future interpretation falls out as a result.

The concept of a perspective time for modals has also proved helpful in the analysis of tense in intensional contexts. Abusch (1997) shows that to get the correct interpretations of tense embedded under an intensional predicate, one needs to take into account the *centered world*; this term, first defined by Lewis (1979), refers to the world the attitude holder believes him- or herself to be in at "believing time," i.e. perspective time, which may differ significantly from the actual world s/he occupies. Additionally, Abusch demonstrates that in extensional contexts, modals like *might* and *ought* convey judgments made at the time of utterance (as in *John married a woman who might become rich*), but in intensional contexts, they are interpreted with respect to the local perspective time (as in *John believed his wife might become rich*). Modals thus provide evidence for the existence and importance of a local perspective time, while also laying the foundation for Abusch's claim that tense involves the positioning of a tense's index with respect to the local perspective time.

2.3.3.2   Scopal interactions

Evidence for scopal interactions between modality and tense is one motivation behind analyses treating modality as a sentence-level operator. At the same time, differences between epistemic and non-epistemic (root) modality with regard to their scopal interaction with tense have given rise to syntactic analyses in which these two classes of modals occupy different positions in the clause. Hacquard (2006), for instance, uses actuality entailment data (see §2.3.2.1 above) to argue that in French and Italian, epistemic and "true" deontic modals (which do not give rise to the entailment) scope above tense (and aspect), while other modals scope below it. Stowell (2004) develops an analysis along the same lines for English data like (20) and (21).

(20)   John's wife couldn't be very rich.
       EPISTEMIC MODAL: present unlikelihood that John's wife is rich

(21)   Max couldn't move his arm.
       ABILITY (DYNAMIC) MODAL: past inability to move his arm

Although past tense is morphologically marked on both types of modal, only epistemic *could* always requires the modal to be evaluated with respect to the time of utterance (or, in embedded clauses, with respect to the matrix event time), and not with respect to the time of the past event under the modal. Stowell speculatively suggests that epistemic modals in English occupy a functional projection above tense, while root modals occupy a lower functional projection below tense.[27]

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[27]Problematically, however, Stowell does not take Aktionsart into account: as in (20) and (21), his examples systematically involve stative predicates in the epistemic cases and eventive ones in the root cases. This affinity between epistemics and stativity is noted by Barbiers (2002), who analyzes it as a selectional requirement: epistemics are required to select a state as their complement.

2.3.3.3 Settledness

In addition to their obvious temporal distinction, past and future tenses differ in a crucial modal respect. Namely, what happens in the past (of perspective time) is settled: that is, eventualities that occurred in the past are irreversible. (Note that *settledness* is not the same as *certainty*: past events are settled even if the speaker or attitude holder does not know what has in fact transpired.) In contrast, what happens in the future (of perspective time) is not yet settled; that is, future events may develop in any number of possible ways, however unlikely those ways may be. Put differently, there is only one actual world up to perspective time; but in the future, there are infinite possible worlds "branching" out from perspective time (Dowty 1977, Landman 1992, Kaufmann *et al.* 2006, e.g.). Kaufmann *et al.* (2006), for instance, probe these associations of past tense (or time) with settledness, future tense (or time) with unsettledness, and futurates (e.g. *I'm getting up early tomorrow*) with both settledness and *planning*. They bring up the oft-ignored fact (which Werner (2006), for instance, fails to explain) that the settledness reading of futurates arises only with eventive predicates. Kaufmann *et al.* argue that that settledness, which they assign its own operator, is in fact a property of sentences in all tenses; in the past and in stative presents, however, this reading is masked by the fact that all worlds in the set of metaphysical alternatives are identical up to the relevant time (e.g. the moment of speech). In futurates, the settledness reading probably arises from the inherent unknowability of the future, combined with the speaker's willingness to assert the eventuality despite that uncertainty. Modality is thus associated with all propositions and all tenses, with the particularly modal flavor of futurates falling out from independent factors.

Copley's 2005 analysis of futurate progressives in English similarly builds on the modal notion of settledness. She builds on the intuition that futurates entail a plan, and that such a plan must involve the desires of some entity that has the ability to carry it out. Futurates, Copley demonstrates, cannot actually assert the existence of such a plan; furthermore, speaker confidence that the plan will be carried out is not an adequate semantics for futurates. Copley analyzes futurates as presupposing that a certain *director*, the individual(s) responsible for the plan, has the ability to make the proposition become true, while asserting that the director is *committed* to making that proposition happen. "Commitment" is here used in a specific, modal sense, based on Kratzer's theory of modality (see §2.2.1.2 above): it reflects the director's desires in the best possible worlds according to the modal base (which may be metaphysical) and ordering source (which must take into account possibly conflicting desires on the part of the "director," weighted according to how much s/he wants each one). In its focus on planning, Copley's analysis is similar to that of Dowty (1977), for whom the futurate simple present (e.g. *The Red Sox play the Yankees tomorrow*) asserts the situation with greater certainty than *will*, as well as asserting that the situation is planned; the futurate progressive, according to Dowty, conveys the plan without the certainty. The convincing analysis of futurates as a temporally-oriented modal with stronger modal force than the future "tense" provides additional evidence that future time lies at the interface of tense and modality.

2.3.3.4 Past tense and the irrealis

Despite the inherent settledness of the past, it has been noted that cross-linguistically, past tense morphology is often used to mark non-actuality, i.e. to couch an assertion in a world other than the actual world. A number of authors have attempted to provide explanations for this particular tense-modality connection.

James (1982) surveys several typologically diverse languages in which "hypothetical" meaning, e.g. in counterfactual wishes, is expressed with a past tense morpheme. She argues that this tendency arises from a semantic similarity between hypothetical situations and past tense: both express "distance" from reality, along either the temporal or the modal dimension. While her hypothesis is interesting, the argument is not thoroughly convincing; why, for instance, use past rather than future morphology, since the future is less knowable than the past and therefore more distant from reality?

Iatridou (2000) offers a more satisfactory analysis of the link between past tense and counterfactuality, which unifies the semantics of "real" past tense – used to express temporal precedence – and the "fake" past that appears in counterfactuals in Greek, English, and elsewhere. She argues that the semantics of "fake" and "real" pasts can be reconciled by replacing a strictly temporal past tense feature with a feature ExclF. The semantics of ExclF is that of exclusion: "$T(x)$ excludes $C(x)$," where x can be a time or a world. Specifically, $T(x)$ refers to "the x that we are talking about," and $C(x)$ to "the x that for all we know is the x of the speaker" (Iatridou 2000:246). "Real" past, then, means that (in the terms of Klein 1994) Topic Time excludes Time of Utterance, and "fake" past means that the worlds for which a claim is being made exclude the actual world. Legate (2003) shows that Warlpiri provides independent support for Iatridou's claims.

Another parallel between tense morphology and the modal semantics of conditionals is pointed out by Chung and Timberlake (1985), who note that crosslinguistically, identical adverbials are often used to indicate "temporal sequentiality" and "conditional modality," as in the case of English *when*. (The two uses may be illustrated by pairs like *When Dolores walked in, Minerva stalked out* vs. *When an underaged wizard performs magic, the Ministry finds out right away*.)

We have seen in this section, then, that there is good empirical and theoretical evidence for links between tense and modality, as well as between aspect and modality. Not only is it impossible to analyze either tense or aspect without considering modality, and vice versa, but their semantics also overlap in often subtle ways.

2.4 What the dissertation will and will not address

This dissertation will address a number of aspectual, modal, and temporal phenomena in Badiaranke, and how the semantics of these phenomena challenge and inform theories of aspect, modality, and tense found in the literature. It will necessarily leave others unresolved, pending future research.

Regarding aspect (Chapters 3 and 4), the dissertation will investigate the distribution and semantics of the major aspectual categories in Badiaranke: particularly the perfective and imperfective aspects, but also the progressive, habitual, prospective, and what I will call "transitional" constructions. I will consider the semantics of these aspects in affirmative declarative clauses, as well as in complement clauses. In sequences of clauses, clauses take on different aspectual morphology than do clauses in isolation; I will also consider this "narrative" morphology and its aspectual (and modal) semantics. For the most part, however, I will be leaving aside the semantics of aspect in relative clauses and wh- questions, as well as the interaction of aspect with negation.

On the subject of tense (Chapter 5), the primary question will be what role past tense marking plays in Badiaranke, since tense marking is so rarely required in the language. To answer this question, I will probe the semantic difference between the two past tense markers; their interaction with irrealis and realis mood; their semantics in a limited number of intensional contexts; and how tense marking affects the default temporal mapping of lexical and grammatical aspect. The dissertation will not delve into the interaction of tense with polarity, or the semantics of tense in nominals.

Finally, as concerns modality, I will focus on the following issues. First, assuming the framework of Kratzer (1981, 1991b), I will investigate in Chapters 3 and 4 the role modality plays in the semantics of aspect in Badiaranke. Second, in Chapter 6, I will consider the ways in which clearly modal environments – particularly clauses with epistemic, deontic, metaphysical, and dynamic modal verbs – interact with aspect, both on the modal verb and on its complement. Third, I will look into the interaction between modality (or mood) and tense. In addition, the connection between modality and future times will be implicated in the semantics of imperfective aspect in Badiaranke (Chapter 3). The discussion of modality will not, however, address in detail other types of modality, such as bouletic and teleological modality; it will also gloss over the complexities of conditional and counterfactual semantics, except insofar as they relate to imperfective aspect and the semantics of the past tense.

I turn now, in Chapter 3, to the semantics of aspect in Badiaranke and the problems it poses for analyses in the literature.

Chapter 3

The perfective and imperfective aspects

3.1   Introduction

In this chapter, I provide a description and semantic analysis of the Badiaranke perfective and imperfective aspects. The perfective-imperfective split in this language has two features that, while not unheard of cross-linguistically, cannot be explained by dominant theories of the semantics of aspect. First, the perfective, which denotes a past event with non-stative eventuality descriptions, denotes a present state when used with stative eventuality descriptions. Second, in addition to having the classic imperfective functions (progressive and habitual), the Badiaranke imperfective is used to assert that eventualities will occur at a future time, in consequent clauses of conditionals (including counterfactuals), and in certain epistemic modal contexts.[1] Below, I provide a solution to these puzzles in Badiaranke, with ramifications for languages with similar aspectual behavior.

Other authors have observed similar patterns in a wide variety of languages. Perfectives of statives have been reported to denote present states in, among others, Island Carib (Bybee *et al.* 1994:92); Dényá (Abangma 1985:114); Wolof (Nussbaum *et al.* 1970:358); and Haitian Creole and Fɔngbè (Fitzpatrick 2006, citing Déchaine 1991). Imperfective marking of various irrealis contexts has been reported in numerous languages, including English, French, Italian, and Spanish (Fleischman 1995); Mangarayi (Merlan 1981); Dényá (Abangma 1985); Wolof (Nussbaum *et al.* 1970:360); Modern Greek (Iatridou 2000); Italian (Ippolito 2004); and Latin, Classical Greek, Russian, Old Irish, Tonga, Haya, and Cree (James 1982). Although some of these authors (e.g. James 1982, Iatridou 2000, Ippolito 2004) have proposed semantic explanations for the data in a given language, none of their proposals is able to account for all of the uses to which imperfective is put in Badiaranke, and none is able to account for

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[1]I use *eventuality* to cover states and events, except when discussing the work of authors who have used "situation" for that purpose. Following Tonhauser (2006:12), I use the term *eventuality descriptions* to refer to "verbal predicates together with their arguments and adjuncts."

the behavior of both perfective and imperfective in the language. In other cases, authors note these phenomena without providing a semantic explanation or probing the patterns' implications for leading theories of aspectual semantics. I show here that the Badiaranke data receive no natural explanation either within the neo-Reichenbachian theory of Klein (1994), or within the more commonly assumed "viewpoint" theories of aspect, typified by Comrie (1976) and Smith (1997), and develop my own analysis to account for the Badiaranke facts.

I argue that the Badiaranke perfective and imperfective invoke different sets of worlds, and that the resulting temporal and aspectual meanings follow from that fact. Perfective aspect in this language essentially indicates that the eventuality is realized at some interval in the base world and all of its *metaphysical alternatives*, equivalent to what Kaufmann *et al.* (2006) call "historical alternatives." Imperfective aspect indicates that the eventuality is instead realized at an interval in a set of accessible worlds selected by a modal base and ordering source that vary with context, in ways that will be discussed below. By default, the base world will be taken to be the actual world, i.e. "the [world] that for all we know is the [world] of the speaker" (Iatridou 2000:46); but in stories or embedded under verbs of belief, for instance, the base world may shift. Less formally, the perfective is used to assert that an eventuality definitely is realized within a certain time frame, while the imperfective is used to talk about eventualities with a strong potential for occurring, as judged by various criteria. Badiaranke thus blurs the aspect-modality boundary not only with respect to the imperfective – whose modal flavor has often been noted (e.g. Dowty 1979, Portner 1998) – but throughout its aspectual system.[2]

The structure of this chapter is as follows. The remainder of the introductory section provides some useful terminology for the discussion of aspect. In section 3.2, I lay out the relevant data. Section 3.3 discusses viewpoint and neo-Reichenbachian analyses of aspect, as well as the challenges Badiaranke poses for such frameworks. In sections 3.4, I present my analysis of perfective and imperfective aspect. Finally, in 3.5, I conclude with some ramifications of the proposals in this chapter.

3.1.1 Terminology and theoretical background

3.1.1.1 Grammatical aspect

As was discussed in depth in Chapter 2, assumptions about the nature of aspect vary widely. In interval semantics accounts (e.g. Bennett and Partee 1972, Dowty 1977), aspect expresses the temporal relationship between an interval having a certain property (expressed by an eventuality description or sentence) and some other interval. For (neo-)Reichenbachian theories (e.g. Klein 1994), aspect is the relationship between some reference time and the time span of the eventuality. In event semantics terms (e.g. Parsons 1989, Higginbotham 2004),

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[2]Although I will argue that these categories' semantics are modal as well as aspectual, I will continue using the terms "perfective" and "imperfective" – both for ease of reference, and because many of their functions are typical of perfectives and imperfectives cross-linguistically.

aspect indicates that an eventuality is complete, in progress (or developing), or iterated at a given time (and, in some accounts, in a given world). What all these characterizations share is the conclusion that aspect operates on eventuality descriptions (Tonhauser 2006:20). As such, grammatical aspect often interacts with aspectual properties of the eventuality descriptions themselves. These intrinsic aspectual properties are variously referred to as lexical aspect, Aktionsart, or situation type.

3.1.1.2 Situation type

As reviewed in Chapter 2, Smith (1997) distinguishes between *viewpoint aspect*, which reflects the speaker's "subjective" choice about which part of a situation (eventuality) to portray, and *situation aspect* or *situation type*, which is part of the lexical semantics of the verb and its arguments and is therefore objective. Situation type often interacts with the semantics of grammatical aspect, and therefore must be considered in any treatment of the latter. Smith's (1997) classification of the "situation types" to which eventuality descriptions can belong – which differs from Vendler's (1957) taxonomy mainly in adding semelfactives – is shown in (1).

(1) Situation types and their defining properties, from Smith (1997)

- States: stative (non-dynamic), durative (*know the answer, love Mary*)

- Activities: dynamic, durative, atelic (*laugh, stroll in the park*)

- Accomplishments: dynamic, durative, telic (*build a house, walk to school, learn Greek*)

- Achievements: dynamic, telic, instantaneous (*win a race, reach the top*)

- Semelfactives: dynamic, atelic, instantaneous (*tap, knock*)

Klein (1994) divides eventuality descriptions (which he calls "lexical contents") into just three categories, according to the number of eventualities they encode:

(2) Klein's (1994) *n*-state classification of eventuality descriptions

- 0-state eventuality descriptions: denote individual-level states (e.g. *be in Russian, be tall*). If a proposition involving a 0-state eventuality description is true at one time, then it is true for any (relevant) time.

- 1-state eventuality descriptions: denote unchanging situations with a start- and (usually) end-point. Klein's 1-state eventuality descriptions encompass the traditional Aktionsart categories of activities (e.g. *dance*) and stage-level states (e.g. *be tired*).

- 2-state eventuality descriptions: encode two situations, a "source state" (SS) and a "target state" (TS). They encompass accomplishments (e.g. *write a book*) and achievements (e.g. *arrive*).

It is not immediately clear where semelfactives fit into Klein's taxonomy. On the one hand, semelfactives only encode one situation – a cough, a knock on the door, etc. On the other hand, semelfactives do not behave aspectually like 1-state situations: for instance, the progressive of a semelfactive forces an iterative reading, while the perfective of a semelfactive allows for a single event reading. According to Klein (1994:96-7), "In the semelfactive reading, [these predicates] behave like other 2-state lexical contents, with the additional condition that, if TT is in SS, it must include part of SS2. In the iterative reading, they behave like a 2-state lexical content whose single state is not completely uniform." (The second sentence appears to have a typo; both the reference to a "single state" and contemplation of the semantics of iterative semelfactives suggest that "2-state" should be replaced here with "1-state.") Rothstein (2008) argues that semelfactives (on their semelfactive reading) are essentially telic, in that they have a natural endpoint, occur with telic adverbs, produce an imperfective paradox, and constitute "minimal events" that are "atomic," perceived as indivisible units.

Situation type will prove crucial for an analysis of grammatical aspect in Badiaranke. In particular, I will need to draw one distinction between states and non-states, and one between permanent and temporary states. Klein's typology is adequate for the latter distinction, but not for the former, since he combines activities and temporary states into a single 1-state category. On the other hand, Smith's typology distinguishes successfully between states and non-states, but not between different kinds of states. I will therefore draw from both taxonomies in the discussion that follows.

3.1.1.3 Other terminology

In laying out the data, I adopt three other terms used by Klein (1994). Time of the Situation, or TSit, is the time spanned by the eventuality in question. Topic Time, abbreviated TT, is the time being talked about (not necessarily coextensive with TSit); it may or may not be explicitly delimited by adverbials. Finally, TU stands for Time of Utterance.

3.2 Perfective and imperfective: The data

In this section, I lay out the fundamental data for an analysis of Badiaranke's perfective and imperfective aspects.

Badiaranke is an "aspect language": tense is rarely expressed overtly, but every clause fits one of the templatic constructions whose semantics are, I will argue, aspectual. In general,[3] aspectual meaning in Badiaranke is not isolated in any particular morpheme(s); rather, each aspect is characterized by several morphosyntactic properties, including those listed in (3).

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[3]With the exception of periphrastic habitual *kəd-* and imperfective *pə-*, discussed in Chapter 4 below.

(3) Morphosyntactic factors distinguishing Badiaranke aspects in general:

    a. Which series of subject markers is used in the clause, and whether the subject marker is prefixed or suffixed;

    b. What it is that the subject marker attaches to (main verb, auxiliary verb, or other);

    c. Whether or not there is an auxiliary verb;

    d. The presence or absence of other morphemes (e.g. habitual *kəd-*, affirmative declarative *de*); and

    e. The overall syntax, including relative positions of the auxiliary and main verb.

The perfective and imperfective, in particular, are differentiated by the subject agreement markers used: person/number is marked with a suffix from one series in the perfective, but with a prefix from a different series in the imperfective.

Each Badiaranke aspect has a default mapping to tense – a default which, in some cases, may be overridden by contextual factors, e.g. temporal adverbials and past tense suffixes. Overt tense marking is often absent, yet Badiaranke is not a tenseless language per se. There are two past tense markers, *-ako-* and *-akəd-*; *-ako-* is used with the periphrastic progressive and perfective, while *-akəd-* occurs in imperfective, periphrastic habitual, and subjunctive-marked clauses. As I argue in Chapter 5, the further appearance of *-akəd-* in deontic, epistemic, and counterfactual environments shows it to be the irrealis counterpart of *-ako-*.

For simplicity, I limit my discussion here primarily to affirmative declarative matrix clauses; negation, subordination, and non-declarative mood all affect aspectual morphosyntax (and semantics) in complex ways. In addition, with certain exceptions, sequences of clauses take "narrative morphology," which I leave aside until §4.2 below.

Let us now consider the morphosyntax and the semantic contributions of the Badiaranke perfective and imperfective.

3.2.1 The perfective

3.2.1.1 Morphosyntax

The simplest version of a perfective clause is sketched schematically in (4), where V represents the verb stem (root plus derivational suffixes), *de* is a particle that appears in affirmative declarative clauses, and <u>SUBJECT</u> is a subject agreement marker from the suffix series in (5).[4]

(4) V-<u>SUBJECT</u> *de*

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[4] I underline subject markers in examples to facilitate recognition of the aspects.

(5) Subject marker series in the perfective[5]

1sg: -ə̃ (or nasalization, with vowel quality depending on the preceding segment)

2sg: -i

3sg: -ə̃ (or nasalization, with vowel quality depending on the preceding segment)

1pl: -bõ

2pl: -nũ

3pl: -bə̃

(6) exemplifies a simple perfective clause.

(6) **seːt-** <u>**ə̃**</u>   **de**.
speak- <u>1sg.PERF</u> AFF.DECL

'**I spoke**.' (1.101, #2, elicitation)[6]

Non-subject arguments follow the verb and may be placed either before or after *de* (7).

(7) **soːs-** <u>**ə̃**</u>   **(de)**   **Aamadu (de)**.
pay- <u>1sg.PERF</u> AFF.DECL Aamadu AFF.DECL

'**I paid Aamadu**.' (4.16, #2, elicitation)

The template in (4) may be supplemented with adjuncts; with object markers, as in (8); and with past tense marking, as in (9).

(8) **lẽb-** <u>**i-**</u>   **abə̃**   **de**
call- <u>2sg.PERF-</u> 3pl.NSBJ AFF.DECL

'**You called them**.' (2.138, #2, elicitation)

(9) paːki   **rəs-**   **akõ̱**   **de**.
yesterday be.tired- PAST.1sg.PERF AFF.DECL

'Yesterday **I was tired**.' (But now I'm not tired.) (5.90, #3, elicitation)

Despite these variations, the morphosyntax of the Badiaranke perfective is entirely regular and systematic: past tense marking precedes subject agreement marking, for instance, and an object marker always precede a subject agreement suffix.

Armed with this overview, let us delve deeper into perfective clauses and their semantics.

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[5]The same series of subject marker suffixes is used in the periphrastic habitual and progressive; see Chapter 4 below. Nonetheless, to facilitate readers' recognition of the aspects, I gloss these subject markers as 1sg.PERF, 2sg.PERF, and so on in perfective clauses; I gloss the same suffixes in periphrastic progressive clauses as 1sg.PROG and so on, and in periphrastic habitual clauses as 1sg.HABIT and so on.

[6]In examples, numbers in parentheses indicate the source of the example; e.g. (5.33, #1, elicitation) means the example is on page 33 of notebook 5, spoken by consultant #1 during elicitation. Numbers are used instead of initials to adhere to human subjects requirements. Bolding is used to highlight the predicate of interest in each sentence.

3.2.1.2 Data and semantics

Perfectives of non-stative eventuality descriptions

With non-stative eventuality descriptions, perfective clauses in Badiaranke denote an eventuality whose time span is contained within a more- or less-specified reference interval (Topic Time, in Klein's terms). As Klein notes, "...a TT may be definite or indefinite, and many utterances are ambiguous in this regard" (1994:7). That is, although the semantics of both tense and aspect depend on the relation of TT to some other time interval, TT may or may not be explicitly delimited.

Activities

Activities encode a single process. The perfective of an activity in Badiaranke asserts[7] roughly that the activity's time span (TSit) is contained within TT, as in (10).

(10) birĩ 1:00 haː 2:00 paːki **jaːsə- raːn- ə̰̃**   **de**.
      since 1:00 until 2:00 yesterday walk- PLUR- 1sg.PERF AFF.DECL

      'From 1:00 to 2:00 yesterday **I walked around**.' (5.33, #1, elicitation)

The interval within which the activity begins and ends need not be overtly delimited: in (11), the narrative context – the speaker's life story – implicitly defines it as the speaker's lifespan up to TU.

(11) jã̃   **karaŋ- ə̰̃**   **de**.
      here study- 1sg.PERF AFF.DECL

      'Here, **I studied**.' (4.21, #3, life story)

Telic events

The perfective of a telic eventuality description generally indicates that the change of state occurs within a vague (12) or explicitly delimited (13) TT. (12) is an appropriate response to a question about where the individual in question is at present.

(12) **rə̰̃-**   **de**   **fe pədao**.
      go.3sg.PERF AFF.DECL P field

      '**S/he went to the field**.' (5.3, #1, elicitation)

(13) paːki   **ru- ṵ̃**   **kabə̃tã- e- mã̃nə̰̃ de**.
      yesterday steal- 3sg.PERF shirt-   of- mine AFF.DECL

      'Yesterday **s/he stole my shirt**.' (8.5, #2, elicitation)

Often, as in (12)-(13), the perfective of a telic eventuality description implicates that the target state holds at TU (or at another contextually determined perspective time); this

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[7]In declarative clauses, of course.

observation, together with the fact that the same construction can be used to talk about ongoing states (see below), might lead one to suspect that this category is not a *perfective* so much as a *perfect*, i.e a grammatical category used to talk about "a past action with current relevance" (Bybee *et al.* 1994:61). Crucially, however, Bybee *et al.* (1994:54) point out that "[The perfect] differs from perfective in that it would not be marked on several verbs in succession that are reporting a sequence of events but would only be used to show that some action is prior to the others in the narrative." The data in (14) shows that the Badiaranke construction in question is not a perfect: it *can* be used to talk about sequences of events and events without current relevance, that is, ones whose result state doesn't hold anymore.[8]

(14) A: waː riː- se   boːli sẽ?
          what do- REL.PERF bowl DET

          'What happened to the bowl?' (Uttered while looking at a glued-together bowl.)

       B: **ni- õ̲   de**,   ŋiː   riː- se   koːliŋ- õ.
           break- PASS.3sg.PERF AFF.DECL that.is do- REL.PERF glue-   PASS.3sg.PERF

           '**It was broken**; that's why it was glued together.' (5.96, #2, elicitation)

Note that unlike B's response in (14), with the Badiaranke perfective, the English sentence *The bowl has been broken*, with perfect aspect, would be infelicitous if the bowl has been repaired.

Similarly, in (15) and (16), the construction is used to mark a sequence of completed events, showing it to be a perfect rather than a perfective. Indeed, in (16), the perfective-marked first clause describes an event whose result is explicitly canceled by the next perfective-marked clause.

(15) A: birĩ **seːt- i̲   koina**, waː **ri- ĩ̲**?
          since speak- 2sg.PERF thus   what do- 3sg.PERF

          'When **you said that**, what **did she do**?'

       B: **bədd- ə̲̃   paːdə pã de**.
           exit- 3sg.PERF room   DET AFF.DECL

           '**She left the room**.' (5.77, #1, elicitation)

(16) **baj- n-   ə̲̃   kobədemã̃nə̃ de   bari watʃ-**
       black- CAUS- 1sg.PERF my.hand   AFF.DECL but wash.hands-
       ã̲   de,   baj- r-   a.
       DETRANS.3sg.PERF AFF.DECL black- NEG.PERF- 3sg.NEG

       '**I blackened my hand** but **I washed my hands**; [now] it's not black.' (7.35, #2, elicitation)

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[8]Nonetheless, it is entirely plausible that the modern perfective developed out of what was *historically* a perfect.

The category in question, then, is more of a perfective han a perfect; it often has a perfect *implicature*, namely that the result state of the eventuality obtains at perspective time, but this implicature clearly can be cancelled.

(17) contains an achievement verb, *səm-* (which can be translated, depending on the context, as 'arrive', 'encounter', or 'happen'). In the context offered by the consultant, the addressee arrived when no one was around, and the speaker has just arrived.

(17) biɲ- ĩ təma **səm- u- iː de** ba?
     be.long.ago- 3sg. time arrive- VENT- <u>2sg.PERF</u> AFF.DECL Q

     'Was it long ago that **you arrived** (here)?' (5.56, #2, elicitation)

On a resultative or perfect reading, (17) would be vacuous in this context (or pragmatically odd, at best). Instead, (17) too is a true perfective, asking whether the addressee's arrival occurred long ago.

Semelfactives

Smith's situation type parameters (see (1) above) predict that a language might treat semelfactives either as the linguistically punctual equivalent of activities (which are 1-state verbs) or the atelic equivalent of achievements (which are 2-state verbs). In the former case, one would expect the perfective to indicate that the semelfactive situation is terminated at some point. If this were so, a sentence like *I coughed* should be able to mean that the speaker's cough was cut off partway through; but of course, the sentence doesn't mean that at all. Instead, on the single-event reading, perfectives of semelfactives group with the achievements discussed above: the perfective of a semelfactive is true only if the point in time (or, more precisely, the "minimal interval," as Rothstein (2008) points out) occupied by the semelfactive situation occurs within TT, just as the perfective of an achievement is true only if the point in time occupied by the transition from SS to TS occurs during TT. Indeed, Smith notes briefly that her semelfactive category is "treated as a special atelic subclass of Achievements by Vendler (1957) and Dowty (1979)" (Smith 1997:37, fn. 8).

In the presence of a durative temporal adverbial, as in (18), semelfactives are coerced into an iterative reading even in the perfective. On this reading, the semelfactive behaves aspectually like an activity, one consisting of the repetition of a single action (just as the activity of walking consists of taking one step after another).

(18) toː **wub- ə̃ de** birĩ 1:00 haː 2:00.
     today cough- <u>1sg.</u> AFF.DECL from 1:00 until 2:00

     'Today **I coughed** (repeatedly) from 1:00 to 2:00.' (5.28, #1, elicitation)

Temporal reference of non-stative eventuality descriptions

In Badiaranke, perfectives of non-statives describe an event in the past of perspective time, which by default is taken to be utterance time; the perfective-past mapping is extremely

common cross-linguistically (Bybee *et al.* 1994:51). The default mapping from the perfective of a non-stative to past time reference can be overcome in some syntactic contexts, e.g. subordinate 'if/when' clauses. In (19), 'come to your house' and 'leave for school' take the perfective even though the eventualities they describe are complete only with respect to a future TT.[9]

(19) kũpia nĩ **rẽ** **fe teːr- eː- nũ** mã- səmə
tomorrow if/when come.1sg.PERF P home- of- 2pl.NSBJ 1sg.IMPF- arrive

de **raː- i** **de** **fe lekol**.
AFF.DECL go- 2sg.PERF AFF.DECL P school

'Tomorrow if/when **I come to your house** I'll find **you've left for school**.' (7.98, #2, elicitation)

However, a mere future adverbial is not enough to license future time reference:

(20) *kũpia **das- ə̃** **de**.
tomorrow laugh- 1sg.PERF AFF.DECL

Intended: 'Tomorrow I'll laugh.'

The limitation of non-past perfectives to non-declarative clauses is not surprising; Bybee *et al.* (1994:84) observe that such behavior is also common cross-linguistically.

Perfectives of stative eventuality descriptions

In contrast to the behavior of the perfective with non-stative eventuality descriptions, a stative perfective in Badiaranke denotes a state that holds throughout TT, not one terminated within TT. By default, the perfective of a stative denotes a present state, as shown in (21)-(22).

(21) baː Afrik **bajə-** **bə̃** **de**.
people.of Africa be.black- 3pl.PERF AFF.DECL

'Africans **are black**.' (5.61, #2, elicitation)

(22) **tʃab- ə̃** **de** kodi.
have- 1sg.PERF AFF.DECL money

'**I have money.**' (4.10, #2, elicitation)

In some languages (e.g. Spanish and Mandarin Chinese (Comrie 1976:19-20)), the perfective of a stative is inceptive. In Badiaranke, this is not the case, as shown by two types of data.[10] First, the perfective is available with individual-level statives. In (23), the perfective

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[9]The absence of *de* in the antecedent is due to the restriction of *de* to declarative clauses.

[10]Perfectives of stage-level statives, however, can sometimes be ambiguous between an inceptive and continuous state reading, as in (i):

(i) nəse nə̃ silana **baj-** **ĩ** **de**.
child DET now be.black- 3sg.PERF AFF.DECL

'The child **is now black/has now become black**.' (7.36, #2, elicitation)

describes a permanent state characterizing the Badiaranke people, not transition into that state.

(23) mbõ   fanã **naː- bõ**   de   **bə- mãdẽ** bə- kəde-   waːj-
     1pl.INDEP also have- 1pl.PERF AFF.DECL PL- healer PL- REL.HABIT- treat-
     ã.
     3sg.NSBJ

    'Us too, **we have healers** that treat it (snake bites).' (2.95, #2, snake narratives)

Similarly, (24) claims the two mothers resemble each other, not that they have come to look alike.[11]

(24) naːjẽ   ŋka naːjemma **miːrə-   bə̃**   **de**.
     your.mother and my.mother resemble.RECIP- 3pl.PERF AFF.DECL

    'Your mother and my mother **resemble each other**.' (2.80, #1, elicitation)

Second, clauses expressing psychological states ((25)-(26)) show that the perfective of a stative is not inceptive.

(25) **lafieːn-   ə̃**   ka- sədd- e   de.
     want/like- 1sg.PERF INF- cook- INF AFF.DECL

    '**I want/like to cook**.' (1.112, #2, elicitation)

(26) **mitʃ- ĩ**   **de**   kũpia   mpə-   tʃimə de.
     think- 1sg.PERF AFF.DECL tomorrow 3sg.IMPF- sing   AFF.DECL

    '**I think** tomorrow s/he'll sing.' (1.115, #2, elicitation)

The default mapping from perfective aspect to present time reference can be shifted by temporal adverbials, by a past-tense suffix, or by other contextual cues. In (27), where the adverbial expression delimits a TT in the past, the perfective of a stative eventuality description denotes a state that held throughout that past TT (but not necessarily at TU).[12]

(27) jã   ŋka mã-   lẽbə naːemma   (paːrə paːki) **tʃew- õ**   **de**.
     there and 1sg.IMPF- call my.mother two.days.ago fear-   PASS.3sg.PERF AFF.DECL

    'Before I called my mother (two days ago), **she was afraid**.' (5.90, #3, elicitation)

Similarly, in the context of a narrative about past events, the perfective of a stative asserts a state that held during the TT established by preceding clauses, not necessarily at TU. (28), for instance, was spoken in the midst of a description of what the speaker had done the day before, so *rəsə-bõ de* is taken to describe a past state of tiredness.

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[11]The Badiaranke perfective cannot express the same semantics as the English experiential perfect (as in *I have been to Disney World before*), so (24) cannot mean something like 'Our mothers have resembled each other before.'

[12]To explicitly assert that the state no longer holds at perspective time, one may add *-ako-*, the past/anterior suffix; see Chapter 5 below.

(28)   tẽbe ni:na waina   be- fali   sẽ **rəsə-**   **bɔ̃**   **de**   mi-
            time that at.that.time PL- donkey DET be.tired- <u>3pl.PERF</u> AFF.DECL NARR-
            je:r-   ũ.
            go.home- VENT.1sg.PERF

            'Then, since the donkeys **were tired**, I came home.' (2.58, #1, 'what I did yesterday' text)

3.2.2   The imperfective

The Badiaranke imperfective is used in a wide range of functions. It is used to talk about: (a) eventualities in progress; (b) habitual eventualities; (c) future eventualities; (d) consequents of conditionals and counterfactuals; and (e) assertions which the speaker believes are probably true. The first two are prototypical imperfective functions; (c)-(e), though attested in other languages, do not fit conventional definitions of imperfective aspect, having a more modal flavor.

3.2.2.1   Morphosyntax

The basic imperfective template is sketched in (29), where SUBJECT is a subject agreement marker from the prefix series in (30).

(29)   <u>SUBJECT</u>-V *de*

(30)   Subject marker series in the imperfective
       1sg: mã-
       2sg: k-
       | **3sg: mp-** |
       1pl: bõ-
       2pl: nũ-
       3pl: bẽ-

I will sometimes refer to clauses using these subject prefixes as *mp-* clauses for simplicity.

     In imperfective clauses, the presence or absence of *de*, the affirmative declarative marker, depends on two factors. One is syntactic: only matrix and complement clauses may contain *de*. The second is semantic: future-type imperfective clauses and conditional consequents usually contain *de*, whereas progressive-type imperfectives do not; and only affirmative and declarative clauses do.[13] Nonetheless, *de* is not an aspectual morpheme; it is hard to see how it could transform progressive semantics into habitual, future, conditional, or counterfactual semantics, while also being compatible with perfective aspect. For now I simply note the

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[13]These factors are not entirely independent: progressive *mp-* more often occurs in embedded clauses than in matrix clauses. In fact, consultant #1 rejected certain clauses with progressive *mp-* when spoken in isolation, preferring to substitute the periphrastic progressive (which coexists with the imperfective) or to embed the progressive *mp-* under another matrix aspect.

presence or absence of *de*, leaving a more thorough account of its distribution for future research.[14]

3.2.2.2 Data and semantics

The least surprising uses of the imperfective are in progressive and habitual clauses. In this subsection I lay out the contexts where imperfective aspect receives a progressive or habitual reading.

Progressive *mp-*

(31)-(32) illustrate the progressive use of *mp-* with activities and accomplishments, respectively. (31) was preceded by a sentence meaning 'She finished drawing water and started to sweep.' Note that although statements about the future also take *mp-*, (31) *cannot* mean 'She will sweep,' both because of the presence of *haː toː* 'still' and because of the absence of *de*.

(31) haː   toː   **mpə-**   **peːs**.
      until today 3sg.IMPF- sweep

     '**She's** still **sweeping**.' (8.64, #2, elicitation)

Similarly, (32) has only a progressive reading, not a future one.

(32) Aamadu ŋka Binta **bẽ-**   **safiŋə leːtar**.
      Aamadu and Binta 3pl.IMPF- write   letter

     'Aamadu and Binta **are writing a letter**.' (7.120, #2, elicitation)

Achievement eventuality descriptions with *mp-* receive an achievement-in-progress reading (33).

(33) toː   kodiemãnã̃ mə-   səb- õ.   paːki   fanã kodiemãnã̃ mə-
      today my.money NARR- lose- PASS.3sg.PERF yesterday also my.money NARR-

    səb- õ.   kodiemãnã̃ **mpə-**   **səb- o**   udaːre udaːre.
    lose- PASS.3sg.PERF my.money 3sg.IMPF- lose- PASS little   little.

     'Today my money got lost. Yesterday too my money got lost. My money **is getting lost little by little**.' (5.57, #2, elicitation)

Here, what is in progress throughout TT is the prolonged eventuality of periodically losing money.

As (31)-(33) show, when unmarked for tense, progressive *mp-* is interpreted by default as describing a process ongoing throughout a TT that includes TU, i.e. in the present. However, given the right context, such as a temporal adverbial delimiting a past time interval, *mp-*

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[14] Similarly mysterious affirmative declarative particles occur in some other African languages, e.g. Dagaare (Scott Grimm, p.c.) and Sheko (Hellenthal 2007).

clauses can also receive a past progressive interpretation, as in (34), or a future progressive one, as in (35).

(34) birĩ midi haː 1:00 nəse nə̃ **mpə- tʃimə.**
      since noon until 1:00 child DET 3sg.IMPF- sing

      'From noon to 1:00, the child **was singing**.' (7.119, #2, elicitation)

(35) kũpia   mã-   dʒeːn- ã̃   de   **mpi-   dʒaː pamaːno.**
      tomorrow 1sg.IMPF- see-   3sg.NSBJ AFF.DECL 3sg.IMPF- eat   rice

      'Tomorrow I'll see him **eating rice**.' (4.43, #1, elicitation)

Progressive *mp-* is often used to talk about an eventuality that is directly observed to be in progress, often in a complement to a verb of witnessing, as in (35). A progressive reading also arises for *mp-* clauses modifying an ongoing eventuality that has just been mentioned, as in (36).

(36) ka- jeːr-   e k- ə̃   **mpə-   tʃim- a.**
      INF- go.home- INF be- 3sg.PERF 3sg.IMPF- sing- DETRANS

      'She was heading home, **singing to herself**.' (8.3, #1, elicitation)

Similarly, a progressive reading is favored in discourses describing current goings-on, as in (37).

(37) nĩ dʒeːn- i   bidʒadə   bẽ kab- oː- re-   bə̃,
      if look- 2sg.PERF Badiaranke.people DET know- PASS- NEG.PERF- 3pl.PERF

      dʒittə- re-   bə̃   bə- karaŋə- daːr-   se…   kã̃dʒadə kã̃ peːr
      get-   NEG.PERF- 1pl.NEG PL- study- INTENS- REL.PERF language DET all

      mpə-   karaŋ- oː taːme, mə-   rəbət- ã̃
      3sg.IMPF- study- PASS now   NARR- remain- DETRANS.3sg.PERF

      bidʒadə   bẽ.
      Badiaranke.people DET

      'If you take a look, the Badiaranke people are unknown; we haven't gotten any scholars…. Every language **is being studied now**, except for [that of] the Badiaranke people.' (8.20, #1, codification festival text)

The imperfective also gets a progressive reading in responses to inquiries as to an individual's current status, as in (38), and in performative speech acts, as in (39).

(38) A: dʒeːn- te-   mã   Mamadu.
          see-   NEG.PERF- 1sg.NEG Mamadu

          'I don't see Mamadu.'

      B: **mpə-   limmə wusia u-   tʃoːdə- se   feː wẽ.**
          3sg.IMPF- hit   man   NMLZ.SG- sit   REL.PERF there DET

          '**He's hitting the man sitting over there**.' (8.21, #2, elicitation)

(39) **m̃ã-**   **paɲ-** **ẽ**   kũtuma Aysatu Kamara. ŋan- u-   se   fe
      1sg.IMPF- greet- 2sg.NSBJ big   Aysatu Kamara   arise- VENT- REL.PERF P
      Parɔ̃ba.
      Paroumba

    '**I greet you** warmly, Aysatu Kamara. Who's come here from Paroumba.' (8.108,
#4, self-introduction)

Overall, then, the progressive reading is favored when the current discourse topic is a state
of affairs ongoing in the base world.

    All the examples of *mp-* progressives so far have involved non-stative eventuality descriptions. While progressive aspect is often said to be incompatible with stativity (Smith 1997:74, e.g.), the *mp-* progressive simply coerces statives into an inceptive reading, as in (40).

(40) paːki   mpǝ-   lẽb- ã   wẽ waina **mpǝ-**   **fitʃ-**   **oː**.
      yesterday 3sg.IMPF- call- 1sg.NSBJ DET that.time 3sg. IMPF- be.clean- PASS

    'Yesterday when he called me, **he was becoming clean**.'
    *'Yesterday when he called me, he was clean.' (5.63, #2, elicitation)

Habitual *mp-*

The habitual reading of the imperfective is available when eventualities meeting the same description recur regularly. It is favored in sentences with habitual adverbials (e.g. 'every year', 'on Tuesdays') ((41)-(42) and (44)) or, as in (43), in a discourse or narrative about regularly recurring events (e.g. 'what happens on a given holiday' or 'what I do every day').

    (41)-(43) show that achievements and accomplishments can a receive a habitual reading with imperfective *mp-*.

(41) birĩ duniaː sẽ fẽt- ɔ̃   piːsidoː pidʒaːda pẽ **mpǝ-**   **bǝdd- uː**
      since world DET begin- 3sg.PERF every.day sun   DET 3sg.IMPF- go.out- VENT
      de.
      AFF.DECL

    'Since the world began, every day **the sun comes out**.' (7.89, #2, elicitation)

(42) piːsidoː   waːti waina **mpǝ-**   sǝmǝ asamaːnǝ sẽ   a-   pǝ-   dʒinnǝ
      every.day hour that   3sg.IMPF- arrive sky   DET 3sg.HABIT- IMPF- red
      de.
      AFF.DECL

    'Every day at that time **it happens** that the sky reddens.' (7.36, #2, elicitation)

(43) ame **mpǝ-**   **duːdǝ be- teːre sẽ** haː ma-   wutǝn- a jaːr sẽ fop.
      thus 3sg.IMPF- enter   PL- house DET until 3sg.SBJ- meet- IRR village DET all

    'In that way **he enters all the houses** until he's covered the whole village.' (7.14,
#1, what happens when the *kãkurã* spirit comes)

(44) and (45) show that given the right context, a *mp-* clause can also refer to a past habitual eventuality.

(44) paːrə peːs   rĩ   faː   matʃaw de   kare   Faatu. piːsidoː
     two.years.ago do.1sg.PERF month three   AFF.DECL at.place.of Faatu. every.day
     mpə-   səddə de   moːni.
     3sg.IMPF- cook   AFF.DECL porridge

     'Two years ago I spent three months at Faatu's. Every day **she used to cook porridge**.' (7.90, #2, elicitation)

(45) paːrə peːs   u-   jak- akõ   fe Fuuta wẽ   loːkũ woː **mpi-**
     two.years.ago NMLZ.SG- be- PAST.1sg.PERF P Fuuta DET week every 3sg.IMPF-
     dʒafə de   pakkã.
     rain   AFF.DECL one

     'Two years ago when I was in the Fuuta, every week **it used to rain once**.' (7.91, #2, elicitation)

In fact, in both progressive and habitual *mp-* clauses, there is no way to mark tense overtly: *-ako-*, the past suffix used with the perfective, is ungrammatical in combination with *mp-*; and when its allomorph *-akəd-* is used with *mp-*, only the counterfactual reading is available.

With individual-level statives, the imperfective cannot receive a habitual reading. Instead, as (46) shows, such *mp-* clauses are interpreted as talking about a future state.

(46) paːdə pã   fe koneː teːre **mpi-   jak**.
     room DET P within house 3sg.IMPF- be

     * 'The hut is in the compound.'
     ✓'The hut **will be** in the compound …'
     ✓ '…but has not been built yet.'
     ✓ '…but only after the compound's boundaries change.' (7.85, #1, elicitation)

Generic *mp-*

Among the types of habitual *mp-* clauses are ones with kind-referring subjects, which I will refer to here as "generics."[15] A generic clause makes an assertion about an eventuality that is repeated not only (or even necessarily) at multiple times, but also by different entities: the

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[15]Carlson (2006) observes that descriptive work tends to use the term "habitual" for the same type of construction that much formal work terms "generic," although some authors use "habitual" as an overarching term, and "generic" for the subtype of habituals with a generic (kind-denoting) subject. For purposes of descriptive clarity and comprehensiveness, I follow the last practice. References in the text to "habitual" sentences should be understood to encompass habituals with both generic and non-generic subjects, while claims about "generic" sentences apply only to the generic subtype. This usage contrasts with that of Dahl (1995), who treats habituals as a subtype of generics rather than the reverse.

eventuality characterizes a certain type of individuals. Thus generics can contain eventuality descriptions which can be applied to a given individual only once, e.g. 'die' in (47).

(47) bɔ̃   maːe mã kebe-   jak- akəde   ka- balu- e. pakkã
      3pl.INDEP two DET NEG.IMPF.3pl- be- PAST.IRR.NPERF INF- live- INF one

      pã   **mpə-**   **sadə**.
      DET 3sg.IMPF- die

      'The two of them [twins] wouldn't stay alive. One **would die**.' (6.7, #3, Damaseree story, according to which it used to be the practice that if one twin died, the other would be killed and buried with the first.)

(48) and (49) similarly make generic assertions about characteristic behaviors – here, actions typical of Badiaranke women in general. (48) uses a plural subject, 'the women', while (49) uses a singular NP, 'a woman', but both subjects are kind-referring, and the sentences describe generic facts about the world.

(48) u-   jeləmər- se   wẽ, bitʃaːe bẽ **bẽ-**   **sammə de**
      NMLZ.SG- change- REL.PERF DET women   DET 3pl.IMPF- cultivate AFF.DECL

      leː   **sẽ**.
      rice.paddy DET

      'What changed (is), the women **cultivate the rice paddy**.' (3.40, #1, work text)

(49) taːme nõ mə- k- ə̃   utʃaːfe wusia peːr tʃaːfe **mpə-**   **baːn**
      now   TOP NARR- be- 3sg.PERF woman   man   all woman 3sg.IMPF- put.in

      de   **pədao**.
      AFF.DECL field

      'But now, women and men both, women **put in fields**.' (3.42-43, #1, work text)

With individual-level statives, however, *mp-* cannot get a generic reading. To make a generic statement with these eventuality descriptions, one must use a distinct, specifically habitual construction.

(50) a. matə mãmã **mpə-**   **sar**   **de**.
          tree DEM   3sg.IMPF- be.tall AFF.DECL

          ✓'This (specific) tree **will be tall**.'
          *'This (type of) tree gets tall.' (5.61, #2, elicitation)

      b. matə mãmã **a-**   **pə-** **sar**   **de**.
          tree DEM   3sg.HABIT- IMPF- be.tall AFF.DECL

          'This (type of) tree **gets tall**.' (5.61, #2, elicitation)

Indeed, despite the abundant evidence that the general imperfective has progressive and habitual uses, Badiaranke also has two periphrastic constructions expressing specifically progressive and habitual semantics. Although they infringe on the imperfective's semantic domain, the periphrastic progressive and habitual both take the subject agreement suffixes

used in the perfective, rather than the prefixes that occur in the imperfective.[16] (51)-(52) illustrate the periphrastic habitual and periphrastic progressive, respectively.

(51) piːsidoː   mma   **kəd- ə̰̃**   **dasə de**.
  every.day 1sg.INDEP HABIT- 1sg.HABIT laugh AFF.DECL
  'Every day, me, **I laugh**.' (4.3, #2, elicitation)

(52) isã sẽ **ka- woː- e   k- ə̰̃**.
  fish DET INF- swim- INF be- 3sg.PROG
  'The fish **is swimming**.' (8.31, #2, elicitation)

The periphrastic aspects are discussed in more depth in Chapter 4.

We turn now to less expected functions of the Badiaranke imperfective, starting with assertions that an eventuality will occur in the future.

Futurate *mp-*

Cross-linguistically, it is rare for assertions that an eventuality will occur at a future time to use the imperfective alone (Bybee *et al.* 1994:278). In Atlantic languages, however, it is relatively common for statements about a future TT to take the imperfective (e.g. Nussbaum *et al.* 1970 on Wolof; Fagerberg-Diallo 1983 on Pulaar; Fudeman 1999 on Balanta). In Badiaranke, such clauses not only *allow* the imperfective, but actually *require* it. In fact, except in those contexts that favor a habitual or progressive reading, speakers prefer a futurate interpretation for *mp-*. In §3.4.3 below, I posit an explanation for the fact that the general imperfective receives a futurate reading by default.

In future-like (henceforth "futurate") *mp-* clauses, *de* is obligatory, except when a future TT is explicitly specified. Thus one gets minimal semantic pairs between futurate *mp-* and progressive *mp-*; (53) gets a progressive reading when *de* is removed.

(53) nəse nə̃̃ **mpə-**   **tʃimə de**   **(maːtʃim)**.
  child DET 3sg.IMPF- sing   AFF.DECL song
  ✓'The child **will sing (a song)**.'
  *'The child is singing (a song).' (7.120, #2, elicitation)

The imperfective can be used to talk about a future eventuality regardless of the eventuality's duration, and regardless of whether it is "viewed from the inside" (Comrie 1976:4) or not (counter to the predictions of viewpoint analyses of aspect, as we will see below). This is clearest for punctual eventuality descriptions, as in (54), but also applies to activities (55) and accomplishments (56).

(54) (kũpia)   nĩ̃   mpə-   raː fe lekol **mpə- dam- oː de**   fe faːse.
  tomorrow if/when 3sg.IMPF- go P school 3sg.IMPF- kill- PASS AFF.DECL P path
  'Tomorrow when he's on his way to school, **he'll get killed**.' (5.29, #1, elicitation)

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[16]Habituals with 3sg. subjects, however, generally take the suppletive form shown in (50b) above.

(55) kũpia   bepoːse pã **bẽ-   tʃimə de**   birĩ katʃudu haː midi.
     tomorrow children DET 3pl.IMPF- sing   AFF.DECL since morning until noon

   'Tomorrow the children **will sing** from morning to noon.' (7.117, #2, elicitation)

(56) kũpia   **mpə-   baj- aːs- ã̃   de**.
     tomorrow 3sg.IMPF- take- REP- 3sg.NSBJ AFF.DECL

   'Tomorrow **he'll take it away again.**' (2.5, #1, elicitation)

Unsurprisingly, states behave differently than other situation types with respect to futurate *mp-*; moreover, a distinction must be drawn between 1-state (stage-level) and 0-state (individual-level) statives. With a 1-state stative, *mp-V de* indicates that transition into the state will occur at a future time (57).

(57) **mpə-   rəsə   de**   toː   ŋka kũpia.
     3sg.IMPF- be.tired AFF.DECL today and tomorrow

   'She **will be tired** today and tomorrow' (but isn't tired yet). (5.20, #1, elicitation)

For 0-state statives, *mp-V de* is only grammatical if the subject does not yet exist (58).

(58) nĩ   safiŋ- ə̃   buki wũ **mpi-   jak ã̃gəlekã̃ de**.
     if/when write- 1sg.PERF book DEM 3sg.IMPF- be English AFF.DECL

   'If/when I write a book, that **will be in English**.' (7.37, #2, elicitation)

Unlike in (58), the subject of (57) already exists at utterance time; thus (57) predicates a future temporary state of a currently existing entity, while (58) predicts that a future entity will have a certain permanent property.

Note that futurate *mp-* is only used when the speaker is *asserting* that the eventuality will occur in the future (if all goes according to expectations). In those irrealis contexts expressing a mere desire that the eventuality occur – such as requests or commands, which use imperative or subjunctive/hortative morphology – *mp-* does not appear.

Consequents of counterfactuals and conditionals

It is very common cross-linguistically for imperfective aspect to appear in conditionals and counterfactuals; see, e.g., Fleischman (1995), Iatridou (2000), Lazard (2006). However, what is usually addressed is the imperfective's appearance in the antecedent of conditionals and counterfactuals in various languages. In Badiaranke, in contrast, it is the consequent that consistently takes imperfective morphology, while many antecedents of conditionals and counterfactuals bear perfective aspect.

(59)-(60) give examples of (past) counterfactuals. In consequents of counterfactuals, the irrealis past suffix *-akəd-* is often judged optional, but *mp-* is required.[17]

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[17]Unless a modal verb (e.g. *tʃoom-* 'must') is present, *-akəd-* is required for a counterfactual interpretation, but it may occur in either the antecedent or the consequent (or both). Arguably, the irrealis past tense

(59) nĩ kaː torsə sẽ, **mpə- saf- akəd- ã̃ de**.
if NEG.IMPF.3sg. flashlight DET <u>3sg.-</u> sting- PAST.IRR- 1sg.NSBJ AFF.DECL

'If it weren't (for) the flashlight, **it** [the scorpion] **would have stung me**.' (5.8, heard "in the wild")

(60) nĩ dʒitt- aːs- akudõ nəse ujaːra, **mpə- baj- akəde**
if get- REP- PAST.IRR.PERF.3sg. child other <u>3sg.impf-</u> black- PAST.IRR.NPERF
de.
AFF.DECL

'If she had had another child, **it would have been black**.' (5.74, #1, elicitation)

(61) is a future counterfactual.[18]

(61) nĩ jã̃ padʒeːna teː- pə- reː wẽ **mpə- das- akəde**
if here night REL.IMPF- IMPF- come DET <u>3sg.IMPF-</u> laugh- PAST.IRR.NPERF
de.
AFF.DECL

'If s/he were here this coming night, **he would have laughed**' (but s/he definitely can't come). (4.29, #1, elicitation)

The imperfective also shows up in consequents of non-counterfactual conditionals, as in (62)-(67).

(62) nĩ səm- ə̃ Aamadu mpi- tʃimə, Mariaama **mpə- kamə**.
if/when arrive- 3sg.PERF Aamadu 3sg.IMPF- sing Mariaama <u>3sg.IMPF-</u> dance

✓ 'If Aamadu sings, Mariaama **will dance**.' (*future*)
✓ 'If/when Aamadu sings, Mariaama **dances**.' (*habitual*) (7.73-75, #1, elicitation)[19]

(63) nĩ mpə- kamə **mpə- tʃak- oː**.
if/when 3sg.IMPF- dance <u>3sg.IMPF-</u> give- PASS

'When he [the circumcised boy] dances, **he is given** [money].' (*generic*) (7.55, #1, *bakidõ* text)

Conditionals with perfective antecedents also imperfective-mark the consequent ((64)-(67)).

(64) hani nĩ par- i toː, kũpia **kə- kamə de**.
even if/when refuse- 2sg.PERF today tomorrow <u>2sg.IMPF-</u> dance AFF.DECL

'Even if you refuse today, tomorrow **you'll dance**.' (8.38, #2, elicitation)

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marking in counterfactuals indicates that the worlds in which the consequent is true are not candidates for the actual world at TU, but rather alternative worlds in which the antecedent would have been true; see Iatridou (2000) on Greek and Nichols (2003) on Zuni. For more on the semantics of -*akəd*-, see Chapter 5 below.

[18]See Iatridou (2000:253) on the possibility of future counterfactuals. The presence of -*akəd*- in future counterfactuals shows it to be (at least sometimes) a "fake past" in Iatridou's (2000) sense.

[19]A progressive reading becomes available if *səm-ə̃* 'happens' is omitted.

(65) nĩ dʒaf- ə̃ katʃudu, mə- waːt- õ, **mã̃- raː**
if rain- 3sg.PERF morning NARR- stop.raining- PASS.3sg.PERF 1sg.IMPF- go
de.
AFF.DECL

'If it rains in the morning, then it stops raining, **I'll go**.' (7.104, #1, Koufambora plans)

(66) nĩ dʒõk- i- ã̃ kodi **mã̃- kã̃tə- de ŋafas**.
if give- 2sg.PERF- 1sg.NSBJ money 1sg.IMPF- buy AFF.DECL horse

'If you give me money, **I'll buy a horse**.' (2.49, #2, elicitation)

(67) nĩ lafiɲieːn- i fanã̃ waːti woː waːti **kə̃- mən de** a-
if want- 2sg.PERF also time every time 2sg.IMPF- POSSIB AFF.DECL 2sg.SBJ-
jetʃ- a kopaːjemã̃nə̃.
hear- IRR my.voice

'If you want, also, every so often **you can** listen to my voice.' (7.112, #1, audio records release[20])

Arguably, most non-counterfactual conditionals describe eventualities expected to occur at some future time when the condition in the antecedent is met, and/or eventualities which could recur whenever the antecedent is true. Since Badiaranke marks future and habitual eventualities with the imperfective, it may be unsurprising that conditional consequents also take the imperfective.[21]

Epistemic *mp-*

The final use of *mp-* is an epistemic one, where use of the imperfective indicates less than full certainty on the part of the speaker about the truth of the assertion. In sentences like (68)-(69), *mp-* lends the flavor 'I strongly suspect X is the case, but I wouldn't swear to it.'

Epistemic *mp-* shows up most often in identificational focus constructions, as in (68) (where B's response means, literally, '(I think) it's in the store he'll be'; 'in the store' identifies the unique place where Waalibo is most likely to be at utterance time).

(68) A: e faː k- ə̃ Waalibo? ka- r- a fe paːdi- jã̃.
P where be- 3sg.PERF Waalibo be- NEG.PERF- 3sg.NEG P room- 3sg.NSBJ

'Where's Waalibo? He's not in his room.'

B: (mitʃ- ĩ de) fe bitiki **mpi- jak**.
think- 1sg.PERF AFF.DECL P store 3sg.IMPF- be

'(I think) **he's probably** in the store [now].' (8.9, #2, elicitation)

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[20]See Appendix A.

[21]The exception is epistemic conditionals about past times; further research is needed on whether the consequents of such conditionals are imperfective-marked.

(69) katʃud- eː toː   sẽ **mpə-**   **duːdə** fe Amerik.
      morning- of today DET 3sg.IMPF- enter   P America

'This morning she**'ll likely have entered** America.' (8.22, #2, elicitation)

That these are truly epistemic, and not futurate, uses of *mp-* is clear from the context of utterance: in (68), B is responding to A's inquiry about Waalibo's whereabouts at TU, while in (69), the adverbial 'this morning' places the entry event before the speaker's now.

3.3   Problems posed by Badiaranke aspect

3.3.1   Two previous approaches to aspect

In this section I review two influential analyses of aspect that, despite their widespread acceptance, cannot account fully for the Badiaranke system. These are the viewpoint-based theories put forth by Comrie (1976) and Smith (1997), among others (§3.3.1.1), and Klein's (1994) neo-Reichenbachian proposal (§3.3.1.2). Both approaches were discussed in §2.2.4 above; I summarize them again here to refresh the reader's memory.

3.3.1.1   Viewpoint theories

Viewpoint theories of aspect (e.g. Comrie 1976, Smith 1997) treat situations metaphorically as one-dimensional spatial entities, occupying a stretch along a timeline. A speaker can position him- or herself at any point along this stretch of time, either along the line spanned by the situation or at some point beyond it. Smith (1997) makes this metaphor explicit with the term *viewpoint aspect*, suggesting that the role of grammatical aspect is to show what the speaker can "see" from his or her chosen position on the timeline. In other words, aspect is "subjective" (Smith 1997:6; Comrie 1976:4), a matter of the speaker's choice of where to position him- or herself along the space time of the situation.

According to viewpoint analyses, perfective aspect shows a situation "from [the] outside" (Comrie 1976:4), as a complete or "bounded" whole (Bybee *et al.* 1994:54), or "in its entirety, including endpoints" (Smith 1997:62). That is, the speaker portrays the situation as it would be seen from a point beyond its span on the timeline. Imperfective aspect, in viewpoint frameworks, is said to show a situation "from [the] inside" (Comrie 1976:4), or to make "explicit reference to [the] internal structure" of the situation (Bybee *et al.* 1994:125). That is, in uttering an imperfective clause, a speaker positions him- or herself along the part of the timeline spanned by the situation, then describes the situation as it looks from that perspective. The imperfective is commonly divided into just two semantic subcategories, habitual aspect and progressive aspect (see, e.g., Bybee *et al.* 1994:151). The habitual describes a situation that is repeated regularly over the course of some time interval, such that its repetition is a defining trait of that time period (Bybee *et al.* 1994:125; Comrie 1976:27-8); in habitual clauses, what is portrayed "from inside" is the time period characterized by the situation's recurrence, not an individual occurrence of that situation. The progressive,

in contrast, describes a single process which is in progress or "ongoing" at some temporal reference point (Bybee *et al.* 1994:125-6; Smith 1997:89). On the viewpoint analysis, both imperfective types "show" the situation from somewhere in the middle of the time period over which it is repeated (for habituals) or in progress (for progressives); accordingly, neither endpoint is shown, if indeed the situation (or its repetition) has endpoints at all.

3.3.1.2 Klein (1994): A neo-Reichenbachian theory

Klein (1994) objects to the vagueness of the metaphors on which viewpoint theories often rely. On Klein's alternative theory, based loosely on that of Reichenbach (1947), aspect expresses relations of inclusion, overlap, and precedence between two time intervals: the time being talked about (which he calls Topic Time, or TT) and the time spanned by the eventuality (Time of Situation, or TSit). Each aspect involves a particular set relation between TT and TSit, which he illustrates visually. (70) repeats Klein's representation of the perfective and imperfective of a "1-state" eventuality description (one encoding a temporary state or activity); dashes represent TSit, while brackets represent TT.

(70) a. Perfective: TSit overlaps with, and ends within, TT (TSit AT TT)

$- - - - [- - - \quad]$ (Klein 1994:109)

b. Imperfective: TT is fully included in TSit (TT INCL TSit)

$- - - - [- - -]- - -$ (Klein 1994:102)

(71) reiterates Klein's representations for "2-state" eventuality descriptions (ones involving a change of state). Here dashes represent the "source state" (SS) and plus signs symbolize the "target state" (TS).

(71) a. Perfective: TSit overlaps with change of state from SS to TS

$- - - - [- - - + + +] + + +$ (Klein 1994:106)

b. Imperfective: TT is fully included in SS

$- - - - [- - -] - - - + + + +$ (Klein 1994:106)

On Klein's account, then, a speaker's aspectual choice is tantamount to choosing the span and duration of the Topic Time; and in all perfective clauses, TT covers a span including the transition out of an initial state into the final one. (In 2-state eventuality descriptions, this final state is lexically specified, whereas in 1-state eventuality descriptions it is simply the absence of the eventuality described.)

Klein does not distinguish between the habitual and progressive or discuss the applicability of the representations in (70b) and (71b) to these imperfective subtypes. Arguably, at least in the case of activities, (70b) can represent either the habitual – in which case the dashes represent the time characterized by the repetition of the eventuality – or the progressive, in which case they represent the time spanned by the single activity.

With respect to Badiaranke, however, Klein's representational analysis makes the wrong predictions for perfectives of stative eventuality descriptions (§3.3.2.1). Moreover, Klein's

analysis, depending entirely on set relations between time periods, fails to represent – and therefore cannot analyze – uses of the Badiaranke imperfective other than progressive and habitual.

3.3.2 Theoretical challenges of the Badiaranke perfective and imperfective

3.3.2.1 Theoretical challenges: Perfectives of statives

Although both viewpoint-based and neo-Reichenbachian theories can easily account for perfectives of non-stative eventuality descriptions, the behavior of stative eventuality descriptions is problematic for both types of analyses. First, let us consider the viewpoint theories of Comrie (1976) and Smith (1997). Such analyses predict that for ongoing states, since the speaker can't "see" the state's endpoints, languages should use the *imperfective*, claimed to show eventualities "from the inside," to express states persisting throughout TT.

This prediction, however, is wrong not only for Badiaranke, but also for other languages in which perfectives of statives refer to present states (e.g. Wolof (Nussbaum *et al.* 1970:358), Igbo and Yoruba (Welmers 1973:346-7), Kisi (Childs 1995:225), and Fongbe (Lefebvre and Brousseau 2002:87-8), among others). Some authors who report such facts assume a viewpoint analysis without confronting the clash between the theory and the data. Abangma (1985), for instance, assumes Comrie's (1976) framework for aspect in Dényá (Ekoid Bantu), even though perfectives of "stative verbs and verbs of cognition have a present reading" (while perfectives of a non-statives denote events that "took place") (Abangma 1985:114).[22]

Despite its cross-linguistic frequency, the ability of perfectives to denote a present state is not predicted by viewpoint analyses. As they stand, what such analyses predict is that one of two relationships should hold between perfective aspect and states.[23] If the perfective shows the endpoint(s) of an eventuality, then with statives either (a) the perfective should "show" both the beginning and the end of a state (and therefore be incompatible with permanent states), or (b) the perfective of a stative might be impossible altogether, or coerce ordinarily stative eventuality descriptions into a derived situation type. Smith (1997:69) points out that both of these alternatives are realized cross-linguistically. The first type of language is exemplified by French, as Smith illustrates with the example in (72).

(72) Marie a   vécu à Paris (#et   elle y   vit   encore).
Marie have.3sg. lived P Paris   and she there lives still

'Marie lived in Paris (#and she still lives there).' (Smith 1997:70, example 16b)

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[22]All the examples of non-statives that Abangma lists are telic (2-state) eventuality descriptions; consideration of activities is needed to make sure that the crucial distinction is really one of stativity, as opposed to one of telicity.

[23]Smith (1997:69) claims that "No prediction about perfectives and statives is made by Universal Grammar." Whether or not one accepts this stance with respect to UG, the viewpoint analysis *does* make predictions about this relationship, as discussed here.

As examples of the second type of language – in which perfective aspect is either incompatible with statives, or coerces them into a different meaning – Smith lists Mandarin, Russian, and Navajo. (73) is a Mandarin example from Smith (1997:70, her example 18):

(73) a. Mali bing- le.
          Mali sick- PERF
          'Mali got sick.'

      b. * Mali congming- le.
          Mali intelligent- PERF

Note that 'sick' is a 1-state, or stage-level, stative, while 'intelligent' is a 0-state, or individual-level, stative; the latter is understandably incompatible with inceptive meaning.

Along these lines, Comrie (1976) reports that perfectives of (certain) statives also have inceptive semantics in Ancient Greek and Spanish. In Ancient Greek, the perfective of 'live with' means 'go to live with'; the Spanish perfective of 'know' means 'get to know', and so on. Comrie himself observes (1976:21) that such cases do not fit neatly into his definition of perfective aspect.

In addition to these two possibilities, Smith also points out that in languages like English, the perfective simply does not meet the viewpoint definition when used with statives: in such languages, the perfective of a stative may or may not show the endpoints of the state, as she illustrates with the sentence in (74).

(74) a. Jennifer knew Turkish.

      b. . . . but she has forgotten it all (closed).

      c. . . . and she still knows it (open).

      "Both readings are possible because the first moment of a state is like every other moment" (Smith 1997:70) (her example 17).[24]

Since the concept of "boundedness" is so central to the viewpoint definition of perfectivity, the only way to explain this behavior within viewpoint analyses is to assert, as Smith does, that perfectives of statives are not really perfective. In §3.4.2 I pursue the logical alternative, namely to revise the definition of perfectivity such that it encapsulates the stative cases as well. Given the cross-linguistic frequency with which perfectives do apply to stative eventuality descriptions, and the frequency with which this combination yields a present state reading, we would like this semantics to receive a natural explanation under our theory of aspect.

Like viewpoint theories, Klein's analysis faces serious problems with respect to perfectives of Badiaranke statives. Since he analyzes the perfective as meaning that the time of the situation ends within TT, Klein predicts this aspect to be incompatible with 0-state

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[24]Smith's terms "open" and "closed" describe whether the sentence makes a claim about the entire situation, including the final endpoint (closed), or merely some part of the situation excluding a final endpoint (which may not even exist, as with permanent states). Only the closed (b) reading is possible in Badiaranke when 'know' is explicitly past-marked.

(individual-level) statives. Specifically, Klein (1994:101) points out that for such eventuality descriptions, "TSit extends over the entire time. . . . Hence, their TSit always includes TT. . . no part of TT can be outside TSit." Meanwhile, he defines the perfective as "TT AT TSit" (1994:108), which he translates as "either TSit and TT overlap, or TSit in turn is included in TT" (1994:102).[25] Since these defining properties of 0-state statives and perfective aspect are mutually exclusive, Klein predicts 0-state eventuality descriptions to be incompatible with the perfective. This prediction is clearly wrong for Badiaranke, as shown by (21) and (23)-(24) above. Moreover, according to Klein's definition of perfectivity, the perfective of a 1-state stative should mean the state ends within TT, contra (25)-(28). Thus, both types of analyses – viewpoint theories and Klein's representational one – stumble when faced with stative perfectives.

3.3.2.2 Theoretical challenges: The imperfective

Even more than the perfective, the Badiaranke imperfective poses a serious analytical challenge for the theories of aspect discussed above. First, consider viewpoint theories, according to which the imperfective shows an eventuality as "unbounded" or "from the inside."

It is clear that this definition cannot account for the futurate, conditional, and epistemic uses of the Badiaranke imperfective. Examples like (54) above show that futurate *mp-* can be used even to talk about punctual events, which by definition cannot be viewed from the inside, as such eventualities have no duration (from a linguistic point of view); it would not be tenable to claim that punctual future events are portrayed as "unbounded," without "showing" the final endpoint. Futurate *mp-* fits the viewpoint characterization no better in examples like (56) ('Tomorrow he'll take it away again'), where it is asserted that a change of state will be completed within a certain time in the future. Only with 0-state eventuality descriptions, in which a single state is predicted to hold throughout the future TT, does futurate *mp-* fit the viewpoint definition of imperfectivity.

The conditional/counterfactual and epistemic functions of *mp-* are also problematic for viewpoint theories, since such uses do not describe eventualities "from the inside" (Comrie 1976:4). Fleischman (1995), who assumes a viewpoint definition of aspect, offers an explanation for the ties between imperfectives and hypothetical contexts (such as conditionals) based on "the discourse notion of backgrounding": citing Hopper (1979), she argues that backgrounding "involves a reduced assertion of the finite reality of the event. . . . hypothetical statements likewise do not assert the truth of their propositions" (1995:539). My analysis in §3.4.3 below captures this intuition, while going beyond it and making it more precise: the imperfective, I will argue, does not make *any* assertion about the reality (realization) of the eventuality in the *base world*, only about its realization in some set of possible worlds. These worlds may or may not include the base world, depending on how they are selected.

Klein's analysis of the imperfective, that TSit fully includes TT, also falls short in accounting for the semantic range of *mp-*. That Klein makes the wrong prediction for futurate

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[25]It is clear from Klein's discussion and illustrations that he intends "overlap" to mean coextension and not inclusion.

mp- is clearest in (54) above ('tomorrow on his way to school he'll get killed'). Using Klein's notation, we can sketch the assertion of (54) as in (75), where brackets represent time spent on the way to school, SS is the "source state," and TS is the "target state":

(75) - - - - - - - - - - - - - [- - - + + +] + + + + + + +
                          ↑
                          TU

SS (= 'alive')   TS (= 'dead')

Since the transition from SS to TS occurs within TT, Klein would wrongly predict (75) to be expressed with the perfective. Moreover, Klein's theory, depending as it does on overlap and inclusion relations between time periods, provides no straightforward way to model the conditional and epistemic uses of *mp-*; at the very least, it would have to be greatly modified to do so.

In fact, Klein's analysis of imperfectivity also fails to encapsulate the well-known habitual subtype of imperfective. For habituals of 2-state eventualities, Klein's analysis of 2-state imperfectives, shown in (71) above, is clearly wrong. In such clauses, it is not asserted that the SS is repeated throughout TT, while TS begins sometime after TT, as (71) would suggest; rather, the transition from SS to TS is repeated with some frequency over a time including TT. Potentially, incorporation of plural events could redeem Klein's analysis of habitual imperfectives; but the problems with futurate, conditional, and epistemic *mp-* remain.

Conventional viewpoint theories and Klein's theory thus both fail to account for the Badiaranke facts. In the next section, I present my own proposal.

3.4   Analysis

The analysis for which I argue here has two defining features. First, it claims that the semantics of aspect in Badiaranke is inextricably intertwined with modality. Second, it revolves around the distinction between settled pasts and branching futures.

3.4.1   Branching worlds and the future/past asymmetry

The analysis I build here relies on the idea of *metaphysical alternatives* (what Kaufmann *et al.* (2006) call "historical alternatives").[26] The metaphysical alternatives to a base world w at a time t (which Kaufmann *et al.* (2006) abbreviate $\approx_{<w,t>}$) are those worlds that are identical to w up to and including t, but diverge from w after t. This notion is similar to Dowty's concept of "branching time," in which at any given time there is only one past but "multiple possible futures" (Dowty 1977:63). Metaphysical alternatives capture the intuition that the future is *unsettled* – there are many ways in which the actual world might evolve

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[26]I refer to these worlds as "metaphysical alternatives" instead of "historical alternatives" to emphasize the metaphysical modal base, which will become important when we turn to the imperfective.

– unlike the past, which is *settled*. At the same time, adoption of metaphysical alternatives does not mean taking a stand against truth values for assertions about future eventualities; it simply means that there is a subset of possible worlds that can be distinguished from the base world only after a given time.[27]

In the discussion below, I use t to represent perspective time, the time *from* which the truth of the proposition is evaluated. By default t will be the moment of utterance, but contextual factors can shift t into the past or future. My analysis also refers to a second time, the evaluation time i; this is an interval of time at which the truth of the proposition is evaluated. Essentially, I am splitting the Reichenbachian idea of reference time into two times with distinct roles in the semantics. For instance, in (7) above ('I paid Aamadu'), t is the moment of utterance, while i is some past time interval within which <I pay Aamadu> is asserted to be true. Thus i is roughly equivalent to Klein's TT; t has no general equivalent in Klein's system, though it corresponds to TU in the default case.

3.4.2   Semantics of the Badiaranke perfective

An analysis of the Badiaranke perfective should capture four observations. First, use of perfective aspect in an assertive clause entails realization of the eventuality either in the actual world, or in the world treated as the actual world at that point in the discourse (i.e. the base world). Second, the perfective can be used to talk about eventualities up to and including the present moment, suggesting that an analysis should encode some difference between future and non-future times. Third, the time at which the state is ongoing, or with respect to which the event is in the past, can be shifted by adverbials, tense markers, syntactic embedding, or other contextual factors. Finally, some property of states causes their temporal interpretation with the perfective to differ from that of any other eventuality type.

We can capture all of these observations with the following semantics: the Badiaranke perfective asserts that in every metaphysical alternative w' to the base world w at perspective time t, there is an eventuality e and interval i such that the eventuality description P is true of e in w' at i. This analysis is formalized in (76).[28]

(76)   Semantics of the Badiaranke perfective:
PERF(P) is true at a world-time pair $<w,t>$ iff $\exists e$ and $\exists i$ such that for all w', where w' is a metaphysical alternative to w at t, P is true of e in w' at i.

Because truth at i in all metaphysical alternatives at $<w,t>$ requires that i precede or be identical to t, (76) accounts for the fact that the Badiaranke perfective limits eventualities to times not in the future of perspective time.

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[27]See Kaufmann *et al.* (2006) for a discussion of the philosophical debate over whether statements about the future carry a truth value.

[28]I use P for eventuality descriptions, following authors like Portner (1998) who have used it to stand for "predicate."

This analysis can explain the difference in temporal interpretation of states vs. non-states, if we just take into account a fundamental difference between situation types. Namely, only states have the *subinterval property* (Dowty 1979, Bennett and Partee 1972, among others) – the property that if they obtain at an interval, they obtain at all subintervals of that interval, including singleton intervals.[29] Dowty (1979) (cited by Jackson 2005:27) argues that for English, the default evaluation time in the absence of past tense marking is the moment of utterance. Extending this proposal to Badiaranke, in which tense is relative rather than absolute (see Chapter 5 below), let us assume that the default evaluation time in Badiaranke is perspective time. Then for stative eventuality descriptions – which can be true at a moment – the perfective will indicate by default that the state holds at perspective time, which itself is set at TU by default.

In contrast, the truth value of a non-stative P can only be evaluated at a non-momentary interval. By (76), the final endpoint of i must be no later than t, the point at which the metaphysical alternatives begin to diverge from w and from each other. The perfective of a non-stative P means, then, that P was true of some e at an interval preceding t. This semantics is illustrated in (77), where t is perspective time, the point where the metaphysical alternatives branch apart, and dashes represent evaluation time, within which e is realized.

(77) Perfective of an eventive:
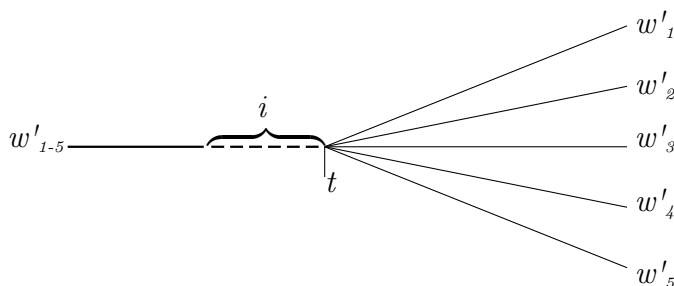
Because TU is simply the default, not the required, value for t, (76) correctly predicts that a shift in perspective time will shift the time that the event precedes or that the state overlaps (as in (19) and (27) above). The division of reference time into t and i, meanwhile, can account for the inability of future adverbials to license perfective aspect on their own, as in (9) above: apparently such adverbials can only restrict the range of i, not shift t. In (9), where t is TU, *kũpia* 'tomorrow' sets up an i that is inaccessible, since the metaphysical alternatives to w at t will have diverged by then.

Let us see how this analysis predicts the correct semantics for both stative (78) and non-stative ((79)-(80)) eventuality descriptions.

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[29]Bennett and Partee (1972) actually treat progressives as well as states as having the subinterval property, while others, e.g. Smith (1997), have treated both activities and states as having it. More recently, however, other authors, e.g. Ogihara (2007), argued against the extension of the subinterval property to non-stative eventuality types; I follow this last school of thought.

(78) mə-   rã   səm-   a   tʃimã sẽ   **nãk-**   **ã̱!**
     NARR- go.3sg.PERF encounter- IRR river DET be.full- DETRANS.3sg.PERF

   'She found that the river **was full (of water)**!' (8.45, #3, runaway woman story)

In (78), the perspective time t is the moment when the woman in the story encountered the river. Because the stative P can be true of an eventuality at the very moment of perspective time, the interpretation is that the state of being full held of the river at the past perspective time itself – which is exactly what the sentence is intended to mean. The analysis of Klein (1994), in contrast, would not work here: TT, the time being talked about, is the time when the woman encountered the river, and TSit is the time during which the river was full. Since TSit extends past TT in both directions, Klein would predict the imperfective to be used instead of the perfective that we actually see here. Viewpoint analyses, meanwhile, might make either of two predictions. First, they might take the perfective in (78) to mean that the state of fullness is viewed "from the outside" at utterance time, meaning that the river is no longer full at utterance time – but in fact, (78) entails nothing whatsoever about the properties of the river at utterance time. Alternatively, viewpoint analyses could treat the time of the woman's arrival as viewpoint time – in which case they would predict, like Klein, that the imperfective should be used to convey the meaning that (78) actually conveys with the perfective. The present analysis thus successfully captures the semantics of (78) in a way that competing analyses cannot.

For the application of (76) to perfectives of eventives, let us look at (79), where the speaker is talking about the status of a newly built school in the village.

(79) lãpã sẽ **riːt-**   **ō̱**   **de**   pur   ka   ma-   dʒaf- aː-   o.
     fence DET remove- PASS.3sg.   AFF.DECL so.that NEG 3sg.SBJ- rain- DETRANS- PASS

   'The fence **was removed** so it wouldn't get rained on.' (7.24, #3, wishes and dreams text)

In (79), the context sets perspective time at TU. The eventuality description describes a process leading to a change of state, i.e. an accomplishment. Our world knowledge dictates that ordinarily (barring an extraordinary act of nature), a fence's removal can only be true at a non-momentary interval; since it must be realized at this interval in all metaphysical alternatives to w at TU, the fence is taken to have been removed in the past of speech time in the base world (which here is the actual world).

For the sake of completeness, let us consider an eventive clause where the base world is not the actual world. (80) was spoken during a detailed description of Badiaranke marriage practices.

(80) tẽbe niːna, ma-   səm-   a   **dam-** **iː**   **wãdaːfe**, wũ   i   bẽ-
     time DEM 3sg.NARR- arrive- IRR kill-   2sg.PERF goat   DEM COP 3pl.IMPF-
     daːtuaː- enə, wũ   i   te-   jakə siːmã fanã.
     lunch-   INSTR DEM COP REL.IMPF- be   dinner also

   'At that time, it happens that **you've killed** a goat; that's what they'll eat for lunch; that's what they'll eat for dinner as well.' (3.28, #1, marriage customs text)

In this case, although the text describes actual customs, the base world cannot be the actual world: the 2sg. subject of the perfective-marked clause refers to a newlywed groom, which the addressee, a female American linguist, is not. The base world, then, is one where the addressee is a newlywed man. Perspective time has been set by the immediately preceding sentences, which state that three or seven days after the wedding, the young women of the village wash everyone's clothes elsewhere, then return to the village around 7 p.m. Since 'kill a goat' is eventive, evaluation time is no later than perspective time, so realization in all metaphysical alternatives to the base world entails that the goat is killed by 7 p.m. on the appointed day in the hypothetical world.

Before we leave accomplishments, it is worth noting that other authors (e.g. Bar-El *et al.* (2005) for Salish, Singh (1998) for Hindi) have argued that in some languages, perfectives of accomplishments implicate, but do not actually entail, culmination. In the data I elicited to get at this question, I found two sentences, given in (81)-(82), that might suggest a lack of culmination entailment for Badiaranke perfectives of accomplishments; in both cases, however, the superficial appearance of non-culmination stems from independent factors.

(81) pattakka **raŋ- eːn- i**   **fe lekol** bari səmə- re-   ni.
      sole   go-   INSTR- 2sg.PERF P school but arrive- NEG.PERF- 2sg.NEG
      '**You walked to school**, but you didn't arrive (there).' (5.28, #1, elicitation)

At first glance, (81) appears to pose a serious problem for (76), as reflected by the oddity of the English translation. However, it turns out that in Badiaranke, the verb *raŋ-* can mean 'depart [for]' in addition to 'go (to)' (Meyer 2001:282). If (81) is translated as 'You departed for school on foot, but didn't arrive there', the failure to arrive at school no longer looks like non-culmination of the perfective-marked eventuality.

For (82) the consultant was able to get the reading that the room was only partially built between 1:00 and 2:00, as well as the reading (which he preferred initially) that the room's construction was finished within the hour. In other words, on the non-culmination reading, (82) means something like 'Between 1:00 and 2:00 I worked at building a room.'

(82) birĩ 1:00 haː 2:00 **ɲeɲi- ndaːn- ə̃**   **de**   **paːdə.**
      since 1:00 until 2:00 stand- CAUS- 1sg.PERF AFF.DECL room
      'Between 1:00 and 2:00, **I built a room**.' (5.34, #1, elicitation)

Here, however, real-world knowledge is an issue: the culmination reading is preferred, but it is in fact difficult or impossible to completely build a room within a one-hour time period.[30] Indeed, in general, examples like (82), with a 'from…to…' adverbial and a perfective-marked accomplishment, get the reading that the eventuality is culminated within the given time frame, whether the time of the eventuality occupied the entire time (as was the preferred reading in (83)), or only a small slice of that time (as is an available reading of (84)).

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[30]The same is true for the English translation, which is hard to reconcile with speakers' awareness that rooms generally take more than an hour to build; one speaker tried to accommodate this world knowledge by offering a reading on which the "room" was built out of Legos or Lincoln Logs.

(83) birĩ   1:00 haː   2:00 **wo-**   **ǫ̃**   **t∫imã sẽ**.
      since 1:00 until 2:00 cross.water- 1sg.PERF river   DET

'Between 1:00 and 2:00, **I swam across the river**.' (5.34, #1, elicitation)
Consultant's comment: The river has to be a big one that took the speaker the entire hour to cross, not a small one that was crossed within a few minutes.

(84) birĩ   1:00 haː   2:00 kabãtã pakkã **dakk-**   **ǝ̃**.
      since 1:00 until 2:00 shirt   one   launder- 1sg.PERF

'Between 1:00 and 2:00, it's just one shirt that **I washed**.' (5.34, #1, elicitation)
Acceptable readings:
✓ Washing that one shirt took an entire hour.
✓ Washing the shirt took only a few minutes within the hour.

For achievements, something else needs to be said to prevent (76) from making the wrong prediction. If achievements are truly instantaneous, then they too should be true at a moment, despite lacking the subinterval property.[31] If so, the default temporal interpretation for perfectives of achievements would be present tense (coextension with perspective time) rather than past tense (precedence with respect to perspective time), counter to fact. This problem can be solved by making use of the uncontroversial fact that achievements, like accomplishments, are 2-state eventualities (Klein 1994); both achievements and accomplishments involve a change of state. For an achievement-type P to be true of e at an interval i, both states must be included in i; so i cannot be a singleton interval. Achievements, then, must be evaluated at some longer i that does not extend beyond t, and therefore receive a (relative) past interpretation with the perfective.

3.4.3   Semantics of the Badiaranke imperfective

3.4.4   Motivation

To explain why Badiaranke uses a single morphosyntactic construction to talk about in-progress, habitual, future, conditional/counterfactual, and epistemically probable eventualities, we need to find a semantic property that (unlike unboundedness) is shared by all these functions. At the same time, the property must be broad or flexible enough to allow for the diversity of imperfective functions. To identify such a common property, let us consider on an intuitive level what the Badiaranke imperfective means in each of its uses.

On its progressive use, the imperfective means that the eventuality described has begun to develop, such that by some later time, it is likely to be realized. If something interrupts the eventuality, however, it might never develop fully. This potential for non-realization of progressive-marked eventualities has been captured in Dowty's (1977, 1979) *imperfective paradox* and argued for by many subsequent authors (e.g. Landman 1992, Portner 1998). The fact that the Badiaranke imperfective progressive participates in this paradox is shown

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[31]I thank Judith Tonhauser for bringing this issue to my attention.

in (85), where 'go to school' is *mp*-marked and receives a progressive reading, but the individual's progress is to be interrupted before he reaches his destination.

(85) (kũpia) nĩ **mpə-** **raː fe lekol** mpə- dam- oː de fe faːse.
tomorrow if/when 3sg.IMPF- go P school 3sg.IMPF- kill- PASS AFF.DECL P path

'Tomorrow when **he's going to school**, he'll get killed on the way.' (5.29, #1, elicitation)

Just as progressive *mp*- marks a developing eventuality that might not in fact be fully realized, numerous authors, including Chung and Timberlake (1985), Papafragou (2006), and Boneh and Doron (2008), argue that habitual clauses require that the eventuality described have the potential to recur in the (relative) future. Thus someone who has quit smoking once and for all can no longer truthfully say "I smoke," even if s/he has smoked a pack of cigarettes every day for years. Nonetheless, a habitual sentence does not *entail* that the eventuality will actually occur again: an elderly woman who has played bingo every Thursday for the past ten years, and who says on a Friday, "I play bingo every week," is telling the truth, even if she suddenly dies an hour after her utterance. Like progressives, then, habituals make a prediction about the *likely*, but not necessarily realized, continuation of an eventuality.

Similarly, a futurate *mp*- clause makes a prediction that a certain eventuality will occur at a future time. Since, however, the future is not *settled* like the past (Kaufmann *et al.* 2006), the eventuality in question may not actually be realized, no matter how likely it seems at perspective time. The absence of an actualization entailment is particularly evident in examples like (86), where the breakage that Faatu predicted did not come to pass.

(86) Faatu jim- ə̃ de Maimuna **mpə-** **niː kaːs sɛ̃ de** bari
Faatu say- 3sg. AFF.DECL Maimuna 3sg.IMPF- break teacup DET AFF.DECL but
niː- r- a- nã.
break- NEG.PERF- 3sg.NEG- 3sg.NSBJ

'Faatu said Maimuna **would break the teacup**, but she didn't break it.' (10.6, #1, elicitation)

As with the previous three imperfective subtypes, the eventuality described in the consequent of a conditional or counterfactual is not necessarily realized in the actual world; it is required to be realized only under circumstances where the antecedent is true. Since truth of the antecedent is not entailed, it is entirely possible that the consequent eventuality remains unrealized, particularly in the case of counterfactuals.

Finally, epistemic *mp*- also expresses a judgment – in this case, on the basis of known facts – that an eventuality is *likely* to be realized; like the other imperfective uses, epistemic *mp*- does not commit the attitude holder to the proposition that the eventuality is *actually* realized.

Despite their superficial diversity, then, the five uses of the Badiaranke imperfective share a common semantic property: the eventuality is judged *likely* to be realized based on contextually varying criteria, but might not ever be realized in the actual world. The different imperfective functions simply reflect different ways of determining likelihood. That

is, whereas the perfective indicates that an eventuality is realized in all the metaphysical alternatives to the base world, the imperfective indicates that the eventuality is realized at some interval in some contextually determined set of worlds accessible from the base world, but not necessarily in all its metaphysical alternatives.

As reviewed in §2.2.1.2 above, Kratzer (1981, 1991b) argues that modal statements invoke two sets of propositions: a modal base and ordering source. The modal base determines the accessible worlds (those in which the propositions in the modal base are true); the ordering source ranks these worlds by their adherence to certain other propositions. A sufficiently broad modal semantics along these lines, underspecified for the kind of modal base and ordering source, can account for all the disparate functions of the Badiaranke imperfective. This semantics is laid out in (87).

(87)   Semantics of the Badiaranke imperfective:
        IMPF(P) is true at a world-time pair $<w,t>$ iff in all the best possible worlds w', according to a contextually determined modal base and ordering source, as evaluated from w at t, $\exists e$ and $\exists i$ such that P is true of e in w' at i.

The imperfective's various readings differ with respect to two parameters: which possible worlds are accessible and how the "best" of these worlds are selected. Contextual factors, to be spelled out below, determine the modal base and ordering source.

Let us consider each of the imperfective's functions in turn, starting with the progressive.

Progressive *mp-*

Numerous authors, e.g. Dowty (1977), Landman (1992), Portner (1998), have argued that the English progressive demands a modal semantics: it makes an assertion about what happens not only in the base world, but also in worlds accessible from the base world (see §2.2.4.1 and §2.3.2.2 above). The progressive, they have argued, may be true even if something happens that prevents the eventuality from continuing beyond the reference time (e.g. in *Max was crossing the street when he was hit by a bus*). What the progressive asserts is that in the inertia worlds – plausible candidates for the base world in which the relevant circumstances evolve as expected – the eventuality is completed.

The clearest, least contested formulation of inertia worlds is that of Portner (1998), who defines them as the best worlds selected by (i) a circumstantial modal base, Circ(e,P) (worlds in which all the circumstances relevant to the eventuality *as encoded in the eventuality description* obtain), and (ii) a "non-interruption" ordering source, abbreviated NI(e), consisting of the propositions that must be true for the eventuality not to be interrupted before it is realized. The fewer potential disruptions occur in a given world, the more likely the eventuality is to be realized in that world, and the more highly that world will be ranked by the ordering source. Portner (1998:779) argues convincingly that the modal base must be a function of P, the eventuality description, as well as of e: the same eventuality can be described in different ways, and the description can affect which worlds the ordering source ranks highest. (88) applies Portner's semantics to progressive *mp-*.

(88) $\text{IMPF}_{\text{PROG}}(P)$ is true at a world-time pair $<w,t>$ iff <u>in all the best possible worlds w'</u>, according to a <u>circumstantial</u> modal base and <u>inertial</u> ordering source, as evaluated from w at t, $\exists e$ and $\exists i$ such that P is true of e in w' at i.

(88) is simply a more restricted version of the general imperfective semantics in (87). As in (87), the eventuality is realized in all of the best possible worlds; (88) specifies that in contexts favoring a progressive reading, these worlds are selected by a circumstantial modal base and ranked by an inertial ordering source. Note that the incorporation of perspective time into (88) (and into the imperfective semantics in (87) more generally) allows for past or future progressives without overt tense marking, as we saw illustrated in (34) and (35) above.

The function of the non-interruption ordering source is most evident with telic events, as in (89).

(89) Sana tʃoːd- ə̃   fe u-   səf- aːna   **mpə-**   **səfə kaməs** u-
       Sana sit-   3sg.PERF P NMLZ.SG- sew- INSTR.NMLZ <u>3sg.IMPF-</u> sew cloth NMLZ-

       dunn-   aːna   fe mã̃bo.
       enter.CAUS- INSTR.NMLZ P body

       'Sana is sitting at the sewing machine **sewing an outfit**.' (4.1, #6, conversation)[32]

The relevant circumstances for *mpə-səfə kaməs...* might include those listed in (90).

(90) $\text{Circ}(e',P)$={Sana is a tailor; Sana knows how to work the sewing machine; Sana has enough thread and fabric; Sana is sitting at the sewing machine with half a shirt before him...}[33]

But (89) does not assert <Sana sew an outfit> to be true in *all* the worlds in (90), only the *best* ones as selected by the non-interruption ordering source, which includes such propositions as those in (91).

(91) $\text{NI}(e')$={The machine doesn't break down; Sana doesn't get a headache; a thief doesn't steal the machine before Sana finishes; the fabric doesn't get stained by tea...}

The best worlds for (89) will be those w' in (90) in which as many as possible of the propositions in (91) are true. In those worlds, the eventuality e is an eventuality of Sana's sewing a complete outfit.

Habitual *mp-*

Ferreira (2004) demonstrates that Portner's (1998) modal analysis of the progressive can be straightforwardly extended to habitual imperfectives cross-linguistically; the only differ-

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[32]Ordinarily, the French loan *kõpəlet* is used instead of *kaməs u-dunn-aːna fe mã̃bo*; the sentence in (89) was uttered by a speaker attempting to teach me "true" Badiaranke vocabulary.

[33] Circ's eventuality argument e' must be a stage of the eventuality of which P is predicated in (88). This particular modal base and ordering source will only be chosen when the context makes clear, in any of the ways laid out in §3.2.2, that such an e' exists in w.

ence is that progressives apply to "singular intervals," consisting of one continuous stretch, whereas habituals apply to "plural intervals," consisting of two or more non-contiguous intervals. In the habitual case, Ferreira argues, "non-interruption" means that in all the inertia worlds, there is at least one future singular interval after TU, such that TU is included in a plural interval, in which there is an eventuality of which the eventuality description holds (Ferreira 2004:87). In Badiaranke, TU is merely the default perspective time for habitual *mp-*. For past or future habituals, the discourse context shifts the perspective time; the "future" singular interval is then in the future of that perspective time. (88) thus applies equally to the habitual use of *mp-*, with a slightly different semantics for the non-interruption ordering source and the inclusion of plural eventualities, as in (92).

(92)   IMPF$_{\text{HABIT}}(P)$ is true at a world-time pair $<w,t>$ iff in all the best possible worlds w', according to a circumstantial modal base and inertial ordering source, as evaluated from w at t, $\exists e$ and $\exists i$ such that e is a plural eventuality and P is true of e in w' at i.

In clauses with generic subjects, the various singular eventualities that make up the plural eventuality may involve different individuals, all denoted by the kind-referring subject term. (Generics of 0-state statives are predicted correctly to be expressible with the perfective, since such states hold at all times before and up to t in w, and therefore in all metaphysical alternatives to w at those times, obviating the need for reference to other possible worlds.)

Recall that the habitual reading of *mp-* arises with habitual adverbials and in discourses about habitually recurring events. The example in (93) came in the middle of a narrative about a forest-dwelling spirit called a *kãkurã*. On festive occasions, a young man disguised as a *kãkurã* sometimes shows up to dance and play. Regarding this pseudo-*kãkurã*, my consultant explained:

(93)   kemәsә kã **mpә-** **miːr** **de**   bar kaː   weː   fe puɲu.
       cloth   DET 3sg.IMPF- resemble AFF.DECL but NEG.IMPF.3sg. 3sg.INDEP P woods

       'The outfit **looks similar**, but it's not the one from the woods.' (7.18, #1, *kãkurã* text)

The context for (93) makes clear that the speaker is discussing a plural eventuality, one occupying multiple disjoint intervals of time. The text discusses habitual behaviors of the *kãkurã* in this day and age, so perspective time is not shifted from TU. The circumstances relevant for the evaluation of the *mp-* clause are the properties characteristic of the intervals occupied by the plural eventuality, including those in (94):

(94)   Circ(e',P)={It is a festive occasion; a fake *kãkurã* is in the village; the fake *kãkurã* is dressed all in red...}

The non-interruption ordering source will consist of propositions negating potential reasons that the fake *kãkurã* might never again wear such an outfit:

(95) NI(e')={The fake *kãkurã* is not outlawed in Senegal; villagers don't forget what a *kãkurã* is supposed to look like; religious leaders don't forbid the wearing of costumes; red dye of the shade the *kãkurã* wears doesn't become exorbitantly expensive...}

The best worlds will be those where the circumstances in (94) are met and nothing mentioned in (95) interferes. In such worlds, there is a plural interval including at least one interval after t – here TU – at which a fake *kãkurã* appears wearing a similar outfit to the real *kãkurã*.

This analysis of habitual *mp-* predicts two characteristic features of generic clauses. First, it predicts that generic sentences will be true even if the eventuality in question does not actually come to pass again in the base world (as in the bingo example above): if the base world is not among those in the modal base, or if too many of the propositions in the ordering source prove false when the requisite circumstances do obtain, then the eventuality will not actually happen again in w. Nonetheless, the generic proposition may still be true, as long as the eventuality does recur in the best accessible worlds whenever the right circumstances arise. Second, generics have been argued to not always require verifying instances (e.g. Carlson 1995). Indeed, the current analysis allows a generic sentence to be true despite any evidence that the eventuality has occurred previously in w, if the right circumstances have not arisen in w or if something prevented the eventuality from occurring under those circumstances. This seems to be a good result, although in practice it is difficult to test the permissibility of generic *mp-* without verifying instances: a futurate reading, independently available for *mp-*, is hard to distinguish from a generic-without-verifying-instances reading. (96) illustrates this complication. (The actual context of utterance for this sentence – a discussion about the powers of two tree-dwelling spirits – favors a generic reading, but the sentence could also be read as a prediction of what would happen if an infertile woman were to petition the women's tree spirit in the future.)

(96) nĩ   foː- n-   aː-   õ,   jã ŋka tẽnẽ wẽ nãnã,
      if/when end- CAUS- DETRANS- PASS.3sg.PERF there and Monday DET DEM

      tʃaːfe wẽ, kə-   dʒeːn de   **mpə-** **dʒittə de**. lafiŋieːn-
      woman DET 2sg.IMPF- see   AFF.DECL 3sg.IMPF- get   AFF.DECL want-

      ã̃   wẽ, **mpə-** **səmə de**   dʒitt- ã̃.
      3sg.PERF DET 3sg.IMPF- arrive AFF.DECL get-   3sg.PERF

      'When it's finished, by the next Monday, the woman, you'll see **she'll get/she gets** [a pregnancy]. What she wanted, **it'll happen/it happens** that she got (it).' (9.3, #7, magic and the supernatural text)

Some habitual statements, especially claims about particular individuals, do seem to be infelicitous if the eventuality described has not occurred at least once in w. Papafragou (1996) argues that in such cases, the need for verifying instances arises from the hearer's inference about the speaker's unwillingness to predicate eventuality descriptions of actual individuals without evidence. In some cases, as in (43) above, the discourse topic makes clear that the eventuality description has been instantiated in the base world. Similarly, in (97),

the adverbials make it clear both that the imperfective should be interpreted habitually, and that instances of the eventuality have occurred in the actual world before perspective time.

(97) birĩ paːrə peːs   bepoːse pãpã piːsidoː **bḛ-**   **dobbə de.**
since two.years.ago children DEM every.day 3pl.IMPF- be.dirty AFF.DECL

'Ever since two years ago, the children get dirty every day.' (8.24, #2, elicitation)

A type of circumstantial modal base plus a non-interruption (inertial) ordering source, then, takes care of both progressive and habitual readings of the Badiaranke imperfective.

Futurate *mp-*

I have labeled futurate *mp-* as such because it is best analyzed not as a simple future tense (referring directly to a future time), but rather as a futurate. In fact, Copley's (2002) analysis of English futurates can be adapted to account for futurate *mp-*, in a way that successfully situates it within the general imperfective whose semantics were given in (87).

Futurate *mp-* is not a future tense, since future time reference is neither a necessary nor a sufficient condition for the use of this morphology. It is not sufficient, since future orientation does not prompt imperfective aspect on modal verbs or their complements.[34] In (98), for instance, the future-oriented deontic modal takes perfective marking and its complement irrealis marking.

(98) **tʃoːm- ə̰̃** **karaŋ- a**   **de**
should- 3sg. study- IRR AFF.DECL

'**S/he should study**.' (8.48, #1, elicitation)

Similarly, antecedents of conditionals about a future time often take the perfective ((65)-(66) above), and imperatives, instructions, and wishes about future eventualities do not allow the use of *mp-*; thus, like its other uses, the imperfective's futurate use must be modally restricted. Nor is future time reference a necessary condition for use of *mp-*, since it appears with progressive and habitual semantics as well as in epistemic and counterfactual statements about past times.

The sensitivity of *mp-* to modal environments, together with the absence of a one-to-one mapping between futurate *mp-* and future time reference, indicates a modal rather than temporal semantics. A straightforward temporal semantics of the sort Kissine (2008:130) advocates for English *will* – that "the semantics of *will* is unitary: *will* extends the evaluation time toward the future" – is not possible for *mp-*. Indeed, analyzing one use of *mp-* as a tense, when the others are so clearly aspectual and modal, would be forcing Badiaranke into a system it shows no sign of belonging to. If futurate *mp-* indicates future tense, what "tense" would be assigned to non-tense-marked perfective aspect, and to the non-future uses of *mp-*?

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[34]See Chapter 6 below for more details on the interaction between aspectual morphology and the orientation' of modal verbs.

The aspectual/modal treatment of futurate *mp-* is further supported by scopal ambiguities between futurate *mp-* and indefinite subjects. Indefinite subjects are known to interact scopally with other quantificational elements, such as modality and negation (see, e.g., Ernst 1998). As (99) shows, indefinite subjects of clauses with futurate *mp-* can receive both a specific reading (with wide scope for the indefinite) and a non-specific reading (with narrow scope for the indefinite).

(99) kũpia   nəse (pakkã) **mpə-**   **tʃimə de**.
      tomorrow child one   3sg.IMPF- sing   AFF.DECL

      'Tomorrow a/one child will sing.' (7.118, #2, elicitation)
      ✓ 'There is some child such that in all the best worlds, that child sings tomorrow.'
      (indefinite > modal; specific reading)
      ✓ 'In all the best worlds, there is a child such that that child sings tomorrow.'
      (modal > indefinite; non-specific reading)

Such scopal interactions would not be expected if futurate *mp-* were strictly a temporal category.

Instead, futurate *mp-* conforms to the semantics in (87) for imperfective aspect in Badiaranke. The modal base and ordering source are similar to those argued for by Copley (2002) for English futurates. According to Copley, futurates fall into two categories: those that presuppose a *plan* by some *director* – an individual with the power and intention to cause the plan to be realized – and those that do not.[35] Both involve a *metaphysical* modal base, consisting of worlds that are identical to the base world up to and including perspective time – in other words, the metaphysical alternatives. The difference is in the ordering source. The first kind of futurate, typified by *The Red Sox play the Yankees tomorrow*, has a bouletic ordering source: the best worlds are those most compatible with the "director's" desires. (99) above is an example of this type, as is (100):

(100) Mamadu paːki   kab- akõ   de   Musaa toː **mpə-**
      Mamadu yesterday know- PAST.3sg.PERF AFF.DECL Musaa today 3sg.IMPF-

      naːtaː **kunaː kũ de**... bari reː- r-   a   dam- a.
      slaughter cow   DET AFF.DECL but come- NEG.PERF- 3sg.NEG kill- IRR

      'Mamadu knew yesterday that Musaa was going to kill a cow, but he didn't end up killing it.' (8.7,#2, elicitation)

For (100) to be true, the actual world must have turned out to be one that didn't go according to the director's plan, which – at some past time – was for for Musaa to kill the cow today.

The second type of English futurates describe eventualities which are beyond human control, but are still viewed as inevitable. Such cases, Copley argues, involve an inertial ordering source (her equivalent of Portner's non-interruption ordering source) – if nothing happens to prevent the world from evolving on its present course, the eventuality will occur. This option explains the felicity of *The sun rises at 5:13 a.m. tomorrow* (Copley 2002:54),

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[35]The director is often implicit; it may be the speaker or, as in (99), an unnamed third party.

where data on sunrise patterns in the past predict with certainty the sun's inevitable rising at 5:13, but not ?*It rains at 5:13 a.m. tomorrow, where the raining is not so inevitable or certain.

Indeed, Badiaranke speakers are reluctant to use futurate *mp-* to talk about future eventualities whose likelihood of occurrence is, in their view, beyond human powers of prediction – a sick person's recovery, for example, or the likelihood of rain. To be felicitous, such *mp-* marked eventuality descriptions must be qualified with an expression like *fe kamitʃemma* 'in my opinion' or *nĩ kodã maŋ-ə̃* 'God willing', or embedded under a non-factive verb like 'think'; such qualifiers shift the base world to the centered world of the attitude holder, in the sense of Abusch (1997). Only if the speaker has exceptional scientific knowledge would (101), for instance, be felicitous without *ndoto*.

(101) ndoto **mpə̃-**   **kẽdanə**.
       maybe 3sg.IMPF- healthy

       'Maybe **s/he will get better**.' (8.94, #1, elicitation)

In fact, though, an inertial ordering source cannot account for all the futurate *mp-* data not covered by a bouletic one. In (102), the presence of *mp-* does not imply that Faatu has any plan about her utterance, nor that facts about the world make her utterance inevitable.

(102) Faatu **mpə̃-**   **dã̃t- i-** **abõ**   **de**   nte   Maimuna kam- ə̃
       Faatu 3sg.IMPF- say- BEN- 1pl.NSBJ AFF.DECL COMP   Maimuna dance- 3sg.PERF
       de.
       AFF.DECL

       'Faatu **will tell us** whether Maimuna danced.' (10.5, #1, elicitation)

Similarly, in (103) (=(57) above), it is hard to imagine becoming tired as either a plan or an inevitable fact about the world.

(103) **mpə̃-**   **rəsə**   **de**   toː   ŋka kũpia.
       3sg.IMPF- be.tired AFF.DECL today and tomorrow

       '**She will be tired** today and tomorrow' (but isn't tired yet). (5.20, #1, elicitation)

For such cases, an inertial ordering source is too restrictive.

Instead, the ordering source is *stereotypical*: the best worlds are those consistent with what normally happens in *w*. In fact, a stereotypical ordering source can take care of the "inertial" cases above as well: only a speaker with sufficient knowledge about typical occurrences in the base world can comfortably rank the metaphysically accessible worlds by normalcy.

(104) formalizes the analysis of futurate *mp-*, which differs from progressive- and habitual-type *mp-* only in the choice of modal base and ordering source.

(104) $\text{IMPF}_{\text{FUT}}(P)$ is true at a world-time pair $<w,t>$ iff in all the best possible worlds w', according to a metaphysical modal base and bouletic or stereotypical ordering source, as evaluated from w at t, $\exists e$ and $\exists i$ such that P is true of e in w' at i.

This semantics is depicted graphically in (105), where w_2, w_4, and w_5 are the best metaphysically accessible worlds and dashes represent evaluation time in worlds where e is realized.

(105) Futurate imperfective:
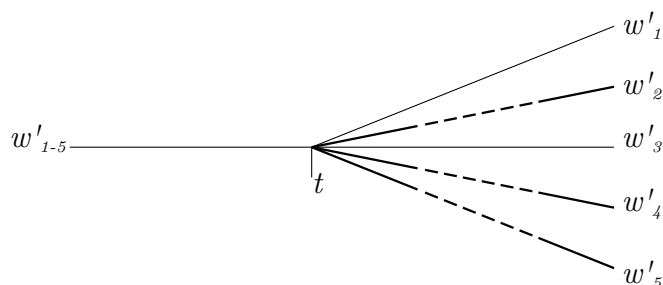
The analysis in (104) deals easily with the use of *mp-* to talk about future eventualities that are not "viewed from the inside," unlike both the traditional viewpoint analyses and Klein's neo-Reichenbachian one: the typically imperfective uses of *mp-* and its future use both assert that an eventuality is realized in some worlds accessible from the base world, though not necessarily in all metaphysical alternatives to the base world. In fact, the proposal that futurate *mp-*, like the perfective, involves a metaphysical modal base explains why future semantics is the imperfective's default reading: namely, the default modal base consists of those worlds identical to the base world up to perspective time. It takes special context, such as those laid out for progressive and habitual *mp-* in §3.2.2 above, to shift the modal base and/or ordering source.

Let us consider the application of (104) to (102) above, repeated in (106).

(106) Faatu **mpə-**   **dãt- i-**   **abõ**   **de**   nte   Maimuna kam- ə̃
       Faatu 3sg.IMPF- say- BEN- 1pl.NSBJ AFF.DECL COMP Maimuna dance- 3sg.PERF
       de.
       AFF.DECL

       'Faatu **will tell us** whether Maimuna danced.' (10.5, #1, elicitation)

In the absence of any context favoring a habitual interpretation, and in the presence of *de* (which rules out a progressive reading), a metaphysical modal base is assigned (107). Use of the imperfective indicates that not all the metaphysically accessible worlds are among this ideal set, so the interval within which Faatu's utterance may be realized is in the future of perspective time (which by default is TU). There is also no indication that any plan has been made, so the speaker must be making an assertion based on normal patterns in w, such as those in (108).

(107) M(w,t)=$\approx_{<w,t>}$ (the metaphysical alternatives to w at t)

(108) O(w,t)={Faatu is a gossip, Faatu always goes to parties, Faatu tends to answer our questions, Faatu generally tells the truth... }

Conditional and counterfactual consequents

In conditional and counterfactual uses of *mp-*, the antecedent restricts the accessible worlds. Following Kratzer (1981), I assume that counterfactuals involve an empty modal base and a totally realistic ordering source. That is, for any world w, the ordering source consists of the propositions that together uniquely define w: they are all true in w, but in all other worlds, at least one of them is false. The best worlds are those in which the antecedent is true, and as many as possible of the propositions that define w are also true – i.e. the best worlds are those "closest" to w. That is:

(109)   A counterfactual of the form $n\tilde{\imath}\,\alpha$, $\text{IMPF}_{\text{CF}}(P)$, where α is the antecedent and P is the eventuality description in the consequent, is true at a world-time pair $<w,t>$ iff of the worlds w' in which the proposition expressed by α is true, <u>in all the best w' worlds</u> as selected by an <u>empty</u> modal base and <u>totally realistic</u> ordering source, as evaluated from w at t, $\exists e$ and $\overline{\exists i}$ such that P is true of e in w' at i.[36]

In non-counterfactual conditionals, the modal base for the consequent is a totally realistic one, to which the proposition expressed in the antecedent is added (Kratzer 1981:68, Kratzer 1991b:648).[37] The ordering source is empty, since the conditional claims that the eventuality described in the consequent obtains in all worlds in which the antecedent is true. With a perfective-marked antecedent, the accessible worlds for the consequent are those in which the eventuality in the antecedent is realized within some interval i'; the endpoint of i' serves as perspective time for the consequent. With an imperfective-marked antecedent, the conditional asserts that at perspective time for the consequent, the eventuality in the antecedent is not yet realized, but likely to be realized in the best worlds, in the sense of progressive, habitual, or futurate *mp-*.[38]

Epistemic *mp-*

Finally, in epistemic uses of *mp-*, the speaker asserts that the eventuality described by P is realized in worlds that are epistemically possible, indeed probable, from the perspective of t in w, while it is uncertain whether the eventuality holds in the base world itself (and, of course, in all of its metaphysical alternatives). The modal base in such cases is clearly epistemic, consisting of the propositions that the speaker knows to be true. The ordering source consists of propositions deducible from some additional source of information beyond what the speaker "knows" – but exactly what this source is will depend on the utterance

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[36]My analysis is agnostic as to whether the falsehood of the antecedent is an entailment or, as has been argued for English (e.g. Anderson 1951), a cancellable implicature. Further research is needed to determine which is the case for Badiaranke counterfactuals.

[37]This is Kratzer's analysis of *material* implication, in which $p{\to}q$ is true iff either p and q are both true, or p is false (Kratzer 1991a). For *strict* implication, in which q is true in all worlds where p is true, Kratzer (1981) argues that both the modal base and the ordering source are empty.

[38]Although I do not go into all the implications here, there is precedent for analyzing conditionals with modal consequents as doubly modalized, e.g. Frank (1997) and Zvolenszky (2002).

context. It might be, for instance, something the speaker vaguely recalls or suspects, or something the speaker believes about the character of the individuals involved.

(110) $\text{IMPF}_{\text{EPIST}}(P)$ is true at a world-time pair $<w,t>$ iff <u>in all the best possible worlds w'</u>, according to an <u>epistemic</u> modal base and <u>non-empty</u> ordering source, as evaluated from w at t, $\exists e$ <u>and $\exists i$</u> such that P is true <u>of e in w'</u> at i.[39]

Let us look at the application of (110) to (69) above, repeated here as (111).

(111) katʃud- eː toː sẽ **mpə- duːdə** fe Amerik.
      morning- of today DET <u>3sg.IMPF-</u> enter P America

    'This morning **she'll likely have entered** America.' (8.22, #2, elicitation)

Here i is specified to be 'this morning', which, in the context given (where the sentence is uttered at noon), is in the past of perspective time. Use of the imperfective indicates lack of epistemic certainty that the subject entered America this morning in all metaphysical alternatives to w at TU, and thus in w itself. Because i does not extend beyond t, only an epistemic (and not a progressive, habitual, or futurate) reading is available: for interruption to be an issue (as in progressive or habitual mp-) or for the metaphysical alternatives to be differentiated at i (as in futurate mp-), at least part of i must follow t.

We have arrived, then, at a unified analysis of the Badiaranke imperfective. Like classic analyses of typical imperfectives, the present analysis treats Badiaranke's imperfective as a category used to talk about eventualities that are not yet complete with respect to a certain time; unlike classic analyses, the one here successfully accounts for those functions of the Badiaranke imperfective more reminiscent of modality than of aspect. I have argued that all five imperfective subtypes – progressive, habitual, futurate, conditional/counterfactual, and epistemic mp- – express the general semantics in (87): they all assert likely realization of an eventuality, i.e. realization in some highly-ranked set of possible worlds. The subtypes differ only in how likelihood is evaluated, i.e. how the candidate worlds are selected (the type of modal base) and ranked (the type of ordering source). This modal solution of the Badiaranke imperfective puzzle is satisfying given recent modal analyses of the English progressive (e.g. Portner 1998) and habitual (Ferreira 2004), as well as of the imperfectives in other languages, e.g. Blackfoot (Dunham 2007).

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[39]The proverbial astute reader may note a potential problem for (110) with respect to the analysis of the perfective in §3.4.2 above. Namely, an epistemic modal base is always realistic: the base world is always part of the modal base. As a result, we might expect epistemic mp- to be usable when talking about eventualities that have definitely come about in w by t. This problem is entirely parallel to the fact noted by Kratzer (1991b:645), among others, that sentences with epistemic *must* are felt to be weaker than the corresponding sentence without *must*, even though $\Box p$ logically entails p. As Kratzer argues, the claim that in the *best* epistemically accessible worlds as ordered by a non-empty ordering source, p is true is weaker than a claim that in all metaphysical alternatives, including w, p is true; hence, use of epistemic $mən$- implicates that the stronger perfective cannot be used, and is infelicitous if it can be.

3.4.5 Advantages of the present analysis

The analysis presented here has a number of advantages. First, it makes the correct predictions for the tricky cases, statives. If imperfective aspect indicates that the eventuality is (potentially) not realized in all the metaphysical alternatives at $<w,t>$ – and if the metaphysical alternatives, including w, are indistinguishable up to t – then imperfective aspect on a stative eventuality description is correctly predicted not to mean that the state holds in w before or at t. The progressive subtype of imperfective, when applied to a stative, should have a not-complete-state reading, whereas a simple assertion that the state obtains should be expressed with the perfective; as we saw in §3.2, this is indeed the case. The habitual-type imperfective, requiring a plural eventuality, should be compatible only with temporary statives (which can occur episodically) and not with permanent statives; indeed, as (50) above shows, imperfective on individual-level statives cannot get a habitual reading. At the same time, we correctly predict that with a kind-denoting subject, individual-level statives should be compatible with generic *mp-*, if different individuals' instantiations of the state are separated in time; (93) above shows this prediction to be correct.

More generally, my analysis of the perfective explicitly explains the dependence of temporal interpretation on stativity, which is often stipulated or taken for granted. Through the use of metaphysical alternatives, it also explains the correlation not only between perfective aspect and past times – which multiple previous analyses of aspect also account for – but also between imperfective aspect and future times, which traditional analyses cannot account for.

Regarding the imperfective, the analysis here provides a unified account for its superficially diverse uses, most of which, despite their cross-linguistic frequency, cannot be explained by viewpoint-based and neo-Reichenbachian analyses. I have thus extended the insights of previous modally-based analyses, e.g. Dowty (1977) and Portner (1998), which have focused on the progressive. This unified approach distinguishes my analysis from others, e.g. Hacquard (2006), that treat the imperfective in other languages as a morphological default and not a coherent semantic category. Since (87) covers all the imperfective functions, and since pragmatics and syntax resolve the potential semantic ambiguity, it is desirable to encode the semantic commonalities of the imperfective subtypes in the semantics of a single underspecified Badiaranke imperfective.

In fact, it is conceivable that the English "progressive" could be analyzed as having a similarly broad semantics, as this form also has at least habitual (e.g. *I'm teaching linguistics these days*) and futurate (e.g. *We're leaving tomorrow*) meanings. While a general semantics for the English progressive is beyond the scope of this work, it is worth noting that the multiplicity of modal base-ordering source combinations may hold true for imperfectives in more familiar languages as well. Languages with a more restricted imperfective might place more limits on the modal base and ordering source. English, for instance, might limit its imperfective to a circumstantial modal base, since English *be* V-*ing* does not share the epistemic use of Badiaranke *mp-*.

3.4.6   Less attractive analyses

3.4.6.1   A proposal problematic for the perfective

Bohnemeyer and Swift (2004) observe that in certain languages (e.g. German and Inuktikut), clauses unmarked for aspect receive a perfective interpretation with telic eventuality descriptions but an imperfective interpretation with atelic ones. Their analysis centers on the notion of event realization – "informally, the factual occurrence of an event as described by a certain eventuality description at a certain time" (Bohnemeyer and Swift 2004:264) – which has clear parallels to my own analysis, with its evocation of eventuality realization in various worlds. In the languages in question, according to Bohnemeyer and Swift, eventuality descriptions unmarked for aspect are interpreted with whatever aspect is required for event realization. Bohnemeyer and Swift's proposal is intriguing with respect to Badiaranke, in which the perfective – lacking any overt perfective morpheme, and taking the subject agreement affixes that are most widespread in the language (see Chapter 4 below) – is arguably zero-marked. Could the perfective, then, simply assert event realization? After all, states are atelic, and 2-state eventualities are telic.

It turns out that for Badiaranke, this simpler non-modal solution is not tenable, due to the semantics of the perfective with activities. Since activities are atelic, an analysis following Bohnemeyer and Swift (2004) would predict perfective-marked ("zero-marked") activities to receive an imperfective interpretation, counter to fact (see (10)-(11) above). In Badiaranke, the critical distinction is one of stativity (true possession of the subinterval property) rather than of telicity.

3.4.6.2   Proposals problematic for the imperfective

Since many languages use imperfective aspect in irrealis environments, including in future and conditional/counterfactual contexts, one might look to literature on the imperfective-irrealis link for an analysis applicable to the Badiaranke imperfective.

Most of this literature has attempted to explain the cross-linguistic affinity between imperfective aspect and conditional/counterfactual antecedents (rather than in consequents, as in Badiaranke). For Iatridou (2000), the imperfective appears in antecedents of Greek counterfactuals (and conditionals) simply because in this environment, "the temporal coordinates of an eventuality are not set with respect to the utterance time" (Iatridou 2000:262). If this applied to imperfective marking in Badiaranke conditionals, one would expect *mp-* to appear everywhere that TSit is not fixed with respect to TU, including in the antecedents of conditionals like (67) (repeated in (112)), counter to fact.

(112) nĩ **lafiŋieːn- i** fanã waːti woː waːti kə- mən de a- jetʃ- a
if want- 2sg. also time every time 2sg.- POSSIB AFF.DECL 2sg.SBJ- hear- IRR

kopaːjemanə.
my.voice

'If **you want**, also, every so often you can listen to my voice.' (7.112, #1, audio records release)

Another proposal, Ippolito's (2004) analysis of Italian imperfective conditionals, relies heavily on the fact that the *imperfetto* is a past imperfective; her account is thus of limited relevance to the Badiaranke imperfective, which has no particular association with past tense.

Along similar lines, Fleischman (1995) raises the question of why some languages, like Bargam (Papuan), mark habitual clauses as irrealis, and similarly, other languages (e.g. Bulgarian) use identical morphology to mark habitual aspect and certain irrealis categories. She argues that irrealis mood can indicate a stance not only about the reality of an eventuality, but also about its reference (or lack thereof) to a specific time, world, and place – much as the habitual is "the aspect of generic, non-referring expressions" (1995:537). My analysis above takes the opposite tack to Fleischman's: rather than broadening the definition of irrealis mood, I have proposed an analysis of the Badiaranke imperfective itself from which this association with irreality falls out naturally.

Another conceivable proposal would treat the imperfective not as a unitary category, but rather as a type of subject agreement conditioned by numerous null morphemes. On this way of thinking, some semantic commonality – such as truth in a subset of accessible worlds but not in all metaphysical alternatives – between a null progressive, a null habitual, a null future, and so on triggers imperfective agreement. The problem with such an analysis is that it offers no empirical advantages over the one argued for here, and several theoretical and empirical disadvantages. It is not evident that having five null morphemes that trigger identical agreement would make better predictions about the data than does a one-to-one mapping between morphosyntax and semantics. Given the lack of empirical distinctions, Occam's razor argues against proliferation of null entities. Moreover, if this other analysis were correct, one would expect habitual and progressive semantics to trigger *mp-* series agreement wherever they occur. This is not the case, however: as mentioned earlier and as discussed in Chapter 4 below, the periphrastic habitual and periphrastic progressive actually take the same subject agreement markers as the perfective, not those used in the general imperfective. Indeed, that a modal imperfective should vary along the dimensions of modal base and ordering source is no less surprising than the widely accepted fact that modal verbs like *can*, *must*, *may*, etc. vary along these same dimensions.

3.5 Conclusion

The analysis of Badiaranke proposed in this chapter has both typological and theoretical implications. Typologically, this chapter makes two contributions. First, it describes and analyzes the aspectual system of a poorly documented minority language with a complex tense/aspect/modality system. Second, although many languages share one or more of Badiaranke's less-common aspectual properties, few (if any) seem to share all of them. While other authors have been able to explain one or another correlation – between the perfective and present states, for instance, or between generics and irrealis – in various languages, the combination of these features in Badiaranke draws out their connectedness and lends the language to a unified analysis, which I have provided. Furthermore, while the data in this chapter come from Badiaranke, and hence the particular claims apply strictly to Badiaranke's aspectual system, the present analysis has implications for our understanding of related languages. The use of imperfective in future contexts is common among Atlantic languages, of which at least Pulaar (Fagerberg-Diallo 1983:247), Wolof (Nussbaum *et al.* 1970:360), Balanta (Fudeman 1999:94), Kisi (Tucker Childs p.c.) and Mani (Tucker Childs p.c.) display this pattern. I would expect my analysis of Badiaranke imperfectivity to extend to these typologically similar languages. I would also expect my treatment of the Badiaranke perfective to shed light on the many African languages, e.g. Wolof (Nussbaum et al. 1970), Aghem (Stephen Anderson, p.c.), and Bamileke-Dschang (Derek Nurse, p.c.), in which a single form expresses present states and past events.

On the theoretical front, I have demonstrated the need for a revision of conventional theories of aspect with regard to Badiaranke, and the inextricability of modality from the semantics of aspect. By using the same morphology to mark not only progressive and habitual, but also a number of other semantic categories usually considered more modal than aspectual, Badiaranke provides overt evidence for the inherent modality not only of the progressive, but of imperfective aspect in general. Previous proposals for modal semantics of the imperfective tend to focus only on one type of imperfective-modal interaction (e.g. progressive/inertia worlds for Portner, Dowty, etc.; imperfective/irrealis for Fleischman), without testing how the resulting semantics can or cannot be extended to other such phenomena, as I have done in this chapter.

While it is widely accepted that we need some sort of modal semantics for imperfectives, I have argued that the Badiaranke perfective also involves modality. The use of some modality in the perfective is not unprecedented (cf. Bar-El *et al.* (2005), and the English perfect receives a modal treatment by Portner (2003); but rarely if ever is the modality of the imperfective tied to that of the perfective as in my analysis, where truth of a proposition in all metaphysical alternatives to w at t is the distinguishing factor between imperfective and perfective aspects. Modality is similarly implicated throughout the rest of the aspectual system, as described in Chapter 4 below.

On the analysis argued for here, both perfective and imperfective "aspect" in Badiaranke bridge the categorial divide between aspect and modality. Even while being partially modal,

they are aspectual in that they relate the time of an eventuality to a reference interval, i; in Tonhauser's (2006) terms, they are "operators on eventuality descriptions." This dual nature of these particular categories does not mean we should erase the distinction between aspect and modality: in Badiaranke as in English, for instance, there exist lexically modal verbs, whose contribution is purely modal (quantifying over possible worlds) and not aspectual. Instead, the lesson from Badiaranke is that in many languages – especially African ones with imperfective "futures" and perfective-marked present states – modality and aspect might be better treated as a continuum than as two sharply distinct categories within a given language.[40]

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[40]It is possible to view aspect and modality as spanning a cross-linguistic continuum as well. In some languages, e.g. French (Hacquard 2006), perfective aspect might occupy the purely aspectual zone of the continuum; it is less clear whether imperfectives are ever entirely free of modality, although Boneh and Doron (2008) claim that one of Hebrew's two habituals has no modal content.

Chapter 4

Other aspectual constructions

4.1 Introduction

While Chapter 3 focused on the perfective and imperfective, Badiaranke has a number of other aspectual constructions. The perfective and imperfective merit their own chapter due to their centrality to and pervasiveness in Badiaranke, and indeed their involvement in other aspectual categories in the language, as we will now see. At the same time, addressing *only* the perfective and imperfective would provide an incomplete and oversimplified picture of Badiaranke's complex, multi-faceted aspectual system. For descriptive completeness, especially important for an under-described language like this one, it is therefore necessary to review the other aspects as well. In the present chapter I provide an overview of aspectual constructions and morphemes not yet discussed, proposing a less-formal semantic analysis of each one. In some cases, a synchronic treatment proves inadequate, leading me to consider the constructions' diachronic sources.

4.2 Narrative morphology

The Badiaranke perfective and imperfective aspect do not always take the forms that have been discussed thus far. The templates in §3.2.1 and §3.2.2 above, repeated in (1)-(2), schematize the forms the aspects take in affirmative declarative clauses spoken in isolation, or in the first such clause in an utterance.

(1)   Perfective template: V-<u>SUBJECT</u> *de*

(2)   Imperfective template: <u>SUBJECT</u>-V *de*

When an utterance consists of multiple clauses, in contrast, many of the non-initial clauses bear a different type of morphology, which I will refer to as *narrative morphology*. For a clause to qualify as "non-initial," it must be preceded by another clause at the *same* level in the DRT sense (see, e.g., Roberts 1989): non-initial matrix clauses are preceded by other

matrix clauses, and embedded clauses qualify as initial unless preceded by another clause within the same subordinating structure (e.g. within the antecedent of a conditional or within a complement clause). In the discusssion below, I refer to the preceding clause that sets up the necessary environment for use of narrative morphology as the "antecedent clause." All clauses containing narrative morphology (henceforth NM) are affirmative.

Special morphology on sequences of non-initial clauses describing sequences of events has been observed in a number of other African languages. Parallel phenomena abound in Bantu languages, including Kimwani (Petzell 2002), Kinyamwezi (Maganga and Schadeberg 1992), Sesotho (Makalela 2004), SiSwati (Ziervogel and Mambuza 1976),[1] Kiswahili (Hopper and Thompson 1980), Zulu (Hlongwane 1996), among others (Nurse and Phillipson 2006). Narrative morphology also appears in many non-Bantu African languages, e.g. within the Cushitic, Nilotic, Kru, Gbe, and Chadic subfamilies (Longacre 1986) and in Senufo, Bambara, and various Olti-Volta languages (Carlson 1992); the phenomenon has not often been noted in Atlantic languages, although it does occur in Pulaar (Comrie 1985:104). Similar morphology has also been noted in non-African languages, e.g. Quechua (Howard-Malverde 1988).

In the literature, such morphology is usually claimed to mark "tense," and is often assumed to mark sequentiality of events (e.g. Longacre 1986, Ziervogel and Mambuza 1976:176). As a result, NM is often labeled "narrative tense" (e.g. Carlson 1992, Hlongwane 1996, Hopper and Thompson 1980) or "consecutive tense" (e.g. Longacre 1986, Nurse and Phillipson 2006). In this section, I argue that these tense-based terms do not fit the Badiaranke phenomenon: NM in Badiaranke does not mark tense. Despite superficial appearances, moreover, we will see that Badiaranke NM does not always mark sequences of events. Nor is Badiaranke NM aspectual; I discuss NM in this chapter only because it affects the form, as well as the semantics, of constructions that are clearly aspectual. The semantics of Badiaranke NM is instead modal.

Badiaranke is cross-linguistically unusual in possessing not one, but two types of NM, which correspond roughly (but not precisely) to perfective and imperfective aspect. The first type, which I will refer to as NM1, simply consists of a prefix, *mə-*. The affirmative declarative marker *de* is not permitted; otherwise, NM1-marked clauses are morphosyntactically identical to ordinary clauses spoken in isolation. NM1 usually occurs in perfective clauses, as shown in (3)-(6).[2]

(3) seːt-   ə̃   de   **mə-** seːt- aːs- ə̃.
     speak- 1sg.PERF AFF.DECL NARR- speak- REP- 1sg.PERF

     'I spoke, **I spoke again**.' ('I spoke over and over.') (1.101, elicitation)

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[1]In SiSwati, unlike in Badiaranke, NM can be used in negative clauses.

[2]In this chapter, I continue to put the predicate of interest in boldface, and I underline the defining morphemes of the construction being illustrated.

(4) **mə- sətə- bə̃** **mə- raː- bə̃** jaːr siaːr kataːs.
    <u>NARR</u>- move- 3pl.PERF <u>NARR</u>- go- 3pl.PERF village other.place again

    '**They moved**; **they went** to yet another village.' (6.1, #1, *Daamaseree* story)

(5) maː jaːr sənaː jak- ako- se jã. **mə- riː- bə̃**
    QUOT town other be- PAST- REL.PERF there <u>NARR</u>- do- 3pl.PERF

    dʒã̄badõ. taːme wũtoːfu ŋka wũntiŋa **mə- jim- bə̃** maː
    circumcision.ceremony now rabbit and hyena <u>NARR</u>- say- 3pl.PERF QUOT

    dʒalijaː bẽ- raː.
    music.making 3pl.IMPF- go

    'It's said that there was once a town. **They put on a circumcision ceremony**.
    Now the rabbit and the hyena **said** that they were going to pretend to be musicians.'
    (6.30, #4, rabbit and hyena story)

(6) **mə- watt- ə̃** haː **mə- rəs- ə̃.**
    <u>NARR</u>- wait- 3sg.PERF until <u>NARR</u>- tired- 3sg.PERF

    '**She waited** until **she was tired**.' (2.10, #2, elicited narrative)

Presumably due to data like these, Brown and Logdon (1994:II.33) claim that *mə*- appears
only in perfective clauses. This generalization, however, is too strong, as we will see below.

   The second kind of narrative morphology, henceforth NM2, is morphologically identical
to the subjunctive/hortative: the verb bears a prefix agreeing with the subject (distinct from
the imperfective subject agreement prefixes) and an irrealis suffix, -*a*.[3] The NM2 subject
agreement prefixes are laid out in (7).

(7) NM2 subject agreement prefixes
    1sg: ma-
    2sg: a-
    3sg: ma-
    1pl: bo-
    2pl: nu-
    3pl: be-

   NM2 occurs in clauses which, if spoken in isolation, would take imperfective morphology,
i.e. ones that express progressive (8), habitual ((9)-(10)), or futurate ((11)-(12)) semantics.[4]

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   [3]The analysis of NM2 developed below accounts for its subjunctive use in some embedded clauses; it is
probable that the hortative use can receive a related diachronic or synchronic explanation, which I leave for
future research.
   [4]I have found no examples of NM2 expressing epistemic probability, but I also have not tested its ability,
or lack thereof, to serve the function of epistemic *mp*-.

(8) to:tũ **be-** **dʒakk-** **ən-** **a** ma:sə bẽ- pə- battə bẽ- pə-
now 3pl.NARR- fast- CAUS- IRR eye 3pl.IMPF- IMPF- harvest 3pl.IMPF- IMPF-
battə.
harvest

’Now **they were glancing around** (lit. were moving their eyes quickly), they were
harvesting, they were harvesting.‘ (6.17, #4, old woman and bean fields story).

(9) comes from a text about a game that children play at harvest time, in which one or more
of them is disguised as a being called a *dũdurã*; (10) is part of a description of a celebration
known as a *mambasa:mbas*, hosted and attended by women with children. Both texts are
described in more detail in Appendix A.

(9) nĩ ka: wũ **ma-** **jib-** **a** **kũta:na kũ** to:sa sẽ pe:r
if NEG.IMPF.3sg. DEM 3sg.NARR- take- IRR ashes DET face DET all

ma- **lesiŋ-** **a** **ma-** **səm-** **a** ke: dʒa:bətə ma:m-
3sg.NARR- paint- IRR 3sg.NARR- arrive- IRR NEG.IMPF.2sg. recognize owner-

ã i.
3sg.NSBJ COP

‘Or else **he takes ashes** and **paints** his whole face with it so **it happens** you can’t
recognize who it is.’ (7.28, #1, *dũdurã* text)

(10) **be-** **ri-** **a** **be-** **kam-** **a** **be-** **ni:n-** **a** ha: **ma-**
3pl.NARR- come- IRR 3pl.NARR- dance- IRR 3pl.NARR- play- IRR until 3sg.NARR-

pi:s- **a.**
daybreak- IRR

‘**They come, they dance, they play** until **dawn**.’ (7.5, #1, *mambasa:mbas* text)

(11) nĩ jott- ã **ma-** **watt-** **a** **ma-** **da:tua-** **a.**
if/when rest- DETRANS.1sg.PERF 1sg.NARR- wait- IRR 1sg.NARR- eat.lunch- IRR

ma- **da:tua-** **a** **ma-** **bu:-** **o.** **ma-** **raŋ-** **a** **ma-**
1sg.NARR- eat.lunch- IRR 1sg.NARR- bathe- PASS 1sg.NARR- go- IRR 1sg.NARR-

saliŋ- **a** **salifana** **sẽ.**
pray- IRR midday.prayer DET

‘Once I’ve rested, **I’ll wait, I’ll eat lunch. I’ll eat lunch, I’ll take a bath, I’ll
go and pray the midday prayer**.’ (2.37, #2, ‘what I’ll do tomorrow’ text)

(12) … wũ kama re: de mã- da:s- o: de. katʃudu
DEM NEG.IMPF.1sg. come EMPH 1sg.IMPF- lie.down- PASS AFF.DECL morning

ma- **pamm-** **u-** **a:s-** **a.**
1sg.NARR- set.out.in.morning- VENT- REP- IRR

‘In that case, I won’t come – I’ll stay over. In the morning **I’ll head back here**.’
(7.106, #1, Koufambora plans)

There are two questions, then, that need to be resolved. First, what is the function of narrative morphology in Badiaranke in general? Second, what is the semantic difference between NM1 and NM2? Let us consider three hypotheses that do not work. In testing (and rejecting) these hypotheses, we will get a better handle on the distribution and semantics of Badiaranke NM.

The first reasonable, but wrong, hypothesis, inspired by the "tense" terminology in the literature, is that NM expresses temporal semantics. In particular, one might guess that NM1, being (often) used to talk about past events, expresses past tense, while NM2, being used to mark ongoing and future eventualities, expresses non-past tense. Problematically for this hypothesis, when NM1 is applied to a perfective-marked stative eventuality description, the clause can be interpreted as present tense, as in (13). Given what we have seen about the Badiaranke perfective so far, this observation is unsurprising.

(13) katʃidde pakkã patʃõku kiː   jã   de,   paddas **mə-** **kiː**
      cooking one   *patʃõku* be.3sg.PERF there AFF.DECL *paddas* NARR- be.3sg.PERF
      jã, paɲaɲi **mə-** **kiː**   **jã,** kudadə **mə-** **kiː**   **jã,**
      there, *paɲaɲi* NARR- be.3sg.PERF there, couscous NARR- be.3sg.PERF there,
      pamaːno **mə-** **kiː**   **jã.**
      rice   NARR- be.3sg.PERF there.

      'One type of cooking, **there's *patʃõku*, there's *paddas*, there's *paɲaɲi*, there's couscous, there's rice.'** (4.90, #3, cooking text)

(14) lafiɲieːnə- b� ̃...   **mə-** **lafiɲieːnə-** **b ̃...**   **mə-** **lafiɲieːnə-** **b ̃...**
      want-   3pl.PERF NARR- want-   3pl.PERF NARR- want-   3pl.PERF
      'They want X... and **they want Y**... and **they want Z**....' (Heard "in the wild," in a lament about kids today)

Additionally, as we will see below, NM1 can appear on progressive- or habitual-marked clauses describing eventualities that overlap with a previously mentioned eventuality.

The second reason to doubt a tense-based analysis is the appearance of NM1 in perfective-marked, eventive *nĩ* clauses – which can function as antecedents of conditionals or as temporal 'when/once' clauses – with a non-past interpretation. NM1 can appear in the scope of a conditional if preceded by another, non-NM-marked clause within the scope of the same conditional. In (15)-(26), the NM-marked clauses receive a generic interpretation.

(15) nĩ   wuttə- rə-   nũ   **mə-** **jim-** **ə̃**   bismila kuru   kũ
      if/when meet- RECIP- 2pl.PERF NARR- say- 3sg.PERF welcome kola.nut DET
      ma-   fətt- oː.
      3sg.NARR- split- PASS

      'Once you've come together (agreed) and **he has said "welcome,"** the kola nut is split.' (3.24, #1, marriage customs text)

(16) nĩ   tʃuːraːn- õ   **mə- fõ**,   nu-   duaː- r-
     if/when distribute- PASS.3sg.PERF <u>NARR</u>- finish.3sg.PERF 2pl.NARR- pray- RECIP-
     a, nu-   piːsər-   a   pakkã wo ma-   jeːr-   a fe teːr- e-
     IRR 2pl.NARR- separate- IRR one   all 3sg.NARR- head.home- IRR P house- of-
     jã.
     3sg.NSBJ

'Once it's been distributed, **finished** (once it's all been distributed), you pray together, you split up, each one goes to his own home.' (2.61, #1, 'when someone dies' text)

Just as NM1 cannot mark past tense, NM2 cannot mark non-past tense, since it can be used to talk about eventualities in progress (17) or recurring (18) with respect to a past time.

(17) toːtũ **be-   dʒakk- ən- a** maːsə bẽ- pə-   battə bẽ- pə-   battə.
     now   <u>3pl.NARR</u>- fast- CAUS- <u>IRR</u> eye 3pl.- IMPF- harvest 3pl.- IMPF- harvest

'Now **they were glancing around** (lit. were moving their eyes quickly), they were harvesting, they were harvesting.' (6.17, #4, old woman and bean fields story)

(18) tʃifədə- mã   wẽ, nĩ   jim- õ   ma-   ra daːs-
     marry- 3sg.on.3sg.PERF DET if/when say- PASS.3sg.PERF 3sg.SBJ- go spend.night-
     a e paːd- e mur-   ã   **ma-   jim- a** kẽdan- t-
     IRR P room- of husband- 3sg.NSBJ 3sg.NARR- say- IRR healthy- NEG.PERF-
     a.
     3sg.NEG

'Once he [the ruler] married him [the man who had been brought up as female], if he was told to go sleep in his husband's room, **he would say he was sick**.' (6.36, #5, ruler with two "wives" story)

A second reasonable, but wrong, hypothesis – consistent with references in the literature to "consecutive tense" – is that NM marks sequentiality of events. In the framework developed in Chapter 3 above, this hypothesis would mean that NM sets evaluation time to an interval beginning at the end time of a previously mentioned eventuality.

Four observations disprove this second hypothesis. First, if NM marked sequential events, one would expect the clause before an NM-marked clause to express a preceding event. In fact, however, the clause preceding an NM-marked clause sometimes describes a state or process that overlaps with, and therefore does not end before, the eventuality in the NM-marked clause. In (19), for instance, the state of not being a blacksmith (a class to which one belongs from birth) is permanent; it holds before, during, and after the decision to enter the blacksmiths' dance.

(19) nĩ ka- re-   ni   wusaː **mi- jim- i   kə-   bər-**
      if be- NEG.PERF- 2sg.NEG blacksmith <u>NARR</u>- say- 2sg.PERF 2sg.IMPF- enter-

      ã   de   kataː kədeː- dʒitt- ẽ.
      3sg.NSBJ AFF.DECL disaster REL.HABIT- get-   2sg.NSBJ

      'If you're not a blacksmith and **you say you'll enter it** [the dance], it's disaster
      that gets you.' (7.9, #1, *pəsaːsaː* description)

Similarly, in (20), the poverty of the speaker's father still holds at utterance time, rather
than having ended before her mother's death.

(20) birĩ nõ   tẽbe niːna naː- re-   mã   paːp- e- mma   naː-
      since INTERJ time DEM have- NEG.PERF- 1sg.NEG father- of- 1sg.INDEP have-

      r-   a,   naː-   e- mma   fanã **mə- sad-   ə̃.**
      NEG.PERF- 3sg.NEG mother- of- 1sg.INDEP also <u>NARR</u>- die/dead- 3sg.PERF

      'Now ever since then, I have nothing, my father has nothing, my mother too **died/is
      dead**.' (4.20, #3, life story)

The reverse problem also exists. That is, there are cases where the NM-marked clause
itself expresses a state, and this state overlaps with the eventuality described in the preceding
clause, as in (21) – where the speaker is a man at the same time that the addressee is a
woman – and in (22), where the event of the addressee's picking up the shirt begins after,
not before, the subsequently mentioned desire to don it. This situation, too, is not predicted
by a sequentiality analysis.

(21) … mbõ   ŋk ẽ   nna   pakkã appa pakkã bədd-   õ, wiː
         1pl.INDEP and 2sg.NSBJ mother one   father one   come.out- 3sg. 2sg.INDEP

      mi- jak- i   tʃaːfe mma   **mi- jak- ə̃**   wusia.
      <u>NARR</u>- be- 2sg.PERF woman 1sg.INDEP <u>NARR</u>- be- 1sg.PERF man

      '…[If] You and I came from one mother and one father, (while) you, **you're a
      woman**, me, **I'm a man**' (then your son can marry my daughter). (7.33, #1,
      kũpãbra (kidnapping of the bride) and other marriage practices)

(22) tʃekit- iː   kabãtã kã **mə- lafiŋieːn- i-   ã**   ka-
      take- 2sg.PERF shirt   DET <u>NARR</u>- want-   2sg.PERF 3sg.NSBJ INF-

      dunnaː-   e.
      put.on.clothes- INF

      'You took the shirt and **wanted to put it on**.' (5.101, #2, elicitation)

Even more problematic for a sequentiality analysis is the fact that some NM-marked
clauses describe an eventuality that temporally *precedes* those in preceding clauses, as in
(23), where the giving-of-palm-oil event precedes the previously mentioned leaving-for-the-
fields event, and in (24), where the baby is clearly born *before* the baby naming ceremony is
held.

(23) <u>mə-</u> pamm- ə̃ fe pədao. jã ŋka mpə- raː <u>mə-</u> nĩk-
<u>NARR-</u> leave.in.morning- 3sg.PERF P field there and 3sg.IMPF- go <u>NARR-</u> give-

ə̃ niajã tẽtulu ma- sədd- eːn- i- ã wuna daːtua.
3sg.PERF his.wife palm.oil 3sg.SBJ- cook- INSTR- BEN- 3sg.NSBJ that lunch

'He left for the fields. Before he went, **he gave his wife palm oil** for her to cook lunch for him with it.' (5.30, #1, elicited narrative)

(24) awa, bə̃ bə- basə bẽ, nĩ lẽb- aːn- i-
INTERJ 3pl.INDEP PL- woman.with.children DET if/when call- CAUS- 2sg.PERF-

abə̃, nĩ kulli rĩ, ka- ŋiːs- e rĩ,
3pl.NSBJ if/when baby.naming do.3sg.PERF INF- shave.head- INF do.3sg.PERF

<u>mi-</u> dʒitt- i **nəse** <u>mi-</u> **ŋiːs- i weː**...
<u>NARR-</u> get- 2sg.PERF child <u>NARR-</u> shave.head- 2sg.PERF 3sg.INDEP

'So, them, the women with children, if/when you call for them, if/when a baby-naming happens, a shaving [of the baby's head] is done, **you had a baby** and **you shaved it**...' (7.5, #1, *mambasaːmbas* text)

The final nail in the coffin of the sequentiality hypothesis is the ability of NM1 and the relative past suffix -*ako*- to co-occur in a single clause. As I demonstrate in Chapter 5 below, -*ako*- on a perfective-marked clause implicates that the state described, or the state resulting from the event described, no longer holds at the time being talked about; this implicature holds unless explicitly canceled. In (25)-(26), -*ako*- appears in NM-marked clauses, indicating that these clauses describe an eventuality realized before the time being talked about at that point in the discourse, i.e. the time of the previously mentioned eventuality. These data are thus incompatible with an analysis of NM as marking sequentiality.

(25) <u>mə-</u> səm- ə̃ fe gaːaːs. <u>mə-</u> lafiŋieːn- <u>akõ</u> ka- raŋ- e
<u>NARR-</u> arrive- 1sg.PERF P car.stop <u>NARR-</u> want- <u>PAST.3sg.PERF</u> INF- go- INF

fe Velingara.
P Velingara

'She arrived at the place where cars come to. **She had wanted to go to Velingara**.' (2.10, #2, elicited narrative)

(26) nĩ jim- ə̃   ma-   tʃoːd- a   haː dimãsi- e toː sẽ mpə-   sarə-
      if say- 1sg.PERF 1sg.SBJ- stay- IRR until Sunday- of today DET 3sg.IMPF- long-

      daːr-   akəde   de. **mi- jim- ako- bə̃** toː dimãs sẽ
      INTENS- PAST.IRR.NPERF AFF.DECL NARR- say- PAST- 3pl. today Sunday DET

      be-   ri- akəde   pidʒaːda kobəda ŋka maːe mã be- tʃadd i-
      3pl.NARR- do- PAST.IRR.NPERF day   seven   DET 3pl.- tie- BEN-

      aːs-   akəd-   ã   sadaː.
      REP- PAST.IRR.NPERF- 3sg.NSBJ sacrifice

      'If I said I should stay until Sunday, i.e. today, it would have been very long. **They
      had said** today, Sunday, they would come, the seventh day, they would distribute
      the sacrifice (what one gives to guests at funerals, baby namings, etc.).' (4.69, #1,
      Kounkandé text)

The "sequentiality of events" hypothesis, then, cannot be maintained.

A third conceivable hypothesis is that NM1 and NM2 are simply the equivalents of
perfective and imperfective aspect, respectively, in sequences of (affirmative) clauses. In
addition to begging the question of *why* sequences of clauses require special morphology,
this analysis fails to explain another key fact about NM1. While *mə-* does more frequently
appear in clauses with perfective semantics, it is (contra Brown and Logdon 1994:II.33)
compatible with other aspects as well, including the general imperfective (27), periphrastic
habitual ((28)-(29)), and periphrastic progressive (30).

(27) waːti bõ-   seːt- ər   fe portabl wẽ, tʃekit- iː   kabãtã kã
      time 1pl.IMPF- talk- RECIP P cell.phone DET take- 2sg.PERF shirt   DET

      de   **mə- kə-   dunnaː.**
      AFF.DECL NARR- 2sg.IMPF- put.on.clothes

      'When we were talking to each other on the phone, you took the shirt and **were
      putting it on**.' (5.101, #2, elicitation)

(28) Mariaama wu-   rəm-   ə̃   wẽ, nəs- e- mãnə̃, **mə- kəd-**
      Mariaama NMLZ.SG- give.birth- 1sg.PERF DET child- of- mine NARR- HABIT-

      ə̃   **jimə** maː wun-   ã   k- i.
      3sg.HABIT say QUOT person- 3sg.NSBJ be- 2sg.PERF

      'Mariaama, the one I gave birth to, my child, **she says** that you're her person.' (4.23,
      #3, self-introduction)

(29) wũ i   mitʃ- oː   se   Ceddo Ñaabali, **mə- kəd- ə̃   jim-**
      DEM COP call- PASS- REL.PERF Ceddo Ñaabali NARR- HABIT- 3sg.HABIT say-

      o   Sunkaru.
      PASS Sunkaru

      'It's she that is called Ceddo Ñaabali, and **she's also called** Sunkaru.' (4.23, #3,
      self-introduction)

(30) mi-   jeːr-   ũ   mə-   rẽ   ri-   a   **mi- jak-**
NARR- head.home- VENT.1sg.PERF NARR- come.1sg.PERF come- IRR NARR- be-
ə̃   ka- ruːf-   e   pədao.
1sg.PROG INF- clear.field- INF field

'I came home, I came, **I was clearing the field**.' (8.14, #2, 'what I've done in the past two years' text)

Evidently, then, NM expresses neither temporal nor (purely) aspectual semantics.

Instead, the semantics of NM is *modal*. Roughly, NM marks a proposition as being part of the same assertion as the preceding one(s); in non-asserted NM-marked clauses, such as those in antecedents of conditionals, NM marks its clause as being true if preceding ones are true. The distinction between NM1 and NM2, despite its superficial correlation with aspect, is in fact a modal distinction as well. I now argue for this intuition and formalize it in terms of possible worlds, beginning with NM2.

Our analysis of NM2 should explain the following three observations. First, NM2, like the general imperfective, can express futurate, progressive, or habitual semantics (as in (8)-(12) above), but is never used in clauses with perfective semantics (in the Badiaranke sense of "perfective"). Second, an NM2-marked clause is always interpreted as expressing the same type of "imperfectivity" as that expressed by the "antecedent" clause, or set up implicitly as the discourse topic: in (31), an NM2-marked clause following an antecedent with progressive semantics receives a progressive interpretation; in (32), which occurs in a narrative about plans for the next day, one following an antecedent with futurate semantics receives a futurate reading (with *katʃudu* '[the next] morning' specifying the time frame within which the future event could happen); and in (33), from a text about what happens in general when a baby is born, the NM2-marked clauses receive a generic interpretation and follow an imperfective-marked antecedent with a generic reading.[5]

(31) toːtũ **mi- jakə- bə̃**   ka- batt- e. nĩ bẽ-   battə...
now NARR- be-   3pl.PROG INF- harvest- INF while 3pl.IMPF- harvest
[song sung by the harvesting monkeys] toːtũ **be-**   dʒakk- ən- **a** maːsə
                                       now **3pl.NARR-** fast-   CAUS- IRR eye
bẽ-   pə- battə bẽ-   pə- battə.
3pl.IMPF- IMPF- harvest 3pl.IMPF- IMPF- harvest

'Now **they were harvesting** [periphrastic progressive]. As **they were harvesting** [imperfective progressive]...Now **they were glancing around** (lit. were moving their eyes quickly), they were harvesting, they were harvesting.' (6.17, #4, old woman and bean fields story)

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[5]More detailed text analysis is needed to isolate the precise factors allowing for implicit setting of the modal base and ordering source, although these factors are likely to closely resemble the contextual elements that, as discussed in Chapter 3 above, narrow down the possible readings of an ordinary imperfective clause.

(32) ... wũ kama   reː de   **mã-   daːs-   oː de.**
     DEM NEG.IMPF.1sg. come AFF.DECL 1sg.IMPF- spend.night- PASS AFF.DECL

      katʃudu **ma-   pamm-   u-   aːs- a.**
      morning <u>1sg.NARR</u>- set.out.in.morning- VENT- REP- <u>IRR</u>

      'In that case, I won't come – **I'll stay over** [futurate imperfective]. In the morning **I'll head back here**.' (7.106, #1, Koufambora plans)

(33) wũ fanã kə-   wudə de   kuppie **a-   ri- a kuru, a-**
     DEM also 2sg.<u>impf</u>- pound AFF.DECL flour   <u>2sg.NARR</u>- do- <u>IRR</u> kola.nut <u>2sg.NARR</u>-

      sədd- a   daːsoːma, biaːra **be-   ri- a moːni**, walla podda.
      cook- <u>IRR</u> breakfast   others <u>3pl.NARR</u>- do- <u>IRR</u> porridge or   solid.food

      'That, too, **you pound up some flour** [habitual/generic imperfective], **you do (offer) kola nuts**, **you cook breakfast**, others **do (prepare) porridge**, or other kinds of food.' (3.22, #1, 'what happens when a baby is born' text)

The framework developed in Chapter 3 provides a straigthforward way to explain these facts: NM2 means that the worlds in which the eventuality is realized are the same ones in which the eventuality in the antecedent is realized. A series of NM2-marked clauses is interpreted as entailing realization of the eventualities in a single, consistent set of worlds. The worlds in the modal base – be it circumstantial, metaphysical, or otherwise – are chosen and ranked once, upon utterance of the preceding non-NM-marked clause at the same "level." In the absence of such an antecedent, the worlds are selected and ranked upon implicit establishment of a discourse topic entailing modality, such as what one does every day or what one expects to do tomorrow. Consequently, all the eventualities in a string of NM2-marked clauses are asserted to be realized in the same set of worlds. This analysis of NM2 correctly predicts that it should not be used with negative clauses, since such clauses do not delimit the worlds where the eventuality *is* realized, but merely identify some worlds where it is not realized.[6]

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    [6]This analysis can likely be extended to account for the use of NM2 in subjunctive environments, particularly in complements of 'until', as in (i).

(i) bə- basə   bẽ be-   kam- a. bə- basə   bẽ, bẽ-   kamə
    PL- woman.with.children DET 3pl.NARR- dance- IRR PL- woman.with.children DET 3pl.IMPF- dance

    de   **ha: ma-   piːs- a.**
    AFF.DECL until <u>ma</u>- dawn- <u>a</u>.
    AFF.DECL until <u>3sg.NARR</u>- dawn- <u>IRR</u>

    'The women with children, they dance. The women with children, they dance **until dawn** (lit. until it dawns).' (3.21, #1, marriage customs text)

The common use of NM2 to express hortative semantics, as in (ii), could be argued to involve an implicit 'want' that sets up a bouletic ordering source, as it does in (iii).

(ii) kũpia   **a-   ri- a.**
     tomorrow <u>2sg.NARR</u>- come- <u>IRR</u>

    'Tomorrow **please come**.'

On this analysis, NM2 is very similar – though not identical – to what Roberts (1997, 1989) calls *modal subordination*. Roberts (1989:683) illustrates that phenomenon with the data in (34), where the birds are predicted to get hungry only in the as-yet hypothetical worlds in which Edna forgets to fill the birdfeeder (and feels bad as a result).

(34)   a. If Edna forgets to fill the birdfeeder, she will feel very bad.
           b. The birds will get hungry.

In English, at least, other expressions that set up a hypothetical context (e.g. *suppose that. . .*), in addition to antecedents of conditionals, can trigger modal subordination. Roberts argues that modal subordination involves the temporary addition of a hypothetical proposition – i.e. one that is not necessarily true in the actual world – being temporarily added to the common ground, which she treats as approximately equivalent to the modal base in Kratzer's sense. Upon being accepted into the discourse, this hypothetical proposition further restricts the modal base/common ground worlds, by eliminating those in which it is not true. Those subsequent clauses meeting certain TAM criteria are then interpreted against this new, more restricted modal base. Similarly, in Badiaranke NM, the antecedent clause adds a proposition to the common ground, thereby restricting the worlds where subsequent NM2-marked clauses are asserted to be true to ones where the antecedent clause is true.

In contrast, NM1 *cannot* mean that the eventuality is realized in the same set of worlds as eventualities described earlier in the sequence of clauses. This conclusion stems from our earlier observation that NM1 can appear on clauses bearing imperfective, habitual, or progressive aspect and following a perfective "antecedent" (see (27)-(30) above). Instead, NM1 indicates that the *base world*, in which truth of the clause is evaluated, is the same as the base world for the antecedent clause. Often, in ordinary discourse – discourse where, as argued by Roberts (1998), the interlocutors' overarching goal is to narrow down the candidates for the actual world – the base world is simply the (world that to the best of the speaker's knowledge is the) actual world. In fictional stories, however, an NM1-marked clause does not express a proposition whose truth is to be evaluated in the actual world, but rather one that is true in worlds where the antecedent clause – the first perfective-marked clause, which establishes candidates for the base world – is true. Note that *truth of a proposition*

(iii)   lafiɲieːn- ə̃   de   **ma-**   jak- **a**   enspektər.
        want-   1sg.PERF AFF.DECL <u>1sg.NARR-</u> be- <u>IRR</u> inspector

'I want **to be an inspector.**' (4.75, #1, 'where I've traveled' text)

A bouletic ordering source can also be set up for the NM2 clause with *arabi*, which introduces a prayer, as in (iv).

(iv)   nĩ tʃaːfe i,   be-   jim- ẽ   arabi **ma-**   baj- n-   **a** konaːŋo.
        if female COP 3pl.NARR- say- 2sg.NSBJ PRAYER <u>3sg.NARR-</u> black- CAUS- <u>IRR</u> cup

'If it's a girl, they say to you, "May she blacken a cup."' (3.21, #1, 'what happens when a baby is born' text)

Pending a thorough analysis along these lines, however, I gloss subjunctive/hortative clauses with SBJ rather than NARR throughout the dissertation.

in a world is not the same as realization of the eventuality in that world: for instance, as discussed extensively in Chapter 3 above, an imperfective-marked clause can be true in the base world even if the eventuality is never fully realized in the base world. This distinction is critical for cases where NM1 appears on non-perfective clauses, as in (35).

(35) birĩ paːrə peːs   re-   i   mə- re- i   mə- dʒeːn-
      since two.years.ago come- 2sg.PERF <u>NARR</u>- come- 2sg.PERF <u>NARR</u>- see-

      i-   ã   **mə-** **kəd-** **i**   **reː** **kare-** **mma** iːbẽ
      2sg.PERF- 1sg.NSBJ <u>NARR</u>- <u>HABIT</u>- 2sg.HABIT come place.of- 1sg.INDEP this.year

      fanã <u>mə</u>- ri-   aːs- i.
      also <u>NARR</u>- come- REP- 2sg.PERF

      'Since two years ago you came, you came, you saw me, **you came here (habitually) to me**, this year too you came back.' (4.23, #3, life story)

Nonetheless, NM1, like NM2, does effectively restrict the realization worlds, since the choice of base world, from which all other worlds are evaluated, clearly determines the worlds in which the eventuality is claimed to be realized. In this sense, both types of NM involve modal subordination of a sort.

Since, on this analysis, NM imposes a purely modal restriction, it does not require sequentiality of the eventualities it marks: evaluation time is not set by the narrative morphology (nor, for that matter, is perspective time). The superficial correlation between NM and sequentiality arises for independent reasons: NM appears in sequences of clauses within a single narrative, and sequences of clauses in narratives tend to relate sequential events.

4.3   Other imperfective forms

4.3.1   Imperfective *pə-*

The prefix *pə-* appears optionally after the subject agreement prefix, or after the "impersonal" (Brown and Logdon 1994) subject prefix in clauses with subject extraction, in various types of imperfective clauses. It occurs frequently in imperfective-marked subject relative clauses (e.g. (36)-(38)) with a progressive, generic, or futurate interpretation; in clauses with negative imperfective marking and habitual semantics (as in (39)); in consequents of conditionals (40); and, rarely, in straightforward, declarative imperfective-marked clauses, as in (41).

(36) Bala Tamba maː poː-   pã **teː-**   **pə-** **dəmə** ma-   raŋ- aːs- a.
      Bala Tamba said head- DET REL.IMPF- <u>IMPF</u>- hurt 3sg.NARR- go- REP- IRR

      'Bala Tamba said it was his head **that was hurting** and kept going.' (6.62, #3, Bala Tamba story)

(37) nĩ   kutʃãd   i,   nĩ   fett- i   kutʃãd-   e tʃaːfe…
if/when seeking.out COP if/when begin- 2sg.PERF seeking.out- of woman

wiː   wusia wẽ **teː- pə- sãdə** wẽ, wiː   **teː-   pə-**
2sg.INDEP man DET REL.IMPF- <u>IMPF</u>- seek DET 2sg.INDEP REL.IMPF- <u>IMPF</u>-

fədə kuru, a-   raŋ- a   kare   tʃaːfe lafiŋieːn- i   wẽ, kare
split kola.nut 2sg.SBJ- go- IRR place.of woman like/want- 2sg.PERF DET place.of

paːp-   ã.
father- 3sg.NSBJ

'When it's a matter of seeking someone's hand in marriage, if you start seeking out a woman, it's you, the man, the one **who's doing the seeking**, it's you **who splits the kola nuts**, you go to the woman's home, to her father's home.' (3.24, #1, marriage customs text)

(38) S: kũpia   mã-   raː de   fe Pakur.
tomorrow 1sg.IMPF- go AFF.DECL P Pakour

'Tomorrow I'll go to Pakour.'

A: kaː   wiː   soːnu **teː- pə- raː.** mbõ   ŋk
NEG.IMPF.3sg. 2sg.INDEP alone REL.IMPF- <u>IMPF</u>- go 1pl.INDEP and

ẽ   **teː-   pə- raː.**
2sg.NSBJ REL.IMPF- <u>IMPF</u>- go

'It's not just you **that's going to go**. It's you and I **that are going to go**.' (5.6, #2, elicitation)

(39) pijarə pẽ, pijar **kaː   pə- ŋas.** wũ a-   **pə- wuddə**
python DET python NEG.IMPF.3sg. <u>IMPF</u>- bite DEM 3sg.HABIT- <u>IMPF</u>- hammer

de.
AFF.DECL

'The python, a python **doesn't bite**. That one, **it hammers**.' (2.96, #2, snake text #2)

(40) par ezãplə – nĩ lafiŋieːn- i   ana prezidãja. kab- i   de   wũ
for example if want- 2sg.PERF like presidency know- 2sg.PERF AFF.DECL DEM

mann- ɔ̃   de.   he! **kə-   pə- ɲãdə** jabbə- se
big- 3sg.PERF AFF.DECL INTERJ 2sg.IMPF- <u>IMPF</u>- request much- REL.PERF

de.
AFF.DECL

'For example – if you want, like a presidency. You know that's a lot. Ha! **You're asking** quite a lot.' (9.3, #7, magic and supernatural text)

(41) **bẽ-   pə- kamə** waina   jã   k- ɔ̃.
3pl.IMPF- <u>IMPF</u>- dance at.that.time there be- 1sg.PERF

'**They were dancing** while I was there.' (10.14, #1, elicitation)

The *pə*- prefix also appears in clauses with habitual or generic semantics and a 3sg. subject (a suppletive form of the periphrastic habitual), as in (42) (where it marks genericity on a stative verb) and (43).

(42) kãkurã sẽ ko- jak- ɔ̃, fe puɲu kəd- ɔ̃ sann- oː.
kãkurã DET MANNER- be- 3sg.PERF P woods HABIT- 3sg.HABIT take- PASS

kabãtã u- kəd- ɔ̃ dunnaː wẽ fanã, **a- pi- dʒinnə**
shirt NMLZ.SG- HABIT- 3sg.HABIT wear DET also 3sg.HABIT- IMPF- red

de bari fe puɲu kəd- ɔ̃ sann- oː. kabãtã kã **a-**
AFF.DECL but P woods HABIT- 3sg.HABIT take- PASS shirt DET 3sg.HABIT-

pi- dʒinnə de.
IMPF- red AFF.DECL

'The *kãkurã*, the way it is, it's from the woods that it's brought out. The shirt it wears also, **it's red**, but it's from the woods that it's taken. The shirt **is red**.' (7.15, #1, *kãkurã* text)

(43) **a- p- pɔ̃daːnə** ka- dʒaːbət- e be- laːo- jã taːme.
3sg.HABIT- IMPF- fail INF- recognize- INF PL- friend- 3sg.NSBJ now

'**He fails** to recognize his friends now.' (8.45, #1, elicitation)

A nearly identical construction to that in (42)-(43), minus the affirmative declarative marker *de*, can be used to admonish an addressee as to how s/he should behave, as illustrated in (44)-(46).

(44) awa. mã- fett- eːnə jã ŋka kopaɲi kõ.... **a- pə- safiŋ-**
okay 1sg.IMPF- start- INSTR here and last.name DET 3sg.HABIT?- IMPF- write-

ã.
3sg.NSBJ

'Okay. I'll start here with my last name.... **You should write it down**.' (8.108, #8, self-introduction)

(45) **a- pə- karaŋə**.
3sg.HABIT?- IMPF- study

'**You should study**.' (8.103, #1, elicitation)

(46) **a- pi- dʒaːnaː**.
3sg.HABIT?- IMPF- eat

'**You should eat**.' (5.32, #1, elicitation)

It is not clear exactly what the *a*- prefix expresses: the *a-pə*-V construction, when followed by *de* (as in (42)-(39) and (43)), is generally understood as a habitual with a 3sg. subject, so I gloss *a*- as '3sg.' However, 3sg. is not generally marked with an *a*- prefix, and the fact that the same construction can also be used to admonish an addressee that s/he should do

something occasionally, as in (45) and (46), makes this gloss questionable. It is possible that *a-* instantiates a kind of "impersonal agreement," a hypothesis which could also explain its appearance in (47)-(48):[7]

(47) **a̲- mənə de**   ma-   datta- a.
      a̲- POSSIB AFF.DECL 1sg.SBJ- sleep- IRR

'**It's possible** for me to sleep/It's possible I'll be able to sleep.' (8.75, #1, elicitation)
Consultant's scenario: Loud music is being played. The speaker has stated an intention to go to bed, and the interlocutor has replied that the speaker won't be able to sleep. (47) is an appropriate response.

(48) siɲito   **a̲- mənə de**   ma-   jak- a.
      sometimes *a̲-* POSSIB AFF.DECL 3sg.SBJ- be- IRR

'Sometimes **it can** be the case.' (8.74, #1, elicitation)

Conceivably, the superficially deontic use of *a-pə-* means literally 'one does X' and implicates '. . . and therefore you should too', such that it eventually came to be used even to express obligations particular to the addressee, as in (44).

Frequently, *pə-* appears after some phonological variant of the imperfective subject agreement prefixes, particularly in clauses with progressive ((49)-(52)) and (perhaps less frequently) habitual meaning (53). I refer to this construction as the *mã-pə-* construction, after the form the prefixes take with 1sg. and 3sg. subjects.

(49) nĩ   be-   jeːr-   uː,   waina   **bẽ-**   **pə-**   tʃim- uː,
      when 3pl.IMPF- head.home- VENT at.that.time 3pl.IMPF- IMPF- sing- VENT

      bẽ-   pə-   reː bẽ-   pə-   saːdʒ- uː.   bẽ-   pə-   tʃim- uː,
      3pl.IMPF- IMPF- come 3pl.IMPF- IMPF- clap- VENT 3pl.IMPF- IMPF- sing-   VENT

      bẽ-   pə-   reː bẽ-   pə-   saːdʒ- uː.   bẽ-   pə-   tʃim- uː,
      3pl.IMPF- IMPF- come 3pl.IMPF- IMPF- clap- VENT 3pl.IMPF- IMPF- sing-   VENT

      bẽ-   pə-   reː bẽ-   pə-   saːdʒ- uː.   ha   be-   səm-   u-
      3pl.IMPF- IMPF- come 3pl.IMPF- IMPF- clap- VENT until 3pl.SBJ- arrive- VENT-
      a.
      IRR

'When they're coming home, at that time **they sing (as they're coming), they're approaching, they're clapping. They're singing, they're coming, they're clapping. They're singing, they're coming, they're clapping**. Until they arrive back here.' (3.28, #1, marriage customs text)

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[7]Brown and Logdon (1994) use the term "impersonal agreement" to denote the morphemes that replace subject agreement markers in clauses from which the subject has been extracted.

(50) toːtũ be-   dʒakk- ən-   a   maːsə **bẽ-**   **pə-** **battə** **bẽ-**   **pə-**
now 3pl.NARR- fast- CAUS- IRR eye   3pl.IMPF- <u>IMPF-</u> harvest 3pl.IMPF- <u>IMPF-</u>
battə.
harvest

’Now they were glancing around (lit. were moving their eyes quickly), **they were harvesting, they were harvesting**.‘ (6.17, #4, old woman and bean fields story)

(51) ka- jeːr-   e   k- ə̃   **mã-**   **pə-** **tʃimə** pəraŋe.
INF- head.home- INF be- 3sg.<u>prog</u> 3sg.IMPF- <u>IMPF-</u> sing   going

‘S/he is heading home, **singing** as s/he goes.’ (Or: ‘S/he was heading home, **singing** as s/he went.’) (8.3, #1, elicitation)

(52) dʒeːnə- mẽnẽ   de   **kiː-**   **pə-** **kamə**.
see-   1sg.on.2sg.PERF- AFF.DECL 2sg.IMPF- <u>IMPF-</u> dance

‘I saw you **dancing**.’ (10.15, #1, elicitation)

(53) bepoːse pã birĩ rəm-   oː- bə̃   bepoːse pã **bẽ-**   **pə-**
children DET since give.birth- PASS- 3pl.PERF children DET 3pl.IMPF- <u>IMPF-</u>
dobbə.
dirty.

‘The children, since they were born, the children **get dirty**.’ (8.24, #2, elicitation)

Although most of the examples of this construction seem to have either progressive or habitual semantics, there are examples that fill out some of the range of meanings for the general Badiaranke imperfective. (54), for instance, could be analyzed as the consequent of an implied counterfactual, or as a futurate use with modal subordination; (54) appears in a text where the consultant describes what she would do if she could do anything she wanted.

(54) **mã-**   **pə-** **sədd-** **iː** **ujaːra**. wũ fanã mã-   mən   de.
1sg.IMPF- <u>IMPF-</u> cook- BEN other   DEM also 1sg.IMPF- POSSIB AFF.DECL

‘**I would cook for someone**. That too I could do.’ (7.20, #3, wishes and dreams text).

This same text contains other similar examples, as in (55), which could also be argued to have a fundamentally habitual meaning.

(55) nĩ raː- re-   mã   fanã nĩ dʒitt- ə̃   mbõ   ŋka niŋ-   ər-
if go- NEG.PERF- 1sg.NEG also if get-   1sg.PERF 1pl.INDEP and pleasant- RECIP-
se,   maː **mã-**   **pə-** **bəddə** ma-   deːma- a walla wusia kẽde.
REL.PERF QUOT 1sg.IMPF- <u>IMPF-</u> go.out 1sg.NARR- help- IRR or   man good
mã-   **pə-** **bəddə** ma-   deːma- a **mã-**   **pə-** **ri** bisnes.
1sg.IMPF- <u>IMPF-</u> go.out 1sg.NARR- help- IRR 1sg.IMPF- <u>IMPF-</u> do business.

‘If I don’t go, also, if I got (the opportunity), what would make me happy, that **I would go out** and help (in someone’s home), or (I would get) a good man. **I would go out** and help; **I would do business**.’ (7.22, #3, wishes and dreams text)

In relative clauses, the *mã-pə-* construction occasionally appears with a futurate meaning, as in (56), although examples like this are rare in my data.

(56) bitʃaːfe **bə-** **kiː-** **pə-** tʃafə bẽ (kũpia) jabbə- bã̃ pasatʃi
women NMLZ.PL- 2sg.IMPF- IMPF- braid DET tomorrow much- 3pl.PERF hair
de.
AFF.DECL

'The women **you're going to braid** (tomorrow) have a lot of hair.' (5.16, #2, elicitation)

It is worth noting that with achievements, the *mã-pə-* construction is acceptable, but yields what is essentially a perfective interpretation. Thus (57) can only mean that the people's arrival was completed, not in progress (approaching the destination), when Kumba left.

(57) **bẽ-** **pə-** **səmə** dorõ, Kumba mə- bədd- ã̃.
3pl.IMPF- IMPF- arrive only Kumba NARR- go.out- 3sg.PERF

'As soon as **they arrived**, Kumba left.' (10.15, #1, elicitation)

There is one morphosyntactic difference between the ordinary imperfective and the *mã-pə-* forms: *mã-pə-* is never followed by *de* even in clauses with habitual meaning, such as (58).

(58) nəse nã̃ **mã-** **pə-** tʃimə (*de).
child DET 3sg.IMPF- IMPFca- sing AFF.DECL

'The child **sings**.' (8.2, #1, elicitation)

It is not obvious why this restriction should obtain. Nonetheless, *mã-pə-* is not the only aspectual construction that is incompatible with affirmative declarative *de*, despite the particle's widespread nature: the periphrastic and imperfective progressives disallow it as well.

Despite this minor difference in form, there does not seem to be any semantic component that can be pinned to *pə-* and *pə-* alone.[8] It is clear that this suffix is only used in imperfective contexts (in the Badiaranke sense of imperfective), but much less clear what it *contributes* to these contexts, in which it always appears to be optional. This pattern is reminiscent of secondary exponence, as described by Carstairs-McCarthy (2005):

> Carstairs (1987:150-151) introduces a distinction between principal and secondary exponence as follows. Let us suppose that, in some inflectional paradigm, morphosyntactic properties P and Q are realised. Suppose that Q is always or usually

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[8]When asked directly about the meaning contributed by *mã-pə-* forms as opposed to the simpler *mp-* imperfective, one consultant claimed a particular interpretive connotation of (58), which I am not entirely confident applies in any general way. Namely, the consultant stated that (58) suggests that the child sings all the time, and the speaker wants him to. It is unclear, however, what would trigger this interpretation. Could the consultant mean – as for the *a-pə-*V examples with deontic 2sg. meaning ((44)-(46)) – that there is a deontic habitual reading, i.e. that the child *should* sing all the time? No such reading is reported for any of the examples when the *mã-pə-* clause is not in isolation.

realised unambiguously by some inflection x, whether or not P is present. Suppose also that P is realised by a range of inflections including a and b, but that its realisation is consistently b in wordforms where Q is realised by x. In a sense, b is an exponent of Q as well as of P, inasmuch as Q triggers the choice of b to realise P. Nevertheless, in wordforms containing b, Q has an exponent distinct from b, namely x, because (ex hypothesi) x realizes Q unambiguously, independently of the presence or absence of P. In this circumstance, we can call x the 'principal exponent' of Q, while b is merely a secondary exponent of it.

Carstairs-McCarthy (2005:261)

Attempting to apply this model to Badiaranke *pə-*, we might hypothesize that Q=IMPF; x=person markers; and b=*pə-*. In that case, however, it is unclear what category would play the role of P. A more plausible account is a diachronic one, on which P was originally PERSON, Q was IMPF, x (the consistent realization of Q) was *pə-*, and the *mã-*-series prefixes were b, making the person prefixes secondary exponents of IMPF at one time. Ultimately, the secondary affixes were reinterpreted as portmanteau morphemes, with the primary exponent *pə-* eventually dropping out and/or fusing with the person affixes – but still being retained as a now-optional prefix with its original imperfective semantics.

A plausible explanation, then, is that historically, *pə-* was a required imperfective prefix (occurring with general imperfective aspect). However, since the morphologically and phonologically distinct series of imperfective subject markers is sufficient to mark imperfective aspect, *pə-* has become optional in many environments – and is more frequent in more pragmatically loaded constructions (e.g. focus). This hypothesis receives support in the current reflexes *mã-* for 1sg.IMPF (where the *pə-* suffix would have dropped out of *mã-pə-*) and *mpə-* for 3sg.IMPF (where the *ã* would have dropped out). Additionally, the plural person prefixes are identical for imperfective aspect with or without *pə-*; indeed, the 1pl. and 2pl. affixes are phonologically identical in the perfective/progressive/habitual suffix series and the imperfective prefix series.[9]

The idea that *pə-* does not contribute any unique imperfective meaning is problematic for Brown and Logdon (1994), who claim that negation of a habitual assertion requires *ka: pə-* instead of simple *ka:* (which negates other meanings of the Badiaranke imperfective, such as futurity and counterfactuality). In fact, my consultants often used *ka:* alone for negation of habituals and generics, as (59)-(60) show.

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[9]3pl., meanwhile, appears as *-bɜ̃* in perfective and periphrastic progressive clauses and as *bẽ-* in imperfective clauses, but alternates freely between the two in the periphrastic habitual.

(59) **keː**   **naːŋ- asə mãbe**, **keː**   **dakkə sukuru**, **keː**
NEG.IMPF.2sg. drink- REP water NEG.IMPF.2sg. chew   sugar   NEG.IMPF.2sg.

sə̃p- asə tabaː, **keː**   **rakə sigaret**, **keː**   **rakə tabaː**,
chew- REP tobacco NEG.IMPF.2sg. smoke cigarette NEG.IMPF.2sg. smoke tobacco

ndõda o: keː   **ri- as**. hã pidʒaːda pã ma-   ra. nĩ
thing   all NEG.IMPF.2sg. do- REP until sun   DET 2sg.SBJ- go if/when

pidʒaːda pã daj- õ   waina   a-   naːŋ- a.
sun   DET fall- PASS.3sg.PERF at.that.time 2sg.SBJ- drink- IRR

**'You don't drink water anymore, you don't eat sugar, you don't chew
tobacco anymore, you don't smoke cigarettes, you don't smoke tobacco,
you don't do anything anymore**. Until the sun goes (down). When the sun sets,
at that time you can drink.' (2.77, #1, "what happens during Ramadan" text)

(60) bar nĩ   kũpərəkaːnə rĩ   tʃaːfe **kaː**   **dʒeːn- ã**   nəse
but if/when mischief   do.3sg.PERF woman NEG.IMPF.3sg. see-   3sg.NSBJ child

kaː   **dʒeːn- ã**.   sulimaː wo duːdə- r-   a
NEG.IMPF.3sg. see-   3sg,NSBJ boy   all enter- NEG.PERF- 3sg.NEG

kaː   **dʒeːn- ã**.
NEG.IMPF.3sg. see-   3sg.NSBJ

'But if mischief happens, women **don't look at him**, children **don't look at him**,
little boys who are not yet circumcised **don't look at him**.' (7.15, #1, *kãkurã* text)

In support of Brown and Logdon (1994), however, *kaː pə-* does seem to favor a habitual
reading more readily than simple *kaː*, at least when the two are juxtaposed and consultants
are asked for a judgment of the difference. In (61), only the habitual reading is available
when *pə-* is present; without *pə-*, the reading is that Musaa will know Maimuna won't dance
on that particular occasion.

(61) Musaa mpə-   kabə de   Maimuna **kaː**   **(pə-) kamə**.
Musaa 3sg.IMPF- know AFF.DECL Maimuna NEG.IMPF.3sg. IMPF- dance

'Musaa will know Maimuna **won't/doesn't dance**.' (10.3, #1, elicitation)

Similarly, (62) is most felicitously uttered before the rainy season, during which time one
would go regularly to the fields, while (63) is only felicitous during the rainy season. That is,
the negative imperfective clause without *pə-* in (62) is interpreted as asserting that a certain
eventuality will not occur in the future, whereas the negative imperfective clause with *pə-* in
(63) is interpreted as asserting that a certain eventuality does not currently recur habitually.

(62) iːbẽ   piːsidoː **kama**   **raː** fe pədao.
this.year every.day NEG.IMPF.1sg. go P field

'This year, every day **I won't go** to the field.' (4.37, #1, elicitation)

(63) iːbẽ   piːsidoː **kam-**   **pə-** **raː** fe pədao.
      this.year every.day NEG.IMPF.1sg.- IMPF- go   P field

      'This year, every day **I don't go** to the field.' (4.37, #1, elicitation)

This inconsistency suggests one of two explanations: that the language change making *pə*- optional for classically imperfective clauses is still in progress, or that *pə*- favors a classically imperfective (habitual or progressive) interpretation. Perhaps the optionality of *pə*-kicked in before the imperfective was extended to futurate and other uses in the language. This would explain three observations: (a) the general limitation of *pə*- to clauses with progressive or habitual meaning (because those were the earliest meanings of the imperfective, before it came to encompass futurate and other uses); (b) the optionality of *pə*- in futurate clauses (on analogy to other imperfective clauses, once the general imperfective had been extended to its futurate use); and (c) the use of *pə*- to distinguish between progressive or habitual readings and other imperfective readings under negation (since, from the start, the imperfective and therefore *pə*- were associated more closely with progressive and habitual than with other imperfective readings).

4.3.2   Periphrastic progressive

Although the general imperfective can clearly be used to express progressive and habitual semantics, Badiaranke also has dedicated progressive and habitual constructions, as was mentioned in §3.2.2. These semantically narrower constructions are more compositionally transparent than the general imperfective and appear to be newer, possibly edging out the general imperfective in matrix clauses. I first discuss the morphosyntax, distribution, and semantics of the periphrastic progressive, arguing that the difference between the periphrastic and imperfective progressives is not semantic so much as syntactic, diachronic, and pragmatic. I then turn in §4.3.3 to the periphrastic habitual.

In its simplest form, the periphrastic progressive fits the template *ka*-V-*e (ja)k*-PERSON, where *ka*-V-*e* is the infinitival form of some verb, *k*- (or *jak*-) is a copula, and PERSON is a subject agreement suffix from the same series used in the perfective. Objects and adjuncts may appear immediately after the infinitive, or after the inflected copula. The periphrastic progressive is compatible with accomplishments, as in (64)-(66), and with activities, as in (67), as well as with achievements (68) and states (69).

(64) bar nõ,   tẽbe nina alhamədibilai. **ka- dʒittə- t- aː-**   **e k-**
      but INTERJ time DEM praise.be.to.God INF- get-   ?- DETRANS- INF be-

      ə̃̃   daːrə daːrə. haː.
      1sg.PROG little little   yes

      'But now, praise be to God, **I'm getting** [something] little by little. Yes.' (4.20, #3, life story)

(65) Aamadu ŋka Binta **ka- safiŋ- e   kə- bɔ̃   leːtar**.
Aamadu and Binta INF- write- INF be- 3pl.PROG letter

'Aamadu and Binta **are writing a letter**.' (8.2, #1, elicitation)

(66) **ka- jeːr-   e k- ɔ̃   mpə-   tʃimə**.
INF- head.home- INF be- 3sg.PROG 3sg.IMPF- sing

'**S/he is/was heading home**, singing.' (8.3, #1, elicitation)

(67) **ka- jukəd- e   k- ɔ̃   ka- naːŋ- e**.
INF- try-   INF be- 3sg.PROG INF- drink- INF

'**S/he is trying** to drink.' (8.45, #1, elicitation)

With achievements, the periphrastic progressive indicates that some activity leading up to the achievement (in (68), the approach leading up to the president's arrival) is in progress at perspective time.

(68) dʒeːn- a prezidɑ̃ sẽ weː,   ka- səm- e mpə-   reː, **ka- səm-**
see-   IRR president DET 3sg.INDEP INF- arrive- INF 3sg.IMPF- come INF- arrive
e k- ɔ̃,   ka- səm- e mpə-   reː, səmitʃ- ɑ̃
INF be- 3sg.PROG INF- arrive- INF 3sg.IMPF- come arrive- DETRANS.3sg.PERF
de.   səm- ɔ̃ de.   ma-   sadʒ- oː.
AFF.DECL arrive- 3sg. AFF.DECL 3sg.SBJ- clap- PASS

'See the president, he's about to arrive, **he's arriving**, he's about to arrive, he's arrived! He should be clapped for!' (8.13, #1, imitation of news reporter during elicitation)

With states, as in (69), the progressive means that the state is developing, but has not yet been fully realized at perspective time. (69) is felicitous if spoken about a child or a person who has been sick.

(69) **ka- mən- e k- ɔ̃   ka- jaːs- e**.
INF- POSSIB- INF be- 3sg.PROG INF- walk- INF

'(S/he wasn't able to walk before, but) **s/he's becoming able to walk**.' (8.73, #1, elicitation) (progressive of stative)

Like the imperfective progressive, the periphrastic progressive can be used to talk about an eventuality in progress at some past time even without past tense marking, given sufficient context.

(70) peːs   waina   **ka- karaŋ- e kə- bɔ̃**.
last.year at.that.time INF- study- INF be- 3pl.PROG

'Last year, at that time **they were studying**.' (8.90, #1, elicitation)

Evidently, the periphrastic progressive covers the same semantic domain as does progressive *mp-*. What, then, determines which one a speaker chooses in any given clause, and why

do the two progressive forms coexist? Regarding the first question, the progressive forms' distribution is determined largely by both syntactic and pragmatic factors; the answer to the second appears to be diachronic.

Certain syntactic environments favor the imperfective progressive, while others prefer the periphrastic version or accept both forms equally. First, the imperfective progressive is preferred in many subordinate clauses, including relative clauses (although the periphrastic progressive is not ruled out in such contexts; it too can occur in non-subject relative clauses, for instance, as in (73b)).

(71) buki **u-** **mã-** **karaŋə** wẽ sar- ə̃ de.
book NMLZ.SG- 1sg.IMPF- study DET be.long- 3sg. AFF.DECL
'The book **that I'm reading** is long.' (5.11, #2, elicited)

(72) tʃuːra **(u-)** **bõ-** **səddə** wẽ kaː niŋə.
porridge NMLZ.SG 1pl.IMPF- cook DET NEG.IMPF.3sg. be.good
'The porridge **that we're cooking** won't be good.' (5.11, #2, elicited)

(73) a. weː **bẽ-** **tʃimə** wẽ maːm- e- mma a- pə-
3sg.INDEP 3pl.IMPF- sing DET grandparent- of- 1sg.INDEP 3sg.HABIT- IMPF-
tʃim- (akəd-) ã de.
sing- PAST.IRR.NPERF- 3sg.NSBJ AFF.DECL
'What **they are singing**, my grandparent used to sing it.' (5.14, #2, elicitation)

b. weː **u-** **jakə- bõ** **ka- tʃim- e** kã maːm- e-
3sg.INDEP NMLZ.SG- be- 3pl.PROG INF- sing- INF DET grandparent- of-
mma a- pə- tʃim- (akəd-) ã de.
1sg.INDEP 3sg.HABIT- IMPF- sing- PAST.IRR.NPERF- 3sg.NSBJ AFF.DECL
'What **they are singing**, my grandparent used to sing it.' (5.14, #2, elicitation)

Indeed, the imperfective progressive is more acceptable in syntactically subordinated and/or backgrounded clauses, as in (74)-(76a), than in completely unsubordinated clauses, as in (77); but the periphrastic progressive is also acceptable in subordinate clauses, as seen again in (76b).

(74) kũpia Kumba mpə- lẽb- abõ de **nĩ** **bõ-** **səddə**
tomorrow Kumba 3sg.IMPF- call- 1sg.NSBJ AFF.DECL when 1pl.IMPF- cook
daːtuːa.
lunch
'Tomorrow Kumba will call us **when we are cooking lunch**.' (4.115, #1, elicitation)

(75) **waːti bõ-** **səddə daːtua:** wẽ, lẽbə- mabõ de.
time 1pl.IMPF- cook lunch DET call- 3sg.on.1pl.PERF AFF.DECL
'**When we were cooking lunch**, she called us.' (4.114, #1, elicitation)

(76) a. waːti lẽbə- mabõ   wẽ, **waina**   **bõ-**   **sədbə da:tua:**.
          time call- 3sg.on.1pl.PERF DET at.that.time 1pl.IMPF- cook   lunch

          'When she called us, **at that time we were cooking lunch**.' (4.114, #1,
          elicitation)

      b. waːti lẽbə- mabõ   wẽ, **waina**   **ka- sədd- e da:tua: kə-**
          time call- 3sg.on.1pl.PERF DET at.that.time INF- cook- INF lunch   be-
          bõ.
          1pl.PROG

          'When she called us, **at that time we were cooking lunch**.' (4.115, #1,
          elicitation)

(77) ?* paːki   Kumba lẽbə- mabõ   de,   **bõ-**   **sədbə da:tua:**.
      yesterday Kumba call- 3sg.on.1pl.PERF AFF.DECL 1pl.IMPF- cook   lunch

      Intended: 'Yesterday Kumba called us; **we were cooking lunch**.' (4.114, #1,
      elicitation)

Similarly, (78a), with an imperfective progressive in a matrix clause, was judged barely
grammatical, while (78b), with the periphrastic progressive, was accepted.

(78) a. ?* waːti Kumba mpə-   lẽb- abõ   wẽ **bõ-**   **sədbə da:tua:**.
          time Kumba 3sg.IMPF- call- 1pl.NSBJ DET 1pl.IMPF- cook   lunch

          Intended: 'When Kumba called us, **we were cooking lunch**.' (4.115, #1,
          elicitation)

      b. paːki   waːti Kumba mpə-   lẽb- abõ   wẽ **ka- sədd e**
          yesterday time Kumba 3sg.IMPF- call- 1pl.NSBJ DET INF- cook- INF
          da:tua: kə- bõ.
          lunch   be- 1pl.PROG

          'When Kumba called us, **we were cooking lunch**.' (4.115, #1, elicitation)

In (79)-(81), the imperfective progressive is preferred to its periphrastic counterpart. This
preference may be because of the clause's backgrounded status, or because the preceding
clause makes *mp-* unambiguously progressive, obviating the need for a periphrastic aspect.

(79) dʒeːn- ə̃   de   weː   waina   **mpi-**   **dʒa: pamaːno**.
      see- 1sg.PERF AFF.DECL 3sg.INDEP at.that.time 3sg.IMPF- eat   rice

      'I saw him; at that time **he was eating rice**.' ('I saw him while **he was eating
      rice**.') (4.41, #1, elicitation)

(80) kũpia   mã-   dʒeːn- ã   de   **mpi-**   **dʒa: pamaːno**.
      tomorrow 1sg.IMPF- see- 3sg.NSBJ AFF.DECL 3sg.IMPF- eat   rice

      'Tomorrow I'll see him **eating rice**.' (4.43, #1, elicitation)

(81) ?? dʒeːn- ə̃   de   weː   waina   **ka- dʒaː- e   k- ə̃**
      see- 1sg.PERF AFF.DECL 3sg.INDEP at.that.time INF- eat- INF be- 3sg.PROG
      pamaːno.
      rice

      Intended: 'I saw him; at that time **he was eating rice**.' (4.41, #1, elicitation)
      Consultant's comment: The sentence is not ungrammatical but seems too long.[10]

Indeed, as mentioned in §3.2.2 above, complements to verbs of witnessing are one subordinate environment in which the imperfective progressive is frequently preferred; (82) further illustrates this point.

(82) waːti kə-   səmə wẽ waː səm-   i   Faatu **mpi-   jak**?
      time 2sg.IMPF- arrive DET what encounter- 2sg.PERF Fatou 3sg.IMPF- be

      'When you arrived, what did you find Faatu **doing**?' (4.117, #1, elicitation)

Despite the frequent use of imperfective aspect to express progressive meaning in subordinate clauses, the imperfective can also express futurate semantics in such environments, making it potentially ambiguous. (83) and (84), for instance, are structurally identical, but the first was produced as a translation for an unambiguously progressive sentence and the second in response to an unambiguously futurate prompt:

(83) nəse **u-   kə-   sədd- iː   tʃuːra sẽ kẽdan- t-   a**.
      child NMLZ.SG- 2sg.IMPF- cook- BEN porridge DET healthy- NEG.PERF- NEG.3sg.

      'The child **for whom you are cooking porridge** is sick.' (5.16, #2, elicitation)

(84) nə̃piaːr-   e- mma   kũpia   **u-   mã-   kaːtʃ- eːn- iː**
      younger.sibling- of- 1sg.INDEP tomorrow NMLZ.SG- 1sg.IMPF- send- INSTR- BEN
      leːtar sẽ ɲam-   iː-   r-   a   ri-   a   Senekaal.
      letter DET experience- PASS.NEG- NEG.PERF- 3sg.NEG come- IRR Senegal

      'My younger sibling **to whom I am going to send a letter tomorrow** has never come to Senegal.' (5.40, #2, elicitation)

In summary, the imperfective progressive is acceptable if embedded in a relative or complement clause or preceded by *waina* (which is roughly translatable as 'at the time when/at that time', and which has either some sort of syntactic embedding effect or a pragmatic backgrounding effect); it is not acceptable on its own in a matrix clause, as (78b) and (77) above illustrate.

The choice of progressive form is also affected by pragmatic constraints; certain discourse contexts favor a progressive interpretation for the imperfective. In such cases, use of the periphrastic progressive is unnecessary and therefore less frequent. As discussed in §3.2.2 above, such contexts include clauses modifying an ongoing eventuality that has just been

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[10]It is not clear why (81) is bad, as (76a) above, with *waina* + periphrastic progressive, was accepted. Perhaps seeing is not enough of an event to provide an independent perspective time conceptually distinct from the event time of the *waina*-marked event itself.

mentioned; sentences within discourses describing current goings-on; responses to inquiries as to an individual's current status; and performative speech acts. That is, when the discourse participants can already be expected to know that an ongoing state of affairs is being discussed, the general imperfective receives a progressive reading, rendering unnecessary the more explicit, periphrastic aspect.[11]

While these syntactic and pragmatic constraints can help predict which progressive form will be used, the two progressives are still interchangeable in many cases. Consequently, rather than proposing a synchronic semantic distinction, it is more fruitful to consider the diachronic path that led to the coexistence of two constructions with progressive meaning.

Badiaranke's periphrastic proressive is transparently derived, historically, from a locative construction; this locative source is preserved in the synchronic morphosyntax, which mirrors that of locative constructions in the language. According to Bybee *et al.* (1994:129), the development of progressives from locative constructions is extremely common cross-linguistically, especially in Africa. Bybee *et al.* (1994:137) argue that such progressives arise from a locution meaning 'be in location where V typically occurs' or 'be in middle of V'ing' (in that location), with temporal overlap arising as a natural semantic extension from physical proximity. Indeed, although the *(ja)k-* copula in Badiaranke is used in predicational as well as locative clauses, the copula in periphrastic progressives is demonstrably the locative one. Evidence for this claim lies in the use of the verbal copula for progressives with 3sg. subjects, which take a suppletive copula *i* in predicational (and identificational) copular clauses ((85)-(88)) but take the verbal copula in locative clauses ((89)-(90)).

(85) be- ban- e- mma jã jakə- bɔ̃, naː- je- mmɛ **waː**
PL- people- of- 1sg.INDEP there be- 3pl.PERF mother- of- 1sg.INDEP person.of
Gine Bisao i.
Guinea-Bissau COP

'It's there that my people [relatives] are; my mother **was Bissau-Guinean**.' (4.22, #3, life story)

(86) nĩ paːp- ẽ **ŋ̃ãtənna i**, mpə- mən de nĩ ujaːra dam-
if father- 2sg.NSBJ sorcerer COP 3sg.IMPF- POSSIB AFF.DECL if other kill-
ɔ̃ ma- raː dəb- a.
3sg.PERF 3sg.SBJ- go borrow- IRR

'If your father **is a sorcerer**, it can happen that if another (sorcerer) kills (someone), he'll go and borrow (some meat).' (6.93, #7, magic and the supernatural text)

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[11]Further corpus work would be needed to determine whether the imperfective progressive is statistically preferred over the periphrastic one in such environments.

(87) tʃoːm- akədo-   i   dãt- i-   ã   de   bari **wu-   sãpə-**
     NEC- PAST.PERF- 2sg.PERF say- BEN- 3sg.NSBJ AFF.DECL but NMLZ.SG- pass-
     se   i̱.
     REL.PERF <u>COP</u>

'You should have told him, but **that's in the past**.' (8.31, #1, elicitation)

(88) waː beː- se   be- patʃae pã jã jaːr? patʃae fanã **kutʃidi i̱**.
     what bring- REL.PERF PL- chicken DET here village chicken also bird   <u>COP</u>

'What brought chickens here to the village? A chicken too **is a bird**.' (9.33, #11, story of how chickens became domesticated)

(89) jã   tẽbe nə̃nə̃, **fe paːd- i- jã**   **ḵ- ə̃**.
     here time DEM P room- of- 3sg.NSBJ <u>be</u>- 3sg.PERF

'At the moment, **s/he's in his/her room**.' (8.9, #2, elicitation)

(90) A: **e faː   ḵ- ə̃**   Waalibo? ka- r-   a   fe paːd- i- jã.
        P where <u>be</u>- 3sg.PERF Waalibo be- NEG.PERF- 3sg.NEG P room- of- 3sg.NSBJ

     '**Where is** Waalibo? He's not in his room.'

     B: mitʃ- ĩ   de   **fe bitiki jak- ə̃**.
        think- 1sg.PERF AFF.DECL P store <u>be</u>- 3sg.PERF

     'I think **he's in the store**.' (8.9, #2, elicitation)

The locative clauses in (89) and (90) use the same verbal copula found in the periphrastic progressive construction, while the predicational clauses in (85)-(88) do not.

According to Bybee *et al.* (1994), periphrastic progressives develop in the absense of a grammaticalized way to express specifically progressive (rather than general imperfective) semantics; on the flip side, general imperfectives tend to develop out of progressives whose semantics have been extended over time (Bybee *et al.* 1994:127). In Badiaranke, then, it is likely that an older progressive got grammaticalized into what is today the very general imperfective aspect (marked by *mp*-series prefixes and optional *pə-*); subsequently, the language developed the periphrastic progressive to compensate for the loss of a construction with specifically progressive semantics. The relative recency of Badiaranke's periphrastic progressive is reflected in the transparency, with respect to both choice of copula and word order, of its locative source. On this diachronic analysis, it is unsurprising that the *semantics* of the periphrastic and imperfective progressives should be indistinguishable, with the choice between them subject to variation, but largely determined by pragmatic and syntactic context.

4.3.3   Periphrastic habitual

In simple affirmative declarative clauses, the periphrastic habitual generally follows the template *kəd*-PERSON V *de*, where PERSON is a subject agreement suffix from the same series

used by the perfective and periphrastic progressive. In clauses with 3sg. subjects, however, the suppletive form *a-pə*-V *de* is used instead. In both versions, non-subject arguments and adjuncts can either precede or follow *de*.

Like the periphrastic progressive, the periphrastic habitual differs from its imperfective counterpart with respect to acceptable syntactic and pragmatic contexts; unlike the progressives, the habitual aspects in Badiaranke do differ in at least one semantic respect, pertaining to the types of eventuality descriptions on which they can operate. Below I describe the contexts in which the two types of habitual occur in my data.

As expected, the imperfective habitual appears when the context of utterance – either elements of the sentence itself, or the topic of the discourse in which the sentence occurs – strongly favors a habitual or generic reading. It shows up, for instance, in clauses with quantificational temporal expressions, as in (91) and (92). In examples gathered through elicitation, as these ones were, the potential exists for a conflating futurate (or future habitual) interpretation to arise, although the consultant confirmed that (92) could be a statement about times starting in the past and extending through the present.

(91) katʃudu woː **mã-** **seːtə de.**
morning all 1sg.IMPF- speak AFF.DECL
'Every morning **I speak (will speak?)**.' (1.77, #1, elicitation)

(92) mbõ ŋk ẽ, piːsidoː **bõ-** **rəsə (de).**
1pl.INDEP and 2sg.NSBJ every.day 1pl.IMPF- tired AFF.DECL
'You and me, every day **we get tired**.' (8.23, #2, elicitation)

Similarly, adverbials that encode an evaluation time extending into the past, as opposed to one limited to the future, force a habitual, rather than futurate, reading for the imperfective, as in (93).

(93) hani ŋka toː **mã-** **karaŋə ãkale** **de.**
still 1sg.IMPF- study English AFF.DECL
'**I** still **study English**.' (2.71, #2, elicitation)

When the discourse topic addresses regularly recurring events, or when a sentence predicates some property of a kind-referring subject, generic semantics is sometimes expressed by the imperfective, as in (94) and (95). (95) shows that the generic imperfective can sometimes apply to stative eventuality descriptions, at least in the right discourse context and with a kind-denoting subject.

(94) wu- ŋaːs- a beːɲi, jã i **kə-** **ŋaːs.** wu- kãt- a velo,
NMLZ.SG- tear- IRR clothes there COP 2sg.IMPF- tear NMLZ.SG- buy- IRR bike
jã i **mpə-** **kãtə velo.**
there COP 3sg.IMPF- buy bike
'Whoever was buying (literally "tearing") clothes, it's there **you would buy clothes**. Whoever was buying a bike, it's there **he'd buy a bike**.' (4.27, #2, second version of life story)

(95) keməsə kã **mpə-** **miːr** **de** bar kaː wẽ fe puɲu.
cloth DET 3sg.IMPF- resemble AFF.DECL but NEG.IMPF.3sg. 3sg.INDEP P woods

'The outfit **looks similar**, but it's not the one from the woods.' (7.18, #1, *kãkurã*
text)

In texts, the imperfective occasionally appears in relative clauses with habitual seman-
tics, as in (96); in elicitation, however, consultants usually strongly preferred to use the
periphrastic construction to express habitual semantics in relative clauses, as (97) illustrates.

(96) awa, kabãtã- i- ã niːna **mpə-** **dunnaː** niːna, wũ a- pə-
INTERJ shirt- of- 3sg.NSBJ DEM 3sg.IMPF- wear DEM DEM 3sg.HABIT- IMPF-
naː de pasatʃi.
have AFF.DECL hair

'So, that shirt of his, that one **he wears**, that, it has hair.' (7.16, #1, *kãkurã* text)

(97) paːki patʃi- bə̃ **wu-** **te-** tʃoːdə jã {kũpia/ *piːsidoː}
yesterday hit- 3pl.PERF NMLZ.SG- REL.IMPF- sit here tomorrow every.day
wẽ de.
DET AFF.DECL

'Yesterday they hit the one who {**will sit there tomorrow**/*sits there every
day**}.' (8.86, #1, elicitation)

The consultant's choice to use the imperfective in (96) is probably due to the fact that the
discourse topic (what happens when the *kãkurã* spirit arrives, as it does with some regularity)
makes clear that habitual recurrences are being discussed.

Similarly, in a discourse about regularly recurring events (such as what the speaker does
every day, or what happens on a given holiday), it is easy for the imperfective to receive a
habitual or generic interpretation, as in (98) and (99).

(98) nĩ faː- e sũkar sẽ ɲeɲ- õ, sukur sẽ **kə-** **watʃə**
when month- of Ramadan DET stand- PASS.3sg.PERF sugar DET 2sg.IMPF- buy
de sẽkãt.
AFF.DECL fifty

'When the month of Ramadan begins, **you buy a 50-kg. sack of sugar**.' (4.74,
#1, 'what I did last year' text (interlude on what happens during Ramadan))

(99) ka- paɲ- ər- e wũ toina, bidʒaːsa bẽ pakkã **mpə- raː de**
INF- greet- RECIP- INF DEM that.day old.ones DET one 3sg.IMPF- go AFF.DECL

almaːmi sẽ **mpə- raː paɲ- oː de**, awa bidʒaːsa bẽ fanã
imam DET 3sg.IMPF- go greet- PASS AFF.DECL INTERJ old.ones DET also

bẽ- paɲ- ər de. . . .
3pl.IMPF- greet- RECIP AFF.DECL

'The greeting of each other, that, that day, the old people, each one **goes**, the imam, **he's greeted** (lit. 'he goes be greeted'), so anyway, the old people also, **they greet each other**. . . .' (2.79, #1, 'what happens at the end of Ramadan' text)

The imperfective habitual can appear in temporal 'if/when' clauses expressing habitually recurring events (100), an environment where the periphrastic habitual never occurs in my database. Such temporal clauses are morphosyntactically identical to antecedents of conditionals; imperfectives in consequents of conditionals can also receive a generic reading, as in (62)-(63) above and in (101), where the generic subject refers to whatever children are playing the *dũdurã* game.

(100) bar kaː wũ lõ kədeː- dʒaː de nĩ weː
but NEG.IMPF.3sg. DEM only REL.HABIT- eat AFF.DECL if/when 3sg.INDEP

rẽ nĩ **mpə- kamə**, weː ma- kam- a haː
come.3sg.PERF if/when 3sg.IMPF- dance 3sg.INDEP 3sg.NARR- dance- IRR until

jã ma- kam- a nĩ səm- aːn- ə̃ podda pã ma-
there 3sg.NARR- dance- IRR if/when arrive- CAUS- 3sg.PERF food DET 3sg.NARR-

riː ame be- kobəda maːe ame mpə- ri ame mpə- ri ma- sãp- a.
do thus PL- hand two thus 3sg.IMPF- do thus 3sg.IMPF- do 3sg.NARR- pass- IRR

'But it's not just her that eats – when that one comes, when **she dances**, she dances to there, she dances; when she reaches the food she does like this [shoveling food into mouth] with two hands, she does like this, she does like this, she does like this, she moves on.' (7.6, #1, *mambasaːmbas* text)

(101) bari nĩ **bẽ- sadʒi** dũdurã sẽ mpə- kamə feː **de**,
but if/when 3pl.IMPF- clap *dũdurã* DET 3sg.IMPF- dance there AFF.DECL

bɔ̃ be- jak- a jaŋe.
3pl.INDEP 3pl.NARR- be- IRR here

'But while **they're clapping**, the *dũdurã* dances way over there; them, they'll be over here.' (7.29, #1, *dũdurã* text)[12]

Although the general imperfective can express habitual meaning, consultants more frequently produce the periphrastic habitual when asked to translate sentences that are clearly intended to have *non-future* habitual meaning. (The same holds, mutatis mutandis, for the

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[12]As the translation suggests, this example might be better treated as an instance of a progressive imperfective in the temporal clause.

periphrastic progressive.). Plausibly, this tendency arises because an imperfective-marked clause does not receive a habitual (or progressive) interpretation in the absence of those contextual cues discussed above (an adverbial, a preceding clause setting up the expectation for a progressive clause, etc.). As a corollary, to clearly convey progressive or habitual meaning in an isolated sentence without any of those contextual cues, the speaker will ordinarily choose the periphrastic aspect. (Furthermore, once consultants had developed an intuitive grasp of the notion of paradigmatic elicitation, their understanding of my research agenda may have prompted them to use the least aspectually ambiguous form available.) Thus in elicited habitual sentences with a quantificational temporal expression but no other context (e.g. (102)-(104)), as well as in sentences lacking any such adverbial but preceded by an unambiguously habitual prompt, as was the case for (105), the periphrastic habitual is frequently used. As (103)-(104) reflect, the periphrastic habitual is compatible with stative eventuality descriptions.

(102) waːti jak- ə̃   nəse, piːsidoː **kəd- ə̃**   **kamə de**.
       time be- 1sg. child every.day HABIT- 1sg.HABIT dance AFF.DECL

       'Every day when I was young, **I used to dance**.' (1.88, #1, elicitation)[13]

(103) **kəd- ə̃**   **tʃew- oː** ka- baj- e   moto   sẽ de.
       HABIT- 1sg.HABIT fear- PASS INF- take- INF motorcycle DET AFF.DECL

       '**I'm (always) scared** to drive the motorcycle.' (8.10, #1, elicitation)

(104) bitʃaːe bidʒadə   bẽ, birĩ duniaː sẽ fẽt- ə̃,   (piːsidoː) **kədə-**
       women Badiaranke.people DET since world DET begin- 3sg.PERF every.day HABIT-
       bẽ   **rəsə de**.
       3pl.HABIT tired AFF.DECL

       'Badiaranke women, since the world began, every day **they are/get tired**.' (8.23, #2, elicitation)

(105) **kəd- ə̃**   **dakkə de**   **mbuur**.
       HABIT- 1sg.HABIT chew   AFF.DECL bread

       '**I eat bread** (habitually).' (4.12, #2, elicitation)

Like the imperfective habitual, the periphrastic habitual can occur in consequents of conditionals, with or without a quantificational temporal expression.

(106) nĩ   sãk- õ, wũ i **kəde-**   **ri- o** ma-   jim- o hoːloːlo.
       if/when veil- PASS DEM COP REL.HABIT do- PASS 3sg.NARR- say- PASS *hoːloːlo*

       'When she's veiled, that's what **is done**; it's called *hoːloːlo*.' (3.26, #1, marriage customs text)

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[13]Note the lack of past marking here.

(107) mbõ   fanã na:- bõ   de   bə- mãdẽ bə-   kəde-   wa:j-
       3pl.INDEP also have- 1pl.PERF AFF.DECL PL- healer NMLZ.PL- REL.HABIT- heal-

       ã,   nĩ   ŋasə- mẽ   **kədə- bẽ   mo:s-   ẽ**
       3sg.NSBJ if/when bite- 3sg.on.2sg.PERF <u>HABIT</u>- 3pl.HABIT massage- 2sg.NSBJ

       de.
       AFF.DECL

       'Us, too, we have healers that treat it [snake bites]; if it (the snake) bites you **they
       massage you** (to heal you).' (2.95, #2, snake text #1)

(108) Musaa nĩ   se:t-   ə̃   dorõ, **kəd-   ə̃   dasə de**.
       Musaa if/when speak- 3sg.PERF only   <u>HABIT</u>- 1sg.HABIT laugh AFF.DECL

       'If Musaa so much as speaks, **I laugh**.' (8.38, #2, elicitation)

(109) Aamadu sək-   ə̃   ri-   a, ka- ɲãd-   e kodi   tũ   **kəd-**
       Aamadu happen- 3sg.PERF come- IRR INF- request- INF money only <u>HABIT</u>-

       ə̃   re:.
       3sg.HABIT come

       'Aamadu, whenever he comes, it's just to beg for money **that he comes**.' (8.40,
       #1, elicitation)[14]

Similarly, clauses in texts describing generic behavior of individuals or kinds (such as Badia-
ranke people, *kãkurã* spirits, blacksmiths, women with children, witches, etc.) can take the
periphrastic habitual in addition to the imperfective habitual.

(110) ba:jr rəb-   a:-   r-   a   mbõ   na:mu-   je- bõnə̃ ana
       since remain- DETRANS- NEG.PERF- 3sg.NEG 1pl.INDEP tradition- of- ours like

       ko-   kab-   bõ   kõ   **kədə- bõ   ri- i   ma:m-   ã**
       MANNER- know- 1pl.PERF DET <u>HABIT</u>- 1pl.HABIT do- BEN person.of- 3sg.NSBJ

       de   sada:.
       AFF.DECL sacrifice.

       'Since s/he is gone (deceased), us, our custom, the way we're used to, **we do a
       sacrifice for the person**.' (2.60, #1, 'what happens when someone dies' text)

(111) bar silana, ba:jri kãdʒadə   kã   kidʒir- ə̃   de,   ŋ   i:
       but now   since Badiaranke/language DET mix-   3sg.PERF AFF.DECL DEM COP

       ri:- se   mbõ   fop **kədə- bõ   jimə** kũdatə. bari kũdãdã sẽ,
       do- REL.PERF 1pl.INDEP all <u>HABIT</u>- 1pl.HABIT say   *kũdatə* but *kũdãdã* DET

       ŋ   i: pi:r sẽ.
       DEM COP pure DET

       'But now, seeing as how the language is all mixed (with other languages), that's
       why all of us, **we say *kũdatə*** [to mean "old field"]. But *kũdãdã*, that's the pure
       [Badiaranke] one.' (8.116, #10, Badiaranke dialects text (in Sounkoutou, Guinea))

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[14]The use of *kəd-ə̃* instead of *a-pə-* is due to the focus environment.

As mentioned above, the periphrastic habitual frequently appears in relative clauses, as in (112) and (113).

(112) mbõ   jã sapp- eː- bõ   jã. mə-   nã   de   **bə-**
1pl.INDEP here side- of- 1pl.NSBJ here NARR- exist.3sg.PERF INTERJ NMLZ.PL-

ḳəde-   jim- o   be- ŋãtənna.
REL.HABIT- say- PASS PL- sorcerer

'Us here, around here. There's what **are called** sorcerers.' (6.85, #7, magic and the supernatural text)

(113) weː   **ḳədə- bẽ   səddi** jã Senekaal wẽ kaː   pə-   sədd-
3sg.INDEP HABIT- 3pl.HABIT cook   here Senegal   DET NEG.IMPF.3sg. IMPF- cook-

oː   Amerik.
PASS America

'That which **they cook** here in Senegal isn't cooked in America.' (5.14, #2, elicitation)

The periphrastic habitual can be used on the possibility modal, *mən-*, to express generic permission (114), ability (115), or metaphysical possibility (116), but is incompatible with the necessity modal, *tʃoːm-*, at least on its deontic reading (117).

(114) waːti sãp- ̃ə fe jaːr- eː- bõ,   pi- dʒitt- i   woː **ḳəd- i**
time pass- 3sg. P town- of- 1pl.NSBJ LOC- get-   2sg.PERF all HABIT- 2sg.HABIT

mən- (aḳəde)   ka- rak- e de,   bar taːme kaː
POSSIB- PAST.IRR.NPERF INF- smoke- INF AFF.DECL but now   NEG.IMPF.3sg.

siɲi woː **ḳəd- i   mənə a-   rak- a de.**
place all HABIT- 2sg.HABIT POSSIB 2sg.SBJ- smoke- IRR AFF.DECL

'In the past, in our town, wherever you got a chance **you could smoke**, but now it's not just anyplace that **you can smoke**.' (8.54, #1, elicitation)

(115) siɲito   **a-   pə- mənə de   ma-   karaŋ- a.**
sometimes 3sg.HABIT- IMPF- POSSIB AFF.DECL 3sg.SBJ- study- IRR

'Sometimes **s/he's able** to study.' (8.74, #1, elicitation)
Possible contexts: the student has a disease that sometimes prevents him/her from studying, or has other obligations that take time away from studying.

(116) hani ma-   naːŋ- a ataːja **a-   pə- mənə de   ma-   datta-**
even 1sg.SBJ- drink- IRR tea   3sg.HABIT- IMPF- POSSIB AFF.DECL 1sg.SBJ- sleep-

a.
IRR

'Even if I drink tea, **it can be possible** for me to fall asleep.' (8.75, #1, elicitation)

(117) ?* **a-**   **pə-** tʃoːmə(**-də**) karaŋ- a   **de**.
3sg.HABIT- <u>IMPF</u>- NEC   study- IRR AFF.DECL

Intended: 'S/he generally has to study.' (8.103, #1, elicitation)

Given the extensive distributional overlap, the question becomes what semantic distinction, if any, can be drawn between the imperfective and periphrastic habituals. The crosslinguistic literature is not particularly enlightening: though a number of other languages (e.g. Hebrew (Boneh and Doron 2008) and Lezgian (Haspelmath 1993)) have been reported to possess two habituals, or an imperfective and a habitual, there is very little discussion in the theoretical literature about the semantic distinctions between habitual categories within a given language. Discussing two ways of expressing habituality in Hebrew, Boneh and Doron (2008) claim that one habitual is modal (it can be used to talk about potential, but never actually realized, events) but not, strictly speaking, aspectual, while the other is aspectual but not modal (it can only be used to talk about actual iterated events). I have no evidence of a parallel distinction between the imperfective and periphrastic habituals in Badiaranke; to the contrary, the usability of both to make "gnomic" (modal, generic) statements (e.g. (102), (104) and (98)-(99)) casts doubt on such a claim.

Nonetheless, despite the overlapping distribution and frequent interchangeability of Badiaranke's periphrastic and imperfective habituals, there are semantic differences between the two. As mentioned in §3.2.2 above, the periphrastic habitual may be used to talk about generic individual-level states (i.e. to predicate an individual-level state of a kind-denoting subject); the imperfective habitual cannot, although it *can* be used to talk about generic eventualities of other types. Thus (118a) can only mean 'this specific tree will be tall', even though *matə mãmã* can also mean 'this type of tree'. The corresponding generic demands the periphrastic habitual (118b).

(118)   a. matə mãmã **mpə-**   **sar**   **de**.
tree   DEM   <u>3sg.IMPF</u>- be.tall AFF.DECL

✓'This (specific) tree **will be tall**.'
*'This (type of) tree gets tall.' (5.61, #2, elicitation)

b. matə mãmã **a-**   **pə-**   **sar**   **de**.
tree   DEM   3sg.HABIT- <u>IMPF</u>- be.tall AFF.DECL

'This (type of) tree **gets tall**.' (5.61, #2, elicitation)

(119a) is ruled out altogether, since the futurate use of *mp-* is appropriate only for states that do not yet hold. Africans have always been black, so it is infelicitous to imply that they will become black in the future. To predicate a permanent state of a generic subject, one is forced again to use the dedicated habitual, as in (119b), or alternatively the perfective, as in (119c). (A progressive reading is not an option for (119a) because of the lack of any contextual factors favoring such a reading; in the absence of such factors, the imperfective defaults to a futurate reading.)

(119)   a.   * baː   Afrik **bẽ-**   **baj**   de.
             people.of Africa 3pl.impf- be.black aff.decl

             Intended: 'Africans are black.' (5.61, #2, elicitation)

        b.   baː   Afrik **kədə-** **bẽ-**   **baj**   de.
             people.of Africa habit- 3pl.habit be.black aff.decl

             'Africans are (tend to be) black.' (5.61, #2, elicitation)

        c.   baː   Afrik **bajə-**   **bə̃**   **de**.
             people.of Africa be.black- 3pl.perf aff.decl

             'Africans **are black**.' (5.61, #2, elicitation)

Similarly, in (120), an assertion about perpetual happiness, the periphrastic habitual is preferred over the general imperfective. If the eventuality description were interpreted as denoting a stage-level state, I would expect it to be compatible with the imperfective habitual on an inceptive reading, as it was in (92) (the 'we get tired' example); the fact that it is not, as (120b) shows, suggests the consultant may have interpreted the state of happiness as an individual-level state characterizing the subjects, rather than as a stage-level state that recurs daily.

(120)   a.   birĩ paːrə peːs,   nũ   ŋka laːo- j- ẽ   sẽ, **kədə-**
             since two.years.ago 2pl.indep and friend- of- 2sg.nsbj det habit-
             nũ   **niŋə-**   **n-**   **aː**   **de**   (piːsidoː).
             2pl.habit pleasant- caus- detrans aff.decl every.day

             'Since two years ago, you and your friend, **you've been happy every day**.' (8.23, #2, elicitation)

        b.   ?* birĩ paːrə peːs,   nũ   ŋka laːo- j- ẽ   sẽ, **nũ-**
             since two.years.ago 2pl.indep and friend- of- 2sg.nsbj det 2pl.impf
             niŋə-   **n-**   **aː**   **de**   (piːsidoː).
             pleasant- caus- detrans aff.decl every.day

             Intended: 'Since two years ago, you and your friend, **you've been happy every day**.' (8.23, #2, elicitation)

The requirement that individual-level statives take the dedicated habitual marker to receive a habitual semantics echoes, but does not precisely mirror, the situation in Guyanese Creole. According to Sidnell (2002), Guyanese Creole also has both a habitual marker, *doz*, and a general imperfective, *a*. Much as I propose for Badiaranke, above, Sidnell argues that the former entered into the language (in that case, through borrowing) some time after the development of the latter, and that the dedicated habitual is now preferred over the imperfective with stative predicates. The situation is not entirely parallel, however, since Sidnell gives no indication that the stage- vs. individual-level distinction plays a role in Guyanese Creole, and moreover, the general imperfective, when it does occur with statives, forces a habitual reading and disallows a progressive one (unlike in Badiaranke, where progressive *mp-* yields a developing-state reading with stage-level statives).

In any case, our semantic treatment of the periphrastic habitual must explain the data in (118)-(120). What is it about *kəd-* that is more amenable to a kind-DP reading, or to a "tendency" reading more generally?

We can straightforwardly account for this data by noting that on the analysis in §3.4.3, habitual *mp-* requires a plural eventuality (spanning a plural interval or multiple individuals); this restriction means that the imperfective operator cannot take a single individual-level (i.e. permanent) state as its argument and output a habitual or generic reading. Like the imperfective habitual, *kəd-* encodes plurality of an eventuality (repetition across times, possibly by distinct individuals), as well as modality (the probability of continuation beyond perspective time); unlike the imperfective habitual, *kəd-* can take a singular eventuality and *derive* a plural eventuality. Since individual-level statives are true over the lifetime of an individual, plurality of an individual-level stative requires instantiation by different individuals at different times. Thus *kəd-* has a dual role: it pluralizes an eventuality, *and* it quantifies over plural eventualities. The idea that a habitual can pluralize eventualities is akin to the proposal of Carlson (1989) that generic operators turn episodic predicates into ones that are generic, i.e. pertaining to "a more lasting characteristic or disposition" (1989:2). It is arguably also implicit in Ferreira's 2004 analysis of singular and plural imperfectives, which take singular and plural VPs as arguments, respectively. The present analysis of Badiaranke, though, provides a different twist: while the general imperfective *selects* for plural eventualities on its habitual reading, the *kəd-* habitual *pluralizes* singular eventualities and then quantifies over them.

4.4   Transitionals

The Badiaranke construction that I call *transitional* is semantically similar to inchoative or inceptive aspects crosslinguistically: it emphasizes transition into a state, or the coming about (and therefore initiation) of an event.[15] However, if inceptives hone in on the initial endpoint of an eventuality (Smith 1997:49), then they should be extraneous on achievements, which are instantaneous; indeed, inceptive aspect has been claimed to be bad on achievements in English (Smith 1997:41) and Mandarin (Xiao and McEnery 2004:222). In Badiaranke, the aspectual category in question is compatible with achievements, simply expressing realization of the achievement (as in (135) and (136) below); accordingly, I use the term "transitional" to distinguish this aspect from inceptive aspect as traditionally conceived.[16] The construction consists of an aspectually inflected root *rɛ-*, which ordinarily means 'come', followed by an irrealis-marked verb (along with arguments and adjuncts, of course).

Transitional aspect is a secondary aspect, in that unlike the aspects discussed thus far, it is always superimposed on another aspect, such as the perfective or (perhaps less commonly)

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[15]Smith (1997:49) explains that inchoatives apply to stative eventuality descriptions, while inceptives apply to eventive ones.

[16]The invention of a new term was necessitated by the absence of parallel phenomena in descriptions of other languages.

imperfective.[17] This morphosyntactic fact, combined with the fact that consultants are generally unable to articulate any specific meaning contributed by the transitional (as opposed to a simple perfective or imperfective aspect), supports the intuition that transitionals make a primarily pragmatic contribution. Transitionals, then, are best treated as an aspectual or aspect-related phenomenon, but not as an aspect on par with the perfective, imperfective, and so on.

Badiaranke transitionals often occur in contexts that suggest an English paraphrase like 'come to V' or 'end up V'ing (despite expectations)'. (121) contains such a transitional, but (122) shows that essentially the same proposition can be expressed using an ordinary perfective instead. Indeed, the consultant indicated no meaning difference between the two sentences.

(121) par-   akõ   de   ka- kam- e   bari **mə-   rẽ**
      refuse- PAST.1sg.PERF AFF.DECL INF- dance- INF but NARR- come.1sg.PERF
      kam- a.
      dance- IRR
      'I had refused to dance, but **I danced**.' (8.37, #2, elicitation)

(122) par-   akõ   de   ka- kam- e   bari **kam- ə̃   de**.
      refuse- PAST.1sg.PERF AFF.DECL INF- dance- INF but dance- 1sg.PERF AFF.DECL
      'I had refused to dance, but **I danced**.' (8.37, #2, elicitation)

An exception to this interchangeability arises with positional verbs, on which the perfective (plus the suffix -o, which elsewhere has a passivizing function) simply expresses the state of being in the position (as in (123a)), while the transitional indicates transition into the position in question (as in (123b)).

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[17]Transitionals cannot occur in periphrastic progressive clauses:

(i)   a. * ka- re   dattaː- e   (ja)k- ə̃.
            INF- come sleep- INF be-   3sg.PROG
            Intended: 'S/he's going to sleep.' (8.66, #2, elicitation)
      b. * ka- re   datta- a   (ja)k- ə̃.
            INF- come sleep- IRR be-   3sg.PROG
            Intended: 'S/he's going to sleep.' (8.66, #2, elicitation)

I am not sure why this restriction holds; it could be due to a semantic incompatibility of sorts (e.g. the fact that the progressive highlights an interval during which the eventuality itself is developing, while the transitional construction highlights a moment of transition).

(123) a. ŋan- õ   de.
          arise- PASS.1sg.PERF AFF.DECL
          'I've stood up.'
          (Acceptable only while the speaker is still standing). (5.1, #1, elicitation)

      b. tʃoːd- akõ   de   **mə- r̰ẽ   ŋan- a̰**.
          sit-   PAST.3sg.PERF AFF.DECL NARR- come.3sg.PERF arise- IRR
          'S/he was/had been sitting down and then **got up**.' (8.26, #1, elicitation)

Transitionals are compatible with stative verbs, where they indicate transition into a state, as in (124)-(126). (124) illustrates that in perfective-marked transitionals of statives, persistence of the state at perspective time is an implicature, not an entailment, since it is reinforceable.

(124) Aamadu daːs-   õ   de,   **mə- r̰ẽ   datta- a̰**.
        Aamadu lie.down- PASS.3sg.PERF AFF.DECL NARR- come.3sg.PERF sleep- IRR
        hani ŋka toː datta- ã   de.
        still   sleep- 3sg.PERF AFF.DECL
        'Aamadu lay down and **fell asleep**. He's still asleep.' (8.64, #2, elicitation)

(125) puannə paina, he! wũ iː **r̰ẽ   dʒuː- a̰ ka- ŋiː- e**.
        bride that   INTERJ DEM COP come.3sg.PERF exceed- IRR INF- like- INF
        'That bride, well! That's the one **he came to like more**.' (6.68, #2, story of ruler's son avenging his mother)

(126) **bõ-   reː rəs- a̰ de**.
        1pl.IMPF- come tired- IRR AFF.DECL
        '**We'll get tired**.' (8.37, #2, elicitation)

In (126), placing *de* before *rəs-a* makes the sentence ungrammatical. Since *de* can ordinarily immediately follow the verb, and since verbs inflected with an imperfective prefix (like *bõ-*), but not those bearing an irrealis suffix, take *de*, the restricted position of *de* in (126) suggests that *reː-* in transitionals is not a fully autonomous verb, but has been grammaticalized into a sort of prefix.

With activities, perfective-marked transitionals entail realization of the activity in the base world.[18]

(127) birĩ wũ baːdiŋ- õ,   **mə- reː- bə̃   joːm-   ã̰**.
        since DEM bury- PASS.3sg.PERF NARR- come- 3pl.PERF do.burial.rituals- 3sg.NSBJ
        'Once he was buried, **they conducted the burial rituals for him**.' (8.19, #1, account of codification festival (specifically, re-enactment of the *kujoːmu* funerary ritual)) [19]

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[18]It is possible that (127) should be treated as containing an accomplishment, depending on the lexical semantics of *joom-*.

[19]The irrealis suffix -*a* is elided in this transitional example due to the presence of the object suffix -*ã̰*.

(128) Musaa nĩ   seːt- ə̃   dorõ, **mã-**   **reː das- a de**.
Musaa if/when talk- 3sg.PERF only   1sg.IMPF- <u>come</u> laugh- IRR AFF.DECL

'All Musaa has to do is talk and **I start laughing**.' (8.38, #2, elicitation)

The *sək-ə̃* V-*a* construction in (129) seems to be simply a variant of the transitional template; it is the only environment in which the *sək-* verb occurs.

(129) <u>**sək-**</u>   **ə̃**   **sadʒi- raːn- a** be- kumã kũ dorõ pi- jak- i   woː
<u>happen-</u> 3sg.PERF clap-   PLUR- <u>IRR</u> PL- knife   DET only LOC- be- 2sg.PERF all
ki-   jetʃ- ã   de.
2sg.IMPF- hear- 3sg.NSBJ AFF.DECL

'As soon as **he starts clanking the knives**, wherever you are, you'll hear it.' (7.16, #1, *kãkurã* text)

When they occur on accomplishments, transitionals entail transition into the target state:

(130) katrəvẽdə haː   mə-   rã   fe tʃodde. **mə- re- ə̃**   **seːs- a**
82   until NARR- go.1sg.PERF P above   NARR- <u>come-</u> 1sg.PERF exit- <u>IRR</u>
katrəvẽtwit.
88

'[From] '82 until I went up (to more advanced grades). **I quit** in '88.' (4.21, #3, life story)

(131) jak- ə̃   Gambi   haː **mə- reː- bõ je:r- u- a**
be- 1sg.PERF The.Gambia until NARR- <u>come-</u> 1pl.PERF head.home- VENT- <u>IRR</u>
katrəvẽduz mi-   jakə- bõ   jã.
92   NARR- be- 1pl.PERF here

'I was in The Gambia until **we came home** in '92, we were here (there?)' (4.21, #3, life story)

(132) maː   mma   naː-   je- mma   kaː   pi-   dʒittə tʃaːfe.
he.said 1sg.INDEP mother- of- 1sg.INDEP NEG.IMPF.3sg. IMPF- get   female
mma   wusia k- ə̃   **mə- rẽ**   **ri- ã**   **tʃaːfe**.
1sg.INDEP male   be- 1sg.PERF NARR- <u>come.</u>3sg.PERF make- 1sg.NSBJ female

'He said, "Me, my mother doesn't have [lit. 'get'] girls. Me, I'm a male; **she made me into a female**."' (6.39, #5, ruler with two "wives" story)

(133) **mə- rẽ**   **rəm- u- a** pakkã wũ fanã wusia i.
NARR- <u>come.</u>3sg.PERF give.birth- VENT- <u>IRR</u> one   DEM also male COP

'**She gave birth to (another) one**; that one too was male.' (6.35, #5, ruler with two "wives" story)

(134) silana nõ,   mi-   jim- ə̃   ka- je:r-   u-   e,   pur ma-   ri-
now   INTERJ NARR- say- 1sg. INF- head.home- VENT- INF for 1sg.SBJ- come-

akəde   ha: fe Fuuta, bo-   dʒe:n- tər-   jo:,   ma-   paɲ-
PAST.IRR.NPERF until P Fouta 1pl.SBJ- see-   RECIP- IMPER.PL 1sg.SBJ- greet-

enũ,   bar **re:-   re-   mã dʒitt-** ə fa:se, bi-   dʒadə
2pl.NSBJ but come- NEG.PERF- 1sg.NEG get-   IRR path NMLZ.PL- Badiaranke

bẽ   mə-   parə- bə̃.
DET NARR- refuse- 3pl.PERF

'Now, I said that coming home, that I would go to the Fuuta, we could see each other, I could greet you, but **I didn't end up being able to go**; the Baɗiaranke people refused.' (6.75, #2, telling me what I should tell my family in the north of Senegal)

As mentioned above, transitionals also occur with achievements, where it is not clear what semantic contribution transitional morphosyntax makes above and beyond the ordinary semantics of aspect.

(135) nĩ ri- i   koina Bambei **mpə-   re: kab- a-   a de**.
if do- 2sg.PERF that.way Bambei 3sg.IMPF- come know- DETRANS- IRR AFF.DECL

'If you do that, Bambey **will wake up**.' (8.68, #2, elicitation)

(136) mitʃ- ĩ   de   de,   bari **re:- r-   a   ni-   ã**.
think- 1sg.PERF AFF.DECL EMPH but come- NEG.PERF- 3sg.NEG break- 3sg.NSBJ

'I certainly thought so [that he would break the teacup], but **he didn't end up breaking it**.' (8.95, #1, elicitation)

Transitionals can be used with imperfective marking on *re:-* regardless of whether or not the eventuality described is imminent; in this respect they contrast with prospective aspect (see §4.5 below). Consultants accepted (137)-(139), for instance, even for scenarios where the transitional-marked eventuality is expected to occur at some time rather distant from perspective time.

(137) nĩ natʃir-   i   mãtabbar- ẽ   mã fenã, **mpə-   re: səb-**
if leave.behind- 2sg.PERF shoe-   2sg.NSBJ DET there 3sg.IMPF- come be.lost-

a   de.
IRR AFF.DECL

'If you leave your shoe there, **it will get lost**.' (8.39, #2, elicitation)

(138) is acceptable even if the singing won't immediately follow the seeing.

(138) mã-   dʒe:nə de   nəse nə̃ **mpə-   re: tʃim- a**.
1sg.IMPF- see   AFF.DECL child DET 3sg.IMPF- come sing-   IRR

'I'll see the child at a point when later **s/he'll sing**.' (8.1, #1, elicitation)

In (139), the going to bed can be in the fairly distant future, in contrast with the prospective-marked (143) below.

(139) **mpə-** <u>**reː**</u> **daːs-** <u>**a**</u> **de**.
3sg.IMPF- <u>come</u> lie.down- <u>IRR</u> AFF.DECL

  '**S/he will lie down/go to bed**.' (8.63, #2, elicitation)

One might expect the semantics of transitionals to be straightforward: the pieces combine to mean something like 'come to (the point of) V'ing', with 'come' referring to grammaticalized metaphorical motion, rather than physical motion. The semantics of a transitional would fall out from the semantics of 'come' (in this temporal, rather than spatial, sense, with the beginning of a V'ing eventuality being the goal of the 'coming'), to which the semantics of the overlaid aspect would then be applied. There are, however, two problems with such an analysis, from a strictly compositional, synchronic perspective. First, semantically speaking – beyond the fact that this atypical meaning for *reː*- would have to be stipulated – the problem is that the irrealis suffix, -*a*, should indicate that the worlds where the attached eventuality description is evaluated for truth potentially exclude the base world. This prediction does not appear to be borne out by the data; instead, perfective-marked transitionals seem to entail that the eventuality was, in fact, realized. This impression remains to be explicitly tested, e.g. by eliciting a transitional with the continuation '...but V didn't happen'. However, not only do consultants find no semantic distinction between simple perfectives and their transitional counterparts, but they also accept the use of negative transitionals to express the non-occurrence of anticipated eventualities ((140)-(141)). If anticipation of an eventuality – i.e. realization of the eventuality in the worlds best matching the speaker's past expectation – were sufficient to licence the transitional construction, these sentences would use affirmative, not negative, transitionals.

(140) jim- ako- i   de   kə-   ŋan- oː de   bari **reː-**
   say- PAST- 2sg.PERF AFF.DECL 2sg.IMPF- arise- PASS AFF.DECL but <u>come-</u>
   re-   **ni**   **ŋan-** <u>**a**</u>.
   NEG.PERF- 2sg.NEG arise- <u>IRR</u>

   'You'd said you'd get up, but **you didn't end up getting up**.' (8.26, #1, elicitation)

(141) rã   de   ka- kãt- e   kaməs, bari **reː-** **re-**   **mã**   **kãt-**
   go.1sg.PERF AFF.DECL INF- buy- INF cloth   but <u>come-</u> NEG.PERF- 1sg.NEG buy-
   u-   <u>**a**</u>. mbõ   ŋka u-   waːf- a   wẽ, wuttə- r-   re-
   VENT- <u>IRR</u> 1pl.INDEP and NMLZ.SG- sell- IRR DET meet- RECIP- NEG.PERF-
   bõ   **soŋo**.
   1pl.NEG price

   'I went to buy cloth. But **I didn't end up buying (any)**. The seller and I, we couldn't agree on a price.' (8.41, #2, elicitation)

Indeed, perfective-marked transitionals appear to entail not just the coming about, but also the culmination of an eventuality when the eventuality in question is telic; hence (142a)

cannot be followed by (142b).

(142) a. Aamadu **mə-** **r̃ẽ** **kər- a** **kilomeːtr maːe mã**.
Aamadu NARR- come.3sg.PERF run- IRR kilometer two DET
'Aamadu **ran the two kilometers**.'

   b. # haː toː mpə- kərə kilomeːtar maːe mã.
still 3sg.IMPF- run kilometer two DET
'He's still running the two kilometers.' (8.72, #2, elicitation)

A second observation that makes a strictly synchronic, compositional approach less desirable, and a construction-based approach more so, is the fixed position of affirmative declarative *de* in transitional clauses carrying an aspect that normally bears *de*, as in (126) above. Ordinarily, in perfective, non-progressive imperfective, and habitual aspects, *de* can be placed in various positions, including immediately after a verb as well as clause-finally. If transitional clauses were given a purely compositional, and not constructional, treatment, it is not clear how this fixed position could be accounted for. Indeed, it would also be difficult to explain the co-occurrence of irrealis -*a* with *de* on a non-constructional account, since the two do not co-occur elsewhere in the language; if ASP+*reː* V-*a* is viewed as a synchronically opaque unit, however, these facts become less problematic,

A more reasonable approach, then, is to describe what the transitional means synchronically, and consider how it arose diachronically. To the extent that the construction adds any discernible meaning to the simple perfective and imperfective, affirmative transitionals can be said to emphasize transition into a state or the coming about of a non-stative eventuality, while negated transitionals indicate the non-coming about of an eventuality (often counter to expectations). Historically, it is likely that first, the meaning of *reː*- 'come' was extended to encompass temporal as well as spatial meaning; subsequently, the transitional construction itself developed, with the meaning 'come to (the point of) V'ing', without entailed realization of the V'ing eventuality. Finally, due to the actuality entailment of perfective aspect, perfective-marked transitionals came to entail realization of the eventuality in question, with imperfective-marked transitionals retaining an inceptive interpretation.

4.5 Prospective aspect

Badiaranke clauses expressing prospective semantics follow the template *ka*-V-*e* PERSON-*reː*, where PERSON is a subject agreement prefix from the imperfective series. The prospective indicates that an eventuality is expected to be realized in the very near future of perspective time; ordinarily, it can only be used if the action is imminent, as (143)-(144) demonstrate. In (143), *ka-daːs-e mpə-reː* is infelicitous because, as the antecedent makes clear, spending the night is not imminent.

(143) nĩ rã   kaː   re   mən- a ka- jeːr-   u-   e...
         if go.3sg.PERF NEG.IMPF.3sg come POSSIB- IRR INF- head.home- VENT- INF

         #ka- daːs- e mpə- reː.
           INF- lie.down- INF 3sg.IMPF- come

         Intended: 'If she goes she won't end up being able to come home. **She'll spend the night**.' (8.64, #2, elicitation)[20]

Similarly, (144) is ungrammatical because the antecedent indicates that the sentence is spoken some time before noon, the time when the eventuality in the consequent is to appear, while the prospective in the consequent demands that the sweeping occur promptly after utterance time.

(144) *nĩ   midi səm- ə̃,   **ka- peːs- e mpə-   reː**.
         if/when noon arrive- 3sg.PERF INF- sweep- INF 3sg.IMPF- come

         Intended: 'At noon **she's going to sweep**.' (8.65, #2, elicitation)

    (145), according to the consultant, can only be spoken if the sweeping is about to occur, e.g. the individual has a broom in her hand. The sentence is felicitous even if the anticipated sweeping is to take place elsewhere, showing that *reː*- in prospectives, as in transitionals, does not express literal motion toward the speaker.

(145) **ka- peːs- e mpə-   reː**.
         INF- sweep- INF 3sg.IMPF- come

         '**She's about to sweep** (immediately).' (8.65, #2, elicitation)

Unlike (138) above, which contains a transitional, the prospective-marked sentence in (146) requires the child's singing to promptly follow the seeing event.

(146) mã-   dʒeːn de   nəse nə̃ (waina) **ka- tʃim- e mpə-   reː**.
         1sg.IMPF- see   AFF.DECL child DET at.that.time INF- sing- INF 3sg.IMPF- come

         'I'll see the child when **s/he's about to sing**.' (8.1, #1, elicitation)

    At first glance, (147) appears to contradict the generalization that prospectives impose an imminence requirement.

(147) **ka- kər- e kilomeːtr maːe mpə- reː** (pudõ).
         INF- run- INF kilometer two   3sg.- come next.year

         '**He'll run two kilometers** (next year).' (8.69, #2, elicitation)

The acceptability of (147) with *pudõ* 'next year' suggests that no immediacy is entailed. Indeed, immediately after approving (147), the consultant affirmed that the running may be in the distant future even in the absence of *pudõ*. However, upon later inquiry, the consultant claimed the version without *pudõ* or another modifier delimiting a future time, such as *kũpia* 'tomorrow', was infelicitous if the race was not about to start, e.g. if the race

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[20]Note also the transitional clause in this example.

was scheduled for the following day. Evidently, the prospective's imminence requirement holds in the absence of an adverbial, forcing the interpretation is that the individual is ready and about to run right away, but this constraint can be overcome once a suitable future adverbial is added.

(148)-(150) illustrate the use of prospective aspect with achievements, states, and activities; (150) shows that prospective aspect can occur in antecedents of conditionals.

(148) **ka- kirikir-　e mã-　　re:**.
INF- have.malaria- INF 1sg.IMPF- come

'**I'm starting to get malaria**.' (i.e. 'I'm about to get sick.') (8.35, #2, elicitation)

(149) dʒe:n- a　prezidã sẽ we:,　　**ka- səm- e mpə-　　re:**, ka- səm-
see-　IRR president DET 3sg.INDEP INF- arrive- INF 3sg.IMPF- come INF- arrive-

e　k- ə̃,　　**ka- səm- e mpə-　　re:**, səmitʃ- ã
INF be- 3sg.PROG INF- arrive- INF 3sg.IMPF- come arrive- DETRANS.3sg.PERF

de.　　səm- ə̃　　de.　　ma-　　sadʒ- o:.
AFF.DECL arrive- 3sg.PERF AFF.DECL 3sg.SBJ- clap- PASS

'See the president, **he's about to arrive**, he's arriving, **he's about to arrive**, he's arrived! He should be clapped for!' (8.13, #1, imitation of news reporter during elicitation)

(150) nĩ　　**ka- pe:s- e mpə-　　re:** a-　　pə-　dunna:　　kabãtã
if/when INF- sweep- INF 3sg.IMPF- come 3sg.HABIT- IMPF- put.on.clothes shirt

u-　　biɲə-　　se　　wẽ de.
NMLZ.SG- be.long.time- REL.PERF DET AFF.DECL

'When **she's about to start sweeping**, she puts on her old shirt.' (8.65, #2, elicitation)

Regarding the semantic ingredients of prospective aspect in Badiaranke, we see the same semantic extension of *re:-* to encompass metaphorical or temporal motion that appears in transitionals. That is, *re:* has been grammaticalized to express figurative motion toward a goal, in much the same way as English *be going to* has. In prospectives, *re:-* is always imperfective-marked; this imperfective is used in its progressive sense. Evidence for this claim comes from the absence of *de* even when *mpə-re:* precedes the infinitive, as in the following variant on (151):

(151) mã-　　dʒe:n de　　nəse nə̃ (waina)　**mpə-　　re: ka- tʃim- e**.
1sg.IMPF- see　AFF.DECL child DET at.that.time 3sg.IMPF- come INF- sing-　INF

'I'll see the child when **s/he's about to sing**.' (8.1, #1, elicitation)

By using the infinitival (and hence nominalized) form on the main verb, followed by progressive *mp-* on *re:-*, the Badiaranke prospective expresses that at perspective time the subject is "approaching" the eventuality described (which I will call the "V'ing eventuality" for

short). (Indeed, Comrie (1976) notes that prospectives often involve directional expressions crosslinguistically.)

As argued in §3.4.3, the progressive imperfective indicates that in the best possible worlds, as evaluated at t with respect to a circumstantial modal base and non-interruption ordering source, there is some evaluation interval i at which an eventuality e – of which some stage e' is realized in w – is realized. Note that in the case of prospectives, e is not the eventuality denoted by the main verb (and its arguments), but rather the event of "coming" to that eventuality in the metaphorical sense, i.e. getting to the point at which the eventuality is likely to occur. In other words, at perspective time (which by default is utterance time), the "approach" towards V'ing is in progress, and likely to be realized in the best circumstantially accessible worlds. Given this derivation, it was a small diachronic leap for the prospective to come to mean that the V'ing eventuality is not just approaching, but *imminent* at perspective time.

This analysis, together with the observation that adverbials can shift i (but not t), successfully accounts for the data in (147) above. The adverbial (in this case *pudõ* 'next year') delimits the time i within which the event of running two kilometers must (be expected to) begin, i.e. the approach to the running-two-kilometers event is expected to be complete. The worlds within which that run-up to a running-two-kilometers event is expected to be realized are the best circumstantially accessible worlds as ranked by a non-interruption ordering source as evaluated at perspective time, which is, as before, the time of utterance. In the absence of *pudõ* or another adverbial delimiting future times, however, the default interpretation – that of imminent approach of the eventuality described – kicks in.

It is worth comparing this analysis of the Badiaranke prospective with Klein's (1994) analysis of the prospective in English, namely that TSit (Time of the Situation) follows TT (Topic Time). Note that TSit is, in Klein's analysis, the time of the eventuality described by the verb (and arguments), *not* the time of the approach leading up to that eventuality; that is, Klein's TSit is not equivalent to i in this case. Since the coming-to-V eventuality is realized, on my analysis, sometime after t, and since the V'ing eventuality is (potentially) realized only after that, the time of the V'ing eventuality certainly follows some minimal i in which the coming-to-V is evaluated. As a result, the present analysis of Badiaranke turns out to be consistent with Klein's analysis of English, though the two analyses differ in their implementation. Unlike Klein's analysis, however, my analysis of Badiaranke prospectives incorporates a critical modal component; this modal part is critical, since the prospective – in English as well as Badiaranke – must not entail that the V'ing eventuality is realized, only that it is *expected* to be realized in certain possible worlds.

4.6 Other minor aspectual phenomena

Like other Atlantic languages, and many Niger-Congo languages more generally, Badiaranke has a rich system of "extensions," derivational suffixes that can be strung onto the verb.[21] Some of these – such as passivizing *-oː-*, detransitivizing *-aː-*, instrumental *-eːn-*, and causative *-n-*, *-aːn-*, and *-ndaːn-*, affect argument structure; others have a more aspectual flavor, affecting event structure or bearing on the time structure of the eventuality. Below, I briefly discuss those extensions relevant to aspect. They are all secondary aspectual phenomena, in that they cooccur with ordinary aspect marking.

4.6.1 *-ãkən-*: 'still', 'yet'

The *-ãkən-* suffix indicates that the evaluation interval is relatively short, but makes no claims about times after that interval; the semantics of *-ãkən-* are thus relevant to the viewpoint notion of boundedness. This extension functions much like English *still* or *yet*, except that it is not polarity-sensitive. The use of *-ãkən-* is illustrated in (152)-(155).

(152) **matt-** **ãkən-** **ə̃** **de**.
be.satisfied- for.now- 1sg.PERF AFF.DECL

'**I'm full for now** (but later might eat something).' (4.10, #2, elicitation)

(153) **watt-** **ãkən-** **a**.
wait- for.now- IRR

'**Wait for now/awhile**.' (4.10, #2, elicitation)

(154) **ri-** **ãkən-** **t-** **a**; kabə- re- mã faː sãp-
come- for.now- NEG.PERF- 3sg.NEG know- NEG.PERF- 1sg.NEG where pass-
ə̃.
3sg.PERF

'**S/he still hasn't come**; I don't know where s/he went on to.' (5.4, #1, elicitation)

(155) watt- a **ma-** **fett- eːn-** **ãkən-** **a**, jã be- kobəda.
wait- IRR 1sg.SBJ- start- INSTR- for.now- IRR here PL- hand

'Wait, **I'll start here for now with** the hands.' (8.108, #8, transitioning into listing names of body parts after self-introduction)

4.6.2 *-rad-*: 'in the meantime'

The suffix *-rad-* is also boundedness-related, but in a different way from *-ãkən-*: *-rad-* indicates that there is an upper bound to the evaluation time, as illustrated in (156). The upper

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[21]The term "extensions" is used more commonly in work on Bantu languages, but the phenomenon is parallel in Badiaranke.

bound is the start time of some other eventuality, specified by the discourse context (either linguistically or non-linguistically).

(156) jã ŋka mã- reː **səddə- rad-**   **ã.**
   there and 1sg.IMPF- come cook- in.the.meantime- 3sg.NSBJ

   'Before I arrive, **cook it in the meantime**.' (4.11, #2, elicitation)

   While -ãkən- and -rad- say something about the temporal boundaries of a single situation, the next two extensions – pluractional -raːn- and iterative -aːs- – multiply the number of events meeting the eventuality description.

4.6.3 Pluractional *-raːn-*

The pluractional extension *-raːn-* expresses multiple occurrences of the eventuality described, be it an activity or telic event.[22] These occurrences can involve multiple agents, multiple patients, or both, as illustrated in (157)-(160).

(157) toːtũ jã be- niːna- a, **be-** **dakkə- raːn- a** be- beːɲi bẽ
   now there 3pl.NARR- play- IRR 3pl.NARR- launder- PLUR- IRR PL- clothing DET
   haː ma- fo- a.
   until 3sg.SBJ- end- IRR

   'Now, there they play, **they wash all the laundry** completely.' (3.27, #1, marriage customs text)[23]

(158) katʃud- eː toː sẽ tʃoːm- akədo-   i   ŋan- a de
   morning- of today DET NEC- PAST.IRR.PERF- 2sg.PERF arise- IRR AFF.DECL
   a- **jaːsə- raːn- a** udaːre.
   2sg.SBJ- walk- PLUR- IRR little

   'This morning you should have gotten up and **walked around** a little.' (8.57, #2, elicitation)

(159) paːki jetʃ- ĩ   de   fajaːr fã **mpə-** **kər- raːnə** padʒeːna
   yesterday hear- 1sg.PERF AFF.DECL mouse DET 3sg.IMPF- run- PLUR night
   pã fe tʃodd- eː paːdə, mə- tʃew- õ.
   DET P above- of room NARR- fear- 1sg.PERF

   'Yesterday I heard the mouse **running around** at night above the room and got scared.' (8.37, #2, elicitation)[24]

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[22]I have not found any examples of *-raːn-* occurring on stative eventuality descriptions, although I have not explicitly checked its incompatibility with statives.

[23]Since one normally washes multiple items of clothing at a time, *dakkə-raːn-* is essentially lexicalized.

[24]This example was based on a true experience of mine; however, in the end, the "mouse" turned out to be a goat that had climbed up on the straw roof.

(160)   **mə-**   **jeləmə-**   **raːn-**   **i-**   **ã**   peːr ana sadə- se   [i],   a-
        NARR- turn.over- <u>PLUR</u>- 2sg.PERF- 3sg.NSBJ all   like die-   REL.PERF COP 2sg.SBJ-
        kab-   a   rã.
        know- IRR go.3sg.PERF

        '[If] no matter how much **you turn him/her [the person you suspect of being a witch] over and over** s/he's like a dead person, know that s/he is gone [from his/her body].' (6.87, #7, magic and supernatural text)

If the verb bearing -*raːn*- is transitive, the suffix can sometimes (as in (157)) but not always (as in (160)) have the effect of pluralizing the object: since -*raːn*- multiplies the eventualities meeting the given description, and since one would generally not wash a single piece of laundry over and over, (157) is interpreted as a prolonged laundry-washing event involving numerous pieces of laundry (even if the object is not overt). In contrast, in (160), since a single individual can be turned over multiple times, no multiplication of objects ensues.

    To couch these observations within the analysis of aspect in Chapter 3, we can say that pluractional -*raːn*- indicates that a multiplicity of eventualities meeting the eventuality description are realized within evaluation time in those worlds picked out by grammatical aspect (and modality).

4.6.4   Repetitive *-aːs-*

The repetitive suffix indicates that the eventuality described constitutes a reiteration of an earlier eventuality, as illustrated in (161)-(164). Unlike pluractional -*raːn*-, -*aːs*- imposes a requirement of subject identity across the two eventualities.

(161)   **nu-**   **bi-**   **aːs-**   **a**   **kodi**.
        2pl.NARR- bring- <u>REP</u>- IRR money

        '**You [the man seeking a wife] bring money again.**' (I.e. 'You bring more money.') (3.25, #1, marriage customs text)

(162)   **ma-**   **duːd-** **aːs-**   **a**   **jã**   **mãbo-** **j-**   **ã**   **mã**. waina   mãbo mã
        3sg.NARR- enter- <u>REP</u>- IRR there body-   of- 3sg.NSBJ DET at.that.time body DET
        silana **ma-**   **jak-** **aːs-**   **a**   **wunu**.
        now   3sg.NARR- be-   <u>REP</u>- IRR person

        '**S/he re-enters his/her (own) body**. At that time the body now **becomes a person again.**' (6.86, #7, magic and the supernatural text)

(163)   wub-   iː   de   **mə-**   **wub-**   **aːs-**   **i**.
        cough- 2sg.PERF AFF.DECL NARR- cough- <u>REP</u>- 2sg.PERF

        'You coughed; **you coughed again**.' (8.5, #1, elicitation)

(164) nəse nõ   birĩ kab- ã,   **datta-** <u>**as-**</u> **ər-**   **a**.
      child DET since know- DETRANS.3sg.PERF sleep- <u>REP-</u> NEG.PERF- 3sg.NEG

'The child, since s/he woke up, **s/he didn't sleep/hasn't slept again**.' (8.72, #2, elicitation)

4.6.5 Reduplication

Although reduplication does not utilize a fixed extension, as a derivational morphological process with aspectual implications, it merits inclusion in this section. Morphologically, Badiaranke reduplication involves full copying of the verb root, with the vowel [a] inserted between the two copies; semantically, it expresses multiple repetitions or unusual intensity of an eventuality, often to the point of excess. (165)-(167) contain instances of reduplication taken from texts.

(165) weː   nõnə̃ nõ   nĩ ŋas- enə- mẽ   u-   ri- aːn- a
      3sg.INDEP DEM INTERJ if bite- INSTR- 3sg.on.2sg.PERF NMLZ.SG- do- CAUS- IRR
      matʃao mã wũ nafuluja haː a-   sad- a, nafulu sẽ   **mpə-**
      three DET DEM wealth   until 2sg.NARR- die- IRR wealth DET 3sg.PERF-
      jabbajabbə   **de**   tũ!
      <u>be.a.lot.REDUP</u> AFF.DECL only

'Now that one there, if it [the snake] bites you with the third one, that one, wealth until you die, the wealth **will just be enormous**!' (2.95, #2, snake text #1)

(166) awa,   fãkama dĩtaː- j- ã,   wusia i wũ, kaː   pə- rəm...
      INTERJ ruler   peer- of- 3sg.NSBJ man   COP DEM NEG.IMPF.3sg. IMPF- give.birth
      tʃaːfe [wẽ] kaː   pə- rəmə   tʃaːfe, wusia tũ   **kəd-** **ə̃**
      woman DET NEG.IMPF.3sg. IMPF- give.birth female male only HABIT- 3sg.HABIT
      rəmaːrəm.
      give.birth.REDUP

'Well, the ruler, his friend, that was a man, didn't give birth... (his) wife never gave birth to girls; **she kept bearing boys**.' (6.35, #5, ruler with two "wives" story)

(167) **mpə-**   **ŋaːraŋaːrə-**   **n-** **ẽ**   jã   **de**...
      3sg.IMPF- <u>knock.down.REDUP</u>- CAUS- 2sg.NSBJ there AFF.DECL

'**It'll keep knocking you down** there ....' (9.1, #7, magic and the supernatural text)

This concludes the overview of Badiaranke's minor aspectual phenomena.

4.7 Conclusion

The complexity of Badiaranke's aspectual system, as analyzed in this chapter, appears to stem from two diachronic causes. On the one hand, Badiaranke has evidently undergone the

well-attested pattern of reanalysis and subsequent innovation that lead to progressives and habituals coexisting with more general imperfectives. On the other hand, the transitional aspect and prospective aspect, which follow a well-attested grammaticalization path for 'come' and 'go' verbs, seem to have developed to express finer shades of meaning than can be expressed by the perfective and imperfective alone. Additionally, Badiaranke's rich system of derivational extensions provides the morphological scaffolding for grammaticalization of other aspectual concepts, such as pluractionality, which are expressed periphrastically in some other languages. Future research is needed to develop a formal synchronic analysis of all these categories along the lines of that developed for the perfective and imperfective in Chapter 3 above.

Having described and analyzed the aspectual system as comprehensively as possible, let us turn now to the temporal system in Chapter 5.

Chapter 5

Tense

5.1 Introduction to temporal interpretation in Badia-ranke

In "tense languages," such as English, past tense semantics ordinarily requires past tense marking.[1] Badiaranke, in contrast, is an "aspect language," in the sense that tense marking is not always obligatory, but aspect marking is. I do *not* mean to imply that Badiaranke is a tenseless language, as will quickly become evident.[2] Before investigating the semantic effect of overt tense-marking in Badiaranke, let us review how clauses unmarked for tense receive a temporal interpretation.

   As discussed in Chapter 3, each aspect-Aktionsart combination has a default temporal mapping. The perfective of a non-stative eventuality description receives a relative past tense reading; that is, a perfective-marked activity or telic event is taken to have occurred and been completed, or terminated, before perspective time, which is taken in isolation to be utterance time. In (1)-(4), for instance, perfective-marked semelfactive, achievement, accomplishment, and activity eventuality descriptions receive a past tense interpretation.

(1) **wub-** <u>**iː**</u>   **de**.
     cough- <u>2sg.PERF</u> AFF.DECL
     '**You coughed**.' (8.1,#1, elicitation)

(2) **pad- aː-**   <u>**õ̲**</u>   **de**
     kick- DETRANS- PASS.<u>1sg.PERF</u> AFF.DECL
     '**I tripped**.' (2.109, #1, elicitation)

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[1]I am leaving aside exceptions like the historical present.

[2]Plungian and van der Auwera (2006:326ff) describe languages that behave like Badiaranke – with most temporal information conveyed by aspect, but with a Badiaranke-like "discontinuous past" category – as displaying "a basically non-tensed verbal system."

(3) **kaməkam-** **aːnə-** **m-** **ã** **de**.
dance.REDUP- CAUS- 3sg.PERF- 1sg.NSBJ AFF.DECL

'**S/he made me dance**.' (E.g. s/he talked me into it.) (8.41, #2, elicitation)

(4) səkərə- **b ͂ə** **de**.
argue.RECIP- 3pl.PERF AFF.DECL

'**They argued with each other**.' (4.12, #1, elicitation)

In (5) and (6), in contrast, the perfective of a stative eventuality description yields a present tense reading.

(5) **matt-** **ãkən-** **ə ͂** **de**
be.satiated- for.now- 1sg.PERF AFF.DECL

'**I'm full for the time being**.' (4.10, #2, elicitation)

(6) buki u- mã- karaŋə wẽ **sar-** **ə ͂** **de**.
book NMLZ.SG- 1sg.IMPF- study DET be.long- 3sg.PERF AFF.DECL

'The book I'm reading **is long**.' (5.11, #2, elicitation)

Recall from Chapter 3 that these "present" and "past" mappings tie the eventuality to a time in the *relative* present or past: the time with respect to which the event is in the past, or with respect to which the state is ongoing, is not always the time of utterance. In certain syntactic and discourse contexts, as in (7), eventualities in the future of TU can be perfective-marked, as long as they are complete by the contextually-given perspective time; similarly, in the presence of past temporal adverbials or other contextual information (e.g. in a story about the past), a perfective-marked stative unmarked for tense may denote a state that held at some past time, as in (8).

(7) kũpia nĩ **rẽ** **fe teːr-** **eː- nũ** mã- səmə
tomorrow if/when come.1sg.PERF P home- of- 2pl.NSBJ 1sg.IMPF- arrive

de **raː- i** **de** **fe lekol**.
AFF.DECL go- 2sg.PERF AFF.DECL P school

'Tomorrow if/when **I come to your house** I'll find **you've left for school**.' (7.98, #2, elicitation)

(8) paːki **rəs-** **ə ͂** **de** toː rəsə- re- mã.
yesterday be.tired- 1sg.PERF AFF.DECL today be.tired- NEG.PERF- 1sg.NEG.PERF

'Yesterday **I was tired**; today I'm not tired.' (5.90, #3, elicitation)

On the analysis in Chapter 3, the past-shifting of perfective-marked states by past-oriented adverbials (7) and future-shifting of perfective-marked eventualities in subordinate clauses (8) arise for different reasons. In the latter case, the past adverbial delimits an evaluation time i in the past of the perspective time t, overriding the default setting of i as

contemporaneous with *t* for statives. Recall that adverbials, on their own, can only specify evaluation time, and not perspective time, accounting for the ungrammaticality of (9). In (9), the perfective on an activity-type eventuality description indicates that the evaluation time within which the activity is realized precedes perspective time, which here is the time of utterance; but the adverbial *kũpia* 'tomorrow' designates an evaluation time that *follows* utterance time.

(9)　*kũpia　　**das-**　**ə̃**　　　**de**.
　　　tomorrow laugh- 1sg.PERF AFF.DECL
　　　Intended: 'Tomorrow **I'll laugh**.'

In sentences like (7), in contrast, where the future-shifted perfective occurs in a syntactically subordinated clause, perspective time for the subordinate clause is set in the future of TU by the imperfective-marked matrix clause. In such cases, the default that gets overridden is the choice of TU as perspective time. The relationship between a matrix clause and the temporal interpretation of its subordinate clause will play a critical role in the remainder of this chapter.

　　　Future time reference, as we saw in Chapter 3, is expressed with imperfective aspect on any type of eventuality description. Both (10), with an imperfective-marked accomplishment, and (11), with imperfective on a stative eventuality description, receive a future interpretation.

(10)　**mã-**　　　**tʃifəd-**　**ã**　　　**de**.
　　　1sg.IMPF- marry- 3sg.NSBJ AFF.DECL
　　　'**I'll marry her**.' (4.12, #2, elicitation)

(11)　**mpə-**　**tʃaŋə**　**de**.
　　　3sg.- be.good AFF.DECL
　　　'**It'll be good**.' (6.76, #2, conversation)

The future time to which imperfective *mp-* maps eventualities is not necessarily in the future of TU, but is instead a relative future, positioning the eventuality in the future of perspective time. In (12), the time when Maimuna was predicted to break the teacup is in the future of Faatu's utterance, but in the past of TU.

(12)　Faatu jim-　ə̃　　　　de　　　Maimuna **mpə-**　**niː**　**kaːs**　**sẽ**　**de**
　　　Faatu say- 3sg.PERF AFF.DECL Maimuna 3sg.IMPF- break teacup DET AFF.DECL
　　　bari niː-　r-　　　a-　　　nã.
　　　but break- NEG.PERF- 3sg.NEG- 3sg.NSBJ
　　　'Faatu said Maimuna **would break the teacup**, but she didn't break it.' (10.6, #1, elicitation)

　　　As for present time reference, we have already seen that the simple perfective is used to talk about ongoing states ((5)-(6)). For non-stative eventuality types, a progressive or habitual aspect – in the form of either the general imperfective, or the periphrastic version – can be applied, yielding a derived state that is ongoing at perspective time ((13)-(16)).

(13)   **ka- karaŋə- ndaːn- e   k- <u>ə̃</u>.**
       INF- learn-   CAUS- INF be- <u>1sg.PROG</u>

       '**I'm teaching.**' (8.2, #1, elicitation)   PERIPHRASTIC PROGRESSIVE

(14)   **kattaːf <u>bẽ</u>-   daː.**
       leaf   <u>3pl.IMPF</u>- cook

       'It's **leaf (sauce) they're cooking**.'
       (5.17, #2, elicitation)   IMPERFECTIVE PROGRESSIVE

(15)   **kid- <u>i</u>   dʒaː pamaːno** ba?
       HABIT- <u>2sg.HABIT</u> eat   rice   Q

       '**Do you eat rice**?' (4.5, #2, elicitation)   PERIPHRASTIC HABITUAL

(16)   hani ŋka toː **<u>mã</u>-   karaŋə ãkəle   de**.
       still   <u>1sg.IMPF</u>- study   English AFF.DECL

       'I still **study English**.' (2.71, #2, elicitation)   IMPERFECTIVE HABITUAL

Again, this "present" is a relative present; with a past perspective time, as in (17), the derived state (in this case, a habitual one) is taken to be ongoing at the past perspective time.

(17)   waːti jak- ə̃   nəse, piːsidoː **kəd- ə̃   kamə de**.
       time be- 1sg.PERF child every.day HABIT- 1sg.HABIT dance AFF.DECL

       'When I was a child, every day **I used to dance**.' (1.88, #1, elicitation)

Despite the resolvability of temporal interpretation without tense marking, it is possible, and sometimes necessary, to overtly mark past tense in Badiaranke. In fact, the language has two past tense suffixes, *-ako-* and *-akəd-*. Despite the obvious phonological resemblance between *-ako-* and *-akəd-*, I have no concrete evidence as to their morphological relationship or lack thereof; likewise, Meyer (2001), Brown and Logdon (1994), and Ducos (1971) do not claim any particular connection between the two suffixes.[3]

The sentences in (18)-(20) illustrate the use of *-ako-* in three different contexts: a perfective-marked stative clause (18), a perfective-marked eventive clause (19), and a progressive-marked clause (20).

(18)   paːki   **rəs-   <u>akõ</u>   de**.
       yesterday be.tired- <u>PAST.1sg.PERF</u> AFF.DECL

       'Yesterday **I was tired**' (but now I'm not tired). (5.90, #3, elicitation)

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[3]Ducos (1971:129) does speculate that a third form, *-ake*, may combine a tense component with an aspect component, but declares the decomposition impenetrable. In the course of my fieldwork, I learned that *-ake* occurs in the Guinean dialect in clauses from which subject extraction has occurred; in Senegal, *-ako-se*, transparently composed of the past marker *-ako-* and a perfective suffix *-se*, is usually used in these environments instead of *-ake*.

(19) **dãt- <u>ako-</u> bə̃- mã de**.
say- PAST- 3pl.PERF- 3sg.NSBJ AFF.DECL

'**They (had) said it**.' (8.31, #1, elicitation)

(20) **ka- sadʒ- e jak- <u>akõ</u>** waina bẽ- pə- kamə.
INF- clap- INF be- PAST.1sg.PROG at.that.time 3pl.IMPF- IMPF- dance

'**I was clapping** while they were dancing.' (10.14, #1, elicitation)

The other past suffix, *-akəd-*, is used, among other places, in counterfactuals, as in (21), and in past habituals (22).[4]

(21) paːki nĩ kab- ə̃ to kama dʒitt- ẽ fe telefon,
yesterday if know- 1sg.PERF COND NEG.IMPF.1sg. get- 2sg.NSBJ P telephone

mã- watt- <u>akəde</u> de kũpia.
1sg.IMPF- wait- PAST.IRR.NPERF AFF.DECL tomorrow

'Yesterday if I'd known I wouldn't reach you on the phone, **I would have waited till tomorrow**.' (8.62, #1, elicitation)[5]

(22) paːrə peːs **kədə- bẽ lẽb- <u>akəd-</u> ã de**.
two.years.ago HABIT- 3pl.HABIT- call- PAST.IRR- 3sg.NSBJ AFF.DECL

'Two years ago **they used to call him**.' (2.164, #2, elicitation)

Badiaranke does not have any other tense markers; both present and future time reference are understood from the semantics of aspect combined with temporal adverbials. That the language should mark only past tense is unsurprising both from a cross-linguistic perspective – it is common for languages to have past vs. non-past systems (Comrie 1985) – and Badiaranke-internally. Within Badiaranke, ongoing states and developing events can be described with the perfective and imperfective, respectively, and future states or events can be expressed with the imperfective; past time reference for states (lexical or derived) is the marked option, so that its morphological marking is to be expected.

In this chapter, I investigate two questions. First, given that temporal interpretation is available without the use of tense, what does tense marking do in Badiaranke? And second, why does Badiaranke have not one, but two past tense markers? I investigate the first question in §5.3, and the second in §5.4. In §5.5, I sum up what Badiaranke shows us about the role of tense in an aspect language.

First, to better understand the semantic role of tense marking in Badiaranke, we need to specify just what we mean by "tense." In the next section, I review some analyses of the semantics of tense in English.

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[4]While in (21), *-akəd-* occurs in the consequent, we will see below that it can also occur in counterfactual antecedents.

[5]The gloss of *-akəd-* as PERF.IRR reflects my conclusion in §5.4 that *-akəd-* is the irrealis counterpart to *-ako-*. The NPERF part of the gloss indicates that *-akəde* is the variant of *-akəd-* that occurs in non-perfective (e.g. imperfective or subjunctive) clauses.

5.2   The semantics of tense in English

5.2.1   Claims in the literature about English tense

One common analysis of tense – advocated by Comrie (1985), Stowell (1995) and Zagona (1995), among others – treats tense as a predicate relating two time arguments, one of them being the time of an event (E) or state, and the other being utterance time (abbreviated as UT or S). In other words, tense positions the time of an eventuality with respect to utterance time, at least for simple tenses in matrix clauses. Such analyses build on and improve upon the original approach of Reichenbach (1947), which positioned E and S both with respect to each other, and with respect to a third time, R (see §2.2.2.2 above); R is rendered unnecessary because in Reichenbach's system, the only "tenses" in which R and E are not simultaneous would now be said to combine tense and aspect (e.g. the present perfect).[6]

In contrast, Klein (1994) argues that tense does not position the eventuality itself at all; instead, what tense does is position the time under discussion, which Klein calls Topic Time, with respect to the time of utterance – again, at least in matrix clauses. Klein argues for this analysis with the sentence in (23):

(23)   They found John in the bathtub. He was dead.

Klein (1994:22), example 2

If past tense morphology indicated that John's being dead precedes the time of utterance, then, Klein argues, (23) would be false if John were still dead at TU, counter to our intuitions.[7] On Klein's analysis, the past tense in (23) means simply that the time being talked about – namely, the time at which John was found in the tub – precedes the time of utterance. Thus past tense marking is required in (23) even though the situation still obtains at TU. Defenders of the first view, however, might argue (as does Comrie (1985:24)) that (23) merely shows that past tense doesn't forbid the situation it locates in the past from extending into the present. (See also Plungian and van der Auwera (2006), who point out that analyzing past tense as placing an eventuality in the past predicts nothing about the status of the eventuality at utterance time).

In fact, in simple cases, multiple analyses can predict tense semantics correctly. As a result, authors frequently turn to tense in embedded clauses, where the predictions of various analyses differ. In §5.3.2, I discuss temporal semantics of embedded clauses in Badiaranke and argue that in that language, neither type of analysis discussed above makes the correct prediction. First, in §5.2.2, I review previous proposals for the semantics of tense in embedded clauses in English.

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[6]Reichenbach also assumes two versions of the simple future (indistinguishable from each other in English): one in which S and R are simultaneous and precede E, and the other where S precedes the simultaneous R and E.

[7]Or as Klein (1994:22) puts it, "Unless John is one of those who occasionally resurrect, he will still be dead at the time of utterance."

5.2.2   Sequence of tense in English

Enç (1987) and Stowell (1995) demonstrate that in English subordinate clauses, tense can have one of four distinct meanings. Which readings are available depends on the type of embedded clause (relative clause or complement clause) and the Aktionsart of the embedded eventuality description.

In embedded relative clauses, tense allows one or both of two readings: an *indexical* reading and a *simultaneous* reading. In the indexical reading, past tense indicates temporal precedence with respect to utterance time, while present tense indicates temporal overlap with respect to utterance time. In other words, on its indexical reading, tense has the same semantics as in matrix tense in English. (What it is that precedes or overlaps with utterance time is debatable; Enç (1987), Stowell (1995), and Stowell (2007), in their analyses of embedded tense, assume that tense positions a eventuality directly in time; but nothing in their analyses precludes a Kleinian approach, where it is TT that precedes or overlaps TU in the indexical reading. Indeed, Demirdache and Uribe-Etxebarria (2007), whose analysis is in many respects similar to that of Stowell (2007), assume that the time being positioned is in fact "Ast-T" (Assertion TIme), i.e. TT, and not TSit.)

Both Enç (1987) and Stowell (1995) observe that in English, only an indexical reading is available for a past-marked relative clause embedded under a matrix clause with non-present tense.[8] Thus (24) can be paraphrased as 'we spoke at some time before now to the man who was crying at some time before now'; the time of the crying is not fixed with respect to the time of the conversation mentioned, only with respect to utterance time.

(24)   We spoke to the man who was crying.

<div align="right">Enç (1987:638), example 16</div>

Similarly, Stowell claims that in (25), the boy must have been sitting outside at some time not only preceding the future ice-cream-giving event, but also preceding utterance time.[9]

(25)   Adam will give an ice-cream cone to a boy who was sitting outside.

<div align="right">Stowell (1995), example 8a</div>

Another configuration that only allows an indexical reading in English is a present-tense relative clause embedded under a past-marked matrix clause. In (26), for instance, the man

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[8]Actually, the same is true for past-marked relative clauses under a present-tense matrix clause, but in that case there is no meaningful distinction between indexical and non-indexical readings.

[9]My own judgment is that (25) also allows a past-shifted reading (see below), though the indexical reading is clearly preferable. Prescriptively, the appropriate way to convey the shifted reading would be *Adam will give an ice-cream cone to a boy who will have been sitting outside*, but due to the awkwardness of this phrasing, I suspect that (25) could be used instead. Of 41 non-linguist native speakers of English that I surveyed, 12 indicated a clear judgment that the past-shifted reading is also available for (25), while preferring the indexical reading; 26 accepted only the indexical reading, and 3 gave unclear responses. At any rate, for most speakers, the past-shifted reading is strongly dispreferred if not downright unavailable.

must be approaching the speaker at TU, not at the time of John's insulting him.

(26) John insulted the man who is walking towards us.

<div align="right">Enç (1987:638), example 19</div>

A simple indexical reading is available in English only for relative clauses, and not for complement clauses.[10]

In the *simultaneous* reading, in contrast, embedded tense indicates simultaneity (or more precisely, overlap) not with respect to utterance time, but rather with respect to the time of the matrix eventuality. The simultaneous reading arises in both relative and complement clauses in English; however, the conditions that trigger it depend on the type of clause. In both cases, a sort of durative aspect is required in the subordinate clause, be it a stative eventuality type or a progressive aspect (or both). With relative clauses, according to Stowell (1995), only the combination of a non-past tense in the matrix clause and present tense in the relative clause, as in (27), allows a simultaneous reading. On that reading, (27) claims that the time of the ice-cream-cone-giving event is contained within the time of the boy's sitting outside.

(27) Adam will give an ice-cream cone to a boy who is sitting outside.

In contrast, (28) – with past tense in the subordinate clause – and (29) – with past tense in the matrix clause – both allow only an indexical reading for the subordinate tense.

(28) #Adam will give an ice-cream cone to a boy who was sitting outside.

<div align="right">Stowell (1995), example 8a</div>

(29) #Adam gave an ice-cream cone to a boy who is sitting outside.

<div align="right">Stowell (1995), example 7b</div>

One might think that (30), with past tense in both the matrix clause and the subordinate relative clause, also allows a simultaneous reading.

(30) Adam gave an ice-cream cone to a boy who was sitting outside.

<div align="right">Stowell (1995), example 7a</div>

Stowell argues that in fact, (30) receives only a indexical interpretation, as evidenced by the availability of the reading where the boy received the cone before sitting outside. Unfortunately, once an indexical reading is available for a past-under-past tense, it cannot be

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[10]An indexical reading may marginally be available for *future* tense embedded in a complement clause under a matrix past tense – as in *Mary told me that she will come tomorrow/#yesterday* – but I leave such cases aside here due to the debate as to how temporal the English future actually is (e.g. Enç 1996 vs. Kissine 2008). A discussion of some relevant data may be found at `http://linguistlist.org/issues/19/19-1264.html`.

determined if a separate simultaneous interpretation is available; the time of the matrix eventuality is just one of many times in the past of utterance time.

For complement clauses, in contrast, the simultaneous reading becomes available with a past tense in both matrix and embedded clauses, as in (31).[11]

(31)   Hermione thought that Snape was jinxing Harry.

The third reading that embedded tense can receive is the *(past-)shifted* reading, where past tense in an embedded clause indicates pastness with respect to the matrix eventuality time, as in (32).

(32)   Harry swore that Voldemort killed Cedric.
   a. SHIFTED READING (available): Harry swore that Voldemort had killed Cedric at an earlier time.
   b. SIMULTANEOUS READING (unavailable): Harry swore that Voldemort was killing Cedric at that very moment.
   c. INDEXICAL READING (unavailable): Harry swore that Voldemort killed Cedric before now but after Harry's utterance.

Stowell (1995) argues that the past-shifted reading is available only for complement clauses in English; see the discussion of (30) above.

Although (32), with an event in the subordinate clause, can receive only a shifted reading, past-marked complement clauses containing a stative eventuality description or progressive aspect may be ambiguous between the past-shifted and simultaneous readings, as in (33).

(33)   Mrs. Weasley said that Ron was sick with spattergroit.
   a. SHIFTED READING: Mrs. Weasley claimed that Ron was ill before the time of her statement.
   b. SIMULTANEOUS READING: Mrs. Weasley claimed that Ron was ill at the time of her statement.

The final reading of embedded tense is the *double access* reading, so-called because it combines the simultaneous and indexical readings. It is required in English when present tense occurs in a stative complement clause embedded under past tense. In (34), for instance, the symptoms of spattergroit disease are interpreted as holding both at some past time of the Death Eaters' belief, and at the time of utterance.

(34)   The Death Eaters believed that Ron has spattergroit.

In §5.3 we will see that these same readings – with the possible exception of the double access construal – are available for subordinate clauses in Badiaranke, but that the two languages differ with respect to the conditions under which the various readings arise.

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[11]When a present-tense complement clause is embedded under a present-tense matrix clause, as in *The Death Eaters think that Ron is sick*, the potential simultaneous reading is again indistinguishable from an indexical reading.

Noting the lack of time-shifting by tense embedded under past tense in complement clauses, authors such as Ogihara (1995) and von Stechow (1995) have argued that in such an environment, the lower past tense is deleted at LF (see Sharvit (2003) for discussion); such analyses turn on their head the proposals by earlier authors (e.g. Ladusaw 1977, Comrie 1985) for a Sequence of Tense rule that forces a semantically present tense in such embedded clauses to be pronounced as a past tense.

In contrast to such semantically-based proposals, Enç (1987), Stowell (1995, 2007), and Demirdache and Uribe-Etxebarria (2007) develop complex syntactically-based accounts of the semantics of embedded tense in English. In Enç's 1987 analysis, tenses are the temporal analogs to anaphors; they come with indices, which can be ordered with respect to each other, and must be "anchored" by either a higher tense or by the speech time. According to Stowell (1995, 2007), Spec,TP is occupied by the temporal equivalent of PRO, which is controlled by utterance time or by a closer possible antecedent. He develops an elaborate syntactic analysis wherein morphological present and past in English are not true tenses, i.e. T⁰ heads, but rather are heads of a "ZP" complement to T⁰, with T⁰ being occupied by null PRESENT and PAST.

In the remainder of this chapter, I present the corresponding Badiaranke data and develop an analysis of Badiaranke tense. Since I believe that syntactic acrobatics along the lines of Enç (1987) and Stowell (1995) would not contribute at this stage to a deeper understanding of tense in Badiaranke, I focus instead on the semantics.

5.3   Semantics of *-ako-*

5.3.1   Matrix clauses with *-ako-*: Data and description

In this section, I demonstrate that *-ako-* has two basic functions. Its primary function is to indicate that the eventuality in question occurred at a past time. This role is more important for stative or progressive-marked eventuality descriptions, both of which are interpreted by default as describing eventualities ongoing at perspective time. A corollary of this first function is the expression of temporal remoteness. The second function is to indicate that the state (for stative eventuality descriptions) or the "target state" of a telic event (in the sense of Klein (1994)) no longer holds at perspective time.

Whereas perfectives of statives unmarked for tense are interpreted in isolation as describing a present state, *-ako-* on a perfective-marked stative places the state at some past time interval. As a result, it is particularly frequent in the introductory sentences of narratives, as in (35) and (36). (The sentence in (36) is the most common way of opening a story, the equivalent of 'once upon a time'.)

(35) **nã- kõ**   jã   nəse kab- aː-   r-   a.
      exist- PAST.3sg.PERF there child know- DETRANS- NEG.PERF- 3sg.NEG

      '**There once was** a rude child.' (6.20, #4, story of the boy, the drum, and the spirit)

(36) maː nda **jak- ako- se** jã.
    QUOT thing be- PAST- REL.PERF there.

    'It's said that once something **happened**.' (6.1, #3, Daamaseree story) (and many other stories)

Ordinarily, beyond indicating that a state held at some past time, -*ako*- also implicates that the state no longer holds; this implicature is particularly evident in sentences like (37), which clearly can only be uttered by someone not currently asleep, and in (38), where the speaker explicitly says his state of ignorance no longer holds. As we will see shortly, however, termination of the state by perspective time is usually cancellable, and is therefore an implicature, rather than an entailment or presupposition, of -*ako*.

(37) **datta- akõ** **de**.
    sleep- PAST.1sg.PERF AFF.DECL

    '**I was asleep**' (but now I'm awake). (4.11, #2, elicitation)

(38) toina kab- ə̃ wũ, mma naŋa **kab- ako- re- mã**
    that.day know- 1sg.PERF DEM 1sg.INDEP self know- PAST- NEG.PERF- 1sg.NEG

    wũ... toina kab- ə̃ waː i kujoːmu.
    DET that.day know- 1sg.PERF what COP *kujoːmu*

    'It's that day that I learned about that. I myself **didn't know that** ...It's that day that I came to know what a *kujoːmu* is.' (8.16, #1, codification festival text)[12]

Without -*ako*-, and without any temporal adverbials delimiting a past time interval, (37)-(38) would all have been interpreted as talking about present states.

Despite appearances in (37)-(38), termination of the final state is in fact an implicature, not an entailment, of -*ako*-, as illustrated in (39).

(39) paːki paːdə pã **dobb- akõ** **de** bari haː toː Mariaama
    yesterday room DET be.dirty- PAST.3sg.PERF AFF.DECL but until today Mariaama

    reː- r- a peːs- a jã paːd- i- jã pã.
    come- NEG.PERF- 3sg.NEG sweep- IRR here room- of- 3sg.NSBJ DET

    'Yesterday the room **was dirty**, but Mariaama still hasn't swept here in her room.' (8.67, #2, elicitation)

Since the room has not been cleaned, it is still dirty at utterance time, despite the presence of -*ako*-. Similarly, (40b) cancels the implicature of (40a) that fetishes are no longer used.

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[12]The *kujoːmu* is a funerary ritual that used to be performed when an important ruler died. The corresponding dance and songs, known as the *majã̄ŋoːr*, are no longer widely known, except by some older people in Guinea and in the village of Tonguia in Senegal.

(40) a. walaa, be- dʒalã sẽ, **jak- <u>ako</u>- bẽ** **de**, bari silã lislam sẽ ka-
voila PL- fetish DET be- <u>PAST</u>- 3pl.PERF AFF.DECL but now Islam DET INF-
ŋabət- e k- ə̃ be- dʒalã.
reduce- INF be- 3sg.PROG PL- fetish

'Voila, the fetishes, **they used to exist**, but now Islam is reducing [the number of] fetishes.'

b. me haː toː **k- ə̃** **de** nõ! haː toː **k- ə̃**
but until today be- 3sg.PERF AFF.DECL INTERJ until today be- 3sg.PERF
de be- dʒalã.
AFF.DECL PL- fetish.

'But to this day **they exist**! To this day **there are** still fetishes.' (9.2, #7, magic and the supernatural text)

With non-stative perfectives, the role of -*ako*- is less obvious. Since the perfective of a non-stative eventuality descriptions already describes an eventuality in the past of perspective time, pastness of an event can be expressed without overt tense marking. The most salient function of -*ako*- with eventive perfectives, then, is to emphasize the temporal distance of the past event, and/or to indicate that the final state denoted by a telic eventuality description no longer holds. The latter function of -*ako*- is illustrated in (41).

(41) katʃud- e toː sẽ **rã- <u>kõ</u>** **de** **fe pədao.**
morning- of today DET go- <u>PAST.{3sg./1sg.}.PERF</u> AFF.DECL P field

'This morning **s/he/I went to the field**.' (5.3, #1, elicitation)

When -*ako*- is left off of the sentence in (41), as in (42), the sentence indicates that the target state of being in the field does still hold, forcing a third person reading for the ordinarily ambiguous subject agreement marker.

(42) toː katʃudu **rã̠** **de** **fe pədao.**
today morning go.{3sg./*1sg.}.PERF AFF.DECL P field

'This morning **s/he/*I went to the field**.' (5.3, #1, elicitation)

In general, perfective clauses without suffixal object markers are ambiguous between a third person singular and first person singular subject. However, (42) can only be interpreted as having a 3sg. subject: the absence of -*ako*- implicates that the target state of being in the field still holds of the subject, and if the speaker is the subject, than *reː*- 'come' should be used instead of *raŋ*- 'go.' To get the meaning that the speaker went to the field earlier but is no longer there, -*ako*- is needed. In such cases, -*ako*- yields an "anti-perfect implicature," so-called because it contrasts with the "current relevance" meaning of the English perfect (cf. Inoue 1979, Portner 2003). Given another reason for the use of -*ako*- – e.g. to express temporal distance – the anti-perfect implicature that -*ako*- introduces in (41) can be cancelled, as illustrated in (43).

(43) peːs   Mamadu **rã- <u>kõ</u>**   **de**   **Itali.** jeːr-   u-
      last.year Mamadu go- PAST.3sg.PERF   AFF.DECL Italy   return.home- VENT-

      ãkən-   t-   a.
      for.now- NEG.PERF- 3sg.NEG

      'Last year Mamadu **went to Italy**. He still hasn't come back home.' (5.9, #1,
      elicitation)

Like the "anti-perfect" implicature of *-ako-*, the perfect implicature of the perfective
without *-ako-* can be cancelled given the right context, as in (44), which in no way suggests
that the speaker has stayed in the field for the past two years straight.

(44) paːrə peːs   **rã**   **de**   **fe pədao**
      two.years.ago go.1sg.PERF AFF.DECL P field

      'Two years ago **I went to the field**.' (5.9, #1, elicitation)

The ability of *-ako-* to cancel the final state encoded by the eventuality description gives
rise to infelicity in (45c). The sentence in (45a) can be followed felicitously with (45b), using
the perfective with no tense marking. When *-ako-* is added to (45b), as in (45c), the only
possible reading is one of reincarnation.

(45) a. piːs-   ə̃   wẽ, mə-   raː- bõ   fe paːdi-jã ka-   jikət-   e.
          dawn- 3sg.PERF DET NARR- go- 1pl.PERF P his.room INF- awaken- INF

          'In the morning, we went to his room to wake [him] up.'

      b. … mə-   raː- bõ   səm-   a   **sad- ə̃**   (padʒeːna pã).
          NARR- go- 1pl.PERF arrive- IRR die- 3sg.PERF night   DET

          'We found out he was dead/had died (in the night).'

      c. #… mə-   raː- bõ   səm-   a   **sad- <u>akõ</u>**   de.
            NARR- go- 1pl.PERF arrive- IRR die- PAST.3sg.PERF AFF.DECL

          Consultant's comment: 'If you say *sad-akõ de*, that means he had been dead
          but he came back to life.' (5.70, #1, elicitation)[13]

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[13]The infelicity here arises from a combination of the lexical semantics of *sad-* and *-ako-* on the one hand,
and the context of utterance on the other. In some contexts, *-ako-* may in fact be used with *sad-* without
generating a reincarnation reading. One such context is when describing a belief, later discovered to be false,
that someone/something had died:

(i) dam ə̃   wakkədə wã, mitʃ- akõ   de   **sad- <u>akõ</u>**   **de**   jaːti
     kill- 1sg.PERF scorpion DET think- PAST.1sg.PERF AFF.DECL die- PAST.3sg.PERF AFF.DECL in.fact

     sadə- r-   a.
     die- NEG.PERF- 3sg.NEG
     'I killed the scorpion. I thought **it was dead/had died**, but in fact it hadn't died.' (5.70, #1,
     elicitation)

Similarly, *sad-ako-* occurs in (ii), which was uttered in a narrative about funeral practices, in a section about
the speaker's upcoming trip to a nearby village.

Note that this example differentiates -*ako*- from both past tense and perfect aspect in English: it is completely acceptable in English to say *he was dead*, *he had/has been dead for two days*, or *he has/had died*.

From the data in this section, we have seen that an -*ako*-marked perfective clause entails realization of an eventuality at some time significantly preceding perspective time, and implicates that the state (for stative eventuality descriptions) or the state resulting from an event (for eventive ones) no longer holds at the later time. A priori, one could imagine that -*ako*- effects this time shifting in either of two ways: either by shifting the perspective time t, or by shifting the evaluation time i. In §5.3.3, I will argue that it is perspective time, not evaluation time, that is shifted by -*ako*-. I do so on the basis of data in §5.3.2, where I pin down the source of perspective time by looking at embedded perfective clauses with and without -*ako*-. The semantics of -*akəd*- will be probed later, in §5.4, on the basis of its complementary distribution with respect to -*ako*-.

5.3.2 Sequence of "tense" in Badiaranke

In Badiaranke, there is of course no present tense morphology per se. Instead, in the discussion that follows, I will treat the absence of past tense marking in the subordinate clause as equivalent to present tense marking in English. Due to the perfect implicature of perfective-marked clauses without -*ako*-, this choice is not as arbitrary as it might seem: *all* perfective-marked stative clauses without -*ako*- implicate that the state holds at perspective time, while eventive ones implicate that the final state encoded by the eventuality description holds at that same perspective time. In much the same way, present tense in English indicates overlap with utterance time.[14]

That said, however, in analyzing embedded tense in Badiaranke, we will have to treat perfectives of eventive predicates in matrix clauses as bearing past tense semantics, even in the absence of -*ako*-, since they always describe an event in the past of perspective time. This fact makes it unnecessary to distinguish between eventive matrix clauses with and without -*ako*- in analyzing the temporal semantics of embedded clauses. (As in English, it is also uninteresting to look at biclausal Badiaranke sentences with the equivalent of English present tense – i.e. perfectives of statives with no -*ako*- – in the matrix clause, because such

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(ii) bõ- raː jã de kaː- raː tʃadd- i- e sadaː, wu- raː- se wẽ wũ-
3pl.IMPF- go there AFF.DECL INF- go tie- BEN- INF sacrifice NMLZ.SG- go- REL.PERF DET DEM-
i fureːse. paːki ujaːra **sad- <u>ako-</u> se**. tʃaːfe ujaːra sadə- se.
COP deceased yesterday other die- <u>PAST</u>- REL.PERF woman other die- REL.PERF

'We'll go there to go partake in the sacrifice [distribution of food], the departed one, that's the dead person. Yesterday **someone died**, a certain woman died.' (2.60, #1, elicitation)

Here *sad-ako-* is felicitous – perhaps because, unlike in (45b), it is not embedded under a (perfective-marked) verb of witnessing.

[14]This perfect implicature is usually cancellable in Badiaranke (see §3.2.1 above); in the rare case that it is not, lexical or contextual factors are at fault. In (42), for instance, the inability of *raŋ*- 'go' to mean 'come to where the speaker is' conspires with the perfect implicature to strongly disfavor a 1sg. reading.

a configuration makes it impossible to distinguish indexical from non-indexical readings.)

5.3.2.1 Complement clauses

First let us look at eventive complement clauses. In such cases, only a shifted interpretation is available for the subordinate clause, regardless of whether it contains -*ako*- or not. Because the perfective of an eventive always denotes an event in the past of perspective time, the presence or absence of -*ako*- in the embedded clause makes no difference, as illustrated in (46) and (47).

(46) Suntuure jim- ə̃   de   Aysatu **lim- m-**   **ã**   **de**.
      Suntuure say- 3sg.PERF AFF.DECL Aysatu hit- 3sg.PERF- 3sg.NSBJ AFF.DECL

     'Suntuure said Aysatu **hit him**.' (7.2, #1, elicitation)

(47) Musaa kab- akõ   de   Mamadu **ni-**   **akõ**   **kaːs sẽ**
      Musaa know- PAST.3sg.PERF AFF.DECL Mamadu break- PAST.3sg.PERF cup DET

    de.
    AFF.DECL

    'Musaa knew that Mamadu **had broken the cup**.' (8.96, #2, elicitation)

Both (46), with no -*ako*- in the subordinate clause, and (47), with -*ako*-, can only mean that the subordinate event preceded the matrix eventuality. An indexical construal is not available: (46) cannot mean that Aysatu was predicted to hit Suntuure at a time preceding TU but following the past prediction, and (47) cannot mean that Musaa has oracular tendencies. In complement clauses containing an eventive eventuality description, the event is positioned not with respect to utterance time, but with respect to the time of the matrix eventuality. In other words, the embedded complement clause obligatorily takes (roughly) the time of the matrix eventuality as its perspective time. This observation will help us tease apart the readings for stative complement clauses, which can be more subtle.

When the complement clause contains a stative eventuality description, the presence or absence of -*ako*- determines whether tense in the subordinate clause receives a past-shifted or a simultaneous construal. Thus (48), in which the subordinate clause is -*ako*- marked, allows only a past-shifted construal, although the absence of a simultaneous construal can be difficult to see at first.[15]

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[15]As reflected in the discussion following (48), the use of *jim*- 'say' as the embedding verb introduces certain complications due to the fact that 'say' is not a factive verb. Nonetheless, there are reasons to choose *jim*- instead of, e.g., *kab*- 'know'. Use of a stative embedding verb, such as 'know', would be undesirable in two ways. First, the perfective of a stative in a matrix 'know' clause would denote a present state, which would make indexical and past- shifted readings indistinguishable. While this problem could be solved with addition of -*ako*- to the matrix clause, a second problem is more severe: since states, especially ones like the state of knowing, can span extended periods of time, it is possible for part of the subordinate state to precede the matrix state while another part of it overlaps the matrix state. Thus in (i), it is not clear whether Musaa's illness overlapped with or preceded Mamadu's knowledge of it.

(48) Faatu jim- ə̃   de   Maimuna **kə̃dan-**   **akõ**   **de**.
      Faatu say- 3sg.PERF AFF.DECL Maimuna be.healthy- <u>PAST.3sg.PERF</u> AFF.DECL

‘Faatu said Maimuna **was healthy**.’ (10.9, #1, elicitation)
✓Shifted reading
* Simultaneous reading
* Indexical reading

(48) can be uttered regardless of Maimuna's state of health at the time Faatu made her report (and regardless of her state of health at the time Faatu gathered her information), as long as Maimuna was ostensibly healthy at some time preceding Faatu's utterance. Although Maimuna must also have been healthy (according to Faatu) at some time preceding TU, (48) lacks a true indexical reading. It happens that the matrix event, Faatu's utterance, itself precedes TU, so anything that precedes Faatu's utterance precedes TU as well; but (48) cannot mean that Maimuna was healthy before TU but after Faatu's utterance. Similarly, it appears at first glance that (48) allows a simultaneous reading, since it is acceptable if Maimuna was still healthy at the time of Faatu's past utterance. However, it is important to tease apart the truth conditions of a sentence from the circumstances in which its utterance is felicitous.[16] The question of whether or not Maimuna happens to in fact be healthy at the time of Faatu's past utterance is tangential to the question of what Faatu was asserting in her utterance, and has no bearing on the semantics of (48); the apparent simultaneous reading simply arises from a particular scenario in which the state of health that Faatu claims to have obtained at some earlier time in fact extends through the time of her utterance.

When -*ako*- is removed, as in (49), the past-shifted reading disappears. Instead, (49) receives the simultaneous reading that according to Faatu, Maimuna was healthy at the time of Faatu's utterance.

(i) Mamadu **kab-** **akõ**   **de**   Musaa **kə̃ndan-** <u>**ako:-**</u> **r-**   **a**.
     Mamadu know- <u>PAST.3sg.PERF</u> AFF.DECL Musaa healthy- <u>PAST-</u> NEG.PERF- 3sg.NEG

‘Mamadu knew that Musaa **was/had been sick**.’ (8.6, #2, elicitation)

With an eventive embedded clause, past-marked *kab-* in the matrix clause yields the same shifted reading as would perfective (and optionally past-marked) *jim-* in the matrix clause, as in (ii). In (ii), the presence of -*ako*- in the subordinate clause serves only to imply greater temporal distance of the slaughter.

(ii) Mamadu **kab-** <u>**akõ**</u>   **de**   Musaa {**na:t-**   **ã**   **de**   /
     Mamadu know- <u>PAST.3sg.PERF</u> AFF.DECL Musaa slaughter- DETRANS.3sg.PERF AFF.DECL

     na:t-   <u>**akõ**</u>   **de**} **kuna:**.
     slaughter- <u>PAST.3sg.PERF</u> AFF.DECL cow

‘Mamadu knew that Musaa **slaughtered/had slaughtered** a cow.’ (8.22, #2, elicitation)

Additionally, ‘say’ is preferable to other verbs, such as ‘want’, that take subjunctive rather than perfective- (or imperfective-)marked complements.

[16]To give an extreme example, *Thelma ate a brownie for dessert* may be true whether she ate pasta or ratatouille for dinner; this does not mean that the two menu options correspond to two different semantic construals of the sentence.

(49) Faatu jim- ɔ̃   de   Maimuna **kɛ̃dan-**   ɔ̃   **de**.
      Faatu say- 3sg.PERF AFF.DECL Maimuna be.healthy- 3sg.PERF AFF.DECL

      'Faatu said Maimuna **was healthy**.' (10.9, #1, elicitation)
      * Double-access reading
      ✓Simultaneous reading
      * Indexical reading

Although Maimuna may (or may not) still be healthy at TU, (49) claims only that Faatu made a statement about Maimuna's health at that time. Thus, unlike (34) above (*The Death Eaters believed that Ron has spattergroit*), (49) does not have a true double access reading.

Both stative and eventive complement clauses, then, position their eventualities with respect to the time of the eventuality in the matrix clause, not with respect to utterance time. In §5.3.3.2, I will discuss how this descriptive generalization can be implemented more formally in the semantics.

Note that I have not discussed stative complement clauses embedded under another stative eventuality description. The problem with such a configuration is that it is difficult to apply the notions of simultaneity and precedence to pairs of states: in cases where one state partially overlaps another, the state that begins first could be said to be both simultaeous with and preceding the other. Thus, although I elicited such sentences, the results were not clear enough to yield meaningful conclusions.

5.3.2.2   Relative clauses

Unlike complement clauses, each relative clause allows two temporal interpretations. I argue here that the two readings that arise in any particular case are distinguished solely by the choice of perspective time for the relative clause.

Tense in relative clauses can position the eventuality described with respect to either the time of utterance, or the time of the matrix eventuality. The presence or absence of the -*ako*- suffix determines the relationship between whichever perspective time is chosen and the time of the eventuality described in the relative clause. For stative (perfective-marked) relative clauses without -*ako*-, the state is understood to overlap either of the available perspective times; with -*ako*-, the state is taken to have ended before one (or both) of these perspective times. For eventive (perfective-marked) relative clauses, the presence of -*ako*- indicates that the target state of the event no longer holds at the chosen perspective time, while its absence indicates the opposite.[17]

First, let us consider relative clauses describing an event. (50), with no -*ako*- on 'come' in the subordinate relative clause, can have two readings: either that the man came at some time before TU and is still there at TU, or that he came at some time before TU, was beat up while still there, and then left before TU. That is, the target state of the man's coming –

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[17]Although in this introduction I talk about the time of the eventuality itself for ease of discussion, below I will argue more precisely that in fact, the time in question is perspective time for the lower clause, rather than eventuality time or evaluation time.

his presence at the speaker's location – may obtain either at utterance time or at the matrix eventuality time. The man must be present at the speaker's location at at least one of those two times for (50) to be true.[18]

(50) patʃi- bɔ̃   wusia **(u-)**   **reː-** **se**   jɑ̃ wẽ de.
     hit- 3pl.PERF man   NMLZ.SG- come- REL.PERF here DET AFF.DECL

'They hit the man who **has come here/had come here**.' (8.86, #1, elicitation)
✓The hittee is there at TU (≈ indexical).
✓When the man got there, they hit him. (≈ shifted? simultaneous?)

These two readings do not correspond clearly to those discussed in the literature on English SOT. From an Anglocentric perspective, one might be tempted to lump the two into an indexical reading: the man may have come before or after he was hit, as long as it was before TU. Doing so, however, would not capture the fact that in Badiaranke, use of the perfective conveys information not just about the man's arrival, but also about the timing of his subsequent departure. Looked at from the perspective of when the target state obtains, the first reading might be labeled indexical and the second simultaneous. On the other hand, looked at from the perspective of when the coming event happened, the second reading might instead be deemed past-shifted. The failure of (50) to fit into one of the neat readings postulated for English sequence of tense provides evidence that the semantics of -*ako*- involves more than mere pastness.

In contrast, (51), with -*ako*- on 'come', means either that the man's arrival *and departure* preceded utterance time, or that both preceded the hitting time (as well as the later utterance time). On the basis of (51) alone, one might suspect, again, that both readings are actually indexical readings, with the relative positions of the matrix and subordinate events being immaterial. I will argue below that these actually are distinct readings.

(51) patʃi- bɔ̃   wusia **wu-**   **ri-** <u>**akoː-**</u> **se**   jɑ̃ wẽ de.
     hit- 3pl.PERF man   NMLZ.SG- come- <u>PAST-</u> REL.PERF here DET AFF.DECL

'They hit the man who **came here/had come here**.' (8.86, #1, elicitation)
✓Hitting < arrival of man < departure of man < TU (≈ indexical).
✓Arrival of man < departure of man < hitting < TU. (≈ shifted)

(52) and (53) illustrate that -*ako*- has the same effect with a stative eventuality description in the relative clause. In (52), with no -*ako*-, the man is understood to be sitting at the chosen perspective time, which may be either yesterday, when the seeing took place, or utterance time. The indexical reading is dispreferred, but can be drawn out by adding continuations like 'but I saw him somewhere else', 'yesterday too I saw him sitting there', or 'but when I saw him he wasn't sitting'.

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[18]The perfective's perfect implicature seems to be particularly difficult to cancel with the verbs *raŋ-* 'go/depart' and *reː-*, and perhaps in relative clauses in general.

(52) paːki   dʒeːn- ə̃   wusia **wu-**   **tʃoːdə- se**   jã wẽ de.
     yesterday see- 1sg.PERF man   NMLZ.SG- sit-   REL.PERF there DET AFF.DECL

'Yesterday I saw the man **sitting there**.' (8.8, #2, elicitation)
✓Simultaneous (preferred)
✓Indexical (also available)

When -*ako*- is added, as in (53), the man must have both sat down *and gotten up before* whichever of these reference times is chosen.

(53) limm- ə̃   wusia **wu-**   **tʃoːd- ako̱ː- se**   feː wẽ de.
     hit- 1sg.PERF man   NMLZ.SG- sit-   PAST- REL.PERF there DET AFF.DECL

'I hit the man who **was sitting there** (earlier).' (8.8, #2, elicitation)
✓Indexical: sitting and getting up (before or after hitting) < TU
✓Past-shifted: sitting and getting up < hitting

As shown in (54) and (55), -*ako*- can also past-shift the eventuality in an embedded relative clause when the matrix clause describes a future eventuality. In (54), unlike in (52), the consultant expressed a preference for the indexical reading. The simultaneous reading requires more context, e.g. *nĩ ujaːra tʃoːd-eːn-ə̃ tĩtĩ-e-mãnã, mã-mũdʒi u-tʃoːdə-se jã wẽ de* ('If someone else sits in my chair, I'll hit the person sitting there').

(54) mã-   mũdʒi wusia **wu-**   **tʃoːdə- se**   jã wẽ de.
     1sg.IMPF- hit   man   NMLZ.SG- sit-   REL.PERF there DET AFF.DECL

'I will hit the man who **is sitting** there.' (8.8, #2, elicitation)
✓Indexical (preferred)
✓Simultaneous (requires more context)

(55) kũpia   mã-   dʒeːnə de   wusia **wu-**   **tʃoːd- ako̱ː- se**
     tomorrow 1sg.IMPF- see   AFF.DECL man   NMLZ.SG- sit-   PAST- REL.PERF
     jã wẽ.
     there DET

'Tomorrow I'll see the man who **was sitting** there (earlier).' (8.82, #2, elicitation)
✓Indexical (preferred): sitting and getting up < TU.
✓Shifted (requires more context): TU < sitting and getting up < seeing

Stowell (1995:385) argues that in English, the past-shifted interpretation of a past-under-past relative clause, as in (51) and (53), is "truth-functionally superfluous" (not distinct from the indexical construal), since an eventuality in the past of a past time is also in the past of utterance time. In Badiaranke, to the contrary, there *is* a truth-functional distinction between indexical and past-shifted interpretations of -*ako*-, even for eventive relative clauses embedded under a past tense matrix clause. Several arguments support this claim. The first is that from the past-under-future data in (54) and (55), we can see that in Badiaranke, unlike in English, the past-shifted reading is clearly available for past-marked relative clauses under matrix clauses with a future interpretation, making it much more plausible to conclude

that it is available under past tense as well. Second, *-ako-*, unlike English past tense, has the additional implicature that the final state no longer holds at perspective time. Therefore, a past-shifted reading for past-under-past requires that the final state be terminated earlier (by the past time of the matrix eventuality) than does the indexical reading (which requires only termination by utterance time). Third, (50) shows, subordinate relative clauses without *-ako-*, at least eventive ones, are ambiguous between two clearly distinct readings when embedded under a matrix clause denoting a past event: overlap of the final state with utterance time, and overlap with the matrix eventuality. This makes it even more desirable to analyze such clauses' *-ako-*-marked counterparts as being ambiguous in parallel fashion.

To this point, we have seen four ways in which Badiaranke sequence of "tense" differs from English sequence of tense:

1. Past tense in an embedded relative clause can get a shifted reading only in Badiaranke.

2. "Present tense" in a relative clause embedded under past tense can get a simultaneous reading only in Badiaranke.

3. "Present tense" in a complement clause embedded under past tense requires a double access reading in English, but not in Badiaranke.

4. "Present tense" in an eventive subordinate relative clause can receive a simultaneous reading (of sorts) only in Badiaranke. In English, there is no way to get a simultaneous reading with an eventive predicate in a subordinate relative clause, since present tense on an eventive predicate gets a habitual interpretation, while past tense triggers an indexical construal, with no limitation on when the final state of the eventive predicate obtains and ends. But in Badiaranke, in the absence of *-ako-*, that final state is required to hold either at the time of the matrix eventuality (an indexical reading) or at TU (a sort of simultaneous reading).

These differences are summarized in Table 5.1 on page 176.

In §5.3.3, I develop a semantics for *-ako-* that explains these data.

5.3.3 Contributions to temporal interpretation

5.3.3.1 The temporal role of aspect

Before analyzing the effect of *-ako-* on perfective-marked clauses, let us review the semantics of the Badiaranke perfective itself when unmarked for tense. As I argued in Chapter 3, the perfective of a non-stative eventuality description in Badiaranke denotes the realization of an activity or telic event within an evaluation time i in all the metaphysical alternatives to the base world w at perspective time t; the perfective of a stative eventuality description entails that the state described holds at i in all metaphysical alternatives to w at t. Because the metaphysical alternatives are identical only up to perspective time, and because propositions

Table 5.1: Subordinate tense readings in English and Badiaranke

Embedded clause	Embedded Aktionsart	Matrix tense	Embedded tense	Language	Simultaneous	Pastshifted	Doubleaccess	E.g.
Relative	Stative/ Eventive	Any	Past	English	No	*No*	No	(24), (25)
				Badiaranke	No	*Yes*	No	(51), (53), (55)
Relative	Stative	Past	Present	English	*No*	No	No	(29)
				Badiaranke	*Yes*	No	No	(52)
Complement	Stative	Past	Present	English	*Not only*	No	Yes	(34)
				Badiaranke	*Yes*	No	Yes	(49)
Relative	Eventive	Past	Present	English	*No*	No	No	N/A[19]
				Badiaranke	*Yes*	No	No	(50)

[19]This structure is ruled out in English on the desired episodic reading for the embedded clause, since present-marked eventives in English receive a habitual reading.

involving non-stative eventualities can be evaluated only at a non-singleton interval, perfective aspect on a non-stative eventuality description indicates that the eventuality occurred in the past of perspective time. Since propositions involving non-stative eventualities can be evaluated at a single moment, the perfective of a stative means by default that the state holds at perspective time. My semantics for the Badiaranke perfective is repeated in (56).

(56)   Semantics of the Badiaranke perfective:
       $\mathrm{PERF}(P)$ is true at a world-time pair $<w,t>$ iff $\exists e$ and $\exists i$ such that for <u>all w'</u>, where w' is a metaphysical alternative to w at t, P is true of e in w' at i.

This definition meets the generalization of Hacquard (2006:50) that "Aspect is a quantifier over events, which takes a predicate of events, and turns it into a predicate of times. The predicate of times can then combine with a tense." Note that in (56), the evaluation time, i, is existentially bound by the perfective itself, while the perspective time t is simply introduced as a time variable by PERF. The role of tense will be to bind t, thereby fixing the position of this perspective time with respect to either utterance time or some other contextually salient time.

At first glance, this setup might appear problematic. In English, at least, tense does not locate (or dislocate) perspective time; it positions either the time of the eventuality itself (according to Comrie (1985)) or the time being talked about (according to Klein (1994)) – both of which have more in common with i than t, i being a time at which the eventuality is realized.

However, if -*ako*- did shift evaluation time into the past, we would not expect it to have the observed impact on the relationship between the previously established perspective time and the time spanned by the target state for telic events, or by the state itself for statives. The first reason is that with perfectives of eventives, the only restriction on i is that it not extend beyond t, so it is not clear what shifting i backwards would mean – where would evaluation time be shifted back *from*? Its range of possible values, when not restricted by an adverbial (or otherwise), is simply the entire expanse of time leading up to t. Second, no matter how far back i is shifted, the target state of a telic event realized within i could extend into the indefinite future, up to and including utterance time. If, instead, -*ako*- shifts t, then the perfective with -*ako*- will ensure that the change of state took place not just before the perspective-holder's now, which we can call t_0, but also before some earlier t. This shift is only meaningful if t precedes t_0 by a contextually significant amount, explaining both the temporal distancing effect of -*ako*- and its implication that the target state held at some past time, i.e. t, but no longer.

Indeed, "aspect" in Badiaranke already does much of the temporal work done by tense in English. Since the imperfective can locate an eventuality in the future (or present, in the case of habitual and progressive *mp*-) and the perfective can place any eventuality in the past and states in the present, we do not need Badiaranke tense to do the same work as English tense.

Use of -*ako*- is not the only way to shift perspective time. As argued in Chapter 3, utterance time is merely the default setting for perspective time. While it cannot be shifted

by temporal adverbials alone (hence the ungrammaticality of (9) above), we have seen several other ways in which perspective time can be reset without tense marking. In the antecedent of a conditional, for instance, perspective time is reset at (roughly) the start time of the eventuality in the consequent. In (57), the bride's unveiling is complete at the time when the young women begin to arrive.

(57) nĩ   **sãkə- t-   õ**,   toina   bematʃaːe   mã be-
      if/when veil- REVERS- PASS.3sg.PERF that.day young.women DET 3pl.NARR-

      ri-   a.
      come- IRR

      'Once she (the bride) **is/has been unveiled**, that day the young women come.'
      (3.27, #1, marriage customs text)

Similarly, perspective time can be shifted by embedding the eventuality description in an "at that time" clause, as in (58), or in a complement to *səm-* 'arrive/encounter/happen', as in (59)-(60).

(58) kũpia   mpə-   lẽb- ã   wẽ ana   **fitʃ- õ**   **de**.
      tomorrow 3sg.IMPF- call- 3sg.NSBJ DET while/like clean- PASS.3sg.PERF AFF.DECL

      'Tomorrow when she calls her, at that time **she'll be clean**.' (5.63, #2, elicitation).

(59) paːki   səm-   ə̃   de   **tʃoːd- ə̃**   mpə-   səf
      yesterday arrive/encounter- 1sg.PERF AFF.DECL sit-   3sg.PERF 3sg.IMPF- sew

      kabã́tã.
      shirt

      'Yesterday I encountered him **sitting** and sewing a shirt.' (5.69, #1, elicitation)

(60) kũpia   kə-   səmə   de   **dattaː- bõ̃**.
      tomorrow 2sg.IMPF- arrive/encounter AFF.DECL sleep-   3pl.PERF

      'Tomorrow you'll find **they're asleep**.' (8.91, #1, elicitation)

In such cases, t is reset to a time in the past or future of TU, and PERF will then make reference to an i in the past of that t.

As we saw in §5.3.2, perspective time can also be shifted away from TU by syntactic subordination more generally. In complement clauses, this shifting is obligatory: the perspective time for complement clauses is always set by the matrix eventuality time and never by utterance time (i.e. the perspective time for the matrix clause). In relative clauses, in contrast, we have seen that the shift in perspective time is merely optional. Any given relative clause allows two temporal readings, reflecting two different perspective times with respect to which perfective (or imperfective) aspect can position the eventuality.[20] In the indexical readings – the ones where the temporal placement of the eventuality is exactly the same as it would have been in a matrix clause without adverbials – clearly this time is TU.

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[20]Note that for English, in contrast, we don't want to posit such an explanation, because the shifted reading and simultaneous readings are not always available in English relative clauses.

In the non-indexical readings – the simultaneous and past-shifted ones – the time in question is instead the time of the matrix eventuality; a shifted reading arises when *-ako-* is present, and a simultaneous reading when it is not. In complement clauses, in contrast, only a shifted or simultaneous reading is available, indicating that complement clauses can only access the perspective time established by the matrix eventuality, and not the perspective time of the matrix clause (i.e. TU).

Of course, the statement that perspective time can be set with respect to the time of the matrix eventuality is too vague. Up to now I have treated perspective time as a point, the perspective-holder's now. The temporal trace of the matrix eventuality (TSit, in Klein's terms), will in general not be a point; it will be a non-singleton interval. In the shifted and simultaneous readings for embedded clauses, which point of time in this interval is the one chosen for perspective time? In her DRT analysis of tense, Partee (1984) argues that reference-time-changing events set reference time at the end of their run-time; since the role of eventive eventuality descriptions, on her analysis, is to move narrative time forward, her analysis implies that what is important for locating a given event is the end time of another one. In the subordinate clauses we are looking at, in contrast, it appears that perspective time for the subordinate clause is set at the *start* of the time in which the matrix eventuality is realized. In (61) (= (50)), for instance, the man has to have come before the others begin beating him, not before the end of the beating.[21]

(61) patʃi- bɔ̃   wusia **u-**   **reː- se**   jã wẽ de.
      hit-   3pl.PERF man   NMLZ.SG- come- REL.PERF here DET AFF.DECL

   'They hit the man **who has come here/had come here**.' (8.86, #1, elicitation)
   ✓The hittee is there at TU. (≈ indexical).
   ✓When the man got there, they hit him. (≈ shifted? simultaneous?)

Similarly, in (62), repeated from (54), the man will have sat down before the speaker begins beating him.

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[21]Given this conclusion, one might wonder whether the other choice for perspective time is really perspective time for the matrix clause, or if it is merely the end time of the matrix eventuality. But the indexical reading of sentences like (i) (=(52)), where the matrix adverbial delimits the maximum evaluation time for the matrix eventuality, show that the time in question is really perspective time for the matrix clause (TU, in this case), and not the end time of the matrix eventuality (sometime during the previous day, in this case). The reading in question means that the subordinate eventuality overlaps with TU, and not with any part of the matrix eventuality.

(i) paːki dʒeːn- ɔ̃   wusia **wu-**   **tʃoːdə- se**   jã wẽ de
     yesterday see- 1sg.PERF man   NMLZ.SG- sit   REL.PERF there DET AFF.DECL
     'Yesterday I saw the man sitting there.' (8.7, #2, elicitation)

(62) mã-   mũdʒi wusia **wu-   tʃoːdə- se**   jã   wẽ de.
      1sg.IMPF- hit   man   NMLZ.SG- sit-   REL.PERF there DET AFF.DECL

‎   'I will hit the man who is sitting there.' (8.8, #2, elicitation)
      ✓Indexical (preferred)
      ✓Simultaneous (requires more context)

To sum up our conclusions thus far, the temporal interpretation of embedded clauses in Badiaranke may be affected by three parameters: which aspect is chosen, which matrix clause time is used as the reference point for tense in the subordinate clause, and the presence or absence of tense marking in the subordinate clause. Relative clauses can access two perspective times from the matrix clause – the matrix perspective time (which is set at utterance time for the examples we have seen) and the beginning of matrix eventuality time – while complement clauses can access only the latter. The presence or absence of past tense marking affects the relationship between the subordinate eventuality time and the chosen perspective time for the subordinate clause: absence of tense marking indicates overlap between the two times (a simultaneous reading), and presence of *-ako-* indicates precedence (a past-shifted reading).

Now that we have identified the three factors influencing the temporal interpretation of embedded clauses in Badiaranke, let us look more closely at the semantics of *-ako-* itself.

5.3.3.2   The formal semantics of *-ako-*

The contribution of *-ako-* is twofold: it carries both a presupposition and an implicature. The suffix *presupposes* that perspective time for its clause precedes a previously established perspective time. At the same time, it *implicates* that the state described, the immediate post-state of the activity described, or the target state of the telic event described no longer holds at that later, contextually salient time – in other words, *-ako-* implicates that the perfect implicature of perfective aspect does not hold at the time it would have without *-ako-*. Note that this implicature applies to the "original" perspective time, so to speak – the one that *-ako-* shifts the eventuality in its clause away from. The absence of *-ako-* in a perfective-marked clause, meanwhile, triggers two implicatures of its own: the "perfect" or "resultative" implicature spelled out in §5.3.3.1 above (i.e. that the state itself or the target state of the telic event still holds at perspective time), and the implicature that the presupposition of *-ako-* does not hold. I will demonstrate that together, these three implicatures and one presupposition successfully account for the temporal interpretations available to matrix clauses with *-ako-*, as well as to both complement clauses and relative clauses with and without *-ako-*. I will discuss each of these sentence types below.

(63), repeated from (37) above, illustrates the use of *-ako-* in a matrix clause.

(63) **datta- <u>akõ</u>   de.**
      sleep- <u>PAST.1sg.PERF</u> AFF.DECL

‎   '**I was asleep**' (but now I'm awake). (4.11, #2, elicitation)

Since (63) was elicited in isolation, perspective time at this point in the "discourse" is set at the time of utterance. If -*ako*- were absent, the stativity of the eventuality description, together with the perfective's perfect implicature, would yield the interpretation that the sleeping state holds of the speaker at perspective time, i.e. at utterance time. What -*ako*- does is set the perspective time at which the perfective of <I sleep> is true in w to a time preceding the previously established perspective time – that is, to a time in the past of utterance time. After application of the perfective semantics in (56) to the eventuality description meaning <I sleep>, we get the following meaning for (63):

(64) $\exists e$ and $\exists i$ such that for all w', where w' is a metaphysical alternative to w at t, <I sleep> is true of e in w' at i.

Let us use t_0 to represent the perspective time at the point in the "discourse" before (63) is uttered. Then the role of -*ako*- in (63) is to specify that t in (64) – the time from which (63) can be assessed as true – precedes t_0. In other words:

(65) The proposition in (63) is true at a world-time pair $<w,t_0>$ iff $\exists e$ and $\exists i$ such that **for some $t<t_0$**, for all metaphysical alternatives w' to w at t, <I sleep> is true of e in w' at i.

That t precedes t_0 is the presupposition of -*ako*-. The time t that, by virtue of -*ako*-, precedes t_0 is the time which, by application of the perfective, the state of being asleep will overlap. On its own, however, this presupposition says nothing about the status of the sleeping state at t_0 (which here is just TU): it is entirely possible for someone to have been asleep at t_0 as well as at an earlier t (and at all times in between). This is where the additional implicature comes in: the presence of -*ako*- implicates that the sleeping state that held at t no longer holds at t_0. The implicature is particularly difficult to cancel in this case because people rarely assert that they are sleeping while actually asleep.

The effect of -*ako*- on perspective time can be easier to see in embedded clauses, where t_0 is made "visible" by the matrix eventuality. It is clearest of all when the matrix clause describes an eventuality in the *future* of TU, so that precedence with respect to the matrix eventuality time does not entail precedence with respect to TU, as in (66).

(66) Faatu mpi-   jimə de   Maimuna **kẽdan- akõ**   de.
      Faatu 3sg.IMPF- say AFF.DECL Maimuna healthy- PAST.3sg.PERF AFF.DECL

      'Faatu will say that Maimuna **was healthy**.' (10.7, #1, elicitation)

In (66), only a past-shifted reading is available for the subordinate tense. For (66) to be true, the requirement is that Maimuna's health must have been good (according to Faatu) at some time before Faatu makes her future proclamation; the time at which Maimuna will be claimed to have been healthy may or may not be so far in the past of Faatu's future claim that it precedes the time when (66) itself is uttered. In other words, t_0 – the time with respect to which -*ako*- places the subordinate perspective time in the past – can only be the (start) time of the matrix eventuality.

The interpretation of (67), with a past-tense interpretation for the matrix clause, proceeds in an entirely parallel manner.

(67) Faatu jim- ɔ̃   de   Maimuna **kɛ̃dan-**   **akɔ̃**   **de**.
      Faatu say- 3sg.PERF AFF.DECL Maimuna be.healthy- PAST.3sg.PERF AFF.DECL

'Faatu said Maimuna **was healthy**.' (10.9, #1, elicitation)
✓Shifted reading
* Simultaneous reading
* Indexical reading

In (67), -*ako*- presupposes that t for its clause – the perspective time from which PERF(Maimuna be healthy) is judged to be true – is earlier than the perspective time at that point in the discourse. Because complement clauses can only be interpreted from the perspective of the matrix eventuality time, and not from the perspective of utterance time, the time that t must precede is the (start) time of the matrix eventuality. On this past-shifted reading, there was (according to Faatu) some time t preceding Faatu's past utterance at which Maimuna was healthy. However, the fact that the state of being healthy held of Maimuna at this time before Faatu's utterance does not *entail* that it doesn't also hold at the time of Faatu's past utterance. Rather, Maimuna's being sick at the time of Faatu's utterance (t_0) is merely an implicature of -*ako*-, so that (67) can still be true even if Maimuna was still healthy when Faatu made her report.

To better understand how the proposed semantics for -*ako*- work, let us step through the computation of (67) in more detail.

The subordinate clause in (67) involves a stative eventuality description meaning <Maimuna be healthy>, which is operated on by perfective aspect. The result is a predicate of times which in turn is operated on by -*ako*- to yield a truth value (once the world variable is bound by the matrix world binder (Hacquard (2006:47-54), citing Percus (2000)), a complication that I will ignore here). Before -*ako*- is applied, the semantics of the perfective-marked subordinate clause is as in (68):

(68) *Maimuna kedan-ɔ̃ de* (= PERF(Maimuna be healthy)) is true at $<w, t_0>$ iff $\exists e$ and $\exists i$ such that for all w', where w' is a metaphysical alternative to w at t_0, <Maimuna be healthy> is true of e in w' at i.

If this clause (PERF(Maimuna be healthy)) were uttered in isolation, t would be bound by the matrix perspective time, i.e. utterance time. Since the eventuality description is stative, the proposition can be true at a moment, so the clause would be interpreted as asserting that Maimuna is healthy at TU.

At the next step, -*ako*- is applied to the predicate of times output by (68). Through its presupposition, -*ako*- sets t – at which time PERF(Maimuna be healthy) is true – earlier than the previously established perspective time. (Additionally, -*ako*- implicates that the state described by <Maimuna be healthy> no longer holds at that later time.) If the clause at this stage – *Maimuna kɛ̃dan-akɔ̃ de* – stood on its own, the previously established perspective time would be TU, yielding the interpretation that Maimuna was healthy at some time before TU (and the implicature that she is no longer healthy at TU).

(69) *Maimuna kedan-akõ de* (= PAST(PERF(Maimuna be healthy))) is true at $<w,t_0>$ iff $\exists e$ and $\exists i$ such that **for some $t<t_0$,** for all metaphysical alternatives w' to w at t, <Maimuna be healthy> is true of e in w' at i.

When the matrix clause is added, it introduces two more time variables: an evaluation time i_{matrix} (at which time <Faatu said...> is true of some event), and a perspective time t_{matrix}. Since (67) receives a past-shifted reading and not an indexical one, the time with respect to which the embedded *-ako-* expresses precedence should be the start time of e_{matrix} and not t_{matrix}, the latter being identical to TU. The overall effect of *-ako-* in the embedded clause will be to presuppose that t_{subord}, the time at which PERF(Maimuna be healthy) is true according to Faatu, precedes the start time of e_{matrix}, the time within which PERF(Faatu say ...) is true, giving us the desired semantics. The composition at this point becomes terribly complex, but can be broken down into two parts ((70a)-(70b)) corresponding to the two clauses; (70c) lists the resulting temporal relations.

(70) a. *Maimuna kedan-akõ de* (= PAST(PERF(Maimuna be healthy))) is true at $<w,t>$ iff $\exists e_{subord}$ and $\exists i_{subord}$ such that **for some $t_{subord}<t$,** for all metaphysical alternatives w' to w at t_{subord}, <Maimuna be healthy> is true of e_{subord} in w' at i_{subord}.

   b. *Faatu jim-ɔ̃ de Maimuna kedan-akõ de* (= PERF(Faatu say(PAST(PERF(Maimuna be healthy)))) is true at $<w_{matrix},t_{matrix}>$ iff $\exists e_{matrix}$ and $\exists i_{matrix}$ such that for all w'', where w'' is a metaphysical alternative to w_{matrix} at t_{matrix}, <Faatu say (PAST(PERF (Maimuna be healthy))> is true of e_{matrix} in w'' at i_{matrix}, **and t_{matrix}=TU and w_{matrix}=w_0** (the actual world).

   c. - End time of $i_{matrix} \leq t_{matrix}$ (by virtue of the semantics of metaphysical alternatives).
      - i_{matrix} is a non-singleton interval (since the matrix eventuality is non-stative).
      - Therefore start of $i_{matrix}<t_{matrix}$.
      - Start time of $e_{matrix} \leq$ start of i_{matrix} (since e_{matrix} must be realized at i_{matrix}, by virtue of the semantics of the perfective).
      - Therefore start time of $e_{matrix}<t_{matrix}$ (by transitivity).
      - t_{matrix}=TU (binding by the matrix time binder) (and w_{matrix}=w_0 (binding by the matrix world binder)).
      - $t_{subord}<$ start time of e_{matrix} (by the semantics of *-ako-* in complement clauses).
      - $i_{subord} \leq t_{subord}$ (by virtue of the semantics of perfectives of statives and of metaphysical alternatives).
      - e_{subord} is realized at i_{subord} (by virtue of the semantics of the perfective).
      - So e_{subord} is realized at or before a time t_{subord} preceding the start time of e_{matrix}, which itself precedes TU.

All this work is done by the presupposition of *-ako-*, together with the semantics of perfective aspect and the syntax of subordination.

In addition to the information in (70), -*ako*- adds the cancellable implicature that the eventuality described by <Maimuna be healthy> no longer holds at the start time of e_{matrix}. The sentence in (67) therefore entails that (according to Faatu) Maimuna was healthy at some time before Faatu made her report, and implicates that (again according to Faatu) Maimuna was no longer healthy at the time of Faatu's report.

Speaking more generally, what -*ako*- implicates is that the eventuality in question is no longer *relevant* at the previously established perspective time: it has an "anti-perfect" implicature. The notion of relevance can be somewhat fuzzy; in the case of -*ako*- or lack thereof, it appears to be defined in terms of temporal distance or proximity. When the -*ako*- marked clause describes a state, the implicature of -*ako*- is that the state no longer holds at the previously established perspective time; with an activity, the implicature is that the activity ended a contextually significant amount of time earlier; and with a telic event, the implicature is that the target state no longer holds at the previously established perspective time.

This analysis is very much in keeping with that of Plungian and van der Auwera (2006), who survey the literature and crosslinguistic data on what they call "discontinuous pasts" – tense markers that express both pastness of the eventuality, and its lack of relevance at the present time. The authors note that this type of morpheme is particularly prevalent in languages that lack other tense markers and use aspect and modality to convey temporal meaning, including many West African languages; the discontinuous past morpheme tends to be less obligatory and hence less frequent than ordinary past tense markers. They argue that all discontinuous pasts contribute "a notional 'break' between 'speaker's now' and the point in time referred to" (Plungian and van der Auwera 2006:346).

While these generalizations clearly apply to Badiaranke -*ako*-, my analysis contrasts with that of Plungian and van der Auwera (2006) in one key respect. On their analysis, current non-relevance is the fundamental contribution of discontinuous pasts; actual past time reference is more peripheral and even optional in some of the languages they look at. For Badiaranke, in contrast, I have shown that -*ako*- always entails pastness of the perspective time, while the non-relevance or anti-perfect implicature is cancellable in the right conditions. It can be overcome as long as the context provides some other reason for the use of -*ako*-, e.g. to express that the proposition is true at some relatively distant past perspective time as well as at the current perspective time, as in (39) (the dirty room example). It will be more difficult to cancel when truth at any particular time entails truth at all other times going forward, as in the reincarnation examples we saw earlier, repeated in (71).

(71) a. piːs- ə̃   wẽ, mə- raː- bõ   fe paːdi-jã ka- jikət- e.
          dawn- 3sg.PERF DET NARR- go- 1pl.PERF P his.room INF- awaken- INF

          'In the morning, we went to his room to wake [him] up.'

      b. … mə- raː- bõ   səm- a   **sad- ə̃**   (padʒeːna pã).
          NARR- go- 1pl.PERF arrive- IRR die- 3sg.PERF night   DET

          'We found out he was dead/had died (in the night).'

      c. #… mə- raː- bõ   səm- a   **sad- <u>akõ</u>**   de.
          NARR- go- 1pl.PERF arrive- IRR die- <u>PAST.3sg.PERF</u> AFF.DECL

          (5.70, #1, elicitation)

In (71c), the addition of -*ako*- implicates that while it held at some time before the time we found the man, the target state of dying no longer held at the time we found him. World knowledge, however, tells us that death is permanent: if the man died any time before the time we found him, then he was still dead at the time we found him. As a result, (71c) is infelicitous: the implicature of -*ako*- essentially changes the meaning of *sad*- 'die/be dead', suggesting that the person died and came back to life.

When -*ako*- is removed from (67), as in (72) (=(49)), none of the semantics in (69) apply.

(72) Faatu jim- ə̃   de   Maimuna **kẽdan- ə̃   de**.
      Faatu say- 3sg.PERF AFF.DECL Maimuna be.healthy- 3sg.PERF AFF.DECL

      'Faatu said Maimuna **was healthy**.' (10.9, #1, elicitation)

In (72), the composition for the subordinate clause proceeds as in (68) above, repeated in (73).

(73) *Maimuna kedan-ə̃ de* (= PERF(Maimuna be healthy)) is true at $<w,t>$ iff $\exists e$ and $\exists i$ such that for all w', where w' is a metaphysical alternative to w at t, $<$Maimuna be healthy$>$ is true of e in w' at i.

Because no -*ako*- is present in (72) to shift perspective time, t_{subord} is simply bound by the start time of e_{matrix}. Therefore, by the semantics of the perfective, i_{subord} extends no later than the start of e_{matrix}, entailing that (according to Faatu) the state of Maimuna's being healthy – which is realized at i_{subord} – is realized within an interval leading up to matrix event time. The absence of -*ako*- implicates that moreover, this state has not been terminated by t_{subord}, i.e. by Faatu's speech time; thus Maimuna's healthy state overlaps (according to Faatu) with the matrix event of speaking.

To formally capture the lexical semantics of -*ako*-, we can modify a proposal for the lexical semantics of English past tense to account for the facts we have observed about Badiaranke. According to Hacquard (2006:47), herself citing Kratzer (1998), the English past tense carries the lexical semantics in (74).

(74) ⟦past⟧^{g,c} only defined if c provides an interval t$<$t$_0$ (speech time). If defined ⟦past⟧^{g,c}=t.

This lexical entry will have to be altered in two ways for -*ako*-. First, the earlier *t* will be a moment, rather than a non-momentary interval, since in Badiaranke the earlier *t* is the new

perspective time, the time *from* which eventuality realization in all metaphysical alternatives (in the case of perfective-marked clauses) is evaluated, rather than the time *at* which the eventuality is realized. Second, the time that t precedes will be the previously established perspective time, rather than speech time. The resulting definition is spelled out in (75).

(75) $[\![$-*ako*-$]\!]^{g,c}$ only defined if c provides a moment $t < t_0$ (perspective time at that point in the discourse). If defined $[\![$-*ako*-$]\!]^{g,c} = t$.

According to (75), -*ako*- refers directly to a time; it combines with a predicate of times (an eventuality description to which aspect has been applied) to yield a truth value. The proposition expressed in an -*ako*-marked clause is true if there is in fact some time t, preceding the previously established perspective time t_0, at which the eventuality description is realized at the worlds and times selected by aspect.

The temporal interpretation of relative clauses proceeds in the same way as that of complement clauses, except that relative clauses can position the subordinate perspective time with respect to either $\tau_{e\ matrix}$, i.e. the time spanned by the matrix eventuality, or t_{matrix}, i.e. TU. When -*ako*- is present in the perfective-marked relative clause, it will presuppose that the eventuality description is true of the eventuality by some time t_{subord} either preceding $\tau_{e\ matrix}$ or preceding TU itself. Furthermore, -*ako*- will implicate that the eventuality is over a significant amount of time before e_{matrix} begins (in the past-shifted construal) or TU (in the indexical construal). When -*ako*- is absent from the relative clause, its absence will implicate that the target state of the eventuality (including the state itself for stative eventuality descriptions) still holds at the start of $\tau_{e\ matrix}$ (in the "simultaneous" construal) or at TU (for the indexical construal).

As in Badiaranke, indexical construals are available in English only for some relative clauses, and never for complement clauses. To explain this disparity, Stowell (1995) argues that present-marked relative clauses are forced to move out of the scope of a matrix PAST tense at LF,[22] while past-marked relatives are allowed to remain in situ, and complement clauses are barred from raising at LF. Enç (1987), in contrast, argues that it is present-marked complement clauses that raise out of the scope of a matrix past at LF, due to certain "anchoring conditions" for tense, parallel to binding conditions for pronouns. While these analyses provide syntactic *implementations* of the semantic observations, they do not provide a satisfying *explanation* for why these syntactic differences should obtain between relative and complement clauses. In any case, I leave for future research the extent to which Stowell's or another syntactic analysis can account for the differences between complement and relative clauses in Badiaranke.

Treating pastness as a presupposition, rather than an assertion, of -*ako*- is neither arbitrary nor unusual. Along the same lines, Sauerland (2002) argues that in English, past tense presupposes that the time of an eventuality precedes the time of utterance. (While Klein (1994) argues that the time preceding TU is actually TSit, nothing in his analysis precludes

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[22]Stowell distinguishes between the semantic tenses, "PAST" and "PRESENT." and the morphological markings "past" and "present." On his analysis, past can be scoped over by a higher PRESENT, as long as it is also c-commanded by a PAST; present, however, cannot remain in the scope of a PAST.

this precedence from being a presupposition as well.) That this precedence is a presupposition, rather than an assertion, of past tense follows from application of the "p-family tests" of Chierchia and McConnell-Ginet (2000), which define the criteria that presuppositions must meet: like all presuppositions, past tense semantics survives under negation and yes/no questions.[23] This is so in English ((76)-(77)) as well as in Badiaranke (78).

(76)   Sirius didn't kill Harry's parents.

(77)   Did Snape murder Dumbledore?

(78)   **mitʃ- <u>akoː-</u> re-   mã   nte   mpə-   ruː   Musaa de.**
       think- <u>PAST</u>- neg.perf- 1sg.neg comp 3sg.impf- steal Musaa aff.decl

       'I didn't think s/he would steal from Musaa.' (10.17, #1, elicitation)

As in English, past tense in Badiaranke is presuppositional. Unlike in English, however, the presupposition introduced by -*ako*- is that perspective time for its clause precedes the previously established perspective time. That is, Badiaranke tense differs from English tense in terms of both what time interval is being positioned by tense (TT or TSit in English, vs. perspective time in Badiaranke), and what that interval is positioned with respect to (a fixed utterance time in English, vs. a more flexible, contextually dependent perspective time for Badiaranke).[24] The "anti-perfect implicature" further differentiates -*ako*- from English past tense. Recall that in (23) (*We found John in the bathtub. He was dead*), the past tense can be used on *be dead* even though the state of being dead still holds of John at perspective time (the moment when we found John dead in the bathtub) as well as at utterance time. In Badiaranke, as we saw in (71), the anti-perfect implicature is too strong for a non-resurrection reading.

The fact that the time with respect to which -*ako*- expresses precedence is contextually dependent, rather than being fixed at TU, makes it a *relative* tense, in contrast with so-called *deictic* or *absolute* English tense. Comrie (1985:56) defines a relative tense as one where "The reference point for location of a situation is some point in time given by the context, not necessarily the present moment." Usually, according to Comrie, the reference point for relative tense is determined by the tense of the closest tensed verb (and the time of the situation described by that tensed verb); this generalization clearly applies to complement clauses (and some relative clauses) in Badiaranke, where as we have seen, matrix eventuality time (which is affected by tense and aspect on the matrix clause) sets the reference time for the subordinate clause. In fact, even in matrix clauses, the time with respect to which -*ako*- expresses precedence is the (start) time of the last-mentioned event. This fact was not

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[23]The final test proposed by Chierchia and McConnell-Ginet (2000), i.e. whether the presupposition candidate survives in the antecedent of conditionals, is problematic for English past tense, due to the complication of "fake pasts" (Iatridou 2000) in that environment. In Badiaranke, the antecedent test might work, since -*ako*-, as the realis counterpart of -*akəd*-, can only be a true past; at this time, however, I lack the data needed to verify this prediction (i.e. non-counterfactual, epistemic conditionals with -*ako*- in the antecedent).

[24]This characterization of English is not quite accurate; if it were strictly true, only an indexical reading of tense would ever be available. See Declerck (1991, 1995) and Michaelis (2006).

apparent in earlier examples of matrix -ako-, because they were elicited in isolation, making utterance time the only available perspective time at that point in the "discourse." It is more evident in (79), where -ako- shifts Musaa's trip to Diaobe into the past of the topic time at that point in the story.

(79) a. araməsa sãpə- se   wẽ, Musaa kabaː- ti-   ĩ   de.
          Thursday pass- REL.PERF DET Musaa wake- early- 3sg.PERF AFF.DECL
          mə-   daasomaŋ- ã.   mə-   pamm-   ə̃   fe
          NARR- breakfast- DETRANS.3sg.PERF NARR- leave.in.morning- 3sg.PERF P
          pədao. jã   ŋka mpə-   raː mə-   nĩk- ə̃   nia-jã tẽtulu
          field   there and 3sg.IMPF- go NARR- give- 3sg.PERF his.wife palm.oil
          ma-   sədd- eːn-   i-   ã   wuna daːtua.
          3sg.SBJ- cook- INSTR- BEN- NSBJ that   lunch

          'Last Thursday Musaa woke up early. He ate breakfast. He left for the fields. Before he went, he gave his wife palm oil for her to cook lunch for him with it.'

    b. … paːki   **rã- kõ**   **de**   **fe dʒaobe**, mə-   watʃ-
          yesterday go- PAST-3sg. AFF.DECL P Diaobe   NARR- buy-
          ũ   bidoŋ- e tẽtulu.
          VENT.3sg.PERF jug-   of palm.oil

          'The day before **he had gone to Diaobe** and bought a jug of palm oil.' (5.30, #1, elicited story)

The conclusion that Badiaranke has relative rather than absolute tense is satisfying given the language's ability to locate an eventuality temporally without tense marking. Since it is possible in Badiaranke to indicate absolute temporal position merely through the obligatory use of aspect, it is unsurprising that tense-marking should have a different function. Moreover, since aspect already positions evaluation time – and by extension, eventuality time – with respect to the local perspective time, it makes sense that the role of tense is to shift perspective time, rather than to position evaluation time.

While the discussion thus far has focused on perfective clauses, it is worth noting briefly that -ako- has the same semantics with periphrastic progressives. In (80), -ako- presupposes that the perspective time with respect to which the dancing is ongoing – here, the time when the scorpion stings the speaker – precedes the perspective time at that point in the discourse, i.e. TU. In this case, the fact that the -ako- clause is followed up with the explicit mention of an event that would be virtually guaranteed to stop one's dancing reinforces the implicature that the time of the dancing eventuality does not extend beyond the earlier perspective time.

(80) **ka- kam-   e jak-   akõ**   wakkədə wã   mə-   safə-
       INF- dance-INF be- PAST.1sg.PERF scorpion DET   NARR- sting- 3sg.PERF-
       m-   ã.
       1sg.NSBJ

       '**I was dancing**, [then] the scorpion stung me.' (5.92, #3, elicitation)

In (80), progressive aspect indicates that as evaluated from w at perspective time, in the best worlds w' as evaluated by a circumstantial modal base and a non-interruption ordering source, there is an interval i and eventuality e such that e is a dancing event at i. Without -*ako*-, and without additional context, perspective time would be simultaneous with utterance time, such that an activity of dancing would be interpreted to have begun in w and to be likely to continue for some interval beyond utterance time. When -*ako*- is added, it shifts perspective time into the past, such that as evaluated at some past time in w, an activity of dancing had begun and was likely to continue for some interval beyond that past perspective time. This composition is outlined in (81), where, as before, t_0 is the previously established perspective time (here equivalent to utterance time, given the absence of preceding context). Through its presupposition, -*ako*- specifies that the new t, from which perspective (80) would express a true proposition, precedes t_0.

(81) The proposition in (80) is true at a world-time pair $<w,t_0>$ iff in all the best worlds w' accessible from w **at some $t<t_0$**, as selected by a circumstantial modal base and non-interruption ordering source, $\exists e$ and $\exists i$ such that $<$I dance$>$ is true of e in w' at i.

Additionally, -*ako*- implicates that the dancing event that was ongoing at t has been terminated by t_0. The second clause, 'a scorpion stung me', strengthens this implicature (scorpion stings being more than painful enough to interrupt dancing), but is not solely responsible for it.

5.4 The other past tense marker: *-akəd-* and its semantics

As mentioned in §5.1, -*ako*- is not the only way to mark past tense in Badiaranke; it coexists with another suffix, -*akəd*-, that also appears to contribute past tense semantics. The next question to pursue, then, is what determines the distribution of -*ako*- vs. -*akəd*-, and what this says about the semantic role of each. In this section, I argue that the semantic difference between these two tense morphemes is *modal* in nature. Specifically, I will demonstrate that -*akəd*- is the irrealis counterpart to -*ako*-, i.e. -*ako*- is used in realis contexts and -*akəd*- in irrealis ones.

5.4.1 Distribution of *-akəd-* (vs. *-ako-*)

That -*akəd*- plays a past-marking role similar to -*ako*- is most obvious in clauses asserting that an eventuality used to recur in the past, as in (82)-(84).

(82)　Mamadu **a-**　　　　**pə-** **dam-** <u>**akəde**</u>　　　　**de**　　　**kuna:** bari damə-
　　　 Mamadu 3sg.HABIT- IMPF- kill-　<u>PAST.IRR.NPERF</u> AFF.DECL cow　　but kill-
　　　 r-　　　 a　　　 wa:ti wãwã.
　　　 NEG.PERF 3sg.NEG time DEM

　　　 'Mamadu **used to kill** (i.e. slaughter) **cows** but these days he hasn't killed (any).'
　　　 (8.7, #2, elicitation)

(83)　mbõ,　　　　**u-**　　　　**kədə-** **bõ-**　　**ri-** <u>**akəde**</u>　　　**wẽ**, ta:me bepo:se
　　　 1pl.INDEP NMLZ.SG- HABIT- 1pl.HABIT- do- PAST.IRR.NPERF DET now　 children
　　　 pã　kebẽ　　　　　 pə-　　ri-　ã.
　　　 DET NEG.IMPF.3pl. IMPF- do- 3sg.NSBJ

　　　 'Us, **what we used to do**, now the young people don't do it.' (8.31, #2, elicitation)

(84)　puannə pã　naŋa. pi:sido:　pat∫ae ma:e da:tua:, si:mã patʃae ma:e. ha:
　　　 bride　　DET self　every.day chicken two　lunch　　dinner chicken two　　until
　　　 pidʒa:da kobəda ŋka ma:e. **wũ i**　**kəde-**　**ri-** <u>**akəd-**</u>　**a:-**　　**o**.
　　　 day　　　 seven　　　　　 DEM COP REL.HABIT- do- <u>PAST.IRR-</u> DETRANS- PASS

　　　 'The bride herself. Every day two chickens for lunch; dinner, two chickens. Until the
　　　 seventh day. That's what **used to be done**.' (3.26, #1, marriage customs text)

In such cases, *-akəd-* indicates that some time before utterance time was characterized by
the regular repetition of the eventuality described. In terms of the analysis in Chapter 4,
habitual aspect indicates that as evaluated at the base world w and some perspective time t,
in the best worlds w' selected by a circumstantial modal base and non-interruption ordering
source, there exist a plural eventuality e and interval i such that the eventuality description
P is true of e in w' at i. The contribution of *-akəd-* is twofold: it indicates that t precedes
TU (the previously established perspective time), and it suggests that the eventuality no
longer recurs at TU, i.e. that the habitual recurrence was in fact interrupted in w before TU.

　　Like the "anti-perfect" implicature of *-ako-*, however, the no-longer-holds implicature of
-akəd- can be canceled. In (85), the second clause explicitly cancels the implicature that the
speaker no longer goes to the location in question.

(85)　fa:　　o:　**kəd-** **ə̃**　　　**raŋ-** <u>**akəde**</u>　　　**de**.　　ha: to:
　　　 month every HABIT- 1sg.HABIT go-　PAST.IRR.NPERF AFF.DECL until today
　　　 kəd-　ə̃　　　　 ra: de　　 fa:　o:　fa:.
　　　 HABIT- 1sg.HABIT go AFF.DECL month every month

　　　 'Every month **I used to go**. To this day I still go every month.' (5.18, #1, elicitation)

　　Also like *-ako-*, even if the habitual state no longer obtains at TU, *-akəd-* is not always
necessary. In (86), *-akəd-* is omissible even if the grandparent is dead and therefore no longer
sings.

(86) weː bẽ-   tʃimə wẽ, maːmemma   **a-**   **pə-** **tʃim-** **(akəd-)**
DEM 3pl.IMPF- sing DET my.grandparent 3sg.HABIT- IMPF- sing- PAST.IRR-

ã   de.
3sg.NSBJ AFF.DECL

'That thing they're singing, my grandparent **used to sing it**.' (5.14, #2, elicitation)

The other environments where it appears, however, suggest that the semantics of -akəd-
is somewhat more complex. Its other uses do not involve repetition of an eventuality; in
fact, they all have in common the *non*-occurrence of some eventuality in the actual world.

The non-habitual environments in which -akəd- appears are all counterfactual in nature.
The counterfactuality may have a deontic ((87)-(89)), metaphysical ((90)-(93)), or bouletic
(94) flavor.

(87) **tʃoːm-** <u>akədo-</u>   **i**   **dãt- i-** **ã**   **de**   bari wu-
should- PAST.IRR.PERF- 2sg.PERF say- BEN- 3sg.NSBJ AFF.DECL but NMLZ.SG-

sãpə- se   i.
pass- REL.PERF COP

'**You should have told him**, but it's too late for that now.' (8.31, #1, elicitation)

DEONTIC MODALITY (with overt modal)

(88) **mpə-**   **kər-** <u>akəde</u>   **de!**
3sg.IMPF- run- PAST.IRR.NPERF AFF.DECL

'**He should have run**!' (But he didn't.) (8.32, #2, elicitation)

DEONTIC MODALITY (without overt modal)

(89) **ma-**   **kər-** <u>akəde</u>!
3sg.SBJ- run- PAST.IRR.NPERF

'**He should have run**!' (But he didn't.) (8.32, #2, elicitation)

DEONTIC MODALITY (with subjunctive/hortative)

In general, in the absence of the necessity modal *tʃoːm-*, a counterfactual must contain at
least one -akəd-.[25] (90)-(94) show that -akəd- may occur in the antecedent or the consequent
of a counterfactual, or even in both.

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[25]I elicited one strange example, shown in (i), where the consultant accepted -ako- in the antecedent of
a conditional without -akəd- in the consequent, but this was the one exception to the generalization that
counterfactuals require -akəd-.

(i) paːki   nĩ **kab-** <u>akõ</u>   (to) kama   dʒitt- ẽ,   kama   lẽb-
yesterday if know- PAST.1sg.PERF COND NEG.IMPF.1sg. get-   2sg.NSBJ NEG.IMPF.1SG. call-
ẽ.
2sg.NSBJ

'Yesterday if **I'd known** I wouldn't reach you, I wouldn't have called you.' (8.59, #1, elicitation)

I have no explanation for the apparent acceptability of this example, which deserves verification in future
fieldwork.

(90) paːki   nĩ **kab- akədõ**   kama   dʒitt- ẽ,
     yesterday if know- PAST.IRR.PERF.1sg. NEG.IMPF.1sg. get-   2sg.NSBJ
     kama   lẽb- ẽ.
     NEG.IMPF.1sg. call- 2sg.NSBJ

‘Yesterday if **I had known** I wouldn’t reach you, I wouldn’t have called you.’ (8.51, #1, elicitation)

<div align="right">METAPHYSICAL COUNTERFACTUAL</div>

(91) paːki   nĩ kab- ə̃   to   kama   dʒitt- ẽ   fe telefon,
     yesterday if know- 1sg.PERF COND NEG.IMPF.1sg. get-   2sg.NSBJ P telephone
     mã-   watt- akəde   **de**   kũpia.
     1sg.IMPF- wait- PAST.IRR.NPERF AFF.DECL tomorrow

‘Yesterday if I’d known I wouldn’t reach you on the phone, **I would have waited** till tomorrow.’ (8.62, #1, elicitation)

<div align="right">METAPHYSICAL COUNTERFACTUAL</div>

(92) nĩ kaː   torsə   sẽ, **mpə-   saf- akəd-   ã**
     if NEG.IMPF.3sg. flashlight DET 3sg.IMPF- sting- PAST.IRR.NPERF- 1sg.NSBJ
     de.
     AFF.DECL

‘If it weren’t (for) the flashlight, **it [the scorpion] would have stung me**.’ (5.8, heard “in the wild”)

<div align="right">METAPHYSICAL COUNTERFACTUAL</div>

(93) paːki   nĩ **kab- akədõ**   kama   dʒitt- ẽ   (fe
     yesterday if know- PAST.IRR.PERF.1sg NEG.IMPERF.1sg. get-   2sg.NSBJ P
     telefon), **mã-   watt- akəde**   **de**   kũpia.
     telephone 1sg.IMPF- wait- PAST.IRR.NPERF AFF.DECL tomorrow

‘Yesterday if **I’d known** I wouldn’t reach you (on the phone), I **would have waited** until tomorrow.’ (8.47, #1, elicitation)

<div align="right">METAPHYSICAL COUNTERFACTUAL</div>

(94) bari nĩ kaː   wũ   kãtʃi **ma-   raŋ- akəde**   dʒaobe walla dakaːr.
     but if NEG.IMPF.3sg. 3sg.DEM then 3sg.SBJ- go-   PAST.IRR. Diaobe or   Dakar.

‘But if not that, then **I would go** to Diaobe or Dakar.’ (7.22, #3, elicitation)

<div align="right">COUNTERFACTUAL WISH</div>

What all these environments have in common is that the worlds in which the eventuality described is ostensibly realized are not the same as the one in which the utterance is made:

the eventuality is realized in one set of worlds and the truth of the utterance evaluated in another.

Hacquard (2006), following Percus (2000), treats worlds as pronouns, or variables, that are introduced by eventuality descriptions as well as by aspect. Each world variable must be bound in order for the sentence to receive a truth value, with world binding being subject to locality constraints. At the highest level, each clause is capped by a matrix world binder; this is the base world or world of evaluation, the world in which the sentence is uttered and claimed to be true. In the absence of a modal operator, the matrix world binder, as the only and therefore the most local one, will bind both the world variable introduced by aspect and the one introduced by the eventuality description. In that case, the eventuality description is asserted to be true of an eventuality in the same world in which the truth of the proposition is evaluated: that is, the eventuality is claimed to be realized in the base world itself.

When a modal operator is present, it introduces a second world binder. According to Hacquard, in sentences with root (i.e. non-epistemic) modals, ModP, headed by the modal, is merged right above the vP, below TP. Hacquard argues that Aspect starts out inside the vP as an argument of the verb, but moves to a position immediately below Tense for type reasons: since aspect takes predicates of events to predicates of times, it needs to combine with, and hence must be adjacent to, tense in order for the clause to receive a truth value. Crucially, once this movement has happened in a sentence with a root modal, the world variable introduced by the vP and the one introduced by aspect are bound by different operators. For the world variable within the vP, the closest binder is the one introduced by the modal. But for the one introduced by Asp, the most local binder is now the matrix world binder, coindexed with the base world. The result is that the world(s) in which the eventuality must be realized in order for the clause to be true are not the same as the one in which the utterance itself is made.

Although not every -akəd- clause contains one of Badiaranke's overt modal verbs (the necessity modal tʃoːm- or the possibility modal mən-), semantically the following generalization holds: each environment where -akəd- appears instead of -ako- is one where an eventuality meeting the eventuality description need not occur in the base world in order for the proposition as a whole to be evaluated as true in that world. That is, the world(s) in which the eventuality description under Tense is true of some eventuality need not be identical to the value of the matrix world binder, which sits above Tense. Let us see how each -akəd- environment meets this description.

Habitual aspect, as we saw in Chapter 3, indicates that in each or the best worlds according to a circumstantial modal base and non-interruption ordering source, there is an eventuality e and a plural interval i such that the eventuality description P is true of e at i. On this analysis of habituals, recurrence of the eventuality in the base world before perspective time is not sufficient for habitual aspect to be used: rather, at least one singular interval that makes up the plural interval must *follow* perspective time in all the best worlds. The base world may or may not be among these best worlds in which the eventuality is realized, regardless of the position of perspective time with respect to utterance time. What -akəd- does in past habituals (e.g. (82)-(84)) is to shift the perspective time for the habitual

into the past of utterance time (or, more generally, perspective time at that point in the discourse). A sentence like (82) then asserts that in the best worlds as evaluated from a past perspective time in the base world, the eventuality described by <Mamadou kill a cow> is realized at a plural interval, at least one singular interval of which follows that past perspective time. The base world – the world in which the truth of (82) is evaluated – may or may not be among these worlds; a speaker may utter (82) even if s/he knows that in fact, an eventuality of cow-killing by Mamadou never recurred again after the past perspective time (as indeed is implied by the second clause, 'but these days he hasn't killed any').

Similarly, sentences involving deontic modality clearly do not entail that the eventuality scoped over by the modal is realized in the base world. Deontic modals introduce and quantify over a set of worlds that may or may not include the base world: the best worlds, the ones where the eventuality scoped over by the deontic modal is realized, are those selected from a circumstantial modal base by a deontic ordering source. That is, the eventuality in question is realized only in worlds where, given a certain set of circumstances, as many as possible of the rules or laws (laid out by some context-dependent authority) are followed. That the base world is not always among these worlds is easy to see in an English example like (95), where the modal is interpreted deontically:

(95) Annabelle's murderer must be thrown in jail.

To interpret (95), we start with a modal base consisting of worlds where the circumstances are such that Annabelle is murdered. The deontic ordering source consists of the laws of the land pertaining to murderers, one of which will be *Murderers go to jail*. (95) asserts that in all the best worlds in the modal base – the Annabelle-is-murdered worlds where all the relevant laws are followed – Annabelle's murderer goes to jail. Unfortunately, in the actual world, some people who are murderers are never caught, some are caught but declared innocent by a jury, some kill themselves before they are caught, and so on; in the actual world, Annabelle's murderer may turn out to be one of those who escapes justice. Therefore, while the sentence in (95) may well be true in the actual world, the actual world is clearly not necessarily one of the worlds where the eventuality under the deontic modal – <Annabelle's murderer go to jail> – is true.

In parallel fashion, the Badiaranke sentence in (96) asserts that given a certain set of circumstances at a certain past time, of the worlds in which those circumstances held at that time, a deontic ordering source ranks highest those in which the addressee tells certain information to the individual in question.

(96) **tʃoːm- <u>akədo-</u>   i   dãt- i- ã   de   bari wu-**
      should- <u>PAST.IRR.PERF</u>- 2sg.PERF say- BEN- 3sg.NSBJ AFF.DECL but NMLZ.SG-
      sãpə- se   i.
      pass- REL.PERF COP

      '**You should have told him**, but it's too late for that now.' (8.31, #1, elicitation)

In (96), unlike in (95), the obligation to effect the eventuality under the scope of the deontic holds not at the moment of utterance, but from the perspective of a time in the past.

The second clause contributes two useful pieces of information: it indicates both that the obligation no longer holds at TU, and that the eventuality was not (and will not be) realized in the base world. This example thus makes clear that the world in which the obligation held – the world in which (96) is true – is not among the worlds in which the eventuality under the scope of the deontic was realized.

In (88)-(89), repeated in (97)-(98), the counterfactual interpretation stems from the context of utterance as well as from *-akəd-* itself.

(97) **mpə-** **kər-** <u>**akəde**</u> **de!**
3sg.IMPF- run- <u>PAST.IRR.NPERF</u> AFF.DECL

'**He should have run**!' (But he didn't.) (8.32, #2, elicitation)

(98) **ma-** **kər-** <u>**akəde**</u>!
3sg.SBJ- run- <u>PAST.IRR.NPERF</u>

'**He should have run**!' (But he didn't.) (8.32, #2, elicitation)

Immediately before these sentences were elicited, I asked the consultant to translate a short narrative about a man, Aamadu, who is accosted by a bandit demanding his money. Since Aamadu refuses, the bandit kills him. From this context, it is clear that the eventuality described – Aamadu's running away – did not occur in the base world; it occurs only in the best worlds, in which Aamadu survives the bandit attack, unlike in the base world. Even in the absence of such context, however, (97)-(98) would be interpreted counterfactually; *-akəd-* both indicates that <he should run> was true at some past time and implicates that it no longer holds.

As this discussion makes clear, the role of *-akəd-* in deontic examples like (96)-(98) is to past-shift the perspective time at which someone is under an obligation or permission to carry out the eventuality. The obligation (or permission) is always to cause an eventuality to be realized in the *future* of that past perspective time. In the terminology of the next chapter, deontic modality is always *future-oriented*: it is moot to oblige or permit someone to carry out an action before the obligation or permission is imposed. Structurally, the fact that *-akəd-* past-shifts perspective time for the deontic modal means that the tense (in the head of TP) scopes over the modal (in the head of ModP) when the modality is deontic. This conclusion is consistent with much the literature regarding the relative scope of tense and modality (e.g. Barbiers 2002, Condoravdi 2002, Stowell 2004, Hacquard 2006), which argues that all root modals, including deontics, are merged below tense. (96)-(98), then, support the generalization that *-akəd-* occurs in environments where truth of the utterance does not depend on realization of the eventuality scoped over by tense.

As seen in (97), a clause also gets a past, counterfactual deontic interpretation when *-akəd-* occurs with imperfective aspect, even without an overt modal. Such examples (imperfective with *-akəd-* yielding a deontic interpretation) might be analyzed in either of two ways. Conceivably, what examples like this show is that in addition to the ordering sources discussed in Chapter 3, the Badiaranke imperfective allows yet another ordering source, a deontic one. Alternatively, (97) can be analyzed as a metaphysical counterfactual with the

antecedent – something like 'If he had done the wise thing' – omitted. In either case, the primary role of -akəd- – to shift perspective time into the past – remains the same, and the requirement for use of -akəd- rather than -ako- – that the eventuality whose description is scoped over by tense has its world variable bound by worlds other than the matrix world binder – is met. In the case of (98), which differs from (97) only in using hortative morphology, the deontic meaning arguably arises from the semantics of the hortative itself.

The counterfactual wishes and assertions in (90)-(94) also contain the conditions for triggering use of -akəd- rather than -ako-. In (90), both the antecedent and the consequent of the counterfactual are marked with -akəd-. Indeed, neither the eventuality described in the antecedent – the speaker's knowing that the addressee was unavailable – nor that described in the consequent – the speaker's refraining from calling the addressee – is realized in the base world w, the world in which (90) was uttered. The eventuality described in the antecedent is realized only in certain metaphysical alternatives accessible from w *at some past perspective time*; the eventuality described in the consequent is realized in the subset of those formerly metaphysically accessible worlds that are ranked highest by a totally realistic ordering source, i.e. the ones most similar to w in all other respects. Since w is not in fact one of the worlds in which the antecedent eventuality is realized, the consequent eventuality is also not realized in w. Indeed, although metaphysical modals, like epistemic modals, are classed as non-root (see Chapter 6 below), some have argued metaphysical modality to behave like root modality in scoping under tense (Condoravdi 2002, Hacquard 2006:97).

It follows from this analysis that while -akəd- in (90) is critical for conveying counterfactuality (the consequent eventuality is realized in worlds that were metaphysically accessible from w at some earlier time, but not anymore), its presence in both antecedent and consequent is redundant. When it occurs in the consequent alone, as in (91) and (92), -akəd- indicates that the actual world is not among the worlds in which the consequent eventuality is realized, and that these worlds diverge from w at some past perspective time. Past-marking in the consequent is all that is needed to shift perspective time into the past; the choice of -akəd- is sufficient to indicate that the consequent eventuality occurs in non-actual worlds; and conditional morphosyntax is sufficient to indicate that the consequent eventuality is realized in worlds where the antecedent is true, entailing that the antecedent eventuality is realized in at least some non-actual worlds and implicating (at least) that it is not realized in the actual world.

When, on the other hand, -akəd- occurs only in the antecedent, as in (90), it sets the perspective time for the antecedent in the past and indicates that the worlds in which the antecedent eventuality is realized potentially exclude the base world. Because the worlds in which the consequent eventuality is realized are a subset of those in which the antecedent is true, the consequent eventuality is understood to be realized in worlds other than the base world even without -akəd- in the consequent. (Note that this example, where -akəd- appears on a perfective-marked clause, demonstrates that -akəd- is not merely the *imperfective* counterpart to -ako-. Indeed, -akəd- occurs in both perfective clauses, where it is followed by /o/, and in imperfective ones, where it is followed by /e/.)

It is worth noting that -*akəd*- has exactly the same function in future counterfactuals as in ordinary past ones, even though future counterfactuals describe eventualities that will not occur in w in the future of TU. (99) is an example of a future counterfactual that received a deontic reading.

(99) pudõ **bẽ-** **karaŋ- <u>akəde</u>** de.
next.year 3pl.IMPF- study- PAST.NPERF AFF.DECL

'Next year **they should have studied** (but they won't).' (8.88, #1, elicitation)

Although the evaluation time for the eventuality – the time at which the potential studying was to occur – follows TU, the perspective time – the time at which it is a live option that this studying will occur next year – is in the past of utterance time, as indicated by -*akəd*-. In other words, -*akəd*- has the same function here as in the other environments we have looked at: it shifts perspective time into the past, and it distinguishes the matrix world, in which the sentence as a whole is true, from the worlds in which the eventuality description scoped over by the modal element is true of some eventuality.

(100), where -*akəd*- in the subordinate clause can only receive a metaphysical counterfactual interpretation, demonstrates that -*akəd*-, like -*ako*-, is a marker of relative rather than absolute tense. The sentences in (100) were elicited on a day following a lunar eclipse, making (100b), with -*akəd*-, infelicitous in the context of utterance.

(100) a. bə- karaŋə- se kab- ako- bõ̃ de faː fã̃
PL- study- REL.PERF know- PAST- 3pl.PERF AFF.DECL moon DET
mpə- **baj** **de**.
3sg.IMPF- be.black AFF.DECL

'Wise people knew that the moon **would become dark**.' (8.103, #1, elicitation)

b. # bə- karaŋə- se kab- ako- bõ̃ de faː fã̃
PL- study- REL.PERF know- PAST- 3pl.PERF AFF.DECL moon DET
mpə- **baj-** **<u>akəde</u>** **de**.
3sg.IMPF- be.black- PAST.IRR.NPERF AFF.DECL

✓'Wise people knew that the moon **was supposed to have become dark** (but didn't).'
* 'Wise people knew that the moon **would become dark**.' (8.103, #1, elicitation)

As (100a) shows, perspective time for a futurate imperfective in a complement clause is set by matrix eventuality time, not by utterance time. Thus to talk about an eventuality that happens in the future of a past perspective time, simple imperfective aspect is sufficient. If -*akəd*- is added to the imperfective-marked subordinate clause, as in (100b), the interpretation is instead that the time at which it was likely that the eclipse would later occur preceded the past knowledge time as well as utterance time. This result is highly problematic: due to the factive nature of *kab*- 'know', it is not clear what (100b) is really trying to express.

Thus *-akəd-*, like *-ako-*, shifts the perspective time for the counterfactual to a time before the previously established perspective time – here, the start time of the matrix eventuality.

Finally, in the counterfactual wish in (101) (=(94)), *-akəd-* again indicates that the eventuality is realized at some worlds accessible from the base world at a past perspective time, but (most likely) not in the base world itself.

(101) bari nĩ kaː   wũ   kãtʃi **ma- raŋ- akəde**   dʒaobe walla
       but if NEG.IMPF.3sg. 3sg.DEM then 3sg.SBJ- go- PAST.IRR.NPERF Diaobe or
       dakaːr.
       Dakar.
       'But if not that, then **I would go** to Diaobe or Dakar.' (7.22, #3, elicitation)

In (101), the worlds where the eventuality in the consequent is realized are defined not only by the antecedent, but by the broader discourse context. The sentence was part of a narrative in which the speaker laid out what she would do with her life if she could do anything she wanted. The worlds in which an eventuality described by <I go to Diaobe or Dakar> is realized, then, are those worlds in which the previously mentioned wishes do not come true, but as many as possible of the speaker's other fantasies are fulfilled. Given the circumstances of the speaker's life (lack of funds and education, e.g.), these worlds are not circumstantially accessible at TU, only at the earlier perspective time set up by *-akəd-*.

While we have seen that *-akəd-* occurs with a wide range of modality types, there is one type of modality that does not trigger *-akəd-*, namely epistemic modality. Indeed, sentences like (102) and (103), which allow only a (metaphysical) counterfactual reading, show that epistemic modality is incompatible with *-akəd-*.

(102) mitʃ- ĩ   **mpə- səm- akəde**   **de**
       think- 1sg.PERF 3sg.IMPF- arrive- PAST.IRR.NPERF AFF.DECL

       ✓ 'I think **s/he would have arrived (by now)** (but s/he didn't).'
       * 'I think s/he must have arrived (by then).' (8.39, #1, elicitation)

(103) mən- ə̃   ma- jak- akəde   **bẽ- karaŋ- akəde**
       POSSIB- 3sg.PERF 3sg.SBJ- be- PAST.IRR.NPERF 3pl.IMPF- study- PAST.NPERF
       de.
       AFF.DECL

       ✓ 'They **could have studied** (but they didn't).'
       * 'It could be the case that they studied.' (8.77, #1, elicitation)

This incompatibility is in fact expected. As mentioned above, a distinction has long been made between *root* modality, which scopes only over the eventuality description, on the one hand, and epistemic modality, which scopes over the entire utterance, on the other. Numerous authors, including Barbiers (2002), Condoravdi (2002), Stowell (2004), and Hacquard (2006), argue that epistemic modals differ syntactically from other types – including metaphysical modals – in that they scope *over* tense, while other modals scope under it. This syntactic difference reflects our intuitions about what epistemic modality can actually mean.

Using examples similar to those in (104), Condoravdi (2002) shows that while the *orientation* of an epistemic modal can be towards either the past or the future (or indeed the present), the *perspective* time can only be the attitude holder's now.

(104)   a. He may/might have (already) won the game (# but he didn't).

      b. At that point he might (still) have won the game (but he didn't in the end).

In (104a), which receives an epistemic reading, the second clause is infelicitous. The second clause states that from the perspective of utterance time, the speaker is certain that the player in question has not won the game by utterance time. From the resulting infelicity, we can see that perspective time for the epistemic *un*certainty expressed in the first clause also must be utterance time: the sentence cannot mean that at some past perspective time, based on what the speaker knew then, it was possible that the player had won the game, but now the speaker knows that the player lost. The perfect ("modal for the past") morphology here reflects pastness of the modal's orientation, not of its perspective time. Only in (104b), with a metaphysical counterfactual reading, does the the "modal for the past" place perspective time in the past.

Since epistemic modality can only take the same perspective time as the clause as a whole, epistemic modals (in the head of ModP, according to Hacquard (2006)) must scope over tense. Thus in epistemic statements, the prerequisite structural condition for use of -*akəd*- – that tense scope over a world binder separate from that of the matrix clause – is not met. This is why clauses containing -*akəd*- cannot receive an epistemic interpretation.

A less straightforward problem is why the periphrastic progressive, which I have analyzed in Chapter 3 as being as modal as the habitual, takes -*ako*- instead of -*akəd*-. There are two conceivable hypotheses that could help explain this pattern. The first is a semantic one: perhaps the synchronic semantic difference between the periphrastic progressive and progressive *mp*- is that while the latter makes a statement about the larger eventuality (the one realized at some interval in the best accessible worlds), the former focuses on the stage of that eventuality that takes place in the base world by perspective time. Indeed, (105) provides some tentative evidence that progressive *mp*-, unlike the periphrastic progressive, is compatible with -*akəd*-.

(105)   fe kamitʃ- e- mma,   **mpə- sədd- akəde**   de   **da:so:ma**
        p thought- of- 1sg.INDEP 3sg.IMPF- cook- <u>PAST.IRR.NPERF</u> AFF.DECL breakfast
        sẽ.
        DET

        'In my opinion, **she was cooking breakfast**.' (8.41, #2, elicitation)

Along the same lines, it may be that the progressive is "less irrealis" than the habitual in that the former, but not the latter, requires that part of the eventuality occur in the actual world.

The second hypothesis is syntactic: the periphrastic progressive is transparently derived from a nominalized verb (an infinitive or gerund) plus a perfective-marked copula. Conceivably, the aspect here should be treated as a simple perfective (of the stative copula), with the

progressive interpretation arising from the juxtaposition of the nominal and copular forms. (This was surely the case diachronically, at least.) Since in a simple perfective clause (without modals), the eventuality is always realized in the base world, -*ako*- is used instead of -*akəd*-.

On Hacquard's 2006 analysis of perfective aspect in French, the perfective involves no modal operator. If this were the case in Badiaranke, then simple perfective clauses would be expected not to take -*akəd*-, since the matrix world binder would bind both the world variable introduced by perfective aspect and that introduced by the eventuality description, yielding an actual eventuality (the eventuality must exist in the base world). On my own analysis of the Badiaranke perfective, it is not as obvious why the perfective does not always trigger -*akəd*-, since on my analysis the perfective too involves quantification over worlds, specifically over w' worlds, where w' worlds are metaphysical alternatives to the base world w. Note, however, that the perfective involves *universal* quantification over these worlds. Since w is always among the set of w', realization of the eventuality in all w' entails realization in w itself. Thus, a perfective (affirmative) clause cannot be true unless the eventuality description is true of an eventuality in the same world in which the utterance is made. This distinction between the perfective and all subtypes of the Badiaranke imperfective – where realization of the eventuality described by the eventuality description in the best accessible worlds does *not* entail realization in the base world – is captured by my formulations of the perfective and imperfective in Chapter 3. Notice that in my semantics for the perfective (repeated in (106)), the existential operators that bind e and i scope over the modal operator, requiring the eventuality to exist in the base world in order for the perfective clause to be true.

(106)   Semantics of the Badiaranke perfective:
PERF(P) is true at a world-time pair $<w,t>$ iff $\exists e$ and $\exists i$ such that for <u>all w'</u>, where w' is a metaphysical alternative to w at t, P is true of e in w' at i.

In contrast, in the definition of the imperfective (repeated in (107)) the existential operators scope *under* the modal, such that an imperfective clause may be true even if the eventuality is not realized in the base world, as long as it is realized in the best possible worlds as defined by the context.

(107)   Semantics of the Badiaranke imperfective:
IMPF(P) is true at a world-time pair $<w,t>$ iff <u>in all the best possible worlds w'</u>, according to a contextually determined modal base and ordering source, as evaluated from w at t, $\exists e$ and $\exists i$ such that P is true of e in w' at i.

All of the environments in which -*akəd*- does appear, then, are ones in which realization of the eventuality in some worlds does not entail its realization in the base world. In other words, all the -*akəd*- environments involve *irrealis mood*. Authors disagree as to the precise definition of irrealis mood, and its manifestations vary crosslinguistically (see, e.g. Merlan (1981), Mithun (1995), Chafe (1995), Palmer (2001)), to such an extent that Bybee *et al.* (1994:238) deny that irrealis constitutes a valid crosslinguistic category. Considering the vast body of literature to the contrary, however (e.g. Michael 2010), I assume that irrealis is

a valid notional category. Fleischman's (1995) definition of irrealis mood states in part that irrealis mood conveys:

> . . . a speaker's lack of belief in or lack of commitment to (a) the reality, realization, or referentiality of an event or sequence of events predicated in an utterance; (b) the realization of an agent's wishes, hopes, or intentions, as expressed in the proposition of an utterance. . . .

<div align="right">Fleischman (1995:522)</div>

In terms of possible worlds, irrealis indicates willingness to assert that the eventuality obtains in some accessible possible worlds, but not in the actual world. Deontic modality clearly falls into this category, as do counterfactual assertions and wishes. As for the appearance of *-akəd-* in habitual clauses, a number of other languages, like Bargam (Papuan) and Bulgarian, either mark habitual clauses as irrealis, or mark habitual and irrealis semantics identically (Merlan 1981, Fleischman 1995); for Fleischman (1995), this type of irrealis marking falls under her "referentiality" category, habituals being clauses that aver a *pattern* of events rather than a particular event.[26] Note that irrealis does *not* indicate that a proposition is not true in the actual world, but rather reflects the *speaker's* lack of certainty or commitment as to whether it is true in the actual world, acting as a hedge on the assertion (cf. Bybee *et al.* 1994).

While some languages treat negated clauses as irrealis (Chafe 1995), negation is not a trigger for use of *-akəd-*: negative counterparts of *-ako-* clauses always take *-ako-* as well, as in (38) and (78) above. On my analysis in this section, negation is indeed predicted to be excluded from Badiaranke's irrealis triggers: it does not introduce a new binder for the world variable in the eventuality description.

Table 5.2 summarizes the complementary distribution of *-akəd-* vs. *-ako-*.

5.5 Conclusions: The role of tense in an aspect language

I have argued that tense in Badiaranke plays not only a temporal role, in positioning eventualities with respect to each other, but also a modal role, in distinguishing between the actual (or base) world and other accessible, but non-actual, worlds. The temporal meaning stems from the lexical semantics of *-ako-* and *-akəd-* themselves; the modal distinction, in contrast, is a function of the syntactic environment and is simply *reflected*, rather than contributed, by the choice of one past tense suffix instead of the other. Use of *-akəd-* rather than *-ako-*

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[26]Though somewhat unsatisfying, Fleischman's explanation for the affinity between habitual aspect and irrealis mood provides another potential explanation for why the the periphrastic progressive takes realis *-ako-* rather than irrealis *-akəd-*. Namely, despite its many similarities to the habitual, the progressive describes a single, specific eventuality while the habitual describes a plural eventuality.

[27]In rare cases, *-ako-* can also occur in antecedents of counterfactuals, as long as the consequent contains *-akəd-*.

Table 5.2: Past tense allomorphs and environments

Environment	Suffix	Examples
Perfective aspect	-*ako*-	(18)-(19), (35)-(48), (51), (53), (55)
Periphrastic progressive aspect	-*ako*-	(20), (80)
Deontic modality	-*akəd*-	(34), (88)
Counterfactual antecedents[27]	-*akəd*-	(90), (93)
Counterfactual consequents	-*akəd*-	(90)-(91), (92)-(94)
Imperfective aspect or subjunctive mood	-*akəd*-	(88), (89)
Wishes and dreams (with the subjunctive/hortative)	-*akəd*-	(94)
Habitual aspect	-*akəd*-	(22), (82)

indicates that the eventuality is realized in a set of worlds that do not necessarily include the base world; in structural terms, it indicates that the world variable in the eventuality description is bound by something other than the matrix world binder. In contrast, -*ako*- is used in contexts where the eventuality is necessarily realized in the world of evaluation. This dual function of past tense marking – expressing both a modal and a temporal contrast – is reminiscent of observations about other languages by, e.g., Iatridou (2000) and James (1982), in which past tense often expresses counterfactual or hypothetical semantics. Unlike in the languages discussed by those authors, however – e.g. Greek, where, on the analysis of Iatridou (2000), some past tense morphology in conditionals and counterfactuals is a "fake past," indicating truth in a non-actual world rather than at a non-present time – past tense in Baḍiaranke always makes a truly temporal contribution even when playing a modal role.

Regarding temporality, both -*akəd*- and -*ako*- play a single role. They presuppose that perspective time for their clause precedes the previously established perspective time (i.e. utterance time in matrix clauses, and utterance time or the start of matrix eventuality time in embedded clauses), and they implicate that the eventuality is no longer relevant at the previously established perspective time. Both -*ako*- and -*akəd*- mark relative and not absolute tense, a satisfying result given that the semantics of aspect in Baḍiaranke, and its consequent mapping to tense, is such that aspect alone can usually position an eventuality with respect to utterance time. In the few cases where aspect marking alone yields temporal ambiguity – e.g. in perfectives of statives, periphrastic progressives, and periphrastic habituals – -*ako*- and -*akəd*- disambiguate by forcing a (relative) past interpretation.

I have argued that one presupposition and three implicatures, together with one difference between embedded clause types, can account for the temporal contribution of both -*ako*- and -*akəd*-. These semantic ingredients are summarized in (108).

(108)   Semantic and pragmatic ingredients for temporal interpretation in Badiaranke:

- Presupposition and implicature of past tense marking:
  - Presupposition: Perspective time for the clause precedes the previously established perspective time.
  - Implicature (the "anti-perfect implicature"): The eventuality described is no longer relevant at the previously established perspective time.
- Two implicatures of the absence of past tense marking:
  - Implicature 1: The presupposition of past tense marking is false (cf. Sauerland 2002).
  - Implicature 2 (the "perfect implicature"): The eventuality is still relevant at the previously established perspective time.
- Binders for perspective times:
  - Perspective time in complement clauses can only be bound by the matrix eventuality time.
  - Perspective time in relative clauses can be bound by the matrix eventuality time or by utterance time.

The differences between Badiaranke and English sequence of tense semantics, discussed in §5.3.2, can now be seen to stem from two factors. First, English past and present tense lack the perfect and anti-perfect implicatures that arise from absence and presence of past tense marking in Badiaranke; and second, English tense preferentially takes utterance time as its binder while Badiaranke tense takes the current perspective time, which may be in the past or present of utterance time.

I have not yet fully addressed the question of whether -*ako*- and -*akəd*- themselves contribute realis and irrealis semantics, or whether the two suffixes are simply semantically identical allomorphs whose choice is triggered by the clause's realis or irrealis status. The data and analysis in this chapter favor the latter view. The two suffixes appear in complementary distribution, and the form of the past tense suffix can be predicted entirely by the semantics of the surrounding clause. It therefore seems preferable to treat both of the suffixes as *discontinuous past* markers, in the terminology of Plungian and van der Auwera (2006), with the phonetic form being determined by the semantics of the surrounding clause.

Chapter 6

Modal verbs and aspect

6.1 Introduction

In chapters 3 and 4, I argued that aspect in Badiaranke has a strong modal component to its semantics. Badiaranke also has two modal verbs, the possibility modal *mǝn-* and the necessity modal *tʃoːm-(ǝd-)*.[1] Both modals are generally marked for aspect, raising the question of how the modality inherent in aspect interacts with that of the modal verb itself. Specifically, this chapter will address and resolve the following questions.

1. Do modal verbs, which are arguably stative, behave aspectually like other stative verbs? If not, in what ways do they differ and why?

2. How does the choice of aspect on modals affect the modal semantics, and why? Most interestingly, we will see that aspect on the modal itself appears to have no effect for the interpretation of epistemic modals, but to have an "actuality entailment"-like effect on deontics; what accounts for these facts?

3. How does the choice of aspect on the modal's complement affect modal semantics, and why? How does this effect reflect upon the analysis of aspect in Chapter 3?

4. What role does tense play in the modal semantics of a given sentence?

Having answered these questions, we will consider how Badiaranke modals – *mǝn-* in particular – support or challenge what has been claimed in the literature about modality in other languages.

Like English modals, Badiaranke modals can express a wide range of modality types. In this chapter, I investigate a few kinds of modality in depth, focusing on epistemic, metaphysical, deontic, and dynamic (ability) modality, rather than superficially surveying all kinds

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[1]While it may have made a semantic contribution historically, synchronically addition or omission of *-d-* to *tʃoːm-* appears to make no semantic difference. There are, however, morphosyntactic constraints, with certain aspect/polarity combinations allowing the suffix and some forbidding it.

(including, for instance, bouletic, teleological, and stereotypical modality). I also devote more attention to possibility than to necessity, both in order to abstract away from (possibly superficial) morphosyntactic differences between the modals (see §6.5 below), and because I want to avoid making unsupported claims about the necessity modal, which I have not yet fully investigated.

While this chapter focuses on modal *verbs*, it is worth mentioning that Badiaranke has additional ways of expressing modality. We have already seen that a kind of epistemic necessity can be expressed with the general imperfective; this option may obviate the need for epistemic uses of the necessity modal.[2] Similarly, counterfactuals involving metaphysical necessity, such as those discussed in Chapter 5 above, do not require a necessity modal, as imperfective marking of the consequent is sufficient to do the job. The language also has other ways of expressing deontic necessity, notably with the complementizer *afo* followed by a subjunctive form, as in (1)-(2).

(1)   bar nĩ baːdĩ   sẽ   raː- re-   bɔ̃   wuttə- r-   eːn-   a   mə-
     but if relatives DET go- NEG.PERF- 3pl.NEG meet- RECIP- INSTR- IRR NARR-
     parə- bɔ̃, kaː   mənə ma-   jak- a, **afo** *ma-*   *baːn- aːs- oː.*
     refuse- 3pl. NEG.IMPF.3sg. POSSIB 3sg.SBJ- be- IRR <u>NEC</u> 3sg.SBJ- put- REP- PASS
     'But if the relatives end up not being able to come to an agreement and refuse, it can't happen, **it [what belongs to the deceased person] has to** *be put back.*' (4.71, #1, 'what happens when someone dies' text #2)

(2)   **afo** mbɔ̃   fanã *bo-*   *ri- a* **feːre**,   bidʒadə   bẽ be-
     <u>NEC</u> 1pl.INDEP also 1pl.SBJ- do- IRR attempt Badiaranke.people DET 3pl.SBJ-
     kab- oː.
     know- PASS
     'It was necessary that us too, **we should** *make an effort/find a way* that the Badiaranke people too should be known.' (8.20, #1, codification festival text)

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[2]Although I have yet to conduct extensive elicitation on the epistemic function of necessity *tʃoːm-*, the data in (i) suggest that such a reading is possible.

(i)   bi- jaːra mə-   jimə- bɔ̃,   pudõ   **tʃoːməd- ɔ̃**   *dʒitt- a pattio wuli* birĩ ka-
     PL- other NARR- say- 3pl.PERF next.year NEC-   3sg.PERF get- IRR year   1000 since INF-
     sĩtʃaŋ- o-   jã   premier ŋka rẽ   piːsər- a   wẽ ŋka rẽ   ŋan-
     found- PASS- 3sg.NSBJ first   and come.3sg.PERF split.up- IRR DET and come.3sg.PERF arise-
     ndaːn- aːs- o   nĩ peːr dabbə- r-   aːn-   õ   pudõ   mpə-   dʒitt-
     CAUS- REP- PASS if all   add-   RECIP- CAUS- PASS.3sg.PERF next.year 3sg.IMPF- get-
     akəde   wũ.
     PAST.IRR.NPERF DET

     'Others say, next year **it [Paroumba] should** *become 1000 years old* from its first settlement and the departure of its first settlers and its rebuilding, if it's all added together, next year it would be that old.' (2.143, #1, history of Paroumba)

In addition, the subjunctive/hortative, discussed above in §4.2, can express bouletic (wishes) and teleological (goal-oriented) modality; the same construction, in the guise of NM2, can express a kind of stereotypical modality. The available data suggest that both *mən-* and *tʃoːm-* can also express these sorts of modality, which, however, I leave aside in the present chapter.

In the discussion below, I use the term *prejacent* to designate the complement to the modal expression, following von Fintel and Gillies (2005) and von Fintel and Iatridou (2008), among others. In (3), for instance, the modal expression is *ka: mənə ma-jak-a* and the prejacent is *bẽ-datta: de*.

(3) **ka:**   **mənə ma-**   **jak- a**   <u>*bẽ-*</u>   *datta: de.*
   NEG.IMPF.3sg. POSSIB 3sg.SBJ- be-   IRR <u>3pl.IMPF-</u> sleep AFF.DECL

$$\underbrace{}_{\text{MODAL EXPRESSION}} \quad \underbrace{}_{\text{PREJACENT}}$$

'**It's not possible** *they'll be asleep* (later).' (8.76, #1, elicitation)

Throughout the chapter, I bold modal expressions and italicize prejacents, as in (3), underlining the subject agreement morpheme when aspectual choice is at issue or other critical morphemes when they are at issue.[3]

6.2   Modal verbs: The data

Although I will be focusing on *mən-*, in this section I lay out basic information about both of Badiaranke's modal verbs, for the sake of completeness.

The *mən-* modal expresses possibility, i.e. *existential* quantification over worlds; it can be used to express at least epistemic, metaphysical, deontic, dynamic, and stereotypical possibility. The verb *tʃoːm(əd)-*, meanwhile, expresses necessity, i.e. *universal* quantification over worlds; it can definitely express deontic and epistemic necessity, while further research is needed to confirm its ability to express other kinds of modality.

Both modals are truly verbal (unlike the aforementioned *afo*); morphosyntactically, they behave very similarly to other, non-modal verbs in the language. This description is especially true for *mən-*, which can bear all the same aspectual, tense, and negation morphology as other verbs. Certain aspects, however, allow only a dynamic (ability) reading for the modal; these aspects are incompatible with *tʃoːm(əd)-*, for which there is no comparable dynamic reading.

(4)-(13) illustrate the wide range of TAM combinations that are acceptable on the possibility modal, *mən-*.

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[3]In general, I consider post-modal auxiliaries to be part of the modal expression, although in cases where there is no other prejacent verb, as in (6)-(7) and (10) below, I treat the 'be' or 'happen' verb itself as the prejacent.

(4) **mən-** **ə̰̃** **de** **ma-** **jak-** **a** *datt-* *ã̰* *de.*
POSSIB- 3sg.PERF AFF.DECL 3sg.SBJ- be- IRR sleep- 3sg.PERF AFF.DECL

'**It's possible** *he's asleep.*' (8.75, #1, elicitation)

<div align="right">PERFECTIVE</div>

(5) Amerik nõ wusia **mən-** **t-** **a** *ma-* *tʃifəd-* *a* *tʃaːfe* *maːe.*
America TOP man POSSIB- <u>NEG.PERF-</u> <u>3sg.NEG</u> 3sg.SBJ- marry- IRR woman two

'Now in America, a man **can't** *marry two women.*' (8.53, #1, elicitation)

<div align="right">NEGATIVE PERFECTIVE</div>

(6) **mpə-** **mən** **(de)** *ma-* *jak-* *a* *(de).*
<u>3sg.IMPF-</u> POSSIB AFF.DECL 3sg.SBJ- be- IRR AFF.DECL

'**It's possible/it could** *be.*' (8.9, #2, elicitation)

<div align="right">IMPERFECTIVE</div>

(7) <u>**kaː**</u> **mənə** *ma-* *jak-* *a.*
NEG.IMPF.3sg. POSSIB 3sg.SBJ- be- IRR

'**It's not/won't be possible** *for that to be the case.*' (8.78, #1, elicitation)

<div align="right">NEGATIVE IMPERFECTIVE</div>

(8) **ka-** **mən-** **e** **k-** **ə̰̃** *ka-* *doːkuŋ-* *e.*
INF- POSSIB- INF be- 3sg.PROG INF- work- INF

'(S/he wasn't able to work before, but) **s/he's becoming able** *to work.*'
(Felicitous if spoken about a child or a person who's been sick.) (8.73, #1, elicitation)

<div align="right">PERIPHRASTIC PROGRESSIVE</div>

(9) **ka-** **r-** **a** **ka-** **mən-** **e** *ka-* *karaŋ-* *e.*
be- NEG.PERF- 3sg.NEG INF- POSSIB- INF INF- study- INF

'**S/he's not currently able** *to study.*' (…but s/he hasn't abandoned his/her studies altogether.) (8.74, #1, elicitation)

<div align="right">NEGATIVE PERIPHRASTIC PROGRESSIVE</div>

(10) **a-** **pə-** **mənə** **de** *ma-* *jak-* *a* *(koina).*
3sg.HABIT- <u>IMPF-</u> POSSIB AFF.DECL 3sg.SBJ- be- IRR that.way

'**It can** *happen* (that way).' (8.80, #1, elicitation)

<div align="right">PERIPHRASTIC HABITUAL</div>

(11) <u>**kaː**</u> **pə-** **mənə** *ma-* *jak-* *a.*
NEG.IMPF.3sg. <u>IMPF-</u> POSSIB 3sg.SBJ- be- IRR

'**It's not (ever) possible** *for that to happen.*' (8.74, #1, elicitation)

(12) wũ   i   te-   raːr be- madaːke   mã, pur   bə-   pərək-
DEM COP REL.IMPF- guard PL- circumcised.ones DET so.that NMLZ.PL- ruin-

aː-   n-   a   bẽ   **nte**   **be-** **mən-** **a** be-   pərək-
DETRANS- CAUS- IRR DET <u>NEG.IMPER</u> <u>3pl.SBJ-</u> POSSIB- <u>IRR</u> 3pl.SBJ- ruin-

aː-   n-   a   fe sappe kujã.
DETRANS- CAUS- IRR P side   circumcision

'It's him (the *kãkurã*) that protects the circumcised ones, so that those who would harm them **will not be able** *to ruin* anything related to the circumcision.' (7.13, #1, *kãkurã* text)

(13) tʃoːməd- ə̃̀   **mən-** **a** ka- jak- e   de.
should- 3sg. POSSIB- <u>IRR</u> INF- be- INF AFF.DECL

'It should **be able** *to be the case*', or 'S/he should **be able** *to be X*.' (8.50, #1, elicitation)

Unlike *mən-*, *tʃoːm(əd)-* can take some, but not all, of these aspects. In particular, *tʃoːm(əd)-* is ungrammatical with the periphrastic progressive (affirmative or negative) ((18)-(19)) and only borders on grammaticality with the periphrastic habitual ((20)-(21)).

(14) **tʃoːməd- ə̰̃̀**   *karaŋ- a* **de.**
NEC-   <u>3sg.PERF</u> study- IRR AFF.DECL

'**S/he should** *study*.' (8.48, #1, elicitation)

(15) **tʃoːmədə- r-**   **a**   *ka- karaŋ- e.*
NEC-   <u>NEG.PERF-</u> <u>3sg.NEG</u> INF- study- INF

'**S/he shouldn't** *study*.' (8.48, #1, elicitation)

(16) **mpə-**   **tʃoːmə** *jak- a* **de.**
<u>3sg.IMPF-</u> NEC   be- IRR AFF.DECL

'**It should/must/has to/will have to** *be*.' (8.48, #1, elicitation)

(17) **<u>kaː</u>**   **tʃoːmə** *karaŋ- a.*
<u>NEG.IMPF.3sg.</u> NEC   study- IRR

'**S/he doesn't/won't have to** *study*.' (8.78, #1, elicitation)

(18) *ka- tʃoːm(əd)- e   k- ə̃   *karaŋ- a.*
       INF- NEC-   INF be- 3sg.PROG study- IRR
       Intended: '**S/he currently should** *be studying.*' (8.77, #1, elicitation)

(19) *ka- r-   a   ka- tʃoːm(əd)- e *karaŋ- a.*
       be- NEG.PERF- 3sg.NEG INF- NEC-   INF study- IRR
       Intended: '**S/he doesn't currently have to** *study.*' (8.78, #1, elicitation)

(20) ? (siɲito)   **a-   pə- tʃoːmə(*də)** *jak- a*   **de.**
       sometimes 3sg.HABIT- <u>IMPF</u>- NEC   be- IRR AFF.DECL
       Intended: '**It has to/should** *be the case* (habitually).' (8.78, #1, elicitation)

(21) ? <u>**kaː**</u>   **pə- tʃoːmə(də)** *karaŋ- a.*
       <u>NEG.IMPF.3sg.</u> <u>IMPF</u>- NEC   study- IRR
       Intended: '**S/he doesn't have to** *study* (habitually).' (8.78, #1, elicitation)

(22) <u>**kaː**</u>   **pə- tʃoːmə(də)** *jak- a.*
       <u>NEG.IMPF.3sg.</u> <u>IMPF</u>- should   be- IRR
       '**It doesn't have to** *be the case*', or '**It shouldn't** *be the case* (in general).'[4] (8.78, #1, elicitation)

(23) mpə-   mən de   **<u>ma-</u> tʃoːm- <u>a</u>** *karaŋ- a.*
       3sg.IMPF- POSSIB AFF.DECL <u>3sg.SBJ</u>- NEC- <u>IRR</u> study- IRR
       'It could be **s/he'll have to** *study.*'[5] (8.48, #1, elicitation)

Both modals, then, are truly verbal: they are fully inflected and accept all (or most) of the aspectual, temporal, and modal morphology that Badiaranke offers. Although I will, as promised, focus here primarily on *mən-*, I expect my conclusions to turn out, upon future research, to apply to *tʃoːm(əd)-* as well.

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[4]The scope of negation is not clear here.

[5]The consultant accepted this sentence, but he preferred to eliminate one of the modals.

6.3 The temporal interpretation of modals

Like aspect on the analysis in Chapter 3, modality involves two reference times. The reference time of the modal itself – the time that determines what Condoravdi (2002) calls *perspective*, and which I refer to simply as *perspective time* – is the time *from* which the speaker evaluates possibility, necessity, etc. of whatever sort (deontic, epistemic, etc.). The reference time of the eventuality description that the modal scopes over – which is what Condoravdi calls *time of evaluation*, and which determines what she calls the *orientation* – is the time *at* which the eventuality in the proposition over which the modal scopes may/must/should/etc. be realized. We will see that this second reference time, which determines orientation, corresponds to evaluation time for aspect, and in fact is identical to the evaluation time for the prejacent, when that prejacent is aspectually marked. Let us first consider what determines perspective time for Badiaranke modals, turning to evaluation time and orientation in §6.3.2.

6.3.1 Perspective time

In English, modal perspective time is taken to be the present moment unless shifted into the past with *have*, in what Condoravdi (2002) calls "modals for the past." Thus (24)-(27) take the perspective of TU, while (28) and (29) take the perspective of some time in the past; the possibility that held at that past time no longer holds at TU.

(24) Dumbledore might be in his office (now/tomorrow morning/*yesterday).

Present perspective, present or future orientation (epistemic)

(25) Hufflepuff might win the Quidditch Cup (#now/next year/*last year).[6]

Present perspective, future orientation (epistemic/metaphysical)

(26) Neville might have lost his frog again, but I'm not sure.

Present perspective, past orientation (epistemic)

(27) Mrs. Norris might have been hiding in the owlery, but Hermione didn't spot her.

Present perspective, past orientation (epistemic)

(28) Cedric might have won the Triwizard Tournament if Voldemort hadn't killed him.

Past perspective, future orientation (metaphysical)

(29) The Minister of Magic should have followed Harry's advice (but he didn't).

Past perspective, future orientation (deontic)

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[6] *Now* is grammatical here but yields an immediate future reading, not the present reading it is intended to draw out.

As in English, present perspective time in Badiaranke is unmarked.[7] With a present perspective time and an imperfective-marked prejacent, as in (30), it is difficult to distinguish between an epistemic and a metaphysical reading (cf. Condoravdi 2002:61): times in the future of perspective time are both metaphysically *unsettled* (Kaufmann *et al.* 2006) and epistemically uncertain.

(30) **kaː**   **mənə ma-**   **jak- a**   *bẽ-*   *dattaː de.*
NEG.IMPF.3sg. POSSIB 3sg.SBJ- be- IRR <u>3pl.IMPF-</u> sleep AFF.DECL

'**It's not possible** *they'll be asleep* (later).' (8.76, #1, elicitation)

<div align="right">EPISTEMIC/METAPHYSICAL</div>

With a perfective-marked prejacent, however, only an epistemic reading is available, as in (31).

(31) **mən- ə̃**   **de**   **ma-**   **səm- a** *karaŋə- bə̃*   *de.*
POSSIB- 3sg.PERF AFF.DECL 3sg.SBJ- happen- IRR study- <u>3pl.PERF</u> AFF.DECL

'**It's possible** *they studied.*' (8.77, #1, elicitation)

<div align="right">EPISTEMIC</div>

As was discussed in detail in Chapter 5, perspective time for a modal clause can be shifted into the past using the irrealis past suffix -*akəd*-. Past-shifting of perspective time is particularly common with metaphysical and deontic modals, yielding a counterfactual reading for both. In (32), the speaker takes the perspective of some point in the past at which it was still possible that the actual (base) world would turn out to be one in which certain individuals studied; by the time of utterance, however, that possibility has been ruled out.[8]

(32) **mpə-**   **mənə ma-**   **jak- a** *bẽ-*   *karaŋ- akəde*   *de.*
3sg.IMPF- POSSIB 3sg.SBJ- be- IRR 3pl.IMPF- study- <u>PAST.IRR.NPERF</u> AFF.DECL

'**They could have** *studied* (but they didn't).' (8.87, #1, elicitation)

<div align="right">METAPHYSICAL COUNTERFACTUAL</div>

In (32), -*akəd*- appears on the prejacent; it can also appear on the modal itself, with the same effect, as in (33).

(33) peːs   **bẽ-**   **mən-**   <u>**akəde**</u>   *ka- karaŋ- e de*   bari
last.year 3pl.IMPF- POSSIB- <u>PAST.IRR.NPERF</u> INF- study- INF AFF.DECL but
karaŋə- re-   bə̃.
study- NEG.PERF- 3pl.NEG

'Last year **they could have** *studied,* but they didn't.' (8.88, #1, elicitation)

<div align="right">METAPHYSICAL COUNTERFACTUAL</div>

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[7]In my discussion of Badiaranke modals, "past," "present," and "future" perspective time and evaluation time should be taken to refer to *relative* pasts, presents, etc., as is the case with non-modal clauses.

[8]As mentioned in Chapter 3, additional research is needed to determine whether this counterfactuality is an entailment or merely – as has been argued for English (Anderson 1951) – a strong implicature.

Similarly, (34), with *-akəd-* on the modal, and (35), with *-akəd-* on the prejacent, express obligations that (according to the speaker) the addressee was under at a past time, but failed to fulfill. At the time of utterance, the obligation no longer holds.

(34) **tʃoːm-** **akədo-** **i** *dãt- i-* *ã* *de* bari wu- sãpə-
    NEC- <u>PAST.PERF-</u> 2sg.PERF say- BEN- 3sg.NSBJ AFF.DECL but NMLZ.SG- pass-
    se   i.
    REL.PERF COP

    '**You should have** *told him*, but it's too late for that now.' (8.31, #1, elicitation)

<div align="right">DEONTIC COUNTERFACTUAL</div>

(35) **tʃoːmədə-** **re-** **ni** *seːt-* <u>*akəde*</u> *weː.*
    NEC-   NEG.PERF- 2sg.NEG speak- PAST.IRR.NPERF 3sg.INDEP

    '**You shouldn't** *have said that.*' (8.46, #1, elicitation)

<div align="right">DEONTIC COUNTERFACTUAL</div>

(32)-(35) show that *-akəd-* shifts perspective time for the modal itself, not just for the eventuality described in the prejacent. That is, tense scopes over the modal, even when morphologically it is attached to the prejacent. This pattern is consistent with what we observed about *-akəd-* in Chapter 5.

The minimal pair in (36) further confirms that *-akəd-* past-shifts perspective time, without having any impact on orientation. The modals in both (36a) and (36b) are future-oriented, but (36a), without *-akəd-*, takes present perspective, while (36b), with *-akəd-*, takes the perspective of some past time. (36b) means that although the potential studying would have happened in the future of utterance time, the time when it still seemed possible – i.e. the perspective time – is in the past.

(36) a. pudõ **mpə-** **mən de** **ma-** **jak- a** *bẽ-* *karaŋə*
        next.year 3sg.IMPF- POSSIB AFF.DECL 3sg.SBJ- be- IRR 3pl.IMPF- study
        de.
        AFF.DECL

        '**It's possible** *they'll study next year.*' (8.87, #1, elicitation)

<div align="right">EPISTEMIC/METAPHYSICAL</div>

    b. pudõ **mpə-** **mən de** **ma-** **jak-** <u>**akəde**</u>
        next.year 3sg.IMPF- POSSIB AFF.DECL 3sg.SBJ- be- <u>PAST.IRR.NPERF</u>
        bẽ- *karaŋə de* (bari kebe   *karaŋə*).
        3pl.IMPF- study AFF.DECL but NEG.IMPF.3pl. study

        '**It could have been the case that** *they would study* next year (but they won't).' (8.87, #1, elicitation)

<div align="right">METAPHYSICAL COUNTERFACTUAL</div>

Note that all the sentences we have seen with past perspective time involve future orientation. For past-oriented modals, there is rarely a need to past-shift perspective time, since an evaluation time in the past of a past perspective time is also in the past of a present perspective time.[9] Indeed, the past-oriented epistemic modal in (37) is ungrammatical with -akəd-:

(37)　*mən-　ə̃　　ma-　jak- <u>akəde</u>　　　(de)　　karaŋə- bə̃
　　　　POSSIB- 3sg.PERF 3sg.SBJ- be- <u>PAST.IRR.NPERF</u> AFF.DECL study- 3pl.PERF
　　　　(de).
　　　　AFF.DECL
　　　　Intended: '**It's possible** *they studied.*'

Formally speaking, (37) is problematic because, as argued in Chapter 5, -akəd- is limited to environments where tense scopes over a modal element, while epistemic modals are said to scope over tense (Hacquard 2006). More intuitively, the problem is that epistemic modals are, as argued by Condoravdi (2002:62-3), incompatible with past perspective: they make a claim based on the attitude holder's knowledge at the present moment.[10]

In (37), the epistemic reading is forced by the perfective-marked prejacent, which establishes a past orientation. In the next subsection, we will investigate why aspect on the prejacent determines modal orientation and thereby restricts the possible modal readings.

6.3.2　Orientation

Recall that modal orientation simply captures the relationship of evaluation time to perspective time. If evaluation time precedes perspective time, the result is past orientation; if evaluation time and perspective time overlap, we get a present orientation; and if evaluation time follows perspective time, a future orientation results.

Modals (or modal readings) are commonly divided into two classes. Non-root modals, which can be subdivided into epistemic and metaphysical modals, "report the speaker's modal judgment relative to the truth-value of the modal propositional complement" (Demirdache and Uribe-Etxebarria 2008): that is, they indicate the speaker's (or attitude holder's) willingness to vouch for the truth of the proposition.[11] Root modals, which include deontic

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[9]See Condoravdi (2002:63) on the absence of modals with a past perspective and past orientation in English.

[10]Kai von Fintel (p.c.) speculates that past epistemics are, in fact, possible, at least in English. He proposes a scenario in which person A is searching for her keys and opens a kitchen drawer, but finds the drawer empty. Person B asks, "Why did you open the drawer?" Person A responds, "The keys could have been in there." In her response, A assumes the perspective of her past self, at the moment before she opened the drawer – a time when (unlike now) it still seemed possible to her that the keys might be in there. Additional research is needed to see if past epistemics are really possible in Badiaranke, and if so, whether they involve -akəd-. My analysis in Chapter 5 predicts that if they do exist, they should *not* take -akəd- (at least when perfective-marked), due to the scopal restriction of that past suffix. If they take any past marking at all, it should be in the form of -ako-, although it is quite possible that they will take no tense marking at all, with perspective time set only by context.

[11]Eide (2005:6) reports that many Germanic root modals also have a third, "evidential" reading.

and ability modals, involve a circumstantial modal base (Hacquard 2006:24); they qualify the proposition, rather than the sentence as a whole, in terms of the necessity or possibility that the eventuality described will come true (Zagona 2008:276). For deontic modals, the issue is whether an agent is permitted or obligated to carry out the action; for dynamic modals, the question is whether the agent is capable of doing so.

In Badiaranke, as in many languages, root and non-root modals are morphosyntactically distinct. Deontic and ability *mən-* can take either subjunctive-marked or infinitival complements, as in (38)-(39), but their complements are never marked for aspect.[12]

(38)   **bẽ-**   **mən**   **de**   bə-   karaŋ- a   bẽ   *be-*   *jetʃ-*   *ã*
       3pl.IMPF- POSSIB AFF.DECL NMLZ.PL- study- IRR DET 3pl.SBJ- hear- 3sg.NSBJ

       walla bə-   doːkuŋ- a   bẽ   *be-*   *jetʃ-*   *ã,*   walla bə-   sãd- a
       or   NMLZ.PL- work- IRR DET 3pl.SBJ- hear- 3sg.NSBJ or   NMLZ.PL- seek- IRR

       kũkabə   fe koneː kãdʒadəkũda   fanã *be-*   *jetʃ-*   *ã.*
       knowledge P within Badiaranke.culture also 3pl.SBJ- hear- 3sg.NSBJ

       'Students **can** *listen to it*, or workers (i.e. linguists) **can** *listen to it*, or seekers of knowledge about the Badiaranke also **can** *listen to it*.' (7.114, #1, audio records release)

(39)   maː   **keː**   **mən-**   **ã**   *ka-*   *tʃab-*   *e.*
       QUOT NEG.IMPF.2sg. POSSIB- 3sg.NSBJ INF- hold- INF

       'He said, "**You won't be able to catch him**."' (9.12, #7, magic and the supernatural text)

Root modals are inherently future-oriented: one cannot impose a retroactive obligation or permission (though one may take the *perspective* of a past time in the future of which the required or permitted action was to be fulfilled). Nor, barring time travel, can one have the ability to go back and perform an action in the past.

Unlike root modals, Badiaranke non-root modals require aspect marking on the prejacent. This aspect marking is what determines modal orientation, as shown in (40).

(40)   a.   **kaː**   **mənə ma-**   **jak- a**   *dattaː-* <u>*bə̃*</u>   *de.*
             NEG.IMPF.3sg. POSSIB 3sg.SBJ- be- IRR sleep- <u>3pl.PERF</u> AFF.DECL

          '**It's not possible** *they are asleep* (now).'/ '**It's not possible** *they were asleep* (then).' (8.76, #1, elicitation)

                                       Present/past orientation; epistemic only

     b.   **kaː**   **mənə ma-**   **jak- a**   <u>*bẽ-*</u>   *dattaː de.*
             NEG.IMPF.3sg. POSSIB 3sg.SBJ- be- IRR <u>3pl.IMPF-</u> sleep AFF.DECL

          '**It's not possible** *they'll be asleep* (later).' (8.76, #1, elicitation)

                                 Future orientation; metaphysical/epistemic

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[12]The other modal verb, *tʃoːməd-*, takes irrealis-marked or infinitival complements; see §6.5.

Both (40a) and (40b) contain a possibility modal, which here bears negative imperfective aspect (though we will see in §6.3.3 that aspect marking on the modal is immaterial); a subjunctive-marked auxiliary, here the copula *jak-*; and, in the prejacent, a stative main verb. The only morphosyntactic difference is aspect on the prejacent: (40a), with perfective marking on the prejacent, can be interpreted as either past-oriented or present-oriented (the conceivable sleeping state may hold before or at perspective time), while (40b), with imperfective marking on the prejacent, is future-oriented (the time spanned by the conceivable sleeping state follows perspective time).

When the prejacent is eventive, the situation is slightly different: perfective marking on the prejacent allows only a past orientation. (41), for instance, can only mean 'It's possible they studied', and not 'It's possible they are studying.'

(41) **mən- ə̃ ma- səm- a** *karaŋə-* <u>*b*ə̃</u> *de.*
POSSIB- 3sg.PERF 3sg.SBJ- arrive- IRR study- <u>3pl.PERF</u> AFF.DECL

  '**It's possible** *they studied.*' (8.77, #1, elicitation)

<div align="right">Past orientation; epistemic only</div>

(42) shows that just like stative prejacents, eventive prejacents with imperfective marking yield a future orientation.

(42) **mən- ə̃ ma- jak- akəde de** <u>*b*ẽ-</u> *karaŋə*
POSSIB- 3sg.PERF 3sg.SBJ- be- PAST.IRR.NPERF AFF.DECL <u>3pl.IMPF-</u> study
de.
AFF.DECL

  '**They could have** *studied* (but they didn't).' (8.77, #1, elicitation)

<div align="right">Future orientation; metaphysical counterfactual</div>

Metaphysical modality, like deontic modality, is inherently future-oriented: by definition, metaphysical alternatives can only be distinguished at times in the future of perspective time. Since future orientation for non-root modals requires imperfective aspect on the prejacent, a metaphysical reading is only available with an imperfective-marked prejacent, as in (40b) and (42) above, and not with a perfective-marked prejacent, as in (40a) and (41) above. Put differently, a modal expression with a perfective-marked prejacent can only receive an epistemic reading.[13]

In §6.4, I will argue that the analysis of aspect given in Chapter 3 correctly predicts the effect of prejacent aspect on modal orientation. First, however, we must consider the effect (or lack thereof) of aspect marking on the modal itself.

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[13] For simplicity, I restrict my discussion here to perfective- and imperfective-marked prejacents, but non-root modals can also take prejacents with the periphrastic progressive ((i)-(ii)), and presumably with other aspects as well.

(i) **mpə- mənə** *be- jak- a ka- karaŋ- e.*
3sg.IMPF- POSSIB 3pl.SBJ- be- IRR INF- study- INF

  '**They could** *be studying.*' (8.90, #1, elicitation)

6.3.3 Aspect on the modal

A priori, one would expect Badiaranke modals to behave like any other stative verb with respect to aspect: they express *states* of possibility or necessity, they can be true at a moment, and so on. If so, perfective on a modal verb should express present or past possibility or necessity, while imperfective on the modal should express future (or, conceivably, developing or recurring) possibility or necessity. This prediction, however, is not always borne out. Let us look at the effect of aspect on non-root, deontic, and dynamic modals in turn.

For epistemic/metaphysical *mən-*, surprisingly, aspect on the modal makes no semantic difference whatsoever. The minimal pairs in (43)-(44) show that modal aspect affects neither orientation nor perspective time. In (43), perfective marking on a stative prejacent and the lack of past marking yield a present or past orientation and present perspective time, even though the modal takes perfective aspect in (43a) and imperfective aspect in (43b).

(43) a. **mən-** <u>ə̃</u> **de** **ma-** **jak- a** *dataː- <u>bə̃</u>* *de.*
POSSIB- <u>3sg.PERF</u> AFF.DECL 3sg.SBJ- be- IRR sleep- <u>3pl.PERF</u> AFF.DECL

'**It's possible** *they are/were asleep.*' (8.75, #1, elicitation)

b. <u>mpə-</u> **mənə de** **ma-** **jak- a** *dataː- <u>bə̃</u>* *de.*
<u>3sg.IMPF-</u> POSSIB AFF.DECL 3sg.SBJ- be- IRR sleep- <u>3pl.PERF</u> AFF.DECL

'**It's possible** *they are/were asleep.*' (8.76, #1, elicitation)

Similarly, in both (44a) and (44b), the combination of *-akəd-* and imperfective marking on the prejacent yields past perspective and future orientation, despite the use of perfective on the modal in (44a) and imperfective on the modal in (44b).

(44) a. **mən-** <u>ə̃</u> **ma-** **jak- <u>akəde</u>** **de** <u>bẽ-</u> *karaŋə*
POSSIB- <u>3sg.PERF</u> 3sg.SBJ- be- <u>PAST.IRR.NPERF</u> AFF.DECL <u>3pl.IMPF-</u> study

de.
AFF.DECL

'They **could have** *studied* (but they didn't).' (8.87, #1, elicitation)

b. <u>mpə-</u> **mənə ma-** **jak- a** <u>bẽ-</u> *karaŋ- <u>akəde</u>*
<u>3sg.IMPF-</u> POSSIB 3sg.SBJ- be- IRR <u>3pl.IMPF-</u> study- <u>PAST.IRR.NPERF</u>

de.
AFF.DECL

'They **could have** *studied* (but they didn't).' (8.87, #1, elicitation)

In contrast, choice of aspect on the modal *does* make a semantic difference for deontic *mən-*. Imperfective aspect on the deontic possibility modal yields a pure deontic reading, expressing permission, as shown in (45a). Perfective marking on deontic *mən-*, however, disallows a pure deontic reading: (45b) not only expresses permission, but also presupposes

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(ii) peːs **mpə-** **mən de** **ma-** **jak- a** waina *ka- karaŋ- e* *kə- bə̃.*
last.year 3sg.IMPF- POSSIB AFF.DECL 3sg.SBJ- be- IRR at.that.time INF- study- INF be- 3pl.PROG

'**It's possible that** last year *they were studying.*' (8.90, #1, elicitation)

that the subject is in fact *able* to carry out the action described. Thus, while (45a) is interpreted as reporting a law forbidding polygamy, (45b) suggests that the men in question cannot marry more than woman at least in part because they do not have the means to do so.[14]

(45) a. (wusia woː) *tʃaːfe*   *pakkã (lõ)* **kə-**   **mənə** *ka-* *tʃifəd-* *e.*
          man   all   woman one   only <u>2sg.IMPF-</u> POSSIB INF- marry- INF

              'Each man **is allowed** *to marry one woman.*' (8,53, #1, elicitation)

  b. wusia woː *tʃaːfe*   *pakkã* **mən-** **iː**   *ka-* *tʃifəd-* *e.*
          man   all   woman one   POSSIB- <u>2sg.PERF</u> INF- marry- INF

              'Each man **can (and has the means to)** *marry one woman.*' (8,53, #1, elicitation)

This ability presupposition is reminiscent of, but distinct from, the "actuality entailment" observed by Hacquard (2006) and Bhatt (1999) for goal-oriented and ability modals in Romance and Hindi (see §2.3.2.1 above).

    Along similar lines, (46a) is a perfectly reasonable injunction against smoking in some places, while (46b) is pragmatically odd: *mən-iː ka-rak-e*, with perfective marking on the modal, would be better used to express permission to someone who would like to smoke there and then than to talk about general permissibility.

(46) a. taːme kaː   *pə-* *dʒitt-* i   woː **kə-**   **mənə** *ka-* *rak-*   *e*
          now   NEG.3sg. LOC- get- <u>2sg.PERF</u> all 2sg.IMPF- POSSIB INF- smoke- INF
          de.
          AFF.DECL

          '. . . now it's not wherever you get the chance that **you can** *smoke.*' (8.54, #1, elicitation)

  b. ?? taːme kaː   *pə-* *dʒitt-* i   woː **mən-** **iː**   *ka-*
          now   NEG.IMPF.3sg. LOC- get- <u>2sg.PERF</u> all POSSIB- <u>2sg.PERF</u> INF-
          rak-   *e* **de**.
          smoke- INF AFF.DECL

          Intended: '. . . now it's not wherever you get the chance that **you can** *smoke.*' (8.54, #1, elicitation)

    On its ability reading, *mən-* behaves more transparently like an ordinary stative verb than it does on its epistemic and deontic readings. This fact is unsurprising, since on the dynamic reading, the modal expresses a normal physical or mental state, the state of being able to carry out a certain action (see Fielder (1990:195) and Zagona (2008:276) for similar

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[14]Strictly speaking, (45b) itself indicates only that the men in question are both permitted to marry one woman each and that they are able to do so. The "only one" reading indicated in the free translation was drawn out by the context of utterance – a comparison between polygamous Senegal and monogamous America – although it would arguably arise anyhow through a Q-implicature (due to the use of *tʃaːfe pakkã* 'one woman' instead of just *tʃaːfe* 'a woman').

observations about ability modals). Accordingly, the imperfective can be used on the modal to be talk about future abilities, as in (47)-(49) (while the periphrastic progressive can be used to talk about developing abilities, as in (50), and the periphrastic habitual can be used to talk about recurring abilities of individuals, as in (51), as well as abilities of generic subjects, as in (52)).

(47)   Aliu nĩ   datʃ-   ĩ,   **mpə-**   mənə *ka-* *kərə-* *ndaːn-* *e*   *woto*
     Aliu when grow.up- 3sg.PERF 3sg.IMPF- POSSIB INF- run- CAUS- INF car
     de.
     AFF.DECL
     'When Aliu grows up, **he will be able** *to drive a car*.' (8.9, #2 ,elicitation)

(48)   maː   **keː**   **mən-**   **ã**   *ka-* *tʃab-* *e*.
     QUOT NEG.IMPF.2sg. POSSIB- 3sg.NSBJ INF- hold- INF
     'He said, "**You won't be able** *to catch him*."' (Spoken by the spirit Tamba Dibi to the warrior Bamandala, who has refused to sacrifice his mother to the spirit as payment for capturing his enemy, Musaa Moolo.) (9.12, #7, magic and the supernatural text)

(49)   **mpə-**   mənə **de**   *ma-*   *datta-* *a*.
     3sg.IMPF- POSSIB AFF.DECL 3sg.SBJ- sleep- IRR
     '**S/he will be able** *to sleep*.' (8.75, #1, elicitation)

(50)   **ka-** **mən-** **e** **k-** **ə̃**   *ka-* *jaːs-* *e*.
     INF- POSSIB- INF be- 3sg.PROG INF- walk- INF
     '(S/he wasn't able to walk before, but) **s/he's becoming able** *to walk*.' (8.73, #1, elicitation) (progressive of stative)

(51)   siɲito   **a-**   **pə-** mənə **de**   *ma-*   *karaŋ-* *a*.
     sometimes 3sg.HABIT- IMPF- POSSIB AFF.DECL 3sg.SBJ- study- IRR
     'Sometimes **s/he can** *study*.' (8.74, #1, elicitation)
     (Possible context: the student has a disease that prevents him/her from studying at times.)

(52)   **kədə-** **bẽ**   **mən** **de**   *be-*   *dam-* *a*   *wunu*.
     HABIT- 3pl.HABIT POSSIB AFF.DECL 3pl.SBJ- kill- IRR person
     '**They** [**sorcerers**] **can** *kill a person*.' (6.89, #7, magic and the supernatural text)

At the same time, *mən-* can express a current ability (to do something in the future) with either perfective or imperfective marking. Both (53) and (54) express a current inability to sing; indeed, the sentences were spoken one after the other, with (54) repeating and emphasizing the message of (53).

(53) wũ   bẽ-   tʃimə wẽ nõ **mən-** **te-**   **mã**   wũ   ka- tʃim- e.
      DEM 3pl.IMPF- sing   DET TOP POSSIB- <u>NEG.PERF-</u> <u>1sg.NEG</u> DEM INF- sing- INF

'Now what they sing, **I can't** *sing that.*' (3.28, #1, marriage customs text)

(54) <u>**kam**</u>   **mənə** wũ   ka- tʃim- e.
      <u>NEG.IMPF.1sg.</u> POSSIB DEM INF- sing- INF

'**I can't** *sing that.*' (3.28, #1, marriage customs text)

Table 6.1 summarizes the observations made in this section that need to be explained.

Table 6.1: Effects of aspect on modal interpretation

Modal flavor	Impact of aspect
Epistemic	Aspect on modal: No effect
	Aspect on prejacent: Determines orientation
Deontic	Ability presupposition with perfective; none with imperfective
Dynamic	Normal stative behavior

We will now see that these initially mysterious patterns are in fact predicted by the analysis of Badiaranke aspect given in Chapter 3.

6.4   Analysis

In this section, I will solve two puzzles: why aspect in the prejacent has the effect it does, and why aspect on the modal has the observed effects (or lack thereof) on both root and non-root modals. A straightforward composition, it turns out, explains the observations in §6.3, if we simply assume the analysis of perfective and imperfective aspect in Chapter 3. The modal data thus provide a welcome confirmation of my earlier treatment of aspect.

Ordinarily, and in the cases we have looked at, imperfective aspect in modal prejacents receives a futurate reading. This claim is supported by three observations: the fact that, as we saw in Chapter 3, Badiaranke imperfectives receive a futurate reading by default; the observed correlation between imperfective marking and future orientation; and the fact that progressive and habitual readings for the prejacent are expressed with the periphrastic aspects rather than with the general imperfective (see footnote 13 on page 215).

The analysis below also relies on several other well-motivated assumptions. First, I follow Kratzer (1981) in treating epistemic, deontic, and dynamic possibility (all expressed by *mən-* in Badiaranke) as in (55)-(57).

(55) Semantics of an epistemic possibility modal: In some of the best accessible worlds as selected by an <u>epistemic</u> modal base and some <u>non-empty</u> ordering source, the prejacent is true.

(56) Semantics of a deontic possibility modal: In some of the best accessible worlds as selected by a <u>circumstantial</u> modal base and a <u>deontic</u> ordering source, the prejacent eventuality is realized.

(57) Semantics of an ability modal: In some of the accessible worlds selected by a <u>circumstantial</u> modal base and an <u>empty</u> ordering source, the prejacent eventuality is realized.

Second, I assume that any eventuality that is realized in a metaphysical alternative to the base world w before perspective time is realized in w itself, by definition of metaphysical alternatives (see page 84 above). Third, I assume that non-root modals scope over aspect, while root modals scope under aspect, as argued by Stowell (2004) and Hacquard (2006), among others. In English, where the only aspect that can appear on modals is the perfect, this contrast can be seen by comparing (58) with (59).

(58)   A: Yesterday I had an appointment with Professor Jones. I went to her office at 2:00, but she was nowhere to be found.

   B: That's odd; (based on what I know about her schedule,) **she should have been on campus then**.

(59) (Professor reprimanding a student who skipped class because it was her birthday:) **You should have come to class yesterday**; you missed an important lecture.

In (58), with epistemic *should*, person B asserts that based on what he knows now, it is likely that at the past time of yesterday at 2:00, Professor Jones was on campus (Mod>Asp). In contrast, in (59), with deontic *should*, the speaker says that at the past time when class was held yesterday, the student was under an obligation to come to class (but that obligation is now moot) (Asp>Mod). With respect to Badiaranke, this scopal difference between epistemic and root modals will prove critical: those modals that scope over aspect are the ones apparently unaffected by choice of aspect on the modal, while those that scope under aspect are affected by aspectual choice.[15]

Finally, I follow Hacquard (2006) (who herself adapts a proposal of Percus (2000)) in her assumption that world variables, in parallel to pronouns or eventuality variables, must be bound by the most local world binder. All sentences are anchored to the context of utterance by a matrix world binder; modal expressions introduce an additional world binder, which binds world variables within its scope. Modals are formally represented as a *function* of a world introduced by a higher-up world binder (which may or may not be the matrix world binder, i.e. the actual world); the type of function depends on the modal force (universal vs. existential) and modal flavor (which determines the accessibility relation). VPs introduce both a world variable and an event variable; the former is bound by the most local world binder and the latter is existentially bound by aspect.

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[15]I will not attempt to explain here *why* different types of modals take different scopes with respect to aspect, but simply accept others' arguments in support of this premise. For one detailed account of why this difference exists, see Hacquard (2006).

Beyond those assumptions, my analysis of Badiaranke modals will build upon two previously established observations about aspect and modality in this language. First, we saw in Chapter 3 that aspect in Badiaranke has a modal component. Formally, this observation means that the perfective and imperfective aspects, like modals, introduce a world binder and quantify over worlds. In the case of the perfective, aspect indicates that the eventuality is realized in all the metaphysical alternatives to the world(s) introduced by the higher world binder (which in an isolated matrix clause, with no modals involved, will be the actual world); in the case of the imperfective, aspect indicates that the eventuality is realized in all the *best* alternatives to the worlds introduced by the higher world binder, but the accessibility relation will vary with context. Since, on this analysis, both modals and aspect introduce a world binder, we will see the following interaction between aspect and modals. When aspect scopes over a modal, the base world for the modal's purposes will be the (set of) worlds introduced by the higher aspect – i.e. it the modal's base world will be bound by the world binder introduced by aspect, and coindexed with the worlds that are output by the aspect function. When, in contrast, a modal element scopes over aspect, the base world as far as aspect is concerned will be the (set of) worlds introduced by the modal – i.e. it will be bound by the world binder introduced by the modal, and coindexed with the worlds that are output by the modal function. In other words, the world of evaluation for the modal and the world of evaluation for aspect will not be the same, but they will be interdependent.

The second observation to play a key role in the analysis is that in Badiaranke, unlike in languages like French, perfective-marked root modals do not carry an actuality entailment. This fact will force us to postulate a second, covert aspectual projection under the modal. At the same time, the analysis will account for the fact that perfective-marked deontics, unlike imperfective-marked deontics, do carry an ability presupposition.

In the sections that follow, I lay out the composition for each modal aspect-prejacent aspect combination for epistemic *mən-*, followed by the composition for the root modal readings, deontic and dynamic. From the assumptions and observations above, the explanations for the puzzling effects of aspect on modal interpretation will fall out naturally.

6.4.1   Aspect on non-root modals

Since epistemic and metaphysical modal expressions in Badiaranke require aspect marking on both the modal and its prejacent, we must consider four aspectual combinations: a perfective-marked modal with a perfective-marked prejacent, a perfective-marked modal with an imperfective-marked prejacent, an imperfective-marked modal with a perfective-marked prejacent, and an imperfective-marked modal with an imperfective-marked prejacent. The challenge is to explain why perfective vs. imperfective marking on the epistemic modal makes no semantic difference, while aspectual marking on the prejacent determines modal orientation.

For ease of exposition, in this section I abstract away from the issue of an ordering source, but when discussing the semantic contribution of modals, "at least one (modal base) world" should be interpreted as "at least one of the (modal base) worlds ranked highest by

the ordering source."

6.4.1.1   Perfective-marked *mən-*, perfective-marked prejacent

Since epistemic modals scope over aspect, and the prejacent of an epistemic modal in Badia-ranke is also marked for aspect, the composition for perfective-marked epistemic *mən-* with a perfective-marked prejacent proceeds as illustrated in (60).[16]

(60)   Perfective-marked epistemic *mən-* with a perfective-marked prejacent
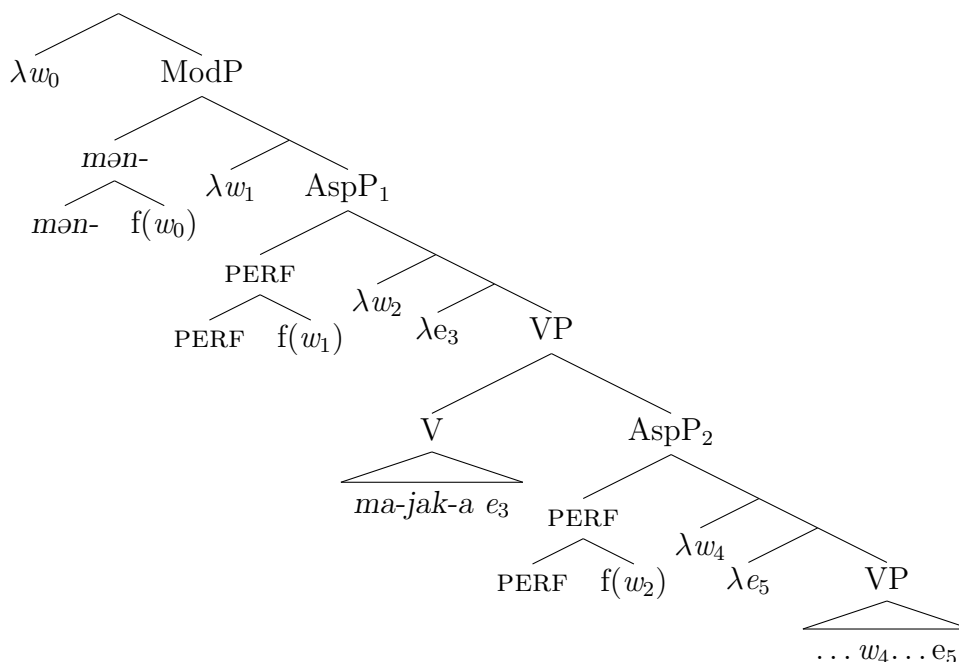
For simplicity, the representation in (60) omits TP projections, presumably one in each clause, which establish the position of perspective time for aspect with respect to matrix perspective time (which is generally equivalent to utterance time). In sentences without the past suffix -*ako*-, like the examples I am considering, t remains unshifted from the matrix perspective time. The only role of T is to introduce a time, which combines with the predicate of times output by aspect (Hacquard 2006:46-7); in Badiaranke, the effect of T is to set the perspective time for aspect. Tense thus plays no role in the interpretation of event and world variables of interest to us here.

The composition illustrated in (60) proceeds as follows. As shown in the tree, the highest-scoping element in clauses containing epistemic *mən-* is *mən-* itself. The modal introduces a world binder; if we call the matrix world binder λw_0 (so that w_0 is the base world), the one introduced by the modal will be λw_1. This binder will quantify over all world variables in its

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[16]This tree, like the others in this section, is intended only to help the reader in following the scope issues and binding relationships involved in the semantic composition; it is not designed to be a complete or syntactically motivated representation of the sentence's syntax.

domain that are not separated from it by another world binder. By the semantics of epistemic modality, w_1 worlds are related to the world introduced higher up, here the actual world, by an epistemic accessibility relation: that is, w_1 worlds are epistemically accessible from w_0. Since we are dealing with a possibility modal, it quantifies *existentially* over w_1 worlds. The epistemic modal, then, means that there is at least one w_1 *epistemically accessible* from the actual world such that the rest of the sentence is true in w_1.

(61) Epistemic *mən-*(ϕ) $\rightarrow$ In some of the best worlds accessible from the base world, as selected by an <u>epistemic</u> modal base and some <u>non-empty</u> ordering source, the proposition ϕ is true.

Being a non-root modal, epistemic *mən-* scopes over the perfective aspect whose morphology it bears. In Badiaranke, the perfective has a modal component, entailing truth in a set of worlds whose members are a function of worlds introduced higher in the structure. In other words, the perfective introduces a new world binder, λw_2 (in addition to an eventuality binder, λe_3). By the semantics of aspect in this language, the perfective indicates that in all w_2, where w_2 worlds are metaphysical alternatives to worlds bound by a higher world binder – in this case, w_1 worlds – the prejacent is true. The worlds involved in the modal are thus implicated in the semantics of the lower-scoping perfective: the base world for the metaphysical accessibility relation introduced by the perfective is the same w_1 world that is epistemically accessible from the actual world.

(62) modifies the general semantics of the Badiaranke perfective to reflect the fact that in this case, the base world for the perfective is not the actual world, but instead some epistemically accessible w_1.

(62) Semantics of the Badiaranke perfective:
PERF(P) is true at a world-time pair $<w_1,t>$ iff $\exists e$ and $\exists i$ such that for <u>all w_2</u>, where w_2 is a metaphysical alternative to w_1 at t, P is true of e in w_2 at i.

With the epistemic modal scoping over aspect, and with the auxiliary *ma-jak-a* 'be' scoping immediately below aspect, perfective-marking on epistemic *mən-* yields the semantics in (63) (where w_0 is the base world, t is perspective time, and ϕ is the proposition expressed in the prejacent).

(63) *mən-*$_{\text{EPIST}}$(PERF(be(ϕ))): $\exists w_1$ epistemically accessible from $<w_0,t>$ such that in all w_2, where w_2 is a metaphysical alternative to w_1 at t, it is the case that ϕ.

That is, the perfective-marked modal means that as evaluated from the base world at perspective time, at least one of the (best) epistemically accessible worlds (w_1) is such that in all the metaphysical alternatives (w_2) to that world, the prejacent is true.

Let us now address the prejacent. In the configuration we are presently considering, the prejacent contains a second perfective aspect, which we can call PERF$_2$. PERF$_2$ introduces yet another world binder, λw_4, as well as an eventuality binder, λe_5, which will bind the world variable and the eventuality variable introduced by the prejacent VP. By the semantics of the Badiaranke perfective, w_4 worlds are metaphysical alternatives to some world(s) introduced

higher in the structure; in this case, the closest world binder is that introduced by the higher $\text{PERF}_1 - \lambda w_2$ – since that aspect scopes under the modal. The perfective-marked prejacent, then, means that for all w_4, where w_4 worlds are metaphysical alternatives to w_2 worlds, there is an eventuality characterized by the eventuality description.

Putting together the pieces – the semantics of the perfective-marked modal, plus the semantics of the perfective-marked prejacent – we obtain the result in (64).

(64) $\textit{mən-}_{\text{EPIST}}(\text{PERF}(\text{be}(\text{PERF}(\text{P}))))$: $\exists w_1$ epistemically accessible from $<w_0,t>$ such that $\forall w_2$ metaphysically accessible from w_1, it is the case that $\exists e_5$ and $\exists i$ such that $\forall w_4$ metaphysically accessible from w_2, P is true of e_5 in w_4 at i.

(64) can be further simplified. Note that anything that is true in all metaphysical alternatives to some world is true of that world itself, since any world is among its own metaphysical alternatives. Furthermore, if w_2 is a metaphysical alternative of w_1 at t, and w_4 is a metaphysical alternative of w_2 at t, then w_4 is a metaphysical alternative of w_1 at t. Therefore, (64) can be reduced to (65):

(65) $\textit{mən-}_{\text{EPIST}}(\text{PERF}(\text{be}(\text{PERF}(\text{P}))))$: $\exists w_1$ epistemically accessible from $<w_0,t>$ such that $\exists e_5$ and $\exists i$ such that $\forall w_4$ metaphysically accessible from w_1, P is true of e_5 in w_4 at i.

Because w_1 is among its own metaphysical alternatives – and since metaphysical alternatives are only identical up to perspective time, so that any eventuality realized in all metaphysical alternatives must be realized by perspective time – (65) entails (66).

(66) $\textit{mən-}_{\text{EPIST}}(\text{PERF}(\text{be}(\text{PERF}(\text{P}))))$: $\exists w_1$ epistemically accessible from $<w_0,t>$ such that $\exists e_5$ and $\exists i$, such that P is true of e_5 in w_1 at i and $i \leq t$.

In other words, in at least one world epistemically accessible from $<w_0,t>$, the prejacent eventuality is realized by perspective time – before perspective time if the eventuality is eventive. This result is exactly what we were looking for: since the time at which the prejacnet event is realized (in some possible world(s)) must precede or coincide with perspective time, perfective marking on both the epistemic modal and the prejacent yields past orientation for eventives. Moreover, as desired, realization of the prejacent eventuality is entailed in at least one epistemically accessible world, but not in the actual world itself.

The perfective-perfective combination with an eventive prejacent is illustrated in (67), where the horizontal line now represents not the world of evaluation for the utterance, but some w_1 epistemically accessible from the base world (the matrix world binder). The dashed line represents the time spanned by the prejacent event, and worlds in which the event is realized are bolded.

(67) w_1: one of the worlds epistemically accessible from the base world w_0 at t.
$w_{4.1}$-$w_{4.5}$: worlds metaphysically accessible from w_1 at t.
$w_{4.1}$-$w_{4.5}$ are identical to w_1 up to t.
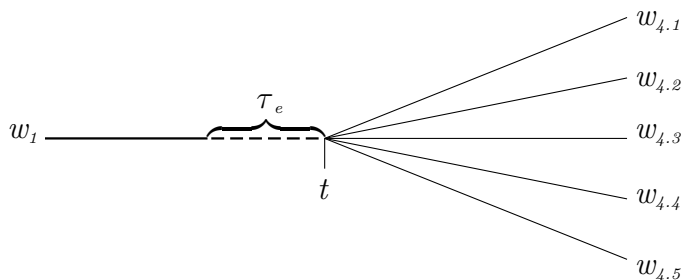
Let us apply this semantics to the sentence we saw in (41) above, repeated in (68).

(68) **mən- ə̃̃   ma-   səm- a   *karaŋə-* *b*ə̃   *de.***
POSSIB- 3sg.PERF 3sg.SBJ- arrive- IRR study- 3pl.PERF AFF.DECL

'**It's possible** *they studied.*' (8.77, #1, elicitation)

Past orientation; epistemic only

In (68), there is no past suffix, so perspective time remains at TU. Since the sentence was uttered in isolation (elicited), the base world, w_0, is simply the actual world. The combination of perfective aspect on both the modal and the prejacent means that for at least one w_1 epistemically accessible from the actual world at TU, the proposition <PERF(they study)> is true: that is, the event described by <they study> is true in w_1 at some interval i preceding TU, so that the event's time span (τ_e) extends no later than t. In other words, the speaker's knowledge at TU (present perspective) is consistent with the possibility that the individuals in question studied at some time before TU (past orientation). (64) thus correctly captures the semantics of the data in question.

Now let us consider why imperfective marking on epistemic *mən-* also yields past orientation with a perfective-marked eventive prejacent.

6.4.1.2   Imperfective-marked *mən-*, perfective-marked prejacent

Other than the fact that Asp$_1$ is now imperfective rather than perfective, the composition proceeds exactly as shown in (60). In the absence of contextual cues to the contrary, imperfective on the modal will receive its default reading, involving a metaphysical modal base; the semantics for this default reading is repeated in (69).

(69) Semantics of the Badiaranke imperfective (futurate reading):
IMPF(P) is true at a world-time pair <w,t> iff in all the best possible worlds w', according to a metaphysical modal base and stereotypical ordering source, as evaluated from w at t, $\exists e$ and $\exists i$ such that P is true of e in w' at i.

The imperfective (on its default reading) differs from the perfective in that it makes reference not to *all* metaphysical alternatives to a base world, but only to the *best* ones of those metaphysical alternatives. As a result, replacing $PERF_1$ in (60) with IMPF will mean that the prejacent eventuality is realized in all metaphysical alternatives w_4 to the *best* metaphysical alternatives w_2 to some epistemically accessible world. However, for the eventuality to be realized in all the w_4 worlds, it still has to be realized by perspective time. Since w_2 worlds are metaphysical alternatives of one another at that same perspective time, this means that the eventuality is (potentially) realized at a time when the best w_2 worlds are indistinguishable from all other w_2 worlds. For this reason, as far as Asp_1 is concerned, IMPF (which makes a claim about the best w_2 worlds) is semantically interchangeable with PERF (which makes a claim about all w_2 worlds). Both variants of the epistemic modal sentence turn out, in the end, to assert the realization of the eventuality in all metaphysical alternatives to at least one epistemically accessible world, i.e. realization in at least one epistemically accessible world by perspective time – yielding past orientation in both cases.

Let us now step through the computation in more detail, using the structure in (60) to guide us, with IMPF substituted for PERF in $AspP_1$. The semantics of the epistemic modal, which remains unchanged, is repeated in (70).

(70) Epistemic *mən-(ϕ)* $\rightarrow$ In some of the best worlds accessible from the base world, as selected by an <u>epistemic</u> modal base and some <u>non-empty</u> ordering source, the proposition ϕ is true.

As before, the modal scopes over the aspect in Asp_1, which is now imperfective instead of perfective. The futurate imperfective, as laid out in (69), introduces a new world binder, λw_2 (in addition to an eventuality binder for *ma-jak-a* 'be'), and establishes w_2 worlds as a function of the w_1 worlds. Combining these pieces, we obtain the following semantics for the imperfective-marked epistemic modal: in the *best w_2* that are metaphysical alternatives to at least one world w_1 epistemically accessible from the base world at perspective time, the prejacent is true. As before, the worlds involved in the modal are implicated in the semantics of the aspect scoping immediately beneath it: the base world for the metaphysical accessibility relation introduced by the imperfective is the same w_1 world that is epistemically accessible from the base world.

The semantics of the prejacent, meanwhile, is identical to what we computed above, since its aspect remains unchanged. We established in §6.4.1.1 that perfective aspect in the prejacent contributes yet another world binder, λw_4, as well as an eventuality binder, λe_5, which will bind the world variable and the eventuality variable introduced by the prejacent VP. The w_4 worlds will still be metaphysical alternatives to the closest world binder, which is still w_2; so the prejacent means that for all w_4, where w_4 worlds are metaphysical alternatives to w_2 worlds, there is an eventuality characterized by the eventuality description. The only difference is how those w_2 worlds are defined.

Combining the imperfective-marked modal with the perfective-marked prejacent yields the semantics in (71).

(71) $mən$-$_{\text{EPIST}}$(IMPF(be(PERF(P)))): $\exists w_1$ epistemically accessible from $<w_0,t>$ such that in all the *best* w_2 metaphysically accessible from w_1, it is the case that $\forall w_4$ metaphysically accessible from w_2, $\exists e_5$ and $\exists i$ such that P is true of e_5 in w_4 at i.

Since any eventuality realized in all metaphysical alternatives to w_2 is realized in w_2 itself by perspective time, (71) entails (72).

(72) $mən$-$_{\text{EPIST}}$(IMPF(be(PERF(P)))): $\exists w_1$ epistemically accessible from $<w_0,t>$ such that in all the *best* w_2 metaphysically accessible from w_1, it is the case that $\exists e_5$ and $\exists i$ such that P is true of e_5 in w_2 at i and $i\leq t$.

Furthermore, since w_2 worlds are metaphysical alternatives of one another at t, realization of an eventuality in one w_2 by t entails its realization in *all* w_2 by t, be they ranked highly by the ordering source or not. Therefore, like the perfective-perfective combination, the semantics of a sentence with imperfective on epistemic $mən$- and perfective on the prejacent reduces to that in (73):

(73) $mən$-$_{\text{EPIST}}$(IMPF(be(PERF(P)))): $\exists w_1$ epistemically accessible from $<w_0,t>$ such that $\exists e_5$ and $\exists i$, such that P is true of e_5 in w_1 at i and $i\leq t$.

In at least one world epistemically accessible from the actual world at perspective time, the eventuality described in the prejacent is realized by that perspective time. Put differently, it is compatible with the speaker's knowledge that the eventuality in question has occurred by perspective time (which by default will be utterance time), yielding past orientation for an eventive prejacent. This output is represented graphically in (74), where the best worlds (which I have arbitrarily designated $w_{4.2}$, $w_{4.4}$, and $w_{4.5}$) are bolded.

(74) w_1: one of the worlds epistemically accessible from the base world w_0 at t.
       $w_{4.1}$-$w_{4.5}$: worlds metaphysically accessible from w_1 at t.
       $w_{4.1}$-$w_{4.5}$ are identical to w_1 up to t.
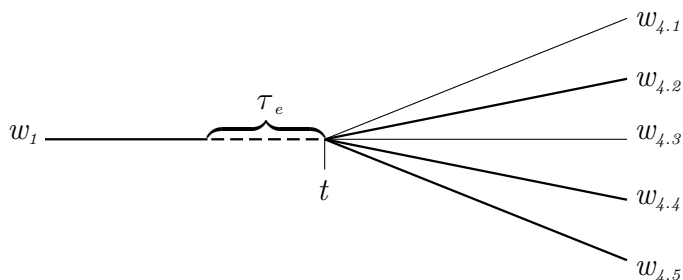
(74) is, in the end, identical to (67), the representation of the perfective-perfective combination, even though their origins are different. In (67), τ_e is limited to times no later than perspective time because the eventuality is realized in all metaphysical alternatives to w_1, which are identical only up to perspective time. In (74), the eventuality is realized in all metaphysical alternatives w_4 to the best metaphysical alternatives w_2 to w_1, meaning that it is realized before t in all the best metaphysical alternatives w_2 to w_1 – but before t, all

w_2, including w_1, are identical, entailing realization in w_1 itself. Regardless of aspect on the modal, then, a perfective-marked prejacent yields a past orientation.

While I have been focusing on eventive prejacents for simplicity, the analysis accounts equally well for the availability of present orientation with a perfective-marked stative prejacent. As argued in Chapter 3, stative eventuality descriptions allow a present-state reading with the perfective because of their subinterval property, which allows evaluation time – a time at which the state is realized – to be as short as perspective time itself. Thus, when a stative prejacent is perfective-marked, the state described is asserted to be realized in at least one epistemically accessible world not necessarily *before* perspective time, but *by* perspective time – that is, either before perspective time, or, possibly, at perspective time itself. Hence perfective-marked stative prejacents allow both present and past orientation with epistemic *mən-*. Modal orientation is affected, then, by both grammatical aspect and Aktionsart: aspect limits evaluation time to times up to and including to perspective time, while Aktionsart determines whether or not a present-oriented reading is available in addition to a past-oriented one.

Let us look at (75) to see how this analysis works for stative prejacents.

(75) **mən-**   **ə̃**   **de**   **ma-**   **jak- a** *dattaː-* <u>*bə̃*</u>   *de.*
      POSSIB- 3sg.PERF AFF.DECL 3sg.SBJ- be- IRR sleep- <u>3pl.IMPF</u> AFF.DECL

   '**It's possible** *they are/were asleep.*' (8.75, #1, elicitation)

As in (68), w_0 and t remain unshifted from the actual world and TU, respectively. The sentence means that the proposition <PERF(they sleep)> is true in at least one epistemically accessible w_1 as evaluated at the speaker's here and now. Since <they sleep> is stative, <PERF(they sleep)> requires that the individuals in question be asleep in w_1 at some interval i either *before or at* TU. In other words, the speaker's knowledge at TU is consistent with the possibility that the individuals in question slept at some time before TU (past orientation) or are asleep at TU (present orientation).

We turn now to imperfective-marked prejacents and why they yield future orientation regardless of aspect on the modal.

6.4.1.3   Perfective-marked *mən-*, imperfective-marked prejacent

In this third combination of aspects, the upper half of the tree in (60) remains unchanged; the only difference is that AspP$_2$ is now headed by imperfective rather than perfective aspect. The result is illustrated in (76).

(76)　Perfective-marked epistemic *mən-* with an imperfective-marked prejacent
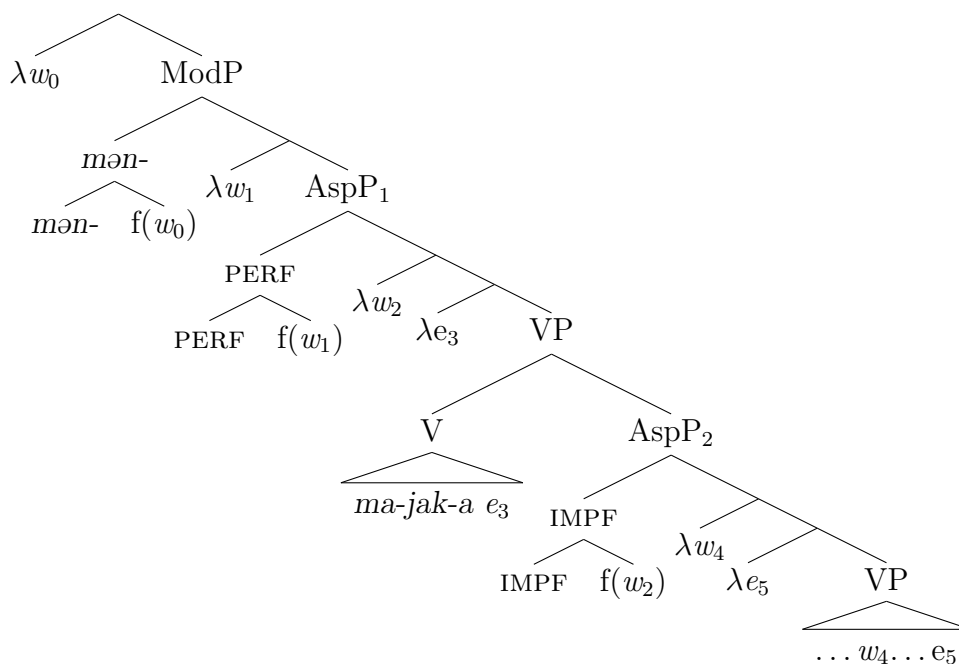
As argued in §6.4.1.1 above, perfective-marked epistemic *mən-* means that as evaluated from the base world at perspective time, it is the case that in all metaphysical alternatives w_2 to at least one epistemically accessible w_1 at t, the prejacent is true. The question now is how that semantics for the modal interacts with imperfective marking on the prejacent.

Recall from §6.4.1.1 that with perfective aspect on the epistemic modal, perfective aspect in the prejacent has the effect of asserting realization of the prejacent eventuality in all metaphysical alternatives to an epistemically accessible world – thereby requiring the eventuality to be realized in those worlds by perspective time, the time when they branch apart. In Badiaranke, while the perfective conveys eventuality realization in all metaphysical alternatives, the imperfective conveys realization in only the *best* metaphysical alternatives; because metaphysical alternatives are indistinguishable up to perspective time, the imperfective indicates that the eventuality is realized in the *future* of perspective time. The combination of perfective aspect on epistemic *mən-* and imperfective aspect on the modal, then, means that the prejacent eventuality is realized at some interval *after perspective time* in the best metaphysical alternatives to an epistemically accessible world; since the time at which the eventuality may be realized follows perspective time, the result is future orientation.

Having summarized the expected result, I will now show how a careful composition indeed produces this semantics. As before, I assume the default, metaphysical-modal-base reading for the imperfective, repeated in (77).

(77) Semantics of the Badiaranke imperfective (futurate reading):
IMPF(P) is true at a world-time pair $<w,t>$ iff <u>in all the best possible worlds w'</u>, according to a metaphysical modal base and stereotypical ordering source, as evaluated from w at t, $\exists e$ and $\exists i$ such that P is true of e in w' at i.

Just like perfective aspect in the prejacent, IMPF in that clause introduces a world binder as well as an eventuality binder, which bind the world and eventuality variables in the prejacent VP. By the semantics of the (futurate) imperfective, w_4 worlds are required to be metaphysical alternatives to some world(s) bound higher in the structure – specifically, the w_2 worlds introduced by the higher perfective aspect. Up to this point, the composition is identical to what we saw in (60). The difference is that whereas perfective aspect in the prejacent places the eventuality in question in *all* w_4 worlds (the metaphysical alternatives to w_2), imperfective aspect indicates realization of the eventuality only in the *best* w_4.

We can now combine the semantics of the perfective-marked modal and of the imperfective-marked prejacent as in (78).

(78) *mən*-$_{\text{EPIST}}$(PERF(be(IMPF(P)))): $\exists w_1$ epistemically accessible from $<w_0,t>$ such that $\forall w_2$ metaphysically accessible from w_1, it is the case that in all the *best* w_4 metaphysically accessible from w_2, $\exists e_5$ and $\exists i$ such that P is true of e_5 in w_4 at i.

Anything that is true of all w_2 worlds is true of w_1, which is, as always, one of its own metaphysical alternatives. Thus (78) entails (79).

(79) *mən*-$_{\text{EPIST}}$(PERF(be(IMPF(P)))): $\exists w_1$ epistemically accessible from $<w_0,t>$ such that in all the *best* w_4 metaphysically accessible from w_1, $\exists e_5$ and $\exists i$ such that P is true of e_5 in w_4 at i.

As observed previously, the best worlds are differentiable only after perspective time. Therefore, (79) boils down to the following: at least one world epistemically accessible from the actual world at utterance time is likely to evolve such that at some time in the future of perspective time, the eventuality is realized. Less formally, there is a possibility compatible with the speaker's knowledge that e will be realized after t. Since evaluation time i follows perspective time, the result is future orientation – just as we observed in the data.

This semantics for perfective-marked *mən*- with an imperfective-marked prejacent is illustrated in (80).

(80) w_1: one of the worlds epistemically accessible from the base world w_0 at t.
$w_{4.1}$-$w_{4.5}$: worlds metaphysically accessible from w_1 at t.
$w_{4.2},w_{4.4},w_{4.5}$ (bolded): the highest-ranked w_4 worlds.
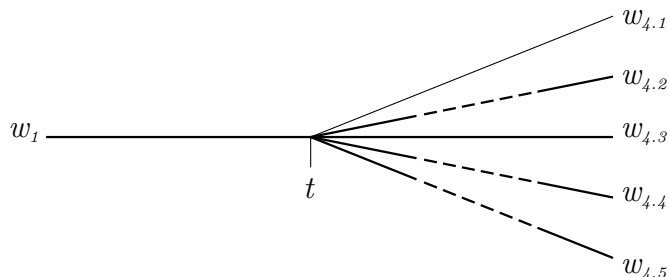
Using (79) and (80) as a starting point, we can capture the semantics of the data in (81).

(81) **mən-** ə̃ **ma-** **jak-** **akəde** **de** <u>*bẽ-*</u> *karaŋə*
POSSIB- 3sg.PERF 3sg.SBJ- be- PAST.IRR.NPERF AFF.DECL <u>3pl.IMPF-</u> study
de.
AFF.DECL

'*They* **could have** *studied* (but they didn't).' (8.77, #1, elicitation)

Here, the base world is unshifted from the actual world, but perspective time is shifted into the past of TU by *-akəd-*. According to (79), perfective marking on the modal expression and imperfective marking on the prejacent mean that in some w_1 that was epistemically accessible at a past perspective time, <IMPF(they study)> is true. However, as discussed above, with a past perspective time, an epistemic modal base becomes unavailable. Since (81) has the syntax of non-root modality, a metaphysical modal base is chosen instead of an epistemic one. The semantics of (81), then, is that in some w_1 that was *metaphysically* accessible at a past perspective time, <IMPF(they study)> is true. Modifying (79) accordingly, we get that in the best worlds w_4 metaphysically accessible from some w_1 that was a metaphysical alternative to the actual world at some past t, there is an interval i at which <they study> is realized. Since all metaphysically accessible worlds are identical at perspective time, however, w_1 was identical to w_0 itself at t. Substituting w_0 for its metaphysical alternative w_1, we find that in the best worlds w_4 that were metaphysically accessible from w_0 (the actual world) at some past t, there is some i at which the individuals in question study. In other words, at some past t (past perspective), the actual world was likely to turn into one where, at some time after t (future orientation), the individuals would study. This is indeed what (81) means.

Finally, let us consider what happens when both the modal and its complement are imperfective-marked.

6.4.1.4 Imperfective-marked *mən-*, imperfective-marked prejacent

We have already dealt with both imperfective-marked epistemic *mən-* and imperfective-marked prejacents; now we just need to put the pieces together. Recall from §6.4.1.2 that imperfective-marked epistemic *mən-*, with the modal scoping over aspect, means that in all the *best* worlds w_2 metaphysically accessible from at least one epistemically accessible w_1, the prejacent is true. Recall also from §6.4.1.3 that with binding of its world variable, the imperfective-marked prejacent indicates that in all the *best* w_4 worlds metaphysically accessible from w_2 worlds at t, there is an interval i at which e is realized. When combined, these pieces yield the semantics in (82).

(82) *mən-*$_{\text{EPIST}}$(IMPF(be(PERF(P)))): $\exists w_1$ epistemically accessible from $<w_0,t>$ such that the best w_2 metaphysically accessible from w_1 are such that in all the best w_4 metaphysically accessible from w_2, $\exists e_5$ and $\exists i$ such that P is true of e_5 in w_4 at i.

This dizzying semantics can, fortunately, be simplified. At perspective time, all metaphysical alternatives are identical to one another; so the set of metaphysical alternatives of

w_1, i.e. the w_2 worlds, is identical to the set of metaphysical alternatives of w_2, i.e. the w_4 worlds. Moreover, the same metaphysical alternatives will be ranked highest at t regardless of which member of the set serves as the base world. Thus (82) can be reduced to (83).

(83) $m\partial n\text{-}_{\text{EPIST}}(\text{IMPF}(\text{be}(\text{PERF}(P))))$: $\exists w_1$ epistemically accessible from $<w_0,t>$ such that in the best w_4 metaphysically accessible from w_1, $\exists e_5$ and $\exists i$ such that P is true of e_5 in w_4 at i.

As always, the metaphysical alternatives, w_4, can only be ranked at times after perspective time. (83), then, means simply that at least one epistemically accessible world is likely to evolve such that the prejacent eventuality is realized at some time following perspective time – yielding, as desired, future orientation. In other words, it is compatible with the speaker's knowledge for the prejacent eventuality to be realized in the future. The semantics in (79) and the illustration in (80), then, apply whenever the prejacent is imperfective-marked, regardless of aspect on the modal. I have now successfully explained why imperfective on the prejacent yields future orientation even with imperfective on the modal, as we saw in (36a), repeated in (84).

(84) pudõ **mpə-** **mən** **de** **ma-** **jak-** **a** <u>bẽ-</u> *karaŋə*
       next.year 3sg.IMPF- POSSIB AFF.DECL 3sg.SBJ- be- IRR 3pl.IMPF- study
       de.
       AFF.DECL
       '**It's possible** *they'll study next year.*' (8.87, #1, elicitation)

<div align="right">EPISTEMIC/METAPHYSICAL</div>

In this section, the first puzzle in Table 6.1, repeated in Table 6.2, has been solved. Having explained the observed interactions between aspect and epistemic modals, let us now

Table 6.2: The epistemic puzzle

Modal flavor	Impact of aspect
Epistemic	Aspect on modal: No effect
	Aspect on prejacent: Determines orientation

turn to deontic modals and the "ability presupposition" triggered by perfective aspect.

6.4.2   Aspect on deontic modals

Recall that the challenge with deontic modals is to explain why imperfective marking on deontic *mən-* simply conveys permission, while use of perfective aspect carries an additional felicity condition, the "ability presupposition," that the subject be capable of carrying out the permitted action. The relevant data are repeated in (85).

(85)　a.　(wusia woː) *tʃaːfe   pakkã (lõ)* <u>kə-</u>   **mənə** *ka- tʃifəd- e.*
　　　　　man   all   woman one   only <u>2sg.IMPF-</u> POSSIB INF- marry- INF

　　　　'Each man **is allowed** *to marry one woman.*' (8,53, #1, elicitation)

　　　b.　wusia woː *tʃaːfe   pakkã* **mən-** <u>**iː**</u>   *ka- tʃifəd- e.*
　　　　　man   all   woman one   POSSIB- <u>2sg.PERF</u> INF- marry- INF

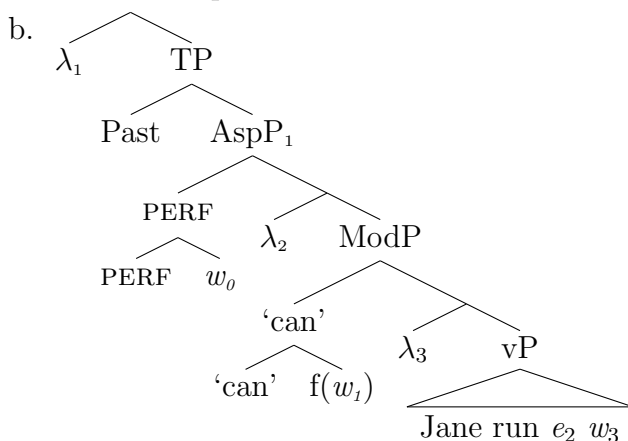　　　　'Each man **can (and has the means to)** *marry one woman.*' (8,53, #1, elicitation)

The key to explaining this unusual pattern, which has not, to my knowledge, been observed in other languages, is the fact that deontic modals scope under aspect (Hacquard 2006).[17] Together with two other premises – the unusual semantics of Badiaranke aspect, and the fact that *mən-* on its root readings denotes a true *state* of permission (deontic) or ability (dynamic) – this assumption straightforwardly accounts for the ability presupposition and its absence in imperfective-marked deontics.

Let us first consider (85b), where the modal is perfective-marked. The semantics for the Badiaranke perfective is repeated yet again in (86); (87) reiterates Kratzer's (1981) semantics for deontic modals.
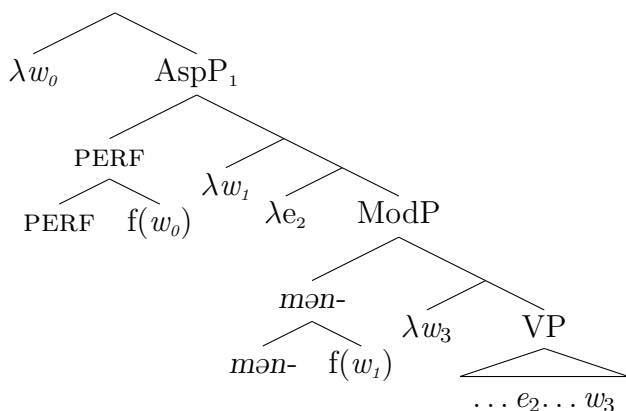
(86)　Semantics of the Badiaranke perfective:
　　　PERF(P) is true at a world-time pair $<w,t>$ iff $\exists e$ and $\exists i$ such that for <u>all w'</u>, where w' is a metaphysical alternative to w at t, P is true of e in w' at i.

(87)　Semantics of a deontic possibility modal: In some of the best accessible worlds as selected by a <u>circumstantial</u> modal base and a <u>deontic</u> ordering source, the prejacent eventuality is realized.

According to the conventional wisdom on root modals, PERF should scope over the deontic modal. It turns out, however, that simply sticking Asp above Mod and treating the prejacent as a simple VP (as it appears to be) will not do the trick. The problem is that this arrangement, illustrated in (89), wrongly (for Badiaranke) predicts an actuality entailment. (89) is a version of Hacquard's composition for perfective-marked deontic modals in French, shown in (88) (2006:56); (89) modifies (88) to take into account the semantic differences between the Badiaranke perfective with its French counterpart.

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[17]Hacquard (2006) distinguishes between "ought-to-do" modals, which impart permission or obligation to the referent of the syntactic *subject*, and "ought-to-be" modals, which impart permission or obligation to the *addressee*. The deontics discussed here are all ought-to-do, subject-oriented deontics in Hacquard's sense.

(88) a. Jane could-pfv run.[18]

b.

λ_1 TP

Past AspP$_1$

PERF λ_2 ModP

PERF w_0

'can' λ_3 vP

'can' f(w_1)

Jane run e_2 w_3

(89)

λw_0 AspP$_1$

PERF λw_1

PERF f(w_0) λe_2 ModP

mən- λw_3 VP

mən- f(w_1) $\ldots e_2 \ldots w_3$

Unlike the Badiaranke perfective, the French perfective, as illustrated in Hacquard's tree in (88), makes no reference to metaphysical alternatives; this accounts for the difference in the PERF node and the fact that PERF in (88) introduces only an eventuality binder, not a world binder. Additionally, the perfective in French is a *past* perfective, accounting for the presence of Past in T. If (89) were correct for Badiaranke deontics, the composition of (85b) would proceed as follows. The VP, which describes an eventuality of marrying one woman, introduces an eventuality variable and a world variable. The world variable is bound by the closest world binder, namely the one introduced by *mən-*, λw_3; the eventuality is realized in those worlds. By the semantics of deontic possibility modals, *mən-* establishes that w_3 worlds are circumstantially accessible from worlds introduced higher in the structure – here, w_1 worlds – and quantifies existentially over these worlds. The ModP, then, means that at least one of the circumstantially accessible worlds contains an eventuality of the addressee's marrying one woman. Meanwhile, there is only one binder for the eventuality variable in the VP: the one introduced by the single aspect. By the semantics of perfective aspect in Badiaranke, AspP means that in all w_1, where w_1 are metaphysical alternatives to the actual world, a certain eventuality is realized; that is, by definition of metaphysical alternatives, a

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[18]Hacquard abbreviates "perfective" as "pfv."

certain eventuality is realized *in the actual world* before perspective time. The eventuality binder introduced by aspect is required to bind an eventuality variable, of which the structure offers only one: the variable in the prejacent. This means that the eventuality which, in the w_3 worlds, is a marrying-one-woman event is realized in the past of perspective time in the actual world. Hacquard (2006:57) argues for a process of *event identification*, which forces an eventuality to have the same defining properties in all worlds in which it exists. With that final step, we obtain the reading that the eventuality occurs not only in at least one circumstantially accessible (and deontically good) world, but also in the actual world itself, in the past of perspective time: a classic actuality entailment.

While this is apparently the right result for French, it is not the right result for Badiaranke.[19] (45b) does not ordinarily mean that each man was previously permitted to, and actually did, marry one woman, but rather that each man is currently permitted to, and has the ability to, marry one woman.

The undesirability of structurally enforcing an actuality entailment becomes even more evident in (90) and (91), which use deontic *tʃoːm-* to impose an obligation which the speaker wants to impose but which, the context makes clear, has not been acted upon. (90) comes from a story in which the addressee, the subject of the deontic modal, has been complaining of a headache; he thus has not obeyed the injunction to become healthy.

(90) mi-   jim maː heː bari **tʃoːməd-** **i**   kẽdan-   a   **de**!
      NARR- say QUOT hey but   NEC-   2sg.PERF be.healthy- IRR AFF.DECL

    'He said, "Hey, but **you have to** *be healthy*!"' (6.64, #3, Bala Tamba story)

Similarly, in the imagined context for (91), the fish is, in fact, floating idly in the water, leading to the panicked plea of its owner.

(91) isã, **tʃoːməd-** **i**   woː-   a   **de**! nĩ kaː   wũ   kə-   sad
      fish NEC-   2sg.PERF swim- IRR AFF.DECL if NEG.IMPF.3sg. DEM 2sg.IMPF- die

    de!
    AFF.DECL

    'Fish, **you have to** *swim*! If not, you'll die!' (8.31, #2, elicitation)

While (91) might be considered an addressee-oriented deontic (which, according to Hacquard, is not expected to trigger an actuality entailment anyway), the same is not true for (92), which similarly does not mean 'fish had to, and did, swim.'

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[19]I did record one variant of (85b), given in (i), where the consultant accepted the reading that all the men in question had, in fact, married one woman.

(i) Senegal jaŋe wusia woː **mən-** **ə̃**   **de**   ka-   tʃifəd- e   tʃaːfe maːe.
     Senegal here man   all   POSSIB- 3sg.PERF AFF.DECL INF- marry-   INF woman two

    'Here in Senegal, a man **can** *marry two women*.' (8.53, #1, elicitation)

The remaining data, however, suggest that while this reading may sometimes arise in contexts that encourage *mən*.PERF to be interpreted as denoting a *past* state of permission, it is by no means the dominant one.

(92) isã **tʃoːməd-** $\underline{\tilde{\text{ə}}}$ woː- a **de.**   nĩ kaː   wũ mpə-
      fish NEC-   3sg.PERF swim- IRR AFF.DECL if NEG.IMPF.3sg. DEM 3sg.IMPF-
      sadə de.
      die AFF.DECL

      'A fish **has to** *swim*. If not, it'll die.' (8.31, #2, elicitation)

These data show that the analysis in (89) cannot be right.

    In order to avoid the actuality entailment, what we need is another, more local eventuality binder to bind the eventuality variable in the prejacent; this will prevent the realization of the prejacent eventuality in the actual world (and all its metaphysical alternatives) that is forced in (89) after existential closure at the AspP level. That is, we need a covert AspP subordinate to the modal, whose role will be to seal off the eventuality variable in the prejacent, as in (93).

(93)   AspP$_2$

    λe_4 VP

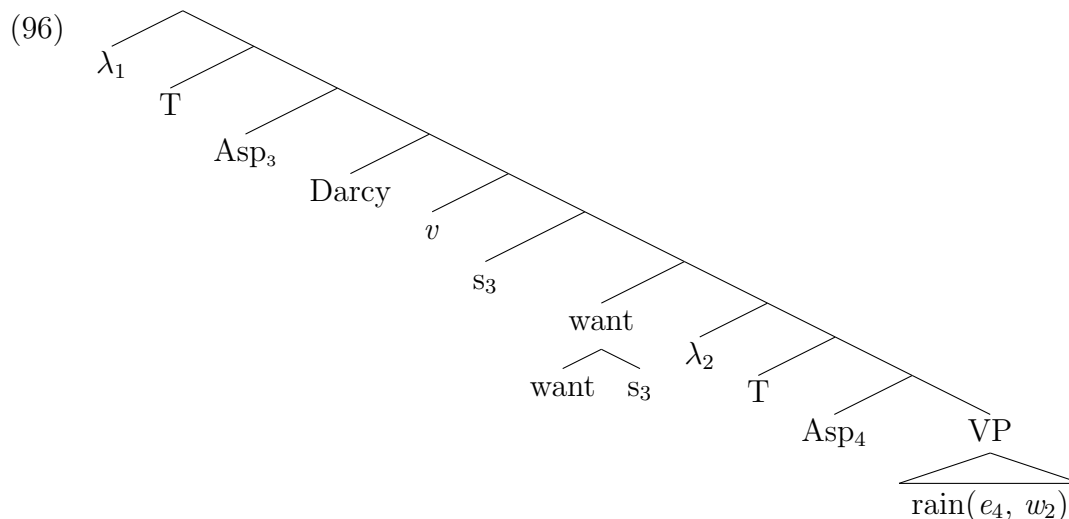 $\ldots e_4 \ldots w_3$

Unlike the overt perfective and imperfective aspects in Badiaranke, this zero aspect has no modal component; its only contribution is to turn the VP into a predicate of events, as purely aspectual categories do in other languages (Hacquard 2006:17).[20]

    Simply adding a covert Asp$_2$ into (89) would create a new problem, however: the uppermost aspect, whose role is, in part, to bind an eventuality, would have no free variables to bind. In fact, though, there *is* another eventuality involved in Badiaranke deontic sentences: the state of permission (or obligation) itself. While it may not be appropriate for all languages to treat deontics as introducing an eventuality (state) variable, Sabine Iatridou (p.c.) observes that Badiaranke deontic modals (unlike epistemic ones) act like "well-behaved stage-level statives" in the language. Just as perfectives of ordinary stage-level statives express present states, while imperfectives of such statives often denote generic or future states, so the perfective of deontic *mən-* indicates that the state of permission holds right now, while

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[20]There are two conceivable alternatives to such a zero aspect. One would be to treat the matrix aspect as binding the eventuality variable of prejacent VP; as we saw above, this configuration would yield an actuality entailment, contrary to the Badiaranke facts. Alternatively, as pointed out by Lev Michael (p.c.), one could imagine a construction-based analysis, on which the deontic interpretation would arise from something like the juxtaposition of a modal verb and an eventuality description unmarked for aspect; in such an approach, the binding of eventuality and world variables would simply not arise. Such an approach is taken, for instance, by Brantjes (2007) in her analysis of Dutch deontic constructions. However, in the framework I have adopted here – a compositional semantics in which aspect and modal verbs introduce operators that bind eventuality and world variables in their scope – there remains no option other than to posit the zero aspect. Furthermore, this analysis is aesthetically pleasing, in that it treats both root and non-root modal sentences as involving two aspects, and differing along only two parameters: the scope of the modal with respect to the matrix aspect, and whether the subordinate aspect is a zero aspect or one of its more substantive, world-evoking counterparts.

imperfective-marked *mən-* indicates that the state of permission holds generically (or in the future). If the modal itself comes with an eventuality variable, that variable will both solve the problem of the lonely eventuality binder and capture the fact that the modal behaves like ordinary Badiaranke statives with respect to aspect. This revised analysis is represented in (94).

(94)

The composition in (94) proceeds as follows. With Asp_1 scoping over the modal, perfective-marked deontic *mən-* means that in all w_1, where w_1 worlds are metaphysical alternatives to the actual world at perspective time, there exists a state of permission for the prejacent eventuality to occur. The modal, in addition to providing an eventuality variable for Asp_1 to bind, introduces another world binder, λw_3, and establishes (as a deontic modal) that w_3 worlds are worlds that are circumstantially accessible from the previously introduced w_1 and ranked highly by a deontic ordering source. As long as the state of permission holds, it is the case that in at least one (highly ranked) world w_3 circumstantially accessible from w_1 (the meaning of the deontic modal), there exists an eventuality (the contribution of the lower aspect) that instantiates the property described in the prejacent. As always with perfectives of statives in Badiaranke, if the state of permission holds at all metaphysical alternatives – here, the w_1 worlds – it also holds in the base world itself – here, the actual world, w_0 – at (or before) perspective time. Thus the semantics of a sentence with perfective-marked deontic *mən-* can be distilled into (95).

(95)   PERF($mən$-$_{\text{DEONT}}$(Asp(P))): $\exists w_3$ circumstantially accessible from $<w_0,t>$ (and highly ranked deontically) such that in w_3 $\exists e_4$ and $\exists i$ such that P is true of e_4 in w_3 at i.

In other words, there is at least one world that shares relevant circumstances with the actual world and that conforms with the rules in which the prejacent eventuality is realized.

While this analysis represents a novel approach to deontic modals, it is similar to the control structure posited by Asarina and Holt (2005) for Tagalog deontics, although their analysis abstracts away from issues of world and eventuality variables. It also resembles the analysis of Hacquard (2006:170) for some propositional attitude verbs, particularly English

want and French *vouloir*. Hacquard argues that English *Darcy wants it to rain* and its French equivalent have the semantics represented in (96).[21]

(96)

Although Hacquard does not label the nodes in this particular tree, the presence of v suggests that she is treating *want* as a V head, which in this case introduces a world binder in addition to the eventuality variable (which she represents with an "s" for "state") that verbs always carry. The representation of *mən-* in (94), in some sense, turns this semantics for *want* inside out: instead of being a verb that happens to introduce a world binder, *mən-* is a modal that happens to introduce an eventuality variable. I prefer to treat deontic *mən-* as categorially modal, rather than verbal, to unify it with its epistemic counterpart, which is clearly modal and does not introduce an eventuality variable.

The zero aspect posited in (94) is not limited to deontic (or even root) modals; it occurs in infinitival or subjunctive-marked clauses in Badiaranke more generally, e.g. clauses with *lafiɲieːn-* 'want/like', which, like deontic *mən-*, takes either a subjunctive-marked or infinitival complement (97), or complements of *jim-* 'say' with subjunctive/hortative morphology (98).

(97) lafiɲieːn- ə̃   de   ma-   jak- a   enspektər.
      want-   1sg.PERF AFF.DECL 1sg.SBJ- be- IRR inspector

      'I want *to be an inspector.*' (4.75, #1, 'where I've traveled' text)

(98) jim- a   bə̃bẽ   be-   ri-   a.
      say- IMPER 3pl.INDEP 3pl.SBJ- come- IRR

      'Tell those people *to come.*' (5.6, #1, elicitation)

In these cases, as with deontic *mən-*, the eventuality is certainly not entailed to occur in the actual world, only in worlds compatible with the attitude holder's desires.

In addition to explaining the lack of actuality entailment of perfective-marked deontic *mən-*, (94) and its condensed version in (95) successfully account for the ability presupposition, in the following manner. Circumstantially accessible worlds are ones that share

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[21]λ_1 in Hacquard's tree corresponds to λw_0 in my trees; it represents the matrix world binder.

certain relevant circumstances with the world from which they are evaluated. Crucially, if the circumstances in the actual world (and, equally, in all of its metaphysical alternatives w_1) are such that, for whatever reason, they render the subject *incapable* of enacting the eventuality described in the prejacent, the subject will be equally incapable in all circumstantially accessible worlds. In that case, there will be *no* worlds circumstantially accessible from w_0 in which the eventuality is realized, so the sentence cannot be true. Therefore, use of a perfective-marked deontic *presupposes* that the subject has the ability in w to carry out the action described in the prejacent; the subject's ability to carry out this action is a *felicity condition* for uttering a perfective-marked deontic. As a result, (85b) is infelicitous if the men lack the means to marry. Furthermore, since circumstances are evaluated at perspective time (here utterance time), perfective-marked *mən-* is felicitous only if the actual circumstances in w_0 at TU enable the subject to carry out the permitted action.

For the same reason, *mən-iː ka-rak-e* 'you may.PERF smoke' can only be uttered at a time and place where the addressee is permitted to smoke, making its generic use in (99) problematic.

> (99) ?? taːme kaː   pə- dʒitt- i   woː **mən-** **iː**   *ka- rak-*
>   now   NEG.IMPF.3sg. LOC- get- 2sg.PERF all POSSIB- 2sg.PERF INF- smoke-
>   *e   de.*
>   INF AFF.DECL
>
>   Intended: '...now it's not wherever you get the chance that **you can** *smoke.*' (8.54, #1, elicitation)

Intuitively, given the semantics of the Badiaranke perfective, this restriction on context makes sense: there is no point in forbidding someone to smoke right now in every conceivable place, since the person can only be in one place at a time.

The contrast between perfective-marked deontic modals in Badiaranke, which carry an ability presupposition but no actuality entailment, and in French, where they do involve an actuality entailment, arises from two factors.[22] The first is internal to the analysis in this section: French root modals take a VP (or vP) complement directly, while in Badiaranke, a second aspect intervenes between the modal and the prejacent VP, preventing the matrix aspect from binding the eventuality variable in the prejacent. The second explanation is independently motivated, having to do with the meaning of perfective aspect in the two languages. The French perfective, unlike its Badiaranke counterpart, is a *past* perfective: it always comes along with past tense. The Badiaranke perfective can also be used to talk about past eventualities, but as evidenced by its compatibility with present states, this pastness arises from the semantics of metaphysical alternatives, rather than from past-shifting by T.

It is likely that the above analysis also extends to aspectual marking on deontic *tʃoːm(əd)-* (the necessity modal) as well. (100) is an example containing perfective-marked deontic *tʃoːm-*.

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[22]The French actuality entailment arguably includes an element of ability: in order for the prejacent eventuality to have been actually carried out, the subject must have been capable of carrying it out. This ability reading is subsumed by the actuality entailment.

(100) **tʃoːm- akudo-   i   ŋan- a de**.
       should- PAST.IRR.PERF- 2sg.PERF arise- IRR AFF.DECL

   '**You should have** *gotten up*' (but you didn't). (8.57, #1, elicitation)

In (100), perspective time is set in the past by *-akəd-*. The deontic modal, which in this case has universal force, has the semantics in (101).

(101) Semantics of a deontic necessity modal (here *tʃoːm(əd)-*): In all of the best accessible worlds as selected by a <u>circumstantial</u> modal base and a <u>deontic</u> ordering source, the prejacent eventuality is realized.

Perfective-marked deontic *tʃoːm-*, with aspect again scoping over the modals, will mean that for all w_1, where w_1 is a metaphysical alternative to w_0 at the past t, it is the case that in *all* of the best worlds w_3 circumstantially accessible from w_1 as ordered deontically, the prejacent is true. As with perfective-marked *mən-*, since w_0 is a member of the set of its own metaphysical alternatives w_1, the perfective-marked modal entails that in all of the best worlds w_3 circumstantially accessible from w_0 itself as ordered deontically, the prejacent is true. Once again, if the circumstances in w_0 are such that the subject does not have the *means* to make the prejacent true, then there will be *no* worlds circumstantially accessible from w_0 in which the prejacent is true; that is, the ability presupposition is predicted to impose a felicity condition. (100), for instance, is predicted to be infelicitous if the speaker knows the addressee was physically incapacitated at the past time when the obligation held. This prediction seems intuitively correct but requires future research for explicit confirmation.

   Let us turn now to imperfective-marked deontic *mən-*, which, as we have seen, entails nothing about the potential for the prejacent eventuality to be realized in the base world itself.

   I will focus on (85a) (the 'marry' example where *mən-* is imperfective-marked), where imperfective on the modal involves the default, metaphysical modal base; in the absence of a special context, the ordering source for that imperfective is presumably stereotypical rather than bouletic, but the type of ordering source is immaterial to our concerns here.[23]

(102) Semantics of the Badiaranke imperfective (default reading):
       IMPF(P) is true at a world-time pair $<w,t>$ iff <u>in all the best possible worlds w'</u>, according to a <u>metaphysical</u> modal base and <u>stereotypical</u> ordering source, as evaluated from w at t, $\exists e$ and $\exists i$ such that P is true of e in w' at i.

With aspect again scoping over the modal, imperfective-marked deontic *mən-* means that in the *best* w_1, where w_1 worlds are metaphysical alternatives to the actual world at perspective time, there exists a state of permission for the prejacent eventuality to occur. As in (94), the prejacent eventuality is asserted to be realized in at least one highly ranked w_3 circumstantially accessible from the best w_1. In keeping with the explanation above for the ability presupposition, this configuration requires that the circumstances in those w_1 worlds

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[23]For the 'smoke' example with imperfective-marked *mən-*, which involves a generic imperfective rather than a futurate one, the modal base will instead be circumstantial and the ordering source inertial.

– those metaphysical alternatives to the actual world most highly ranked by a stereotypical (or perhaps bouletic) ordering source – are such that the subject is capable in those worlds of carrying out the permitted action. What is critical for explaining the absence of an ability presupposition with an imperfective-marked modal is the fact that the base world, w_0, is not required to be among the *best* members of its own metaphysical alternatives (whereas perfective on the modal makes a claim about *all* the w_1 worlds). Thus, although the requisite circumstances for realization of the prejacent eventuality must still hold at some time in the *best* metaphysically accessible w_1, they are not required to hold at times when these w_1 worlds are identical to w_0; it is possible for the right circumstances to obtain at some later time in the best w_1 without ever holding in the base world itself. As a result, imperfective-marked deontic *mən*- means that w_0 is likely to evolve such that the subject is permitted (and able) to carry out the action described in the prejacent; that is, it expresses straightforward permission, with no felicity condition on circumstances in the actual (or base) world. (103) lays out this semantics more formally.

(103)   IMPF($mən$-$_{\text{DEONT}}$(Asp(P))): $\exists w_3$ circumstantially accessible (and highly ranked deontically) from the best worlds w_1 metaphysically accessible from $<w_0,t>$ such that $\exists e_4$ and $\exists i$ such that P is true of e_4 in w_3 at i.

In other words, the actual world is likely to evolve in such a way that at some future time, certain relevant circumstances will be such that the prejacent eventuality is both permissible and possible.

6.4.3   Aspect on the ability modal

Kratzer (1981:304-5) argues that ability modals involve some kind of circumstantial modal base and, at least on some readings, an empty ordering source. That is, an modal on its ability reading means that in at least one of the worlds in which certain relevant circumstances hold, the prejacent eventuality is realized. The question becomes, what circumstances count as "relevant"?

   Kratzer observes that different ways of encoding dynamic possibility, both within and across languages, vary on this front: an ability modal may allude to an agent's internal capacities (intellectual or mental ability), to an agent's physical capacities (pertaining to strength or health, for instance), or to facts about the world that are external to the agent. In Badiaranke, *mən*- can express agent-internal ability, be it physical or mental – or, as in (104), some combination of the two. (104) makes a claim about what is possible in light of the subject's own physical and cognitive capabilities, even though, as it happens, the *external* circumstances in the actual world (the absence of a motorcycle) prevent the subject from carrying out the action. The agent-external circumstances are thus ignored by *mən*-.

(104) **mən-** **ə̰̃** *ka-* *baj-* *e* **de**, bari moto ka- r-
POSSIB- 1sg.PERF INF- carry- INF AFF.DECL but motorcycle be- NEG.PERF-

a.
3sg.NEG

'**I can** *drive [a motorcycle]*, but there isn't a motorcycle (here now).' (8.53, #1, elicitation)

The claim that dynamic *mən-* encodes agent-internal ability is further supported by a construction in Badiaranke wherein *mən-* occurs as a transitive verb taking a nominal object, with no verbal prejacent. In such cases, *mən-* makes reference to physical ((105)-(106)) or mental (107) capacities of the subject.[24]

(105) **mənə-** **bə̰̃** *Ankola* **de**.
POSSIB- 3pl.PERF Angola AFF.DECL
'**They [the Senegalese soccer team] can** *[beat] Angola.*' (8.103, #1, elicitation)

PHYSICAL

(106) kab- i de mma **mən-** **te-** **mã** *mãbe*,
know- 2sg.PERF AFF.DECL 1sg.INDEP POSSIB- NEG.PERF- 1sg.NEG water

wiː nõ fe mãbe jak- i. fe patəbə.
2sg.INDEP TOP P water be- 2sg.PERF P mud

'You know that me, **I can't** *[swim in the] water*, while you, you stay in the water. In the mud.' (6.52, #9, frog and mouse story)

PHYSICAL

(107) kãdʒadə pakkã pãpã lõ – **mən-** **te-** **mã** *fuːtãkã* *de!*
language one DEM only POSSIB- NEG.PERF- 1sg.NEG Pular.Fuuta EMPH
'Only this language – **I** certainly **can't** *[speak] Pular Fuuta!*' (8.112, #12, self-introduction)

INTELLECTUAL

The modal base for ability *mən-*, then, consists of worlds where the agent has certain internal properties; the ordering source is (or at least can be) empty. Otherwise, the syntax and semantics of ability *mən-* – which, like subject-oriented deontic *mən-*, is a root modal – are identical to those of deontic *mən-*, which I have already analyzed in §6.4.2. Modifying the semantics for perfective-marked deontic *mən-* to incorporate the difference in modal base and ordering source yields the semantics in (108) for ability *mən-*.

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[24]I have not eliminated the possibility that ability *mən-* might also make reference to external circumstances in certain cases; further research is needed to probe this question.

(108) PERF($mən$-ABIL(Asp(P))): For all w_1, where w_1 is a metaphysical alternative to w_0 at t, it is the case that in <u>at least one</u> of the worlds w_3 that share <u>relevant agent-internal circumstances</u> with w_1, the agent carries out the implicitly salient or explicitly described action.

As with deontic $mən$-, perfective marking on dynamic $mən$- places a constraint on the base world: since w_0 is among its own metaphysical alternatives, perfective-marked $mən$- demands that the requisite agent-internal capabilities hold at t in w_0 itself. (109) gives the simpler version of (108) that results from this observation.

(109) PERF($mən$-ABIL(ASP(P))): $\exists w_3$ that as evaluated from $<w_0,t>$ shares <u>relevant agent-internal circumstances</u> with w_0 such that $\exists e_4$ and i such that P is true of e_4 in w_3 at i.

Thus perfective-marked $mən$- requires the agent to actually possess the ability at perspective time (as in (104)-(107)), even if the external circumstances prohibit the eventuality in question from being realized at present.[25]

   Just as perfective-marked dynamic $mən$- behaves like an ordinary perfective-marked state in Badiaranke, entailing that the state of ability holds of the subject in the base world, so imperfective-marked dynamic $mən$- acts like any other imperfective-marked state in the language. As we saw in §6.3.3, imperfective marking on $mən$- can be used to predict future (but as yet unrealized) ability, as in (110)-(112); epistemically probable ability, as in (113); or generic ability, as in (114).[26]

(110) Aliu nĩ   datʃ- ĩ,   **mpə-** mənə ka- kərə- ndaːn- e   woto
       Aliu when grow.up- 3sg.PERF <u>3sg.IMPF-</u> POSSIB INF- run- CAUS- INF car
       de.
       AFF.DECL

       'When Aliu grows up, **he will be able** *to drive a car*.' (8.9, #2 ,elicitation)

(111) maː **keː**   **mən-** ã   ka- tʃab- e.
       QUOT <u>NEG.IMPF.2sg.</u> POSSIB- 3sg.NSBJ INF- hold- INF

       'He said, "**You won't be able** *to catch him*."' (9.12, #7, magic and the supernatural text)

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[25]Perfective-marked dynamic $mən$-, unlike its imperfective counterpart, suggests that the assertion is based on evidence that the individual(s) has/have performed the action before and could do so again (although further research is needed to confirm whether this suggestion is a true actuality entailment like that in languages like French (Hacquard 2006) and Hindi (Bhatt 1999), or merely a strong implicature). In Badiaranke, this impression arguably results from the fact that the agent's capability in the base world is entailed, combined with the speaker's willingness to assert with certainty that this ability holds in all worlds identical to the base world up to perspective time.

[26]Progressive mp- on dynamic $mən$- is unattested in my data, although I have not yet asked about it explicitly.

(112) **mpə-** **mənə** **de** *ma-* *datta-* *a.*
3sg.IMPF- POSSIB AFF.DECL 3sg.SBJ- sleep- IRR

'**S/he will be able** *to sleep.*' (8.75, #1, elicitation)

(113) Aliu **kaː** **mənə** *ma-* *kərə-* *ndaːn-* *a* *woto...* koːre- jã kõ
Aliu NEG.IMPF.3sg. POSSIB 3sg.SBJ- run- CAUS- IRR car leg- 3sg.NSBJ DET

roːm- ə̃ de.
short- 3sg.PERF AFF.DECL

'Aliu **can't possibly** *drive a car...* his legs are too short.' (8.10, #2, elicitation)

(114) **mpə-** **mən** **de** *ma-* *raŋ-* *a* jã haː frãs.
3sg.IMPF- POSSIB AFF.DECL 3sg.SBJ- go- IRR here until France

'**S/he [the sorcerer] can** *go [fly]* from here to France.' (6.86, #7, magic and the supernatural text)

The semantics of imperfective-marked dynamic *mən-* is captured in (115).

(115) IMPF($mən$-$_{\text{DEONT}}$(Asp(P))): For all the *best* worlds w_1 accessible from $<w_0,\ t>$ as selected by a contextually varying modal base and ordering source, $\exists w_3$ that shares relevant agent-internal circumstances with w_1 such that $\exists e_4$ and $\exists i$ such that P is true of e_4 in w_3 at i.

If w_0 happens to be one of the best worlds selected by the imperfective, the ability will hold in w_0 itself. For this reason, imperfective-marking on the modal can be used to assert actual ability (or inability) as well, as in (116)-(117).

(116) **kam** **mənə** *wũ* *ka-* *tʃim-* *e.*
NEG.IMPF.3sg. POSSIB DEM INF- sing- INF

'**I can't** *sing that.*' (3.28, #1, marriage customs text)

(117) Aliu **mpə-** **mənə** **de** *ka-* *kərə-* *ndaːn-* *e* *woto.*
Aliu 3sg.IMPF- POSSIB AFF.DECL INF- run- CAUS- INF car

'Aliu **can** *drive a car.*' (8.9, #2, elicitation)

I expect, however, that use of the imperfective to express present ability should carry additional connotations: of the expectation that the ability (or lack thereof) will continue into the future (as in (116)), or of epistemic uncertainty (as in (117)). More detailed elicitation is needed on this front.

6.5   Conclusion

6.5.1   Remaining questions

While we have now resolved many issues about aspect-modal interactions in Badiaranke, a number of questions remain to be resolved in future research.

One puzzle is why the two modal verbs differ in the types of complements they allow. Whereas *mən-* requires its immediate complement to carry subjunctive, infinitive, or ordinary aspectual marking, *tʃoːm-* can take irrealis-marked complements (118) as well as infinitival ones (119), but never occurs with subjunctive-marked ones.[27]

(118) mi-   jim- ə̃   maː   heː bari **tʃoːməd- i**   kẽdan- <u>a</u>   **de**.
      NARR- say- 3sg.PERF QUOT hey but NEC-   2sg.PERF healthy- <u>IRR</u> AFF.DECL

'He said, "Hey, but **you have to** *be healthy*!"' (6.64, #3, Bala Tamba story)

(119) **tʃoːmədə- r-**   **a**   <u>ka</u>- karaŋ- <u>e</u>.
      NEC-   NEG.PERF- 3sg.NEG <u>INF</u>- study- <u>INF</u>

'**S/he shouldn't** *study*.' (8.78, #1, elicitation)

What causes these differences in form, and what, if any, are their ramifications for the *semantic* interactions between modal verbs and aspect? Since we saw that root and non-root possibility modals differ in their morphosyntax, a related issue is the extent to which *tʃoːm(əd)-* is productively used to express non-deontic modality, and the morphosyntactic differences – if any – between deontic and non-deontic *tʃoːm(əd)-*.

A second topic for future investigation is the semantics of clauses containing two or more modal verbs, as in (120) and (121).

(120) **<u>tʃoːməd-</u> ə̃**   **<u>mən-</u> a** *ma-*   karaŋ- a **de**.
      <u>NEC</u>-   3sg.PERF <u>POSSIB-</u> IRR 3sg.SBJ- study- IRR AFF.DECL

'**S/he should be able to** *study*.' (8.50, #1, elicitation)

(121) **<u>mən-</u> ə̃**   **de**   **ka-** **<u>tʃoːməd-</u> e** *karaŋ- a*.
      <u>POSSIB</u>- 3sg.PERF AFF.DECL INF- <u>NEC</u>-   INF study- IRR

'**S/he could have to** *study*. (8.48, #1, elicitation)

While I have elicited many such examples, more detailed work with consultants is needed to verify possible contexts for felicitous utterance, the types of modality each modal can express, and the semantic interactions between the modals.

An additional topic beyond the scope of this dissertation is a syntactic explanation of the morphosyntactic differences between different types of modals. I have already offered an explanation for one of these differences, namely the fact that epistemic *mən-* strongly prefers to have an auxiliary (usually *jak-* 'be' or *səm-* 'arrive/happen') before the prejacent, while

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[27]The additional difference noted in §6.2 – that *tʃoːm(əd)-*, unlike *mən-*, cannot bear progressive aspect and is questionable with the habitual – arises from the fact that the ability modal has no necessity dual as other types of possibility modals do (Hacquard 2006:64). That is, while deontic modals can encode universal (obligation, e.g. *must, have to*) or existential (permission, e.g. *may, can*), it is hard to imagine what the necessity counterpart for ability would be, unless it were an irresistible compulsion (e.g. *I have to sneeze*). In fact, Aboh and Nauze (2008:229) give just such an example suggesting a compulsion reading for the necessity modal in Gungbe; further elicitation regarding involuntary behavior of sneezing, coughing, etc. is needed for Badiaranke.

deontics and other types of root modals disprefer or disallow an auxiliary. On the analysis in this chapter, this particular difference arises because the aspect on epistemic *mən-* scopes under the modal, so that it needs an eventuality variable to bind, whereas for root modals, aspect on the modal binds the eventuality variable introduced by the modal itself. A related question for future research is why deontic modals agree with the subject, while epistemic modals generally take third person singular agreement. Some authors (e.g. Jackendoff 1972, Brennan 1993) have claimed that morphosyntactic differences between root and non-root modals in English reflect a control structure for the former and raising for the latter; other authors (e.g. Barbiers 2002) have argued against this hypothesis, while Nauze (2008) argues for cross-linguistic variation in this respect. Further research is needed to determine the plausibility of a raising vs. control split for Badiaranke modals.

A related puzzle is posed by the fact that imperfective-marked epistemic *mən-* can appear immediately adjacent to the prejacent, while perfective-marked epistemic *mən-* requires an intervening auxiliary, as shown in (122).

(122)   a.   * **mən-**   **ə̃**   **de**   *dattaː-*   *bə̃*   *de.*
                POSSIB- 3sg.PERF AFF.DECL sleep- 3pl.PERF AFF.DECL

             Intended: '**It's possible** *they're asleep.*' (8.75, #1, elicitation)

       b.   **mpə-**   **mənə**   **de**   *dattaː-*   *bə̃*   *de.*
             3sg.IMPF- POSSIB AFF.DECL sleep- 3pl.PERF AFF.DECL

             '**It's possible** *they're asleep.*' (8.75, #1, elicitation)

The solution to this last puzzle may involve some kind of elliptical process, aided by the availability of an epistemic reading for the imperfective (but not for the perfective).

6.5.2   Resolved questions

In this chapter, we have explained two puzzling semantic behaviors of Badiaranke modals. Both the apparent irrelevance of aspect on epistemic modals and the ability presupposition of perfective-marked deontic modals follow straightforwardly from a Kratzerian semantics for modality, fixed scopal relations between aspect and different modality types, and my analysis of Badiaranke aspect.

The indifference of non-root modals to the aspect on the modal results from the fact that these modals scope over aspect, the interaction of modal aspect with prejacent aspect, and the role that metaphysical alternatives play in both perfective and imperfective aspect in Badiaranke (on the imperfective's default reading). The dependence of non-root modal orientation on prejacent aspect stems directly from the semantics of aspect in this language and the distinction that Badiaranke aspect draws between future and non-future times.

The ability presupposition of perfective-marked deontics, meanwhile, falls out from three facts: that aspect scopes over root modals, that perfective aspect in Badiaranke entails eventuality realization in the base world; and that deontic modality involves a circumstantial modal base, which is always *realistic* (including the base world). As for ability modals, they

behave aspectually like any other stative verb in the language and are therefore essentially unproblematic.

What initially seemed to be surprising interactions between aspect and modal verbs has, in the end, provided gratifying support for the analysis in Chapter 3 of the Badiaranke perfective and imperfective. Given the heavy implication of modality in the semantics of both the perfective and the imperfective, the ability of my semantics for aspect to explain the effect of aspect on modal verbs is particularly satisfying. Moreover, the fact that this particular set of aspect-modality interactions has not been noted in the cross-linguistic literature becomes less surprising, since the semantics of aspect in Badiaranke is similarly cross-linguistically unusual.

6.5.3 Comparison with other languages

Badiaranke modality differs in crucial ways from other languages whose modal systems are far better represented in the literature. As a result, claims made about modality in those languages cannot be applied wholesale to Badiaranke, forcing one to develop an original analysis, as I have done in this chpater.

The Badiaranke modal constructions I have discussed are, in a sense, a blend between two types of modal constructions in English. Since non-root modals in Badiaranke generally take an auxiliary complement, they are somewhat comparable to English expressions like *it could be (the case) that*. In such English sentences, the prejacent is marked by tense as well as (sometimes) aspect, and it is not just Aktionsart, but also tense that determines orientation.

(123)   It could be that he is/was/will be asleep.

(124)   It could be that he studied/is studying/will study.

On the other hand, since Badiaranke modals are verbal, they are somewhat comparable to English modal verbs – which, unlike their Badiaranke counterparts, do not allow aspect on their complements ((125)-(126)).

(125)   He might be asleep.

(126)   He might study.

Von Stechow (2005) tackles the kind of modal sentences in (125)-(126). Much like my analysis here of non-root modal prejacents in Badiaranke, von Stechow (2005) argues that modal orientation in English modal sentences with bare modal complements is determined in part by Aktionsart on the prejacent. Unlike my analysis of Badiaranke, however, von Stechow's account of English relies on an additional mechanism that is not independently motivated: a covert future operator, which is optionally inserted between a modal and its infinitival complement. His Future Principle is stated in (127).

(127)   Between a modal and an infinitival we may embed a covert relative FUT.

<div align="right">von Stechow (2005:7)</div>

This principle is needed, according to von Stechow, in order to account for cases where evaluation time for the complement is understood to follow perspective time for the modal, without any overt tense being present. For instance, while (128) is unproblematic, since evaluation time – a time at which the state of McGonagall's anger holds – can simply be identical to perspective time, (129) and (130) are both somehow interpreted as though evaluation time – the time at which the eventuality might occur – follows perspective time (the present moment).

(128)   Professor McGonagall might be angry.

(129)   Professor McGonagall might be angry when she finds out that Harry flew without permission.

(130)   Hedwig might eat a mouse (tomorrow).

Inserting the future operator in (129)-(130) allows the time at which McGonagall becomes angry, or the time when Hedwig eats a mouse, to follow the time when the chance of these eventualities' occurence is assessed.

Despite the differences between Badiaranke and English modals, my analysis of modal orientation in Badiaranke supports von Stechow's hypothesis in a way, by providing independent evidence from an unrelated language that modal orientation is determined by aspectual properties of the prejacent (both Aktionsart and grammatical aspect, in the case of Badiaranke); this orientation, together with other morphosyntactic properties of the sentence (such as whether the prejacent is marked for aspect at all, and whether the modal agrees with the subject of the prejacent eventuality description), determines the possible modal interpretations. At the same time, my analysis attributes the observed correlation to a different source: whereas von Stechow attributes future orientation in English to covert insertion of a future tense, which does not seem to be needed elsewhere in the language, I derive the same phenomenon in Badiaranke from an independently motivated semantics for Badiaranke aspect. While it is clear that the precise analysis given here for Badiaranke modal orientation will not translate directly to English, where grammatical aspect is not always marked on the complement, the fact that similar facts in Badiaranke can receive a motivated explanation suggests that for English, too, a less stipulative explanation might be possible.

Von Stechow's discussion of English raises another difference between Badiaranke and English modal orientation. In English, stative prejacents unmarked for tense can yield either future or present orientation (128)-(129); in Badiaranke, as we have seen, perfective-marked stative prejacents yield ambiguity between *past* and present orientation, while imperfective marking on either stative or eventive complements yields an unambiguously future orientation. The fact that Badiaranke stative prejacents do not behave like their English counter-

parts provides further confirmation that the Badiaranke perfective is a contentful category, not simply the absence of imperfective semantics.

Regarding the interactions between modals and aspect more generally, it is difficult to apply my findings about Badiaranke to other languages (or vice versa), both because of different patterns of aspect marking in modal sentences, and because of differences in the semantics of aspect. In English, clearly, modals are not marked for aspect; in French and Italian, among other languages, they can be (Hacquard 2006); and in Hindi and Greek, modals, like any other verb, must be marked for aspect (von Fintel and Iatridou 2009:4). Even in languages that require or allow aspect marking on modals, however, many of the Badiaranke patterns – such as the ability presupposition of perfective-marked deontics – have not been noted, while other observations that have been made for these languages – such as the actuality entailment observed for perfectives of root modals in French and Hindi (Hacquard 2006, Bhatt 1999) – do not necessarily apply in Badiaranke. This disparity must result from the differences between Badiaranke and these other languages with respect to what the "perfective" and "imperfective" aspects do. In French and Italian, for instance, the imperfective encodes past time reference as well as aspect, which is not the case in Badiaranke; in Badiaranke, perfectives can be used to talk about present states, which is not the case for most languages.

Nonetheless, the present analysis of Badiaranke suggests that for languages where aspect is sometimes or always expressed on modals, an adequate analysis of aspect in those languages, together with a commonly accepted semantics for modals cross-linguistically, will help account for any initially surprising interactions between aspect and modality. Because Badiaranke aspect is so unusual, I would in fact expect its interaction with modals to be equally unusual. I also predict that of those languages, such as those mentioned in Chapter 3 above, whose aspectual systems resemble that of Badiaranke, the ones that also mark modals for aspect should display some of the patterns we have investigated in the present chapter. Whether this prediction is borne out is discussed further in Chapter 7.

Chapter 7

Conclusion

7.1 Summary of results

I began this dissertation by lamenting the lack of interaction between the formal literature on tense, aspect, and modality on the one hand and the descriptive literature on the other. I have now attempted to eliminate that disconnect for one language, Badiaranke, that is both under-described and under-documented. I have highlighted several properties of Badiaranke TAM that are surprising in light of what the existing literature on TAM semantics predicts, including the use of perfective aspect to talk about present states and of imperfective aspect to talk about future eventualities; the semantics of and distinctions between two past tense suffixes, despite the general optionality of tense marking in the language; and the bewildering effects of aspect marking on different kinds of modal verbs. My own analysis accounted for these atypical properties while also building upon many insights of earlier semantic analyses of TAM.

I have argued that none of the "aspects" in Badiaranke – at least as far as the perfective, imperfective, progressive, habitual, prospective, and transitional aspects are concerned – is purely aspectual; the semantics of each of incorporates modality. They are all aspectual in that they "operate on eventuality descriptions" (Tonhauser 2006:20), but they are all modal in that they make reference to possible worlds. Given my arguments for the mutual inextricability of TAM categories, it is interesting to note that it was observation of the *temporal* correlates of aspectual marking – the use of perfective aspect to talk about past events and present states, and of imperfective aspect to talk about currently developing and currently repeating, as well as future, eventualities – that made evident the inapplicability of common aspectual theories and inspired the partially modal analysis. In Chapter 3, I argued that the difference between Badiaranke's perfective and imperfective is not, as viewpoint analyses predict, one of boundedness vs. unboundedness. Nor is it, as neo-Reichenbachian analyses predict, a matter of how the eventuality's time span relates to that of the reference interval; both perfective and imperfective aspect entail realization of the eventuality *within* a certain time interval. Instead, the distinction has to do with the worlds in which the

eventuality is realized. If realization in all worlds identical to the base world up to perspective time is entailed, the perfective is used; if realization is in some other set of worlds – the best metaphysically, circumstantially, or epistemically accessible worlds – the imperfective must be used instead. Because metaphysical alternatives branch apart at perspective time, this semantics allowed me to explain the mapping of perfective aspect to times present (for states) and in the past (for events and, sometimes, states), and of imperfective aspect to times in the future. In Chapter 4, I argued that Badiaranke's other aspects share this modal quality – in some cases (e.g. transitionals and prospective) because their components include perfective or imperfective aspect, and in others (i.e. periphrastic habitual and periphrastic progressive) because they have developed specifically to take over part of the imperfective's broad semantic range.

The analysis of aspect in Chapters 3 and 4 received support in the two subsequent chapters, where it helped explain the semantics of both tense and modal verbs in Badiaranke. On the analysis in Chapter 3, aspect involves two reference times – perspective time and evaluation time. The relative position of evaluation time with respect to perspective time is fixed by aspect, through a combination of the modal component (particularly the semantics of metaphysical alternatives) and Aktionsart (specifically, the subinterval property that distinguishes statives from non-statives). Since the eventuality is realized at evaluation time, and since perspective time is generally clear from the context of utterance, aspect usually suffices to temporally position the eventuality. In Chapter 5, I argued that tense marking serves the purpose that aspect cannot: shifting perspective time into the past. Meanwhile, just as Badiaranke aspect covers part of the semantic space conventionally reserved for tense, tense in Badiaranke is deeply intertwined with modality: past tense is realized as -akəd- in sentences describing eventualities that might not be realized in the actual (or base) world, and as -ako- elsewhere.

In Chapter 6, my semantics for aspect helped explain two troubling facts about Badiaranke modals that have rarely, if ever, been observed in other languages: the fact that perfective and imperfective aspect are interchangeable on epistemic modals, and the fact that perfective aspect on deontic modals triggers an ability presupposition. The solution to both puzzles relied on the involvement of metaphysical alternatives both in Badiaranke's perfective aspect, and in the imperfective on its default reading. I argued that with aspect scoping under epistemic modals, perfective-marked epistemic mən- makes a claim about all the metaphysical alternatives to at least one epistemically accessible world, while imperfective-marked epistemic mən- makes a claim about the *best* metaphysical alternatives to at least one epistemically accessible world. The key to the epistemic mystery is the temporal effect of aspect in the prejacent: it determines whether the eventuality is realized (in certain worlds) by perspective time – when all metaphysical alternatives are indistinguishable – or after perspective time, when the metaphysical alternatives can be ranked. As for the ability presupposition of perfective-marked deontic mən-, it springs from the semantics of the high-scoping perfective – which requires the state of permission to hold at or before perspective time in the base world – together with the semantics of deontic possibility – which requires realization in at least one world in which certain relevant circumstances hold. Together, these requirements

mean that at some time at or before perspective time, the base world (and all its metaphysical alternatives at perspective time) contain (or contained) circumstances compatible with realization of the permitted action – including, crucially, ability of the subject to carry out the action.

7.2   Future research

The dissertation leaves open several syntactic and semantic questions about Badiaranke that deserve future investigation. On the syntactic front, one pressing issue is the syntax of sequence of tense in Badiaranke: why can relative clauses "choose" between two perspective times (either the matrix perspective time, or matrix eventuality time) while tense (and aspect) in complement clauses can take only matrix eventuality time as perspective time? Previous syntactic accounts of English sequence of tense, e.g. Enç (1987) (who argues that "anchoring," or binding, conditions for tenses force present-marked complement clauses to raise above a matrix past tense at LF) and Stowell (1995) (who postulates a similar operation for present-marked *relative* clauses and *not* for complement clauses), cannot be applied to Badiaranke as they stand, since the sequence of tense facts, and the semantics of tense more generally, differ in Badiaranke. A second syntactic puzzle, as mentioned in Chapter 6, is the source of morphosyntactic differences between the two modals; since the semantic analysis in Chapter 6 is in part syntactically driven, this matter is important in establishing the applicability of the theory to necessity *tʃoːm-*.

There are also several semantic matters that deserve further research. First, for the sake of manageability, I have focused primarily on aspect in affirmative, declarative clauses. This limitation leaves open the semantics of negation and its interaction with aspect. As Verkuyl (1993) notes, the aspect of an affirmative clause is not necessarily the same as that of its negative counterpart; specifically, the primary aspectual distinction in his analysis – terminativity (i.e. telicity) vs. durativity – is neutralized under negation. A negative proposition is durative, regardless of whether its affirmative equivalent is durative or terminative. In the terminology of my own analysis, all negative clauses are semantically stative, regardless of Aktionsart and the aspect of the corresponding affirmative clauses. Because of the effect of stativity on the semantics of grammatical aspect in Badiaranke (e.g. the perfective of a stative eventuality description is by default interpreted as describing a present state, while the perfective of an eventive one generally describes a past event), it stands to reason that the semantics of aspect may be affected by negation. A related question, given the importance of possible worlds in Badiaranke aspect (and, of course, modality), is the semantics of aspect (and modals) in wh- questions, since questions have been argued to involve either sets of propositions (Hamblin 1958, 1973; Karttunen 1977) or partitions on the set of possible worlds (Groenendijk and Stokhof 1984, Groenendijk 1999). A third area in which additional research is needed is the semantics of the minor aspects discussed in Chapter 4, for which it is desirable to develop a more formal synchronic analysis, on a par with that of the perfective and imperfective in Chapter 3.

Regarding the semantics of modals, Chapter 6 focused on epistemic, metaphysical, deontic, and dynamic modality, particularly possibility. Additional research is required to in order to test the interactions of aspect with bouletic, teleological, stereotypical, and addressee-oriented deontic modals, as well as with necessity *tʃoːm(əd)-* more generally. Although languages like English might lead us to expect any given modal verb to be capable of expressing any type of modality, Nauze (2008) shows that cross-linguistically, modals vary in this respect. Some languages have no modals that can express more than one kind of modality, while in others, modals can express several, but not all, modal flavors; Lillooet (Salishan) is an example of the first type of language, while Korean is an example of the second (Nauze (2008:127-9); see also van der Auwera *et al.* (2005)). Due to this diversity, we should not assume without evidence that Badiaranke modals have the same range of meanings as their English counterparts, or even that *tʃoːm(əd-)* has the same range as *mən-*.

Two other semantic topics, pertaining to mood rather than to modality per se, also deserve further investigation. One is the semantics of *de*, the affirmative declarative marker. As observed on page 70, the existence of such a morpheme is hardly limited to Badiaranke; similar markers have been noted in languages as diverse as the Gur language Dagaare (Scott Grimm, p.c.), the Omotic langauge Sheko (Hellenthal 2007:20), the Tibeto-Burman language Kuki-Thado (Cover 2005), and the Haruai language of Papua New Guinea (Miestamo 2005:105), but, to my knowledge, an explanation for such markers' distribution and a full account of their semantics remain to be worked out. A second mood-related question is the semantic relationship between two Badiaranke suffixes, *-a* and *-akəd-*, both of which I have argued are connected to the realis/irrealis distinction. I have glossed *-a* as 'irrealis' (IRR), while also arguing that *-akəd-* is the past tense suffix that appears in irrealis environments. Interestingly, the two suffixes appear in an overlapping, but not identical, set of environments. The *-a* suffix appears in subjunctive/hortative clauses, imperatives and prohibitives, complements of *tʃoːm(əd-)*, transitionals, and purposives; *-akəd-* appears in these same environments (with the exception of purposives), but also – unlike *-a* – with habitual aspect and with the general imperfective. Given that there is debate about the validity or uniformity of irrealis as a cross-linguistic category (e.g. Bybee *et al.* 1994:236-238, Palmer 2001:188-191, Michael 2010), this disparity between *-a* and *-akəd-* takes on some significance. Does Badiaranke have two kinds of irreality? Or would it be better to give one of them another label – or even, following Meyer (2001), to treat the various uses of *-a* as cases of accidental homophony, not constituting a unified category at all? Like any study that investigates one part of a language in depth, this dissertation opens the door to many other avenues of research on that same language.

A broader ramification of the analysis put forth here is its potential to inform our understanding of other languages whose TAM systems share some of Badiaranke's distinctive properties. While it is satisfying to have successfully explained the puzzling and even quirky behavior of TAM in Badiaranke, it would be even more so to find that this explanation sheds light on other under-described languages. Put differently, having demonstrated that careful description of Badiaranke demands a revision of previous analyses, ideally the novel proposal could be used to guide elicitation on, and thereby improve description of, TAM in related

languages with similar behavior. Such work would not only increase our knowledge about how each of the three TAM categories works in more languages, but also advance research into the extent to which the categories – particularly aspect and modality – can be cleanly separated cross-linguistically.

In Chapters 3 and 5, I commented that the tense and aspect systems of several other languages share similarities with Badiaranke's. Island Carib (Bybee *et al.* 1994:92), Dényá (Abangma 1985:114), Wolof (Nussbaum *et al.* 1970:358), Kisi (Childs 1995:225), Fongbe (Lefebvre and Brousseau 2002:87-8), and Igbo and Yoruba (Welmers 1973:346-7), among others, use the perfective to talk about present states; Pulaar (Fagerberg-Diallo 1983:247), Wolof (Nussbaum *et al.* 1970:360), Balanta (Fudeman 1999:94), Kisi (Tucker Childs p.c.) and Mani (Tucker Childs p.c.), among others, use the imperfective to predict future eventualities; and East Futunan, Kisi, Guyanese Creole, Wolof, Tokelauan, and other languages have some kind of discontinuous past (Plungian and van der Auwera 2006). Not all of these languages parallel Badiaranke in all of these respects, although some – such as Kisi and Wolof – appear to. Will my proposals for Badiaranke help explain TAM patterns in those languages, and if so, how will they have to be modified to account for any differences that arise? For instance, what if a language has futurate imperfectives but not present-referring perfectives of statives, or vice versa? In related languages, such as Pulaar, that have both a general imperfective and dedicated progressive and habitual constructions, is there sometimes a modal distinction, or a pragmatic one, between the general and more restricted imperfective categories? Why do discontinuous pasts in some languages entail current non-relevance but not necessarily pastness (as claimed by Plungian and van der Auwera (2006)), while the reverse is true in Badiaranke, and how does this distinction affect the interaction of tense and aspect?

For languages that *do* have futurate imperfectives as well as present-referring perfectives of statives, a number of questions arise with respect to modal verbs (if indeed they exist). In any such languages that mark modal verbs for aspect, my analysis of Badiaranke predicts an indifference of epistemic modals to aspect and an ability presupposition triggered by perfective marking on deontic modals. If these predictions are not borne out, an explanation will have to be found – either by modifying my proposal for Badiaranke in such a way that it encompasses both Badiaranke and the other language(s), or by further finetuning the semantic typology of possible TAM systems, with different semantic or syntactic parameters corresponding to the different types of languages.

Unfortunately, with the grammars and other descriptive materials available at this time, it is difficult if not impossible to test my analysis' predictions in languages of interest. As Nauze (2008) observes:

> The major difficulty that arises when one wants to pursue a typological work on modality is the scarcity of descriptions of modal systems from a semantic perspective. Most descriptive grammars do address the issue of modality but not always in enough depths to make it useful from a semantic point of view.

<div align="right">Nauze (2008:19)</div>

Indeed, many descriptions of languages that use the perfective to talk about present states and/or use the imperfective to talk about future eventualities (e.g. Childs (1995) on Kisi, Fudeman (1999) on Balanta, Sylla (1993) on Pulaar) deal with modality little if at all; explicit discussion of modal verbs and their interaction with aspect is vanishingly rare. Even when modals are discussed, it is not always possible to evaluate the applicability of my analysis of Badiaranke to the language in question.

Lefebvre and Brousseau's grammar of Fongbe (2002) is an example both of the kind of description that is needed and the problematic nature of the descriptions that exist. On the one hand, Lefebvre and Brousseau discuss in some depth both aspect and modal verbs in Fongbe; on the other hand, the modals they label as expressing "obligation" and "permission" (2002:288-93) actually appear, based on the examples, to express epistemic necessity and possibility. As a result, although the authors observe certain restrictions on modal-aspect combinations – e.g. that the "obligation" modal cannot be inflected with imperfective or prospective aspect – it is not entirely clear what conclusions to draw from these restrictions, since it is not clear that the "obligation" modal really expresses deontic modality. Moreover, although perfectives of statives do describe present states in Fongbe, the language does *not* have a futurate imperfective, but instead has both a definite and an indefinite future (Lefebvre and Brousseau 2002:91-94); so I would neither expect epistemic modals to show the same indifference to aspect, nor expect deontic modals to interact with imperfective aspect in the same way that Badiaranke modals do.

Uchechukwu (2008) attempts to remedy the inadequate treatment of modality in the literature on Igbo, a language of interest to us here because, according to Welmers (1973:346-7), it contains a "factative," i.e. a construction used to talk about both present states and past events. Uchechukwu describes the language's aspectual and modal systems, discussing in detail the combinatory possibilities of different aspectual morphemes with various modals and the semantic consequence of these combinations. Intriguingly, he makes the claim, unpredicted by my analysis of Badiaranke, that there is an "affinity" between deontic modality and perfective aspect on the one hand, and epistemic modality and imperfective aspect on the other.

Upon closer inspection, however, the Igbo data that Uchechukwu offers neither confirm nor challenge my prediction, for several reasons. The aspect that he terms "perfective" (or "completive") is in fact distinct from the factative, which he refers to as "non-completive neutral".[1] The "perfective," which is realized as -lá,[2] has some combination of perfective and perfect (current-relevance) semantics; it appears to indicate that the result state of a past event currently holds (Uchechukwu 2008:246). This aspect is distinct, morphologically at least, from the factative or "non-completive neutral," which is marked by a suffix -rV (the vowel varying in quality), and which appears to be semantically parallel to Badiaranke's perfective, indicating past realization for events and present realization for states. The ostensible connection in Igbo between perfectivity and deontic semantics has nothing to do

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[1]Adding to the terminological disparity, Uchechukwu uses "deontic" as a cover term for both deontic and dynamic – i.e. root – modality.

[2]The *lá* syllable is preceded by a vowel whose quality is determined by that of the preceding vowel.

with the use of perfective aspect per se; rather, Uchechukwu makes this claim based on the fact that three suffixes expressing inchoative meaning, directionality, and completeness on the *prejacent* of *rV*-marked modals allow a deontic meaning for the modals but not an epistemic meaning. Not only does this observation not help to test my predictions based on Badiaranke, but it is also puzzling, in that inchoativity is surely more aligned with imperfectivity in the traditional sense (as it does not portray a complete event) than with perfectivity.[3]

For the morphemes that appear most similar semantically to Badiaranke *mən-*, *nwé ík'e* (literally 'have strength') and *pạ*, both of which can express deontic, dynamic, or epistemic possibility, all of Uchechukwu's examples have the *-rV* suffix on the modal expression itself and an infinitival complement, and all express present permission, ability, or epistemic possibility. In this sense the data are entirely parallel to perfective-marked *mən-*. What is less clear is whether Igbo allows these modals to be marked with the imperfective, or with the distinct habitual and progressive aspects that exist in some dialects (Uchechukwu 2008:247-8), and what the resulting semantics would be; since Uchechukwu does not mention a futurate use for the imperfective, I would expect the semantics to differ from that of imperfective-marked *mən-*. It is also unclear from Uchechukwu's discussion whether deontic *nwé ík'e* and *pạ* trigger an ability presupposition, like perfective-marked *mən-*, leaving this question open for future research. Intriguingly, one of the other modal expressions Uchechukwu discusses – *tòsì* 'be suitable/appropriate', which expresses weak deontic or epistemic necessity and which takes the *-rV* suffix in his examples – does invoke an ability presupposition of sorts; the author notes that *tòsì* differs from an otherwise synonymous word *kwési* in that "-*tòsì* connotes that the subject who is to carry out the action modified by this verb is 'old enough' to execute it" (269). With such a rich system of modals (Uchechukwu discusses several other modal morphemes that are incompatible with the *-rV* suffix, either for morphological or for semantic reasons) and tantalizing parallels to Badiaranke, Igbo would be an excellent candidate for further research in aspect-modality interactions.

Aboh and Nauze (2008) provide a nice overview of modality-aspect interactions in another African language with a factative perfective, namely Gungbe (a Kwa language). They describe two modal verbs – *ɖó-ná* (necessity) and *sìgán* (possibility) – both of which can receive both root and epistemic readings, as well as a third, non-verbal modal element *ní*, which expresses deontic necessity. In Gungbe, as in Badiaranke, the zero-marked perfective receives an ongoing state reading with statives and a completed event reading with eventives; also as in Badiaranke, the time at which the state is claimed to hold can be shifted in certain environments (Aboh and Nauze 2008:218). Unlike Badiaranke, Gungbe, according to these authors, does not have a single, general imperfective form, let alone a futurate imperfective, but it does have progressive and habitual morphemes (218-9). Aboh and Nauze imply by omission that the modal verbs themselves are never marked for progressive or habitual aspect, although in certain cases the complements may be; however, since the Gungbe perfec-

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[3]Uchechukwu (2008:271) observes that Emenanjọ (1991) classes the Igbo inchoative suffix among the imperfective morphemes, but nonetheless asserts that the inchoative suffix is perfective-like in that it portrays an event as "fully started."

tive is zero-marked, it is unclear whether they view the modals – which do, after all, receive a present state reading – as being perfective-marked or not. Like Uchechukwu (2008), Aboh and Nauze (2008:235-6) claim that perfective aspect favors a root reading over an epistemic one; but it is not clear to me how their data show this, and indeed elsewhere (2008:234) they appear to make the opposite claim. Moreover, like Uchechukwu (2008), these authors are investigating the interaction with modals of aspect on the *prejacent*, not on the modal itself.[4] This language, too, is worth further investigation, although the resources available do not answer the precise questions raised by this dissertation.

While these last two papers offer a glimpse of the potential for research on TAM interactions in African languages, the combination of inconsistent terminology, paucity of examples, and absence of morpheme-level glosses in many grammars, together with the rarity of systematic discussion of aspect-modal interactions in the descriptive literature, makes it impractical at this time to test my predictions on these languages whose aspectual systems makes them good candidates for comparison with Badiaranke. Instead, I conclude with a plea to descriptive linguists everywhere, but especially those working on African languages, to devote more attention in grammars to modality and its interaction with aspect, and to seriously consider and explore the ramifications of the terminology they use in describing these categories – while also beseeching formal semanticists to devote more attention to TAM in lesser-studied languages. In the circumstantially accessible world ranked highest by my own bouletic ordering source, this dissertation will inspire others to conduct careful investigations of TAM semantics in Niger-Congo languages, thereby taking advantage of the very real potential for language description and linguistic theory to strengthen one another.

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[4]Aboh and Nauze (2008) make another interesting observation about aspect on the modal's complement, namely that progressive or habitual aspect in that position disallows a dynamic reading while allowing a deontic or epistemic one. My intuition is that this finding applies to Badiaranke as well, but further research is needed on this front.

Appendix A

Description of texts

A.1 Non-fictional texts

A.1.1 *kãkurã* text

This text describes the appearance and behavior of the *kãkurã*, a "spirit" known to various ethnic groups in southern Senegal and in Guinea. It is said to live in the woods. Years ago, when boys were circumcised, they would be taken a short distance away from the village. During their stay there, the *kãkurã* would protect them. To this day, the *kãkurã* is said to come to the village when the circumcision happens, even though nowadays the circumcision is done locally, often at the health post; men who know the spirit's whereabouts then summon it to the village.

When the *kãkurã* arrives, usually in the late afternoon, it clangs together its enormous knives and makes an eerie shrieking noise that can be heard throughout the village. The *kãkurã* is frightening to behold: only males of young adult age or older are allowed to see it, while children and women are not supposed to see it and flee when it makes its arrival known. It enters compounds where newly circumcised boys live (though not into the rooms themselves) and beats up those who do not obey its demands. If it meets a younger man, for instance, it forces him to take off his shirt and bow his head to the ground as though praying until it has passed. If it encounters an older man, it forces him to take off his head covering and bow forward; if he obeys, the *kãkurã* leaves, but if not, it beats him up.

Nowadays, a fake *kãkurã* sometimes shows up for fun, such as at celebrations of traditional culture or at circumcision celebrations. The fake *kãkurã* is a young man dressed up in a costume that resembles, as closely as possible, the appearance of the real *kãkurã*: completely red, with a special red shirt made of some mystery material from the woods and hair down to the waist that completely hides the face.

A.1.2 *dũdurã* text

The *dũdurã*, unlike the (real) *kãkurã*, is a human being in costume. It is the central character in a game played by children during the dry season, at the time when the rice has been harvested and has begun to be eaten. Once the grain has been removed, boys take the leaves and stalks from rice and/or fonio plants and tie it onto one or more of their group, who become the *dũdurã*. They smear the face of the *dũdurã* with red dirt, or with ashes from the cooking fire, such that he can't be recognized. They then call out "*dũdurã dũdurã*" to summon the girls, who get smacked with sticks by the *dũdurã*. Other times, they go to a place where they know the girls are and ambush them. When the girls try to run away, they are met by another *dũdurã*. The *dũdurã* doesn't actually hit the girls hard enough to hurt them; it's just a game.

A.1.3 *bakidõ* text

The *bakidõ* is a dance performed at the celebratory ceremony some time after a group of boys has been circumcised. It is performed by the circumcised boys and the young men who accompany them. The dance is quite difficult. It involves a stick, made of pliable young wood, that is bent into a semicircle; one of the dancer's legs enters the hoop while the other leaves it, and sometimes the dancer swings the hoop around his head.

A.1.4 *mambasa:mbas* text

The *mambasa:mbas* is a dance performed by women with children (*bəbas*) any time one of them is having a celebration, such as at a baby naming. The host invites all the *bəbas* and prepares a large quantity of food for them, such as porridge or couscous. The women arrive in the evening, often wearing special outfits that they reserve for *mambasa:mbas* occasions, which sometimes feature male-style clothing; they provide music by beating on a drum or on a large calabash floating in a basin full of water. The women dance and play all night. They also eat vast quantities, with each dancer grabbing handfuls of food out of basins and gobbling them down.

A.1.5 Magic and the supernatural text

This lengthy text recounts traditional (and ongoing) Badiaranke beliefs about magical and supernatural beings and phenomena, including spirits (jinns) and sorcerers. These beliefs persist despite the fact that essentially all Badiaranke people are now Muslim. The speaker first talks about sorcerers, who have the power to leave their bodies and "eat" other people from inside, causing illnesses that cannot be identified in the hospital; he gives detailed case studies of such evil witchcraft, as well as of sorcerers who use their powers for good, e.g. to accumulate wealth through non-violent means or to invent devices that help society. He then describes in detail particular spirits, some of which he has only heard about and some of which

he has encountered himself; these spirits appear in various guises and are often troublemakers. This topic leads him to relate the mythical founding of the village of Paroumba (my primary fieldwork site), according to which the Badiaranke founder, Bamandala, negotiated with a famous (and very demanding) tree spirit in Guinea-Bissau, Tamba Dibi, to lead him to victory over the local Pulaar ruler, Musaa Moolo.

A.1.6   Codification festival text

In this text, the consultant describes the festivities that were held in 2006 to celebrate the codification of the Badiaranke language in Senegal (which gave the language an official orthography as well as "national language" status in the country). The festival, attended by Badiaranke people from all three countries where the language is spoken (Senegal, Guinea, and Guinea-Bissau) as well as by ministers from the national government, featured traditional dances, costumes, and ceremonies of the Badiaranke culture. There were a few pseudo-*kãkurã* present, as well a *leppur*, a man dressed in a frightening costume that women used to be afraid of. Dances performed included the *pəsaːsaː* (the blacksmiths' dance), the *mambasaːmbas*, the *bakidõ*, and the *tʃiŋ* and *dʒãbadõ* (two other post-circumcision dances). Inhabitants of Tonguia, the most Badiaranke-dominated village in Senegal, re-enacted the *kujoːmu*, a pre-Islam ceremony, now largely forgotten, that used to be carried out when a respected leader died, while Guinean women re-enacted a ceremony called the *majãŋoːr*.

A.1.7   Kidnapping of the bride

The practice of *kũpãbra*, or kidnapping of a bride, is sometimes followed when a woman has been promised for marriage, but something is preventing her from being married: e.g. she wants to refuse, her parents have second thoughts, or her family doesn't have the means to provide her with the clothing and household items that a bride typically takes with her. The young man to whom she has been promised can then conspire with his friends to steal her away. For instance, they might come to hang out with her at night and then kidnap her, or one of the friends of the bride or groom might lure her out at night to a spot where the young men ambush her and take her to the groom's room, where she is stuck. Eventually, her parents will send her belongings after her. Afterwards, when it is too late for the bride to return to her family's home, the groom sometimes comes back and gives his in-laws kola nuts as a kind of peace offering.

A.1.8   Audio records release

At the end of each period of fieldwork, as required by the Committee for the Protection of Human Subjects, I obtained an "audio records release" from each consultant, specifying the ways in which I could use the data I had obtained from him or her. The consent was recorded orally. One consultant, instead of simply stating his approval of each usage I mentioned,

tended to provide a small monologue in Badiaranke about the importance of the work and the ways in which he allowed it to be used.

A.2 Stories

Badiaranke stories begin with the formulaic opening *tʃarijoː* (which is formally a plural imperative, but has no meaning in the sense that it is not used anywhere else), to which listeners respond with *duməsereː*. They conclude with one of several semi-formulaic endings (e.g. 'That's the end of the story. I lay it down in front of you'). Stories almost always include a song, repeated at intervals throughout the story. Many of the stories I recorded were translated spontaneously from stories in Mandinka, in which case the song was usually sung in Mandinka rather than in Badiaranke.

A.2.1 Bala Tamba story

This story is about a child who likes fishing and digging for yams. He goes to the river, where he encounters some mischievous pygmies (possibly spirits in pygmy form). The pygmies force him to help them carry their baskets of fish and refuse to let him go home, but ultimately he figures out a scheme that enables him to escape.

A.2.2 Runaway woman story

In this story, a woman runs away from her husband to her parents. To get there, she has to cross a river, which is full of water, with no bridge. A crocodile offers to carry her across, on the condition that she tell no one how she traversed the river. She agrees, not realizing at first that the crocodile has sent a little bird along to spy on her. Initially she keeps her promise, but after one persistent inquiry she lets on that she crossed on the crocodile's back. The bird begins to sing about her betrayal, and she realizes she will be stuck on that side of the river. She hastily bids farewell to her family, taking with her heavy bags of grain that her parents give her. As she rides on the horse cart to the river, she lets the grain spill out behind her, and the little bird eats all of it. She thereby slows the bird down enough that she beats it to the crocodile. The crocodile asks whether she has told anyone the secret; she says she hasn't, and the crocodile lets her cross. When the bird eventually arrives and sings about the betrayal, the crocodile lures it closer and closer and grabs it, blaming it and its gluttony for the fact that the woman was allowed to escape uneaten.

A.2.3 Daamaseree story

This is the story of a pair of twins born at a time and place where if twins are born, one of them is supposed to be killed. One of the twins, Daamaseree, is a perennial troublemaker and gets in a fight, in which he gets killed. The young man he had been fighting with had

threatened to kill the other twin as well. When it comes time for the funeral, people attempt to prepare the surviving twin for burial with his brother – they try to wash his body and carry him to the gravesite, but he insists on doing everything himself, reminding them that he is still alive. Ultimately, the people push the surviving twin into his brother's grave, but God interferes and lifts him out unharmed, allowing him to run away. Ever since then, it has not been the practice to kill twins.

A.2.4 Rabbit and hyena story

The wiley rabbit and the easily duped hyena are recurring characters in Badiaranke folklore. In this story, the rabbit and hyena travel to a village that is putting on a *dʒãbadõ*, pretending to be musicians. They sing and dance. When food is brought out to them, the hyena takes the best food for himself and gives the meager food to the rabbit. Eventually, they are given a goat, which they both claim for themselves. The rabbit plays a trick on the hyena, successfully hiding the goat and securing it for his own consumption.

A.2.5 Woman and bean fields story

This is the tale of an old woman who plants a field of beans. Some monkeys disguise themselves as young men and offer to help her harvest her crop; the old woman accepts their offer. While she goes off to cook for them, the monkeys sing about their duplicitous scheme. When the woman returns, she pretends she is tired and lies down, ostensibly to sleep but really to keep an eye on them. She hears them singing and sees them eating up the beans as they harvest them, but she is too afraid to lift her head while they are there. When they have eaten all the beans, they take off, and the woman runs home, crying out a warning to her neighbors about the destructive monkeys.

A.2.6 Ruler with two "wives" story

This somewhat racy story is about a boy born to a ruler whose wife keeps giving birth to boys, but wants a girl – so she decides to bring up her son as a woman. Eventually, he is given in marriage to a friend of his father's, who already has another wife, an older woman. The young man's older cowife comes to suspect that he is not in fact female and tricks him into revealing his true gender. She tells on him to the husband, who becomes angry and says that all women in his household must come to the village meeting place the next day and prove that they are female; anyone who is not will be killed. The young man is traumatized and goes outside the village to cry. He is discovered by a *jinne* (spirit), who, when he hears the sad tale, assures the young man that all will be well and tells him what to do. The *jinne* arranges things so that the old woman, when she goes outside to the bathroom at night, is made into a man, while the young man becomes female. The next day, the young man reveals himself as bidden, and it is discovered that he is a woman. The old woman tries to

avoid going to the meeting place but is dragged there, where it is found that she is now a man. The old woman is then killed.

A.2.7   Frog and mouse story

In this tale, a mouse goes hunting and brings back some game. His friend the frog sees his success and asks to borrow the mouse's gun. The mouse is reluctant, doubting that the frog will return it, but eventually gives in. Sure enough, having secured the gun, the frog refuses to give it back to the mouse, no matter how many times the mouse returns; and the mouse is unable to pursue the frog when he hides in the water. Finally, the mouse comes back with a bow and arrow and shoots the frog that way. The frog then returns the gun.

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