DOCTORAL DISSERTATION

At the intersection of temporal & modal interpretation:
a view from Arnhem Land (northern Australia)
[working title]

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Abstract

This dissertation presents a theory of the temporal and modal expression and the interaction of tense and modality devices on the basis of original data elicited in a number of language varieties spoken in Arnhem Land, Northern Australia.

The primary empirical focus of the dissertation is on Western Dhuwal(a), a Yolŋu language with four verbal inflections that are licensed in a number of contexts not straightforwardly predicted by existing accounts of tense, aspect or modality. On the basis of new data collected from native speakers during fieldwork in Northern Australia, I develop a formal semantic analysis of how this morphological material—in concert with both contextual information and other lexical and grammatical items—contributes to temporomodal expression and displacement in discourse.

Of particular note for theories of temporal and modal expression are two related phenomena: **cyclic tense** and **negation-based mood asymmetries**. Both of these have been documented in previous scholarship, although neither has been explained by existing formal semantic frameworks.

Cᴜᴄʟɪᴄɪᴛʏ—a phenomenon named by Comrie (1983:91)—refers to cross-linguistically uncommon tense marking systems in which the temporal intervals compatible with given markers are discontinuous. While current theories of temporal expression that have been brought to bear on similar phenomena (accounts based on interactions with situation and/or viewpoint aspect, sequence-of-tense effects and pragmatic shifting), these fail to predict the distribution of Western Dhuwal(a) verbal inflections. I propose a unified, interval-semantic analysis which can be shown to capture the temporal contributions of each marker, a finding that is additionally supported by the language's interval-denoting demonstrative inventory. Here I argue that, while the temporal semantics of these markers ostensibly diverges sharply from that of tense morphology cross-linguistically, this phenomenon in fact points to the semanticisation of universal pragmatic and discourse-structural norms (cf. Culioli 1980).

Additionally, in most contexts, irrealis, future and negative operators trigger a different set verbal inflections ('ɴᴇɢᴀᴛɪᴏɴ-ʙᴀsᴇᴅ ᴍᴏᴏᴅ ᴀsʏᴍᴍᴇᴛʀʏ' following Miestamo 2005). I propose an analysis which treats these semantic categories, as they are instantiated in W Dhuwal(a), as a natural class. A consequence of this is a treatment of W Dhuwal(a) inflection as encoding information about tense, mood and assertoric force; a finding that I argue speaks to the porous boundaries between these categories, and one that the inventory of formal semantics can insightfully and elegantly account for.

Consequently, the analysis defended in this dissertation shows that these two properties of Western Dhuwal(a) morphosemantics are epiphenomenal on an inflectional system that grammaticalises interactions between tense and mood; these *prima facie* surprising distributions fall out naturally from a compositional, unified semantics for each of the four inflectional categories.

Finally, on the basis of data from a number of other Yolŋu language varieties, I show that these tense and modal phenomena are innovations that point to a history of contact-induced change between western varieties of Yolŋu and the unrelated languages of Western Arnhem. These innovative varieties are a consequence of the reanalysis of the semantic contribution of an older tense-based paradigm. These meaning change phenomena rebalance the division of labour between pragmatic reasoning and a number of pragmatic operators, giving rise to the diachronic reorganisation (and synchronic variation) in the means of temporal and modal expression across

Yolŋu Matha. This semantic change pathway provides additional, diachronic support to theories of conceptual connections between the temporal and modal domains.

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Chapter 1

Introduction

Dispλacement — a stated universal and distinctive feature of human language — permits us to make assertions that are embedded in different times, locations and possible worlds (*e.g.* Hockett's 'design features of human language' 1960:90). Linguistic work — descriptive, pedagogical, theoretical — has traditionally assumed a categorical distinction between subtypes of verbal inflection: *viz.* the TEMPORAL and MODAL domains. Whether or not these basic claims are intended as heuristic, they quickly unravel upon close inquiry into cross-linguistic data; a challenge for linguistic theory, and one that a growing body of literature is identifying (*e.g.* Condoravdi 2002, Laca 2008, Rullman & Matthewson to appear *i.a.*).

The **empirical focus** of the dissertation proposed here is the tense-mood-aspect (TMA) systems of a set of languages in the Arnhem Land linguistic area of Northern Australia. Arnhem Land is 'linguistically dense' — an area of close historic and contemporary contact between unrelated languages (see map in Figure **??**). The verbal systems of many of these languages have evaded an adequate, unified account and exhibit various features that have been identified elsewhere as typologically rare (and certainly sharply diverge from better described Indo-European systems).

Consequently, given how resistant these data have been to description and analysis with existing linguistic apparatus, no theory neatly accounting for the inflectional range or making predictive generalisations; a better understanding of these systems will help us to nuance the way we think about categories like 'tense' and 'modality' — a theory of temporomodal displacement. The potential **theoretical contribution** of this dissertation, then, bears broadly on *intensionality*: our notional categories of tense, mood, modality, aspect, evidentiality, conditionals *etc.* Further, as will be shown in §2, the role of pragmatics/information structure and their interactions with semantics are crucial for understanding how these categories are expressed and interpreted: how intensional meanings are generated, how communication permits for the displacement of times and worlds.

Additionally, in this work I seek to consider the contribution of studying **language change** (specifically meaning change) to a better understanding of the cognitive apparatus that permits for the interpretation of temporomodal devices (*sc. 'what is it that speakers are doing in order to 'displace' discourse?'*). A starting point in the assumption that 'diachronically consecutive grammars are not characterised by radical discontinuities or unpredictable leaps, but that change consists of gradual discrete steps constrained by properties of grammar' (Deo 2006: 5). By hypothesis, then, the investigation of these 'steps' between subsequent stages of a grammar with respect to its verbal semantics–and the inference of 'constraints' on these changes–represent a significant potential source of insight into the linguistic expression and evaluation of event structure, time and possibility.

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Abstract

'Apprehensional' markers are a nuanced, cross-linguistically attested grammatical category, reported to encode epistemic possibility in addition to information about speakers' attitudes with respect to the (un)desirability of some eventuality. Taking the meaning of Australian Kriol particle *bambai* as an empirical testing ground, this paper provides a first semantic treatment of apprehensionality, informed by a diachronic observation (due toAngelo and Schultze-Berndt 2016 in which apprehensional readings emerge from erstwhile temporal frame adverbials that encode a relation of SUBSEQUENTIALITY between a discourse context and the eventuality described by the prejacent predicate.

3.1 Introduction

Consider the contributions of *bambai* in the Australian Kriol sentence pair in (1):

(1) **Context:** I've invited a friend around to join for dinner. They reply:

a. **Subsequential reading of** bambai

yuwai! ***bambai*** *ai gaman jeya!*
yes! ***bambai*** 1s come there

'Yeah! I'll be right there!'

b. Apprehensional reading of bambai

najing, im rait! ***bambai*** *ai gaan binijim main wek!*
no 3s okay ***bambai*** 1s NEG.MOD finish 1s work

'No, that's okay! (If I did,) I mightn't (be able to) finish my work!' [GT 20170316]

To be explicated in this chapter, while the reading of *bambai* in (1a) roughly translates to 'soon, in a minute', this reading is infelicitous in (1b), where *bambai* is a discourse anaphor which contributes a shade of apprehensional meaning (i.e. indicates that the Speaker's hypothetically joining for dinner may have the undesirable possible outcome of him not finishing his work.) This chapter is concerned with the emergence of APPREHENSIONAL readings of the temporal frame adverbial *bambai* in Australian Kriol. It describes the distribution of these two readings (synchronically, when do apprehensional readings "emerge" in context, (§ 3.3), considers how apprehensionality emerges out of so-called "subsequentiality" markers diachronically (§ 3.4), and proposes a unified meaning component for the two readings (§ 3.5). This chapter is intended for a general audience, although draws insights throughout from the formal semantics literature, particularly in capturing the meaning components and proposing a formal lexical entry for *bambai*.

3.1.1 Background

Having entered into their lexicons predominantly via the contact pidgin established in NSW in the late eighteenth century (Troy 1994), cognates of the English archaism *by-and-by* are found across the English-lexified cognate languages of the South Pacific. Additionally, Clark (1979) describes *by-and-by* as a particularly broadly diffused feature of the *South Seas Jargon* that served as a predominantly English-lexified auxiliary means of communication between mariners of diverse ethnolinguistic backgrounds and South-Pacific islanders (21, cited in Harris 1986:262*ff* a.o.). The cognates across these contact languages have preserved the function of *by-and-by* as encoding some relationship of temporal subsequentiality between multiple eventualities.[1,2]

As shown in 1, Australian Kriol (hereafter Kriol *simpliciter*) has retained this function: in (2), *bambai* serves to encode a temporal relation between the two clauses: the lunch-making event

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[1] *baimbai* (sic) is described as a 'future tense marker' by Troy (1994:112,418,711) and (Harris 1986:268). Indeed it appears to be a general marker of futurity in the textual recordings of NSW pidgin that these authors collate, although still retains a clear syntactic function as a frame adverbial. Their description of *bambai* (along with *sun, dairekli, etc*) as tense marker is possibly due to the apparent lack of stable tense marking in the pidgins, although is likely used pretheoretically to refer to an operator that is associated with future temporal reference. This is discussed further in § **??** below

[2] See also Angelo and Schultze-Berndt 2016 for further review of cognates of *bambai* across other Pacific contact languages.

occurs at some point in the (near) future of the speaker's father's trip to the shop: *bambai* might well be translated as 'then' or 'soon after'.

(2)   *main dedi imin   go la det shop ailibala **bambai** imin   kambek   bla   gugum*
       my   father 3s=PST go LOC the shop morning **bambai** 3s=PST come.back PURP cook

      dina   bla   melabat
      dinner PURP 1p.EXCL

      'My dad went to the shop this morning, **then** he came back to make lunch for us' [AJ 23022017]

In addition to the familiar 'subsequential' use provided in (2), *bambai* appears to have an additional, ostensibly distinct function as shown in (3) below.

(3)   **Context:** It's noon and I have six hours of work after this phonecall. I tell my colleague:

      *ai=rra dringgi kofi   **bambai** mi gurrumuk la   desk iya   gin*
      1s=IRR drink   coffee *bambai* 1s fall.asleep LOC desk here EMPH

      'I'd better have a coffee otherwise I might pass out right here on the desk'   [GT 28052016]

In (3), the speaker asserts that if he doesn't consume coffee then he may subsequently fall asleep at his workplace. In view of this available reading, Angelo and Schultze-Berndt (2016) describe an 'apprehensive' use for Kriol *bambai* — a category that is encoded as a verbal inflection in many Australian languages and is taken to mark an 'undesirable possibility' (256). In this case, *bambai* is plainly not translatable as an adverbial of the 'soon'-type shown in (2). Rather, it fulfills the function of a discourse anaphor like 'otherwise', 'or else' or 'lest' (see also Phillips and Kotek, Webber et al. 2001).

    This chapter proposes a diachronically-informed and unified semantics for Kriol *bambai*. It begins with section 3.2, which motivates the grammatical category of 'apprehensional epistemics' as described in typological literatures. Section 3.3 describes the function and distribution of Kriol *bambai*, both in its capacity as a subsequential temporal frame adverbial (§3.3.1) and its apparent apprehensional functions (§3.3.2). Section 3.5 proposes a unified semantics for *bambai* and discusses the grammaticalisation of apprehensional meaning while section 3.6 concludes.

3.2   Apprehensionality as a functional category

While descriptive literatures have described the appearance of morphology that encodes "apprehensional" meaning, very little work has approached the question of their semantics from a comparative perspective. Particles that encode negative speaker attitude with respect to some possible eventuality are attested widely across Australian, as well as Austronesian and Amazonian languages (Angelo and Schultze-Berndt 2016:258). While descriptive grammars of these languages amply make use of these and similar categories,[3] Lichtenberk (1995) and Angelo and Schultze-Berndt (2016) are among the only attempts to describe these markers as a grammatical category).[4]

    Lichtenberk claims that the To'abaita ([mlu] Solomonic: Malaita) particle *ada* in (4a) serves to modalise ("epistemically downtone") its prejacent while dually expressing a warning about the undesirability of opening the stone oven in vain.

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[3] TIMITIVE and particularly EVITATIVE a.o are also cited in these descriptive literatures.

[4] An edited collection on *Apprehensional constructions*, edited by Marine Vuillermet, Eva Schultze-Berndt and Martina Faller, is forthcoming via Language Sciences Press. This volume (in which a version of this work will appear) similarly seeks to address this gap in the literature.

(4b), meanwhile, links two clauses: it expresses negative speaker attitudes about a future eventuality of getting caught in the rain, a possible consequence of the subjects' hypothetical failure to take umbrellas with them. Of particular interest for present purposes is the categorical co-occurrence of SEQ-marking *ka* in the prejacent to *ada*. Lichtenberk notes that the sequential subject-tense portmanteau *appears categorically in these predicates*, independent of their 'temporal status.' He claims that this marking indicates that the encoded proposition '*follows the situation in the preceding clause*' (296, emphasis my own). The analysis appraised in this dissertation proposes a basic conceptual link between the expression of the **temporal sequentiality** of a predicate and **apprehensional** semantics.

(4) **Apprehensional marking in To'abaita**

a. **CONTEXT.** Dinner's cooking in the clay oven; opening the oven is a labourious process.

ada	*bii*	*na'i*	*ka*	*a'i*	*si*	*'ako*	*ba-na*
APPR	oven_food	this	it:**SEQ**	NEG	it:NEG	be.cooked	LIM-its

'The food in the oven may not be done yet' (295)

b.
kulu	*ngali-a*	*kaufa*	***ada***	*dani*	*ka*	*'arungi*	*kulu*
1p.INCL	take-PL	umbrella	APPR	rain	it:SEQ	fall.on	1p.INCL

'Let's take umbrellas in case we get caught in the rain' (298)

Drawing on comparative evidence (*viz.* with Lau ([llu] Solomonic: Malaita) and other SE Solomonic languages), Lichtenberk argues that the apprehensional functions of *ada* are a result of the grammaticalisation of an erstwhile lexical verb with meanings ranging a domain 'see, look at, wake, anticipate' that came to be associated with warning and imprecation for care on the part of the addressee before further developing the set of readings associated with the present day APPR marker (1995:303-4).

Dixon (2002:171) refers to the presence of nominal case morphology that marks the AVERSIVE as well as the functionally (and sometimes formally, see Blake 1993:44) related verbal category of apprehensionals as 'pervasive feature of Australian languages' and one that has widely diffused through the continent.[5] Lichtenberk (1995:306) marshalls evidence from Diyari ([dif] Karnic: South Australia) to support his claim about a nuanced apprehensional category, drawing from Austin's 1981 grammar. The Diyari examples in (5) below are all adapted from Austin (1981).

(5) **Apprehensional marking in Diyari**

a.
wata	*yarra*	*wapa-mayi,*	*nhulu*	*yinha*	*parda-**yathi**,*	*nhulu*	*yinha*	*nhayi-rna*
NEG	that way	go.IMPER-EMPH	3s.ERG	2s.ACC	catch-**APPR**	3s.ERG	2s.ACC	see-IPFV$_{SS}$

'Don't go that way or else he'll catch you when he sees you!' (230)

b.
wata	*nganhi*	*wapa-yi,*	*karna-li*	*nganha*	*nhayi-**yathi***
NEG	1s.NOM	go-PRES	person-ERG	1s.ACC	see-**APPR**

'I'm not going in case someone sees me' (228)

c.
nganhi	*yapa-li*	*ngana-yi,*	*nganha*	*thutyu-yali*	*matha~matha-thari-**yathi***
1s.NOM	fear-ERG	be-PRES	1s.ACC	reptile.ERG	ITER~bite-DUR-**APPR**

'I'm afraid some reptile may bite me' (228)

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[5]Dixon in fact attributes the paucity of work/recognition of this linguistic category to 'grammarians' eurocentric biases' (171).

 d. *nhulu-ka kinthala-li yinanha matha-**yathi***
   3s.ERG-DET dog-ERG 2s.ACC bite-**APPR**

   'This dog may bite you'   (230)

The sentences in (5) shows a range of syntactic behaviour for Diyari suffix *-yathi* 'APPR.' The *-yathi* marked clause is linked to a prohibitive in (a), a negative-irrealis predicate in (b) and predicate of fearing in (c), or alternatively occurs without any overt linguistic antecedent in (d).[6] In all cases, the predicate over which *-yathi* scopes is **modalised** and expresses a proposition that the speaker identifies as 'unpleasant or harmful' (Austin 1981:227). Little work has been undertaken on the emergence of these meanings.[7]

As we will see in the following sections, apprehensional uses of preposed *bambai* in Kriol have a strikingly similar distribution and semantic import to the apprehensional category described in the Australianist and other typological literatures. Angelo and Schultze-Berndt (2016) focus their attention on demonstrating the cross-linguistic attestation of a grammaticalisation path from (sub)sequential temporal adverbial to innovative apprehensional marking. They suggest that for Kriol, this innovation has potentially been supported by the presence of like semantic categories in Kriol's Australian substrata. Data from virtually all attested languages of the Roper Gulf are shown in (6). Note that for (almost all of) these languages, there are attested examples of the apprehensional marker appearing in both biclausal structures (*p* LEST q) as well as monoclausal ones ($\lozenge_{apprehensive}$ *p*).

(6) **Apprehensional/aversive marking in Roper Gulf languages**

 a. **Ngandi**

   *a-ḏaŋgu-yuŋ ŋaṛa-waṭi-ji,   a-waṭu-ḏu aguṛa-**miliʔ-ŋu-yi***
   NCL-meat-ABS 1s>3s-leave-NEG:FUT NCL-dog-ERG 3s>3s-**APPR**-eat-**APPR**

   'I won't leave the meat (here), lest the dog eat it.' (Heath 1978:106, interlinearised)

 b. **Ngalakan**

   *garku buru-ye **mele**-ŋun waṛŋ'waṛŋʔ-yiʔ*
   high 3ns-put **APPR**-eat.PRES crow-ERG

   'They put it up high lest the crows eat it.'   (Merlan 1983:102)

 c. **Rembarrnga**

   *ŋaran-**maʔ**-ɲamʔ   ŋa-na   laŋə ṛalk*
   3s>1p.INCL-**APPR**-bite.PRES 1s>3-see.PST claw big

   'He might bite us! I saw his big claws.'   (McKay 2011:182)

 d. **Wubuy**

   *numba:-'=da-ya:::-ŋ gada, nama:='ru-**ngun-magi***
   2s>1s=spear.for-go-NONPST oops 1d.INCL>ANIM=leave-**APPR**-**APPR**

   'Spear it! Ey! Or else it will get away from us!'   (**?**:13.12, interlinearised)

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[6]Austin claims that these clauses are invariably 'structually dependent' (230) on a 'main clause' (*viz.* the antecedent.) We will see in what follows a series of arguments (to some degree foreshadowed by Lichtenberk (1995: 307)) to eschew such a description.

[7]Dixon (2002:171) and Blake (1993:44) are partial exceptions although these both focus on syncretism in case marking rather than dealing explicitly with the diachronic emergence of the apprehensional reading.

e. **Ritharrŋu**

*gurrupulu rranha nhe, **wanga** nhuna rra buŋu*
give.FUT   1s.ACC 2s   **or else** 2s.ACC 1s hit.FUT

'Give it to me, or else I'll hit you.'

(Heath 1980, interlinearised & standardised to Yolŋu orthography)

f. **Mangarayi**

*bargji ∅-ṇama **baḻaga** ña-way-(y)i-n*
hard   2s-hold **lest**   2s-fall-MOOD-PRES.

'Hold on tight lest you fall!'   (Merlan 1989:147, cited also in A&SB:284)

g. **Marra**

*wu-ḻa   ṇariya-yur, **wuniŋgi** ŋula ṇiŋgu-way*
go-IMP 3s-ALL   **lest**   NEG 3s>2s-give.FUT

'Go to him, or else he won't give it to you.'   (Heath 1981:187, cited also in A&SB:284)

As shown in (6), there is a diversity of formal strategies deployed (or combined) in these languages to realise apprehensional meaning: suffixation inside the verbal paradigm (6a), prefixation to the verb stem (6a-d), a separate apprehensional particle (6e-f).

In view of better understanding the cognitive unity of these categories and the mechanisms of reanalysis which effect semantic change in *bambai* and its TFA counterparts in other languages, the distribution and meaning of the 'subsequential' and apprehensional usages of *bambai* are described below.

3.3   The distributional properties of *bambai*

Angelo and Schultze-Berndt (2016) provide convincing cross-linguistic evidence of the candidacy of temporal frame adverbials (TFAs) for recruitment as 'apprehensional' markers. Table 3.1 summarises examples of adverbials they collect in favour of this hypothesis. They additionally suggest that there is some evidence of apprehensional function emerging in the *bambai* cognates reported in Torres Strait Brokan [tcs] and Hawai'ian Creole [hwc].

Table 3.1. Etyma and polysemy for apprehensional modals

Language	Adverbial	Gloss[6]	Author (grammar)
Std Dutch [nld]	*straks*	soon	Boogaart (2009, 2020)
Std German [deu]	*nachher*	shortly, afterwards	A&SB (2018)
Marra [mec]	*wuniŋgi*	further	Heath (1981)
Mangarayi [mpc]	*baḻaga*	right now/today	Merlan (1989)
Kriol [rop]	*bambai*	soon, later, then	

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[6]This isn't to suggest that the semantics of those words provided in the 'GLOSS' column in the table above ought to be treated as identical identical: the definitions seek to capture a generalisation about sequentiality. A prediction that falls out of this generalisation is that TFAs like 'later, soon, afterwards, then' might be best interpretable interpretable as subsets of this category.

Compare, for example, the uses of Marra *wuninggi* and Mangarrayi *barlaga* in (7) to those in (6f,g), where the availability of apprehensional and subsequential readings appears to echo that of Kriol.

(7)   a.   **Mangarayi**

*gaḷaji   ŋaŋʔ-ma   **baḷaga**   ∅-yag*
quickly   2s.ask-IMP   **before**   3s.go

'Ask him quick, before he goes.'   (Merlan 1989:147, cited also in A&SB:284)

  b.   **Marra**

*wayburi   jaj-gu-yi   **wuniŋgi**: gaya*
southward   chase-3s>3s.PST   **further**   there

'[the dingo] chased [the emu] a bit more in the south.'   (Heath 1981:360)

Merlan (1989:147) glosses *baḷaga* as 'EVITATIVE/ANTICIPATORY', commenting that these two notions are "sometimes indistinguishable." She also notes the formal (reduplicative) relation to frame adverbial *baḷaḷaga* 'right now, today', commenting on the shared property of "immediacy" that links all these readings. Of *wuniŋgi*, Heath (1981:308) suggests translations of 'farther along, furthermore, in addition' (common in text translations) in addition to (elicited) apprehensional readings. He explicitly notes the similarity between this apparent polysemy and Kriol *bambay* (sic) (given the "closeness" of the sense of 'later' to that of 'farther along'.)

The remainder of this section will (informally) describe the distribution and meaning of both temporal-frame and apprehensional readings of *bambai* in the data. The Kriol data used here includes draws from Angelo and Schultze-Berndt ([*A&SB*], 2016) and the Kriol Bible ([*KB*], The Bible Society in Australia 2007) in addition to elicitations from, and conversations with, native speakers of Kriol recorded in Ngukurr predominantly in 2016 and 2017.

3.3.1   Temporal frame use

Temporal frame adverbials (TFAs) are linguistic expressions that are used to refer a particular interval of time, serving to precise the *location* of a given eventuality on a timeline. As an example, TFAs include expressions like *this morning* or *tomorrow*, which situates the eventuality that it modifies within the morning of the day of utterance or the day subsequent to the day of utterance respectively (see Binnick 1991:307). Formally, we can model the contribution of a TFA by assuming a set $\mathcal{T}$ of points in time which are all strictly ordered with respect to each other chronologically. This is represented by a PRECEDENCE RELATION $\prec$ (where $t_1 \prec t_2 \leftrightarrow t_1$ precedes t_2). A TFA like *today*, then, is a predicate of times: it picks out all the points in time between the beginning and the end of the day of utterance. In the sentence *Mel ate today*, the TFA restricts the instantiation time of the eating event (t_e) to this interval. That is, *Mel ate today* is true iff Mel ate at t_e and $t_{\text{start-of-day}} \prec t_e \prec t_{\text{end-of-day}}$.

As discussed in §3.1, Kriol *bambai* is derived from an archaic English temporal frame adverbial, *by-and-by*, a lexical item with some currency in the nautical jargon used by multiethnic sailing crews in South Pacific in the nineteenth century. The general function of *by-and-by* has been retained in contemporary Kriol, namely to temporally advance a discourse, much as Standard Australian English uses expressions of the type 'soon/a little while later/shortly after(wards)' or 'then.' These expressions represent a subset of 'temporal frame adverbials': clause modifiers that delimit the temporal domain in which some predicate is instantiated. In this paper, I refer to the relevant

set of TFAs as *subsequentiality* ('SUBSEQ') adverbials. The motivation for describing this as a se-
mantic subcategory is the robust intuition that, in addition to temporally advancing the discourse
(*i.e.* marking the instantiation of the prejacent predicate posterior to a given reference time), SUB-
SEQ TFAs give rise to a salient, truth-conditional expectation that the predicate which they modify
obtain in non-immediate sequence with but in the **near future** of a time provided by the context
of utterance. This general function of *by-and-by* is attested in the contact varieties (i.e. pidgins)
spoken in the nineteenth century in Australia; this is shown in (8).

(8)   An excerpt from a (diagrammatic) explanation of betrothal customs and the genealogy of
      one couple as given to T A Parkhouse by speakers of a Northern Territory pidgin variety from
      the Larrakia nation. in the late nineteenth century. (Parkhouse 1895:4, also cited in Harris
      1986:299.)My translation (incl. subscript indexation)

... that fellow lubra   him have em nimm.
that ATTR woman 3s   have TR boy

by-and-by *him catch him lubra,   him have em nimm.*
bambai   3s   catch TR   woman 3s   have TR boy

Him lubra   have em bun-ngilla. **By-and-by** *girl big fellow, him nao'wa   catch him,*
3s   woman have TR girl   **bambai**   girl big ATTR   3s   husband catch 3s

him méloa   have em bun-ngilla.
3s   pregnant have TR girl

By-and-by *nimm big fellow, by-and-by bun-ngilla big fellow, him catch him.*
bambai   boy   big ATTR **bambai**   girl   big ATTR   3s   catch 3s

'...That woman$_h$ had a son$_i$. Later, he$_i$ got a wife and had a son$_j$. This woman$_k$ had a daughter$_\ell$.
Then, when the girl$_\ell$ had grown up, her husband got her$_\ell$ pregnant, she$_\ell$ will had a daughter$_m$.
Then, when the boy$_j$ was grown and the girl$_m$ was grown, he$_j$ got her$_m$.'

Note that, according to Parkhouse, (8) constitutes a description of the relationship history of a
one couple; each sentence is past-referring. In this sense, it is clear that there is no tense marking
in the narrative. In each of the *by-and-by* clauses in (8), the speaker asserts that the event being
modified is *subsequent* to a reference time set by the previous event description. In this respect,
by-and-by provides a temporal frame to predicate that it modifies.

As we have seen above, the SUBSEQ-denoting function of *bambai* shown here has been retained
in Kriol. This reading is shown again in the two sentences in (9). The schema in (9c) informally
shows how the *bambai* establishes a temporal frame for the instantiation of the predicate that it
modifies.

(9)   a.   **Context:** During a flood a group of people including the speaker have moved to dry place
            up the road

            *mela   bin ol mub deya na, jidan deya na, **bambai** elikopta   bin kam*
            1p.EXCL PST all move there now sit   there now **bambai** helicopter PST come

            deya na, detlot deya na   garra kemra
            there now DET:PL there now have   camera

            'We all moved there, **then** a helicopter came, the people there had cameras'

[A&SB: 271]

b. **Context:** Eve has conceived a child.

   Bambai *imbin   abum   lilboi*
   bambai   3s.PST   have   boy

   'Subsequently, she had (gave birth to) a boy'   [KB: Jen 4.1]

c. **Instantiation for subsequential reading**

   w_0, t_0 ——————— $w_0, \boldsymbol{t_e}$ ⋯⋯⋯⋯⋯ w_0, t_r^+

   In the reference world w_0, the eventuality described by the predicate is instantiated before some time t^+ in the future of a reference time t_r (the latter is contextually determined, by an antecedent proposition if present, or otherwise established by the discourse context.)

As shown in (9a) above, the arrival of the helicopter (and its associated camera crew) is modified by *bambai qua* TFA. It has the effect of displacing the instantiation forward in time with respect to the reference time provided by the first clause. *Bambai* has the effect of displacing the instantiation of helicopter-arrival forward in time with respect to the reference time provided by the first clause (*sc.* the time that the group had moved to a dry place up the road).

Similarly, (b) asserts that the eventuality described by the prejacent to *bambai* (namely the birth of Esau) is instantiated in the near future $\{t_e : t_e \prec t_r^+\}$[8] of some reference time t_r provided contextually, albeit not by a linguistically overt antecedent clause. Subsequential TFAs are distinguished by this 'near future' restriction, underpinned by a set of conversational expectations over reasonable degrees of "soonness."

This subsection has described the contribution of *bambai* in its capacity as a 'subsequential' TFA. A discussion of apprehensional uses follows.

3.3.2   Apprehensional use

In his survey of "apprehensional modality", Lichtenberk (1995:295-6) describes apprehensionals like To'abaita *ada* as having a dual effect on their prejacents: *epistemic downtoning* — *i.e.* 'signal[ling] the [speaker's] relative uncertainty...about the factual status of the proposition' — and (a shade of) *volitive modality* — 'the fear that an undesirable state of affairs may obtain'. As shown below, this is an additional function to Kriol *bambai* (and one that diverges from the subsequential/temporal frame uses described above.

Angelo and Schultze-Berndt (2016:272*ff*) observe that apprehensional *bambai* occurs with both an 'admonitory' illocutionary force in a precautioning/warning sense (10a), in addition to declarative illocutionary acts; where the speaker formulates a prediction of undesirable eventuality as the possible outcome of some discourse situation (10b).

3.3.2.1   Indicative 'nonimplicationals'

The sentence data in (10) demonstrate how *bambai*-sentences are used to talk about undesirable possible future eventualities. Formally, we can enrich the time model introduced in the previous subsection by postulating a set of *possible worlds* $\mathcal{W}$ (following standard assumptions, a "proposition" ($p \in \mathcal{W} \times \{\mathbb{T}, \mathbb{F}\}$) is a set of possible worlds, namely those in which it is true, e.g. Stalnaker 1979, **?**).

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[8]This is not to suggest the psychological reality or referability of some 'latest bound' reference time t_r^+. The latter merely represents a contextual expectation by which the event described by the prejacent had better have obtained for the whole sentence to be judged true. See §3.5 for further discussion of this device.

Generally speaking, the construction *p bambai q* in its apprehensional meaning means 'if the situation in p doesn't obtain in w, then the (unfortunate) situation in q might' $(\neg p(w) \rightarrow \blacklozenge q(w))$.

(10) a. **Context:** Two children are playing on a car. They are warned to stop.

Ey!	***bambai₁***	*yundubala*	*breikim*	*thet*	*motika,*	*livim.*	***bambai₂***	*dedi*	*graul*	*la*	*yu*
Hey!	***bambai***	2d	break	DEM	car	leave	***bambai***	Dad	scold	LOC	2s

'Hey! You two might break the car; leave it alone. Otherwise Dad will tell you off!'

[A&SB: 273]

b.
ai	*garra*	*go*	*la*	*shop*	*ba*	*baiyim*	*daga,*	***bambai***	*ai*	*(mait)*	*abu*	*no*	*daga*	*ba*
1s	IRR	go	LOC	shop	PURP	buy	food	***bambai***	1s	(POSS)	have	no	food	PURP

dringgi	*main*	*medisin*
drink	my	medicine

'I have to go to the shop to by food **otherwise** I may not have food to take with my medicine' [AJ 23022017]

In (10a), there are two tokens of apprehensional *bambai*. The second *(bambai₂)* appears to be anaphoric on imperative *livim!* 'leave [it] alone!' Notably, it appears that the Speaker is warning the children she addresses that a failure to observe her advice may result in their being told off $(\neg p \rightarrow \blacklozenge q)$ — unlike the uses of *bambai* presented in the previous subsection, *bambai* here is translatable as 'lest/otherwise/or else.' *bambai₁*, the first token in (10a) appears to have a similar function, although has no overt sentential antecedent. In this case, the Speaker is issuing a general warning/admonition about the children's behaviour at speech time. In uttering the *bambai₁* clause, she asserts that, should they fail to heed this warning, a possible event of their breaking the car is a possible outcome. (10b) provides an example of an apprehensional/LEST-type reading occurring in a narrative context: here the Speaker identifies a possible unfortunate future situation in which she has no food with which to take her medicine. Here, in uttering the *bambai* clause, she asserts that such an eventuality is a possible outcome should she fail to go to the shop to purchase food. This reading is robustly attested in contexts where the antecendent is modified by some irrealis operator. The example from (3) is repeated below as (11): here *bambai* makes a modalised claim: if κ is a set of worlds in which I drink coffee at t' (and $\overline{\kappa}$ is its complement), then an utterance of (3) asserts that $\exists w \in \overline{\kappa} :$ I sleep by t^+ in w.

(11) a. **Context:** It's noon and I have six hours of work after this phonecall. I tell my colleague:

ai=rra	*dringgi*	*kofi*	***bambai***	*mi*	*gurrumuk*	*la*	*desk*	*iya*	*gin*
1s=IRR	drink	coffee	*bambai*	1s	fall.asleep	LOC	desk	here	EMPH

'I'd better have a coffee otherwise I might pass out right here on the desk'(GT 28052016)

b. **Instantiation schema for apprehensional reading in (a)**
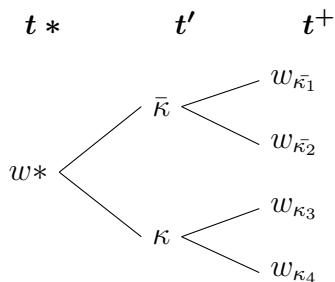
In the reference world w_0 at speech time t_0, the Speaker partitions possible futures into those in which he drinks coffee and those in which he doesn't (that eventuality described by the antecedent.) In those worlds where he fails to drink coffee, there exist possible futures ($w_{\neg\kappa_1} \vee w_{\neg\kappa_2}$) in which he is asleep by some future time t^+.

Notably, this behavior where *bambai* is anaphoric on a proposition that is related to the complement of its antecedent clause appears to be categorical. This is further shown in (12) below, where a SUBSEQ reading of *bambai* is infelicitous.

(12) **Context:** The Speaker is experiencing a bout of insomnia

$^{\#}$*airra   wotji   muvi bambai mi gurrumuk*
1s=IRR watch film   *bambai* 1s fall.asleep

Intended: I'll watch a film, then I'll (be able to) fall asleep [AJ 23022017]

The relationship between the antecedent clause and the context on which *bambai* is anaphoric is further discussed in §§**??**-4.

3.3.2.2 Subjunctive 'nonimplicationals'

bambai also receives an apprehensional reading in subjunctive/counterfactual contexts: those where an alternative historical reality is considered (see von Fintel 2012). (13) below provides an example of apprehensional *bambai* in one such context.

In (13), the Speaker identifies that in an alternative history (w') in which he behaved differently to the way in which he did in the evaluation world ($\not\simeq w*$), namely one in which the event described in the antecedent failed to instantiate, it is a significant possibility that he would have slept at work. Consequently, and comparably to the example (12) above, *bambai* modalises its prejacent: it asserts that $\exists w' \not\simeq w* : w \in \kappa \wedge$ I sleep by t^+ in w'.

(13) a. *ai=bin dringgi kofi   nairram **bambai** ai bina   silip~silip-bat   la   wek*
1s=PST drink   coffee night   **bambai** 1s PST:IRR sleep~DUR-IPFV LOC work

'I had coffee last night **otherwise** I would've slept at work' [AJ 23022017]

b. **Instantiation schema for apprehensional reading in (a)**

t_0 t' $t*$ t^+
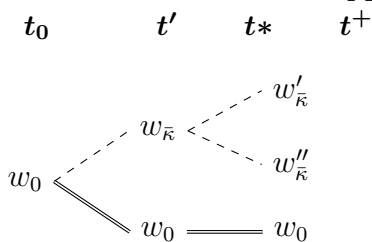
Here, the Speaker considers a set of worlds that historically diverge from the evaluation world w_0, namely the set of worlds where, unlike the evaluation world, the Speaker did not drink coffee at t'. The Speaker asserts that there are some possible near futures to $\langle t', w_{\bar{\kappa}} \rangle$ in which he falls asleep by some time t^+, posterior to t'.

The Kriol apprehensional data described so far is intuitively unifiable and bears some amount of syntactic similarity to familiar conditional constructions *(i.e.* that of an "infixed" two-place relation between two propositions.) For all examples we have seen so far, *bambai* introduces an

predicate that describes an eventuality q which construes as undesirable for the speaker. It appears to that this eventuality is a *possible, foreseeable* future outcome of some other contextually provided proposition p.

The 'indicative' and 'subjunctive' uses can be unified by appealing to the notion of 'timeline settledness' (e.g Condoravdi 2002): in those contexts where the prejacent is understood to be being asserted of a future time ($t_e \succ t*$) or a different world ($w' \not\simeq w*$), those where the Speaker could not possibly have access to a determinate set of facts, the Speaker R-implicates (see Horn 1984) that they are making a prediction; the entire proposition construes as modalised. The reference world and time are provided by some tensed or modalised antecedent proposition, linguistically overt or otherwise. Of additional interest is the fact that in the examples we have seen so far, the instantiation of the predicate that is modified by *bambai* appears to be a potential consequence of the non-instantiation of the antecedent to *bambai*. This observation is further investigated in §3.5.2 below. We turn first to additional apprehensional uses of *bambai*.

3.3.2.3   Epistemic adverbial

In contrast to the 'nonimplicational' (*i.e.* LEST/'in case'-type) readings presented immediately above,[9] *bambai* also appears to function as an epistemic adverbial with apprehensional use conditions: Lichtenberk's *apprehensional-epistemic function* (1995). This use of *bambai* occurs in monoclausal sentences (described here) as well as conditional sentences (§ 3.3.2.4 below).

In (14) below, *bambai* functions as an "epistemic downtoner" (cf Lichtenberk 1995) to its prejacent (*bambai* $q = \blacklozenge q$). In this case, where the speaker doesn't *know* who's at the door, the function is to make a claim about how, in view of what she *does* knows and might expect to be happening, the (present-tensed) situation described in the prejacent is a distinct possibility (and a distinctly undesirable one at that.)

(14)   **Context:** Speaker is at home to avoid running into her boss. There's a knock at the door; she says to her sister:

   Gardi! **Bambai** *im main bos iya   la   det dowa rait na*
   Agh   **bambai** 3s my   boss here LOC the door right now

   'Oh no! That could be my boss at the door.'   [AJ 02052020]

In these apprehensional-epistemic occurrences, *bambai* has entered into the functional domain of other epistemic adverbials (notably *marri~maitbi* 'perhaps, maybe'.) The meaning implications of this on the epistemic adverbial domain in Kriol are discussed below.

3.3.2.4   *if*-Conditionals

In contrast to the 'nonimplicational' (*i.e.* LEST-type) readings presented immediately above, Kriol also forms conditional sentences using an English-like *if...(then)* construction. The two sentences in (15) give examples of an indicative and subjunctive *if*-conditional, where *bambai* introduces the apodosis.

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[9]Note however that *bambai*$_1$ in (10a) also represents a use like this.

(15) a. *if ai dringgi kofi* ***bambai*** *mi* [#]*(nomo) gurrumuk*
         if 1s drink   coffee ***bambai*** 1s [#](NEG)   sleep

         'If I drink coffee then I might not sleep'   [AJ 23022017]

     b. *if ai=ni=min-a*   *dringgi det kofi* ***bambai*** *ai(*[#]*=ni)=bin-a*   *gurrumuk jeya*
         if 1S=NEG=PST-IRR drink   the coffee ***bambai*** 1s([#]=NEG)=PST-IRR be.asleep   there

         Intended:'If I hadn't drunk coffee then I may well have fallen asleep there'
                                                                    [GT 16032017]

The contrast between (15a,b) and (11a;13a) respectively, evinces some restriction that *if* forces on the interpretation of the antecedent to *bambai*. Whereas the *if*-less sentences presented previously assert that a particular eventuality may obtain/have obtained just in case the antecedent predicate **fails**/failed to instantiate (i.e. the LEST readings), the sentences in (15) diverge sharply from this interpretation; that is, they claim $p \rightarrow \blacklozenge q$: should the antecedent proposition hold (have held), then q may (have) obtain(ed).

In this respect, *bambai* appears to be behaving truth conditionally as an epistemic modal auxiliary encoding possibility, similarly to an adverbial like *marri* 'perhaps'. The examples in (16-17) below, however, demonstrate the perseverance of apprehensional expressivity in these syntactic frames.

(16) **Context:** I'm planning a trip out to country but Sumoki has taken ill...

     a. *if ai gu la   holiday,* ***bambai*** *main dog dai*
         if 1s go LOC holiday ***bambai*** 1s   dog die

         'If I go on holiday, my dog may die'
         $\rightsquigarrow$ I'm likely to cancel my holiday

     b. *if ai gu la   holiday,* ***marri***   *main dog (garra) dai*
         if 1s go LOC holiday **perhaps** 1s   dog (IRR)   die

         'If I go on holiday, my dog may die'
         $\not\rightsquigarrow$ I'm likely to cancel my holiday   [AJ 04082017]

Here, the contrast between (a) and (b) is attributable to the expressive content of *bambai* (cf. Kaplan 1999). That *bambai* licenses an implicature that the Speaker is considering cancelling her holiday to tend to her sick pet, an inference that isn't invited by neutral epistemic counterpart *marri* provides strong evidence of the semanticisation of *bambai*'s expressive content (similar to 'sincerity'- or 'use-conditions' for a given lexical item.) The extent of this process is further evinced in (17) below, where the selection of *marri* instead of *bambai* gives rise to a conventional implicature that the Speaker's utterance of (17) ought not be interpreted as the expression of a desire to prevent her daughter's participation in the football game.

(17) **Context:** I am cognizant of the possibility that my daughter injures herself playing rugby.
     [#]**Context:** I am uncomfortable with the likelihood of my daughter injuring herself playing rugby.

     if im pleiplei fudi, marri   main doda   breigi im leig
     if 3s play   footy *perhaps* my   daughter break her leg

     'If she plays footy my daughter may break her leg'
                         $\not\rightsquigarrow$ [so she shouldn't play]   [AJ 04082017]

Based on this evidence, we may conclude that the ostensible encroachment of *bambai* into the domain of epistemic adverbials has given rise to a privative dyad (*i.e.* 'Horn scale', see Horn 1984: 33-8) of the type $\langle marri, bambai \rangle$ — "an utterance of *marri p* conventionally implicates that the Speaker was not in a position to utter *bambai p*."[10]

3.3.3 Summary

In the preceding sections, we have seen clear evidence that *bambai* has a number of distinct readings. Nevertheless, we can draw a series of descriptive generalisations about the linguistic contexts in which these readings emerge. These are summarised in Table (3.2).

Table 3.2. Semantic conditions licensing readings of *bambai*.
bambai is interpreted as SUBSEQ when the state-of-affairs being spoken about is **settled**/the same as the actual world ($w' \simeq w*$) (i.e. **factual**, **nonfuture** contexts). In other (nonreal/unsettled) contexts, apprehensional readings "emerge." In the *p bambai q* formula, *bambai q* is interpreted as a predication about the negation of p (the LEST reading.)

	p bambai q		$w' \simeq w*$	*p bambai q*
	SUBSEQ		✓	✗
APPR	LEST	$\neg p \rightarrow \Diamond q$	✗	✓
	EPIST	$(p \rightarrow) \Diamond q$	✗	✗

As discussed in the preceding sections, unsettled timelines (*i.e.* those in which (a) the prejacent's understood reference time t_e is in the future of evaluation time $t*$/***now*** or (b) the predicate described in the prejacent is understood as instantiating in a world w' which is not a historic alternative to the evaluation world $w*$) give rise to the modalised readings of *bambai.* There are a series of operators which we have seen in the data presented above that appear to 'trigger' predication into an unsettled timeline. A selection of these is summarised in Table 3.3 below.

3.4 Apprehensional readings emerge in subsequential TFAs

Here I consider a number of linguistic factors that appear to have contributed to the emergence of apprehensional readings of TFAs.

Numerous authors (e.g. Culicover and Jackendoff 1997, Harder 1995, Klinedinst and Rothschild 2012, Schmerling 1975, Stukker and Sanders 2012 a.o.) have investigated the semantic dependencies that often obtain between clauses that are *syntactically coordinate*. These include the "conditional readings" of *and* and *or*, in addition to asyndetic constructions of the type: *John comes, I leave* (where my departure is interpreted as a consequence of his arrival.) In these cases, although the second clause is interepreted as being "semantically subordinate" to the first, this relation is not made explicit in the syntax (see Roberts 1989) for discussion and an implementation of "modal subordination".)

Relatedly, consider the parallels between interrogative and conditional clauses. The functional motivation for these appears to be that conditional apodoses (consequent clauses) can be under-

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[10]Therefore the meaning of the 'weaker' expression comes to represent the relative complement of the stronger in the semantic domain: the neutral epistemic adverbial comes to conventionally implicate *non-apprehensional* readings: $[\![marri]\!] \approx \Diamond \setminus \{[\![bambai]\!]\}$

[8]This is not intetnded to entail the claim that these operators are in any way semantic primitives.

[9]This example due to Dickson (2015:168 [KM 20130508]).

Table 3.3. Semantic operators[11] that give rise to modalised readings of *bambai*

GLOSS	Form	Example
IRREALIS	*garra*	*ai**rra** dringgi kofi **bambai** mi gurrumuk* 'I'll have a coffee or I might fall asleep'
PROHIBITIVE	*kaan*	*ai **kaan** dringgi kofi **bambai** mi nomo silip* 'I won't have a coffee or I mightn't sleep'
C'FACTUAL	*bina* PST:IRR	*ai **bina** dringgi kofi nairram **bambai** aibina silip* 'I had a coffee last night or I might've fallen asleep'
IMPERATIVE	∅	*yumo jidan wanpleis **bambai** mela nogud*[12] 'Youse sit still or we might get cross'
PROHIBITIVE	∅ [*nomo*] IMPR	***nomo** krosim det riba, **bambai** yu flodawei* 'Don't cross the river or you could be swept away!'
GENERIC	∅	*im gud ba stap wen yu confyus, **bambai** yu ardim yu hed* 'It's best to stop when you're confused, or you could get a headache'
NEGATIVE	∅ [*nomo*] GEN	*ai **nomo** dringgi kofi enimo **bambai** mi fil nogud* 'I don't drink coffee anymore or I feel unwell'
CONDITIONAL	*if*	***if** ai dringgi kofi **bambai** ai kaan silip* 'If I have coffee, then I mightn't sleep'

stood as answering a "question" posed by the protasis (antecedent, see Phillips and Kotek ms. for further discussion of this style of analysis.) This is clearly demonstrated for Danish by Harder (1995:101-2), replicated in (18) below.

(18) a. **A two-participant discourse**

    A. *Kommer du i aften?*

       Are you coming tonight?

    B. *ja*

       Yes

    A. *Så laver jeg en lækker middag*

       Then I'll cook a nice dinner.

  b. *Kommer du i aften, (så) laver jeg en lækker middag*

    'If you're coming tonight, (then) I'll cook a nice dinner.'

Harder suggests that "the conditional can be seen as a way of *telescoping a discourse sequence into one utterance* so that **B** has to respond not only on the basis of the present situation, but also on the basis of a possible future."

Consider the discourses in (19-21) below.

(19) **Context:** A child is playing on a car and is told to stop.

  A. *gita la jeya!*

    get off LOC there!

  B. *ba wani?*

    why?

    A. *bambai yu breigim motika*
       bambai 2s break   car

    'Get off of there [...why?...] Then you'll break the car!'   [GT 16032017]

(20) **Context:** It's the wet season and the Wilton River crossing has flooded.

    A. *nomo krosim   det riba!*
       NEG   cross.TR the river

    B. *ba wani?*
       why?

    A. 1 *bambai yu flodawei!*
         bambai 2s float away

    'Don't cross the river [...why not?...] Then you'd be swept away!'   [GT 16032017]

(21) **Context:** A snake slithered past *A*'s leg.

    A. *det sineik bin bratinim   mi!*
       the snake PST frighten.TR me

    B. *ba wani?*
       why?

    A. *bambai imina   baitim mi!*
       bambai 3s.PST:IRR bite.TR 1s

    'The snake scared me [...why?...] It might've been about to bite me!'   [GT 01052017]

In all of the short discourses above, the translation provided elucidates the capacity of the temporal properties of *bambai qua* sequential TFA to implicate additional nontemporal properties of the relation between the clauses it links. Via pragmatic strengthening *(viz. post hoc ergo propter hoc)*, *bambai* can be understood to assert that there exists some type of logical (*e.g.* etiological) relation between the predicate contained in the first proposition and the eventuality described in *bambai*'s prejacent: the second clause.

Furthermore, Angelo and Schultze-Berndt (2016) propose that:

> The conventionalisation of the implicature of undesirability may come about through frequent use of a clausal sequence in which the first clause has the illocutionary force of a directive and the second is introduced by the temporal marker. (285)

Synchronically, the apprehensional reading frequently occurs embedded under a predicate of fearing or with a directive/prohibitive antecedent (19-21) also show examples of this. Relatedly, Boogaart (2020:192*ff*) suggests (of Dutch) that it is the "sense of immediacy" of this class of adverbials that associates with notions of "urgency" and that this is the source of the "expressive nature" of subsequential TFAs. Consequently, we hypothesise that the frequent association of sequential TFAs with these discourse contexts (situations of urgent warning) has resulted in the **conventionalisation** of apprehensional use-conditions for *bambai q*. The selection of an subsequential TFA instead of a different epistemic adverbial in some unsettled context invites the inference that the Speaker is negatively disposed to the event described in the prejacent.

exiseting Dutch
judgments/elicitatitons to
be added

Marshalling cross-linguistic evidence of this path of change,[13] for German and Dutch respectively, an utterance *nicht jetzt, nachher!/niet nou, straks!* 'not now, later' is reported to involve a higher degree of intentionality and immediacy than the less specialised *nicht jetzt, später!/niet nou, later!* 'not now, later.' What's more, tracking the facts for *bambai*, these TFAs appear to have encroached into the semantic domain of epistemic adverbials, where they are reported to encode negative speaker affect with respect to their prejacents (relative to the other members of these semantic domains.)[14,15]

Additionally, *nachher* appears to have acquired a similar semantics to *bambai*, shown by its felicity in the discourse in (**??**) below, where, tracking ⟨*marri, bambai*⟩, *nachher* appears to have encroached into the semantic domain of *vielleicht* 'perhaps.' In these contexts, *nachher* asserts negative speaker attitude with respect to its prejacent in terms relative to neutral *vielleicht* (Hanna Weckler, p.c.).

(22) **A two-participant discourse in German**

A *ich hoffe, dass   es heute nicht regnet*
I   hope COMP it today NEG rain

B *warum?*
why?

A₂ *nachher wird die Party noch abgesagt!*
nachher INCH the party *noch* cancelled

'I hope it doesn't rain today [...why?...] Then the party might be cancelled!'

B₂ *nein, das   ist nicht möglich*
no,   that is   not   possible

B′₂ #*nein, das   wäre   gut!*
no,   that would.be good

B″₂ *ja,   das   ist möglich aber das   wäre   nicht so schlimm!*
yes, that is possible but   that would.be NEG   so bad!

Similarly to the Kriol data, German *nachher*, a TFA encoding susbsequentiality, has developed the characteristics of an apprehensional epistemic, a likely consequence of frequent embedding in the discourse contexts discussed above. Following the literature on expressive content and use-conditional semantics (e.g Gutzmann 2015, Kaplan 1999, Potts 2007), it is fruitful to model the 'negative speaker attitude' component of the meaning of apprehensionals as inhabiting a semantic 'dimension'—connected to but distinct from the truth conditions set out above. The infelicity of (22**B₂**)'s utterance shows that negation cannot target this component of Speaker meaning, an

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[13]See also Angelo and Schultze-Berndt 2018 for these observations and insightful comments about the properties of these adverbials in Kriol and German. Related observations are made for Dutch by Boogaart (2020).

[14]Thanks to Hanna Weckler and Mireille L'Amie for discussion of German and Dutch intuitions respectively.

[15]Compare also the colloquial English expression *(and) next thing you know, q (22)* As with the other subsequential TFAs we have seen, it appears that this adverbial tends reads less felicitously (or indeed invites an ironic reading) when *q* is not construed as an undesirable proposition. This is shown in 22 below, attributed to Jon Stewart.)

(i)   *The fields dried up, **and the next thing you know** our fleet dropped from 68 drivers to six in the matter of a few months.*   *[Google result]*

(ii) *The Supreme Court ruled that disabled golfer Casey Martin has a legal right to ride in a golf cart between shots at PGA Tour events. Man, **the next thing you know,** they're going to have some guy carry his clubs around for him.*

argument for its treatment as a non-truth-conditional component of the semantics (Pott's *nondisplaceability* 2007:169. Borrowing Gutzmann's 'fraction notation'(2013, 2015), we can tease apart the use- and truth-conditional components of the *bambai* clause in (21).

(23) $$\frac{S \text{ is worried about/negatively disposed to snake bites}}{S \text{ gets bitten by a snake in } w' \in \mathbf{best}(f, g, t*, w*) \text{ at } t' : \mu(t*, t') < c_s}$$

> this is the wrong place for this, I don't know exactly where the UC part should go if it sticks around, but at the moment it's formulated in such a way that it presupposes the TC semantic analysis

If this mode of thinking about the speaker attitude implications of *bambai* q is on the right track, then, in superposition to the meaning above, we can conceive of *bambai* as a function from contexts to contexts. In uttering *bambai* q at t in w, the Speaker has created a context just like $\langle t, w \rangle$, but one in which 'it registers that [they regard q] negatively somehow' (Potts 2007:175).

3.5 A semantics for *bambai*

This section seeks to provide a semantics for Kriol *bambai* that unifies the available SUBSEQUENTIAL and APPREHENENSIONAL readings discussed above and explains how a given reading is privileged in particular linguistic contexts. In order to do this, we assume a Kratzerian treatment of modal operators (1977, 1981 *et seq*).

3.5.1 Subsequentiality

§3.3.1 outlined the retained meaning of *bambai* as a TFA derived from 'by-and-by.' As we saw, the function of the so-called SUBSEQUENTIALITY class of frame adverbials is to effect the constrained forward-displacement of the reference time of their prejacents with respect to some contextually provided reference time. (24) represents a proposal to capture this relation.

(24) **SUBSEQUENTIAL INSTANTIATION** (intensionalised)
SUBSEQ$(P, t, w) \leftrightarrow \exists t' : t \prec t' \wedge P(t')(w) \wedge \mu(t, t') \leq s_c$
A subsequentiality relation SUBSEQ holds between a predicate P, reference time t and reference world w iff the P holds in w at some time t' that follows t.
Additionally, they assert that the temporal distance $\mu(t, t')$ between reference and event time must be below some contextually provided standard of 'soon-ness' s_c.

The relation between a contextually-provided standard and measure function $\mu(t_1, t_2)$ analysis[16] builds in a truth-condition that captures variable intuitions about the falsity of a statement such as *Eve fell pregnant then shortly afterwards gave birth to a son* in some situation where the birth of Cain succeeds the pregnancy described in the antecedent clause by some contextually inappropriate length of time (*e.g.* ninety years.) An additional advantage is that, in appealing to a pragmatically retrieved standard, we allow for faultless disagreement between interlocutors, in case speaker and addressee retrieve divergent standards of soonness from the discourse context.

In its capacity as a TFA then, *bambai* can be thought of as realising a subsequential instantiation relation, as shown in (25) below.

(25) **Lexical entry for *bambai* (TFA)**
$[\![bambai]\!]^{t,w} \underset{\text{def}}{=} \lambda P.\text{SUBSEQ}(P, t, w)$
bambai asserts that the property described by its prejacent (P) stands in a SUBSEQ relation with a time and world provided by the discourse context.

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[16]Given that $\mathcal{T}$ is isomorphic with $\mathbb{R}$, formally $\boldsymbol{\mu} : \wp(\mathcal{T}) \to \mathbb{R}$ represents a Lebesgue measure function that maps any interval $[t_1, t_2]$ to its length $t_2 - t_1$.

3.5.2 'Settledness' & intensionalisation

A primary motivation for the current work is to better understand the linguistic reflex that underpins the availability of apprehensional/apprehensive-modality readings of *bambai*.The TFA treatment formalised in the subsection above fails to capture this readings, although, as I will show, provides an essential condition for understanding *bambai*'s synchronic semantics and diachronic trajectory.

In §3.3.2 above, the concept of **settledness** was introduced, as deployed by Condoravdi (2002) and otherwise well established in the literature. Thomason traces the notion of historical necessity to Aristotle and Jonathan Edwards (1984:138) (see also Kamp 1979). The notion is deployed to similar effect in Giannakidou and Mari (2018) in their modal account of the future tense. The primary intuition is that some property (of times or eventualities) P is settled just in case it is a fact in the evaluation world that the truth of P resolves at a given time.

Settledness/historical necessity is normally expressed in terms of **historical alternatives**. This refers to the notion of equivalence classes ($\simeq_{\langle t,w \rangle}$) of possible worlds: those worlds which have identical 'histories' up to and including a reference time t. The properties of the *historical alternative* relation are given in (26) and, on the basis of this, a formal definition of settledness is given as (27).

(26) **Historical alternatives** $\simeq \subset \mathcal{T} \times \mathcal{W} \times \mathcal{W}$

    a. $\forall t[\simeq_t$ is an equivalence relation]
        All world-pairs in $\simeq_t$ (at an arbitrary time) have identical pasts up to that time.
        Their futures may diverge.
        The relation is symmetric, transitive and reflexive.

    b. **monotonicity.** $\forall w, w', t, t'[(w \simeq_t w' \wedge t' \prec t) \rightarrow w \simeq_{t'} w']$
        A world-pair that are historical alternatives at t are historical alternatives at all preceding times t'.   (Thomason 1984:146)

(27) **Settledness for P.**
    $\forall w' : w' \in cg, \forall w'' : w' \simeq_{t_0} w'' :$
    $AT([t_0, \_), w', P) \leftrightarrow AT([t_0, \_), w'', P)$ (Condoravdi 2002:82)

    A property P (*e.g.* an eventuality) is settled in a reference world w' iff P holds at a reference time t_0 in all of w'''s historical alternatives w'' as calculated at t_0.[17]

Here, I defend a claim that the modalised meaning comoponent of apprehensional readings of *bambai* arise in part (*i.e.* Lichtenberk's *epistemic downtoning* — the 'epistemic' component of APPR markers) due to the conventionalisation of an R-based implicature that the Speaker is making a modalised claim when they make any predication that is epistemically unsettled. Given Horn's Speaker-based/R-principle "SAY NO MORE THAN YOU MUST" (1984:13), an utterance of *bambai P* licenses the implicature that the Speaker is basing a predication (particularly an premonitory one, cf. § 3.4) about some unsettled eventuality on its possible truth in view of (perceived compatibility with) a the set of facts that they know of the world.

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[17]The AT relation holds between a time, world and an eventive property iff $\exists e[P(w)(e)\&\tau(e, w) \subseteq t]$ — *i.e.* if the event's runtime is a subinterval of t in w (Condoravdi 2002:70). This can accomodate stative and temporal properties with minor adjustments (see *ibid.*). For the sake of perpescuity, I abstract away from (davidsonian) event variables in this section.

Appealing to a Kratzerian framework, we can modalise our entry for *bambai* in order to capture the 'epistemic downtoning' effect associated with apprehensionals. A principal component (and advantage) of Kratzer's treatment of modals (1977, 1981, 2012) lies in the claim that the interpretation of modalised propositions relies on 'conversational backgrounds': that they quantify over sets of worlds retrieved by an 'accessibility relation' which is *contextually* made available. The entry in (28) proposes a unified, modalised semantics for *bambai*.

(28) $[\![bambai]\!]^{t,w} \underset{\text{def}}{=} \lambda f \lambda g \lambda P.\exists w' \in \textbf{best}_{g(w)}(f, t, w) \wedge \textsc{subseqInst}(P, t, w')$

    bambai asserts that there exists some world w' in a set of worlds that are optimal with respect to a contextually-determined modal base f and ordering source g in the reference context $\langle t, w \rangle$. It additionally asserts that the SUBSEQUENTIAL INSTANTIATION relation (as defined in (24) above) holds between that world w', the prejacent P, and a reference time t.

With the entry in (28), we can formalise the intuition that, when making an unsettled predication, *bambai* p represents an epistemic claim. We model this by claiming that, under these conversational backgrounds, *bambai* has selected an *epistemic* modal base f_{epist} and a stereotypical ordering source. These conversational backgrounds are formalised in (29), adapting liberally from (Kratzer 2012:37-40 i.a.)

(29) **conversational background: *bambai*'s epistemic reading**

    a. $f_{\text{epist}}(w)(t) = \{w' \mid w'$ is compatible with what S knows in w at $t\}$

    b. $g_{\text{s'typ}}(w) = \{p \mid p$ will hold in the 'normal' course of events in $w\}$.

    c. $g(w)$ then induces an ordering $\leqslant_{g(w)}$ on the modal base:
      $\forall w', w'' \in \bigcap f_{\text{epist}}(w)(t) : w' \leqslant_{\boldsymbol{g(w)}} w'' \leftrightarrow \{p : p \in g(w) \wedge'' \in p\} \subseteq \{p : p \in g(w) \wedge w' \in p\}$
      For any worlds w' and w'', w' is 'at least as close to an ideal' than w'' with respect to $g_{\text{s'typ}}(w)$ (*i.e.* it is at least as close 'normal course of events') if all the propositions of $g(w)$ true in w'' are also true in w'.

    d. ***Best***$(f_{\text{epist}}, g_{\text{s'typ}}, t, w)$ then returns just that subset of worlds that are both consistent with what the Speaker knows at t in w that are closest to the normal unfolding course of events in w.

The so-called subsequential TFA use of *bambai*, then, is maintained when the discourse context fails to R-implicate that the Speaker is making a non-modalised claim. This follows from general norms of assertion: given that the speaker is predicating about a settled property, her context set is understood as veridical and the assertion is taken to be factual (cf. Grice's quality supermaxim "try to make your contribution one that is true." 1991:27).

In these cases the intensional contribution of *bambai* can be captured by claiming that it quantifies (trivially) over a *metaphysical* modal base and a *totally realistic* ordering source (adapted partially from Kratzer 2012.)[18]

(30) **conversational background: *bambai*'s subsequential reading**

    a. $\bigcap f_{\text{meta}}(w)(t) = \{w' \mid w' \simeq_t w\}$

    b. $g_{\text{real}_{\text{total}}}(w) = \{w\}$

    c. ***Best***$(f_{\text{meta}}, g_{\text{real}_{\text{total}}}, t, w)$ then simply returns a set of worlds which are historical alternatives to w at t (*i.e.* those that best comply with all the propositions that uniquely

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[18]In her treatment of Marathi present tense marking, Deo (2017) makes similar appeal to veridical vs. nonveridical conversational backgrounds to capture ostensible polysemy associated with these forms.

characterise w).

the omniscience restriction. It is notable that in the apprehensional cases presented above, those where predication into an unsettled timeline has been triggered by one of the operators presented in Table 3.3 (*p.*14 above), modalisation with respect to a non-settled property cannot reasonably select for the set of conversational backgrounds presented in (30). Such an operation would require the participants to be able to retrieve all propositions that are true in and characteristic of worlds with respect to a vantage point in the future or to be able to calculate all the ramifying consequences of eventualities that might have obtained in the past. This condition allows us to unify the modalised and non-modalised readings of *bambai*.

3.5.3   The antecedent p: restriction and partition

The data in §3.3 show that *bambai* can give rise to readings of implicational relations between the two propositions. §3.5.2 defended an analysis of *bambai* that makes use of epistemic modality. The following discussion sketches a way to reconcile these observations.

Von Fintel (1994), following from Kratzer (2012:64, 90*ff*), models conditionals as modalised propositions, the antecedents of which provide *restrictions to the domain of quantification* by intersecting with the modal base. These insights provide a fruitful way of conceiving between the 'antecedent' clause of *bambai* and its prejacent. A possible implication of the discussion in §3.4 is that *bambai* is understood as introducing a negative eventuality which is a possible consequence of a failure of the antecedent subject to attend to some situation described in the antecedent clause *i.e.* $\neg p(w) \rightarrow \Diamond q(w)$ (*i.e.* if p is false in w then q is possibly true) — a truth condition very similar to that which is frequently given for *if...(then)*-type clauses in English. In this case, the modal's premise set (*i.e.* conversational background) is restricted to a subset of the worlds in the modal base, *viz.* those worlds in which an antecedent proposition does not hold true.

For the familiar example in (3 [=11]) above, the presence of *garra* in the antecedent clause triggers an predication into an unsettled timeline, yielding an apprehensional reading of the *bambai* clause. *bambai* merges with an anaphoric proposition (which is linguistically overt in the current example but need not be), taking its complement as a restrictor to the modal base (yielding f^+ to borrow Kratzer's (1981) notation). The denotation for (3) is given in (31) below.

(31) $[\![airra\ dringgi\ kofi\ bambai\ mi\ gurrumuk]\!]^{t,w} =$
$$\exists w' \in \boldsymbol{Best}(f^+, g, t, w) \land \text{SUBSEQINST}((\text{sleep}(Spkr)), t, w')$$
Where $f^+ = f_{\text{epist}} \setminus \{w \mid \text{drink}(\lambda x.\text{coffee}(x), Spkr)(t')\}$

The treatment as described in the current subsection is not, however, complete. A problem persists in understanding the relationship that the overt linguistic clausal antecedent bears to the proposition on which *bambai* is anaphoric. It is plainly not, for example, the case that the complement of *airra dringgi kofi* 'I must drink coffee', is the proposition on which provides the restriction on the conversational background that is being quantified over. Such a treatment would incorrectly yield an interpretation truth-conditionally identical to: 'I will fall asleep if it is not the case that I must drink coffee.' This particular question may be solvable by adopting a modal subordination approach following Roberts 1989 *et seq.*

Similarly, as discussed in §3.3.2.4, with *if...bambai* constructions, there appears to be no additional operation performed upon the *if*-marked antecedent — that is, the *if*-marked antecedent predicate is precisely the proposition upon which *bambai* is anaphoric.

This analysis has in part been superseded by Phillips and Kotek-ms, which deploys a modal subordination approach to understand the relation between p and q. What is clear is that the **bambai** clause is **not** syntactically subordinate to **p**.

These remaining questions — about the relation between the syntactic antecedent and the antecedent proposition which is responsible for anaphorically partitioning the modal base in order to yield the 'nonimplicational' readings of apprehensional *bambai* — are a remarkable linguistic phenomenon in and of themselves and a fertile domain for ongoing research. The analysis presented in this section takes the restricted modal base that is an outcome of this process and compositionally derives the proper semantics for *bambai* and its relationship with its prejacent.

3.6 Conclusion

This paper has proposed a formal account for the emergence of apprehensional epistemic markers from temporal frame adverbs, based on the central descriptive observation of Angelo and Schultze-Berndt (2016). It shows the potential of formal semantic machinery for better understanding the conceptual mechansims that underpin meaning change (in the spirit of much the emergent tradition appraised in Deo 2015) as applied to the modal domain. Further work may additionally extend the formal treatment of the expressive component of apprehensional (and other apparently use-conditional) items.

It has attempted to elucidate the mechanisms through which frame adverbs that originally encode a relation of temporal sequence come to encode causality, possibility and speaker apprehension by way of the generalisation and conventionalisation of implicatures. The existence of this 'pathway' of grammaticalisation provides further evidence of the conceptual unity of these linguistic categories and sheds light on the encoding of (and relationship between) tense and modality in human language. Of particular note is the salient role played by 'settledness' (*cf.* Condoravdi 2002 a.o.) in adjudicating the available readings of relative tense operators (here exemplified in subsequential' TFAs.)

Additionally, an apparent cross-linguistic relationship between subsequentiality and the semanticisation of apprehensional use-conditions may have implications for our understanding of the development of linguistic markers which express speaker attitudes.

An open issue that demands further consideration is that of better understanding the relation between the proposition on which the *bambai* clause is anaphoric and which is interpreted as the restrictor of the modal base in apprehensional contexts and the antecedent clause to which it is syntactically linked. A satisfying answer to this question likely lies at the semantics-pragmatics interface. A successful analysis may have ranging implications for understanding the interplay of factors that contribute to the proper interpretation of discourse anaphors.

Part II

Yolŋu Matha intensionality

Drawing on data from Yolŋu Matha, a subfamily of Pama-Nyungan spoken in central- and eastern Arnhem Land, this part of the Dissertation provides an amphichronic description and analysis of the Yolŋu Matha verbal paradigm and a discussion of the linguistic devices that speakers use for displacement: temporal and modal displacement.

Yolŋu Matha is a language family spoken in north-central and -eastern Arnhem Land. . As explained in Chapter 2, subgrouping of the family remains somewhat controversial, but most treatments understand the it as containing six languages with thirty or so 'clan-lects' distributed between them. For the purposes of this prospectus, I will make reference to the closely related Western varieties of Djambarrpuyŋu ([djr] Dhuwal) and Gupapuyŋu ([guf] Dhuwala), slightly further afield Wangurri ([dhg] Dhaŋu) and Southern variety Ritharrŋu [rit]; the varieties for which there is the most significant amount of presently available documentation.

Chapter 4 *contains a general description of the language ecology of Yolŋu Matha and patterns of verbal inflection in Yolŋu varieties, paying particular attention to Djambarrpuyŋu, how it diverges to Djinba, Ritharrŋu and Wangurri, and the puzzles that these paradigms pose for theories of tense and modality.*

Chapter 5 *proposes a formal treatment and analysis of temporal and modal expression in synchronic Yolŋu varieties.*

Chapter 6 *foregrounds 'diachronic thinking' about the comparative Yolŋu data presented here and considers: What might the paths of change and synchronic variation in Yolŋu Matha suggest about the cognitive implementation of displacement operators?*

Chapter 4

The Yolŋu Matha verbal paradigm

On inspection this isn't the most appropriate ch title if i'm speaking about nonparadigmatic things (auxiliaries, adverbials etc.) Also the fact that the demonstrative system is gonna get a treatment... should this be i this chapter? Do we wanna make the title much more inclusive? ughhhh

Chapter 5

The Yolŋu language of intensionality

Chapter 6

Variation, change & 'design principles'

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