

DISSERTATION PROSPECTUS

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**The intersection of temporal & modal  
interpretation:**  
**a view from Arnhemland (northern Australia)**  
*working title*

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## 1 Motivation

DISPLACEMENT — a stated universal 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). Prevailing trends in linguistic work — descriptive, pedagogical, theoretical — assume 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. This will become clear in section 2 of this prospectus.

The empirical focus of the dissertation will be the verbal inflectional 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. 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 understood Indo-European systems). Consequently, given how resistant these data have been to description and analysis with existing linguistic apparatus, a better understanding of these systems will help us to nuance a theory of temporomodal displacement.

Crucially, in this work I seek to consider the contribution of studying language change (specifically meaning change) in better understanding the cognitive apparatus that permits for the interpretation of

temporomodal devices. It is a starting assumption in this dissertation 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’ and the inference of these ‘constraints’, represent a significant potential source of insight into the linguistic expression and evaluation of event structure, time and possibility.

This prospectus is organised into four sections: this statement of motivation, followed by an introduction of particular phenomena in Arnhem Land languages in §2. The following section (§??) seeks to identify and situate this work within the broader scholarship of the semantics and interpretation of verbal inflectional categories. The final sections draft a chapter structure and schedule to completion of the proposed dissertation followed by a conclusion which rehearses the prospective contribution of this work in §4, additional data is provided in appendix.

## 2 Some phenomena

As indicated above, Australian data have not been explicitly accounted for in the elaboration of formal semantic work. Temporal and modal phenomena in these languages appear to pose some problems for our models. The proposed dissertation would seek to marshal synchronic and diachronic data to nuance our understanding of the interpretation of temporal and modal operators. §2.1 summarises a diachronically-informed account of the emergence of modal meaning from a temporal frame adverbial in Australian Kriol [rop], a contact language borne of early Twentieth Century frontier expansion in South-eastern Arnhem Land, varieties of which are now spoken across many communities in northern Australia.

§2.2 provides a comparative overview of the verbal paradigms of some Yolŋu languages, which are problematic for standard model-theoretic conceptualisations of tense and modal semantics. These phenomena are examples of the work that will be developed through the proposed dissertation. Data and existing descriptive and analytic work are described in this section in addition to some amount of preliminary analysis.

While Kriol and Yolŋu varieties are not ‘genetic’ relatives of one another, they are languages in contact. As we will see, both will be shown to provide clear examples of phenomena that represent similar analytic challenges to semantic theory — the well-understood categories which form the basis of the theory fail in these cases to predict changes or capture generalisations that adequately describe phenomena integral to the meaning of the inflectional paradigms of these varieties.

### 2.1 Kriol. The emergence of APPR

Australian Kriol is a contact language spoken through many communities in Northern Australia, including much of southern Arnhem Land. The Ngukurr variety is generally considered to be the ‘birthplace’ of this language, a result of radical language contact between English-based pidgins and a number of Arnhemland substrates in the early twentieth century.


Recent work has shown the apparent recruitment of a temporal frame adverbial *bambai* ‘< by-and-by’ (a lexical item present in many Pacific contact languages) as a marker of so-called APPREHENSIONAL modality (see Angelo & Schultze-Berndt 2016; Phillips forthcoming.) Apprehensionals are a grammatical category widely represented in Australian (in addition to Austronesian, Amazonian etc.) languages. In the only published work dedicated to a treatment of apprehensionals, Lichtenberk (1995) describes these markers as dually encoding (a) an assertion of the possibility (his “epistemic downtoning”) and (b) information about negative speaker affect vis-à-vis their prejacent. The sentence pair in (1) shows the possible temporal or modal contribution of *bambai*.


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

- a. *yuwai! bambai ai gaman jeya!*  
yes! **bambai** 1s come there  
'Yeah! I'll be right there!'
- b. *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!'

In (a), *bambai* displaces the reference time of the preajacent slightly forward; the speaker has undertake to join for dinner in the near-immediate future of speech time. In (b), however, the speaker asserts that, in the event that they join for dinner, they may fail to complete their work (a negative outcome).


Similarly, as shown in the sentence pair (2), this apprehensional meaning also appears in past irrealis (i.e. counterfactual) contexts.

- (2) a. *ai-bin wotji muvi en bambai aibin silip~silip*  
1s-PST watch film and **bambai** 1s-PST sleep~RED   
'I watched a film last night, **then shortly afterwards**, fell asleep'
- b. *ai-bin dringgi kofi nairram bambai ai bina silip~silip-bat la wek*  
1s-PST drink coffee night **bambai** 1s PST:IRR sleep~RED-IPFV LOC work  
'I had coffee last night, **otherwise** I would've slept at work' (A) 23022017)

The apprehensional reading shown in both (b) examples above appears to have emerged out of what I term the 'subsequential' reading of *bambai*, **the latter of which** is shared by *bambai*'s many cognates in related Pacific contact varieties (and the English etymon). These apprehensional readings appear to emerge in the contexts summarised in table 1 below. 



**Table 1.** Semantic operators<sup>1</sup> that give rise to modalised readings of *bambai*

GLOSS	Morph	Example
IRREALIS	<i>garra</i>	<i>airra dringgi kofi bambai mi gurumuk</i> 'I'll have a coffee or I might fall asleep'
PROHIBITIVE	<i>kaan</i>	<i>ai kaan dringgi kofi bambai mi nomo silip</i> 'I won't have a coffee or I mightn't sleep'
COUNTERFACTUAL	<i>bina</i> PST:IRR	<i>ai bina dringgi kofi nairram bambai aibina silip</i> 'I had a coffee last night or I might've fallen asleep' 
IMPERATIVE	∅	<i>yumo jidan wanpleis bambai mela nogud<sup>2</sup></i> 'Youse sit still or we might get cross'
PROHIBITIVE	∅ [nomo] IMPR	<i>nomo krosim det riba, bambai yu flodawei</i> 'Don't cross the river or you could be swept away!'
GENERIC	∅	<i>im gud ba stap wen yu confyus, bambai yu ardim yu hed</i> 'It's best to stop when you're confused or you'll get a headache'
NEGATIVE	∅ [nomo] GEN	<i>ai nomo dringgi kofi enimo bambai mi fil nogud</i> 'I don't drink coffee anymore or I feel unwell'
CONDITIONAL	<i>if</i>	<i>if ai dringgi kofi bambai ai kaan silip</i> 'If I have coffee, then I mightn't sleep'

The formal machinery proposed in (3) goes part of the way to providing a unified treatment of these two uses.

(3) a. **Subsequential Instantiation** (intensionalised)


$$\text{SUBSEQINST}(P, t, w) \leftrightarrow \exists t' : t' \succ t \wedge P(t')(w) \wedge \mu(t, t') \leq s_c$$


A subsequentiality relation SUBSEQINST holds between a predicate  $P$ , reference time  $t$  and reference world  $w$  iff the  $P$  holds in  $w$  at some time  $t'$  in the future of  $t$ .

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’  $s_c$ .

b.  $\llbracket \text{bambai} \rrbracket^{t,w}_{\text{def}} = \lambda f \lambda g \lambda P. \exists w' \in \text{Best}(f, g, t, w) \wedge \text{SUBSEQINST}(P, t, w')$

*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 holds between that world  $w'$ , the prejacent  $P$ , and the reference time  $t$ .


My second qualifying paper proposed that that temporal frame (sc. ‘subsequential’) uses of *bambai* differ from apprehensional uses in terms of the CONVERSATIONAL BACKGROUND  $f, g$  that is selected (cf. Kratzer 1981 a.o.)  These conversational backgrounds must be retrieved from context, both linguistic and nonlinguistic.


With the entry in (3), we can formalise the intuition that, when predicating into an unsettled timeline  $\llbracket \text{bambai } p \rrbracket$  represents an epistemic claim. We model this by claiming that under these conversational backgrounds, *bambai* has selected an *epistemic* modal base  $f_{\text{epist}}$  and a stereotypical ordering source. These conversational backgrounds are formalised in (4), adapting liberally from Kratzer (2012: 37,39-40 a.o.) 

- (4) a.  $\bigcap f_{\text{epist}}(w)(t) = \{w' \mid w' \text{ is compatible with what } S \text{ knows in } w \text{ at } t\}$   
 b.  $g_{\text{s'typ}}(w) = \{p \mid p \text{ will hold in the ‘normal’ course of events in } w\}$ .  
 c.  $g(w)$  then induces an ordering  $\leq_{g(w)}$  on the modal base:

$$\forall w', w'' \in \bigcap f_{\text{epist}}(w)(t) : w' \leq_{g(w)} w'' \leftrightarrow \{p : p \in g(w) \wedge w' \in p\} \subseteq \{p : p \in g(w) \wedge w'' \in p\}$$

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.  $\text{Best}(f_{\text{epist}}, g_{\text{s'typ}}, t, w)$  then returns just that subset of worlds that are both consistent with what the Speaker knows at  $t$  in  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 (cf. Grice’s Quality<sub>2</sub>)<sup>3</sup>. 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.)<sup>4</sup> 

<sup>9</sup>This does not entail the claim that these operators are in any way semantic primitives.

<sup>10</sup>This example due to Dickson (2015:168 [KM 20130508]).

<sup>3</sup>I.e. ‘Do not say that for which you lack adequate evidence’ (Grice 1991: 27, a.o.)

<sup>4</sup>This component of the analysis has additionally benefited greatly from Deo who makes use of similar formalism in her treatment of present tense semantics (2017).

- (5) a.  $\bigcap f_{\text{meta}}(w)(t) = \{w' \mid w' \simeq_t w\}$   
 b.  $g_{\text{real}}(w) = \{w\}$   
 c. **Best**( $f_{\text{meta}}, g_{\text{real}}, t, w$ ) 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 characterise  $w$ ).

### 2.1.1 selecting a conversational background

Ultimately, the interpretation of *bambai* must be anaphoric on discourse context, apprehensional readings restricted to propositions made in the ‘nonfactual speaker mood’ (cf. Roberts 1989).

- (6) **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 1 (p.4 above), modalisation with respect to a non-settled property cannot reasonably select for the set of conversational backgrounds presented in (5). 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*.

The emergence of new data shows that the omniscience restriction as formulated above is too strong; it fails to predict the felicity of the subsequential reading in (1a). The interpretation of *bambai* then seems to provide evidence for the necessity of considering both extralinguistic factors (i.e. world knowledge and notions of the *common ground* (see Stalnaker 1979) and intersentential dependencies and speaker mood (i.e. discourse structuring, e.g. Kamp 1979; Heim 1981; Roberts 1989, 1998.) The insights from information structure and dynamic semantics literatures can provide a vital framework to help us to understand the heuristic devices which allow speakers to identify an antecedent to *bambai* and to disambiguate these readings.

### 2.1.2 a diachronic perspective

In addition to the synchronic analysis described above, *bambai* provides a case study of the emergence of modal meaning from an erstwhile temporal adverbial in particular supporting contexts. I suggest that a discussion of the apparent semanticisation of apprehensional readings can be best explained in terms of invited inference theory (e.g. Eckardt 2006, Deo 2015a).

In (7) below, 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 (sc. the ‘invitation’ of a *post hoc ergo propter hoc* inference), *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 negative eventuality described in *bambai*’s prejacent: the second clause.<sup>5</sup>

- (7) **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?

<sup>5</sup>There is an extensive, contemporary literature investigating the pragmatics of clausal connection/concatenation e.g. Schmerling 1979, Stukker & Sanders 2012 a.o.

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

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

The conventionalisation of *bambai*'s connective syntax and its frequent embedding underneath (alternatively, its semantic 'subordination to' in the parlance of Roberts 1989) warnings, prohibitives (e.g. 7A) and predicates of fearing, appear to be a likely source of the semanticisation of the apprehensional reading.

In addition to these insights, however, the unified denotation that is proposed above also suggests the existence of a conceptual link between (relative) future marking and epistemic modalities, in keeping with observations made elsewhere on the semantics of the future tense (e.g. Copley 2001, Palffy-Muhoray 2016 i.a.). The demonstration of this possible meaning change trajectory likely represents *per se* additional support for the conceptual unity of futurity marking and epistemic modalities.

## 2.2 W. Yolŋu Matha

Yolŋu Matha is a language family spoken in northeastern Arnhem. Internal classification and subgrouping has been somewhat controversial, but most treatments understand the family 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 ([dʒɪɾ] Dhuwal) and Gupanyŋu ([guf] Dhuwala), slightly further afield Wangurri ([dhg] Dhaŋu) and Southern variety Ritharrŋu ([ɾɪt]), the varieties for which there is the most significant amount of presently available documentation.

The verbal inflectional paradigms of contemporary Yolŋu languages can be reconstructed to proto-Yolŋu (e.g. Bower 2009). Notwithstanding this demonstrated cognacy, there is significant cross-linguistic variation reported in the distributions and 'meanings' associated with each of the four inflectional categories (glossed throughout this prospectus as capital roman numerals I~IV). Where eastern and southern language varieties are described as having 'basic tense categories' that are 'semantically straightforward' (e.g. Heath 1980 on Ritharrŋu:74ff), an adequate treatment of the morphosemantics of tense marking in the related Yolŋu languages spoken in western Arnhem land appears to be much more elusive notwithstanding the nuanced and detailed descriptions in Wilkinson 1991 and McLellan 1992. Consider to begin, the minimal pair in (8) below.

### (8) Apparent insensitivity of verbal morphology to tense distinction in Wangurri

#### a. NONFUTURE USE

*nhän gayŋa ɲirrima-li ɲarra*  
 3s IPFV home-ALL go.I

'they went/were going home' (PST) **or** 'they're going home' (PRES)

#### b. FUTURE USE

*nhän ɲarru ɲirrima-li ɲarra*  
 3s IRR home-ALL go.I

'they will/should/must go home' ([dhg] McLellan 1992:154)

In (8), the verbal inflection alone (glossed here as I) fails to disambiguate tense altogether: it provides no information on whether the event described (*viz.* it go home) obtains in an interval preceding, subsequent to or overlapping with the speech time. This information must be provided by context or by aspectual/modal auxiliary.

Additionally, Western Yolŋu varieties exhibit a phenomenon which Comrie refers to as ‘cyclic tense’ — an ostensibly areal feature and crosslinguistic rarity<sup>6</sup> that it shares with the neighbouring, unrelated Maningrida language family. Exponence of *cyclic tense* is discussed in more detail in §?? below, although refers to a phenomenon where tenses have ‘discontinuous time reference’, ostensibly arising from ‘the combination of two oppositions, one an absolute cut-off point between today and earlier than today, the other between recent and remote within each of these two time frames’ (89). The example that follow in (9) demonstrate this discontinuity: three past tense events; the event in (a), temporally intermediate to the other two is inflected with the primary verb form whereas those in (b,c) are inflected in the tertiary form.

- (9) a. *yo barpuru-n ŋarra ŋapa nhaa-ma-n (\*nhaaŋal)*  
yes, yesterday-PROM 1s 3s.ACC see-I-PROM

‘Yes, I saw him yesterday’<sup>7</sup>

- b. *ŋe gaathur ŋarra ŋapa nhaa-ŋal goḍarr dhiyal*  
yes, today 1s 3s.ACC see-III morning PROX-LOC

‘Yes, I saw him here this morning’

- c. *maarrma ga-n malwan-dja dhaara-n yindi maṇḍa-n*  
two IPFV-III Hibiscus-PROM stand-III big 3d-PROM

‘Two big Hibiscus flowers were growing there’ (at some place in the speaker’s youth)

(Wilkinson 1991: 339)

All Yolŋu languages are described as having (at least) four cognate verbal inflection classes (‘forms’). Existing labels for these verbal inflections are summarised in Table 2 below. This prospectus adopts the semantically agnostic terminology adopted in Wilkinson (1991) and Lowe (1996), who enumerate the four forms, eschewing semantically-motivated labeling/metalinguage. The descriptive inadequacy of other scholars’ heuristic metalinguistic approaches will be shown in detail in what follows.

**Table 2.** Existing classifications of inflectional Yolŋu classes

DHUWAL(A)		WANGURRI	RITHARRŊU
Wilkinson/Lowe [djr]/[guf]	Morphy [dɥu]	McLellan [dhg]	Heath [rit]
I	UNM	NEU/1	PRES
II	POT	IRR/4	FUT
III	PERF	PFV/2	PST
IV	PST NON-INDIC	HAB.PFV/3	PST.POT

<sup>6</sup>Little typological work has been done on cyclical and metrical tense systems. Nevertheless, in his important (1979) cross-linguistic survey of tense systems, Comrie identifies these systems as uncommon, pointing only to Burarra ([bvr] Maningrida: W Arnhem), and perhaps Kiksht ([wac] Chinookan: Columbia River) and Bamileké ([ybb] Niger-Congo: Cameroon). Bybee *et al.* (1994) also point to a particle in Palantla Chinantec ([cpa] Oto-Manguan: Oaxaca) that appears to refer, discontinuously, to events completed the previous day or immediately prior to utterance time (*i.e.* ‘earlier today’ reference is out and receives its own dedicated marker (104, citing Merrifield 1968:25).)

<sup>7</sup>Note that, as McLellan points out of the phonologically-identical Wangurri cognate, *barpuru*, while translated as ‘yesterday’, can mean ‘the time of some “recent specific event”’ (1992:155).



### 2.2.1 Descriptive work on the Yolŋu verbal paradigm

While some important attempts have been made to describe the functional contribution of Yolŋu verbal inflections, these ultimately amount to listed distributions. Table 3 below summarises the functions of the verb forms below and their interactions with auxiliaries that appear to be shared by documented western Yolŋu languages [djr]/[guf]/[dhg].

**Table 3.** Preliminary summary of distribution of verbal inflectional forms and their interaction with auxiliaries (adapting from Wilkinson 1990 and Lowe 1996 on Dhuwal/a)

	$\emptyset$	<i>ŋuli</i> ‘HAB/HYP’	<i>dhu</i> ‘FUT’	<i>yaka/bäyŋu</i> ‘NEG’	<i>balan</i> ‘IRR’
<b>[I]</b>	•PRES •PST (*today)	PRES.HAB	•FUT today •FUT indefinite	?*	?
<b>[II]</b>	IMPER		FUT definite (incl. tomorrow)	$\supset$ [I]	
<b>[III]</b>	•PST today •PST unspecified • $\psi$ states <sup>86.5.1.2</sup>	*	*	*	*
<b>[IV]</b>		•distant PST.HAB •counterfactual	*?	$\supset$ [III]	PST.IRR

### 2.2.2 Temporal relations and the semantics of Yolŋu verbal inflection

One of the immediate implications of the data presented in (9) above—and the temporal discontinuity of the availability of the primary and tertiary inflectional forms—is the apparent insufficiency of presuppositional-indexical treatments (sc. the best candidate for a ‘standard formalism’) of morphological tense for predicting this distribution. This treatment is provided in (10) below, adapting and extending the formalism from Kratzer 1998 (see also Rullman & Matthewson to appear).

- (10) a.  $\llbracket \text{PST} \rrbracket^{g,c} = \lambda t : t < t_0.t$   
 PAST is only defined if  $c$  provides a  $t$  that precedes speech time  $t_0$ .  
 If defined then  $\llbracket \text{PST} \rrbracket = t$
- b.  $\llbracket \text{PRS} \rrbracket^{g,c} = \lambda t : t \circ t_0.t$   
 PRESENT is only defined if  $c$  provides an interval  $t$  that contains speech time  $t_0$ .  
 If defined then  $\llbracket \text{PRS} \rrbracket = t$
- c.  $\llbracket \text{FUT} \rrbracket^{g,c} = \lambda t : t > t_0.t$   
 PAST is only defined if  $c$  provides a  $t$  that follows speech time  $t_0$ .  
 If defined then  $\llbracket \text{FUT} \rrbracket = t$

I describe these formal treatments of morphological tense as presuppositional-indexical given that they contain two formal components:

- A **presuppositional component** that restricts the time of property instantiation relative to evaluation time.  
 This predicts the anomalousness of a sentence such as <sup>#</sup>*I worked tomorrow* but claims that the past tense inflection makes no truth-conditional claim about the instantiation of the predicate (i.e. asserts nothing about the time that the described eventuality holds.)
- An **identity function**  $\langle i, i \rangle$ ; the instantiation time is provided contextually (i.e. it is not linguistically specified/is not in the denotation of the tense marker.)

The context, then, is wholly responsible for providing the temporal span of the eventuality. If this time is outside of the presuppositional range of the tense marker, the sentence is **unevaluable**.

In order to make a purely presuppositional-indexical treatment of tense work for Yolŋu, the denotation of the primary inflectional form would then have to resemble something like (11) below.

(11) POTENTIAL PRESUPPOSITIONAL-INDEXICAL TREATMENT OF THE YOLŊU PRIMARY INFLECTION (I)

$$\llbracket \mathbf{I} \rrbracket^{g,c} = \lambda t : \begin{cases} t \in \text{today} \leftrightarrow t \succcurlyeq t_0 & .t \\ t \notin \text{today} \leftrightarrow t \prec t_0 \wedge \mu(t, t_0) < s_c & .t \end{cases}$$

**I** is only defined if *c* provides **a** **either** a *t* within the span of *today* that coincides with or follows speech time **or** it precedes *today* by some contextually-constrained period.

If it is defined then  $\llbracket \mathbf{I} \rrbracket = t$

The defense of an preliminary analysis like that given in (11) would entail:

- motivating the introduction of a privileged interval *today* into Yolŋu temporal ontology;
- motivating the joint grammaticalisation of these disjoint presuppositions (a defining characteristic of ‘cyclicity’/‘cyclicalit
- understanding whether and how a contextual standard is retrieved in order to predict in which past contexts the verb is inflected with **I** in lieu of **III** (a defining characteristic of ‘metricity’).

Consequently, an analysis that treats the verbal inflectional categories in Yolŋu as ‘morphological tense’ is unwieldy and likely fails to capture a deeper, principled generalisation about the interpretation of these categories by Yolŋu speakers. The following questions then remain:

(i) What is the proper semantics for Yolŋu inflectional categories?

(ii) How are temporal relations encoded and understood in Yolŋu?

### 2.2.3 What is ‘cyclic tense’?

I **am aware of no existing treatment** — formal or typological — that investigate the phenomenon that Comrie refers to as ‘cyclic time reference’ (1989:88ff). As discussed above, Comrie takes **as** Burarra [bvg], Western neighbour of Yolŋu as his primary case study on the basis of a discussion in Glasgow (1964 *non vidi*). A thoughtful consideration of the Yolŋu inflectional system, which exhibits many of the same facts of its neighbour, may help us to understand this reported typological rarity. The primary distinguishing property of this classification is the existence of a *temporal discontinuity in the range of a given marker*, which is seen, for instance, in the temporally interwoven denotations of **I** and **III** in Western Yolŋu. The Kiksht and Yemba data that Comrie points to as potentially exhibiting cyclicity as p is definition behaves in a manifestly different way to the phenomena described of Arnhem languages. These systems are good examples of relative and metrical tense. This is briefly addressed in §3.

In her treatment of the Wangurri verb system (1992), McLellan claims that ‘[t]he concern of Wangurri is not to locate a process in time, but in reality’ (153) as a governing principle behind the inflectional system that is ‘basic to [a verb’s] finiteness.’ For McLellan, then, the distinction between reality and irreality: whether ‘a process or state is based in reality’ or not is crucial for clausal interpretation. Wilkinson makes an adjacent claim about a ‘realis-irrealis opposition’ in Yolŋu, where the inflectional morphological categories associate (to varying degrees) with one side or other of the opposition. This claim is schematised in figure 1 below.

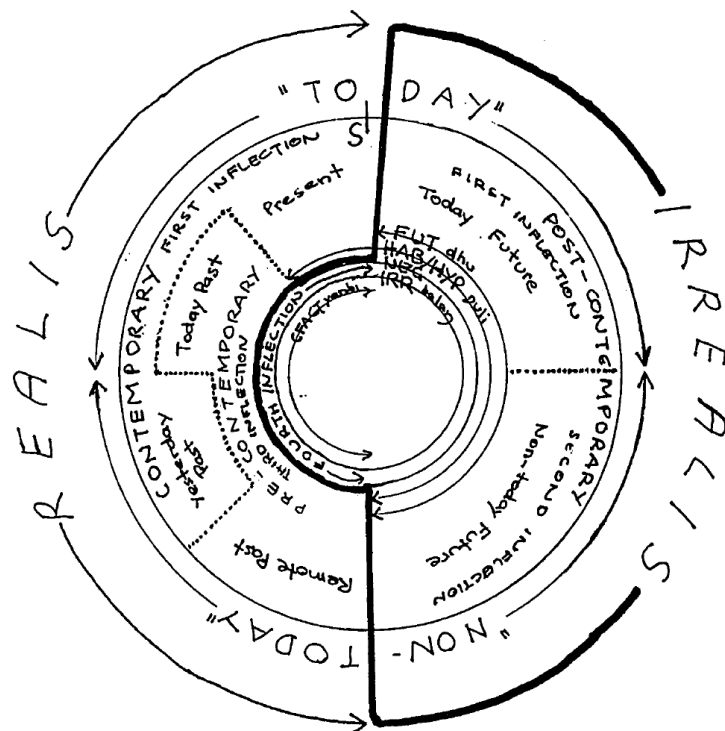
**Figure 1.** A schematisation of Wilkinson's proposed correlations between inflectional categories and the  $[\pm\text{IRREALIS}]$  opposition in Djambarrpuyŋu (1991:345)



These intuitions are wanting of a formal treatment but form a primary source of data for an understanding about the intersections between temporal and modal interpretation: a question which has also arisen in Malotki's 1983 Hopi grammar and refutation of Whorfianism, which makes explicit reference to the interaction of particles that appear to be closely associated with modal and aspectual meaning in giving rise to a full range of temporal readings (624ff).

*Contra* the basic assumptions made in cartographic approaches adopted elsewhere in the syntactic literature (e.g. Cinque & Rizzi 2009:2), Ritter and Wilstchko's *parametric substantiation hypothesis* (2009, 2014) suggests that the 'substantive content' of a functional category INFL (sc. where tense marking is assumed to reside in most Indo-European languages) varies cross-linguistically. They propose that different languages variably associate this projection with temporal, spatial or participant marking. This type of analysis seeks to account for the optionality or absence of tense morphology across languages.

**Figure 2.** Melanie Wilkinson's diagrammatic treatment of the distributional properties of Djambarrpuyŋu's four verbal inflections (1991:362)



## 2.2.4 A division of labour

The work of encoding and interpreting temporal relations in Yolŋu discourse then cannot be explained without a theory of the interplay of semantics (viz. those of the verbal morphology and of auxiliaries) and

pragmatics.

**verbal morphology: the semantics of inflection.** The data provided above, as summarised in the set of observations made of Dhuwal/Dhuwala that is given in table 3 above, allow us to make a series of immediate observations with respect to the relative contribution of Yolŋu inflectional for the encoding of temporal relations:

- The subtlety of these categories, which appears to resist being understood as the encoding of a presupposition of pastness/presentness/futurity with respect to utterance time (*i.e.* the ‘off-the-shelf’ treatment of morphological tense);
- The (gradient) association of these inflectional categories with shades of modality/irreality;
- The complex association of tense as well as polarity, temporal aspect and perhaps speaker attitude with these modal categories.

**the semantics of auxiliaries.** The interpretation of inflectional suffixes on the verb stem seems additionally to be substantially affected by the presence or absence of the various auxiliaries.

All four forms occur with *ga+INFL*<sub>[djr]</sub> / *gayŋa+INFL*<sub>[djr]</sub>, the IPFV auxiliary, although the distributional restrictions on cooccurrence with other temporomodal particles is more complicated.

Table 4. Modal particles

PARTICLE	[djr] form	[dhg] form
Future	<i>dhu</i>	<i>barkthu</i> (?)
Habitual Counterfactual	<i>ŋuli</i> <sub>[djr]</sub>	<i>bayiŋ</i> <sub>[dhg]</sub> <i>warri</i>
Irrealis	<i>balan</i> <sub>[djr]</sub>	<i>ŋarru</i> <sub>[dhg]</sub>

McLellan describes the habitual, irrealis and realis (Ø) markers as existing in a “paradigmatic relationship in a clause” (1992:152), that is all clauses are marked for one of these ‘modalities.’ She goes on to investigate the apparent meanings of each by taking their basic meaning to be the contribution that each makes to a form I verb.

These modal particles have a range of effects on clausal interpretation that are briefly summarised in table 3 above; this provides an essential set of data for understanding the contributions made by each of these marking strategies to temporal and modal displacement. The fact that form III fails to tolerate any modal marking has been taken as evidence of its strict alignment with realis situations (e.g Wilkinson 1991:345; McLellan 1992: 164-5).

Additionally, temporal particles/adverbials are used to provide information about the time span of a given event. These particles all have clear distributional restrictions — evidence of a strong correlation between inflectional form and temporal interpretation. Nevertheless, as shown in (8) above, particle selection is necessary for disambiguating past, present or future instantiation of the predicate with respect to utterance time.

The exact glosses of these adverbials are heuristic. Wilkinson points out that, while adverbial-like particles like *bongun* and *godarr* might both be glossable as ‘tomorrow’ they can be used for “any future event beginning with tomorrow.” *godarr* can only be used for roughly one post-crastinal week and can also refer to ‘morning’, meaning it is also available for nonfuture contexts. She suggests, then, that a better semantics for *godarr* may be “the early part of certain temporal domains” (340). A treatment such as this that builds vagueness into the semantics is highly informative in our goal of better understanding temporal perception and the interpretation of all of these lexical items.

**Table 5.** Temporal modification

PARTICLE	[djr] form	[dhg] form
today	gäthur	
now	dhiyaŋ bala	
yesterday	yawuŋgu/barpuru	yawuŋgu/barpuru
near future	goḍarr'	barkthu
future	boŋguŋ	
remote future	yalala	yalala
past	ŋäthil	



An additional observation requiring further investigation is the relative infrequency of these particles in the small Ritharrŋu [rit] corpus provided in Heath 1980. Given the stronger apparent correlation between verbal inflection and absolute time reference, a preliminary hypothesis may be that the burden on temporomodal particles/auxiliaries is alleviated.

**pragmatics: the role of context in discourse and information structure.** Analogies between tense marking and pronouns have motivated a considerable amount of scholarship that greatly informed the way we talk about the contribution of the former category. In an influential 1973 article, Barbara Partee points to apparent deictic, anaphoric and 'bound variable' uses of markers (and potential constructions that lead to ambiguity between these uses.) One of the most important insights of this work is an explicit move that shifts the burden of temporal interpretation to the context, both linguistically explicit and nonlinguistic.

Dynamic approaches to semantics and pragmatics attempt to better understand the role of information flow and conversational reasoning in properly accounting for these types of items. Certainly any treatment of metricity in tense marking seems to require reference to speaker perceptions of remoteness and specificity. Section below outlines some of the tools and theoretical work available for understanding this interplay.

### 3 Working at the intersection of tense & modal semantics

In a 1998 paper, Angelika Kratzer extends Partee's discussion of the contextually determined properties of temporal interpretation and inflection to 'sequence of tense' phenomena, explicitly referring to the 'intimate ways' in which '[t]ense, aspect and modality interact...to fool us about their individual contribution[s] to the temporal semantics of sentences' (93). This is not a novel observation; additionally, it has long been observed that our theories of temporal expression are heavily biased to discussions of dedicated tense (and to a lesser degree, aspect) given that these are the morphologised strategies of Indo-european languages (e.g. Klein & Li 2009:1; Klein 2009:41).

This section contains a compact overview of formal discussions of tense and tense-mood interactions (§§3.1-3.2), some examples of work on change in the temporal domain (§3.3), a synopsis of work on 'tenselessness': how languages without morphological tense talk about time (§3.4), and a brief overview of work on lexical and grammatical semantics in the Australianist tradition (§3.5).

#### 3.1 Interpreting tense


On p. 9 above, I provide a brief discussion of one of the preponderant linguistic theories of tense. The presuppositional-indexical treatment claims, in view of the reported deictic qualities of temporal reference, that the time of some event description is wholly contextually provided. Morphological tense marking, then, is basically a grammatical device which contains a preposition that the runtime of the described event precedes, overlaps with, or follows speech time.


### 3.2 Formalising tense and mood interaction


The degree to which temporal readings ‘bleed into’ markers that are traditionally associated with modality, and vice versa, is an area that has been attracting an increasing amount of scholarship in recent years, although these observations themselves are hardly new. Laca (2008) suggests that the nonindependence of these two categories is primarily informed by the fact that ‘interpretation of modal verbs sometimes appears to be fully determined – or at least severely restricted — by the associated temporal configuration, providing the minimal pair in (12) below as an example. Why is it that (a) receives an epistemic interpretation whereas (b) fails to admit of one?

- (12) a. He must’ve left early  
b. He’ll have to leave early (Laca 2008:1)

Hacquard draws on similar data from French, where modal interpretation appears to be restricted by aspectual marking as in (13) below. The (b) case appears to entail that an event of Jane taking the train actually occurred. This is not the case in (a).

- (13) a. *Pour aller à Londres, Jane pouvait prendre le train*  
For go to London Jane can.PST:IPFV take the train   
b. *Pour aller à Londres, Jane pouvait prendre le train*  
For go to London Jane can.PST:IPFV take the train  
‘To get to London, Jane could take the train’ (2009: 283)

In an influential 2002 article, Condoravdi considers the ‘temporal interpretation of modals’, enriching the conceptualisation of modals by considering them a function from timelines to propositions ( $f : \mathcal{W} \times \mathcal{T} \rightarrow \wp(\mathcal{W})$ ). This work has multiple important consequences, which I briefly outline here. (1) The disentanglement of the temporal *perspective* (time of access of the modal base) and temporal *orientation* of a modalised assertion: (2) ambiguity between the counterfactual and epistemic readings of past-tensed modal statements (e.g. *they might have won the game*) can now be accounted for by considering the relative scope relations of aspectual and modal operators (63ff). Additionally, (3) modals for the past can be understood as quantifying over ‘historical alternatives’: sets of worlds that are identical at a particular point of evaluation. These concepts and their consequences (e.g. ‘settledness’) are essential tools in predicting the possible readings of *bambai* as discussed in §2.1 above. Further (4), Condoravdi’s analysis is accompanied by a pragmatically-driven principle (the ‘diversity condition’) which predicts the infelicity of circumstantial readings of past-oriented modals. 

Condoravdi’s analysis has given rise to a current research program represented by recent work by Chen *et al.* (2017) and Rullman & Matthewson (to appear) among others, which considers the representation of past possibility and temporomodal interaction across typologically diverse languages. This work seeks to explain the interactions and apparent restrictions on all possible combinations of temporal orientation, perspective and modal base. 

### 3.3 Diachrony: temporal phenomena and meaning change

- Comrie 1979  
Accords cyclic tense systems ‘marginal status in the theory’ given their rarity (i.e. that they challenge a stated universal)
- Hyman 1980 (Yemba relative tense)
- Silverstein 1974 (Chinook tense evolution — esp Kiksht cyclicity §6.3)

The overarching thesis defended in Silverstein (1974) is that Chinookan languages to varying degrees 'built' an entire morphosyntactic tense system out of the existence of a early Chinookan aspectual proclitic. He observes that "corresponding to linear geographical extension from west to east, the "tense" category shows increasing development into an articulated morphosyntactic paradigm" (S49). Kiksht in particular appears to have developed a particularly rich system of **metrical tense** that relies on deictic notions which Silverstein refers to as *proximad* and *distad* (S95). The nondurative past tense prefixes, for example, "are elaborated to four...and the specifically temporal reference divides time before the speech event by specifying points before which the event predicated took place" (S95).

### 3.4 Integrating 'tenseless languages' into the theory

- Matthewson 2006 temp semantics in a supp tenseless language
- Tohauser 2015 X-linguistic Temp Ref, 2011 Temp ref in guaraní (tenseless lang)
- Bohnemeyer in Klein & Li Yucatec
- Bochnak optional tense
- Smith, Perkins and Fernald 2007 Navaho

### 3.5 The semantics landscape in Australia

- **the effect of NSM on semantic theory in australia.**
- Verstraete 2006 — past and irrealis
- tense and time (eg AJL special vol, ALS special session)

## 4 Proposal: dissertation structure

### 4.1 A chapter outline

**Chapter 0.** INTRODUCTION to research question.

**Chapter 1.** THE LANGUAGE ECOLOGY: Geolinguistic, anthropological and sociohistorical background to Arnhem land.

**Chapter 2.** GENERAL LITERATURE: An overview of the logics of tense and modality and linguistic approaches to these categories. Discussion of previous scholarship on the interdependence of tense, mood and aspectual interpretation.

#### **PART I.** THE KRIOL MODAL DOMAIN AND EMERGENCE OF APPREHENSIONALITY

**Chapter 3.** DATA: Background of the verbal inflection domain in Australian Kriol. *bambai*: how has a temporal frame adverbial become complicit in encoding modal meaning?

**Chapter 4.** A FORMAL ANALYSIS OF *BAMBAI* POLYSEMY  
Speaker meaning, information structure and restricting the domain of quantification.  
Implications for understanding other 'discourse anaphors' (e.g. *other(wise)*)

**Chapter 5.** DIACHRONIC INSIGHTS: How can we understand the emergence of apprehensional readings for *bambai*?  
Does a theory of this process (and the synchronic analysis more broadly) provide evidence of shared conceptual resources for interpreting futurity and epistemic modalities?

**PART II. COMPARATIVE YOLŊU: RESTRUCTURING OF THE VERBAL-INFLECTIONAL PARADIGM AND THE EXPRESSION OF TIME**

**Chapter 6.** DATA: A thorough comparative description of the semantics of verbal paradigms across multiple Yolŋu varieties.  
Field-informed discussion of strategies for expressing temporal and modal relations in Gupapuyŋu and Ritharrŋu.

**Chapter 7.** A FORMAL ACCOUNT OF TMA MARKING IN YOLŊU

**Chapter 8.** A DIACHRONIC DIMENSION: Likely contact-induced meaning change in the TMA paradigms.

**Chapter 9.** THEORETICAL CONTRIBUTION and envoi.

4.2  $\langle \mathcal{T}, \mathcal{I}, \prec, \sqsubseteq, \mathcal{Q}, t^* \rangle$

$i \in \mathcal{I}$	$e \in \mathcal{E}$
<b>TIL END 2017</b>	A dynamic semantic account of <i>otherwise</i>
<b>WINTER 2018</b>	<ul style="list-style-type: none"> <li>• Grant applications (fieldwork)</li> <li>• Field planning</li> <li>• Two handbook chapters</li> </ul>
<b>SPRING 2018</b>	<ul style="list-style-type: none"> <li>• Complete <b>PART I</b> draft (information-structural account of <i>bambai</i>)</li> <li>• Field planning</li> </ul>
<b>SUMMER 2018</b>	<ul style="list-style-type: none"> <li>• Fieldwork (Gapuwiyak/Galiwin'ku &amp; Ngukurr)</li> <li>• Begin CHAPTER 6</li> </ul>
<b>AUTUMN 2018</b>	Complete <b>PART II</b> draft
<b>WINTER 2019</b>	Write CHAPTER 9
<b>SPRING 2019</b>	<ul style="list-style-type: none"> <li>• Compile dissertation</li> <li>• Review <b>review</b> all chapters</li> <li>• Defend dissertation</li> <li>• Submit dissertation</li> <li>• Get a job</li> <li>• Graduate</li> <li>• Win lottery</li> </ul>

**4.3 Parting words: potential contributions**



## A Yolŋu data

Except where noted, the data that follows and the page numbers cited are drawn from Wilkinson (1991) on Djambarrpuyŋu [dʒɪr].

### A.1 primary inflection

(14) PRESENT

*ŋarra marrtji-n dhiyaŋu-n bala*  
1s go.I-SEQ PROX.ERG-SEQ away

‘I am going now’ (256)

(15) PAST

*yo, barpuru-ny ŋarra ŋanya nhā-ma-ny*  
yes yesterday-PROM 1s 3s.ACC see-1-PROM

‘yeah, I saw him yesterday’ (339)

(16) a. PRESENT HABITUAL

*ŋunhi ŋilinyu ŋuli ga warkthu-n maŋda wanggany-ŋur*  
TEXTD 1d.INCL HAB IPFV.I work-I 3d one-LOC

‘us two, who are working in the one work’ (348)

b. PAST HABITUAL

*ŋarra ŋuli ga rur’yun munhawumirri yan bitjan bili*  
1s HAB IPFV.I

‘I always get up early in the morning’ (348)

(17) TODAY FUTURE

*yalala ŋarra dhu nhokal lakara-m*  
later 1s FUT 2s.OBL tell-I

‘I’ll tell you later (today)’ (346)

(18) COOCCURRENCE WITH *ŋULI*

a. PRESENT HABITUAL

*ŋarra ŋuli ga rur’yun munhawumirri yan bitjan bili*  
1s HAB IPFV.I get\_up.I early morning EMP always

‘I always get up early in the morning’ (348)

b. HYPOTHETICAL (CONDITIONAL) USE

*ŋuli nhe dhu warku’yu-n wungan-nha, nayi-ny dhu läwu-m*  
HYP 2s FUT annoy-I dog-ACC 3s-PROM FUT bite-I

‘if you tease the dog, it’ll bite’ (350)

## A.2 secondary inflection

### (19) IMPERATIVE

*yaka waji!*

NEG talk.II

‘don’t speak!’

(360)

### (20) FUTURE

#### a. WITHOUT DHU

*ɲayi bonguɲ nhini ɲäku ɲarra-ny ɲunhal yirrkala*  
1s tomorrow sit.II hear;II 1s-ACC DIST.LOC NAME

‘They will be there at Yirrkala listening to me (in several weeks’ time)’

(340)

#### b. WITH DHU

*godarr’*nha* ɲarra dhu nhuɲu dhäwu-ny lakara-ɲ*  
tomorrow-SEQ 1s FUT 2s.DAT story-PROM tell-2

‘I’ll tell you the story tomorrow’

(346)

#### c. *yalala-ɲu-mirri-y ɲula nhätha ɲarra dhu nhokal lakara-ɲ* later-ɲu-PROP-ERG sometime 1s FUT 2s.OBL tell-2

‘I’ll tell you the story tomorrow’

(346)

### (21) COOCCURRENCE WITH ɲULI

#### a. FUTURE HABITUAL

*note here that there’s a strong hypothetical flavour in this datum*

*nhä-mirr **balaj** ɲayi gi ɲirrimbu-ɲ ɲarra-kal milmitjpa-ny ga godarr’-tja ɲayi ɲuli*  
what-PROM IRR 3s IPFV.II come-II 1s-OBL afternoon-PROM and morning-PROM 3s **HAB**  
*gi dhiyal warkthu-rr*  
IPFV.II PROX-LOC work-II

‘How about she come to me in the afternoon and works here in the morning?’

(351)

#### b. HYPOTHETICAL (CONDITIONAL) USE

*appears to be less frequent than with I for indicatives*

***ɲuli** ɲayi dhu dhuwal raki djaw’yu-rr-nydja bonguɲ Melanie-y dhäruk-mirr*  
HYP 3s FUT PROX tape take-II-PROM tomorrow NAME-ERG word-PROP  
*ɲarr-kalaɲu-mirr-nydja bala ɲayi dhu gi bäki-n nhakun nhanukiyin-galalaɲu-wurr*  
1s-OBL-PROP-PROM then 3s FUT IPFV.II use-SEQ like 3s.EMPH-OBL-PERL  
*ɲä-nha-kurr*  
listen-IV-PERL

‘If they take this tape, then later Melanie will be using it, perhaps by listening (to it)’

(352)

### (22) NEGATIVE RECENT PAST

*bäyɲu ɲayi gi nhini barpuru*  
NEG 3s IPFV.II sit.II yesterday

‘They weren’t staying here yesterday’

(357)

(23) COOCCURRENCE WITH EXPLICIT MODAL *BALAN* 'IRR'

- a. *ɲayi balan limurruŋ maɖakarrɪtj-thi*  
3s IRR 1d.INCL-DAT angry-INCH.II

'she may be angry with us (today)'

(354)

### A.3 tertiary inflection

(24) PAST

- a. TODAY

*ɲe gaathur ɲarra ɲana nhaa-ɲal goɖarr dhiyal*  
yes, today 1s 3s.ACC see-III morning PROX-LOC

'Yes, I saw him here this morning'

(339)

- b. DISTANT/NON-SPECIFIC

*maarrma ga-n malwan-dja dhaara-n yindi maɖa-n*  
two IPFV-III Hibiscus-PROM stand-III big 3d-PROM

'Two big Hibiscus flowers were growing there' (at some place in the speaker's youth)

(339)

(25) Ψ USES

- a. *ɲarra dhuwal/dhika djawaryu-rr/rerrikthu-rr/djanɲarrthi-n*  
1s PROX/INDEFP be.tired-III/be.sick-III/be.hungry-III

'I'm (a bit) tired/sick/hungry'

(278)

- b. *bili djawar'yu-rr-a*  
COMPLV be.tired-III

'They're already tired'

(365)

### A.4 quarternary inflection

(26) COOCCURRENCES WITH *ɲULI* 'HYP/HAB'

- a. PAST HABITUAL

*ga ɲayi-ny ɲuli yarrupthu-na-n ganybu-lil-a dharpu-nha-lil ga linyu-ny ɲuli duwatthu-na-n...*  
and 3s-FOC HAB go.down-IV-SEQ net-ALL-SEQ sew-IV-ALL and 2d.INCL.FOC HAB go.up-IV-SEQ

'And then she would go and sew fishing nets and we two would go up...'

(350)

- b. 'HYPOTHETICAL' (COUNTERFACTUAL)

*ɲäthil ɲarra ɲuli balan liya-ɲamaɲamayun-mi-nya bala ɲarra balan waɲa-nha-n*  
earlier 1s HYP IRR have.idea-1-R/R-IV then 1s IRR speak-IV-SEQ

'Had I thought of it before, I would've spoken'

(27) COOCCURRENCE WITH *BALAN* 'IRR'

- a. *barpuru balan ŋarra bala dentist-kal marrtji-nya dhiyak filling-gu*  
yesterday IRR 1s AWAY dentist-OBL go-**IV** PROX.DAT filling-DAT  
'yesterday I should have gone to the dentist for a filling' (353)

- b. *märr balan ŋayi yaka dharpa-ny galkirri-nya be-ŋur-nydja garramat-ŋur-nydja*  
such.that IRR 3s NEG tree-FOC fall-**IV** INDEF-ABL-FOC top-ABL-FOC  
'(she drove slowly) so the tree wouldn't fall off the top' (354)

(28) REMOTE PAST UNDER NEGATION

- ŋäthil-nydja ŋarra ga-n dhuwal, ga miltjirri marrtji-n bäyŋu ŋarra ŋuli ga-nha nhä-nha*  
before-PROM 1s IPFV-**III** PROX and blind go-III NEG 1s HAB IPFV-IV see-**IV**  
'I was blind before, I wasn't able to see' (358)