

DISSERTATION PROSPECTUS

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

Josh Phillips

Committee

| | |
|-------------------|-------------|
| Claire Bower (c.) | Yale U. |
| Hadas Kotek | New York U. |
| María Piñango | Yale U. |

+ two vacancies

DEPARTMENT OF LINGUISTICS
YALE UNIVERSITY
NOVEMBER 28, 2017

Contents

| | | |
|----------|--|-----------|
| 1 | Motivation | 1 |
| 2 | Tense-Mood interactions in Arnhem Land | 2 |
| 2.1 | KRIOL. Temporomodal polysemy and the emergence of APPrehensional marking | 3 |
| 2.1.1 | A unified semantics for <i>bambai</i> | 5 |
| 2.1.2 | Selecting a conversational background | 6 |
| 2.1.3 | A diachronic perspective | 7 |
| 2.2 | YOLŲU MATHA. Meaning and change in the verbal inflectional paradigm | 8 |
| 2.2.1 | Descriptive work on the YolŲu verbal paradigm | 11 |
| 2.2.2 | Temporal relations and the semantics of YolŲu verbal inflection | 11 |
| 2.2.3 | What is ‘cyclic tense’? | 13 |
| 2.2.4 | A division of labour. <i>Inflectional morphology, auxiliaries and information structure</i> | 14 |
| 3 | Working at the intersection of temporal and modal semantics | 16 |
| 3.1 | Interpreting tense | 17 |
| 3.2 | Formalising tense and mood interaction | 17 |
| 3.3 | Diachrony: temporal phenomena and meaning change | 19 |
| 3.4 | Integrating ‘tenseless languages’ into the theory | 19 |
| 3.5 | The semantics landscape in Australia | 20 |
| 4 | Proposal: dissertation structure | 21 |
| 4.1 | A chapter outline | 21 |
| 4.2 | $\langle \mathcal{T}, \mathcal{I}, \prec, \sqsubseteq, \mathcal{Q}, t^* \rangle$ | 22 |
| | Bibliography | 23 |
| | Works cited | 23 |
| | Further reading | 25 |
| A | YolŲu data | 26 |
| A.1 | primary inflection (I) | 26 |
| A.2 | secondary inflection (II) | 27 |
| A.3 | tertiary inflection (III) | 28 |
| A.4 | quaternary inflection (IV) | 29 |
| | List of abbreviations | 30 |

1 Motivation

DISPLACEMENT — 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.*).

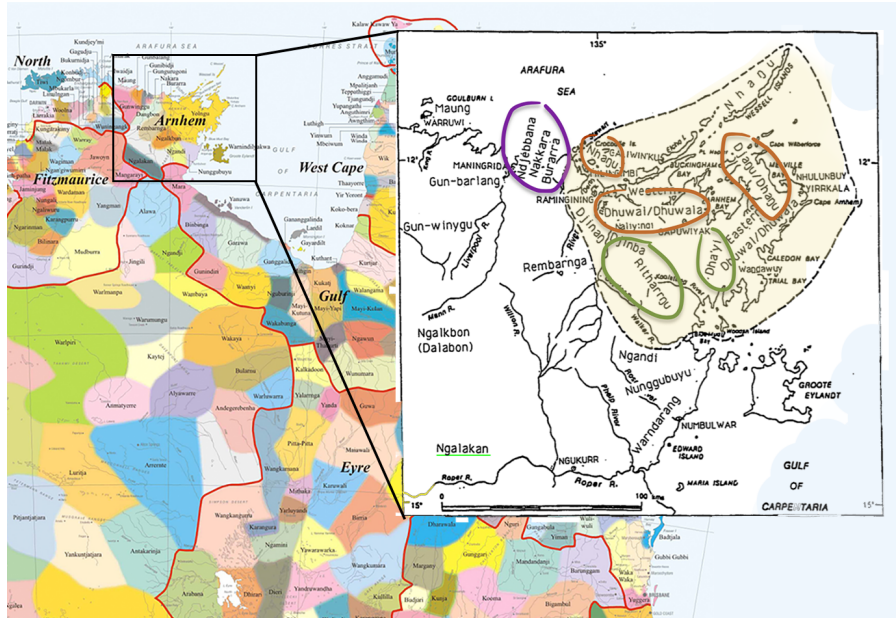
The **empirical focus** of the dissertation proposed here is the tense-mood-aspect (TMA) systems of a set of languages in the Arnhem Land linguistic area of Northern Australia. Arnhem Land is ‘linguistically dense’ — an area of close historic and contemporary contact between unrelated languages (see map in Figure 1). 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, with 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.

This prospectus is organised into four sections: this statement of motivation, followed by a in §2, which introduces examples of particular phenomena in Arnhem Land languages, analyses of which form the focus of the dissertation. The subsequent section (§3) 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 dis-

Figure 1. Traditional language communities in Northern Australia (Horton 1996). **Inset.** Northeast Arnhem land (colourised from Wilkinson 1991:2). Yellow shading indicates the *Yolŋu Wāŋa* (homeland). Brown and green circles indicate the contemporary distribution of Yolŋu languages investigated. Purple circling indicates the neighbouring Maningrida language family. Kriol is spoken in all communities in the southern half of this map.



sertation followed by a conclusion which rehearses the prospective contribution of this work in §4, additional data is provided in appendix.

2 Tense-Mood interactions in Arnhem Land

As indicated above, data from Australia's 400+ indigenous languages 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 seeks 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 Southeastern Arnhem Land, varieties of which are now spoken across many communities in northern Australia (see Harris 1986, Sandefur 1986).

§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 a preliminary analysis.

While Kriol and Yolŋu varieties are not 'genetic' relatives of one another, they are neighbouring languages (with some southern Yolŋu varieties in sustained contact situations with Kriol). As we will see, both provide clear examples of phenomena

that present 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. Temporomodal polysemy and the emergence of APPREhensional marking

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 (TFA) *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 one of the only published works dedicated to a treatment of apprehensionals, Lichtenberk (1995) describes these markers as dually encoding (a) an assertion of the possible instantiation of their prejacent (his “epistemic downtoning”) and (b) information about negative speaker affect vis-à-vis their prejacent. The sentence pair in (1) shows these two possible uses (*viz.* temporal or modal) of *bambai*. Both sentences are possible responses to an invitation.

(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!’ (GT 13072017)

In (a), *bambai* simply displaces the reference time of the prejacent slightly forward; the speaker has undertaken to join for dinner in the near-immediate future of speech time. Conversely, the apprehensional use is shown in (b); here, 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*
 1s=PST drink coffee night **bambai** 1s PST:IRR sleep~RED-IPFV LOC
wek
 work
 ‘I had coffee last night, **otherwise** I may’ve fallen asleep at work’ (AJ 23022017)

The apprehensional reading shown in both (b) examples above appears to have emerged out of what I term the ‘subsequential’ reading of *bambai*, one that is shared by *bambai*’s many cognates in related Pacific contact varieties and the English etymon (Harris 1986: 210).

In table 1 below, I list the contexts in which apprehensional readings of Kriol *bambai* appears to emerge. Notably all of these can be understood as triggering an interpretation of an utterance in **nonfactual speaker mood**. That is, these clauses express ‘a hypothetical assumption...or otherwise some question about the actual truth of the clause’ (Roberts 1989: 686-7).

Table 1. Semantic operators¹ that appear give rise to modalised readings of *bambai*.²

| 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</i> ³ ‘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’ |

1. This does not entail the claim that these operators are in any way semantic primitives.
 2. Except where noted, these data were collected by the author in the field in 2016 and 2017.
 3. This example due to Dickson (2015:168 [KM 20130508]).

2.1.1 A unified semantics for *bambai*

In (3), then, I propose a denotation that goes part of the way to providing a unified treatment of these two uses. It is based on the insight that temporal frame adverbials of the *bambai*-type, appear to induce an expectation of soon-ness (here ‘subsequentuality’) on the instantiation time of their prejacent. This subsequentuality relation can be understood to represent the ‘kernel’ of meaning at the heart of both readings of *bambai*.

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

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

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

In words: *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. ‘subsequentual’) 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, linguistic or 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_{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. $\bigcap f_{\text{epist}}(w)(t) = \{w' \mid w' \text{ is compatible with what SPEAKER knows in } w \text{ at } t\}$
 b. $g_{s\text{typ}}(w) = \{p \mid p \text{ will hold in the ‘normal’ course of events in } w\}.$
 c. $g(w)$ then induces an ordering $\leq_{g(w)}$ on the modal base:

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

IN WORDS: for any worlds w' and w'' , w' is ‘at least as close to an ideal’ as w'' with respect to $g_{s\text{typ}}(w)$ (i.e. it is at least as close to the ‘normal course of events’) if all the propositions of $g(w)$ true in w'' are also true in w' .

- d. **Best**($f_{\text{epist}}, g_{s'\text{typ}}, t, w$) 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 (cf. Grice's Quality₂)⁴. That is, in contexts where the speaker can be understood to have access to the requisite facts to make an assertion about a subsequentiality relation between time and event, then the 'actuality' of this claim is entailed.

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.)⁵

- (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).

2.1.2 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). This can be understood as the operationalisation of the pragmatic principle described in (6).

- (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 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 (but ultimately failed to) 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 in (6) is too strong by itself; 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

4. I.e. 'Do not say that for which you lack adequate evidence' (Grice 1991: 27, a.o.)

5. 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).

and speaker mood (i.e. discourse structuring, *e.g.* Kamp 1981; Heim 1982; Roberts 1989, 1998.) The insights from the 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* (by which to restrict the quantificational domain as formalised in (4-5) above) and to disambiguate these readings. These issues will be discussed in detail in Chapter 4 of the dissertation.

2.1.3 A diachronic perspective

In addition to the synchronic analysis described above, *bambai* provides a case study of the clear 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.* Traugott 1989, 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.⁶

(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?

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.*, see also Bybee *et al.* 1994:247ff). The demonstration of this possible meaning change trajectory likely represents *per se* additional support for the conceptual unity of futurity

6. There is an extensive literature investigating the pragmatics of clausal connection/concatenation *e.g.* Schmerling 1979, Stukker & Sanders 2012 a.o. (for English).

marking and epistemic modalities. This appears to be a function of the conventionalisation of speaker-based inferences that humans' predication into the future is necessarily speculative and informed by their own understanding of their world and observations of relations between possible situations.

2.2 YOLŊU MATHA. Meaning and change in the verbal inflectional paradigm

Yolŋu Matha is a language family spoken in northeastern Arnhem Land. 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 ([dʒɪr] 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.

The verbal inflectional paradigms of contemporary Yolŋu languages can be reconstructed to proto-Yolŋu (*e.g.* Bovern 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 that appear on verbs in these languages (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 ŋirrima-li ŋarra
3s IPFV home-ALL go.I

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

b. FUTURE USE

nhän ŋarru ŋirrima-li ŋarra
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 auxiliaries.

Additionally, Western Yolŋu varieties exhibit a phenomenon which Comrie refers to as ‘cyclic tense’ — an ostensibly areal feature and crosslinguistic rarity that it shares with the neighbouring, unrelated Maningrida language family.⁷ *Cyclic tense* 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’ (1985:89). Claims about the properties of *cyclic tense* systems are discussed in more detail in §2.2.3 below. The examples that follow in (9) demonstrate this discontinuity and grammatical metricality. **Cyclicity** is manifested in the fact that all three sentences predicate into the past; 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. **Metricality** is best shown in the difference between (a) and (c): the seeing event in (a) is framed as a recent event whereas the growing event in (c) is framed as remote. These are schematised in Figure 2.

(9) **Cyclicity and metricality in Djambarrpuyŋu**

a. RECENT PAST WITH **I**

*yo barpuru-ny ŋarra ŋana nhä-ma-ny (*nhäŋal)*
yes, yesterday-PROM 1s 3s.ACC see-I/*III-PROM

‘Yes, I saw him yesterday’⁸

b. TODAY PAST WITH **III**

ŋe gäthur ŋarra ŋanya nhä-ŋal goḍarr dhiyal
yes, today 1s 3s.ACC see-III morning PROX-LOC

‘Yes, I saw him here this morning’

c. DISTANT PAST WITH **III**

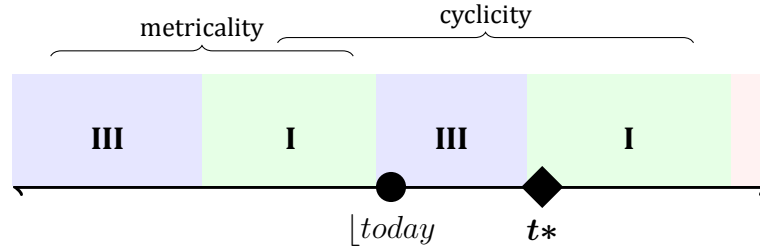
maarrma ga-n malwan-dja dhära-n yindi maṇḍa-n
two IPFV-III Hibiscus-PROM stand-III big 3d-PROM

‘Two big Hibiscus flowers were growing there’ (at some place in the speaker’s youth) (Wilkinson 1991: 339)

7. Little typological work has been done on cyclical and metrical tense systems. Nevertheless, in this important cross-linguistic survey of tense systems, Comrie identifies these systems as uncommon, pointing only to Burarra ([bvr] Maningrida: W Arnhem), and perhaps Kisksht ([wac] Chinookan: Columbia River) and Bamileké ([ybb] Niger-Congo: Cameroon). Bybee *et al.* (1994:104) also point to a particle in Palantla Chinantec ([cpa] Oto-Manguean: 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 prefix (citing Merrifield 1968:25).)

8. 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). Cognates in related languages do have a strict ‘day before today’ reading (Claire Bower, pers. comm.)

Figure 2. Temporal expression in Western Yolŋu dialects, demonstrating two descriptive phenomena: (a) cyclicity — the interspersed/discontinuity of I and III forms and (b) metricality — the (subjective) division of the past domain between these two forms.
 \lfloor today is the beginning of the privileged interval *today*. t^* is utterance time



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 labelling/metalanguage. 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 1983 [dwu] | McLellan 1992 [dhg] | Heath 1980 [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 |

Importantly, the Yolŋu varieties spoken in the north and west, which about the Maningrida languages (Burarra [bvg], Gurr-goni [gge], Nakkara [nck]) exhibit the grammaticalised temporal discontinuity and encoding of metricality outlined above. These features are not attested in southern and eastern varieties (including Ritharrŋu and Djapu) according to Wilkinson (1991:341). This points to a hypothesis that the inflectional paradigms of these Yolŋu varieties spoken in NW Arnhem have been dramatically restructured as a consequence of extended contact with the Maningrida languages. If this is indeed the case, then we are left with a big question:

- (i) How did pre-existing Yolŋu lexical material come to be recruited and reanalysed as a cyclic and metrical temporal system in these varieties?

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 (*e.g.* Wilkinson 1991, Lowe 1996, McLellan 1992). 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). Data demonstrating all of these uses is appended to this prospectus.

Starred (*) cells denote that the relevant auxiliary-inflection combination is ungrammatical. Note that in negative clauses, distinctions between **III/IV** and (for most speakers) **I/II** are neutralised. Consequently, the distribution for **IV** is a superset of **III**'s when the clause is negated.

| | ∅ | <i>ŋuli</i> 'HAB/HYP' | <i>dhu</i> 'FUT' | <i>yaka/bäyŋu</i> 'NEG' | <i>balan</i> 'IRR' |
|------------|--|-------------------------------------|----------------------------------|-------------------------|--------------------|
| I | •PRES •PST (*today) | PRES.HAB | •FUT today •FUT indefinite | % | ? |
| II | IMPER | | FUT definite (incl. tomorrow) | ⊃ I | |
| III | •PST today •PST unspecific •ψ states | * | * | * | * |
| IV | | •distant PST.HAB •counterfactual | *? | ⊃ III | PST.IRR |

2.2.2 Temporal relations and the semantics of Yolŋu verbal inflection

One of the immediate implications of the cyclic-metrical past tense data presented in (9) above—and the temporal discontinuity of the availability of the primary and tertiary inflectional forms—is the apparent insufficiency of 'standard' treatments 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. $[\text{PST}]^{g,c} = \lambda t : t \prec t_0.t$
 PAST is only defined if the context *c* provides a interval *t* that precedes speech time *t*₀.
 If defined then $[\text{PST}] = t$
- b. $[\text{PRS}]^{g,c} = \lambda t : t \circ t_0.t$
 PRESENT is only defined if the context *c* provides an interval *t* that contains speech time *t*₀.
 If defined then $[\text{PRS}] = t$
- c. $[\text{FUT}]^{g,c} = \lambda t : t \succ t_0.t$

FUT is only defined if the context c provides an interval 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**⁹ given that they contain two formal components:

- i) A **presuppositional component** that restricts the time of property instantiation relative to evaluation time.
 This predicts the anomalousness of a sentence such as *#I worked tomorrow*. It additionally 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.)
- ii) A partial **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 theme time of the predicate. 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 be disjunctive, resembling 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 the context c provides a **either** a time t within the span of *today* that coincides with or follows speech time t_0 **or** it precedes *today* by some contextually-constrained period s .

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

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

- a. motivating the introduction of a privileged interval (and understanding the temporal span of) *today* into Yolŋu temporal ontology (requires additional empirical verification of the precise nature of *today* as a relevant interval);
- b. motivating the joint grammaticalisation of these disjoint presuppositions (a defining characteristic of ‘**cyclicity**’); and
- c. 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 ‘**metricality**’).

9. Perhaps the best candidate for a ‘standard formalism’, although see §3.1 below for more.

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:

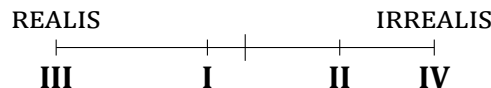
- (ii) What is the proper semantics for Yolŋu inflectional categories?**
- (iii) How are temporal relations encoded and understood in Yolŋu?**

2.2.3 What is ‘cyclic tense’?

I am unaware of any existing treatment — formal or typological — that investigate the phenomenon that Comrie refers to as ‘cyclic time reference’ (1989:88ff). As discussed above, Comrie takes Burarra [bvg], Western neighbour of Yolŋu Matha, as his primary case study on the basis of a discussion in Glasgow (1964). 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 cites as potentially exhibiting cyclicity as per his 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, McLellan (1992) 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 3 below.

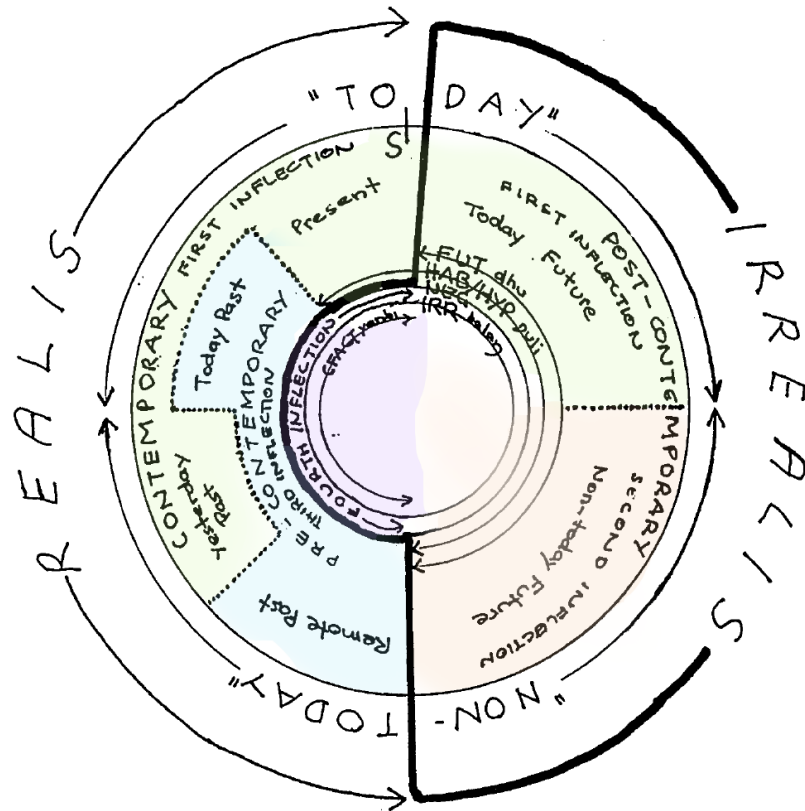
Figure 3. A schematisation of Wilkinson’s proposed correlations between inflectional categories and the [±IRREALIS] opposition in Djambarrpuyŋu (1991:345)



These largely descriptive intuitions, comprehensively schematised in Figure 4, are wanting of a formal treatment but form a primary source of data for an improved understanding about the intersections between temporal and modal interpretation.¹⁰

10. This question has also arisen in Malotki’s 1983 Hopi grammar and refutation of Whorfianism

Figure 4. Melanie Wilkinson's diagrammatic treatment of the distributional properties of Djambarrpuyŋu's four verbal inflections (1991:362). Colourised by author for facilitated presentation of the 'domains' of the four inflections.



2.2.4 A division of labour.

Inflectional morphology, auxiliaries and information structure

The work of encoding and interpreting temporal relations in Yolŋu discourse then cannot be explained without a theory of the interplay of semantics (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 the Yolŋu inflectional system 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);

(*sc.* the 'Hopi Time' myth), 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 interpretations (624ff).

- 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_[djɾ]/gayŋa+INFL_[dhg]*, the IPFV auxiliary, although the distributional restrictions on cooccurrence with other temporomodal particles (given in Table 4 below) is more complicated.

Table 4. Modal particles

| PARTICLE | Wilkinson 1991 [djɾ] / [guf] | McLellan 1992 [dhg] |
|------------------------------------|--|-------------------------------|
| Future | <i>dhu</i> | <i>barkthu</i> (?) |
| Habitual Counterfactual | <i>ŋuli</i> | <i>bayiŋ</i> <i>warri</i> |
| Irrealis | <i>balan</i> | <i>ŋarru</i> |

McLellan describes the habitual, irrealis and realis (\emptyset) 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 (examples listed in Table 5). These particles all have clear distributional restrictions — evidence of a strong correlation between inflectional form and temporal interpretation (e.g. (9a) above, see also Wilkinson 1991:341). Nevertheless, as was 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 *bonɣuŋ* 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),

Table 5. Temporal modification

| PARTICLE | Wilkinson 1991 [djr]/[guf] | McLellan 1992 [dhg] |
|---------------------|--------------------------------------|-------------------------------|
| today | gäthur | |
| now | dhiyaŋ bala | |
| yesterday | yawungu/barpuru | yawungu/barpuru |
| near future | goḍarr' | barkthu |
| future | boŋguŋ | |
| 'later' | yalala | yalala |
| distant past | ŋäthil | |

a description that may well have implications for our understanding of time reckoning in Yolŋu societies. Consequently, a treatment 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.

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 inflectional morphology and absolute time reference, a (very) preliminary hypothesis may be that the burden on these 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 has greatly informed the way we talk about the contribution of the tense morphology. In an influential 1973 article, Barbara Partee points to apparent deictic, anaphoric and 'bound variable' uses of pronouns and tense 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 metricality in tense marking seems to require reference to speaker perceptions of remoteness and specificity. Section 3 below outlines some of the tools and theoretical work available for understanding this interplay.

3 Working at the intersection of temporal and modal semantics

In the foregoing sections, we have seen examples of ways in which temporal and modal expression appear to interact and have inferred problems that these phenomena raise for our understanding of both of these categories. This section that follows comprises a compact overview of formal discussions of tense and tense-mood in-

teractions (§§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 mention of (signs of a mounting interest in) investigation into the semantics of verbal inflection in Australian languages (§3.5).

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; 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 on which Indo-European languages rely for temporal expression (e.g. Klein & Li 2009:1; Klein 2009:41).

3.1 Interpreting tense

On p.11 above, I provided 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 presupposition that the runtime of the described event precedes, overlaps with, or follows speech time.

This referential treatment diverges somewhat from Priorian/Montogovian approaches which analyse tense operators as an existential **quantifiers** over times, typed $\langle\langle i, t \rangle, t \rangle$. Following a quantificational semantics we, tense operator denotations are as (below (see *e.g.* Dowty 1979:324)).¹¹

- (12) a. $\llbracket \text{PRES} \rrbracket^{g,c} = \lambda P \exists i. \text{now} \sqsubseteq i \wedge P(i)$
 b. $\llbracket \text{PST} \rrbracket^{g,c} = \lambda P \exists i. \text{now} \succ i \wedge P(i)$
 c. $\llbracket \text{FUT} \rrbracket^{g,c} = \lambda P \exists i. \text{now} \prec i \wedge P(i)$

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 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’ (2008:1), providing the minimal pair in (13) below as an

11. A variant on this additionally lambda-binds the reference time ($\approx \text{now}$), meaning a tense operator would be typed $\langle i, \langle\langle i, t \rangle, t \rangle \rangle$ (e.g. von Stechow 2009:140 or 1995:17 for a more complex version again.) Yolṅu Matha (*sc.* the cyclic tense phenomenon generally) poses the same problems for this type of tense treatment.

example. Why is it that (a) receives an epistemic interpretation whereas (b) fails to admit of one?

- (13) 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 (14) below. The (b) case appears to entail that an event of Jane taking the train actually occurred. This is not the case in (a).

- (14) a. *Pour aller à Londres, Jane pouvait prendre le train*
 For go to London Jane can.PST:IPFV.3S take the train
 b. *Pour aller à Londres, Jane put prendre le train*
 For go to London Jane can.PST:PFV.3S take the train
 'To get to London, Jane could take the train' (Hacquard 2009: 283)

In an important 2002 article, Condoravdi considers the 'temporal interpretation of modals', enriching the conceptualisation of modals by considering them a function from timelines¹² to propositions ($f : \mathcal{W} \times \mathcal{T} \rightarrow \wp(\mathcal{W})$). This work has multiple important consequences, which I briefly outline here.

- i. The disentanglement of the temporal *perspective* (time of access of the modal base) and temporal *orientation* of a modalised assertion (the temporal relation between the temporal perspective and the time of the prejacent eventuality):
- ii. 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).
- iii. Additionally, 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.
- iv. Further, Condoravdi's analysis is accompanied by a pragmatically-driven principle (the 'diversity condition') which predicts the infelicity of circumstantial readings of past-oriented modals.¹³

12. A *timeline* might be defined as a temporal progression in a given world (i.e. state of affairs). This notion can be formalised by considering the Cartesian product of the set of worlds and set of times (viz. a set of $\langle w, t \rangle$ pairs.)

13. Condoravdi's *diversity condition* relates in an interesting way to the *omniscience restriction* (6) proposed in the foregoing section on *bambai*.

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

The literature on grammaticalisation and semantic change provides many insights into the, primarily lexical, sources of TMA marking. Some of the best-known early surveys of these 'pathways' include Bybee *et al.*'s 1984 *The Evolution of Grammar*, Hopper & Traugott's 1993 *Grammaticalization* and Traugott & Dasher's 2002 *Regularity in Semantic Change* (see Deo 2015a:180 for an appraisal of other work on the cross-linguistic meaning change similarities).

The phenomena described in the previous section, however have received nothing that resembles a functional treatment of the type that these grammaticalisation theorists have studied.^{14,15} Comrie (1985) suggests that cyclic tense systems might be accorded 'marginal status in the theory' given their cross-linguistic rarity, offering no insights into a possible synchronic analysis or diachronic trajectory.

3.4 Integrating 'tenseless languages' into the theory

Discussed briefly in §2.2.3, languages that have been described as 'tenseless' have posed a problem for our eurocentric theories of syntax and semantics. Here I briefly review a selection of recent, foregoing discussions of this problem as examples of treatments that these data have received.

Ritter & Wiltschko (2009) for Halkomelem and Blackfoot, Matthewson (2006) for St'át'imcets, Tonhauser (2011) for Guaraní, Bohnemeyer (2009) for Yucatec and Bochnak (2016) for Washo all represent (a.o.) examples of discussions of the 'problems' that underdocumented, ostensibly 'tenseless' (or optionally tensed) languages, pose for existing theories of temporal expression. 'Tenselessness' can be described as a property of a language for which "topic times of utterances are not constrained

14. Note that Angelo & Schultze-Berndt 2016 does include a short discussion of how mechanisms proposed by these theorists may be brought to bear on the emergence of apprehensional meaning in Kriol.

15. The development of a rich metrical tense system in Kiksht is given some treatment in Silverstein (1974). The overarching thesis defended 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). While Silverstein's thesis bears no direct relevance on the specific questions in this dissertation, methodologically, it represents an interesting example of the complete restructuring of an inflectional paradigm as understood through the comparison of the morphology of related languages.

vis-à-vis utterance times or reference points by the morphosyntactic form of the clause [excluding adverbial modification]¹⁶ (Bohnemeyer 2009: 85).

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 may variably also associate this projection with spatial (*e.g.* Halkomelem [hur] Salishan: Pacific Northwest) or participant marking (*e.g.* Blackfoot [b1a] Algonquian: Alberta). This type of analysis seeks to account for the optionality or absence of tense morphology across languages, characterising INFL more broadly as a projection that houses some *deictic category*, serving to anchor the reported event to an utterance (2009:193).

Matthewson (2006) posits the existence of a covert, obligatory morpheme in arguing for the existence of a future/nonfuture distinction in St'át'imcets ([111] Algonquian: British Columbia) *i.e.* she claims that this language's tenselessness is illusory). The denotation given for this covert nonfuture item is of the indexical type discussed above. St'át'imcets does however contain a number of lexical items (a clitic, an auxiliary and a number of other periphrastic constructions) which must be used in order to express the future. Matthewson provides a detailed argument for the treatment of clitic *kelh* as a temporal marker with a semantics similar to that of Abusch (1985)'s *WOLL*.

Conversely, Bohnemeyer (2009) makes use of the notion of 'temporal anaphora' — effectively a discourse structuring principle and one that is operationalised elsewhere in dynamic semantic frameworks (*e.g.* DRT in Partee 1984, Roberts 1989) — in accounting for the temporal interpretation of sentences in Yucatec ([yua] Mayan: Yucatán). Further building on this treatment, Tonhauser (2011) also explicitly eschews appeal to covert tense in her treatment of Paraguayan Guaraní [gug] despite the latter's apparent similarity to St'át'imcets (268). She instead couches her analysis in a dynamic semantics that seeks to formalise the flow of information through discourse, taking the meaning of a given utterance to be its context change potential.

3.5 The semantics landscape in Australia

As discussed above, Australia's 400+ languages have been extremely under-represented in the elaboration of formal semantic theory. As a consequence of this, existing descriptions of these, particularly with respect to categories like tense, modality and aspect, do not integrate obviously with the assumptions made in much of the literature.

Exceptions to this include a 2012 themed issue of the *Australian Journal of Linguistics*, which emerged out of an explicit project to "bring together the grammatical description and typological investigation of Australian languages with the formal semantic investigation of tense, aspect, mood and evidentiality, in the understanding

16. Note that Bohnemeyer points out that speakers of so-called 'tenseless languages' do not make significantly more frequent use of temporal adverbials than do speakers of tensed languages (2009:113).

that these areas have much to offer one another' (see Stirling & Dench 2012:1).¹⁷ As has hopefully been made clear in this prospectus, I agree with Sterling & Dench on this latter count.

4 Proposal: dissertation structure

4.1 A chapter outline

Chapter 0. INTRODUCTION to research question.

Chapter 1. THE LANGUAGE ECOLOGY: Geolinguistic, anthropological and socio-historical 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.

17. The spirit of this project has also given rise to a Australia-Pacific TAM marking workshop to take place at the Australian Linguistic Society meeting this December.

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

| $i \in \mathcal{I}$ | $e \in \mathcal{E}$ |
|---------------------|--|
| TIL END 2017 | A dynamic semantic (CH. 4) account of <i>otherwise</i> |
| WINTER 2018 | <ul style="list-style-type: none"> • Grant applications (fieldwork) • Field planning • Two handbook chapters |
| SPRING 2018 | <ul style="list-style-type: none"> • Complete PART I draft (information-structural account of <i>bambai</i>) • Field planning |
| SUMMER 2018 | <ul style="list-style-type: none"> • Fieldwork (Gapuwiyak/Galiwin'ku & Ngukurr) • Begin CHAPTER 6 |
| AUTUMN 2018 | Complete PART II draft |
| WINTER 2019 | Write CHAPTER 9 |
| SPRING 2019 | <ul style="list-style-type: none"> • Compile dissertation • Review all chapters • Defend dissertation • Submit dissertation • Get a job • Graduate |

Bibliography

Works cited

- Abusch, D. (1985). *On verbs and time*. [PhD dissertation], University of Massachusetts, Amherst.
- Angelo, D., & Schultze-Berndt, E. (2016). Beware bambai – soon it may turn apprehensive. In F. Meakins & C. O'Shannessy (Eds.), *Loss and Renewal: Australian languages since contact* (pp. 255-296). Berlin: Mouton de Gruyter.
- Bochnak, M. R. (2016). Past time reference in a language with optional tense. *Linguistics & Philosophy*, 39(4), 247-294.
- Bohnemeyer, J. (2009). Temporal anaphora in a tenseless language: the case of Yucatec. In W. Klein & P. Li (Eds.).
- Chen, S., Hohaus, V., Laturnus, R., Louie, M., Matthewson, L., Rullmann, H., . . . Vander Klok, J. (2017). Past possibility cross-linguistically: Evidence from 12 languages. In A. Arregui, M.-L. Rivero, & A. Salanova (Eds.), *Modality Across Syntactic Categories*. Oxford: OUP.
- Comrie, B. (1985). *Tense*. Cambridge: Cambridge University Press.
- Condoravdi, C. (2002). Temporal Interpretation of Modals: Modals for the Present and for the Past. In L. Casillas, B. Clark, & S. Kaufmann (Eds.), *The construction of meaning*. Stanford: CSLI publications.
- Copley, B. L. (2002). *The Semantics of the Future*. (PhD dissertation), MIT, Cambridge, MA.
- Deo, A. (2006). *Tense and Aspect in Indo-Aryan Languages: Variation and diachrony*. (PhD dissertation), Stanford University, Stanford, CA.
- . (2015a). Diachronic Semantics. *Annual Review of Linguistics*, 1, 179-197.
- . (2015b) The semantic and pragmatic underpinnings of grammaticalization paths: The progressive to imperfective shift. *Semantics and Pragmatics*, 8(14), 1-52.
- Dickson, G. (2015). *Marra and Kriol: the loss and maintenance of knowledge across an language shift boundary*. (PhD thesis), Australian National University, Canberra.
- Dowty, D. (1979). *Word Meaning and Montague Grammar*. Dordrecht: Kluwer.
- Eckardt, R. (2006). *Meaning Change in Grammaticalization: An enquiry into semantic reanalysis*. Oxford: OUP.
- Glasgow, K. (1964). *Frame of reference for two Burera tenses. non vidi*.
- Hacquard, V. (2009). On the interaction of aspect and modal auxiliaries. *Linguistics and Philosophy*, 32(3), 279-315.
- Harris, J. (1986). Northern Territory Pidgins and the Origin of Kriol. In S. A. Wurm (Series Ed.) Canberra, *Pacific Linguistics*.
- Heim, I. R. (2011[1982]). *The semantics of definite and indefinite noun phrases*. (PhD dissertation), University of Massachusetts, Amherst.
- Hockett, C. F. (1960). The Origin of Speech. *Scientific American*, 203(3), 88-97.
- Horton, D. R. (Cartographer). (1996). Aboriginal Australia Wall Map. AIATSIS, Canberra, ACT.
- Kamp, H. (1981). A theory of truth and semantic representation In J. Groenendijk, T. Janssen, & M. Stokhof (Eds.), *Formal Methods in the Study of Language, Part I*. Amsterdam: Mathematisch Centrum.
- Klein, W. (2009). How time is encoded. In W. Klein & P. Li (Eds.).
- Klein, W., & Li, P. (Eds.). (2009). *The Expression of Time*. Berlin; New York: Mouton de Gruyter.

- Kratzer, A. (1981). The Notional Category of Modality. In H.-J. Eikmeyer & H. Rieser (Eds.), *Words, worlds, and contexts: New Approaches in Word Semantics* (pp. 38-74). Berlin; NY: Walter de Gruyter.
- . (1998). More Structural Analogies Between Pronouns and Tenses. Paper presented at Semantics and Linguistic Theory **VIII**, Ithaca. <https://journals.linguisticsociety.org/proceedings/index.php/SALT/article/view/2808>
- . (2012). *Modals and Conditionals*. Oxford: OUP.
- Hopper, P. J., & Traugott, E. C. (1993). *Grammaticalization*. Cambridge: Cambridge University Press.
- Laca, B. (2012). *On modal tenses and tensed modals*. Ms.
- Lichtenberk, F. (1995). Apprehensional Epistemics. In J. Bybee & S. Fleischman (Eds.), *Modality in Grammar and Discourse*. Amsterdam: John Benjamins.
- Lowe, B. M. (1996). *Grammar Lessons in Gupapuyngu* (M. Christie Ed.). Darwin, NT: Yolngu Studies, CDU.
- Matthewson, L. (2006). Temporal semantics in a superficially tenseless language. *Linguistics & Philosophy*, 29(6), 673-713.
- McLellan, M. (1992). *A Study of the Wangurri Language*. (PhD thesis), Macquarie University, Sydney.
- Palfy-Muhoray, N. (2016). *Hungarian Temporal and Aspectual Reference in the Absence of Dedicated Markers*. (PhD Dissertation), Yale University, New Haven, CT.
- Partee, B. H. (1973). Some Structural Analogies between Tenses and Pronouns in English. *The Journal of Philosophy*, 70(18), 601-609. doi:10.2307/2025024
- . (1984). Nominal and temporal anaphora. *Linguistics & Philosophy*, 7(3), 243-281.
- Ritter, E., & Wiltschko, M. (2009). Varieties of INFL: Tense, location and person. In J. Van Craenenbroeck (Ed.), *Alternatives to cartography* (pp. 153-202). Berlin; New York: Mouton de Gruyter.
- . (2014). The composition of INFL: An exploration of tense, tenseless languages, and tenseless constructions. *Natural Language & Linguistic Theory*, 32, 1331-1386.
- Roberts, C. (1989). Modal Subordination and Pronominal Anaphora in Discourse. *Linguistics & Philosophy*, 12(6), 683-721.
- . (1998). Focus, the flow of information and universal grammar. *Syntax and Semantics*, 29, 109-160.
- Rullmann, H., & Matthewson, L. (to appear). Towards A Theory of Modal-Temporal Interaction. *Language*.
- Sandefur, J. R. (1986). *Kriol of North Australia: a language coming of age*. Darwin: SIL-AAB.
- Silverstein, M. (1974). Dialectal developments in Chinookan tense-aspect systems: an areal-historical analysis. *International Journal of American Linguistics*, 40(4.2), S49-S99.
- Stalnaker, R. (1979). Assertion. In P. Cole (Ed.), *Syntax and Semantics*. New York: Academic Press.
- von Stechow, A. (1995). On the proper treatment of tense. Paper presented at *Semantics and Linguistic Theory V*, Ithaca, NY.
- . (2009). Tenses in compositional semantics. In W. Klein & P. Li (Eds.) (pp. 129-166).
- Stirling, L., & Dench, A. (2012). Tense Aspect Modality and Evidentiality in Australian Languages: Foreword. *Australian Journal of Linguistics*, 32(1), 1-6.
- Tonhauser, J. (2011). Temporal reference in Paraguayan Guaraní: a tenseless language. *Linguistics & Philosophy*, 34(3), 257-303.
- Traugott, E. C., & Dasher, R. B. (2002). *Regularity in Semantic Change*. Cambridge, UK: Cambridge University Press.

Wilkinson, M. P. (1991). *Djambarrpuyŋu: a Yolŋu variety of Northern Australia*. (PhD thesis), University of Sydney, NSW.

Further reading

- Caudal, P., Dench, A., & Roussarie, L. (2012). A Semantic Type-driven Account of Verb-formation Patterns in Panyjima. *Australian Journal of Linguistics*, 32(1), 115-155.
- Eather, B. (2011/2017). *A grammar of Nakkara (Central Arnhem Land coast)*. Munich: Lincom.
- Green, R. (1987). *A sketch grammar of Burarra*. [Hons thesis], ANU, Canberra, ACT.
- . (1995). *Gurr-goni (North Central Arnhem Land)*. [PhD thesis], ANU, Canberra, ACT.
- Hohaus, V. (submitted). *Counterfactuality and Past*.
- Hyman, L. M. (1980). Relative time reference in the Bamileke tense system. *Studies in African Linguistics*, 11(2), 227-237.
- Martin, J. B. (2010). How to Tell a Creek Story in Five Past Tenses. *International Journal of American Linguistics*, 76(1), 43-70. doi: 10.1086/652754
- Matthewson, L. (2010). Cross-linguistic variation in modality systems: The role of mood. *Semantics and Pragmatics*, 3(9), 1-74.
- Nordlinger, R., & Caudal, P. (2012). The Tense Aspect and Modality System in Murrinh-Patha. *Australian Journal of Linguistics*, 32(1), 73-113.
- Nordlinger, R. & Sadler, L. (2008). When is a temporal marker not a tense?: Reply to Tonhauser 2007. *Language*, 84(2), 325-331.
- Ritz, M.-E., Dench, A., & Caudal, P. (2012). Now or Then? The Clitic -rru in Panyjima: Temporal Properties in Discourse. *Australian Journal of Linguistics*, 32(1), 41-72.
- Schultze-Berndt, E. (2012). Pluractional Posing as Progressive: A construction between Lexical and Grammatical Aspect. *Australian Journal of Linguistics*, 32(1), 7-39.
- Smith, C. S., Perkins, E. T., & Fernald, T. B. (2007). Time in Navajo: Direct and Indirect Interpretation. *International Journal of American Linguistics*, 73(1), 40-71.
- Stirling, L. (2012). Tense Aspect Shifting in Kala Lagaw Ya Oral Narratives. *Australian Journal of Linguistics*, 32(1), 157-190.
- & Dench, A. (2012). Tense Aspect Modality and Evidentiality in Australian Languages: Foreword. *Australian Journal of Linguistics*, 32(1), 1-6.
- Stone, M., & Hardt, D. (1999). Dynamic Discourse Referents for Tense and Modals. In H. Bunt & R. Muskens (Eds.), *Computing Meaning: Volume 1* (pp. 301-319). Dordrecht: Springer Netherlands.
- Tonhauser, J. (2007). Nominal Tense? The meaning of Guaraní nominal temporal markers. *Language*, 83(4), 831-869.
- Tonhauser, J. (2011). Temporal reference in Paraguayan Guaraní: a tenseless language. *Linguistics & Philosophy*, 34(3), 257-303.
- Tonhauser, J. (2015). Cross-Linguistic Temporal Reference. *Annual Review of Linguistics*, 1, 129-154.
- van der Wal, A. E. (1992). *Structure and Function in Gupapuyŋu: a Yolŋu dialect of North-east Arnhemland*. (PhD thesis), University of Newcastle, NSW.
- Verstraete, J.-C. (2006). The Nature of Irreality in the Past Domain: Evidence from Past Intentional Constructions in Australian Languages. *Australian Journal of Linguistics*, 26(1), 59-79. doi: 10.1080/07268600500531636

A Yolŋu data

Except where noted, the data that follows and the page numbers cited are drawn from Wilkinson (1991) on Djambarrpuyŋu [dʒr]. These data provide an overview of the categorised functions of each inflection, enumerated in Table 3 on page 11 of this document.

A.1 primary inflection (I)

(15) PRESENT

ŋarra marrtji-n dhiyaŋu-n bala
1s go.I-SEQ PROX.ERG-SEQ away
'I am going now' (256)

(16) PAST

yo, barpuru-ny ŋarra ŋanya nhä-ma-ny
yes yesterday-PROM 1s 3s.ACC see-1-PROM
'yeah, I saw him yesterday' (339)

(17) a. PRESENT HABITUAL

ŋunhi ŋilinyu ŋuli ga warkthu-n maṇḁa waṇgany-ŋur
TEXD 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)

(18) TODAY FUTURE

yalala ŋarra dhu nhokal lakara-m
later 1s FUT 2s.OBL tell-I
'I'll tell you later (today)' (346)

(19) 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 dhe 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 (II)

(20) IMPERATIVE

yaka waŋi!
NEG talk.II

'don't speak!'

(360)

(21) FUTURE

a. WITHOUT *DHU*

ŋayi bonguŋ nhini ŋäku ŋarra-ny ŋunhal 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 ŋarra dhu nhuŋu dhäwu-ny lakara-ŋ
tomorrow-SEQ 1s FUT 2s.DAT story-PROM tell-2

'I'll tell you the story tomorrow'

(346)

c. *yalala-ŋu-mirri-y ŋula nhätha ŋarra dhu nhokal lakara-ŋ*
later-ŋu-PROP-ERG sometime 1s FUT 2s.OBL tell-2

'I'll tell you the story tomorrow'

(346)

(22) COOCCURRENCE WITH *ŋULI*

- a. FUTURE HABITUAL *note here that there's a strong hypothetical flavour in this datum*

nhä-mirr balan ηayi gi ηirrimbu-η ηarra-kal milmitjpa-ny ga
 what-PROM IRR 3s IPFV.II come-II 1s-OBL afternoon-PROM and
godarr'-tja ηayi ηuli gi dhiyal warkthu-rr
 morning-PROM 3s HAB 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*

ηuli ηayi dhu dhuwal raki djaw'yu-rr-nydja bongun Melanie-y
 HYP 3s FUT PROX tape take-II-PROM tomorrow NAME-ERG
dhäruk-mirr ηarr-kalanu-mirr-nydja bala ηayi dhu gi bäki-n nhakun
 word-PROP 1s-OBL-PROP-PROM then 3s FUT IPFV.II use-SEQ like
nhanukiyin-galalanu-wurr ηä-nha-kurr
 3s.EMPH-OBL-PERL listen-IV-PERL

'If they take this tape, then later Melanie will be using it, perhaps by listening (to it)' (352)

(23) NEGATIVE RECENT PAST

bäyηu ηayi gi nhini barpuru
 NEG 3s IPFV.II sit.II yesterday

'They weren't staying here yesterday' (357)

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

- a. *ηayi balan limurruη maḍakarritj-thi*
 3s IRR 1d.INCL-DAT angry-INCH.II

'she may be angry with us (today)' (354)

A.3 tertiary inflection (III)

(25) PAST

- a. TODAY

ηe gaathur ηarra ηapa nhaa-ηal godarr 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 m̩nda-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)

(26) Ψ USES

- a. *narra dhuwal/dhika djawaryu-rr/rerrikthu-rr/djan̩arrthi-n*
1s PROX/INDEF 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 (IV)

(27) COOCCURRENCES WITH *ŋuli* ‘HYP/HAB’

- a. PAST HABITUAL

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

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

(350)

- b. ‘HYPOTHETICAL’ (COUNTERFACTUAL)

ŋäthil narra ŋuli balan liya-ŋamaŋamayu-n-mi-nya bala narra balan
earlier 1s HYP IRR have.idea-1-R/R-IV then 1s IRR
wana-nha-n
speak-IV-SEQ

‘Had I thought of it before, I would’ve spoken’

(28) COOCCURRENCE WITH *balan* ‘IRR’

- a. *barpuru balan narra 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*** *ḡayi yaka dharpa-ny galkirri-nya be-ḡur-nydja*
 such.that IRR 3s NEG tree-FOC fall-**IV** INDEF-ABL-FOC
garraṃat-ḡur-nydja
 top-ABL-FOC
 ‘(she drove slowly) so the tree wouldn’t fall off the top’ (354)

(29) REMOTE PAST UNDER NEGATION

- ḡäthil-nydja ḡarra ga-n dhuwal, ga miltjirri marrtji-n bāyḡu ḡarra ḡuli*
 before-PROM 1s IPFV-**III** PROX and blind go-III NEG 1s HAB
ga-nha nhä-nha
 IPFV-IV see-**IV**
 ‘I was blind before, I wasn’t able to see’ (358)

List of abbreviations

| | |
|--------|--------------|
| ACC | accusative |
| ALL | allative |
| COMPLV | completive |
| DAT | dative |
| EMP | emphatic |
| ERG | ergative |
| HAB | habitual |
| HYP | hypothetic |
| INCL | inclusive |
| IPFV | imperfective |
| IRR | irrealis |
| LOC | locative |
| MOD | modal |
| NEG | negative |
| OBL | oblique |
| PERL | perlative |
| PROM | prominent |
| PROX | proximate |
| PST | past |
| RED | reduplicant |
| SEQ | sequential |
| TEXD | text-deictic |
| TR | transitive |