Abstract

# At the Intersection of Temporal & Modal Interpretation:
## Essays on Irreality

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This work is chiefly concerned with the semantics of linguistic categories including tense, modality and negation and the relationships between them. In particular, how do they interact in order to "displace" discourse and to talk about situations remote from the time & place where they're produced? What gets conventionally encoded in linguistic expressions (semantics)? And what's the role of discourse context and extralinguistic factors (pragmatics) in performing these operations?

The current thesis contains three connected (but independent) components; each explores different sets of data in view of understanding particular types of displacement phenomena — that is, how, in a given discourse context, reference is established to different possible worlds and different times. In other words, we are concerned with the interactions between temporal reference, modal reference and negation/polarity, and the linguistic phenomena that these give rise to. Methodologically, these projects also engage with diachronic considerations in view of explaining variation and change across spatially and temporally separate language varieties. This is motivated by the desiderata formulated by the AMPHICHRONIC PROGRAM — that is, I assume that studying changes in language use over time has something to teach us about synchronic systems and *vice versa*, all in the service of developing an understanding of human language as a cognitive system.

Each of these three component "essays" considers data from a number of languages spoken in Aboriginal Australia — particularly Yolŋu Matha and Australian Kriol — on the basis of both published and original data, collected on-site in the *Top End* and in consultation with native speakers. While there is a rich tradition of Australian language description, little Australian language data has been brought to bear on the development of formal theories of meaning.

Data from these languages promise to challenge and enrich the methodological and theoretical toolbox of formal semantics. Equally, it is a general contention throughout this work that

formal perspectives hold exceptional promise in terms of better understanding the range of linguistic diversity exhibited across Australian languages and developing cross-linguistic typologies of the expression of grammatical categories.

**'The emergence of apprehensionality in Australian Kriol'** considers the semantics of the adverb *bambai* in Australian Kriol, a creole language spoken by indigenous populations across northern Australia. Derived from English archaism *by-and-by*, Kriol has retained the "temporal frame" use that is found in other South Pacific contact varieties (roughly 'soon afterward'), while also having developed an identifiable "apprehensional" use. Apprehensionals—an understudied, if cross-linguistically well-documented category—are taken to modalize their prejacent while implicating their speaker's negative attitude vis-à-vis the possibility described in the prejacent. This essay proposes an unified analysis of the meaning contribution of *bambai*, analyzing the item as unambiguous and claiming that, synchronically, the apprehensional reading "emerges" reliably in discourse contexts where the truth of its prejacent is *not presumed settled* as a result of standard assumptions about pragmatic reasoning. Diachronically, it is shown that a similar set of processes led to the generalisation and conventionalization of *bambai*'s meaning components.

**'The semantics of the Negative Existential Cycle'** represents a semantic treatment of another little-theorized but cross-linguistically attested cyclic change as it is instantiated in a number of Australian (Pama-Nyungan) language (sub)families. The *Cycle* involves the recruitment of a "special" nominal negative element which diachronically displaces an older sentential negator. In this essay, the PRIVATIVE—a nominal case marking described in many Australian languages—is analysed as a negative quantifier. The *Cycle*, then, is understood as the progressive generalisation in the quantificational domain of a negative quantifier: privatives scope over nominalized event descriptions and ultimately over full sentences, at which stage they have encroached into the domain of "standard" negation.

**'Reality status & the Yolŋu verbal paradigm'** contains a description of and formal proposal for strategies of expressing temporal and modal categories in Western Dhuwal(a), a Yolŋu language of northern Arnhem Land. Crucially, this language exhibits a number of puzzling phenomena — in particular, *cyclic tense* and the *neutralization of reality status marking in negative sentences*. As a consequence of these phenomena, the four inflectional categories that constitute WD's verbal paradigm have been treated as unanalyzable from a compositional perspective.

Further, neither of these phenomena has received attention in the formal semantic literature. Consequently, this essay represents the first formal proposal for the semantics WD inflectional paradigm (as instantiating a cyclic TENSE system and an IRREALIS mood which is licensed by negation) as well as the first formal analysis of these two typological phenomena.

# At the Intersection of Temporal & Modal Interpretation: Essays on Irreality

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# List of glossing convetions

| | |
|---|---|
| AUX | auxiliary. |
| 1/2/3 | 1/2/3-person. |
| ABL | ablative case. |
| ABS | absolutive. |
| ACC | accusative. |
| ALL | allative. |
| ANA | anaphoric reference |
| ANIM | animate. |
| APPR | apprehensional. |
| ASSOC | associative. |
| AUG | augment. |
| CAUS | causative. |
| CFACT | counterfactual. |
| COMIT | comitative case. |
| COMP | complementiser. |
| COND | conditional. |
| CONJ | conjunction. |
| CPLV | completive aspect. |
| d | dual (number). |
| DAT | dative case. |
| DEIC | deictic. |
| DIST | distal. |
| DM | discourse marker. |
| DUR | durative aspect. |
| EMPH | (em)phatic. |
| ENDO | endophoric |
| EPIST | epistemic modal. |
| ERG | ergative case. |
| EX | existential predicate. |
| EXCL | exclusive (pn). |
| FOC | focus. |
| FUT | future (tense). |
| HAB | habitual. |
| HYP | hypothetical. |
| HORT | hortative. |
| IMP | imperative. |
| IMPF | imperfect. |
| INCH | inchoative. |
| INCL | inclusive (pn). |
| INDIC | indicative mood. |
| INDF | indefinite. |
| INFL | verbal inflection (TMA). |
| I | primary inflection. |
| II | secondary inflection. |
| III | tertiary inflection. |
| IV | quarternary inflection. |
| V | past potential. |
| INSTR | instrumental case (ERG). |
| INTNS | intensifier. |
| IPFV | imperfective. |
| IRR | irrealis mood. |
| ITER | iterative aspect. |
| KINPROP | proprietive (kinship) |
| LOC | locative case |
| Ch | child. |
| Da | daughter. |
| Fa | father. |
| Mo | mother. |
| *MÄLK* | Skin name (‘subsection’). |
| MED | medial (demonstrative). |
| MOD | modal particle. |
| MVTAWY | ‘movement away’. |
| NCL | noun (class) marker. |
| NEGEX | negative existential ∄. |
| NEGQ | negative quantifier ∄. |
| NEG | negator. |
| NMLZR | nominaliser. |
| NOM | nominative. |
| NPST | nonpast tense. |
| OBL | oblique case. |

| | |
|---|---|
| **OBLIG** | obligative. |
| **p** | plural. |
| **PERF** | perfect aspect. |
| **PERG** | pergressive. |
| **PERL** | perlative case. |
| **PFV** | perfective. |
| **PNEG** | past negative. |
| **PRECONTEMP** | precontemporary |
| **PRIV** | privative case. |
| **PROG** | progressive. |
| **PROH** | prohibitive. |
| **PROM** | prominence (≈ focus). |
| **PROP** | proprietive case. |
| **PROX** | proximal (demonstrative). |
| **PRS** | present tense. |
| **PST** | past tense. |
| **PURP** | purposive. |
| **R/R** | refllexive-reciprocal. |
| **RECIP** | reciprocal. |
| **REDUP** | reduplicant. |
| **s** | singular (number). |
| **SBJV** | subjunctive. |
| **SEQ** | sequential. |
| **SS** | same subject (subordinate cl). |
| **TEMP** | temporal case (ERG). |
| **TR** | *-thu-* transitiviser. |
| **VBLZR** | *-thu-* verbalizer. |

## Other abbreviations

| | |
|---|---|
| TFA | temporal frame adverbial. |
| TRM | temporal remoteness morpheme. |
| FOC | focus marker. |
| INDF | indefinite. |
| NP | noun phrase. |
| NƎC | Negative Existential Cycle. |
| SN | standard negation. |
| WD | Western Dhuwal-Dhuwala. |

# Acknowledgments

So here I am, at the eleventh hour, for the *n*th time, picking up at the acknowledgments section that's been another victim of successive deferrals. It ought to go with out saying at this stage that this dissertation wouldn't exist & I'd never have gotten to this point in a million years if not for so many people, both in the wonderful time I've spent in New Haven and prior.

*Contra* Fuchs (2020: xiii), it's actually *my* extraordinary thesis committee that's been the best one.

*In order of appearance:*

I'm pretty sure that I'm not the first person to observe that Claire Bowern—*meine Doktormutter*—is some sort of superhero. A few years ago when we (successfully) nominated Claire for an advising award, a friend of mine working in the Grad School office (probably inappropriately) quoted me back at myself. I'm not going to copy it all here but that Claire's been "a sine qua non for my continuation in the program and my optimism about a future working in linguistics and in universities" is no less true now than it was then. Claire's why I came to Yale and she's how I made it through; she's been hugely supportive and enthusiastic of my work as I've navigated grad school and hundreds of conversations with her have shaped not only my views on linguistics per se, but also *Linguistics* as a discipline, as a profession and as a community.

Ashwini Deo was my introduction to formal semantics. It was at some point between that class and her seminar on meaning change the following term, that I spontaneously decided that this was where and how I wanted to work. The deep enthusiasm imbuing Ashwini's teaching is infectious, the dual commitment to clarity and precision reflected in her work and her ability to simultaneously attend to detail and the "bigger questions" are an inspiration and a touchstone for my work and my thinking. Every. single. conversation. with Ashwini has left me with new ideas, visibility of new connections between them and a renewed motivation to work through them.

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*Josh ~ New Haven, May 2021*

# Chapter 1

# Introduction

DISPLACEMENT has been proposed as a universal and distinctive property of human language which 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). Traditionally, linguistic work — descriptive, pedagogical, theoretical — has often seemed to take for granted a categorical distinction between subtypes of verbal inflection: *viz.* the TEMPORAL and MODAL domains. Whether or not these basic claims are intended as heuristic, the independence of tense, modality, aspect and related categories quickly unravels upon close inquiry or on consideration of cross-linguistic data: a challenge for linguistic theory, and one that a rapidly expanding body of literature is identifying (*e.g.*, Condoravdi 2002; Hacquard 2006; Laca 2012; Rullmann & Matthewson 2018 among many others).

The body of this dissertation consists of three more or less related studies that consider the roles of conventionalised linguistic expressions and context (*sc.* the interplay of semantics and pragmatics) in "displacing" discourse – that is, how, in a given discourse context, reference is established to different possible worlds and different times. In other words, we are concerned with the interactions between temporal reference, modal reference and negation/polarity, and the linguistic phenomena that these give rise to. Methodologically, these projects also engage with diachronic considerations in view of explaining variation and change across spatially and temporally separate language varieties. This is motivated by the desiderata formulated by the AMPHICHRONIC PROGRAM — that is, I assume that studying ostensible changes in language use over time has something to

teach us about synchronic systems and vice versa, all in the service of developing an understanding of language as a cognitive system (*e.g.*, Anderson 2016; Deo 2015a; Kiparsky 2006, see also § 1.3).

The role of this introduction is to lay out (and motivate) the major assumptions and theoretical commitments that underpin these essays and to highlight how, they connect with one another and (hopefully) constitute data and analyses that have the potential to further refine and nuance theories of natural language semantics, specifically in terms of what these have to say about the mechanics of displacement.

Each essay considers data from a number of languages spoken in Aboriginal Australia — particularly Yolŋu Matha and Australian Kriol — on the basis of both published and original data, collected on-site in the Top End and in consultation with native speakers. While there is a rich tradition of Australian language description and recent work has attended to a number of distinctive features in the functional semantics of Australian Languages, in places deploying formal tools, the languages of this continent, hugely linguistically diverse, has otherwise received vanishingly little attention in formal semantic theory (some exceptions to this include Stirling & Dench's 2012 special issue of *Aust. J. Linguist. 32*,[1] James Bednall's 2019 thesis on Anindilyakwa temporal and modal expression and Bowler 2014 & Kapitonov 2018 on quantificational expressions in Warlpiri and Kunbarlang respectively.) As we will see, data from these languages promise to challenge and enrich the methodological and theoretical toolbox of formal semantics, just as insights from contrastive work on, *e.g.*, the indigenous languages of the Americas and the Pacific have (*e.g.*, Bochnak et al. 2019; Krifka 2016; Matthewson 2006; von Prince et al. 2019a; Tonhauser 2007, among many others.) Furthermore, it is a general contention throughout this work formal perspectives hold exceptional promise in terms of better understanding this diversity and developing typologies of the expression of functional categories across these languages.

[1] *Australian Journal of Linguistics*'s special issue contained six pieces on various TAME phenomena in Australian languages emerging out of a four-year European Commission-funded grant. Of particular interest from a formal perspective are the contributions of Caudal et al. (2012) and Ritz et al. (2012).

## 1.1 Overview

The body of this dissertation comprises three discrete parts, which represent three related but distinct projects. While they can each be read as independent pieces of work that tackle separate linguistic phenomena, the methodological tools, assumptions and upshots of each component are mutually informing. As described above, the three components all engage with various phenomena at the intersections of tense, mood/modality and negation. They each interrogate the linguistic manifestations of interactions between these semantic categories in view of contributing to a nuanced and cross-linguistically sound semantic theory, with particular implications for our theoretical conceptions of, for example, irreality and counterfactuality. Here, I provide a brief abstract of each of the dissertation's constituent parts.

**Part I** provides a first formal semantic account of ***apprehensionality*** — a "mixed modal" category that encodes possibility and negative affect with respect to some described eventuality. I pay particular attention to an apparent meaning change trajectory, where future-oriented temporal expressions develop modal readings: the semantical connections between futurity and modality are elegantly modelled by formal apparatus like that described in §1.2 below. In order to get at this, Chapter 2 describes and accounts for the changes in the distribution of the Australian Kriol adverb *bambai*. An observation originally due to Angelo & Schultze-Berndt (2016, 2018), *bambai* started life as a temporal frame adverbial ('soon, shortly thereafter') and has developed so-called "apprehensional" uses. The chapter provides a detailed explanation of the range of uses available to *bambai* in both its temporal and modal functions.

In many contexts *bambai* is translatable as 'otherwise': the account defended here treats *bambai*-type apprehensionals as discourse anaphors that involve the "modal subordination" of their prejacent to elements of foregoing discourse. An analysis of the mechanics of this process are provided in Chapter 3. This chapter also provides a historical pragmatic account of the "emergence" of apprehensional readings — their modal and expressive components — in terms of the generalisation of speaker-based implicatures.

On the basis of this, Chapter 4 comprises a proposal for a single lexical entry for *bambai* which unifies the uses described in this Part I.

**Part II** represents a first semantic treatment of the **Negative Existential Cycle (NEC)**, also demonstrating its instantiation in a number of subgroups of Pama-Nyungan on the basis of comparative data from Thura-Yura, Yolŋu Matha and Arandic. The Negative Existential Cycle (see Croft 1991; Veselinova 2016) is a proposed grammaticalisation process where negative existential predicates develop into markers of standard negation. Chapter 5 comprises a proposal for the PRIVATIVE—a grammatical category described in many Australian languages (*e.g.*, Dixon 2002a; Phillips to appear 2021a)—where this marker taken to realise the semantics of a negative existential predicate. Diachronically, I provide evidence from each of these subgroups that erstwhile privatives generalise into sentential negators: instantiating the Negative Existential Cycle.

In Chapter 6, then, I propose a unified semantics for nominal and verbal negation (that is, one that accounts for the polyfunctionality of negative existential predicates which have generalised into markers of clausal negation: the core observation of the NEC. I take this cycle to provide support for a treatment of **negation as a two-place operator** (comparable to contemporary treatments of modal expressions) and additionally suggest that this cycle can be united with general observations made in the grammaticalisation literatures regarding the functional pressures underpinning meaning change — particularly the diachronic loss of the property of "strict/discretional" indexicality (see Perry 2012).

**Part III** comprises a description and analysis of the encoding of temporal and modal information ("reality status") in Western Dhuwal-Dhuwala (WD) — a variety (or cluster of varieties) of Yolŋu Matha spoken in northern Arnhem Land.

Unlike neighbouring varieties, WD exhibits **cyclic tense** (a species of *metricality*/temporal distance marking where a given inflectional category appears to encode the instantiation of a given property at discontinuous intervals) in addition to **negation-based asymmetries in reality-status marking** (*cf.* Miestamo 2005): a phenomenon where mood distinctions are collapsed in negative predications. Part III, then, provides a semantics for each of WD's four inflectional categories which captures and predicts the negative asymmetry.

Chapter 8 consists of an account of temporal expression in WD, motivating cyclic tense and explicating the grammaticalisation of a paradigmatic CONTEMPORARY/PRECONTEMPORARY distinc-

tion. Chapter 9 is concerned with WD modal expression. Central to the analysis is the idea that the paradigm encodes a two-way mood (or "reality status") distinction. This is formulated as a presupposition that a metaphysical modal base is **nonveridical** with respect to the inflected predicate. The species of nonveridicality itself is encoded by a predicate modifier. In WD, the negative particles *yaka* and *bäyŋu* realise two such nonveridical operators. In this sense, the account converges with observations made in Part II, *viz.* it advocates for a treatment of sentential negators and modal expressions as a natural class.

A complete proposal for the distribution of inflectional forms, then, is provided at the beginning of chapter 10, casting the relevant distinctions in terms of two semantical properties which capture the phenomena described above. These two phenomena (to varying degrees) represent areal features of the languages of central Arnhem Land. Part III concludes with a note discussing change and variation with respect to the semantics of verbal inflections in varieties of Yolŋu Matha.

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The next section introduces a number of the key assumptions and formal tools that will be used to analyse each of the phenomena introduced above. Each individual subpart further engages with literature relevant to the respective analysis (*e.g.*, existing treatments of *apprehensionality, modal subordination, existential predication* and *verbal mood*.)

## 1.2 Formal theories of displacement

As indicated above, the three component parts that constitute the primary contribution of this dissertation comprise three treatments of data about natural language expressions responsible for temporal displacement, modal displacement and negation. In this section, I provide an overview of the formal semantic assumptions that guide and motivate these analyses.

The primary goal of semantic theory is the development of models of linguistic meaning. To this end, an understanding of "meaning" as the conditions on the truth and felicity of a given linguistic expression has proved to underpin a particularly successful methodology. A crucial distinction, and one that is key to the work presented here, is that between *extensional* and *intensional*

semantics. An *extensional semantics* is one where the truth of a given sentence is "defined entirely by its form and the extensions of its component sentences, predicates and terms" (Menzel 2017). On the other hand, truth in an *intensional* logic requires appeal (or relativisation) to some object beyond these, *sc.* some semantical index at which a sentence's truth or falsity is evaluated. These indices represent the parameters at which a given sentence is uttered – that is, they might be taken to contain information about the time and world of utterance, the discourse participants, etc. — also perhaps describable as "qualifications (of states of affairs)" (Nuyts 2005).

Formal approaches to semantics are largely developed from traditions of mathematical logic (*e.g.*, Montague 1970, see Janssen 2016 for an overview.) Importantly, the first formal temporal logics (*e.g.*, Prior 1957 *et seq.*) build on the frameworks of modal logic, in particular the notion of *possible worlds semantics*. Where a possible world $w$ is an imaginable state of affairs, a possible 'way the world could be' (*e.g.*, Lewis 1986). The basic operationalisation of a possible worlds semantics lies in positing a modal "frame" $\langle \mathcal{W}, \mathcal{R} \rangle$ — a set of worlds $\mathcal{W}$ and an accessibility relation $\mathcal{R} \subseteq \mathcal{W}^2$ which makes "relevant" worlds available. That is, when a pair of worlds $\langle w, w' \rangle$ is in $\mathcal{R}$, $w'$ can be said to be *accessible* from $w$ or *possible-relative-to* $w$ (alternatively, if $w\mathcal{R}w'$, then $w$ *can see* $w'$ (Hughes & Cresswell 1996: 37)). With a model frame — *sc.* a set of worlds and a way of relating them, a semantics can be defined for unary modal operators (normally $\Box$ or $\mathbf{L} \div$ 'it is necessary that' and $\Diamond$ or $\mathbf{M} \div$ 'it is possible that'.) A standard semantics for these operators given a model $\langle \langle \mathcal{W}, \mathcal{R} \rangle, [\![\bullet]\!] \rangle$ — that is, a modal frame and a valuation function $[\![\bullet]\!]$ — is provided in (1).

(1) A modal semantics for formulae containing the modal operators $\Box$ (necessity) and $\Diamond$ (possibility) (*e.g.*, Hughes & Cresswell 1996: 39)

   a. $[\![\Box\varphi]\!]^w = 1 \leftrightarrow \forall w'[w\mathcal{R}w' \rightarrow [\![\varphi]\!]^{w'}]$
   Where $\varphi$ is some well-formed formula, $\Box\varphi$ is true in some world $w$ iff $\varphi$ is true in **all** worlds $w'$ accessible from $w$.

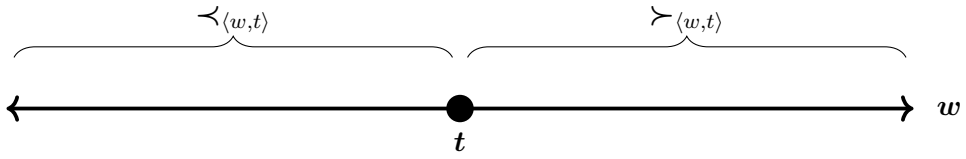
   b. $[\![\Diamond\varphi]\!]^w = 1 \leftrightarrow \exists w'[w\mathcal{R}w' \wedge [\![\varphi]\!]^{w'}]$
   Where $\varphi$ is some well-formed formula, $\Diamond\varphi$ is true in some world $w$ iff $\varphi$ is true in **some** world $w'$ accessible from $w$.

Building on these modal logic traditions, Prior (1957; 1958; 1967) analogised **P**ast and **F**uture tense operators to possibility modals: effectively, these operators are all taken to existentially quantify over a set of states-of-affairs (set of accessible reference points: times/possible worlds).[2] In the

[2]See Copeland (2002, 2020) and Markoska-Cubrinovska (2016) for more on the foundational contributions of Arthur

case of temporal operators, the relevant accessibility relation $\mathcal{R}$ is identified as $\prec$ (or $\succ$), where $t \prec t'$ reads: '$t$ precedes $t'$'. Consequently, $\prec_{\langle w,t\rangle}$ ($\succ_{\langle w,t\rangle}$) make available only the temporal predecessors (successors) of the evaluation index, assuming a dense, linearly-ordered set of times $t, t', t'' \ldots \in \mathcal{T}$.[3] The sets of times that are made available by each of these relations is schematised in Fig. 1.

**Figure 1**. Temporal accessibility relations: the sets of world-time pairs preceding and following $\langle w, t\rangle$ are labelled $\prec_{\langle w,t\rangle}$ and $\succ_{\langle w,t\rangle}$ respectively (adapted from Kaufmann, Condoravdi & Harizanov 2006: 93). Time is assumed to "flow" infinitely rightwards.




By analogy, then, with possibility modals, a past tense operator might be taken to existentially quantify over times preceding the reference time (as in 2 below.)

(2) **The meaning of a PAST tense operator**
$[\![\mathbf{PAST}\varphi]\!]^{w,t} = 1 \leftrightarrow \exists\langle w, t'\rangle\left[\langle w, t'\rangle \prec \langle w, t\rangle \wedge [\![\varphi]\!]^{w,t'}\right]$
**PAST**$\varphi$ is true at $t$ iff there is some time $t'$ that is a predecessor to the reference index (formally, a world-time pair $\langle w, t\rangle$) such that $\varphi$ was true at $t'$.

### 1.2.1 Indeterminist tense logic: on future contingents & branching times

A related consequence of theories of temporal and modal logic emerging out of the philosophical and semantic traditions is the notion of "branching time", which underscores the intimate relationship between temporal and modal reference.

Models of branching time capture a crucial asymmetry between past and future temporal reference: namely the indeterministic, inherently **unsettled** (or *contingent*) nature of predications

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Prior to the development of modal (esp. tense) logic.

[3]For completeness, a binary relation (*e.g.*, $\prec$ over $\mathcal{T}$) is:

a. LINEARLY ORDERED iff it is connex, transitive, irreflexive and asymmetric

b. DENSE iff it is isomorphic to $\mathbb{R}$(*i.e.*, $\forall t, t''\left[[t \prec t''] \rightarrow \exists t'[t' \neq t \neq t'' \wedge t \prec t' \prec t'']\right]$)

about future times — an intuition frequently attributed to Aristotle's example of tomorrow's sea battle (*De Interpretatione*: Ch. 9; see Øhrstrøm & Hasle 1995 for a review of the thinking around this issue.) Widely adopted and developed, the formulation of branching time models is attributed to Arthur Prior and (a 17-year old) Saul Kripke (see Ploug & Øhrstrøm 2012 for a history of the correspondence of the two logicians.)

In effect, branching time formalisms seek to capture the idea that "for any given time there may be not merely a single future course of time, but multiple possible futures" (Dowty 1977: 63, see also Burgess 1978; Thomason 1970 a.o.) — that is, a model of time as *right-branching* (rather than linear.) This asymmetry between the past and the future is observed in multiple places by Prior (1957; 1967, see also Copeland 2020), who develops what he refers to as a couple of alternative solutions, developed by indeterminists, to the problem of future contingency (*e.g.*, 1967: 121*ff*): namely an *Ockhamist* versus a *Peircian* conception of the truth of tensed propositions.[4] Here, the distinction between tense and modality begins to come apart.

For the indeterminist (*i.e.*, on the assumption that the future isn't settled and predetermined), then, FUTURE markers are inherently modal operators insofar as they can be taken to quantify over different possible worlds — here to be represented as "branches."[5] (Potential) futures, then, are calculated from with respect to a given evaluation time. Broadly speaking, $\mathbf{Fut}\varphi$, when evaluated at $t$, can be taken to say that, along all those futures branching from $t$, there's some later time $(t')$ at which $\varphi$ is true (see Thomason 1970: 267).[6]

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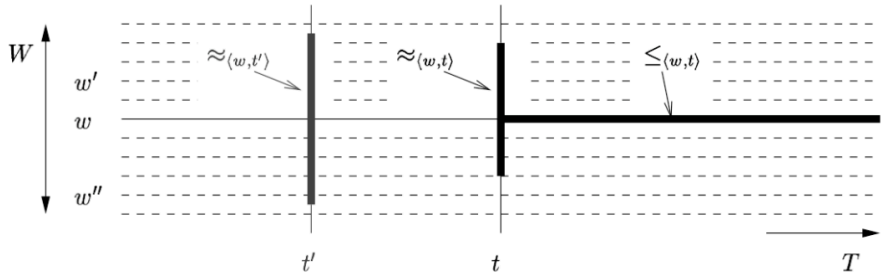
[4] In adopting these descriptors – recast in Burgess 1978 as the *actualist* and *antactualist* schools respectively – Prior alludes to observations made in William of Ockham's tract *De Prædestinatione* (1945 [ca. 1322-4]) and by Charles Sanders Peirce (*e.g.*, Collected Works, Vol 6, ¶368). The primary flection point between these two notions of truth is the "Peircian" collapse of the distinction between Ockhamist notions of future necessity and contingency. For the Ockhamist $\mathbf{Fut}_t\varphi$ is valuable at $t$, even if its truth value is unknown, whereas for the Peircian $\mathbf{Fut}_t\varphi$ is false until that point in the future of $t$ where (perhaps) $p$ comes to be true (that is, the systems differ on whether or not $\mathbf{Fut}_t\varphi \wedge \mathbf{Fut}_t\neg\varphi$ is valid.) Prior (1967: 126*ff*) formalises and give a detailed comparison of these two systems (also additional discussion in Nishimura 1979; Øhrstrøm & Hasle 1995, 2020 including the so-called "Leibnizian" extensions made to the Ockhamist system.)

[5] "Branches" — the set of (maximal) chains within the (poset) $\mathfrak{T}$ — refers directly to this apparent "right-branching" property of time (*sc.* future contingents). Prior also refers to "routes." This terminology s apparently equivalent to the "histories" of other authors (Belnap et al. 2001; Dowty 1977; Tedeschi 1981; Thomason 1970 a.o.) or "chronicles" of yet others (Øhrstrøm & Hasle 1995). For some authors *histories* are distinguished from *branches* in that branches consist only of sequences of indices $\prec$-posterior to a specified branching point – that is, $\prec$-final subsets of histories (*e.g.*, Zanardo 1996: 4). I'll be using the terms interchangeably.

[6] Given a **Peircian** conception of truth-in-the-future (see fn 4). In fact, on Thomason's modified, trivalent account of truth valuation, a given sentence is generally true at $\alpha$ iff it is is true in all $h \in \mathcal{H}_\alpha$ (*i.e.* all those histories $h$ that run through $\alpha$) (1970: 274*ff*). Thomason (1984) uses $B_t$ equivalently. Tedeschi (1981: 247) uses a closely related strategy. Note that this semantics yields NECESSITY-in-the-future on an Ockhamist account.

**Figure 2**. Two-dimensional modal logic: the $\mathcal{W} \times \mathcal{T}$-frame. The thick lines represent sets of individual indices accessible from $\langle w, t \rangle$ by the modal relation $\approx$ (vertical) and the temporal relation $[\preccurlyeq]$ (horizontal). For example, the worlds accessible via $\approx$ from $w$ and $t$ are also accessible at $t'$, but not necessarily vice versa (diagram and caption from Kaufmann, Condoravdi & Harizanov 2006: 95)




Here, I briefly lay out a version of the "branching time frame" as laid out by authors including Thomason (*e.g.*, 1984: §5) and Burgess (1978 a.o.)

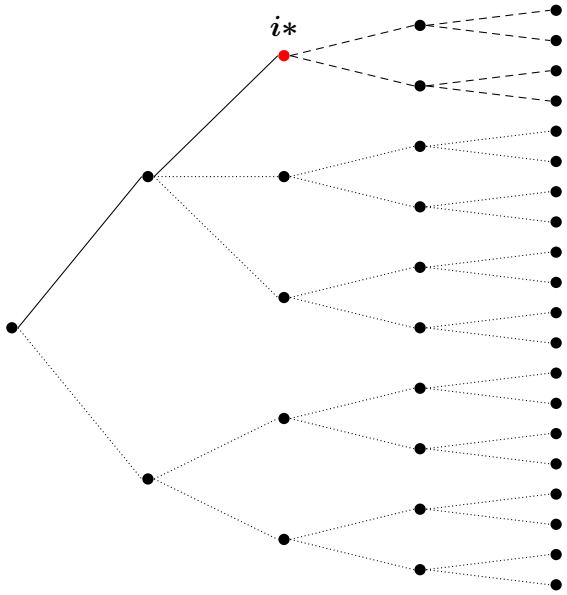
**The mechanics** A branching-time/tree frame $\mathfrak{T}$ is a partially-ordered set (*i.e.*, a pair $\langle \mathcal{I}, \prec \rangle$). That is, we assume a set of semantical indices (referred to elsewhere as *moments*) that is partially-ordered by the transitive precedence relation 'PRECEDES' $\prec$. In effect, this set $\mathcal{I}$ can be recast as comprising a set of world-time pairs $\langle w, t \rangle \in \mathcal{W} \times \mathcal{T}$ (which is assumed in the so-called "parallel worlds" model, represented in Figure 2.)[7]

At any given index $i \in \mathcal{I}$, there is a single past and an infinity of branching futures. Left-linearity (*i.e.*, the tree's trunk) is meant to depict the intuitive fixity ("settledness") of the past versus the right-branching property, depicting the indeterminacy and openness of the future. The framework is diagrammed in Figure 3 below.

**Branches** A branch $b$ which runs through any $i \in \mathcal{I}$ is a (maximal) linearly $\prec$-ordered subset (*sc. chain*) of $\mathcal{I}$. In this sense, a branch can be taken to correspond to a possible world/a complete possible course of events charting "an entire possible temporal development of the world"

[7]For an excellent overview of the related set of objects $\mathcal{W} \times \mathcal{T}$-frames — (perhaps more familiar in much of the linguistic semantics literature and) adopted in Condoravdi (2002); Kaufmann (2005); Klecha (2016) a.o., see Kaufmann, Condoravdi & Harizanov (2006). For comparisons with branching times models, see Rumberg 2016a; Thomason 1970, 1984.

**Figure 3.** A branching times frame $\mathfrak{T} = \langle \mathcal{I}, \prec \rangle$ following von Prince (*e.g.*, 2019: 591). Time "flows" rightwards and vertically aligned indices are taken to be "copresent". $\boldsymbol{i}*$ represents the *evaluation index* (present time & actual world.)




(Rumberg 2019: 148). If all indices $i$ are analogous to world-time pairs $\langle w, t \rangle$, then some $b$ which contains $i$ (notated $b \ni i$) is formally a chain of indices, effectively modelling a timeline/set of possible developments of a given world through time — analogous to a chain over $\mathcal{W} \times \mathcal{T}$ : $\big\langle \langle w, t \rangle, \langle w, t' \rangle, \langle w, t'' \rangle, \ldots, \langle w, t_n \rangle \big\rangle$. Note that these frameworks normally appear to assume that indices correspond to the state of a world at a moment of time. I assume that this model can be extended relatively straightforwardly to capture interval semantic notions (*e.g.*, Bennett & Partee 2004; Dowty 1982; Landman 1991 a.o.).[8]

I will refer to these indices, which constitute the elements of a given branch as **branchmates**. Given that branches are linearly ordered by $\prec$, pairs of branchmates are necessarily related by $\prec$ (and equally by the related linear orders: the weak counterpart $\preccurlyeq$ and the complements of these two orders $\succ, \succcurlyeq$ respectively.)

(3) Two indices $i, i'$ are branchmates iff $i \prec i' \vee i = i' \vee i \succ i'$

[8]This extensibility is also suggested by Dowty (1977) and Tedeschi (1981), who propose an interval semantic formalism for branching futures. Dowty gives a branching time (re)definition of an interval $\boldsymbol{\imath}$ as a connected proper subset ($\sqsubset$) of a history (1977: 64) — *i.e.*, a "sub-branch." Formally, an interval $\boldsymbol{\imath}$ is a subset of $\mathcal{I}$ such that: $\exists b \big[ \boldsymbol{\imath} \sqsubset b \wedge \forall i, i', i'' \in b [i, i'' \in b \wedge i \prec i' \prec i'' \rightarrow i' \in \boldsymbol{\imath}] \big]$

And Priorian-type tense operators can be reformulated as asserting relations between pairs of branchmates $i, i'$( along a given branch $b$):

(4) a. $[\![\textsc{past}\varphi]\!] = \lambda i.\exists i'[i' \prec i \wedge \varphi(i')]$

b. $[\![\textsc{future}\varphi]\!] = \lambda i.\exists i'[i' \succ i \wedge \varphi(i')]$

Given that there are, in-principle, infinite logically possible futures for a given index, $\mathtt{B}_i$ will be taken to represent the set of all possible branches $b$ that run through (that is, contain) a given index $i$ ($\bigcup_{b \ni i} b$). This is closely related to the notion of a **metaphysical modal base**, notated throughout as $\cap\approx_i$, which should be conceived of as comprising the set of branches that represent all the metaphysical/historical alternatives to a given index $i$ (see (7) for further explication of this important phenomenon.)[9]

I'll sometimes also use the notation ${}^b i$ in quantified expressions as a shorthand restricting the domain of $\mathcal{I}$ to a specified branch — *i.e.*, that subset of $\mathcal{I}$ : $\{i \in \mathcal{I} \mid i \in b\}$.[10]

**The "co-present"** Øhrstrøm & Hasle (2020) additionally point out that, for Kripke, these points are ranked with respect to one another — where each rank (or, diagrammatically, layer) of the tree constitutes an equivalence class of "co-present" indices (modally accessible in a $\mathcal{W} \times \mathcal{T}$-model, see Kaufmann, Condoravdi & Harizanov 2006: 95).[11] That is, indices that are neither successors nor predecessors of one another – *i.e.*, those are not ordered by $\prec$ with respect to one another – can still be temporally compared. In developing a branching-time semantics for conditionals,[12,13]

[9] See also Rumberg (2016b) for a discussion of the differences between logical, metaphysical and physical definitions of *possibility* (the alethic modalities.)

[10] *E.g.*, $\exists^b i\varphi = \exists i[i \in b \wedge \varphi]$ reads 'there exists some index $i$ along $b$ s.t. $\varphi$.'

[11] Similarly, Belnap et al. (2001: 194*ff*) distinguish between *moments* (=indices) and *instants*, where the latter are partitions of a tree structure that represent "[a] horizontal counterpart of histories (=branches)." "Rank" is attributed to Kripke in a 1958 letter to Arthur Prior (published in Ploug & Øhrstrøm 2012: 373*ff*).

[12] A crucial desideratum of their account is that it formalise Stalnaker's notion of maximal "similarity" between the evaluation world and the antecedent proposition, following Stalnaker 1968; Stalnaker & Thomason 1970.

[13] This formalism, related to the alternativeness relation ($\approx$) of Thomason (1984: 149), has a similar outcome/motivation to the "Clock" invoked in Dowty (1977); Thomason (1981) and, in later work, the "instant" or "time (value) function" of Rumberg (2016b: 27), Belnap et al. (2001: 195) and von Prince (2019: 592), where time maps an index to a set of "clock times" ordered by $\prec$ (isomorphic to branches).

Similarly Landman (1991: 102) provides a number of ways of establishing equivalence classes of co-present indices. *E.g.*, in what turns out to be an operationalisation of the Kripke's observation referenced above, "rank" can be measured using a function $d : \mathcal{I} \to \mathbb{N}$ that returns the how many "nodes" a given index is from $\mathfrak{T}$'s defined "origin" node (*viz.* $\bigcirc$ — the $\prec$-minimal element of $\mathcal{I}$, *cf.* Zorn's lemma). Equivalence classes can then be defined as sets of indices the same number of nodes from the origin, *sc.* $\approx_{\text{def}}^{=} \lambda i \lambda i'.d(i) = d(i')$.

Thomason & Gupta (1980) propose an additional "co-present" relation ($\simeq \subseteq \mathcal{I}^2$) which defines an equivalence class of co-present indices. With the relation $\simeq$ over $\mathcal{I}$, an index can be compared across, *e.g.*, all possible futures. As Landman (1991: 101) points out, in counterfactuals like: *if she hadn't left me a week ago, I wouldn't be so miserable now*, the indexical adverb *now* appears to pick out an index co-present with the time of speech, but crucially on a different "branch."

Armed with this relation then, Thomason & Gupta define an (anti)posteriority relation that holds between indices that aren't branchmates:

(5) **(Anti)posteriority** (Thomason & Gupta 1980: 311)

a. $i$ is **posterior** ($\succsim$) to $j$ iff there is some copresent index of $j$ (say, $j'$) that is a successor to $i$ $\quad i \succsim j \Leftrightarrow \exists j'[j' \simeq j \wedge i \succcurlyeq j']$)

b. $i$ is **antiposterior** to $j$ iff $i$ is not posterior to $j$ or is copresent with $j$

**Settledness** As suggested above, models of branching time seek to formalise intuitions about asymmetries between past and future predications. We have seen above how the truth of future contingents can be modelled using "forking paths" (i.e. branches of linearly ordered subsets of $\mathcal{I}$). Conversely, the model is "left-linear", depicting 'our notion of necessity *given* the past, [where] only one past, the actual one, is possible' (Burgess 1978: 159). That is, for any index there is only one unique sub-branch representing its history/set of predecessors.

(6) **Left linearity** — *i.e.*, $\mathfrak{T}$ is not branching to the past iff — where $a, b, b' \in \mathcal{I}$ :
$\forall a.b, b'[(b \prec a \wedge b' \prec a) \rightarrow (b \prec b' \vee b = b' \vee b \succ b')]$ (Landman 1991: 105)

Settledness/historical necessity is normally expressed in terms of **historical alternatives**. This refers to the notion of equivalence classes of possible worlds ($\boldsymbol{\approx_t} \subseteq \mathcal{W} \times \mathcal{W}$): those worlds which have identical 'histories' up to and including a reference time $t$.

The properties of the *historical alternative* relation (in a $\mathcal{T} \times \mathcal{W}$ model) are given in (7) which will permit for a formal definition of settledness as in (8).

(7) **Historical alternatives** $\approx \subset \mathcal{T} \times \mathcal{W} \times \mathcal{W}$

a. $\forall t[\approx_t$ is an equivalence relation]
All world-pairs in $\approx_t$ (at an arbitrary time) have identical pasts up to that time.

Their futures may diverge.
The relation is symmetric, transitive and reflexive (*i.e.*, an equivalence relation).

b. **monotonicity**
$\forall w, w', t, t' \big[(w \approx_t w' \wedge t' \prec t) \rightarrow w \approx_{t'} w'\big]$
Two worlds that are historical alternatives at $t$ are historical alternatives at all preceding times $t'$.
That is, they can only differ with respect to their futures. (Thomason 1984: 146)

The monotonicity property (7b) captures the intuition that the metaphysical alternatives that are available at given world-time pair change (monotonically) through time: that is, there is a unique possible state of the worlds at all times in the past. Given that branching-time models are definitionally taken to be left-linear, this additional equivalence relation isn't needed for them: it is a theorem of the system that $\preccurlyeq$ is monotonic (compare 7b′ below.)

(7) b′. **Monotonicity of $\preccurlyeq$**
$\forall i, i', i'' \big[[i' \preccurlyeq i \wedge i'' \preccurlyeq i] \rightarrow [i' \preccurlyeq i'' \vee i'' \preccurlyeq i' \vee i = i'']\big]$

Importantly, the notion of historical alternativeness/necessity is deployed in linguistic semantics to capture a number of natural language phenomena (*e.g.*, Condoravdi 2002; Kaufmann 2002; Thomason 1984).

Settledness, a related property, is satisfied if the instantiation of a given predicate is **identically determined** at all historical alternatives to a given world-time pair $\langle w*, t_0 \rangle$ is adapted in (8) below).[14]

(8) **Settledness for *P* in *w**
$\forall w' : w* \approx_{t_0} w' :$
$AT\big([t_0, \_), w', P\big) \leftrightarrow AT\big([t_0, \_), w'', P\big)$
A property $P$ (*e.g.*, an eventuality) is settled in a reference world $w'$ iff $P$ holds at a reference time $t_0$ in all of $w'$'s historical alternatives $w''$ as calculated at $t_0$.[15]

Further developing this notion, Condoravdi (2002: 82) gives a definition of "presumed settledness" — a property of predicates (see also Kaufmann 2002, 2005). In effect, $P$ is presumed settled in

[14] That is *settledness* is effectively the union of historical necessity and "historical impossibility."

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

a given discourse context iff 'the instantiation of the property it applies to is presupposed to be historically necessary if true (or equivalently, impossible if false.) This is formalised in (10).[16]

(10) a. **The common ground**

COMMON BELIEFS (somewhat heuristically) are the set of propositions that are taken to be believed by all discourse participants (doxastic agents) $\alpha$ in the discourse context $(c)$.

$CB_c(\varphi) \underset{\texttt{def}}{=} \varphi \in \bigcap_{\alpha \in c} \text{DOX}_\alpha(w*)$

THE COMMON GROUND $cg_c$, then, is the transitive closure of the common belief relation (that is, an ancestral relation, compare Fagin et al. 1995; Kaufmann 2010; Stalnaker 2002.)

$cg_c(\varphi) = \varphi \in \bigcup_{i=1}^{\infty} CB_c^i$, where $CB_c^{i+1}\varphi = CB_c CB_c^i \varphi$

That is, a proposition $\varphi$ is in the common ground iff it is a common belief of all participants that it is a common belief of all participants *etc.* that $\varphi$.

b. **The presumption of settledness for *P***

$\forall w' : w' \in \cap cg, \forall w'' : w' \approx_{t_0} w'' :$

$AT\big([t*, \_), w', P\big) \leftrightarrow AT\big([t*, \_), w'', P\big)$ (Condoravdi 2002: 82)

A property $P$ (*e.g.* an eventuality) is presumed settled in a common ground $cg$ iff $P$ is settled at all historical alternatives $w''$ to all worlds $w'$ compatible with $cg$.

Here, a common ground is taken to be equivalent to a context set ($\cap cg$, *cf.* Stalnaker 1978: 321*ff*) — *sc.* the set of worlds that the speaker takes to be epistemically accessible for participants in the discourse context/the set of worlds where all propositions known by the discourse participants are true (compare also Kaufmann's definition of settledness ("decidedness") in fn. 16).

Once again, and drawing on the relations described above, this relation between context set and property (8) can be recast in a branching-time model as in (8′); again $i* \in \mathcal{I}$ represents the evaluation/reference index (analogous to $\langle w_0, t_0 \rangle$ above).

(8′) **Settledness-at-$i*$ for *P*** (branching times)

$\forall b_1, b_2 \in \cap \approx_{i*} : \exists^{b_1} i' \exists^{b_2} i'' \big[ i' \simeq i'' \wedge [P(i') \leftrightarrow P(i'')] \big]$

A property $P$ is settled at an evaluation index $i*$ **iff** for any arbitrary pair of branches $b_1, b_2$ that represent metaphysical alternatives to $i*$, there is a pair of copresent indices $i', i''$ such

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[16] As a property holding between sentences (rather than properties) and doxastic agents, Kaufmann similarly defines this condition ('presumption of decidedness') as:

$\varphi$ is **presumed decided** by agent $\alpha$ at $i$ iff $\underset{\sim\alpha}{\Box}(\varphi \rightarrow \underset{\approx}{\Box}\varphi)$ is true at $i$. (Kaufmann 2005: 240)

That is, iff: in all of $\alpha$'s doxastic alternatives, if $\varphi$ holds at $i$, then it holds at all of $i$'s historical alternatives.

that $P$ holds at $i'$ iff it also holds at $i''$ (that is, $P$ is identically determined at co-present alternative indices.)

Similarly, in a branching time framework, we would stipulate that $P$ is **presumed settled** iff, for any possible branch $b$ that is compatible with a given common ground, $P$ is identically determined at $b$ and all of $b$'s historic alternatives.

**A modal trichotomy** As a consequence of this, von Prince (2017; 2019; von Prince et al. forthcoming) establishes a neat formal trichotomy between the ACTUAL, POTENTIAL and COUNTERFACTUAL domains by appealing to this framework (see also Rumberg 2016b: 41, 2019). This is modelled as having $\prec$ induce a partition of $\mathcal{I}$: that is, all $i \in \mathcal{I}$ can be sorted into (exactly) one of these three sets. This partition is reproduced in (11).

(11) Given a contextually defined ACTUAL PRESENT ($i* \doteqdot \langle w*, t* \rangle$), $\mathcal{I}$ can be partitioned into three subdomains:

a. The ACTUAL (past/present) = $\{i \mid i \preccurlyeq i*\}$
The utterance index $i*$ and its predecessors are the realm of the ACTUAL. Compare this notion to the equivalent one of *historical alternatives to* $w$ *at* $t$. These indices will be shown to be associated with the (notional semantic category of) REALIS.

b. The POTENTIAL = $\{i \mid i \succ i*\}$
Successors to the index of utterance $i*$ are the realm of the POTENTIAL: the full set of metaphysically possible futures to $i*$.

c. The COUNTERFACTUAL = $\{i \mid i$ **is unordered by** $\prec$ **w/r/t** $i*\}$
Those $i \in \mathcal{I}$ which neither precede nor succeed the utterance index $i*$: i.e., indices that are not (possible) branchmates of $i*$.

Each cell of this partition is represented in Figure 3 above: solid lines join those indices that are $i*$-ACTUAL, whereas dashed and dotted lines represent $i*$-POTENTIAL and -COUNTERFACTUAL branches respectively. This trichotomy is shown to have significant linguistic import (which will be explored throughout the dissertation.)

### 1.2.2 Modal auxiliaries as quantifiers: Kratzer 1977 *et seq.*

Building on the tense logics introduced above, following (Kratzer 1977; 1981b; 1991 a.o.), modal expressions are taken to denote **quantifiers over possible worlds**. Crucially, like other natural

language quantifiers, modal auxiliaries are taken to contain (implicit) restrictions over their quantificational domain. For Kratzer the distinction between so-called *epistemic* and *deontic* readings of modal auxiliaries is a function of this restriction. This distinction is shown in the sentence pair in (12) below.

(12) **Two readings of English modal auxiliary *must* from Kratzer (1977: 338)**

a. *All Māori children **must** learn the names of their ancestors*

b. *The ancestors of the Māori **must** have arrived from Tahiti*

In effect, the different readings ("flavours") of *must* in (12a-b) arise as a consequence of different **restrictions** that are made over the set of possible worlds. In effect, the deontic reading (12a) makes a claim about only (and all) those worlds/possible states-of-affairs in which Māori children adhere to some set of societally-given rules, laws and expectations. Conversely (12b) makes a claim about only (and all) those possible worlds that are compatible with everything that the speaker knows. These subsets of $\mathcal{W}$ are referred to as **conversational backgrounds** (*sc.* an *epistemic* vs. *deontic* conversational background). By assuming that conversational backgrounds are supplied by broader lingusitic context, a major advantage of the Kratzerian program is that modal auxiliaries like *must* and *can* can be taken to be semantically unambiguous. The accessibility relations against which modal propositions were verified in earlier modal logics (sc. modals as unary operators) are reconceptualised as contextually-retrieved functions from worlds to (sets of) propositions (see Kaufmann, Condoravdi & Harizanov 2006).

A sentence of the form *must* $\varphi$ asserts that $\varphi$ is true in all relevant worlds (universally quantifying over a subset of $\mathcal{W}$, returned by a **modal base** (*i.e.*, a conversational background $f$) whereas one of the form *can* $\varphi$ makes a weaker claim, namely that the truth of $\varphi$ is *compatible* with those worlds. That is, *must* is a universal quantifier and *can* is an existential quantifier over possible worlds (13).

(13) **The semantics of necessity/possibility modal auxiliaries**

(adapting from Kratzer 1977: 346)

a. $[\![ \textit{must} ]\!] = \lambda f \lambda p \lambda w . \forall w' [w' \in \cap f(w) \rightarrow w' \in p]$
*must* $p$ is true given a modal base $f(w)$ if $p$ follows from $f(w)$

b. $[\![ \textit{ can} ]\!] = \lambda f \lambda p \lambda w . \exists w' [w' \in \cap f(w) \wedge w' \in p]$
*can* $p$ is true given a modal base $f(w)$ if $p$ is compatible with $f(w)$

A second type of conversational background, the **ordering source**, is formally similar to the modal bases invoked above insofar as it comprises a set of propositions $o(w)$. This set can induce an *ordering* over the worlds in the modal base in terms of how well each world conforms with $o(w)$. Appealing to multiple interacting conversational backgrounds has allowed for successful modelling of linguistic expressions that denote/appeal to graded possibilities and probability and subtle differences in modal "flavours." That more than one conversational background is required is well illustrated in (14) (adapted from Kaufmann, Condoravdi & Harizanov 2006).

(14) *Randi must pay a fine for drink-driving*
$\not\Rightarrow$ 'In all those worlds where the rules are best followed, Randi must drink-drive.'

(14) shows that a deontic conversational background can't serve as the modal base for *must* (as this would require that all law-abiding worlds be characterised by Randi's drink-driving.) Instead, we appeal to a "circumstantial" modal base $m(w)$: that is, we consider worlds where relevant circumstances (including Randi's drink-driving) obtain, and universally quantify into a subset of those, namely the ones that best conform to whichever set of rules/laws govern drink-driving (*sc.* those propositions in the deontic ordering source $o(w)$.) Generally this is operationalised by appealing to a function $\underset{o(w)}{\textsc{best}}$ which takes a set of worlds and returns the "best" worlds as determined by an ordering source $o$ (*i.e.*, those worlds in $m$ best conforming to the ideal contained in $o$ as in (15) adapted from von Fintel & Heim 2011: 61.)[17] Armed with this function, we can implement an ordering semantics for modal auxiliaries, as in (16).

(15) **The best worlds in a modal base $m$ according to an ordering $\underset{o(w)}{\prec}$**
$\underset{o(w)}{\textsc{best}}\big(\cap m(w)\big) = \{w \in \cap m(w) \mid \neg\exists w'[w' \underset{o(w)}{\prec} w]\}$

(16) ***must* relativised to two conversational backgrounds** (modal base $m$ and ordering source $o$)
$[\![\textit{must}]\!]^{o,m} = \lambda p \lambda w. \forall w'[w' \in \underset{o(w)}{\textsc{best}}(\cap m(w)) \rightarrow w' \in p]$
*must* $p$ is true in $w$, given conversational backgrounds $\langle m, o\rangle$ if $p$ is in true in all the worlds that are best conforming to $o(w)$ in $\cap m(w)$

[17] This same function is sometimes also given as ***max*** (*e.g.*, von Fintel & Heim 2011; von Fintel & Iatridou 2008; Hacquard 2006, a.o.) or ***O(pt)*** (Schwager 2006: 247).

The formal implementation of orderings and comparisons of sets of worlds (or branches) will be further discussed in the main part of this dissertation.

**Quantifying over $\mathfrak{T}$** Once again, we can recast the contribution of modal expressions within a branching-times type ontology (suggested in von Prince 2019: 594, note 9). In such a system, modals will be taken to quantify over branches ($\mathcal{B} \subseteq \wp(\mathcal{I})$) — again, maximal chains within $\mathcal{I}$ or sets of indices that are linearly ordered by $\prec$. Given that each unique branch represents a possible course of events, modal operators can be taken to quantify over $\mathcal{B}$, much as they do over $\mathcal{W}$ in possible world semantics.

This involves recasting conversational backgrounds — sets of propositions — as functions from indices to sets of possible branches of $\mathcal{I}$. A deontic conversational background $\textsc{deont}(i)$, for example, is a set of propositions which represent the body of laws at a given index $i$. As in possible worlds analyses, these conversational backgrounds restrict the domain of quantification to some contextually relevant subset of $\mathtt{B}_i$ — i.e. a subset of those branches that run through $i$.

Below, I propose a basic Branching-theoretic modification to the lexical entries for the English modal auxiliaries that was provided in (13).[18]

(13′) **A proposed modification to semantics for modal auxiliaries (13) for $\mathfrak{T}$-frames.**

a. $[\![\textit{must}]\!]^m = \lambda p \lambda i . \forall b \ni i [b \in \cap m(i) \rightarrow \exists i' : i' \in b \wedge p(i')]$
*must* $p$ is true if, along all the branches through $i$ that are selected by the modal base $m(i)$, there is a branchmate $i'$ such that $p$ holds at $i'$.

b. $[\![\textit{can}]\!]^m = \lambda p \lambda i . \exists b \ni i [b \in \cap m(i) \wedge \exists i' : i' \in b \wedge p(i')]$
*can* $p$ is true if, there is some branch running through $i$, which is selected by the modal base $m(i)$ and along that branch there is an index $i'$ such that $p$ holds at $i'$.

※

As mentioned above, the vast majority of work in the formal semantic program has taken European languages as its object of study. If model-theoretic approaches to semantics are to provide

[18] Ordering sources can be added back in straightforwardly (*i.e.*, again as sets of propositions which induce an order over a modal base.) They are not given in these entries for the sake of exposition.

a complete theory of natural language phenomena, it is incumbent upon the field to demonstrate the applicability of these tools and principles to all possible human languages. This enterprise includes modelling and precisely describing the diversity of temporal and modal systems cross-linguistically.

For example, recent work on cross-linguistic semantics has shown how the semantics for English modals – where quantificational force is lexically encoded and conversational backgrounds are provided by context – does not provide the correct semantics for other languages' modal systems. Rullmann et al. (2008), for example show that, in Sḵáɬimcets (`lil` Salish: British Columbia), deontic and epistemic modal clitics are separately lexified whereas quantificational force is contextually determined (*viz.* *ka* 'IRR', *k'a* 'EPIST' and *kelh* FUT') (see also Matthewson 2010; Peterson 2010). They model this with a choice function $f_c$, pragmatically provided that restricts the size of the set (*sc.* modal base) which is being universally quantified over (17).[19]

(17) **Semantics for *k'a*** 'EPIST' (Sḵáɬimcets epistemic variable-force modal, from Rullmann et al. 2008: 340)
$[\![k'a]\!]^{c,w}$ presupposes an epistemic modal base $m$ &
$[\![k'a]\!]^{c,w} = \lambda f_c \lambda p. \forall w'[w' \in f_c(m(w)) \rightarrow p(w')]$

Building on other insight on usage of possibility modals (notably Klinedinst 2007), for Rullmann et al. (2008) the "appearance" of force variability in Sḵáɬimcets modals is a result of the relative size of the subset of the modal base picked out by $f_c$ (that is, quantifying over a smaller subset makes a commensurately weaker modal claim.) Numerous authors have since pointed out that this appeal to $f_c$ seems to be actually equivalent to deploying an ordering source as described above (and similarly to von Fintel & Iatridou's 2008 treatment of *ought* "strong necessity" — see Matthewson 2010; Peterson 2008; Portner 2009.) A similar phenomenon (*viz.* force variability) is exhibited in Western Dhuwal(a); see Part III, which will deploy components of this analysis. As we will see through this dissertation, additional elaborations and assumptions will permit us to capture facts about the grammars of these Australian languages.

[19] Deal (2011) shows that a similar phenomenon in Niimiipuutímt [`nez`] suggests an analysis of a variable-force modal as an existential quantifier. She claims that, because there is no "stronger" circumstantial modal competitor to *-o'qa* 'MOD', the variable force phenomenon (her "quantificationally variable modal[ity]") is a result of a single lexical item performing all modal functions.

## 1.3 A note on the "amphichronic program"

Due to Kiparsky (2006 *et seq.*), *amphichronic* linguistics is an approach to linguistic theory that assumes that synchronic and diachronic levels of explanation "feed each other" (see also Bermúdez-Otero 2015). This research program is motivated by the necessity to dissociate *typological generalisations* from *language universals*. Are the phenomena that we see (or don't see) expressed in natural language a function of universal design features and constraints on the human language faculty? Or are they derivable "by-products" from tendencies of language change? (see also Anderson 2008, 2016).

In the semantic domain, for Kiparsky, "[grammaticalisation] reveals the langauge faculty at work. Formal renewal engenders new categories that conform to cross-linguistic generalisations regardless of their source" (Kiparsky 2015: 73). Over past decades, research on meaning change has led to the discovery of regular grammaticalisation "clines/pathways/trajectories": that is, a given lexical expression with meaning $\alpha$ comes to denote $\beta$, then $\gamma$ *etc.* as an independent development across languages separated in space and time (see Deo 2015a; Eckardt 2011). From the identification of these robust cross-linguistic tendencies emerges the question of ***what*** is driving this change and ***why***.

As an example, Bybee et al. (1994) present a hypothesis that grammaticalisation pathways ought to be derivable from the meanings of the lexical items involved in them; frequently these changes involve the "generalisation" of a given item. As Leow (2020: 7) points out, this idea has been taken seriously by diachronic semanticists, where *generalisation* has been modelled as the expansion in the functional domain of a given expression (*e.g.*, Condoravdi & Deo 2015; Deo 2015b).[20] Hypotheses involving the apparent *unidirectionality* of grammaticalisation trajectories are taken to be a reflex of a cross-linguistic tendency for meanings to "generalise."

In this dissertation, I apply a methodology where the precise synchronic meaning of particular linguistic expressions is analysed while simultaneously attending to changes in the interpretive conventions associated with these expressions.

It is a goal of the current research, then, to contribute insights into the ætiology of these

[20] Also James Leow's recent (2020) dissertation which conceives of variation and change in (semi)modal expressions in Cuban Spanish (viz. *IBA a, tener que*) as reflexes of grammaticalisation.
A concise history of formal diachronic semantics as a research program is provided in Yanovich (2020).

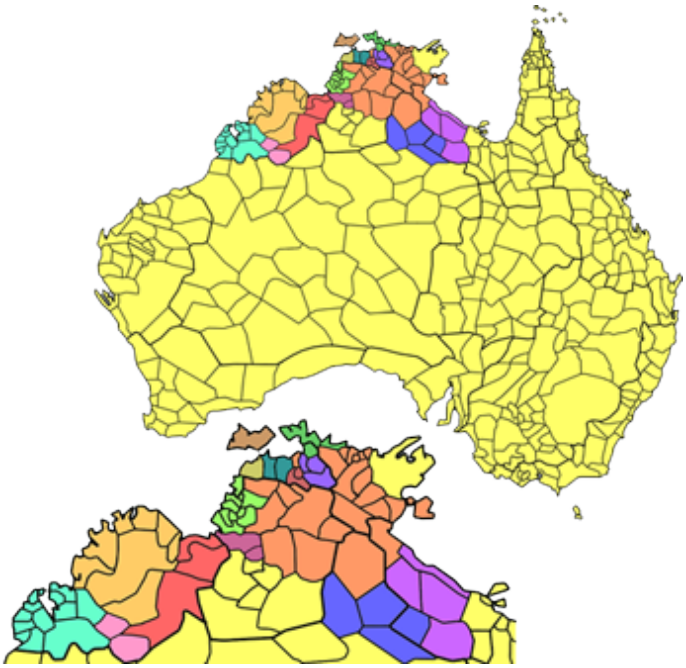
changes and to consider what light, if any, they may shed on the universal "structure" of the semantic domains that are investigated here.

## 1.4 The linguistic ecology of Arnhem Land

The past few decades have seen mounting interest in the deployment of historical/comparative linguistic methods for uncovering linguistic and anthropological prehistory of the continent (see McConvell & Bowern 2011 for an overview.) Some three hundred Australian languages have been reconstructed to a single family, Pama-Nyungan, spoken across mainland Australia (approx. 90% of its area) except for some regions in the north of the continent (Bowern to appear 2021; Dixon 1980). The most recent common ancestor of these languages (*sc. proto-Pama-Nyungan*) is estimated to have been spoken roughly five to seven thousand years before present (5–7Kya, during the mid-Holocene/Northgrippian age: a comparable timedepth to Indo-European), originating in the "Gulf Plains" bioregion around the Gulf of Carpentaria (Bouckaert et al. 2018, supporting earlier work, incl. Hale 1964 a.o.). Many of these languages remain underdescribed (extinct, or recorded in "salvage"-oriented documentatary work.) As a consequence, they are by and large poorly integrated into (model-)theoretic treatments of cross-linguistic semantics (as suggested in § 1.1 above, see also Nordlinger 2021 for an overview of the impact of theoretical treatments of Australian language data.)

**Multilingualism** Arnhem land — detail provided in figure 5 — is a linguistically diverse region of Australia's "Top End." Relatively isolated (several hundred kilometers east of Darwin), the population is roughly 85% indigenous, home to a number of ethnolinguistic groups. Owing to the relative isolation of northern Australian communities, 12 of the 20 aboriginal languages judged as "strong" are spoken in the Northern Territory (Schmidt 1990: 3). Language families spoken in Arnhem Land include Yolŋu (Pama-Nyungan) in the northeast, surrounded by a number of non-Pama-Nyungan isolates as well as the Iwaidjan, Maningrida/Burarran, Gunwinyguan, Rembarngic, Marran and SE Arnhem families; the constituency of these groupings and the relations between them are still uncertain (see *e.g.*, Green 2003 for the proto-Arnhem proposal.) Assessing

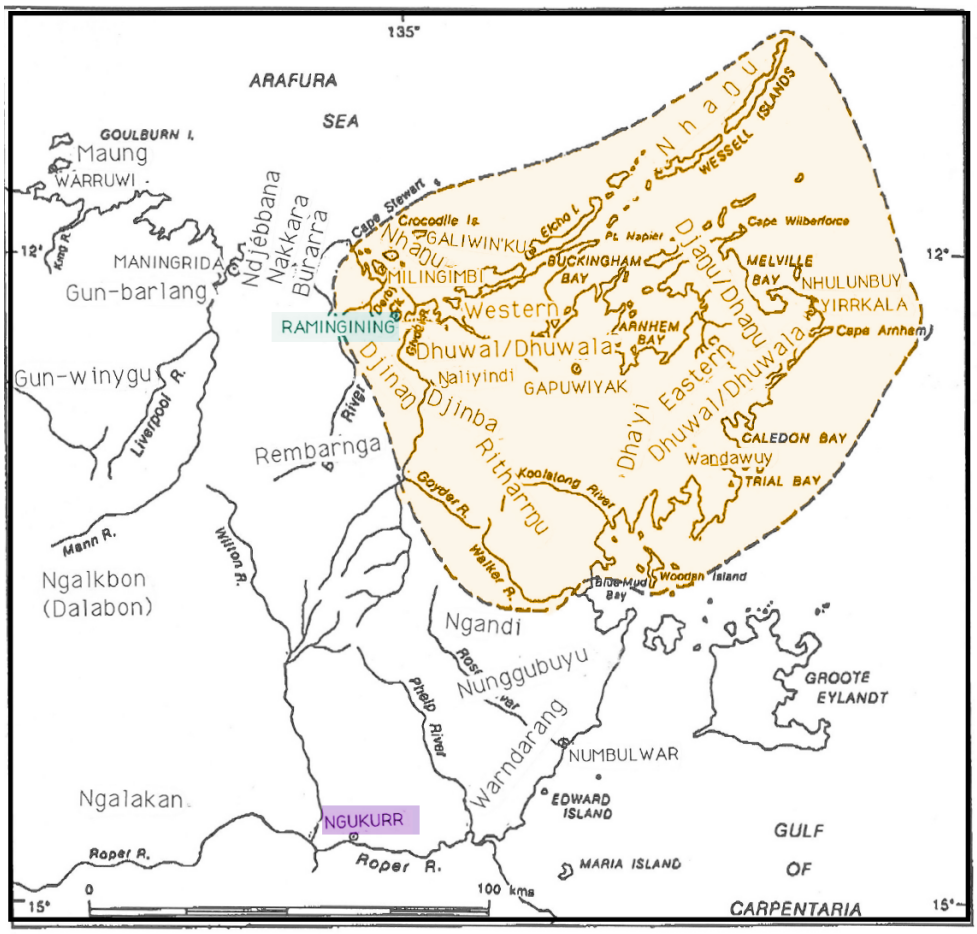
**Figure 4.** Australian language families: Pama-Nyungan is shaded yellow, with detail of diverse Northern Australia (adapted from Dixon 2002a)



these relations is complicated by the especially high degree of language contact and endemic "personal multilingualism" that characterise Arnhem Land speech communities, patterns reinforced by universal moiety/clan exogamy (Evans 2001; McConvell & Bowern 2011, see also Wilkinson 2012; Williams 1986: Ch. 1 for a discussion of clan exogamy in Yolŋu society). Children are raised in multilingual settings and continue acquiring new languages throughout their life.

**Endangerment & displacement** As suggested above, the effects of European invasion of the Australian continent in the eighteenth century were catastrophic for Aboriginal Australia; one consequence of this being the fragmentation of traditional language ecologies. According to Schmidt (1990: 1), two-thirds of Australian languages spoken at the time of contact (which she, perhaps conservatively, numbers as 250) are no longer spoken. She estimates that only one in every ten Aboriginal people speaks their indigenous language. Westward frontier expansion had the effect of bringing Aboriginal pidgin varieties into Arnhem Land, which subsequently developed into a creole language. With varieties estimated to be spoken by more than 30,000 people

**Figure 5**. Languages of Arnhem Land. *Yolŋu*-speaking area is shaded. Primary data in this dissertation was elicited in Ramingining & Ngukurr (highlighted). Map adapted from Wilkinson (2012: 2).



across Northern Australia, Australian Kriol is understood to have first emerged as a community language in the Roper Gulf region (SE Arnhem), close to the contemporary community of Ngukurr (*e.g.*, Harris 1986, see also Phillips 2011 for an overview.) Kriol continues to be the first language of the vast majority of Ngukurr's indigenous population; with a couple of exceptions, most of the traditional Australian languages of the area are now critically endangered (see also chapter 2.)

Additional background information on the sociolinguistic context of the language varieties under investigation is provided in each chapter.

## 1.5 Data & glossing conventions

Each subpart of this dissertation makes use of (novel and published) data from different sources. Example sentences are glossed following (modified) Leipzig conventions (all adopted abbreviations listed on *pg.* xi).

I adopt standard orthographic conventions for Yolŋu Matha (including the standardisation of other sources written in IPA or other Australian language transcription conventions to Yolŋu spelling conventions.) These writing systems are derived from English orthography; digraphs and diacritics which may be unfamiliar or otherwise ambiguous to the reader and their IPA (International Phonetic Alphabet) correspondences are tabulated below (Table 2. See also, *e.g.*, Dixon 2002a: 549 for an overview of "canonical" phoneme inventories in Australian Language and Wilkinson 2012 for the Yolŋu orthography (*pp.* 41–4), due to Beulah Lowe and a general discussion of the Djambarrpuyŋu phoneme inventory.)

Much of the Australian Kriol and Yolŋu Matha dataset was elicited between 2016 and 2019 from native speakers in Arnhem Land (in particular the Ngukurr and Ramingining communities) and Darwin. Where data are sourced from published material, a numbered bibliographic citation is provided. An exception to this is the Djambarrpuyŋu and Kriol bible translations, abbreviated as DjB and KB respectively and accompanied by a cross-reference to the name of the BOOK as well as the chapter and verse numbers (*e.g.* [KB *Jen.* 1:3]). Access to each of these texts is available online at `aboriginalbibles.org.au`, made publicly available by The Bible Society of Australia.

Where data is sourced from original fieldwork, the consultant's initials (compare table 3) and the date associated with the source recording are provided in square brackets — *e.g.*, [JP 20201216].

**Table 2.** Correspondences between `[IPA]`, ***Australianist*** and ***Yolŋu*** orthographic conventions adopted in the dissertation

| OBSTRUENTS | | | SONORANTS | | | VOWELS | | |
|---|---|---|---|---|---|---|---|---|
| [ b ] | *b* | | [ m ] | *m* | | [ ɐ ] | *a* | *a* |
| [ p ] | *p* | | | | | [ ɐː ] | *aa* | *ä* |
| [ d̪ ] | *dh* | | [ n̪ ] | *nh* | | [ ɪ ] | *i* | *i* |
| [ t̪ ] | *th* | | | | | [ ɪː ] | *i* | *e* |
| [ d ] | *d* | | [ n ] | *n* | | [ ʊ ] | *u* | *u* |
| [ t ] | *t* | | [ l ] | *l* | | [ ʊː ] | *uu* | *o* |
| [ ɖ ] | *rd* | *d̲* | [ ɳ ] | *rn* | *n̲* | RHOTICS/GLIDES | | |
| [ ʈ ] | *rt* | *t̲* | [ ɭ ] | *rl* | *l̲* | [ ɻ ] | r | |
| [ ɟ ] | *j/dy* | *dj* | [ ɲ ] | *ny* | *ny* | [ ɾ ] | *rr* | |
| [ c ] | *ch/ty* | *tj* | | | | [ j ] | *y* | |
| [ g ] | *g* | | [ ŋ ] | *ng* | *ŋ* | [ w ] | *w* | |
| [ k ] | *k* | | | | | | | |
| [ ʔ ] | — | ʼ | | | | | | |

**Table 3.** Consultant initials

| **Ramingiṉiŋ** | | **Ngukurr** | |
|---|---|---|---|
| AW | Albert Waninymarr | AJ | Angelina Joshua |
| DB | Daphne Banyawarra | GT | Grant Thompson |
| DhG | Dhuḻumburrk Gaykamaŋu † | RN | Roy Natilma Guyula |
| MG | Mätjarra Garrawurra | DW | David Wilfred |
| | | PW | Peter Djudja Wilfred |
| | | AL | Andy Lukuman |

Western Dhuwal-Dhuwala data was elicited from speakers in Ramingining and Kriol data in Ngukurr. Ritharrŋu-Wägilak data was collected speakers in Ngukurr by Salome Harris (Ngukurr Language Centre) on the basis of a questionnaire translated into Kriol by her and Anthony Daniels (Ngukurr Language Centre, a Kriol native speaker and resident of Ngukurr.)

# Part I

# The emergence of apprehensionality in Australian Kriol

# Chapter 2

# *bambai* as an apprehensional

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

To illustrate the issue, consider the contributions of *bambai* in the Kriol sentence pair in (18):

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

a. SUBSEQUENTIAL reading of *bambai*

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

'Yeah! I'll be right there!'

b. APPREHENSIONAL reading of *bambai*

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

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

While the reading of *bambai* in (18a) roughly translates to 'soon, in a minute', this reading is infelicitous in (18b), where *bambai* is a discourse anaphor which contributes a shade of apprehensional meaning (*i.e.*, indicates that the Speaker's hypothetically joining for dinner may have the undesirable possible outcome of him not finishing his work.)

## 2.1 Background

Having entered into their lexicons predominantly via the contact pidgin established in colonial New South Wales (NSW) in the late eighteenth century (Troy 1994), cognates of the English archaism *by-and-by* are found across the English-lexified contact languages of the South Pacific.[21]

(19) ***baimbai*, translated as 'soon, eventually, (in the) FUTURE'** in Troy (1994)[22]

a. *stopabit massa* ***baimbai*** *mi paiala dat agen aibliv*
'Wait, master, soon I'll speak to them again, I think.' (252, 571)

b. ***Baimbai*** *Potfilip blakfela Waworong blakfela kwambi ded olgon*
'Soon Port Phillip (≈ Melbourne) Aboriginal people, the Waworrong, will be "asleep": dead and completely gone.' (697)

c. *Wool Bill been choot him kangaroo;* ***by and bye*** *roast him*
'Old Bill shot a kangaroo, then cooked it.' (575)

Additionally, Clark (1979) describes *by-and-by* as a particularly broadly diffused feature of the *South Seas Jargon* that served as a predominantly English-lexified auxiliary means of communication between mariners of diverse ethnolinguistic backgrounds and South-Pacific islanders (21, cited in Harris 1986: 262*ff* a.o.). The cognates across these contact languages have preserved the function of *by-and-by* as encoding some relationship of temporal subsequentiality between mul-

[21] Troy collates a corpus of texts, predominantly from settler journals (her data is described in § 1.3 of her 1994 thesis). (19a,c) are taken from Dawson (1831) (Port Stephens) and (b) is taken from James Dredge's diary (Melbourne, 1839). Page numbers given in the example index Troy's (re)publication in the appendices to (and/or orthographically standardised in the body of) her doctoral thesis.

[22] *baimbai* (sic) is described as a 'future tense marker' by Troy (1994: 112,418,711) and Harris (1986: 268). Indeed it appears to be a general marker of futurity in the textual recordings of NSW pidgin that these authors collate, although still retains a clear syntactic function as a frame adverbial. Their description of *bambai* (along with *sun, dairekli, etc*) as a tense marker is possibly due to the apparent lack of stable tense marking in the pidgins, although is likely used pretheoretically to refer to an operator that is associated with future temporal reference. This is discussed further in § 2.3.1 below.

tiple eventualities.[23] Clark takes this shared feature (along with other cognates) to be a retention, evincing a shared history between these varieties (see also fn 24 below.)

As shown above in (18), Australian Kriol (hereafter Kriol *simpliciter*) has retained this function: below, in (20), *bambai* serves to encode a temporal relation between the two clauses: the lunch-making event occurs at some point in the (near) future of the speaker's father's trip to the shop: *bambai* might well be translated as 'then' or 'soon after'.

(20) ***bambai* as a temporal operator**

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

*dina bla melabat*
dinner PURP 1P.EXCL

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

In addition to the familiar 'subsequential' use provided in (20), *bambai* appears to have an additional, ostensibly distinct function as shown in (21) below.[24]

(21) *bambai*'s APPREHENSIONAL function

CONTEXT. It's noon and I have six hours of work after this phonecall. I tell my colleague:

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

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

In (21), the speaker asserts that if he doesn't consume coffee then he may subsequently fall asleep at his workplace. In view of this available reading, Angelo & Schultze-Berndt describe an 'appre-

[23] Clark (1979: 10-11) lists cognates of *bambai* (transcribed as *baymbay* for Roper Kriol) in the contact languages of New Guinea, Solomon Islands, Vanuatu, Cape York, Norfolk Island and Hawai'i. According to Romaine (1995), in Tok Pisin *baimbai* grammaticalised into a general future tense marker. On the basis of a corpus oof Pacific Jargon English, she also hypothesises emergent irrealis-type readings in admonitory contexts. (this claim is discussed further in Ch. 3.) See also Angelo & Schultze-Berndt 2016 for further review of cognates of *bambai* across other Pacific contact varieties.

[24] Note though that Clark also observes that the Pitkern cognate appears to have developed LEST/IN CASE-type readings (*i.e.*, an APPR reading) as in (21′). Pitkern – the variety spoken by *Bounty* mutineers – is generally described as an outlier among other Pacific contact varieties (*i.e.*, not a descendant of the South Seas Jargon, see Clark 1979: 48); this is likely to be an entirely independent innovation.

(21′) Apprehensional-like cognate in Pitkern-Norfolk [pih] (Clark 1979: 15)

*kʌm dʌʊn* ***bɛmbɛə*** *ju fɔl*

'Come down, lest you fall.'

hensive' use for Kriol *bambai* — a category that is encoded as a verbal inflection in many Australian languages and is taken to mark an 'undesirable possibility' (2016: 256). In this case, *bambai* is plainly not translatable as an adverbial of the 'soon'-type shown in (20). Rather, it fulfills the function of a discourse anaphor like 'otherwise', 'or else' or 'lest' (see also Phillips & Kotek ms; Webber et al. 2001).

This chapter proposes a diachronically-informed and unified semantics for Australian Kriol *bambai*, concerned especially with the apparent emergence of APPREHENSIONAL readings in this (erstwhile) temporal frame adverbial. The current chapter reviews and motivates the grammatical category of 'apprehensional epistemics' as described in typological literatures (§ 2.2). Section 2.2.3 describes the function and distribution of Kriol *bambai*, both in its capacity as a subsequential temporal frame adverbial (§ 2.3.1) and its apparent apprehensional functions (§ 2.3.2).

In the data we have seen so far, *bambai* appears to connect two propositions. In Chapter 3, we consider how *bambai* is interpreted in view of the relationship between these two propositions: specifically how the prejacent of *bambai* is **modally subordinate** to material accommodated in a discourse context. In view of these facts, we develop an account of the diachronic emergence of apprehensionality and the status of the expressive component of these items' meaning.

Finally, Chapter 4 comprises a proposal for a unified semantics for *bambai*.

## 2.2 Apprehensionality cross-linguistically

While descriptive literatures have described the appearance of morphology that encodes "apprehensional" meaning, very little work has approached the question of their semantics from a comparative perspective. Particles that encode negative speaker attitude with respect to some possible eventuality are attested widely across Australian, as well as Austronesian and Amazonian languages (Angelo & Schultze-Berndt 2016: 258). While descriptive grammars of these languages amply make use of these and similar categories,[25] Lichtenberk (1995), Angelo & Schultze-Berndt (2016, 2018) and Vuillermet (2018) represent the few attempts to describe these markers as a gram-

[25]The terms TIMITIVE and particularly EVITATIVE, a.o. are also used in these descriptive literatures.

matical category).[26]

### 2.2.1 Apprehensionality as a semantic domain

In the first piece of published work dedicated to the properties of apprehensional marking ("apprehensional-epistemic modality"), Lichtenberk (1995) claims that the To'abaita (mlu Solomonic: Malaita) particle *ada* has a number of functions, though generally speaking, serves to modalise ("epistemically downtone") its prejacent while dually expressing a warning or otherwise some negative attitude about its prejacent. The symbol ⧫ is used throughout to signify these two 'APPREHENSIONAL' properties. Shown here in (22), Lichtenberk distinguishes: (a) **apprehensive-epistemic** function, (b) a **fear** function and (c-d) **precautioning** functions.

(22) **Apprehensional marking in To'abaita [mlu]: four uses of *ada* 'APPR'**

a. Apprehensive modal ⧫$p$

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

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

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

b. Embedding under predicate of fearing fear(⧫$p$)

*nau* *ku* *ma'u* *'asia* *na'a* ***ada*** *to'an* *na'i* *ki* *keka* *lae* *mai* *keka*
1S FACT be.afraid very APPR people this PL they:SEQ go hither they:SEQ
*thaungi* *kulu*
kill 1P.INCL

'I'm scared the people may have come to kill us.' (297)

c. Precautioning ("avertive" reading) $\neg p \rightarrow$ ⧫$q$

*riki-a* ***ada*** *'oko* *dekwe-a* *kwade'e* *kuki* *'ena*
see-it APPR 2S:SEQ break-it empty pot that

'Look out; **otherwise** you may break the empty pot.' (305)

[26] An edited collection on *Apprehensional constructions*, edited by Marine Vuillermet, Eva Schultze-Berndt and Martina Faller, is forthcoming via Language Sciences Press. The papers collected in that volume similarly seek to address this gap in the literature.

d. Precautioning ("in-case" reading) $\neg p \rightarrow \blacklozenge(\mathfrak{r}(q))$

*kulu* *ngali-a* *kaufa* ***ada*** *dani* *ka* *'arungi* *kulu*
1p.INCL take-PL umbrella APPR rain it:SEQ fall.on 1p.INCL
'Let's take umbrellas **in case** we get caught in the rain' (298)

(22a) functions as a possibility modal encoding negative speaker attitude vis-à-vis the eventuality described in its prejacent (e.g., opening the oven in vain). This reading also obtains under the scope of a predicate *ma'u* 'fear' in (22b). Lichtenberk analyses this use of *ada* as a complementizer, introducing a subordinate clause (1995: 296).

In each of (c-d), meanwhile, *ada* appears to link two clauses. In both cases it expresses negative speaker attitude with respect to its prejacent (the following clause), which is interpreted as a possible future eventuality, similarly to the English archaism *lest*. On the *avertive* reading $p$ *ada* $q$— translated as '$p$ otherwise/or else $q$' — a conditional-like interpretation obtains: if $p$ doesn't obtain, then $q$ may $(\neg p \rightarrow \blacklozenge q)$. On "in-case" readings, while $q$ is interpreted as a justification for the utterance of $p$, there is no reasonably inferrable causal relation between the two clauses — Lichtenberk is somewhat ambivalent about whether these two uses constitute a single or multiple readings (1995: 298-302). For AnderBois & Dąbkowski (2020), "in-case" uses involve some distinct "contextually inferrable" proposition $r$ from which $q$ follows $(\mathfrak{r}(q))$. Effectively, if $p$ doesn't obtain, then some $r$ (a consequence of $q$) may. In (22d), the failure to take umbrellas $(\neg p)$ might result in getting wet $(r)$ (should we get caught in the rain – $(q)$). They appeal to a number of pragmatic factors (reasoning about the plausibility of relations between $p$ and $q$) in adjudicating between these two readings. This treatment is discussed in some further detail below.

Of particular interest for present purposes is the categorical co-occurrence of SEQ-marking *ka* in the prejacent to *ada*. Lichtenberk notes that the sequential subject-tense portmanteau *appears categorically in these predicates*, independent of their 'temporal status.' He claims that this marking indicates that the encoded proposition '*follows the situation in the preceding clause*' (296, emphasis my own). Relatedly, Vuillermet tentatively suggests that the Ese Ejja (ese Tanakan: SW Amazon) AVERTIVE marker (*kwajejje*) may derive from a non-past-marked auxiliary with "temporal subordinate" marking (2018: 281). The analysis appraised in this chapter proposes a basic semantical link between the expression of the **temporal sequentiality** of a predicate and **apprehensional** semantics.

Subsequent typological work has concentrated on fine-tuning and subcategorising apprehensional markers. Notably, Vuillermet (2018) identifies three distinct apprehensional items in Ese Ejja, which she refers to as realising an APPREHENSIVE *(-chana)*, AVERTIVE *(kwajejje)* and TIMITIVE *(=yajjajo)* function. These three apprehensionals respectively scope over: entire clauses (as a verbal inflection), subordinate clauses (as a specialised complementiser) and noun phrases (as a nominal enclitic). Similarly to Lichtenberk, Vuillermet suggests that these data provide evidence for a "morphosemantic apprehensional domain" (287).

Adopting this taxonomy, AnderBois & Dąbkowski (2020) focus their attention on the "adjunct" uses of the A'ingae (con NW Amazon) apprehensional enclitic *=sa'ne*. That is, they model the contribution of *=sa'ne* in its functions as • a *precautioning*/avertive marker, analysed as encliticising to (subordinate) clauses (23a-b), compare To'abaita (22c-d), in addition to • a TIMITIVE function, where the APPR functions as a DP enclitic (*e.g.*, c). Adapting treatments of the semantics of rationale/purposive clauses, they propose the core meaning given in (24).

(23) Adjunct uses of apprehensional =sa'ne in A'ingae [con] (AnderBois & Dąbkowski 2020)

a. AVERTIVE use

*sema-'je=ngi* *dû'shû=ndekhû* *khiphue'sû=**sa'ne***
work-IPFV=1 child=PL starve=**APPR**

'I'm working lest my children starve.' (381)

b. IN-CASE use

*tsa'khû=ma=ngi* *guathian-'jen* *[ña* *yaya* *khuvi=ma* *i=**sa'ne**]*
water=ACC=1 boil-IPFV 1SG father tapir=ACC bring=**APPR**

'I am boiling water in case my father brings home a tapir.' (383)

c. TIMITIVE use

*anae'ma=ni=ngi* *phi* *[thesi=**sa'ne**]*
hammock=LOC=1 sit jaguar=**APPR**

'I'm in the hammock for fear of the jaguar.' (374)

(24) AnderBois & Dąbkowski's (2020:382) semantics for A'inge apprehensional adjunct uses of =sa'ne (on its avertive/*lest*-like reading)
$[\![\text{=}sa'ne]\!] = \lambda q.\lambda p.\lambda w : \exists i[\textsc{resp}(i,p)].p(w) \wedge \forall w' \in \textsc{goal}_{i,p}(w) : \neg q(w')$
Supposing that some entity $i$ is the agent of $p$, *=sa'ne* takes a proposition $q$ as its input and outputs a propositional modifier, asserting that, in $w$, both $p$ holds and the (relevant) GOAL

worlds of the agent $i$ are those where $q$ doesn't hold.

For AnderBois & Dąbkowski, the semantics for this *lest*-type usage can be extended to other precautioning ("in-case") uses and timitive uses by appealing to an third, "inferrable" proposition $r$. That is, on the IN-CASE reading, all $\text{GOAL}_{i,p}$-worlds are such that $\neg r(w')$ — as they point out, on this analysis, AVERTIVE is a special case of the precautioning use where $r \Leftrightarrow q$. On the TIMITIVE reading, =*sa'ne* takes an argument $x \in \mathfrak{D}_e$ (instead of $q \in \mathfrak{D}_{\langle s,t \rangle}$ ), now asserting that $\bullet\ x$ "is involved in" $r(w')$ and that $\bullet \neg r(w')$. As a consequence, they retain a lexical entry for $\underset{\text{TIMITIVE}}{=sa'ne}$, distinct from the precautioning uses — that is, on this account, =*sa'ne* is polysemous, with related precautioning and timitive meanings (2020: 15).[27]

On the basis of the apparent loosening of morphosyntactic restrictions between each of these three uses, the authors additionally predict that an implicational hierarchy of the form AVERTIVE $\gg$ IN-CASE $\gg$ TIMITIVE holds (2020: 386-87), and provide some cross-linguistic data in support of this conjecture.[28]

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[27] AnderBois & Dąbkowski (2020: 15) do suggest that an alternative to avoid this polysemy would be to adopt a "coercion" style analysis or (less plausibly) an ellipsis one.

A fourth possibility which they do not address would be to reanalyse the timitive DP as a (verbless) existential proposition (see Part II of the current dissertation.) It is unclear whether this accords with available strategies of existential predication in A'ingae, although there is a reserved negative existential predicate (*i.e.*, one not derived from a (positive) existential one) *me'i* 'NEG PRED' (according to Hengeveld & Fischer 2018). In this case, $\text{EXIST}(x) = r$. Typological support for such a strategy might be found in Pitjantjatjara pjt, where again, a single formative *-tawara* 'APPR' attaches to nouns and verbs. When functioning as a nominal suffix, *-tawara* selects for a LOC marked noun. Pintjupi [piu] deploys similar strategies (Zester 2010: 16-9). Locative-marking of NPs is a strategy related to/often used in existential predication.

[28] Beyond the adjunct uses (23) analysed in AnderBois & Dąbkowski 2020, A'inge =*sa'ne*, Dąbkowski & AnderBois (forthcoming) additionally report uses corresponding to the APPREHENSIVE and COMPLEMENTIZER uses described above. Examples are replicated below (23′). It is not immediately clear what alterations to the semantics in (24) would be needed to account for these uses.

The analysis of Kriol *bambai* that follows shares a number of properties with this treatment of A'ingae apprehensive =*sa'ne* — notably the (possibly) indirect relation between clauses connected by apprehensional morphology. As we will see, however, the numerous distributional and morphosyntactic differences between these two items (in addition to a number of diachronic concerns) will lead us down a somwhat different path.

(23′) **Non**-adjunct uses of =sa'ne (Dąbkowski & AnderBois forthcoming: 3)

d. COMPLEMENTISER use

*tsai–ye=**sa'ne***
bite–pass=APPR

'You might get bitten.'

e. APPREHENSIVE use

*tsama ña dañu=**sa'ne**=khe dyuju–je=ya*
but 1S be hurt=APPR=thus be afraid–IPFV=VERID

'I was afraid I'd get hurt.'

Finally, on the basis of a comparison with the neighboring Lau language [llu] and other SE Solomonic languages, Lichtenberk argues that the apprehensional functions of To'abaita *ada* are a result of the grammaticalisation of an erstwhile lexical verb with meanings ranging a domain 'see, look at, wake, anticipate' that came to be associated with warning and imprecation for care on the part of the addressee, before further developing the set of readings associated with the present day APPR marker (1995: 303-4). According to Lichtenberk, Lau *ada* admits of an *appr* reading while also functioning as a a fullly-inflected predicate. Its To'abaita cognate has lost this function, recruiting a new verb *riki* 'see, look', which apparently has shown signs of being recruited into apprehensional space (evincing a possible grammaticalisation cycle from perception verbs to apprehensionals.)

### 2.2.2 Apprehensionality in the context of Australian Kriol

Dixon (2002a: 171) refers to the presence of nominal case morphology that marks the AVERSIVE as well as the functionally (and sometimes formally, see Blake 1993: 44) related verbal category of apprehensionals as a "pervasive feature of Australian languages" and one that has widely diffused through the continent.[29] Lichtenberk (1995: 306) marshalls evidence from Diyari (dif Karnic: South Australia) to support his claim about a nuanced apprehensional category, drawing from Austin's 1981 grammar. The Diyari examples in (25) below are all adapted from Austin (1981), labelled for the apprehensional uses described in the previous section.

(25) Apprehensional marking in Diyari [dif]

a. Avertive (precautioning)

***wata*** *yarra* *wapa-**mayi**,* *nhulu* *yinha* *parda-**yathi**,* *nhulu* *yinha* *nhayi-rna*
**NEG** that way go.IMP.EMPH 3S.ERG 2S.ACC catch-APPR 3S.ERG 2S.ACC see-IPFV$_{SS}$
'Don't go that way or else he'll catch you when he sees you!' (230)

b. In-case (precautioning)

***wata*** *nganhi* *wapa-yi,* *karna-li* *nganha* *nhayi-**yathi***
**NEG** 1S.NOM go-PRES person-ERG 1S.ACC see-APPR
'I'm not going in case someone sees me.' (228)

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[29] Aversive case is taken to indicate that the aversive-marked noun is "to be avoided." This corresponds to the TIMITIVE for other authors (*e.g.*, AnderBois & Dąbkowski 2020; Vuillermet 2018).

c. Fear complementizer

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

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

d. Apprehensive use

*nhulu-ka* *kinthala-li* *yinanha* *matha-****yathi***
3S.ERG-DEIC dog-ERG 2S.ACC bite-APPR

'This dog may bite you.' (230)

The sentences in (25) shows a range of syntactic contexts in which Diyari apprehensional *-yathi* 'APPR' appears. The *-yathi*-marked clause appears to be evaluated relative to a prohibitive in (a), a negative-irrealis predicate in (b) and predicate of fearing in (c), or alternatively occurs without any overt linguistic antecedent in (d).[30] In all cases, the predicate over which *-yathi* scopes is **modalised** and expresses a proposition that the speaker identifies as 'unpleasant or harmful' (Austin 1981: 227). Little work has been undertaken on the grammaticalisation of apprehensionality.[31]

As we will see in the following sections, apprehensional uses of preposed *bambai* in Kriol have a strikingly similar distribution and semantic import to the apprehensional category described in the Australianist and other typological literatures. Angelo & Schultze-Berndt (2016) focus their attention on demonstrating the cross-linguistic attestation of a grammaticalisation path from (sub)sequential temporal adverbial to innovative apprehensional marking. They suggest that, for Kriol, this innovation has potentially been supported by the presence of like semantic categories in Kriol's Australian substrata. Note that for (almost all of) these languages, there are attested examples of the apprehensional marker appearing in both biclausal structures – the **precautioning**-type uses described in the previous section ($p$ LEST $q$), as well as "apprehensive" (monoclausal) ones ($\blacklozenge p$). Data from virtually all attested languages of the Roper Gulf are shown in (26).

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

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

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

a. Wubuy

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

'Spear it! Ey! Or it will get away from us!' (Heath 1980d: 86, interlinearised)

b. Ngandi

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

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

c. Ngalakan

*garku* *buru-ye* ***mele**-ŋun* *waṛŋ'waṛŋˀ-yiˀ*
high 3ns-put **APPR**-eat.PRS crow-ERG

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

d. Rembarrnga

*ŋaran-**mə?**-ɲam?* *ŋa-na* *laŋə* *ṛalk*
3s>1p.INCL-**APPR**-bite.PRS 1s>3-see.PST claw big

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

e. Ritharrŋu

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

'Give it to me, or else I'll hit you.'
(Heath 1980b, interlinearised & standardised to Yolŋu orthography)

f. Marra

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

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

g. Mangarayi

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

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

As shown in (26), there is a diversity of formal strategies deployed (or combined) in these languages to realise apprehensional meaning: suffixation inside the verbal paradigm (26a-b), pre-

fixation to the verb stem (26b-d) and a separate apprehensional particle (26e-g).[32] While detailed work on the expression of apprehensionality in these languages (including the syntactic status of apprehensional clauses) is not currently available,[33] a number of generalisations can be made on the basis of the data in (26). In all cases, the apprehensional appears to modify a fully-inflected (finite) clause, in most cases, ostensibly linking two (the $p$ LEST $q$-type usage, see discussion above) predicates, each completely inflected for agreement/TMA information. Conversely, the Rembarrnga datum in (d) provides an example of an apprehensive (monoclausal/$\blacklozenge p$) type use. It is unclear at this stage whether/for which languages the apprehensional-marked clauses invite an analysis as syntactically subordinate, althouogh in all cases, the prejacent to APPR can be shown to be modally subordinate to information in the discourse context (often constrained by $p$, see Ch. 3).

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

### 2.2.3 Temporal frame adverbs and apprehensionality

Angelo & Schultze-Berndt (2016, 2018) provide convincing cross-linguistic evidence of the apparent lexical relationships between temporal frame adverbs and apprehensional markers. This can be taken, prima facie, to provide evidence of markers of temporal relations for recruitment as lexicalised modal operators. Table 4 (partially adapted from Angelo & Schultze-Berndt (2016, 2018)) summarises examples from a number of languages where temporal frame adverbials also appear to display a robust apprehensional reading. Further, Angelo & Schultze-Berndt (2016: 288) additionally suggest that there is some evidence of apprehensional function emerging in the *bambai* cognates reported in Torres Strait Brokan, `[tcs]`, Hawai'ian Creole `[hwc]` and Norf'k (see fn 24).

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[32] Nominal suffixes are also reported in Australian languages, often described as EVITATIVES, AVERSIVES, ADVERSATIVES in the Australian descriptive literature (Zester 2010: 9, Browne et al. forthcoming).

[33] Although see Zester (2010) for a typology and Browne et al. (forthcoming) for an overview of apprehensional morphosyntax in Australian languages. The latter includes a detailed description of the variety of strategies deployed across the Ngumpin-Yapa family — *viz.* nominal marking, specialised complementisers and apprehensional auxiliaries. They argue that the precautioning-type apprehensional constructions in these languages are syntactically coordinate.

[34] This isn't to suggest that the semantics of those words provided in the 'GLOSS' column in the table above ought to be treated as identical: the definitions seek to capture a generalisation about sequentiality. A prediction that falls out

**Table 4.** Etyma and polysemy for apprehensional modals

| Language | Adverbial | Gloss[34] | Author (grammar) |
|---|---|---|---|
| Std Dutch [nld] | *straks* | soon | Boogaart (2009, 2020) |
| Std German [deu] | *nachher* | shortly, afterwards | A&SB (2018) |
| Marra [mec] | *wuniŋgi* | further | Heath (1981b) |
| Mangarayi [mpc] | *baḷaga* | right now/today | Merlan (1989) |
| Kriol [rop] | *bambai* | soon, later, then | |

Compare these uses of Mangarrayi *baḷaḷaga~baḷaga* in (27) to (26g) above. In (27a), Merlan (1989: 138) notes that the temporal frame uses of *baḷaḷaga*—while often translated as 'today'—appears to correspond to 'right now' (she also notes that "Pidgin English informants use [...the reduplicated form] *today-today* to mean 'now' as well as 'today' in the English sense"). In all of these Mangarayi data, *baḷaga* appears to indicate that the event described in the clause that it introduces obtains (or may obtain) subsequently to some time established in the previous clause.[35]

(27) **Mangarayi**

a. *ḏayi ŋa-yirri-wa-ya-b gurrji,* ***baḷaḷaga*** *ga-ŋa-wa-n*
NEG 1s>3s-see-AUG-PNEG long.ago **today** 3-1s>3s-go.to.see-PRS
'I hadn't seen it before, today I'm seeing it.'
(Merlan 1989: 138, cited also in A&SB 2018:13)

b. *galaji ŋan?-ma* ***baḷaga*** *yag*
quickly ask-IMP **before** go
'Ask him quick before he goes.' (Merlan 1989: 147, cited also in A&SB: 284)

c. *a-ŋaḷa-yag* ***baḷaga*** *miḷiḷitma*
HORT-1p.INCL-go **before** sunset
'Let's go before the sun sets.' (Merlan 1989: 147)

d. *bargji nama* ***balaga*** *iia-way-(y)i-n*
hard 2s.hold.IMP ***lest*** 2sf
'Hold on tight lest you fall!' (Merlan 1989: 147)

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of this generalisation is that TFAs like 'later, soon, afterwards, then' might be best interpretable interpretable as subsets of this category.

[35]Note that *baḷaga* is glossed by Merlan as 'before' in the imperative sentences (27b-c). In both cases, the speaker appears to indicate that event described in the following clause is imminent (note that in declarative contexts this might be translated as 'then').

e. *ŋiñjag ŋaḷa-bu-n guṛuugguṛug-bayi,* ***wuṛay*** *ḍo?* *a-ŋayan-ma*
PROH 1p.INCL-kill-PRS white.people-FOC **later** shoot IRR-3s>1p.INCL-AUX
'We can't kill white people. Later on they might shoot us.' (Merlan 1989: 147)

Merlan (1989: 147) glosses *baḷaga* as 'EVITATIVE/ANTICIPATORY', commenting that these two notions are "sometimes indistinguishable." She also notes the formal (reduplicative) relation to frame adverbial *baḷaḷaga* 'right now, today', commenting on the shared property of "immediacy" that links all these readings.[36] Note additionally the apparently apprehensional use of *wuṛay* 'later' in a prohibitive context in (27e). While Merlan makes no mention of any conventionalised "evitative/anticipatory" uses of this adverb, this type of use context is a likely source for the type of apprehensional and causal/elaboratory inferences invited by temporal frame adverbials. A similar patter in attested in Marra (28):

(28) **Marra *wuniŋgi*** (Heath 1981b: 360, interlinearised)

a. Subsequential use

*wayburi jaj-gu-yi* ***wuniŋgi:*** *gaya bayi gal-u-jingi*
southward chase-3s>3s.PST **more** there in.south bite-3s>3s-did
'Then [the dingo] chased [the emu] a bit more in the south.'

b. Apprehensional use (see also 26f above)

*ŋa-naŋgu-wa,* ***wuniŋgi*** *ṛag-ṇiŋg-anjiyi*
2s>1s-give.IMP ***lest*** hit-1s>2s-AUX(EVIT)
'Give it to me, otherwise I'll hit you!'

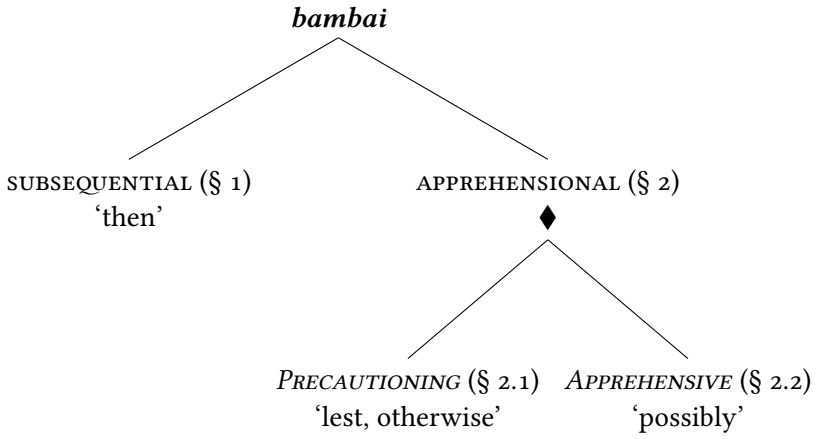
Per Heath's analysis (1981:308), Marra has an inflectional apprehensional category (his 'EVITATIVE') which is realised only in positive *lest*-type clauses (28b). These frequently co-occur (in elicitation) with the adverbial *wuniŋgi* 'farther along, furthermore, in addition' (common in text translations.) Heath suggests that negative *lest*-clauses are "conveyed by the future negative along with *wuniŋgi*" (187). He explicitly notes the similarity between this strategy/apparent polysemy between subsequential-type TFAs and apprehensionals in neighbouring languages, incuding Kriol *bambay* (*sic*; 187, 308). Further discussion and a diachronic account of this apparent polysemy is given in § 3.2.

[36] A common derivational process in Australian languages (Dineen 1990: 113,209; Dixon 2002b: 201), Mangarayi reduplication frequently functions as an property intensifier (Merlan 1989: 166-7). In this sense, *baḷaḷaga* 'imminently/right now' can be read as an intensified form of *baḷaga* 'soon, later.'

## 2.3 The distribution of Kriol *bambai*

This section (informally) describes the distribution and meaning of both temporal-frame and apprehensional readings of *bambai* in the data. The Kriol data cited here draws from Angelo & Schultze-Berndt ([*A&SB*], 2016) and the Kriol Bible ([*KB*], The Bible Society in Australia 2007) in addition to elicitations from, and conversations with, native speakers of Kriol recorded in Ngukurr predominantly in 2016 and 2017 (see Ch. 1). Figure 6 represents a coarse taxonomy of the readings available to *bambai*, cross-referenced for the subsection in which each is discussed:[37]

**Figure 6**. Range of functions for *bambai*




### 2.3.1 Temporal frame reading

*Temporal frame adverbials* (TFAs) are linguistic expressions that are used to refer a particular interval of time, serving to precise the *location* of a given eventuality on a timeline. As an example, TFAs include expressions like *this morning* or *tomorrow*, which temporally situate the eventuality that they modify within the morning of the day of utterance or the day subsequent to the day of utterance respectively (see Binnick 1991: 307).

As shown in Chapter 1, formally, we can model the contribution of temporal expression by assuming a set (chain) $\mathcal{T}$ of points in time which are all strictly ordered with respect to each other chronologically. This is represented by a PRECEDENCE RELATION $\prec$ (where $t_1 \prec t_2 \leftrightarrow t_1$ precedes $t_2$). A TFA like *today*, then, is a predicate of times: it picks out a temporal *frame* for the predicate

[37] As we will see, uses corresponding to Lichtenberk's FEAR function (discussed above) and co-occurrences of *bambai* with *if*-clauses are taken to be subsumed under the *bambai*'s *APPREHENSIVE* function.

— that is, all the points in time between the beginning and the end of the day of utterance. In the sentence *Mel ate today*, the TFA restricts the instantiation time of the eating event $(t_e)$ to this interval. That is, *Mel ate today* is true iff Mel ate at $t_e$ and $\underset{\text{start-of-day}}{t_1} \prec t_e \prec \underset{\text{end-of-day}}{t_2}$. This can be represented using an interval notation as $t_e \in [t_1, t_2]$.

As mentioned in § 2.1, Kriol *bambai* is derived from an archaic English temporal frame adverbial, *by-and-by* 'soon', a lexical item with some currency in the nautical jargon used by multiethnic sailing crews in the South Pacific in the nineteenth century. The general function of *by-and-by* has been retained in contemporary Kriol, namely to temporally advance a discourse, much as Standard Australian English uses expressions of the type 'soon/a little while later/shortly after(wards)' or 'then.' These expressions represent a subset of 'temporal frame adverbials': clause modifiers that delimit the temporal domain in which some predicate is instantiated. In this work, I refer to the relevant set of TFAs as *subsequentiality* ('SUBSEQ') adverbials. The motivation for describing this as a semantic subcategory (a special case of the prospective) is the robust intuition that, in addition to temporally advancing the discourse (*i.e.*, marking the instantiation of the prejacent predicate posterior to a given reference time), SUBSEQ TFAs give rise to a salient, truth-conditional expectation that the predicate which they modify obtain in non-immediate sequence with, but in the **near future** of a time provided by the context of utterance. This general function of *by-and-by* is attested in the contact varieties (*i.e.*, pidgins) spoken in the nineteenth century in Australia; this is shown in (29).

(29) An excerpt from a (diagrammatic) explanation of betrothal customs and the genealogy of one couple as given to T A Parkhouse by speakers of a Northern Territory pidgin variety from the Larrakia nation in the late nineteenth century.

(Parkhouse 1895: 4, also cited in Harris 1986: 299.
My translation, incl. subscript indexation)

*… that fellow lubra him have em nimm.*
that ATTR woman 3S have TR boy

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

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

*him, him méloa have em bun-ngilla.*
3S 3S pregnant have TR girl

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

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

Note that, according to Parkhouse, (29) constitutes a description of the relationship history of one couple; each sentence is past-referring. There is no tense marking in the Pidgin narrative. In each of the *by-and-by* clauses in (29), the speaker asserts that the event being modified is *subsequent* to a reference time set by the previous event description. In this respect, *by-and-by* imposes a temporal frame on the event description that it modifies.

As we have seen above (*e.g.*, 20), the SUBSEQ-denoting function of *bambai* shown here has been retained in Kriol. This reading is shown again in the two sentences in (30). The schema in (30c) provides an informal representation of this context-dependent, "subsequential" temporal contribution.

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

*mela bin ol mub deya na, jidan deya na,* ***bambai*** *elikopta bin kam*
1p.excl pst all move there now sit there now ***bambai*** helicopter pst come
*deya na, detlot deya na garra kemra*
there now det:pl there now have camera

'We all moved there, **then** a helicopter came, the people there had cameras'
[A&SB: 271]

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

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

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

c. **Instantiation for subsequential reading** *(to be revised)*

$t_r$ ——————— $\boldsymbol{t_e}$ ..... $t^+$

The eventuality described by the predicate is instantiated at some time $t_e$ in the future of a reference time $t_r$. $t_r$ is contextually determined—by an antecedent proposition if present—or otherwise established by the discourse context. Further, *subsequential* TFAs impose a requirement that $t_e$ obtain within some constrained interval subsequent to $t_r$ (that is, before $t^+$).

As shown in (30a) above, the arrival of the helicopter (and its associated camera crew) is modified by *bambai qua* TFA. This has the effect of displacing the instantiation time forward with respect to the reference time provided by the first clause. *Bambai* has the effect of displacing the instantiation of helicopter-arrival forward in time with respect to the reference time provided by the first clause (*sc.* the time that the group had moved to a dry place up the road).

Similarly, (b) asserts that the eventuality described by the prejacent to *bambai* (namely the birth of Cain) is instantiated in the near future of some reference time $t_r$ provided contextually, albeit not by a linguistically overt antecedent clause. That is, Eve gave birth at some $t_e \in \{t'_e : t_r \prec t'_e \prec t^+\}$.[38] The subsequent verse: *Bambai na Ib bin abum najawan lilboi* (KB Jen 4:2) 'Soon after *that*, Eve had another boy' further forward-displaces the birth event of Abel. Subsequential TFAs are distinguished by this 'near future' restriction, underpinned by a set of conversational

[38]This is not to suggest the referability of some 'latest bound' reference time $t_r^+$. The latter merely represents a (vague) contextual expectation by which the event described by the prejacent had better have obtained for the whole sentence to be judged true. This device is described in more detail in § 4.1.

expectations over reasonable degrees of "soonness."

**Narrative cohesion** *bambai* additionally occurs with an undoubtedly related endophoric use (along with the apparently phatic discourse particle *na* < 'now').[39] This function is particularly frequent in the Kriol Bible and can be taken to rely on a metonymic relationship between the structure of time and the structure of a text/discourse (compare English *now then* or *so next*).

(31) **Discourse cohesion uses of SUBSEQUENTIAL *bambai***

a. *Wal deya na deibin jidan longtaim.* ***Bambai na*** *wen imbin brabli olmen, Tera bin dai.*

'So they lived there for a long time. And then, when he was very old, Terah died.' [KB Jen. 11.32]

b. *Longtaim God bin meigim det pramis garram Eibrahem, en imbin tok im garra kipum det pramis.* ***En bambai na*** *430 yiyastaim God bin gibit det lowa langa Mosis.*

'Long ago, God made a covenant with Abraham and said that he would keep the promise. **Now then**, 430 years later, God gave Moses the laws…' [KB Gal. 3:17]

In this subsection, we have seen an overview of the semantic contribution of *bambai* in its capacity as a 'subsequential' TFA. A discussion of apprehensional uses follows.

### 2.3.2 Apprehensional reading

In his survey of 'apprehensional epistemics' (reviewed in §2.2.1 above), Lichtenberk describes apprehensionals like To'abaita *ada* as having a dual effect on their prejacents ("mixed modality"):

- *epistemic downtoning* — *i.e.*, 'signal[ling] the [speaker's] relative uncertainty […] about the factual status of the proposition' — and
- (a shade of) *volitive modality* — 'the fear that an undesirable state of affairs may obtain.' (Lichtenberk 1995: 295-6)

While we are not at this stage committed to Lichtenberk's metalinguistic labels, a modal semantics for Kriol *bambai* is suggested on the basis of the data below. We will see how this use diverges from

[39] There are 455 tokens of clause-intial *Bambai na* in the Kriol Bible.

the subsequential/temporal frame readings described above, broadly dividing *bambai*'s apprehensional contribution into two main subtypes that align with the *avertive* (§ 2.3.2.1) and *apprehensive* (§ 2.3.2.2) functions identified in previous literature (Lichtenberk 1995; Vuillermet 2018) and described above.

#### 2.3.2.1 *p bambai q* : the precautioning/conditional use

The "precautioning" uses of apprehensional morphology are characterised by serving to "connect a clause encoding an apprehension-causing situation to a preceding clause encoding a precautionary situation" (Lichtenberk 1995: 298). The data provided below show *bambai*'s function in conditional-like constructions, where it precedes both indicative and counterfactual consequent clauses.[40]

**Indicative 'nonimplicationals.'** Apprehensional *bambai* occurs in situations where the speaker identifies some undesirable eventuality as a potential outcome of the discourse situation. Angelo & Schultze-Berndt (2016: 272*ff*) observe that these readings may or may not constitute "admonitory" speech acts — *i.e.*, can serve as direct warnings or threats (directive illocutionary force in 32a-b), or merely as predictions of a negative outcome for the subject (*e.g.*, 32c).

The sentence data in (32) demonstrate how *bambai*-sentences are used to talk about undesirable possible future eventualities. Extending the model introduced above to modelling this (following the "possible worlds" semantic framework introduced in chapter 1), we postulate a set $\mathcal{W}$ of *possible worlds*. On standard assumptions, a "proposition" ($p \in \mathcal{W} \times \{\mathbb{T}, \mathbb{F}\}$) is a set of possible worlds, namely those in which it is true (*e.g.*, Kratzer 1977; Kripke 1963; Stalnaker 1976, a.o.)

Generally speaking, the "precautioning" construction — *i.e.*, *p bambai q* on its apprehensional reading — appears to convey converse nonimplication between $p$ and $q$: 'if some situation described in $p$ doesn't obtain in $w$, then the (unfortunate) situation described in $q$ might' — *i.e.*, $\neg p(w) \rightarrow \blacklozenge q(w)$.

[40] Given the availability of these counterfactual LEST-type uses of *bambai*, Lichtenberk's "precautioning" label may be less appropriate. Lichtenberk doesn't provide evidence of counterfactual uses for To'abaita *ada*, although his discussion of colloquial Czech *aby* 'APPR' shows that this item is apparently compatible in counterfactual contexts (1995: 309). In any case, I continue to describe all LEST-type uses as *precautioning* given this term has been adopted by other authors (AnderBois & Dąbkowski 2020; Vuillermet 2018).

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

*Ey!* ***bambai***$_1$ *yundubala breikim thet motika, livim.* ***bambai***$_2$ *dedi graul la yu*
Hey! ***bambai*** 2d break DEM car leave ***bambai*** Dad scold LOC 2S

'Hey! You two might break the car; leave it alone. Otherwise Dad will tell you off!'
[A&SB: 273]

b. *yu stap ritjimbat mi na* ***bambai*** *ai kili yu ded en mi nomo leigi meigi yu*
2S stop chase.IPFV 1S EMP **bambai** 1S kill 2S dead and 1S NEG like make 2S
*braja jeikab nogudbinji*
brother jacob unhappy

'Stop chasing me or I'll kill you and I don't want to upset your brother Jacob (*sic*)'
[GT 22062016-21', retelling KB 2Sem 2.22]

c. *ai garra go la shop ba baiyim daga,* ***bambai*** *ai (mait) abu no daga ba*
1S IRR go LOC shop PURP buy food ***bambai*** 1S (MOD) have no food PURP
*dringgi main medisin*
drink my medicine

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

d. *ai=rra gu la det* airport *ailibala,* ***bambai*** *mi mis det erapein*
1S=IRR go LOC the airport early ***bambai*** 1S miss the æroplane

'I'll go to the airport early, **otherwise** I could miss my flight.' [GT 16032017-21']

In (32a), there are two tokens of apprehensional *bambai*. The second *(bambai*$_2$*)* appears to be anaphoric on imperative *livim!* 'leave [it] alone!' Notably, it appears that the Speaker is warning the children she addresses that a failure to observe her advice may result in their being told off: ¬ *(livim)* → ♦ *(dedi graul).* Unlike the uses of *bambai* presented in the previous subsection, *bambai* here is translatable as 'lest/otherwise/or else.' *bambai*$_1$, the first token in (32a), appears to have a similar function, although has no overt sentential antecedent.[41] In this case, the Speaker is issuing a general warning/admonition about the children's behaviour at speech time. In uttering the *bambai*$_1$ clause, she asserts that, should they fail to heed this warning, an event of their breaking the car is a possible outcome. (32b) shows a similar use.

(32c) provides an example of an apprehensional/LEST-type reading occurring in a narrative context (that is a representational/predictive-type illocutionary act). Here, the Speaker identifies

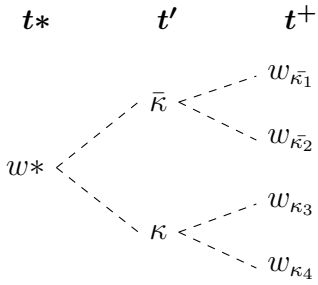
[41] In reconstructing this sentence context, a consultant unprompted introduced an explicit antecent: *gita burru det mutika, bambai yu breigim im* 'get off the car! Otherwise you might break it!' [GT 20170316]

a possible unfortunate future situation in which she has no food with which to take her medicine. Here, in uttering the *bambai* clause, she asserts that such an eventuality is a possible outcome should she fail to go to the shop to purchase food: $\neg$(*go.shop*) $\rightarrow$ ⧫(*foodless*). This reading is robustly attested in contexts where the antecendent is modified by some irrealis operator. For example, in (33) – repeated here from (21) above – *bambai* makes a similarly modal claim: if $\kappa$ is a set of worlds in which I drink coffee at $t'$ (and $\overline{\kappa}$ is its complement), then an utterance of (33) asserts that $\exists w \in \overline{\kappa}$ : I sleep by $t^+$ in $w$.

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

*ai=rra dringgi kofi* ***bambai*** *mi gurrumuk la desk iya gin*
1S=IRR drink coffee *bambai* 1S fall.asleep LOC desk here EMPH
'I'd better have a coffee otherwise I might pass out right here on the desk'
[GT 28052016]

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




In the reference world $w*$ at speech time $t*$, the Speaker establishes a partition over possible futures: they are separated into those in which, at time $t'$, he drinks coffee $\{w' \mid w' \in \kappa\}$ and those in which he doesn't $\{w' \mid w' \in \overline{\kappa}\}$. In those worlds where he fails to drink coffee, there exist possible futures ($w_{\overline{\kappa}_1} \vee w_{\overline{\kappa}_2}$) by which he's fallen asleep by some future time $t^+$.

Of particular note is this behaviour where *bambai* appears to be anaphoric on **the negation** of a proposition that is calculated on the basis of a linguistically represented antecedent (that is, the preceding clause.) Demonstrated in (34), This appears to be categorical where a SUBSEQ reading of *bambai* — *viz.* $^{\#}$*watch.movie*($t_2$) $\wedge$ *sleep*($t_3$) — is infelicitous. That is: only an APPREHENSIONAL reading is available: watching a film is a measure taken to avert asleep ¬*(watch.movie)* $\rightarrow$ ⧫*(sleep).*

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

# *airra wotji muvi bambai mi gurrumuk*
1S=IRR watch film *bambai* 1S fall.asleep

#**Intended**: 'I'll watch a film, then I'll (be able to) fall asleep.'
**Available reading**: 'I'll watch a film, otherwise I may fall asleep.' [AJ 23022017]

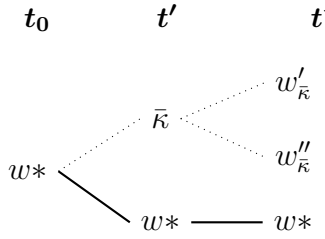
The relationship between the antecedent clause and the context on which (apprehensional) readings of *bambai* is anaphoric is further discussed below in chapter 3.

**Counterfactual 'nonimplicationals'** *bambai* similarly receives an apprehensional reading in subjunctive/counterfactual contexts: those where an alternative historical reality is considered.[42] The occurrence of apprehensionals in these contexts is little-reported cross-linguistically (described as "rare" in Angelo & Schultze-Berndt 2018 for German *nachher*).

In (35), the Speaker identifies that in some alternative world (say $w'$) in which he behaved differently to the way in which he did in the evaluation world ($w' \not\approx_{t*} w*$)[43] — namely one in which the event described in the antecedent failed to obtain — there is a (significant) possibility that he would have slept at work. Consequently, and comparably to the example (34) above, *bambai* modalises its prejacent: it asserts that $\exists w'[w' \notin \kappa \wedge$ I sleep by $t^+$ in $w']$.

(35) a. *ai=bin dringgi kofi nairram* ***bambai*** *ai bina silip~silip-bat la wek*
1S=PST drink coffee night ***bambai*** 1S PST:IRR sleep~DUR-IPFV LOC work
'I had coffee last night **otherwise** I might have slept at work' [AJ 23022017]

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




Here, the Speaker considers a set of worlds that historically diverge from the evaluation world $w*$, namely the set of worlds where, unlike the evaluation world, the Speaker did

[42]See von Fintel 2012 for a general overview of counterfactual conditionals.

[43]A definition and further discussion the $\approx$-relation ("historical alternative to") is given in (7). A formal account is further developed below.

not drink coffee at $t' - \{w' \mid w' \in \overline{\kappa}\}$. The Speaker asserts that there are some possible near futures to $\langle t', w_{\overline{\kappa}} \rangle$ in which he falls asleep by some time $t^+$, posterior to $t'$.

The Kriol apprehensional data described so far is intuitively unifiable insofar as it bears some resemblance to more familiar conditional constructions — *(i.e.*, that of an "infixed" two-place relation between two propositions.) Unlike *if… then*-conditionals, in all the apprehensional data, we have seen so far, *bambai* introduces a predicate describing some eventuality which construes as undesirable for the speaker. It appears that this eventuality is a *possible, foreseeable* future consequence of some other contextually provided proposition — in the examples discussed so far, this proposition is often interpreted as that of the non-instantiation of $q$ (see Ch. 3).

The 'indicative' and 'counterfactual' uses presented here can be unified by appealing to the notion of "settledness" presuppositions (*e.g.,* Condoravdi 2002: 82, *passim*). In all sentences of the form $p$ *bambai* $q$, a reference world and time are provided by some (perhaps modalised) antecedent proposition. In those contexts where $q$ is understood to be being asserted of a future time ($t_e \succ t*$) or a different world ($w' \not\approx_{t*} w*$); the entire proposition construes as modalised. This intuition will be spelled out in detail in Ch 4).

In effect, the contribution and distributional properties of *bambai* examined in this subsection — the conditional-like or so-called *precautioning* uses, in Lichtenberk's typology — resembles that of English *otherwise* (and parallels that of *lest.*) All of these observations are further spelled out in chapters 3 and 4 below.

We turn first, however, to a description of additional "apprehensive" uses of *bambai.*

#### 2.3.2.2 *Bambai* as a modal adverbial: the APPREHENSIVE use

In contrast to the 'nonimplicational' or PRECAUTIONING (*i.e.* LEST/'in case'-type) readings presented above (§ 2.3.2.1), *bambai* also functions as an epistemic adverbial with apprehensional use conditions; a usage corresponding to Lichtenberk's *'apprehensional-epistemic'* function and to Vuillermet's *apprehensive* (proper).[44] As we will see, this function of *bambai* arises in monoclausal contexts in addition to within conditional constructions. Note that this distributional fact can be taken as evidence that *bambai* is **not** a (syntactic) subordinator: that is, it doesn't introduce a

[44]The first token of *bambai* in (32a) also represents an apprehensive use like this.

dependent clause (unlike other purposive/apprehensional expressions cross-linguistically.)[45] Consider first an elaboration of (33), provided as (36) below. Here there is no explicit linguistic antecedent for *bambai*, whereas its prejacent encodes an unfortunate future possibility.

(36) **Context**: Grant's heading to bed. Josh offers him a cuppa.

J. *yu wandi kofi muliri?*
2S want coffee KINSHIP.TERM

'Did you want a coffee, *muliri*?'

G. *najing, im rait muliri!* ***bambai*** *ai kaan silip bobala! Ai mait weik*
no 3S okay KINSHIP.TERM ***bambai*** 1S NEG:IRR sleep poor 1S might awake
*ol nait... garram red ai...*
all night POSS red eye

'No it's fine *muliri*! *bambai* I might not sleep, I could be awake all night… be red-eyed (in the morning)…' [GT 16032017 17']

Similarly, in the exchange in (37) below, B deploys *bambai* to the same effect in two single-clause utterances; each encoding an unfortunate future possibility — namely an unsuccessful trip (♦*no.meat*) in the event that the two *gajin*s permit their young relative to join in.

(37) **Context**: Two relatives (A, B) are planning a hunting trip; a younger relative wants to join.

A. *im rait, yu digi im then gajin.*
3S okay 2S take 3S then KINSHIP

'It's fine, bring him along poison-cousin'

B. ***Bambai*** *yunmi gaan faindi bip*
***bambai*** 1D.INCL NEG.IRR find meat

'But then we may not be able to find meat'

A. *Yunmi garra digi im*
1D.INCL IRR take 3S

'We'll take him'

B. ***bambai*** *im gaan gibi la yunmi.*
***bambai*** 3S NEG.IRR give LOC 1S.INCL

'But then [the country] may not provide for us.' [DW 20170712]

[45] See, *e.g.*, Blühdorn 2008; Cristofaro 2005 for overviews of subordination.

Finally, (38) below provides a clear example of Lichtenberk's (1995) "epistemic downtoning" function for apprehensionals. Here, *bambai* clearly behaves as an epistemic possibility modal ($bambai\ q = \underset{\text{EPIST}}{\blacklozenge}\ q$). In this case, where the speaker doesn't *know* who's at the door, she makes a claim about how—in view of what she *does* know and might expect to be happening—the (present-tensed) situation described in the prejacent is a distinct possibility (and a distinctly undesirable one at that.)

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

*Gardi!* ***Bambai*** *im main bos iya la det dowa rait na*
Agh ***bambai*** 3s my boss here LOC the door right now
'Oh no! That could be my boss at the door.' [AJ 02052020]

In these apprehensional-epistemic occurrences, *bambai* has entered into the functional domain of other epistemic adverbials (notably *marri~maitbi* 'perhaps, maybe'.) Note that the availability of apparently epistemic readings to linguistic expressions with future-orientation is well-attested in English cross-linguistically (e.g., *the bell just rang, it'll be Hanna/that's gonna be Hanna*, see also Condoravdi 2003; Werner 2006; Winans 2016). Giannakidou & Mari (2018), for example, defend an analysis of that unifies future tense morphology with epistemic modality, appealing to data like the English epistemic future and its corollaries in Greek and Italian, to argue that future markers in these languages in fact always encode epistemic necessity (*sc.* that its *epistemic modals* that perform the work of signalling predictive illocutionary force.) We will have further observations to make on these facts in the chapters that follow (ch. 3 for a discussion of pragmatic competition with *marri* and ch. 4 for presentation of an analysis that unifies these uses.)

**Apprehensive counterfactual** The relation between the counterfactual prejacent to *bambai* and the content of the preceding clause appears to diverge from the patterns of data described in the previous subsection. As with the epistemic adverb uses above, in (39), *bambai* appears to introduce a modalised assertion and expresses negative speaker affect. Its interpretation doesn't appear to be restricted by the preceding question. Similarly to the uses shown above, *bambai* appears to behave here as an apprehensive modal insofar as it encodes an unfortunate possible eventuality.

Unlike the above examples, however, the prejacent (*viz.* one of the Philistines committing adultery with Rebekah) is taken to describe a counterfactual event in view of Isaac's deception.

(39) **Context**. Abimelek (king of the Philistines) chides Isaac for having earlier identified his wife Rebekah as his sister.

*Wotfo yu nomo bin jinggabat basdam,* ***bambai*** *ola men bina silipbat garram yu*
why 2S NEG PST think before, APPR all man PST:IRR sleep.IPFV with 2S
*waif? Yu bina meigim loda trabul blanga melabat*
wife 2S PST:IRR make much trouble DAT 1P.EXCL

'Why didn't you think [to say something] earlier? The men might have slept with your wife! You could have caused many problems for us!' [KB Jen 26.10]

**Apprehensives with *if*-restrictors** Contrasting with the 'nonimplicational' (*i.e.*, precautioning/LEST-type) readings in § 2.3.2.1 above, Kriol also forms conditional sentences using an English-like *if…(then)* construction. The two sentences in (40) give examples of an indicative and subjunctive *if*-conditional, where *bambai* modifies the consequent clause (the "apodosis.")

(40) a. *if ai dringgi kofi* ***bambai*** *mi* #*(nomo) gurrumuk*
if 1S drink coffee ***bambai*** 1S #(NEG) sleep

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

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

**Intended**: 'If I hadn't drunk coffee then I may well have fallen asleep there'
(This reading is available if =*no(m)o* 'NEG' is omitted) [GT 16032017]

The contrast between (40a,b) and their *if*-less counterparts in (33a and 35a) respectively (*pp.* 48-49), evinces some restriction that *if*-clauses apparently force on the interpretation of *bambai*. Whereas the *if*-less sentences presented previously assert that a particular eventuality may obtain/have obtained just in case the antecedent predicate **fails**/failed to instantiate (*i.e.*, the LEST readings), the sentences in (40) diverge sharply from this interpretation. That is, each of the *if* $p$, *bambai* $q$ sentences in (40) asserts a straightforward conditional $p \rightarrow \blacklozenge q$: should the antecedent proposition hold (have held), then $q$ may (have) obtain(ed).

In this respect, *bambai* appears to be behaving truth conditionally as a modal expression encoding possibility — *sc.* a modal adverbial — similarly to the monoclausal uses presented above

in this subsection. The MODAL BASE (*i.e.*, those worlds over which bambai quantifies) is explicitly restricted by the (syntactically subordinate) *if*-clause, whose sole function can be taken to involve the restriction of a domain of quantification (cf. von Fintel 1994; Kratzer 1979; Lewis 1975; Roberts 1989, 1995). Additional argumentation to this effect is included in ch. 3.

### 2.3.3 Summary

In the preceding sections, we have seen clear evidence that *bambai* has a number of distinct readings. Nevertheless, we can draw a series of descriptive generalisations about the linguistic contexts in which these readings emerge. These are summarised in (41).

(41) **Semantic conditions licensing readings of *bambai*.**

***a***. *bambai* is interpreted as a **subsequential temporal frame** when the state-of-affairs being spoken about is **settled**/the same as the actual world ($w' \approx_{t*} w*$) (*i.e.*, in **factual**, **nonfuture** contexts).
Consequently, *bambai*'s prejacent generally contains past marking *(bin)* in subsequential contexts

***b***. In other (**nonfactual/future**) contexts (that is, in predications that fail to satisfy SETTLEDNESS) apprehensional readings "emerge".

***c***. In apprehensional contexts, precautioning (LEST-type) readings occur in a $p$ *bambai* $q$ construction. That is, in a sentence of the form $p$, *bambai* $q$ is interpreted as an admonition that $\neg p \rightarrow \blacklozenge q$

As discussed in the preceding sections, **nonfactual** utterances are those in which (a) a predicate is understood to obtain in the future of evaluation time $t*$/***now*** or (b) the predicate is understood as describing some $w'$ which is not a historic alternative to the evaluation world $w*$. It is in exactly these contexts that *bambai* gives rise to a modalised reading. In Kriol, a number of linguistic operators (which we have seen in the data presented above) appear to "trigger" predication into an unsettled timeline. A selection of these is summarised in Table 5 below.[46]

[46]This is not intended to suggest that these operators are in any way semantic primitives, Table 5 is to be read as a non-exhaustive list of linguistic devices that appear to associate with nonfactual mood.

**Table 5**. Semantic operators co-occurring with modal (apprehensional) readings of *bambai*

| Gloss | Form | *Example* |
|---|---|---|
| IRREALIS | *garra* | *ai**rra** dringgi kofi **bambai** mi gurrumuk*<br>'I'll have a coffee or I might fall asleep' |
| NEG IRREALIS | *kaan* | *ai **kaan** dringgi kofi **bambai** mi nomo silip*<br>'I won't have a coffee or I mightn't sleep' |
| C'FACTUAL | *bina*<br>PST:IRR | *aibin dringgi kofi nairram **bambai** ai**bina** gurrumuk*<br>'I had a coffee last night or I might've passed out' |
| IMPERATIVE | ∅ | *yumo jidan wanpleis **bambai** mela nogud*[47]<br>'Youse sit still or we might get cross' |
| PROHIBITIVE | ∅ [*nomo*]<br>IMPR | ***nomo** krosim det riba, **bambai** yu flodawei*<br>'Don't cross the river or you could be swept away!' |
| GENERIC | ∅ | *im gud ba stap wen yu confyus, **bambai** yu ardim yu hed*<br>'It's best to stop when you're confused; you could get a headache' |
| NEG GENERIC | ∅ [*nomo*]<br>GEN | *ai **nomo** dringgi kofi enimo, **bambai** mi fil nogud*<br>'I don't drink coffee anymore or I'd feel unwell' |
| CONDITIONAL | *if* | ***if** ai dringgi kofi, **bambai** ai kaan silip*<br>'If I have coffee, then I mightn't sleep' |

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

# Chapter 3

# An apprehensional pragmatics

Chapter 2 provided a detailed account of the distribution of the Kriol adverb *bambai*, the numerous syntactic environments in which it surfaces and the numerous interpretations that it appears to license. The current chapter proposes a way of understanding the synchronic relationship that holds between these different uses and readings of *bambai*, crucially interrogating the relationship between clauses of the type *bambai q* and the context in which they're embedded/their "matrix discourse" (§ 3.1).

In developing this understanding of the crucial role of context in the interpretation of *bambai*, § 3.2 proposes an account of the diachronic emergence of apprehensional expressions from temporal frame adverbials (*sc.* devices that encode SUBSEQUENTIALITY.) Deploying insights from the diachronic semantics literature, we will see that this apparent meaning change arises from the conventionalisation of a (subtype) of *post hoc ergo propter hoc*-type conversational implicatures.

In contemporary Roper Kriol — due to the developments described in this chapter (and the distribution described in ch. 2) — *bambai*, the erstwhile TFA, can be shown to function as a modal adverb. Consequently, it has entered into the functional domain of other possibility adverbials, notably *marri* 'perhaps.' Incidentally, the competition between *marri* and apprehensive *bambai* provides a frame to investigate the attitudinal component of apprehensionality, the key distinguishing feature of this category. § 3.3 compares Kriol data with that of other apprehensionals and proposes a treatment of the "undesirability" component of apprehensional meaning as *use-conditional* or *expressive* content.

## 3.1 A modal subordination account

The first examples presented in Chapter 2 are repeated below in (42):

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

a. Subsequential reading of *bambai*

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

'Yeah! I'll be right there!'

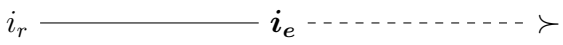
b. Apprehensional reading of *bambai*

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

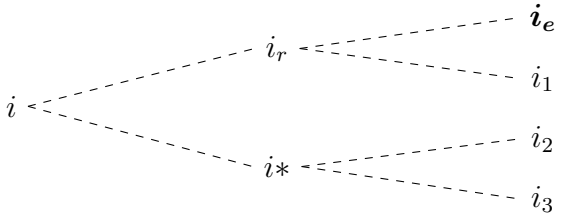
'No, that's okay! (If I did,) I mightn't (be able to) finish my work!' [GT 20170316]

As we have seen, an important way in which the range of uses of *bambai* are united is in the fact that they appear to modify the proposition that they precede (the prejacent), crucially relating it to some component of the discourse context. For clarity, paraphrases and schemata for (42a-b) are provided below.

(42) a′. The prejacent (that the subject comes to dinner) is taken to hold at $i_e$, subsequently to (*i.e.*, in the near future of) some contextually-specified reference time ($i_r$= speech time $i*$ in this case.)




b′. In (42b), the prejacent (the subject's failure to complete his work) is taken to represent a possible outcome (*e.g.*, at $i_e$) of (the negation of) some contextually-supplied proposition (*e.g.*, the subject's not declining their addressee's dinner invitation at $i_r$.)




Craige Roberts (1995: 663) draws an explicit connection between the retrieval of a "Reichenbachian reference time" and the retrieval of a reference "situation", both of which she identifies as "species of domain restriction on an operator" (over intervals/possible worlds respectively.) She

therefore analogises the logical structure of temporal and modal (incl. conditional) operators to other types of quantifiers (43).

(43) The logical structure of quantificational expressions in natural language: `[Operator, Restriction, Nuclear Scope]` as in Roberts (1995: 665)[48]

$$\lambda Q[\textsc{Operator}\ \mathcal{R}\ Q]$$

$Q$ represents the nuclear scope of some quantificational OPERATOR. The first argument $\mathcal{R}$ represents a "restrictor clause" – a free variable that is furnished by context and restricts the domain of the quantificational operator.

We have clear evidence, then, that the interpretation of *bambai* is constrained by and dependent on elements of the foregoing discourse that, crucially, **need not be linguistically explicit**/overt. The phenomenon of interest is that of *discourse anaphora* and the observation that particular linguistic expressions (incl. lexical items) "specify entities in an evolving model of discourse" (see Webber 1988). The uses of *bambai* in (18) exhibit this property: this lexical item apparently an intensional operator whose domain is restricted by entities (prima facie of different types) in its SUBSEQUENTIAL (temporal entities) and APPREHENSIONAL uses (eventive entities).

In order to account for these types of anaphor phenomena (particularly in the modal domain), Roberts (1989, 1990a, 2020) develops the notion of MODAL SUBORDINATION, defined in (44):

(44) MODAL SUBORDINATION is a phenomenon wherein the interpretation of a clause $\alpha$ is taken to involve a modal operator whose force is relativized to some set $\beta$ of contextually given propositions. (Roberts 1989: 718)

In *bambai*'s 'AVERTIVE'-type uses (*sc.* those of the form $p$ *bambai* $q$, described in § 2.3.2.1), *bambai* $q$ often functions to introduce an eventuality which is interpreted as a possible consequence of the antecedent subject's failure to attend to some situation which is described in the antecedent clause — what we had above represented as $\neg p(w) \rightarrow \blacklozenge q(w)$. In other words, these uses of *bambai* have usually been translated as, and strongly resemble, uses of the English adverb *otherwise* (albeit with possible differences in modal force and the conventionalised expressive (apprehensional) content described in §3.3). Phillips & Kotek (ms) provide an account of the interpretation

[48] This terminology likely due (in part) to Heim (1982: *e.g.* 89) although the idea of quantifiers as second-order relations appears to stem from Aristotle's syllogistic logic (see Westerståhl 2019).

(and meaning contribution) of utterances of the form $p$ *otherwise* $q$, where *otherwise* is analysed as a discourse anaphor that triggers modal subordination. In the subsections below, their (our) analysis of *otherwise* as (1) invoking modal subordination and (2) sensitive to information structure is adapted to account for analogous components of the behaviour of *bambai*.

### 3.1.1 Accommodation and restriction

As introduced above (and informally defined in (44)), the notion of MODAL SUBORDINATION captures the idea that a modal operator scoping over a clause has visibility of elements of the foregoing discourse.[49] Roberts's schematisation of this type of relation is reproduced in (45) and a classic operationalisation is given in (46).

(45) **The general logical form of a modal subordination relation** — given two (syntactically independent) clauses $K_1, K_2$ — where the prejacent to a modal operator ($\text{MOD}_2$) is "modally subordinate" to the content in the scope of $\text{OP}_1$, another (intensional) operator (Roberts 2020).

$$\big[_{K_1} \ldots \text{OP}_1[\ldots \texttt{X} \ldots] \ldots \big] \ldots \big[_{K_2} \ldots \text{MOD}_2[\ldots \texttt{Y} \ldots] \ldots \big]$$

1. Y is a presupposition trigger and only the content X (under the scope of $\text{OP}_1$) would satisfy this presupposition.
2. $\text{MOD}_2$ is a modal operator scoping over Y.
3. The constituent in $K_2$, headed by $\text{MOD}_2$, has an interpretation wherein part of its restriction consists of X.

(46) **An example of modal subordination in discourse.** (Roberts 2020: 1)
CONTEXT. Hansel & Gretel are arguing about whether to lock the door.

G. *A wolf* ***might*** *come in. It* ***would/will*** *eat you first!*

$$\underset{\text{OP}_1}{\Diamond}\, \exists x \big[\text{Wolf}(x) \wedge \text{Come.in}(x)\big] \;\&\; \underset{\text{MOD}_2}{\Box}\, \text{Eat.you}(y)$$

This schema is straightforwardly reflected in Gretel's two sentence utterance in (46), where crucially:

[49] Much of the content of this subsection draws on the presentation of a similar analysis for *otherwise* in Phillips & Kotek ms, available at lingbuzz/004800. The arguments in this analysis are summarised and modified in view of accounting for *bambai*'s different properties. The introduction to Discourse Representation Theory and modal subordination are particularly close to the text in ms: §4.

- the domain of $\text{MOD}_2$ is somehow restricted to those worlds in which 'a wolf come[s] in' (*sc.* the proposition in the scope of $K_1$'s possibility modal—$\text{OP}_1$) and
- the presuppositions associated with the pronoun *it* in $K_2$ are satisfied by the (hypothetical) wolf bound, existentially bound in $K_1$ (*i.e.*, $y = x$).

That is, in (46), $K_2$ is **modally subordinate** to $K_1$ (and material in $K_1$ is consequently accessible to $K_2$.) According to Phillips & Kotek (ms), the English adverb *otherwise* is a discourse anaphor and sentences containing this lexical item are taken to rely on a similar logic. Given that the AVERTIVE uses of *bambai* are taken to have a similar meaning contribution to *otherwise*, pertinent details of Phillips & Kotek (ms)'s analysis are adapted here (which in themselves are an implementation of Craige Roberts's extended DRL for modal subordination.) An overview of the basic assumptions of this version of Discourse Representation Theory (DRT) are given in § 3.1.1.1, which are then used to model the contribution of *bambai* in the subsequent sections.

#### 3.1.1.1 A modal discourse representation language

Discourse Representation Theory (originating simultaneously with Kamp 1981 and the related system of Heim 1982) is a framework for modelling the development of participants' "mental representations" of a given situation as a discourse unfolds (see Geurts et al. 2016).[50] Because it models the accretion of information over the course of a discourse, DISCOURSE REPRESENTATIONS — effectively "pictures of the world [≈ partial models] described by sentences that determine them" — are the basic meaning-bearing units in a discourse, mediating between syntactic units (*i.e.*, sentences) and the determination of truth.

For a given Discourse representation structure (DRS) $\boldsymbol{K}$, $K$ denotes a pair $\langle X_K, C_K \rangle$, where $X$ represents a *local domain* – a finite set of variables that represent discourse objects relevant in the context (including participants, eventualities, and times etc.); and $C$ is a finite set of 'satisfaction conditions' that eventually determine the truth value of a given proposition. For diagrams where a DRS $K$ is represented as a box, the top of the box lists the variables $X_K$ and the bottom represents

[50] While these frameworks are often described as empirically equivalent, Heim's *File Change Semantics* differs crucially insofar as it denies or makes no claim about mental representation and or the "procedural aspects" of interpretation (Kamp 1988: 102, this property also addressed in Geurts et al. 2016: § 6.) Nothing in the current work hinges on commitment to a particular dynamic semantics/pragmatic framework.

the satisfaction conditions $C_K$.

For a simple discourse as in (47), we provide a DRS below. Notice that the indefinite is treated as a variable here, and is eventually existentially closed (Heim 1982): any variable that is not locally bound by another operator is assumed to be existentially bound by a global operator that applies to variables that remain free by the end of the derivation. DRT allows us to model continued reference to a variable introduced earlier in a discourse as long as it is still accessible. The first sentence of (47) introduces a discourse referent and condition set, represented as (a), expanded in the second (b).[51]

(47) A duck entered the room. It quacked.

a.

| $x$ |
|---|
| *duck(x)*<br>*entered-room(x)* |

b.

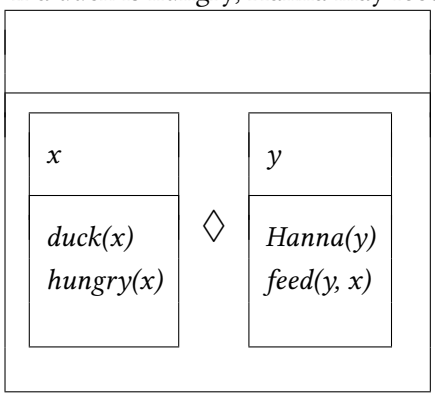
| $x$ $y$ |
|---|
| *duck(x)*<br>*entered-room(x)*<br>*x=y*<br>*quacked(y)* |

A given DRS $K$ contains atomic conditions of the form $P(x_{i_1}...x_{i_n})$ (where $P$ is an $n$-place predicate). In a given model $\mathcal{M}$, if a world/variable-assignment pair $\langle w, f \rangle$ **satisfies** ($\underset{\mathcal{M}}{\Vdash}$) all of the conditions in $K$, then that pair **verifies** ($\underset{\mathcal{M}}{\models}$)$K$. Additionally, DRSs are recursively closed under the operations $\neg, \bigvee, \Rightarrow, \Box, \Diamond$. That is, if $K_i, K_j$ are DRSs and $\circ$ is one of these (2-place) operators, then $K_i \circ K_j$ can represent a *complex condition* in $K$. This complex condition needs to be satisfied by $w$, if $K$ is to be verified in $w$.[52] (48) is an example containing a possibility modal, illustrating that the variable $x$, which is introduced in the box to the left of the operator, remains accessible in the box on the right:

[51] These representations are somewhat abbreviated in subsequent diagrams. See Kamp & Reyle (1993) for further detail.

[52] The semantics and interpretation of these operators is further discussed below, though Roberts (1989: 714) provides formal satisfaction conditions for all condition types that she defines. See also the appendix to Phillips & Kotek for some additional detail.

(48) If a duck is hungry, Hanna may feed it.




Crucial to the theory is the notion of an "accessible domain" $A_{K_i}$ – a superset of the local domain $(X_{K_i})$ for any given $K_i$. As a discourse proceeds, the set of objects that can be referred to expands. The notion of 'accessibility', then, allows us to predict which objects can be referred to at a given stage in a discourse.

(49) The accessible domain $A_{K_i}$ contains all the variables that occur:

a. In $K_i$'s local domain $(X_{K_i})$

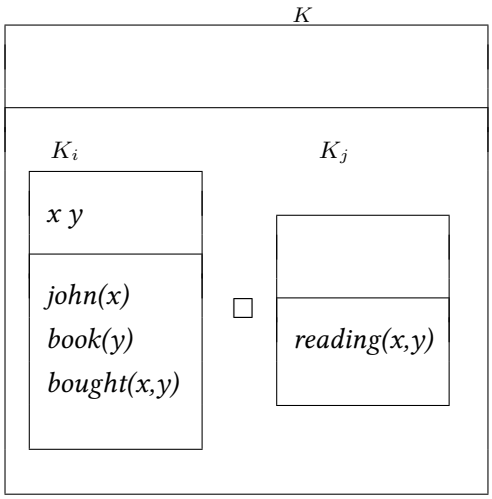
b. In the domains of all DRSs that graphically *contain* $K_i$

c. If $K_i$ is the right element of a (binary) modal condition $(\Rightarrow, \Box, \Diamond)$, $A_K$ also contains all the elements of the antecedent's (the DRS on the left's) local domain.
*I.e.* $K_\ell \,\Box\, K_i \;\longrightarrow\; K_\ell \leqslant K_i$ where '$\leqslant$' reads "is accessible from."

In (48), the consequent box of the conditional makes reference to a variable introduced in the antecedent. Furthermore, the entire conditional statement is embedded inside a larger discourse, so that we are not committed to the existence of any duck in the context: the *feeding*-worlds are a subset of *hungry-duck*-worlds.

Based on the assumptions introduced in (49), a given DRS $K$ that is interpreted in the scope of a modal operator can be *modally subordinate* to those DRSs whose domains it has access to. Example (50) illustrates such a case, from Roberts (1989: 701). Here, the consequent clause is *modally subordinate* to the antecedent *in a given conversational background.* That is, the entire conditional is taken to assert that the speaker predicts that 'John will be at home reading a book' in those worlds *(that best conform with the speaker's expectations)* in which he bought a book. Similarly to (48), we need not be committed to the fact that John bought a book in the actual world; in other words, the entire statement is not a part of the matrix DRS $K$; it is further embedded.

(50) *A DRS illustration of modal subordination in a conditional sentence:*
If John bought a book, he'll be at home reading it by now.




In (50), the DRS representing the consequent clause $(K_j)$ is *modally subordinate* to its antecedent $K_i$ and, as a result, can access the discourse entities introduced in $K_i$ (*i.e.*, $K_i \leqslant K_j$). Moreover, both $K_i$ and $K_j$ are subordinate to the matrix DRS $K$ (*i.e.*, $K \leqslant K_i \leqslant K_j$); had any variables been introduced in $K$, they would have been accessible to both $K_i$ and $K_j$.

#### 3.1.1.2 *p bambai q* and discourse representation

On the basis of this framework, we can propose an account for the apparent clause-linking (avertive/precautioning) uses of *bambai*, representing each clause as a discourse representation structure (DRS) — *sc.* $K_1$ *bambai* $K_2$.
On the basis of the description given in chapter 2, (51) enumerates some key properties of these uses.

(51) **In sentences of the form $K_1$ bambai $K_2$ :**

- ***a*** *bambai* functions as an intensional operator encoding a type of conditional modality; it asserts that – in a set of worlds (according to some criterion), some condition holds $(q)$.
- ***b*** The (modal) domain of *bambai* is restricted to some nonfactal proposition derived from $K_1$: that is, the **negation** of a "basic proposition" (which may be in the scope of another other modal operator.)[53]
- ***c*** The speaker asserts $K_1$.

[53]Operationalised in the discussion of (52) below, where some sentence $K_1$ is of the form $\text{OP}_1\varphi$ (*i.e.*, headed by a modal operator), the corresponding *basic proposition* (prejacent) is $\varphi$.

For clarity, the three sentences in (52) illustrate these interpretation conventions for precautioning uses of *bambai* and different relations between the syntactic antecedent $K_1$ and the prejacent to *bambai* $K_2$, recalling (45), the modal subordination schema from Roberts (2020).

(52) **Modal subordination with *bambai***

a. The negation of $K_1$ restricts the domain of *bambai*

[$_{K_1}$ *ai~bin dringgi kofi nairram* ] ***bambai*** *ai* ***bina*** *silip~silip-bat la wek*
1S=PST drink coffee night *bambai* 1S PST:IRR sleep~IPFV LOC work

'I drank coffee last night otherwise I would have fallen asleep at work'
≈ 'If I hadn't had coffee, I might've fallen asleep' [AJ 23022017]

b. The negation of the proposition in the scope of *garra* 'must, will' restricts the domain of *bambai*

[$_{K_1}$ *ai=**rra** dringgi kofi* ] ***bambai*** *mi gurrumuk la desk iya gin*
1S=IRR drink coffee *bambai* 1S fall.asleep LOC desk here EMPH

'I'll/ought to have a coffee; otherwise I might pass out right here on the desk' [GT 28052016]

≈ 'If I don't have coffee, I might fall asleep'
$\not\approx$ # 'If I need not have a coffee, I might fall asleep'

c. *kaan* $\varphi$ 'won't/can't/mustn't φ' has the logical form $\Box[\neg[\varphi]]$. The negation of the proposition in the scope of □ restricts the modal.

[$_{K_1}$ *yu* ***kaan*** *gu la shop* ] ***bambai*** *yu spendim yu manima*
3S IRR.NEG go LOC shop *bambai* 2S spend 2S money

'You mustn't go to the shop; (otherwise) you could end up spending all your money.' [AJ 23022017]

≈ 'If you don't not go to the shop, you might spend all your money.'
$\not\approx$ # 'If it's not the case that you mustn't go to the shop…'

d. The negation of the (generic) complement of a propositional attitude *BI gud* 'be good to' restricts the domain of *bambai*

[$_{K_1}$ *im gud ba stap wen yu konfyus* ] ***bambai*** *yu ardim yu hed*
3S good PURP stop when 2S confused *bambai* 2S hurt your head

'It's best to stop when you're confused, (otherwise) you'll get a headache!'
≈If you don't stop when you're confused, you might get a headache!.'
$\not\approx$ #If it's not best to stop when you're confused, then you might get a headache!.'

As the infelicitous paraphrases in (52b-d) make clear, $K_1$ *bambai* $K_2$ doesn't have a straightforward conditional semantics. It is **not** the negation of $K_1$, but rather material under the scope

of some modal (or otherwise intensional) operator within $K_1$ (*viz.* $\text{OP}_1$) whose negation ends up being accommodated.

Again, following the analysis laid out in Phillips & Kotek (ms), the possible sets of propositions that are available to constrain the interpretation of *"bambai* $K_2$*"* are calculated on the basis of those discourse representations which **have access to** (*i.e.*, are contained within) the pronounced antecedent to *otherwise*, which will refer to throughout as $\boldsymbol{K_1}$. A new operator over DRSs $\ominus$ (and hence the complex condition $K_i \ominus K_j$) will represent the (truth-conditional) contribution of *bambai*:

(53) **Proposal. A dynamic semantics for *bambai***
$K_i \ominus K_j \Longleftrightarrow (K_i) \wedge (\neg K_{i_{\text{sub}}} \Diamond K_j)$
In words: $K_i \ominus K_j$ is satisfiable iff both $C_{K_i}$ and $(\neg K_{i_{\text{sub}}} \Diamond K_j)$ are satisfiable, where $K_{i_{\text{sub}}}$ is some DRS that is contained within $K_i$.[54]

This proposal can be paraphrased as the claim that: "the conditions of $K_i$ hold; however, in case (some of) these conditions — those of $K_{i_{\text{sub}}}$ — do not hold, the conditions in $K_j$ may then hold." Notice that this treatment takes precautioning apprehensionals to be akin in their (logical) structure to a conditional.

Notice additionally that we employ the possibility operator ($\Diamond$) from Roberts' DRL (1989: 695, 715), building on the observation throughout that apprehensionals (incl. *bambai*) involve a modal (possibility) component. A primary contribution of Roberts 1989 is an expansion of the ontology of the discourse representation theory of Kamp 1981 to include possible worlds, in view of modeling modality. In effect, $\Diamond$ is an existential quantifier which also builds in "conversational backgrounds"—sets of propositions: a modal base $m$ and ordering source $o$—in order to capture the observations made by Kratzer (1981b: §2.7) regarding different "flavors" of modality.

A complex condition of the form $K_i \underset{m,o}{\Diamond} K_j$ then, is satisfiable iff $K_j$ can be verified in some worlds in the conversational background (as determined by $m, o$) in which $K_i$ can be verified. Consequently a DRS containing the condition $K_i \underset{m,o}{\Diamond} K_j$ can be instructively rewritten as in (54):[55,56]

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[54]More precisely, these conditions will be satisfied by the same set of world-assignment pairs $\langle w, g \rangle$. See below for more discussion of the determination of $K_{i_{\text{sub}}}$.

[55]See Chapter 1 for a definition of BEST and a brief overview of ordering semantics.

[56]Roberts (1989) in fact equivalently defines the satisfaction conditions for 'possibility (in view of)' $K_i \underset{m,o}{\Diamond} K_j$ as the

(54) **Satisfaction conditions for Roberts' possibility operator $\Diamond$ as an existential quantifier, given a world $w$:**
$K_i \underset{m,o}{\Diamond} K_j \Longleftrightarrow \exists w' \big[ w' \in \underset{o(w)}{\textsc{best}} \big( \bigcap [m(w) \cup \{ w'' \vDash K_i \}] \big) \wedge w' \vDash K_j \big]$

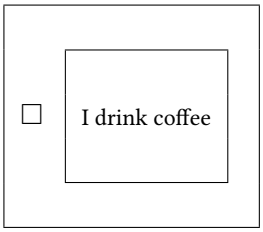
In words: The condition $K_i \underset{m,o}{\Diamond} K_j$ is satisfied in $w$ if there's some world $w'$ in the "best worlds" (according to $o$) within $m$ and verifying $K_i$ which also satisfies the conditions of $K_j$.

#### 3.1.1.3 Modal subordination in action

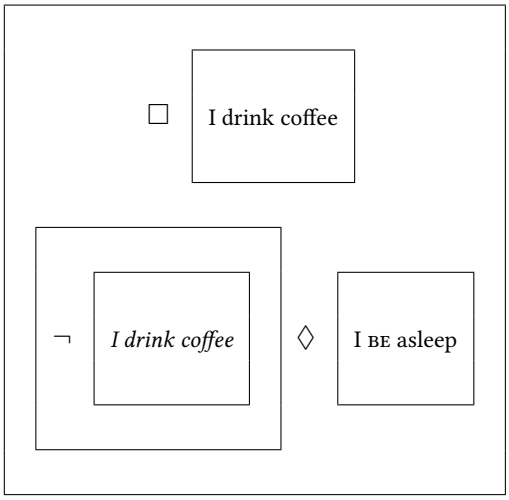
Described above, the second (*bambai*) clause of (52b) is interpreted as *modally subordinate* to antecedent material. Following the discussion of the previous subsection, its discourse representation structure can be diagrammed as in (55). In (a), $K_1$ is asserted. In (b), the content in the scope of $\textsc{op}_1$ (*viz.* $K_{1_{\text{sub}}}$) is accommodated; its negation restricts the domain of the possibility modal encoded in *bambai*.

(55) **Discourse representation structure for (52b)**
$[_{K_1}$*airra dringgi kofi* ] *bambai mi gurrumuk*
'I'll have a coffee, otherwise I may (fall a-)sleep.'

$K_1$. DRS for first clause




$K_2$. DRS for full sentence

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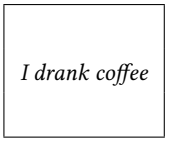
dual of 'necessity (in view of)' $\neg(K_i \underset{m,o}{\Box} \neg K_j)$. Relevant adjustments are made here. Mentioned in the previous section, satisfaction (verification) is a property that holds between a 4-tuple: a model, world, assignment and set of conditions (DRS). This is simplified here for perspicuity.

Crucially, when *airra dringgi kofi* 'I'll have a coffee' is asserted, its prejacent is presumed unsettled at speech time (that is, the sentence presupposes that at the relevant (future) time, the subject's drinking coffee (or failure to do so) is not a settled fact of the world (Roberts's NONFACTUAL mood.) Because of this, NEG('I drink coffee') is available as a restrictor to *bambai* — in other words $K_2$ is **modally subordinate** to $K_1$. Similarly, in (c), it is presumed unsettled that the addressee go to the shop (again at some future time, retrieved from context). The negation of the prejacent of the modal — NEG('You don't go to the shop') — restricts the domain of *bambai*.

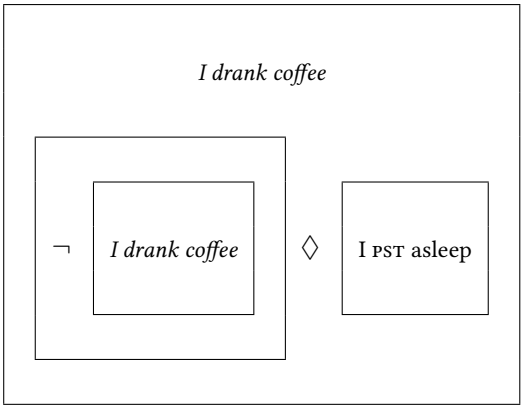
The second clause of (52a) is interpreted as a counterfactual (while it has past temporal reference, *bina* explicitly marks its nonfactual status). Consequently, *bambai* needs a nonfactual antecedent and the negation of the foregoing proposition is accommodated to restrict its domain. Reminiscent of standard treaments of counterfactuals (*i.e.*, where worlds in a nonrealistic proposition are ranked by their "similarity" to the actual world, see von Fintel 2001, 2012; Kratzer 1981b; Lewis 1973). This is represented in (56) below: the first clause (coffee-drinking) is asserted as actual, the second a nonrealised possible outcome had the coffee-drinking not obtained.

(56) **Discourse representation structure for (52a)**
[$_{K_1}$ *aibin dringgi kofi* ] *bambai aibina silip*
'I had a coffee, otherwise I might've slept.'

$K_1$. DRS first clause




$K_2$. DRS full sentence




Unlike *otherwise* (as examined in Phillips & Kotek ms), possible antecedents appear to be predictably constrained by the form of the foregoing linguistic material. The *"Red Light"* sentence pair described in that work is translated in (57); accommodation of the entire conditional as an antecedent appears to be infelicitous (that is *bambai* is not available to translate *otherwise* on the

reading presented in (57b) *cf.* Kruijff-Korbayová & Webber 2001; Phillips & Kotek ms; Webber et al. 2003.)[57] A DRS for (57a) is additionally provided in (58).

(57) ***bambai* accommodates the smallest antecedent: the *Red Light* examples**

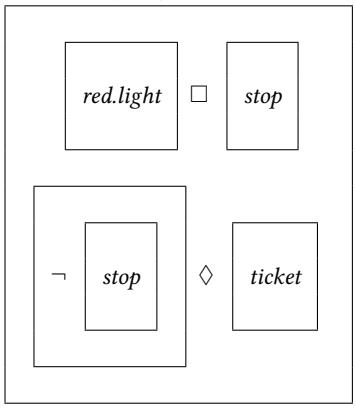
a. *If det lait im redwan, stap;* ***bambai*** *yu gaji tiket.*
if the light 3s red stop ***bambai*** 2s catch ticket
'If the light's red, stop; **otherwise** you might get a ticket.'

b. *If det lait im redwan, stap;* ***if najing****, kipgon.*
if the light 3s red stop **if no** CONT
'If the light's red, stop; **otherwise** continue.' [GT 19032017]

In both Red Light sentences, the *bambai*-clause is modally subordinate to a conditional imperative 'If the light's red, stop!' As with the other precautioning uses analysed above, the "simple" satisfaction conditions (*i.e.*, the conditions of $K_i$ stripped of its own modal restrictions (*viz.* the conditional modality) are accommodated as the restrictor to *bambai*.

(58) **DRS for (57a)**

$K_i \ominus K_j \Leftrightarrow K_i \wedge K_{i_{\text{sub}}} \Diamond K_j$




***summary.***
$K_i$ = *red light* □ *stop*
$K_{i_{sub}}$ = *stop*
$K_j$ = *get ticket*

※

In this subsection, we have considered the relation between the two clauses involved in "precautioning" uses of *bambai* — that is, those uses occurring in *p bambai q* '*p*, otherwise *q*' contexts. Crucially, we have considered evidence that *q* — *bambai*'s prejacent — is **modally subordinate** to

[57] These judgments have only been tested on a single speaker and bear confirmation of a negative judgment/further investigation. Of course the felicity of (57b) would also be predicted to be independently degraded without establishing negative speaker attitude vis-à-vis the prejacent.

material in the foregoing discourse. As shown in Roberts (1989: § 2.2), this operation involves a process which she calls "accommodation (of the missing antecedent)", that is, given a non factual assertion (*i.e.*, $[_{S_2}$ MOD$_2$ . . . Y . . .]), an antecedent (X) that determines the modal domain must be found among accessible discourse referents (*i.e.*, $[_{S_1}$ OP$_1$ . . . X . . .]).

In this chapter, I defend an analysis that treats all APPREHENSIONAL uses of *bambai* invariably as a modal operator that takes a single, nonfactual propositional argument ($q$).[58] When (as in *precautioning* contexts) *bambai* $q$ immediately follows a (conjunct) sentence $p$, it accommodates the negation of the basic proposition associated with that sentence (that is, the prejacent of an imperative or modal operator/the content of $p$, stripped of any mood/modal information.)

The next subsection (§ 3.1.2) contains a discussion of the pragmatic mechanisms by which an antecedent is selected.

### 3.1.2 Information structure

In the previous subsection, we saw how (when it is interpreted as nonfactual), $p$ — the prejacent to *bambai* — is obligatorily modally subordinate to some antecedent proposition. Again following the proposal of Phillips & Kotek (ms), and modulo the constraints in precautioning uses described above, "accommodation of the missing antecedent" operates on a pragmatic basis with reference to prior discourse and the content of the prejacent.[59,60]

By deploying information-structural notions developed in Carlson (1983) and Roberts (1996/2012), we can conceptualize of *otherwise* as representing a DISCOURSE MOVE ($m_n$ : in effect, a temporally-ordered stage in a given discourse), which adds to the QUESTION UNDER DISCUSSION (QUD) in a given discourse context $\mathcal{D}$.

(59) **An information structure for $\mathcal{D}$ (INFOSTR$_\mathcal{D}$) includes**:

a. The **common ground** is a set of mutually assumed background information. The $cg$ is often modeled as a set of propositions, *i.e.*, a set of sets of possible worlds (*e.g.*, Stalnaker

[58] Additionally, a proposal for unifying *bambai*'s range of apprehensional uses with its subsequential use is detailed in Ch. 4.

[59] This claim bears some similarity to the notion of an "anaphorically-derived contextual parameter" that features in the analysis of Webber et al. (2001: 14).

[60] Relatedly, Corblin (2002) notes the possibility of *negative accommodation* without *otherwise* in *I didn't buy the car. I wouldn't have known where to put it (otherwise)* and *I should have accepted. I wouldn't have been fired.* (author's translation: 256, 258).

1978 *a.o.*, also introduced in § 1.2.1).

b. A totally ordered set of discourse moves $m \in \mathbf{M}$, partitioned into questions (setup moves) and answers (payoff moves). A subset of **M** is **Acc**epted in $\mathcal{D}$.

c. The **QUD** is a partially structured set of questions which discourse participants are mutually committed to resolving at a given point in time. It is often modeled as a stack, consisting of ordered subsets of accepted question moves, the answers to which are not entailed by the $cg$ (*i.e.*, the QUD is a set of "open" questions at a given stage $m$ in $\mathcal{D}$)

An important consequence of the conceit of a *QUD stack* is that its structure and management are governed by *strategies of inquiry* (Roberts 1998, 2004, 2012). A (segment) of $\mathcal{D}$ is associated with a *discourse question* (DQ) (or "Big Question.") Subsequent discourse moves (including additional questions) are appropriate iff they are taken to "constitute a reasonable strategy of inquiry" for answering the DQ (Simons, Beaver, Roberts & Tonhauser 2017).

These concepts provide a way of representing the 'flow' of information and changes in the interlocutors' information states over time. Again beginning with *bambai*'s *precautioning* uses, take an utterance $p$ *bambai* $q$ to consist of (at least) three discourse moves. A discourse anaphor, *bambai* represents a "setup" move with the effect of adding to the QUD.

(60) **Proposal: the pragmatics of *bambai***
*bambai* represents a discourse "setup" move with the effect of adding to the QUD stack a question about the COMPLEMENT of a set of worlds calculated on the basis of the discourse in which a *bambai* sentence is uttered .

The role of this information-structural aspect to the interpretation of *bambai* is shown in (61). Crucially, this treatment takes the role of *bambai* to be the "introduction of a question" into the discourse (61-$m_j$): an approach that converges with observations of formal and conceptual links between conditionals, interrogatives and "topichood." That is: an utterance ***q if p*** links the assertion of $[\![q]\!]$ to the raising of a question $[\![?p]\!]$' (Starr 2010: 36). This fact is especially clear when considering "advertising conditionals": *e.g.*, *Single? You haven't visited Match.com*, where an affirmative answer to the question is "supposed", much as a conditional antecedent would be (Starr 2014: 4).[61]

[61]For discussion of these links, see especially Starr (2010, 2011, 2014), containing a proposal for a unified (dynamic/inquistive) semantics for conditional and interrogative-embedding uses of *if*. Relatedly, the "conditional question under discussion (cQUD)" in Ippolito 2013, following insights from Isaacs & Rawlins' 2008 dynamic treatment of conditional questions. These accounts similarly take a conditional antecedent/*if*-clause to induce a temporary restriction

The information-structural analysis of ***p bambai q*** in (61) provides a heuristic to capture some of these insights on functional similarities between conditionals and questions.

(61) **InformationStructure$_{\mathcal{D}}$ and precautioning *bambai***
[*airra dringgi kofi*]$_{m_i}$, **bambai**$_{m_j}$ [*mi silip!*]$_{m_k}$

***m***$_i$ This is the pronounced antecedent. It represents a modalized assertion: the addressee has a coffee in all worlds in some unspecified conversational background (here, potentially some teleological ordering source containing the subject's work goals / expected office behaviour at the Ngukurr Language Centre — *e.g.*, $\underset{tel(w)}{\textsc{best}}\big(\cap_{\textsc{circ}} m(w)\big)$

$$\forall w' \big[w' \in \underset{tel(w)}{\textsc{best}}\big(\cap_{\textsc{circ}} m(w)\big) \rightarrow \textsc{have.coffee}(w')\big]$$

***m***$_j$ Per (60) and the discussion that follows, *bambai* can be understood to encode an instruction to consider the COMPLEMENT of some set of worlds ***p*** that has been made contextually discourse-salient. This set-up move can be thought of as signalling the addition of a question to the QUD stack of the form:[62]

what could (unfortunately) happen next in $w \in \overline{\boldsymbol{p}}$?

In this case, a plausible candidate is: what if we are in a world s.t. the speaker doesn't have a coffee in that world?

***m***$_k$ The second clause – *bambai*'s **prejacent** – is necessarily interpreted as proffering a (partial) answer to the CQ (current QUD, a reflex of the maxim of RELEVANCE.)[63] Here, the speaker predicts that he may pass out as his desk in $\overline{p}$: the set of worlds made available to *bambai*. In this case, $\overline{p}$ is the complement of the set of worlds in which he has a cup of coffee.

$$\exists w'' \big[w'' \in \underset{s' typ(w)}{\textsc{best}}\big(\cap_{\textsc{circ}} \{m(w) \cup \overline{\textsc{drink.coffee}(w'')}\}\big) \wedge \textsc{sleep}(w'')\big]$$

---

over the common ground—"the answer to the question is an answer to the modally subordinated question" (Ippolito 2013: 200). These observations are picked up again in § 3.2

[62] As in the previous chapter, I use the overline notation to denote a function that maps a set of worlds to its complement.

[63] For Craige Roberts, the notion of *Relevance* — a derivative of the Gricean maxim — she defines it as follows (boldface added):

> A [discourse] move ***m*** **is RELEVANT to the question under discussion *q*** (*i.e.*, to the last QUD($m$)), *iff* $m$ either **introduces a partial answer to *q* (*m* is an assertion)** or is part of a strategy to answer $q$ ($m$ is a question). (Roberts 2004: 216)

### 3.1.3 Apprehensive domain restriction

So far, this section has focussed on theorising the relationship between the two clauses in *precautioning* uses of *bambai* — utterances of the form $p$ *bambai* $q$ are interpreted as $p \wedge \blacklozenge q$. § 3.1.1 showed that the assertion of $\blacklozenge q$ (in utterances of the form is interpreted relative to (*sc.* modally subordinate) to some antecedent derived from $p$. § 3.1.2 has shown how appeal to information-structural notions (*viz.* the QUD) is helpful in understanding how this antecedent is accommodated. Here, the accommodation analysis is extended to other apprehensional uses described in Chapter 2 (*e.g.*, Figure 6), again by appealing to pragmatic notions.

In describing her notion of relevance – introduced in (61-$m_k$) & fn 63 above – Roberts additionally notes that, just as assertion moves are felicitous iff they constitute a (partial) "answer" to the QUD: "a question can only be accepted **if it furthers answering those [questions] to which the interlocutors are already committed**" (2012: 21, emphasis added). The *apprehensive* uses of *bambai*, are distinguished insofar as there need not be an explicit, pronounced $p$ to constrain the option space for an antecedent to $\blacklozenge q$.[64] Consider again, for example, (37) from § 2.3.2.2, repeated here as (62).

(62) **Context**: Two relatives **(A, B)** are planning a hunting trip; a younger relative (say, **C**) wants to join.

**A.** *im rait, yu digi im then gajin.*
3S okay 2S take 3S then KINSHIP
'It's fine, bring him along poison-cousin'

**B.** ***Bambai*** *yunmi gaan faindi bip*
***bambai*** 1D.INCL NEG.IRR find meat
'But then we may not be able to find meat'

**A.** *Yunmi garra digi im*
1D.INCL IRR take 3S
'We'll take him'

**B.** ***bambai*** *im gaan gibi la yunmi.*
***bambai*** 3S NEG.IRR give LOC 1S.INCL
'But then [the country] may not provide for us.' [DW 20170712]

[64] The Robertsian model permits for "[q]uestions [to be] raised explicitly, with interrogatives; implicitly, by question-introducing assertions; or by real world goals" (Simons et al. 2017: 200).

In each of B's utterances in (62), there is no "pronounced antecedent." In view of our account of *bambai* as adding to the QUD stack and the (relevance) constraints on felicitous question moves (*i.e.*, any additional questions must form part of a strategy of inquiry for a given *discourse question*), accommodation is guided by pragmatic principles in concert with salient extralingusitic context.

(63) **Context**. The speaker is looking at a high-end stereo in an electronics store.
*My neighbors **would** kill me* (Stone 1997: 5-6)

While likely uninterpretable in an "out of the blue"-type context, note that the modal proposition in (63) is felicitous on a reading where the speaker's neighbours would be furious in the event that the speaker bought an expensive stereo and played it sufficiently loudly (compare fn 64).

Similarly, the uses of *bambai* are interpretable in (62) in view of pragmatic calculations on the basis of the development of each speakers' information state through this dispute ($\mathcal{D}_{(62)}$). In this context, the DQ is ⟨ Should C accompany A *&* B on their hunting trip? ⟩. Additionally, the perspective of each speaker has been established — *i.e.*, A favours a situation where their younger relative accompanies them on the hunt, B disfavours this eventuality and both are arguing in favour of these domain goals (compare Roberts 2004: 215). As a consequence of this, both of B's utterances are likely to be interpreted as justifications for his perspective: that is, in both instances *bambai q* is modally subordinate to a sentence similar in content to: 'we shouldn't permit C to accompany us.' This is spelled out in (64).

(64) **InformationStructure$_{\mathcal{D}_{(62)}}$ and apprehensive *bambai***
**bambai**$_{m_j}$ [*im gaan gibi la yunmi!*]$_{m_k}$

$\boldsymbol{m_j}$ *bambai* signals the addition of a question: *what could (unfortunately) happen next in* $w \in \overline{p}$*?* to the QUD stack. Per Roberts' felicity condition on questions, admissible questions have to contribute to a "strategy" to answering the questions to which the speakers are already committed" — viz. *Should* C *come hunting?*
That B is opposed to this idea (*sc.* the proposition *B believes that C should not come hunting*) is in the common ground.

$\boldsymbol{m_k}$ The prejacent is interpreted as a response to the current QUD (CQ). Here the speaker predicts that a unsuccessful hunting trip ('the country may not provide') in $\overline{p}$. In this case $\overline{p}$ is the complement of the set of worlds in which C does not join the hunting expedition.

$$\exists w''\Big[w'' \in \underset{s'typ(w)}{\text{BEST}}\Big(\cap\{m(w) \underset{\text{CIRC}}{\cup} \overline{\neg\textbf{C}.\text{COMES.HUNTING}}(w'')\}\Big) \wedge \text{HUNTING.FAILURE}(w'')\Big]$$

Ultimately, this section has sought to demonstrate that an appeal to modal subordination (particularly the accommodation of an antecedent) and information structural notions (the relevance of the QUD) allows for a unified account of the pragmatics of apprehensional uses of *bambai* – that is, in all cases, *bambai q* represents a modal claim — $\blacklozenge q$ — against a predictive conversational background restricted by (the negation of) some salient proposition accommodated from the (explicit or implicit) discourse context.

The following section provides a diachronic perspective on the relationship between $p$ and $q$ in view of better understanding the relationship between these apprehensional uses and the subsequential (temporal frame) meaning from which they are understood to have arisen.

## 3.2 Apprehensional readings emerge in subsequential TFAs

> Of course borderline cases can arise because language changes. Something that was not originally employed as a means of expressing a thought may eventually come to do this because it has constantly been used in cases of the same kind. A thought which to begin with was only suggested by an expression may come to be explicitly asserted by it.
>
> (Frege 1897/1979, cited in Horn 2013: 241)

Here I consider a number of linguistic factors that appear to have contributed to the emergence of apprehensional readings of TFAs. As shown in § 2.2.3, this meaning change pathway (and the apparent synchronic polysemy between temporal and apprehensional uses) has been observed by a handful of other authors (Angelo & Schultze-Berndt 2016, 2018; Boogaart 2020) on the basis of data including analyses of German *nachher* and Dutch *straks*, in addition to Kriol *bambai* (see also Kuteva et al. 2019b: 427-8). Parallels between *bambai* and *straks* are shown in (65) below for example, where the contrast between a subsequential (a) and apprehensional (b) reading is apparent.

(65) **Subsequential and apprehensive readings of the *straksconstructie* in Dutch**

a. **Context**. It's 3.30, the shop closes at 4. I tell my friend:

*de winkel is straks gesloten*
the shop is *straks* closed

'The shop will be closed soon.'

b. **Context**. It's 4.10, the shop closes at either 4 or midnight, I'm unsure which. I say to my friend:

*straks is de winkel gesloten!*
*straks* is the shop closed

'The shop may (already) be closed!' [Mireille L'Amie, *p.c.* 20200130]

### 3.2.1 Temporal sequence & conditional modality

Many authors (*e.g.*, Blühdorn 2008; Culicover & Jackendoff 1997; Harder 1995; Klinedinst & Rothschild 2012; Schmerling 1975; Stukker & Sanders 2012 a.o.) have investigated the semantic dependencies that often obtain between clauses that are *syntactically coordinate.* These include the "conditional readings" of *and* and *or*, in addition to asyndetic constructions of the type: *Matt comes, I leave.* In these cases, although there is no explicit conditional morphology, it is R-implicated that the second sentence should be interpreted as modally subordinated to the first: that is, my departure is a consequence of John's arrival. As mentioned above in fn 60, Corblin (2002: 256-258) additionally notes the possibility of *negative accommodation* in coordinate sentences:

(66) **Negative accommodation of a modal antecedent**

a. *Je n'ai pas achetée la voiture. Je ne* ***saurais*** *pas où la mettre.*
I have NEG bought the car I NEG **know**.COND NEG where it put
'I didn't buy the car. I wouldn't have known where to put it.'

b. *J'aurais dû accepté. On ne m'****aurait*** *pas viré.*
I.have.COND ought accepted one NEG me.**have**.COND NEG fired
'I should have accepted. I wouldn't have been fired.'

Crucially, the second sentence in each of (66a-b) contains a modal operator (realised as a conditional inflection, $\text{COND}_2$). The (nonfactual) **negation** of a proposition contained in the previous clause is accommodated as the restrictor for $\text{COND}_2$.[65]

In § 3.1.2, we considered the formal and conceptual links between conditional and interrogative clauses. It was claimed that a functional motivation for these appears to be that conditional

[65]Note that while the first sentence is not under the scope of a modal operator, its **negation**—which is accommodated to restrict the domain of *saurais*—is interpreted as nonfactual making available a modal subordination reading.

apodoses (consequent clauses) can be understood as answering a "question" posed by the antecedent/protasis. The illocutionary effect of both interrogatives and conditionals is often taken to be the "supposition" of a proposition: that is, adding a proposition to the common ground (or partitioning contextual possibilities, see Starr 2010). These conceptual parallels have clear linguistic reflexes, shown clearly for Danish, *e.g.* by Harder (1995: 100-2), replicated in (67) below.

(67) **Conditionals as "telescoped" discourse** (Harder 1995)

a. A two-participant discourse (101)

A. *Kommer du i aften?*
Are you coming tonight?

B. *ja*
Yes

A. *Så laver jeg en lækker middag*
Then I'll cook a nice dinner.

b. *Kommer du i aften, (så) laver jeg en lækker middag*
'If you're coming tonight, (then) I'll cook a nice dinner.' (101)

Harder (1995: 101) suggests that "the conditional can be seen as a way of *telescoping a discourse sequence into one utterance* so that B has to respond not only on the basis of the present situation, but also on the basis of a possible future."

In view of the data presented in (66-67), consider the discourses in (68-70) below.

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

A. *gita la jeya!* [compare (32a)]
get off LOC there!

B. *ba wani?*
why?

A. *bambai yu breigim motika*
***bambai*** 2S break car
'Get off of there [...why?...] You're **about to** break the car!' [GT 16032017]

(69) **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?...] You're **about to** be swept away!' [GT 16032017]

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

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

B. *ba wani?*
why?

A. ***bambai*** *imina baitim mi!*
***bambai*** 3S.IRR:PST bite.TR 1S
'The snake scared me [...why?...] It might've been **about to** bite me!' [GT 01052017]

In each of the short discourses above, the translation provided elucidates: **(a)** that each of these dialogues can be "telescoped" onto a single utterance, and that **(b)** the capacity of the temporal properties of *bambai qua* sequential TFA to implicate additional nontemporal properties of the relation between the clauses it links — that is, the *bambai* clause is modally subordinate to the content of A's first utterance. In each of the examples, A's response identifies an eventuality that might obtain in the near future (of the speech-time for (68-69) and of the slithering/frightening-time for (70).

Further, in all three cases, this *bambai* clause is obligatorily interpreted as nonfactual. In the first two cases it describes an eventuality that is posterior to a possible future event (the one described by the previous imperative and one that is therefore only felicitous if it is presumed unsettled.) In (70), the *bambai* clause has explicit irrealis marking, indicating its coounterfactual status: it expresses that A's psychological state at the event time was such that biting was an unsettled, possible future.

Via pragmatic strengthening *(viz.* an inference of the form *post hoc ergo propter hoc)*, *bambai* can be understood to assert that there exists some type of logical (*e.g.*, etiological) relation between the predicate contained in the first proposition and the eventuality described in *bambai*'s prejacent: the second clause. In (68), for example, the child's failure to comply with A's (precautioning) instruction could contribute causally to the car's breaking. Inferencing-based theories of meaning change will hold that, while there is no lexical item that encodes causality, in many contexts,

reasoning about informativity and relevance "invite" the *propter hoc* inference (*e.g.*, Geis & Zwicky 1971: 564).

This type of implicature is well-documented in cross-linguistic studies of meaning change (see also Kuteva et al. 2019b: 403); the extension of English *since* (*sippan*) from encoding subsequentiality (they report ostensibly similar shifts in numerous other language) to causality (particularly when talking about past events) is discussed by Traugott & Heine (1991):

(71) a. I have done quite a bit of writing **since** we last met (temporal)

b. **Since** Susan left him, John has been very miserable (temporal, causal)

c. **Since** you are not coming with me, I will have to go alone (causal)

d. **Since** you are so angry, there is no point in talking with you (causal)

Traugott & König go on to say

> With *since*, when both clauses refer to events, especially events in the past, the reading is typically temporal, as in [71a] When one clause refers to a non- past event or to a state, the reading is typically causal, as in [71c] and [71d], but the causal reading is not required, as [71b] indicates. The contrastive readings in [71b] signal polysemy, i.e. **conventionalized meanings, not just conversational**. (Traugott & Heine 1991: 195, emphasis added)

It appears, then, that precautioning type uses of *bambai* arise from a related inference, namely the conventionalisation of an inference that emerges on the basis of reasoning about relevance: "if A is alerting me that a possible event $e_1$ may be followed by another possible event $e_2$, it's likely that they're drawing a causal connection between these two possible events" ($e_1$ causes $e_2$). § 3.3 below further investigates this process in view of the expressive/speaker attitude component of *bambai*'s conventional meaning.

### 3.2.2 *Conventionalized…not just conversational*

*Subjectification* — associated especially with related concepts from the work of Elizabeth Traugott (1989; Traugott & Dasher 2002) and Ronald Langacker (*e.g.*, 1989) — refers to an observed meaning change tendency whereby linguistic expressions diachronically come to encode increasingly "subjective" meanings — those concerning the private beliefs and attitudes of the speaker in a given context. Subjectivity as a relevant linguistic notion has been construed in a number of ways (72).

(72) **The loci of SUBJECTIVITY in according to Finegan (1995: 4)** are
A LOCUTIONARY AGENT'S:

1. PERSPECTIVE as shaping linguistic expression;
2. expression of AFFECT towards the propositions contained in utterances;
3. expression of the MODALITY or epistemic status of the propositions contained in utterances.

To my knowledge, at the time of writing, no work has explicitly interrogated the role of (inter)subjectification as a force in meaning change from a formal perspective (Eckardt acknowledges this in her 2006 monograph (239).)[66] As a driver of meaning change, *subjectification* has been evoked especially in view of explaining the development of modal readings of verbal and adverbial elements, where these expressions come to encode the epistemic status of a speaker vis-à-vis a given proposition (Finegan 1995; Traugott 1989, 1995, 2003, 2006).Apparent connections between "non-challengeability"/NOT-AT-ISSUEness and *subjectivity*, however, are implicit in recent formal work, particularly as this relates to the EVIDENTIAL and EXPRESSIVE domains (*e.g.*, Faller 2002; Korotkova 2016, 2020; Murray 2014 a.o.)[67]

The meaning change pathway that *bambai* has traced — *i.e.*, the trajectory from temporal frame adverbial to (multifunctional) apprehensional modal — clearly can be characterised as conforming with generalisations about subjectification in meaning change in each of the criteria in (72).

In chapter 4, a unified lexical entry for *bambai*'s temporal and apprehensional uses is proposed. This proposal relies on the "emergence" of modal readings in **nonfactual contexts** as a function of reasoning about discourse context, a reflex of what I've called the "omniscience restriction" (a component of the asymmetry of past and future/the "problem" of future contingents: outlined in § 1.2.1.) This condition is described in (73) and resembles the epistemic constraints identified in Kaufmann (2002), to be further discussed in Ch. 4.

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[66] Jucker (2012) (cited in Traugott 2012: 562) expresses skepticism that a "cognitive-inferential conceptualization" (what he refers to as the "Anglo-American" approach, apparently including (neo)-Gricean theories) is capable of accounting for these types of phenomena, which apparently invite a "performance-based"/"socio-interactional" pragmatics (which he associates with European research programs.) It is not clear that this is a thoroughly fair assessment (see *e.g.*, discussions of the social motivations for **R**-based implicata in Horn 1984, 1993, 2007; Horn & Bayer 1984 a.o.) Eckardt (2006: 43) does also suggest a role for semanticisation of implicatures in apparently subjectivisation-driven changes.

[67] Korotkova (ms) explicitly suggests links between "nonchallangeability" and subjectivity on the basis of linguistic reflexes of 'first-person authority' (that is the "immunity" of ascriptions of self-knowledge to correction.)

(73) **The omniscience restriction**
Predications of subsequentiality (near-future instantiation, see ch. 4) are interpreted as carrying predictive illocutionary force (*i.e.*, modalised or "epistemically downtoned") when they are presumed unsettled.

In view of this general pragmatic principle, when a *bambai* clause is interpreted as making an unsettled claim — that is, some future-oriented claim that the discourse participants know that the speaker cannot possibly know the truth of — a modal (predicted possibility) interpretation is invited. This implicature can be understood as resulting from reasoning on the part of language users: discourse participants mutually understand that the *bambai* predication is unsettled and therefore must represent a prediction.[68]

More specifically, given the apparently frequent use of *bambai* $q_{nonreal}$ in directive contexts and under fear predicates, encoding an "apprehension-causing situation" (Lichtenberk 1995: 298) and the justification for an utterandce of $p$ *bambai* has come to be associated with *admonitory* predictions. Similarly, Angelo & Schultze-Berndt (2016: 285) propose that:

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

The status and emergence of this "undesirability implicature" is further investigated directly below, in § 3.3.

In this section, I have proposed that the apparent subjectification of *bambai* is unifiable with observations about the diachronic conventionalisation of conversational implicature (*e.g.*, Cole 1975: 273*ff* and especially Traugott's invited inferencing theory of semantic change (1980 *et seq.*)) The frequent occurrence of *bambai* in admonitory contexts and consequent generalisation and conventionalisation of these **R**-implicatures[69] is the source of *bambai*'s apparent (epiphenomenal) subjectification trajectory and present day "lexically denoted information."

[68] A related account might appeal to Eckardt's Avoid Pragmatic Overload principle (2009), where, faced with an utterance that carries an unaccommodable presupposition (*pragmatic overload*), a (charitable) hearer/reader surmises that the speaker has "used words or phrases in a sense that were formerly unknown to the hearer" (22) and "hypothesize[s] a new meaning…for the item that gave rise to the problematic presupposition" (35). In the present case, *bambai* $q$ asserts $q$ in the future of some presupposed reference index (see ch. 4). Given the infelicity of making non-modal assertions about nonactual events, the domain accessible to *bambai*, pragmatic overload is "avoided" by expanding the modal domain of *bambai*.

[69] That is, implicatures following from conversational principles of relevance and avoidance of "overinformativeness" (Horn 1984 *et seq.*)

## 3.3 *Bambai* and apprehensional expressive content

Of course, a crucial, characterising meaning component for apprehensionals is that they express information about the Speaker's attitude vis-à-vis their prejacent. This contrast is demonstrated by the minimal pair in (74), where the utterance in (b) is not "expressively correct" (*cf.* Kaplan 1999) because the conditions on speaker attitude are not satisfied — that is, *bambai* is felicitous in negative-purposive (apprehensional) contexts, not positive purposive ones.

(74) **Apprehensional use conditions for *bambai***

a. *mi* ***nomo*** *wandi gu la mataranka* ***bambai*** *mi luk la main banjimob.*
1S NEG want go LOC Mataranka **bambai** 1S look LOC my cousin.ASSOC
'I **don't** want to go to Mataranka, **(because) then** I might see my cousins.'

b. ?? *mi wandi gu la mataranka* ***bambai*** *mi luk la main banjimob.*
1S want go LOC mataranka **bambai** 1S look LOC my cousin.ASSOC
**Intended**: 'I want to go to Mataranka so/then I'll see my cousins.' [AJ 072017]

As suggested above (see also Angelo & Schultze-Berndt 2016), the apprehensional reading frequently occurs embedded under a predicate of fearing or in conjunction with a directive (prohibitive) antecedent: corresponding to Lichtenberk's FEAR and *precautioning* uses respectively (shown in exx. 68-70 above).

Relatedly, Boogaart (2020: 192*ff*) suggests (of Dutch) that it is the "sense of immediacy" of this class of adverbials that associates with notions of "urgency" and that this is the source of the "expressive nature" of subsequential TFAs. Consequently, we might hypothesise that the frequent association of sequential TFAs with these discourse contexts (situations of urgent warning) has resulted in the **conventionalisation** of apprehensional use-conditions for *bambai q*.

In contemporary Kriol, then, the selection of an erstwhile subsequential TFA when making some unsettled predication (instead of a different epistemic adverbial) conventionally implicates that the Speaker is negatively disposed to the event described in the prejacent.

### 3.3.1 The status of apprehensional "attitude conditions"

Marshalling cross-linguistic evidence of this path of change for German and Dutch respectively, an utterance *nicht jetzt, nachher!*/*niet nu, straks!* 'not now, later' is reported to involve a higher degree

of intentionality and immediacy than the less specialised *nicht jetzt, später!*/*niet nu, later!* 'not now, later.'[70] What's more, tracking the facts for *bambai* presented above, these TFAs appear to have encroached into the semantic domain of epistemic/modal adverbials, where they are reported to encode negative speaker affect with respect to their prejacents (relative to the other members of these semantic domains.)[71]

As with *straks* (*e.g.*, 65), *nachher* appears to have a similar distribution to *bambai*,[72] shown by its felicity in the discourse in (75) where it represents an alternative to *vielleicht* 'perhaps.' In these contexts, *nachher* asserts negative speaker attitude with respect to its prejacent.[73]

(75) **German apprehensional *nachher* and the not-at-issueness of speaker attitude**

[H. Weckler, *pers. comm.*]

**Context**. A two-participant discourse in German

| | |
|---|---|
| **A** | *ich hoffe, dass es heute nicht regnet* |
| | I hope COMP it today NEG rain |
| **B** | *warum?* |
| | why? |
| **A**$_2$ | *nachher wird die Party noch abgesagt!* |
| | ***nachher*** INCH the party *noch* cancelled |
| | 'I hope it doesn't rain today [...why?...] Then the party might be cancelled!' |
| **B**$_2$ | *nein, das ist nicht möglich* |
| | no, that is not possible |
| **B**$'_2$ | # *nein, das wäre gut!* |
| | no, that would.be good |

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

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

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

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

[72] Although see Angelo & Schultze-Berndt (2018: 30) for a discussion of distributional differences between these two items.

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

| | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|
| $\textsc{b}''_2$ | *ja,* | *das* | *ist* | *möglich* | *aber* | *das* | *wäre* | *nicht* | *so* | *schlimm!* |
| | yes, | that | is | possible | but | that | would.be | NEG | so | bad! |

Similarly to the Kriol data, German *nachher*, a TFA encoding imminence or "subsequentiality", has developed the characteristics of an apprehensional epistemic, a likely consequence of frequent embedding in the discourse contexts discussed above (§ 3.2). Crucially, the contrast between the possible responses (in particular the infelicity of $75\textsc{b}'_2$) illustrates that, while the use of *nachher* in $\textsc{a}_2$ does commit the speaker to the proposition 'I am negatively disposed to the possibility of rain today', this commitment has the status of a conventional implicatum (not-at-issue).[74]

Following insights from the the literature on expressive content and use-conditional semantics (*e.g.*, Gutzmann 2015; Kaplan 1999; McCready 2010; Potts 2007, ostensibly developing Karttunen & Peters's 1979 proposed extension to PTQ), it is fruitful to model the 'negative speaker attitude' component of the meaning of apprehensionals as a conventional implicature, inhabiting a second semantic "dimension"—connected to but distinct from the truth conditional contribution (see ch. 4). The infelicity of $(75\textsc{b}'_2)$'s utterance shows that negation cannot target this component of Speaker meaning: an argument for the treatment of this component of its semantics as non-truth-conditional/not-at-issue component. These proposals (variants of a "logic of conventional implicature" $\mathcal{L}_{CI}$) develop a formalism that conceives of the semantic information contained in a given linguistic expression as a pair of truth- and use-conditional content.

Gutzmann (2015) proposes a compositional "hybrid semantics" that is capable of handling these "two dimensions" of meaning — *viz.* distinct truth- and use-conditional content. On this type of account, the semantics of a lexical item like *bambai* might be modelled as a "mixed use-conditional item" — a lexical item whose meaning can be represented as a pair of metalinguistic formulæ. The previous section discussed the truth-conditional contribution of *bambai*, providing the lexical entry in (88) above. Following the proposal in Kaplan (1999) where a "use-conditonal proposition" is understood to denote a set of contexts, Gutzmann (2015), appeals to a model with parallel types, interpretation functions (*i.e.*, $[\![\bullet]\!]^t$ and $[\![\bullet]\!]^u$) and composition rules for both truth- and use-conditions that allow for the interaction of these condition types while distinguishing these two "dimensions"

[74] *I.e.*, "there is no simple way to indicate just the rejection of something that is conventionally implicated (Karttunen & Peters 1979: 14).

of meaning.[75]

Borrowing the informal "fraction notation" deployed by some of these authors, we can tease apart the implicated and asserted meaning components of the *bambai* clause in (70) – this is given in (76).

(76) a. ***Bambai*** *imina* *baitim* *mi!*
***bambai*** 3s.PST:IRR bite 1s
'…It might've bitten me!' [GT 01052017]

b. $\frac{\text{S is worried about/negatively disposed to snake bites}}{\text{S might have been about to be bitten by a snake}}$

If this mode of thinking about the speaker attitude implications of *bambai* $q$ is on the right track, then, in addition to asserting $\Diamond q$, a speaker's utterance of *bambai* $q$ at $t$ in $w$ can be thought of as creating an updated context in which 'it registers that [they regard $q$] negatively somehow' (Potts 2007: 175). The use-conditional contribution of *bambai* can then be informally stated as (77).[76]

(77) **A use-condition for *bambai***
$[\![\textit{bambai}\ q]\!]^u = \{c : c_s \text{ is negatively disposed to } q \text{ in } c_W\}$
*bambai* $q$ is expressively correct in a context where the speaker $c_s$ is negatively disposed to $q$ in $w*$

In this sense, *bambai* $p$ can be taken to conventionally implicate a proposition of the form given in (77).

I propose a formal analysis of both of these components of *bambai*'s semantics (*sc.* the asserted and the conventionally implicated content) in the following section.

### 3.3.2 Competition in the modal-adverb domain

A predicted consequence of this meaning change — that is the "encroachment" of *bambai* into the modal adverbial domain — is that *bambai* enters into competition with other modal adverbs.

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[75] This system closely resembles the proposal of Karttunen & Peters (1979), which these authors attribute (their fn 17) to the "two-dimensional logic" apparently discovered by Herzberger (1973).

[76] This use condition is comparable to the condition proposed by AnderBois & Dąbkowski (2020): $\forall w' \in \textsc{goal}_{i,p}(w) : \neg q(w')$ (I.e. that some proposition $p$ is performed/caused by $i$ in order to achieve the speaker's goals (in which $\neg q$ holds))

One arena in which this is made particuarly clear is in *bambai*'s *apprehensive function* (§ 2.3.2.2) — that is, where it realises a possibility modal whose domain can be restricted by the presence of an *if*-clause. In these contexts *bambai* has entered into the semantic domain of other Kriol lexical items including *marri/maitbi* 'maybe'. The examples in (78-79) below show the perseverance of apprehensional expressive content in these syntactic frames. In (78a), consultants reported that apprehensive *bambai* gives rise to an implication that the speaker may not go on holiday, where the minimally different (b) fails to give rise to this implication.

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

a. *if ai gu la holiday, **bambai** main dog dai*
if 1s go LOC holiday ***bambai*** 1s dog die
'If I go on holiday, my dog may die' ⇝ I'm likely to cancel my holiday

b. *if ai gu la holiday, **marri** main dog (garra) dai*
if 1s go LOC holiday **perhaps** 1s dog (IRR) die
'If I go on holiday, my dog may die' ⇝̸ I'm likely to cancel my holiday
SPEAKER COMMENT. *Tharran jeya im min yu garra gu la holiday*
'That one means you'll go on your holiday.' [AJ 04082017]

Here, the contrast between (a) and (b) is attributable to the expressive content of *bambai*. That *bambai* licenses an implicature that the Speaker is considering cancelling her holiday to tend to her sick pet, an inference that isn't invited by neutral epistemic counterpart *marri* provides strong evidence of the semanticisation of *bambai*'s expressive content (similar to 'sincerity'- or 'use-conditions' for a given lexical item.) The extent of this process is further evinced in (79) below, where the selection of *marri* instead of *bambai* gives rise to a conventional implicature that the Speaker's utterance of (79) ought not be interpreted as the expression of a desire to prevent her daughter's participation in the football game.

(79) **Context**. I am cognizant of the possibility that my daughter injures herself playing football.
#**Context**. I am uncomfortable with the likelihood of my daughter injuring herself playing football.

*if im pleiplei fudi, marri main doda breigi im leig*
if 3s play footy *perhaps* my daughter break her leg
'If she plays footy my daughter may break her leg' ⇝ [so she shouldn't play]
[AJ 04082017]

Based on this evidence, we may conclude that the ostensible encroachment of *bambai* into the domain of modal/epistemic adverbials has given rise to a dyad (*i.e.*, "Horn scale", Horn 1984) with the form $\langle$*marri p, bambai p*$\rangle$ — selection of the "weaker" expression *marri p* ***Q***-implicates that the Speaker was not in a position to utter its stronger (more specific) scalemate, *bambai p*. That is, the meaning of the 'weaker' expression comes to represent the relative complement of the stronger in a given semantic domain. In this case, use of the neutral modal adverb *marri* comes to conversationally implicate **non-apprehensional** readings/modalities.

(80) **Competition in the modal adverbial domain**

$$[\![marri]\!] \approx \Diamond \setminus [\![bambai]\!]$$

Situations in which *marri* is felicitous are those in modal possibility claims in which *bambai* is inappropriate/expressively incorrect.

## 3.4 Summary

This chapter has considered a number of crucial issues relating to the interpretation of apprehensional *bambai*, particularly as it relates to the role of context in the synchronic interpretation and the diachronic reanalysis of this lexical item. In view of the emergence of *bambai*'s modal readings, § 3.1 developed an account of the interpretation of *bambai* clauses as involving modal subordination to some accommodated antecedent. Appealing to basic principles of communication (relevance and the implementation of this notion as the question under discussion), *bambai*'s prejacent is taken to encode a response (specifically a prediction) to a question about a salient eventuality.

In § 3.2, we saw how the development of apprehensional readings of *bambai* (both its modal and expressive content) appears to be a result of its (as with subsequential-TFAs in other languages) frequent occurrence in contexts of "preacautioning" and fearing. These contexts gave rise to inferences creating the conditions for the renalysis of *bambai* as conventionally encoding apprehensional meaning. The reanalysis of *bambai* as a modal adverb permits for the set of uses that correspond to its *APPREHENSIVE* function.

Further developing these observations, the final section — § 3.3 — considered data from other two other languages in which a subsequential TFA appears to have undergone similar functional change, developing apprehensional expressive content (*viz.* Dutch *straks* and German *nachher*). These data support an analysis of the distinctive negative attitude reading that is associated with apprehensionals as NOT-AT-ISSUE CONTENT. As with the diachronic emergence of modal readings of erstwhile TFAs, this expressive content/use condition is understood to have arisen as a result of the conventionalisation of an implicature arising under certain frequent (*sc.* future-oriented + admonitory) discourse contexts.

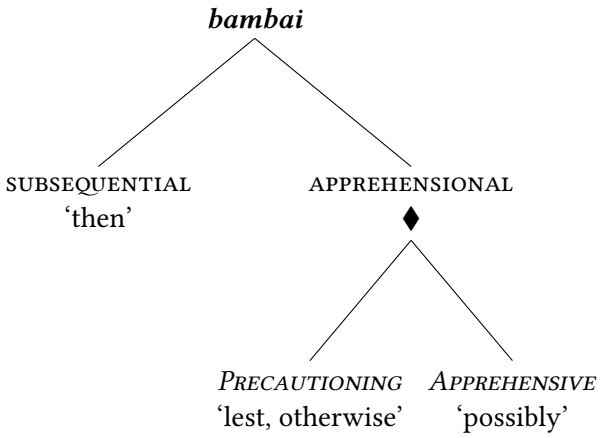
This chapter has shown that the interpretation of *bambai* is highly context-dependent. Where $q$ isn't presumed settled in a discourse context $\mathcal{D}$, an utterance of the form *bambai* $q$ asserts that $q$ could happen (in a $\mathcal{D}$-provided modal base and as a consequence of the non-obtention of some $\mathcal{D}$-salient eventuality) and conventionally implicates that $q$ would undesirable. Drawing on these observations, chapter 4 proposes a lexical entry for *bambai* which unifies its two distinct readings — *viz.* SUBSEQUENTIALITY and APPREHENSIONALITY.

# Chapter 4

# A semantics for *bambai*

This section seeks to provide a semantics for Kriol *bambai* that unifies the available SUBSEQUENTIAL and APPREHENENSIONAL readings discussed above and explains how a given reading is privileged in particular linguistic contexts. Figure 6 is repeated here for reference.

**Figure 7.** Possible readings of *bambai*




In order to settle on a unified semantics, we assume a version of a Kratzerian treatment of modal operators (*e.g.*, Kratzer (1977, 1981b) *et seq.*, an overview provided in § 1.2 above.) The primary insight of Kratzer's treatment is that modal expressions are lexically underspecified for modal "flavour"; different readings emerging as a consequence of a contextually-provided conversational background (see also Hacquard 2011: 1490*ff* for an overview.)

## 4.1 Subsequentiality

In § 2.3.1, we saw how Kriol has retained the temporal frame uses of *bambai* derived from archaism 'by-and-by.' For Dowty (1979, 1982), time adverbials are taken to denote predicates of times/sets of temporal intervals — that is, the set of all those intervals that intersect with the interval specified by the adverb (81).

(81) A lexical entry for the (indexical) TFA today (adapted from Dowty 1979: 328, cited in Ogihara 1996: 43)
$[\![today]\!]^c = \lambda P_{\langle \iota,t\rangle} \exists t_\iota [t \subseteq \text{today}' \wedge P(t)]$
*today* holds of some property of times $P \in \mathcal{D}_{\langle \iota,t\rangle}$ if there there is some time $t$ at which $P$ holds which is a subinterval of the day-of-utterance (today$'$ is an interval supplied by context — *viz.* the timespan of the day in which utterance time ($t*$) is located.)

A frame adverbial, then, takes a predicate and says that its instantiation is contained within a given temporal interval.[77] Following assumptions made by Kamp (1971: 238*ff*) and Johnson (1977: 115), Dowty (1982: 29*ff*) sees fit to appeal to a notion of truth which is relativised to an index containing two intervals of time. These roughly correspond to the notions of *reference time* and *speech time* familiar from Reichenbach (1947). I will use $t*$ and $t_r$ to refer to each of these.

As we saw, the function of (what I have referred to as) the SUBSEQUENTIALITY class of frame adverbials is to effect the constrained forward-displacement of the reference time of their prejacents with respect to some contextually-provided reference time. (82) represents a proposal to capture this relation.

(82) **SUBSEQUENTIAL INSTANTIATION**
$\text{SUBSEQ}(p, t_r, w) \underset{\text{def}}{=} \exists t' : t_r \prec t' \wedge P(t')(w) \wedge \mu(t_r, t') \leq s_c$
A subsequentiality relation SUBSEQ holds between a predicate $P$, reference time $t_r$ and reference world $w$ iff $P$ holds in $w$ at some time $t'$ that follows $t_r$.
Additionally, it constrains the temporal distance $\mu(t_r, t')$ between reference and event time to some value below a contextually-provided standard of 'soon-ness' $s_c$.

The relation between a contextually-provided standard and measure function $\mu(t_1, t_2)$ analysis builds in a truth-condition that captures variable intuitions about the falsity of subsequential

[77] The term "temporal frame adverbial" due to Bennett & Partee 2004, and equivalent to Kamp & Reyle's "locating adverbial" (1993: 613).

claims in context (83-84).[78]

(83) a. The birth of Cain succeeded Eve's pregnancy by some contextually inappropriate length of time (*e.g.,* ninety years.)
$\mathbb{F}$*Eve fell pregnant then shortly afterwards gave birth to a son*

b. **Context**. Dad went to the shop on Monday and returned to make lunch the following week.

$\mathbb{F}$ *main dedi bin go la det shop,* ***bambai*** *im=in gugum dina*
my father PST go LOC the shop ***bambai*** 3S=PST cook dinner
'My dad went to the shop, **then** he made lunch' [AJ 23022017]

That is, the category of "subsequential" TFAs makes explicit reference to a time provided by the discourse context (e.g., identified with the instantiation time of a previous clause.) The assertion of a relation between this reference time and the instantiation of the prejacent is a component of these items' semantics.

An additional advantage is that, in appealing to a pragmatically retrieved standard for subsequentials, we allow for faultless disagreement between interlocutors, in case speaker and addressee retrieve divergent standards of soonness from the discourse context (as in (84) below).[79]

(84) CONTEXT. Glurmo is leading the Planet Express Crew on a tour of the Slurm (a popular beverage) factory. Fry is thirsty and inquires about when he'll be able to get a drink.

**Fry**. When will that be?

**Glurmo**. Soon enough.

**Fry**. That's not soon enough. ('Fry and the Slurm Factory', *Futurama 1e13*)

In (84), Fry's utterance is compatible with a situation in which he and Glurmo agree on the event time (*e.g.*, $t_e$ = THAT EVENING AT 8PM, at which the party with Slurms McKenzie will begin). The source of their disagreement appears to be the value of the contextual standard $(s_c)$ that each of them retrieves, and whether the distance between utterance time and $t_e$ gets to count as 'soon'.

In its capacity as a TFA then, *bambai* can be thought of as realising a subsequential instantiation relation, as shown in (85) below.

[78]Given that $\mathcal{T}$ is isomorphic with $\mathbb{R}$, formally $\boldsymbol{\mu} : \mathcal{T}^2 \to \mathbb{R}$ represents a Lebesgue measure function that maps any interval $[t_1, t_2]$ to its length $t_2 - t_1$.

[79]The term *faultless disagreement* due to Kölbel (2004: 53-4), where the nature of the disagreement does not concern a matter of fact. That is, two participants A,B are in a situation where A believes (judges) $p$ and B believes $\neg p$ yet neither has made a mistake (is "at fault".)

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

## 4.2 'Settledness' & intensionalisation

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

In § 1.2 above, the notion of **settledness** was introduced, as deployed by Condoravdi (2002) (and Kaufmann 2005) using $\mathcal{W} \times \mathcal{T}$ frames, where it is cast as derived from the concept of *historical necessity* (Thomason 1970).

Settledness/historical necessity is normally expressed in terms of **historical alternatives**. This refers to the notion of equivalence classes ($\approx_t \subseteq \mathcal{W} \times \mathcal{W}$ of possible worlds: those worlds which have identical 'histories' up to and including a reference time $t$. The properties of the *historical alternative* relation are given in (86) and, on the basis of this, a formal definition of settledness is given as (87).

(86) **Historical alternatives** $\approx \subset \mathcal{T} \times \mathcal{W} \times \mathcal{W}$ (7 rpt'd)

a. $\forall t \in \mathcal{T}[\approx_t$ is an equivalence relation]
All world-pairs in $\approx_t$ (where $t$ is an arbitrary time) have identical pasts up to that time.
Their futures may diverge.
The relation is symmetric, transitive and reflexive (*i.e.*, an equivalence relation).

b. **monotonicity**
$\forall w, w', t, t'\left[(w \approx_t w' \wedge t' \prec t) \rightarrow w \simeq_{t'} w'\right]$
Two worlds that are historical alternatives at $t$ are historical alternatives at all preceding times $t'$.
That is, they can only differ with respect to their futures. (Thomason 1984: 146)

Formally then, the truth value of proposition $p$ is settled at $t$ iff it is uniformly true or false at all historical alternatives to $w$ at $t$. Also shown in § 1.2.1, Condoravdi and Kaufmann *i.a.* additionally

derive a related property, *viz.* PRESUMED SETTLEDNESS/DECIDEDNESS repeated here as (87). The presumption of settled is effectively understood to be a relation between a discourse context and a predicate (or proposition). Following standard pragmatic assumptions, the *common ground* (***cg***) represents the set of propositions taken to be mutually understood by participants in a discourse context (see 10a). The intersection of these propositions ($\cap cg$) — the *context set* — is modelled as the set of worlds that are compatible with the *cg* (those worlds in which all propositions in the common ground are true.)

(87) **Presumption of settledness for *P*.**
$\forall w' : w' \in \cap cg, \forall w'' : w' \approx_{t*} w'' :$
$\textsc{at}\big([t*, \_), w', P\big) \leftrightarrow \textsc{at}\big([t*, \_), w'', P\big)$ (Condoravdi 2002: 82)
A property *P* is presumed settled if it uniformly holds or does not hold in all historic alternatives to worlds compatible with the discourse participants' beliefs.

As indicated in § 3.2, in this dissertation I defend a claim that the modalised meaning component of apprehensional *bambai* arises as a consequence of a diachronically-conventionalised implicature where **a claim that SUBSEQ holds of a predicate** encodes a **prediction** when that predicate is interpreted as nonfactual (compare § 4.5.4). This explains the *"epistemic downtoning"* function which characterises apprehensionals on Lichtenberk's description (1995).

Specifically, given notions of RELEVANCE (*e.g.*, Horn's $\mathcal{R}$-principle "SAY NO MORE THAN YOU MUST" (1984: 13), an utterance of *bambai P* licenses the (speaker-based) implicature that the Speaker is basing a predication (specifically an premonitory one, *cf.* § 3.2) about some unsettled eventuality on its possible truth in view of (perceived compatibility with) a the set of facts that they know of the world. The locus of this implicature is that the Speaker can rely on her hearer's knowledge of the world to reason that an unsettled subsequentiality predication has the valence of a prediction.

Appealing to a Kratzerian framework, we can modalise our entry for *bambai* in order to capture the "epistemic downtoning" effect associated with apprehensionals. A principal component (and advantage) of Kratzer's treatment of modals (1977; 1981b; 2012) lies in the claim that the interpretation of modalised propositions relies on 'conversational backgrounds': that they quantify over sets of worlds retrieved by an 'accessibility relation' which is *contextually* made available. The entry in (88) gives an intensionalised (modal) semantics for *bambai*.

(88) ***bambai* includes a modal expression**

$[\![bambai]\!]^c = \lambda P.\exists w'\left[w' \in \underset{o(w)}{\text{BEST}}(\cap m(w)) \wedge \text{SUBSEQ}(P, t_r, w')\right]$

*bambai* asserts that there exists some world $w'$ in a set of worlds that are optimal with respect to a contextually-determined modal base $m$ and ordering source $o$ in the reference context $c = \langle t*, t_r, w* \rangle$. It additionally asserts that the SUBSEQUENTIAL INSTANTIATION relation (as defined in (82) above) holds between that world $w'$, the prejacent $P$, and a reference time provided by the utterance context $t_r$.

With the entry in (88), we can formalise the intuition that, when (and only when) *bambai* $p$ is understood as making a nonfactual predication, it constitutes a prediction of a possible — but unverified/unverifiable — subsequential state-of-affairs; that is, one that is presumed unsettled.

As a consequence, the apparent subsequential/apprehensional polysemy exhibited by *bambai* is modelled as deriving form a single core meaning, where different contexts make different conversational backgrounds available (*cf.* Kratzer 2012: 55*ff*). We can conceive of this in terms of a pragmatically-enforced OMNISCIENCE RESTRICTION (§ sec:omni).

## 4.3 A pragmatic ambiguity: *The omniscience restriction*

Crucially, in the apprehensional cases we've seen, *bambai*'s prejacent is understood to encode a predication about an unsettled state of affairs. That is, it involves reference (by means of existential quantification) to either • some time succeeding utterance time $t' \notin \cap \preccurlyeq_{t*}$ (the indicative cases) OR • some world that is not a historic alternative of the actual world $w' \notin \cap \approx_{t*} w*$ (the subjunctive cases.) These two types of contexts can be unified as involving a NON-ACTUAL/NONFACTUAL predication — one without the presumption of settledness. Recalling the discussion of branching-time models in § 1.2.1, the non-actual property can be easily stated over indices as $\{i' \mid i' \not\preccurlyeq i*\}$.[80] In Kriol, the prejacent of *bambai* is interpreted as actual iff *bin*/past marking is present (and *bina*/explicit counterfactual marking is absent.) These contexts were summarised in Table 5 (*p.* 55 above.)

The *omniscience restriction*, also described in (73) is a pragmatic principle implementing the ACTUAL/NONACTUAL distinction to explain the distribution of SUBSEQUENTIAL VS. APPREHENSIONAL *bambai*.

[80] See also the Rumberg/von Prince partition in (11).

(89) **The omniscience restriction**.Predications of subsequentiality (posterior instantiation) are interpreted as carrying predictive illocutionary force (*i.e.*, modalised or "epistemically downtoned") when they are presumed unsettled.

The idea here is that a speaker who makes a predication about the temporal properties of a non-settled eventuality cannot reasonably make an assertion that appears to presume its settledness. 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 (in the case of counterfactual uses.)

This restriction reflects a pragmatic reflex of Condoravdi's (2002: 83) diversity condition[81] and the twin epistemic constraints on the relations between doxa and settledness given in Kaufmann 2002, 2005; Kaufmann et al. 2006 (*viz.* historicity/lack of foreknowledge), axioms which guarantee that "only what is settled can already be known" (Kaufmann et al. 2006: 101). Consider again the truth conditions of *bambai* in (90) with the SUBSEQ relation spelled out. The entry in (90) is translated into a branching-times formalism in order to draw the parallel treatment of "indicative" and "subjunctive" uses of *bambai*. The relevant modelling assumptions were introduced in § 1.2.1.

(90) $[\![bambai]\!]^c = \lambda P.\exists b\big[b \in \underset{o(i)}{\text{BEST}}(\cap\approx_i^+) \wedge \exists i'_b[i' \succsim i_r \wedge P(i') \wedge \mu(i_r, i') \leq s_c]\big]$ *bambai* asserts that $P$ is instantiated at some index $i'$ which is **posterior** (temporally subsequent) to some contextually-retrieved reference index $i_r$ according to some branch that is metaphysically accessible from $i$.[82]

This condition allows us to unify the modalised and non-modalised readings of *bambai* — in view of the constraints discussed above, retrieval of a proper reading for *bambai* in a given context is a function of the relation between evaluation indices. Summarised in table 6, a subsequential reading obtains *only if* the instantiation of the prejacent is ACTUAL w/r/t the utterance index — that is *bambai* receives its *subsequential* reading/*apprehensionality* "fails to emerge" when $i' \preccurlyeq i*$.

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[81] That is, a property holding between properties $P$ and modal bases $m : \mathcal{W} \times \mathcal{T} \to \wp(\mathcal{W})$ that they be unsettled w/r/t the instantiation of $P$ (Condoravdi 2002: 83):

$$\exists w\big[w \in cg \wedge \exists w', w''[w', w'' \in m(w,t) \wedge \text{AT}\big([t,\infty), w', P\big) \wedge \neg\text{AT}\big([t,\infty), w', P\big)]\big]$$

[82] There may be contextually-derived additional restrictions on the modal base, hence $\approx^+$, following the notational convention ($f^+(w)$) introduced by Kratzer (1981b) in modelling conditionals.

**Table 6**. *bambai* clauses relate three semantical indices: the instantation time of the prejacent ($i'$), the utterance index ($i*$) and a contextually-retrieved reference index ($i_r$). *bambai* requires that $i_r \prec i'$

| | FUNCTION | ***relations*** | Text |
|---|---|---|---|
| | a. SUBSEQ | $i_r \prec \boldsymbol{i' \preccurlyeq i*}$ | 'I had coffee$_{i_r}$ **then** fell asleep'$_{i' \prec i*}$ |
| APPR | b. INDIC | $i* \prec i_r \prec i'$ | 'I'll have coffee$_{i_r}$ **otherwise** may fall asleep'$_{i' \succ i*}$ |
| APPR | c. SBJV | $i_r \prec \substack{\prec i' \\ \prec i*}$ | 'I had coffee$_{i_r}$ **otherwise** may've fallen asleep'$_{i' \not\prec i*}$ |

Conversely, if the prejacent's instantiation index ($i'$) is understood to be ***posterior*** to $i*$, a subsequentiality claim is subject to the omniscience restriction.

This can be modelled by assuming that context provides a species of *metaphysical* (circumstantial) modal base. Recall, among the ontological metaphysical assumptions reflected in branching-times structures is *left linearity* (6) — representing historical necessity — and *right branching*, reflecting the problem of future contingency. It will be a property, then, of all metaphysical conversational backgrounds, that all branches undivided at $i_n$ will also be undivided at $i_{n-1}$ ($\therefore \mathtt{B}_{i_n} \subseteq \mathtt{B}_{i_{n-1}}$).[83]

(91) **The structure of the modal base**

a. *Undividedness-at-**i***
$\boldsymbol{b \equiv_i b'} \triangleq \exists i'[i' \succ i \wedge i' \in b \cap b']$
That is: two branches are undivided at some index $i$ iff they both run through some successor index $i'$. (Müller 2014; Rumberg 2016b)

b. A metaphysical modal base ($\approx$) contains all metaphysically possible propositions at an evaluation index $i$.

c. Metaphysical modal bases therefore assume actualness/fixity of the past.
$\forall i, j\left[i \succcurlyeq j \rightarrow \forall b, b'[b \underset{i}{\approx} b' \rightarrow b \underset{j}{\equiv} b']\right]$ (compare 7/86b)
That is: metaphysically-accessible branches are undivided at any evaluation index $i$ and at all indices preceding that evaluation index.

Shown above (*e.g.*, table 6), subsequential readings of *bambai* are limited to contexts where instantiation time is taken to precede utterance time. Against a metaphysical modal base then, the instantiation of the prejacent is presumed settled at utterance time (92).

[83] See Rumberg (2016b: 79-80) for a proof of this theorem.

(92) Assuming that the past morphology restricts instantiation of $P$ (*e.g.*, that property described in *bambai*'s prejacent) to $\{i' \mid i' \prec i*\}$:
$\forall b \in \cap cg_{i*}\Big[\big[i' \in b \wedge P(i')\big] \rightarrow \forall b'\big[b' \underset{i*}{\approx} b \rightarrow [i' \in b' \wedge P(i')]\big]\Big]$
All branches $b$ that are compatible with the common ground are such that if $P$ at $i'$ is true, then it is metaphysically necessary (*i.e.*, holds at all historical alternatives to $b$.)

Conversely, in the absence of past morphology, no such restriction is made on the instantiation index of $P$: the modal base can therefore be *diverse*: the truth (or falsity) of $P(i)$ is contingent/unsettled with respect to $P(i)$ — that is, the common ground is compatible with branches at which $P$ is settled differently (*i.e.*, (92) is not valid if $i' \not\prec i*$).

This is implemented more precisely in the following sections.

## 4.4 Deriving the subsequential reading

What we've called the *subsequential* (TFA) use of *bambai* follows from general norms of assertion: given that the speaker is making a predication about a property that is presumed settled, her context set is understood as veridical and the assertion is taken to be factual — *cf.* Grice's (super)maxim of quality: "try to make your contribution one that is true" (1991: 27).

As shown above, given the notion of historical necessity/the left-linearity of branching models of time, an evaluation index is associated with a unique past.

(93) **A veridical conversational background**:
***bambai*'s subsequential reading**

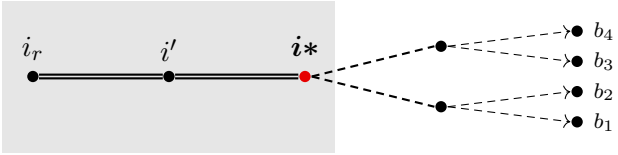
a. *A metaphysical modal base* $\underset{\text{meta}}{\boldsymbol{m}} / \approx$
A metaphysical modal base $\approx$ is a function from indices to a set of propositions that are **consistent** with metaphysical assumptions about the state of the world at a given index $i$.
Consequently, the intersection of these propositions: $\cap\approx_i$ returns the set of **historical branching alternatives** to $i$ — a set of branches that share $i$'s history and branch into its future (while according with metaphysical notions of possibility.)

b. $o_{\text{empty}}(w) = \varnothing$
An empty ordering source $o_{\text{empty}}$ contains no content (propositions) and hence induces no ordering over the modal base.

c. Because the ordering source is empty, the function $\textsc{best}_{\varnothing}\big(\cap\approx_i\big)$ simply returns $\cap\approx_i$: the set of historic/branching alternatives to $i$.

By the (Branching Times-adaptation of Thomason's) definition in (86), historical alternatives have "identical pasts" to one another and to the evaluation index $i*$. In the relevant sense, then, the quantification is trivial. With/respect to some $i'$ : $i' \prec i*$, all branches in the modal base are undivided-at-$i'$. This is shown in the shaded portion of the BT diagram of $\cap\approx_{i*}$ in fig. 8.

**Figure 8**. A possible representation of $\cap\approx_{i*}$: a "subtree" of $\mathfrak{T}$.
***shaded portion***. All metaphysically accessible branches are undivided at indices preceding $i*$.




This is derived for (94) below (the sentence simplified from (20) above). The derivation is further explicated below.

(94) **Deriving the subsequential reading**
*main dedi bin go la det shop,* ***bambai*** *im=in gugum dina*
my father PST go LOC the shop ***bambai*** 3S=PST cook lunch
'My dad went to the shop, **then** he made lunch' [AJ 23022017]

a. **Taking *bin* 'PAST' to restrict $i$ to before speech time $i*$**
$[\![bin]\!]^c = \lambda P \lambda i.i \prec i* \wedge P(i)$
*bin* realises 'PST' — a past tense operator which restricts the instantation time to some index $i$ that precedes the speech index $i*$.

b. **Meaning of the first clause**

$$[\![bin]\!]^c([\![main\ dedi\ go\ la\ det\ shop]\!]^c) = \lambda P \lambda i.i \prec i* \wedge P(i)\big(\lambda i'.\textsc{dad.go.shopping}(i')\big)$$
$$[\![main\ dedi\ bin\ go\ la\ det\ shop]\!]^c = \lambda i.i \prec i* \wedge \textsc{dad.go.shopping}(i)$$

$i$ is then existentially bound (Dowty 1979; Ogihara 1996; Stump 1985). The first clause, then, asserts that the event of Dad's trip to the shop occurs at some index that precedes the utterance index — I'll call this index $j$.

$$[\![main\ dedi\ bin\ go\ la\ det\ shop]\!]^c = \exists j[j \prec i* \wedge \textsc{dad.go.shopping}(j)]$$

c. **Meaning of *bambai* & assignment of $i_r$**

$$[\![bambai]\!] = \lambda P.\exists b\Big[b \in \underset{o(w)}{\textsc{best}}\big(\cap\, m(i*)\big) \wedge \exists^b i'[i' \succ i_r \wedge P(i') \wedge \mu(i_r, i') \leq s_c]\Big]$$

$j$ is assigned to $i_r$, per standard assumptions about temporal anaphora (*e.g.*, Hinrichs

1986; Partee 1984, these insights have been implemented in DRT frameworks § 3.1, see chapter 5 of Kamp & Reyle 1993.)

$$[\![bambai]\!]^c = \lambda P.\exists b\big[b \in \underset{o(w)}{\text{BEST}}\big(\cap\, m(i*)\big) \wedge \exists^b i'[i' \succ j \wedge P(i') \wedge \mu(j,i') \leq s_c]\big]$$

d. **Meaning of the second clause (*bambai*'s prejacent)**
$[\![imin\ gugum\ dina]\!]^c = \lambda i.i' \prec i* \wedge\ \text{DAD.MAKE.LUNCH}(i')$

e. **Substitution of prejacent (d)**

$$\begin{aligned}[\![bambai\ \text{(d)}]\!]^c =& \exists b\big[b \in \underset{\varnothing}{\text{BEST}}(\cap \approx_{i*}) \wedge \exists^b i'[i' \succ j \wedge \lambda i'.i' \prec i* \wedge \text{MAKE.LUNCH}(i') \wedge \mu(j,i') \leq s_c]\big] \\ =& \exists b\big[b \in \underset{\varnothing}{\text{BEST}}(\cap \approx_{i*}) \wedge \exists^b i'[i' \succ i_r \wedge \text{SUBSEQ}\Big(\lambda i.i' \prec i* \wedge \text{DAD.MAKE.LUNCH}(i'), j\Big)]\end{aligned}$$

In (b-c), the mechanism responsible for establishing the interclausal anaphoric relation between *im* and *main dedi* is similar to that which equates of $i_r$ with the index at which Dad's SHOPPING trip was instantiated: *viz.* $j$. As described in § 3.1, in the Kampian/DRT terms (*e.g.*, Kamp & Reyle 1993: Ch. 5) – also adopted in, *e.g.* Partee 1984 – this relies on the notion of an expanding universe of discourse: modelled as sets of assignments.

Shown in (e), MAKE.LUNCH is instantiated prior to the utterance index $i*$; the modal component of *bambai* involves quantification over a totally realistic conversational background. That is, given that the prejacent is predicated of a preceding index $i' \prec i*$, all branches in the metaphysical modal base are undivided at $\{i \mid i \preccurlyeq i*\}$ (fig. 8). Because the SUBSEQ predication involves branchmates of $i*$, it is interpreted as factual.

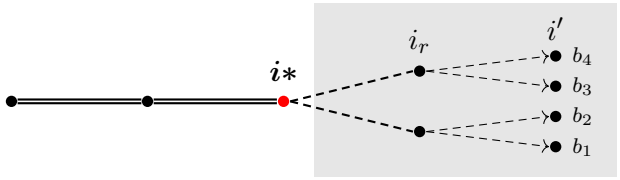
## 4.5 Deriving the apprehensional reading

In unsettled contexts, *bambai*'s metaphysical modal base gives rise to a nonfactual/nonveridical conversational background. In view of pragmatic principles (the "omniscience restriction"), the metaphysical alternatives are sorted by a "stereotypical ordering source" (*e.g.*, Kratzer 2012: 37*ff i.a.*.)

(95) **conversational background: *bambai*'s modal-apprehensional reading**

a. (As above) a metaphysical modal base $\approx$ is a function that retrieves the of metaphysically possible branches from a given index.

**Figure 9**. A possible representation of $\cap\approx i*$: a "subtree" of $\mathfrak{T}$.
***shaded portion***. Multiple accessible branches (metaphysically "possible futures") succeeding $i*$.




b. $\mathfrak{s}(i) = \{p \mid p$ will hold in the 'normal' course of events at $i\}$.
A sterotypical ordering source is a set of propositions that are "normally true" in $w$/can be taken to hold in the "normal course of events" in $w$ (Kratzer 1981b: 295, see Yalcin 2010 for discussion.)

c. A set of propositions $\mathfrak{s}(w)$ then induces an ordering $\leqslant_{\mathfrak{s}(w)}$ on the modal base:

$$\forall b', b'' \in \cap\approx_i : b' \leqslant_{\mathfrak{s}(i)} b'' \longleftrightarrow \{p' \mid p' \in \mathfrak{s}(i) \wedge i'[i' \in b' \wedge p'(i')]\} \supseteq \{p'' \mid p'' \in \mathfrak{s}(i) \wedge i''[i'' \in b'' \wedge p''(i'')]\}$$

That is, $b'$ is more normal (stereotypical) than $b''$ iff $\mathfrak{s}(w)$ – the propositions "normally true given $i$" that are true of indices along $b'$ are a superset of those true of indices along $b''$.

d. $\underset{\mathfrak{s}(i)}{\textsc{best}}(\cap\approx_i)$ then returns just that subset of metaphysical alternative branches that are closest to what is judged to be a "normally-unfolding course of events" at $i$.

Armed with these assumptions, we can now derive the proper semantics for a "precautioning" use of *bambai*, as in (21), repeated here as (96).

(96) **Deriving the apprehensional reading**
*ai=rra dringgi kofi* ***bambai*** *mi gurrumuk (la desk iya gin)*
1S=IRR drink coffee *bambai* 1S fall.asleep LOC desk here EMPH
'I'd better have a coffee otherwise I might pass out (right here on the desk)' [GT 28052016]

a. ***(ga)rra* as a necessity modal**
Let's take *garra* to instantiate the abstract (untensed) modal particle WOLL.[84]

[84]Semantics for WOLL adapted from Condoravdi (2002: 71).
A satisfactory analysis of the semantics of *garra* (glossed here as 'IRR') is beyond the scope of this work. It is treated

$[\![garra]\!] = \lambda P \lambda i \forall b \big[ b \in \underset{o(i)}{\text{BEST}}\big( \cap\, m(i)\big) \rightarrow \exists^{b} i' [i \succ i \wedge P(i')]\big)$

*garra* takes a predicate $P$ and an evaluation index $i$ and asserts that $P$ holds at some successor of $i$ in all of the best-according-to-$o$ worlds in the modal base.

b. **Meaning of the first clause**

Without explicit tense marking, the (evaluation) index variable for $i$ is identfied as the utterance index (this is represented as a covert NPST morpheme below, the alternative to *bin* in 94a)

$$[\![garra]\!]^{c}([\![ai\ dringgi\ kofi]\!]^{c}) = \lambda P \lambda i. \forall b' \big[ b' \in \underset{o(i)}{\text{BEST}}\big( \cap\, m(i)\big) \rightarrow \exists i' [i' \in b' \wedge i' \succ i \wedge P(i')]\big] \ \ \big(\lambda i'.\text{I.DRINK.COFFEE}(i')\big)$$

$$\text{NPST}([\![airra\ dringgi\ kofi]\!]^{c}) = \lambda P \lambda i. i = i* \wedge P(i) \big(\lambda i. \forall b' \big[ \underset{o(i)}{\text{BEST}}\big( \cap\, m(i)\big) \rightarrow \exists i' [i' \in b' \wedge i' \succ i \wedge \text{I.DRINK.COFFEE}(i')]\big]\big)$$

$$[\![airra\ dringgi\ kofi]\!]^{c} = \forall b' \big[ \underset{tel(i*)}{\text{BEST}}\big( \cap\, \underset{\text{CIRC}}{m(i*)}\big) \rightarrow \exists i' [i' \in b' \wedge i' \succ i* \wedge \text{I.DRINK.COFFEE}(i')]\big]$$

*airra dringgi kofi* is true in a context $c$ iff all branches in the modal base that conform best with some ordering source (in $c$, likely a teleological background, consisting of the speaker's goals) contain some index in the future of utterance time at which the speaker drinks coffee.

c. **Meaning of *bambai* & substitution of (96b-$i'$ $(= i_\kappa)$ for $i_r$**

$$[\![bambai]\!] = \lambda P. \exists b \big[ b \in \underset{o(w)}{\text{BEST}}\big( \cap\, m(i*)\big) \wedge \exists^{b} i' [i' \succ i_r \wedge P(i') \wedge \mu(i_r, i') \leq s_c]\big]$$

$$[\![bambai]\!]^{c} = \lambda P. \exists b \big[ b \in \underset{o(w)}{\text{BEST}}\big( \cap\, m(i*)\big) \wedge \exists^{b} i' [i' \succ i_\kappa \wedge P(i') \wedge \mu(i_\kappa, i') \leq s_c]\big]$$

As in (94c), the "reference time" $i_r$ is assigned to the existentially-bound index $i'$ from (b) — here notated as $i_\kappa$ (coffee-drinking time).

d. **Meaning of the second clause**

$[\![mi\ gurrumuk]\!]^{c} = \lambda i.\text{PASS.OUT}(i)$

Temporal abstract *mi gurrumuk* denotes a set of indices at which the speaker passes out.

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by Schultze-Berndt et al. (2019) as polysemous between a future and "obligation" marker, although I have also elicited tentative evidence of epistemic necessity readings. Abstracting away from these questions of modal flavour, it is treated here as a species of necessity modal and glossed as IRR.

e. **(d) saturates *bambai*'s *P* argument; temporal abstract is existentially bound**

$$[\![\textit{bambai}]\!]^c(\mathrm{d}^c) = \lambda P.\exists b\big[b \in \underset{o(w)}{\textsc{best}}\big(\cap\, m(i*)\big) \wedge \exists^b i'[i' \succ i_\kappa \wedge P(i') \wedge \mu(i_\kappa, i') \leq s_c]\big]\big(\lambda i.\textsc{i.pass.out}(i)\big)$$

$$[\![\textit{bambai}\ (\mathrm{d})]\!]^c = \exists b\big[b \in \underset{\mathfrak{s}(w)}{\textsc{best}}(\cap\approx^+_{i*}) \wedge \exists^b i'[i' \succ i_\kappa \wedge \textsc{i.pass.out}(i') \wedge \mu(i_\kappa, i') \leq s_c]\big]$$

$$= \exists b\big[b \in \underset{\mathfrak{s}(w)}{\textsc{best}}(\cap\approx^+_{i*}) \wedge \exists^b i'[i' \succ i_\kappa \wedge \textsc{subseq}\big(\textsc{i.pass.out}(i'), i_\kappa\big)\big]$$

The SUBSEQ component of *bambai*'s meaning asserts that • the speaker's PASSING OUT obtains at some index ($i'$) preceded by a contextually-retrieved reference time $i_\kappa$ DRINK.COFFEE and • the temporal distance between those two times is below some contextual standard ("soonness").

In the context of (96), $i* \prec i_\kappa \prec i'$. Given that $i_\kappa$ (and therefore $i'$) is in the **future of speech time**, the modal base $\approx_{i*}$ is **diverse with respect to the SUBSEQ property** — that is: $\textsc{subseq}\big([\lambda i'.\textsc{pass.out}(i')], t_\kappa\big)$ is **not presumed settled at *i**** (compare fig. 9.)

On this analysis, then, the crucial property that distinguishes the pure (actualised) subsequential reading from the apprehensional one is that the property described by the prejacent is presumed **settled at *i**** (or alternatively, by $t*$ in $w*$.) In all historical alternatives to the evaluation world, the event described by MAKE.LUNCH in $c_{(94)}$ holds at $i'$. Conversely, in (96), the context ($c_{(96)}$) **fails to satisfy** settledness for PASS.OUT because the relation between modal base and predicate here satisfies the *diversity condition* — that is, there are metaphysical alternatives branching from $i*$ which booth verify and falsify $\textsc{pass.out}(i')$ (*cf.* Condoravdi 2002: 83):

(97) **Diversity of the common ground at $i*$ w/r/t prejacent in (96)**

$$\exists b \in \cap cg \wedge \exists b', b''[b, b'' \in \underset{\mathfrak{s}({}^b i*)}{\textsc{best}}(\cap\approx^+_{{}^b i*}) \wedge \textsc{subseq}\big(\textsc{i.pass.out}({}^{b'} i'), {}^{b'} i_\kappa\big) \wedge \neg\textsc{subseq}\big(\textsc{pass.out}({}^{b''} i''), {}^{b''} i_\kappa\big)]$$

There are metaphysical alternatives branching from $i$ where the event described by the prejacent to *bambai* in (96) holds and others where it doesn't hold.

Finally, following the discussion and interpretation conventions discussed in § 3.1, the accommodation of an antecedent (the "apprehension-causing situation") is intersected with the modal base — that is, it is from that subset of metaphysical branching futures to $i*$ in which the speaker doesn't have coffee that $\underset{\mathfrak{s}(i*)}{\textsc{best}}$ selects a domain to be quantified over.

(96) f. **Modal subordination**

$$[\![\textit{bambai mi gurrumuk}]\!]^c = \exists b\big[b \in \underset{\mathfrak{s}(w)}{\textsc{best}}(\cap(\!|\approx_{i*} \cup \overline{[\![\textit{ai dringgi kofi}]\!](i_\kappa)}|\!)) \\ \wedge \exists^b i'[i' \succ i_\kappa \wedge \textsc{subseq}\big(\textsc{i.pass.out}(i'), i_\kappa\big)\big]$$

The modal base is intersected with a (negated) proposition derived from the discourse context. *bambai* signals that *mi gurrumuk* is **modally subordinate** to the proposition *ai dringgi kofi* 'I drink coffee (at $i_\kappa$).

The meaning of the sentence (96), then, is the conjunction of (96b) and (96f). The "dynamic" interpretive conventions (*i.e.*, the update of $c$) are clearly vital in terms of retrieving the relevant parameters of interpretation and the subordinative relation between the propositions in a precautioning-apprehensional (*p bambai q*) usage of *bambai*.

### 4.5.1 The semantics of a counterfactual apprehensional

Subjunctive/counterfactual uses (*e.g.*, ex. (35) or table 6) are assumed to be derivable in much the same way as above. That is, the modal reading emerges as a consequence of a (conventional) implicature that the relation between the common ground and the SUBSEQ relation meets the diversity condition/is presumed **un**settled.[85] A complete derivation is not provided, although truth conditions can be composed for (35, repeated below as 98) drawing on standard treatments of counterfactuals. That is a nonrealistic modal base where alternative branches are ordered by their similarity to $i*$—*i.e.*, a *totally realistic ordering source* — *cf.* Kratzer 1981a, 2012; Lewis 1973, 1981 a.o.)

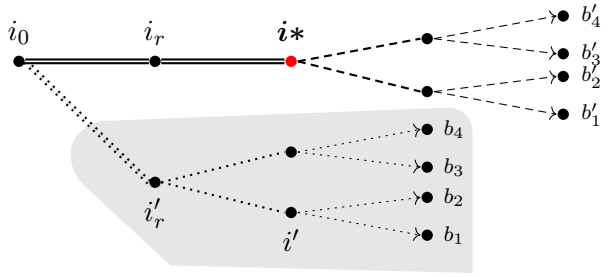
Described previously, in these "subjunctive" uses, *bambai* marks a counterfactual apprehensional proposition. In (98), the subject may have fallen asleep subseqently to a (nonrealistic/counterfactual) **non**instantiation of the coffee-drinking event.

The *counterfactual bambai* construction is similar to the *subsequential* use insofar as the reference time and antecedent upon which *bambai* is anaphoric are past marked ($i_r \prec i*$). Crucially though, as in other apprehensional uses, the common ground is nonveridical/**diverse** with respect

[85] A precondition for diversity to be satsfied is that "the common ground must be compatible with their being some past time at which [the truth of the prejacent is unsettled]" (Condoravdi 2002: 85).

to *bambai*'s prejacent. *Bambai*'s diverse quantificational domain is represented by the shaded region in Figure 10.

**Figure 10.** A possible representation of $\cap\approx_{i_0} \supsetneq \cap\approx_{i*}$: a "subtree" of $\mathfrak{T}$.
***shaded portion***. $\underset{\{p|i*\in p\}}{\text{BEST}}(\cap\neg\kappa)$
Multiple accessible branches (possible developing counterfactuals) succeeding $i_0$ (the greatest lower $\prec$-bound of $i*$ and $i'$.)




(98) *ai=bin dringgi kofi nairram* ***bambai*** *ai bina silip~silip-bat*
1S=PST drink coffee night ***bambai*** 1S PST:IRR sleep~DUR-IPFV
'I had coffee last night **otherwise** I might have slept [at work.]' [AJ 23022017]

a. **The syntactic antecedent** ($\kappa$ stands for the predicate 'I DRINK COFFEE')
$[\![aibin\ dringgi\ kofi\ nairram]\!]^c = \exists i'[i' \prec i* \wedge i' \in last\ night^c \wedge \kappa(i')]$
That is, I DRINK COFFEE holds some index $i'$ preceding speech time and contained within the interval denoted by *last night*.

b. **The prejacent**
*bina* 'PST:IRR' is taken to be a composite auxiliary: in effect a modal with back-shifted temporal perspective (compare treatments of English *would*.)[86] Compare with the present (NPST) perspective reading derived in (96b).
Let $s$ stands for the predicate 'I BE SLEEPING (AT WORK).'

$$[\![ai\ bina\ silipsilipbat]\!]^c = \lambda i'.i' \prec i* \wedge \forall b\big[b \in \underset{s(i')}{\text{BEST}}(\cap \underset{\text{CIRC}}{m}(i')) \rightarrow \exists^b i''[i'' \succ i' \wedge s(i'')]\big]$$

That is, along all branches best conforming with circumstances/expectations at some past index $i'$, I BE SLEEPING holds at some index $i''$ that is a successor of $i'$.

c. **Application to *bambai***
Here, $\underset{i'}{\square}\ s(i'')$ will be used to abbreviate the truth translation of the prejacent given in

[86] This observation, supported by a number of synchronic distributional facts about the Kriol IP has diachronic origins, see Phillips (2011: 45) for a discussion of evidence that *bina* is the result of fusion of *bin* and *wandi* 'DESIDERATIVE' < *AEng.* semimodal 'wanna.' According to Verstraete, "formally composite" counterfactuals are frequently occurring in Australian languages (2006: 72).

(b) above.

$$[\![\textit{bambai ai bina silipsilipbat}]\!]^c = \exists b\Big[b \in \underset{\mathfrak{s}(i_0)}{\textsc{best}}(\cap(\!|\approx_{i_0} \cup\{b' \mid \kappa(i_\kappa) \notin b\}|\!)) \\ \wedge \exists^b i'[i' \succsim i_\kappa \wedge \textsc{subseq}\big(\underset{i'}{\Box}\, s(i''), i_\kappa\big)\Big]$$

That is, there's some branch $b$ which was a metaphysical alternative of $i_0$ along which the speaker didn't have coffee at $i_\kappa$ ($\kappa(i_\kappa)$). In $b$, there's an index $i'$, posterior to $i_\kappa$ at which $\Box\mathrm{s}(i'')$ holds.

### 4.5.2 The "epistemic apprehensive" use

The discussion above has shown how the core meaning of *bambai* involves a predication of a SUBSEQ relation between a predicate and a reference interval, where predictive force/apprehensionality emerge iff the predicate's instantiation is presumed unsettled. From this standpoint, apparently epistemic uses like (38, *p. 52*), repeated here as (99) are perhaps surprising.

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

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

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

This type of use is not reported elsewhere and its acceptability status remains to be confirmed, however the emergence of an apprehensive reading even in a context where the predicate (*i.e.*, the speaker's boss's arrival at the door) is *presumed settled* is perhaps compatible with approaches to future meaning suggested by Bennett & Partee (2004: 100/1978), *sc.* that it could be(come) known (in the future) that AJ's boss is at the door (now).

This proposal, which represents a plausible way of extending the analysis presented here, to ostensibly epistemic uses of *bambai* is not further examined here.

### 4.5.3 Possibly pessimistic

A surprising consequence of the above proposal is the bifurcation of uses of *bambai* into subsequential (interpreted as purely temporal) and apprehensional readings. This section has predominantly been concerned with the emergence of modal (possibility) readings from a temporal

frame adverbial. In §§ 3.2–3.3, we investigated the diachronic emergence and synchronic status of *bambai*'s speaker-attitude/expressive character. This component (*viz.* that *bambai* expresses that the Speaker is apprehensive about or somehow disfavours the instantiation of the prejacent) is modelled as a conventional implicature.

We have seen how a branching-time semantics provides insights into how a single meaning can capture *bambai*'s modal behaviour in contexts where the instantiation of the prejacent is presumed unsettled — *sc.* by modelling *bambai* as a quantifier over metaphysical alternatives. But we have had nothing to say about why the use-conditional component "emerges" only (and exactly) in this set of contexts.

Here, there are again clues from the diachronic account provided above. As discussed in § 3.2, both characterising components *apprehensionality* (its modal and its expressive character) are taken to have developed simultaneously in view of the conventionalisation of implicatures emerging in admonitory contexts. Given that these admonitions obligatorily concern eventualities which are presumed unsettled, the associated expressive content is attached to these "irrealis" uses of *bambai*, presumably extending into counterfactual uses via this abductive meaning change process. In a perhaps related observation, Verstraete suggests that subordinate purposive and apprehensional clauses can be conceived of as unsettled given that the doxastic state of the *subject* (rather than speaker) is diverse with respect to the states of affairs they describe ("non-actualized and inherently unknowable from the agent's perspective" 2006: 71).

From a functionalist perspective, this association in unsurprising, given that speaker (or other agent's) attitude is likely to be more discourse relevant when discussing a potential or a hypothetical state of affairs (*i.e.*, describing an eventuality without committing to its truth, see also Verstraete 2006: 74-76.)

### 4.5.4 Apprehensionalisation and the synchronic system

In this chapter, I have claimed that the emergence of APPREHENSIONAL readings of *bambai* is predictable in context: *i.e*, apprehensionality "emerges" when *bambai*'s prejacent is not presumed settled.

Angelo & Schultze-Berndt (2016) present a number of examples of *bambai* used to modify predications about unsettled states of affairs. Notably, these uses are virtually always constrained to clause-final occurrences of *bambai* and with distinct prosodic properties.[87] In these cases, *bambai* likely performs a related narrative cohesion function rather than behaving a (discourse anaphoric) modifier function as described here. Dutch *straks* displays similar restrictions (65). Negative judgments in (52b) and elsewhere furnish further evidence of this complementary distribution. Otherwise, unsettled predications of (mere temporal) subsequentiality are encoded with other TFAs, including *dregli* < 'directly' or *streidaway* < 'straightaway.' An example is given in (100).

(100) *Wal deibin larramgo wi braja Timathi fri brom det jeil, en if im kaman langa mi* ***dregli****, wal minbala garra kaman en luk yumob.*

'So they've let our brother Timothy out of jail. If he comes to me in time, then we'll come to see youse.' [KB Hibrus 13:20]

Above, apprehensionality is effectively understood as an epiphenomenon of a implicature that subsequential predications have predictive force iff they represent an unsettled property. Whereas this implicature is short-circuited (≒ conventionalised) in the case of *bambai*, it is suspended in the context of other (less frequent) subsequential TFAs (compare the similar, well-documented phenomenon in the (indirect) speech act literature, *e.g.*, Horn 1984: 29-31 and Morgan 1978.)

## 4.6 Conclusion

Part I of this dissertation has proposed a formal account for the emergence of apprehensional epistemic markers from temporal frame adverbs, based on the central descriptive observation of Australian Kriol *bambai* made in Angelo & Schultze-Berndt (2016). A meaning change trajectory documented in other literature (Angelo & Schultze-Berndt 2018; Kuteva et al. 2019a,b), this analysis shows the potential of formal semantic machinery for better understanding the conceptual mechansims that underpin meaning change (in the spirit of much the emergent tradition appraised in Deo 2015a) as applied to the modal domain.

These three chapters have attempted to elucidate the mechanisms through which temporal

[87] Recalling the mention of TFA *baimbai*'s grammaticalisation in Tok Pisin, Romaine (1995) distinguishes clause-initial/connectiv4e uses of *baimbai* from preverbal *bai* 'FUT' (see also Bybee et al. 1994: 271).

frame adverbs that originally encoded a relation of temporal sequency come to encode causality, possibility and speaker apprehension by way of semantic reanalysis performed by language users, driven by the generalisation, conventionalisation and semanticisation of conversational implicatures. The existence of this "pathway" of grammaticalisation provides further evidence of the conceptual unity of these linguistic categories and sheds light on the encoding of (and relationship between) temporal and modal expression in human language. Of particular note is the salient role played by (presumptions of) "settledness" (*cf.* Condoravdi 2002; Kaufmann 2005 a.o.) in adjudicating the available readings of relative temporal operators (here exemplified in subsequential TFAs.) That is, the apparent polysemy of *bambai* reported by Angelo & Schultze-Berndt (2016) can be unified by assuming that this item uniformly quantifies over accessible metaphysical alternatives and asserts the instantiation of its prejacent in one such alternative.

As shown, the apprehensional reading of *bambai q* "emerges" when that set of metaphysical alternatives is understood to be diverse with respect to the instantiation of the eventuality described by *q*. A BRANCHING TIME semantics for temporal and modal operators perspicuously captures this property of metaphysical alternatives: namely the presumed settledness of a given index's unique past in contradistinction to branching future and counterfactual possibilities. Reasoning about settledness – and the proper interpretation of *bambai* sentences – crucially involves the retrieval of particular referents (temporal/propositional) from the broader discourse context, whether or not these are syntactically overt. On the basis of this, *bambai* is understood uniformly as a temporomodal operator, triggering modal (but *not* syntactic) subordination of its prejacent: a finding that can likely be applied to related devices in other languages (*e.g.*, apprehensionals and purposives in addition to other discourse anaphors.)

Further, the apparent cross-linguistic relationship between subsequentiality and the semanticisation of apprehensional use-conditions (*i.e.*, the generalisation of implicatures about speaker attitude previously associated with "admonitory" discourse contexts) likely has implications for our understanding of the development of linguistic markers which express speaker affect and the relation of these SUBJECTIVE experiences to predication about non-actual states of affairs.

# Part II

# Semantics of the Negative Existential Cycle

# Introduction

This essay brings observations about the Negative Existential Cycle (see Croft 1991, Veselinova 2013, 2016, Hamari & Veselinova to appear 2021 (eds.))to bear in the context of the Aboriginal languages of Australia. The Australian language ecology is a fertile area for comparative typological work, given its striking linguistic diversity and small, non-sedentary, frequently exogamous populations (Bowern 2010). Some 90% ($N \approx 290$) of the languages spoken on the Australian mainland have been reconstructed to the Pama-Nyungan family (see also Bowern & Atkinson 2012; O'Grady et al. 1966; Wurm 1972), with a common ancestor spoken in Northern Australia almost 6,000 years before present (Bouckaert et al. 2018).

Taking the negative domains of three Pama-Nyungan subgroups as an empirical testing ground, this chapter describes the relationship between so-called 'standard' (SN) and 'existential' negation in an investigation of predictions made by a postulated cyclic change: Negative Existential Cycle (N∃C).

Represented in figure 11 below, the N∃C involves the emergence of explicit markers of existential negation[88] (stage $\mathbb{A} \rightarrow \mathbb{B}$), which subsequently encroach into the semantic domain of an erstwhile general negative marker (stage $\mathbb{B} \rightarrow \mathbb{C}$), and finally displace the latter, becoming a standard negation marker without the formal or functional features of an existential negator (stage $\mathbb{C} \rightarrow \mathbb{A}$). Examples of each of the N∃C's stages are reproduced in (101) below (these data cited in Croft 1991: 7–12)

[88]For the purposes of this paper, similarly to others in the current volume, "existential negation" is understood as a linguistic strategy for predicating the *absence* of some entity at a certain location (adapting from Criessels' (2014: 2) typology of existential constructions and consonant with the approach taken in Veselinova 2013: 139.) Defining 'existential predication', McNally also points out the relevance of "noncanonical sentence types", distinguished syntactically or lexically, which serve to 'introduce the presence or existence of some individual(s)' (2016: 210). See also Freeze 1992 for an analysis that explicitly relates existential to LOCATIVE and POSSESSIVE predications.

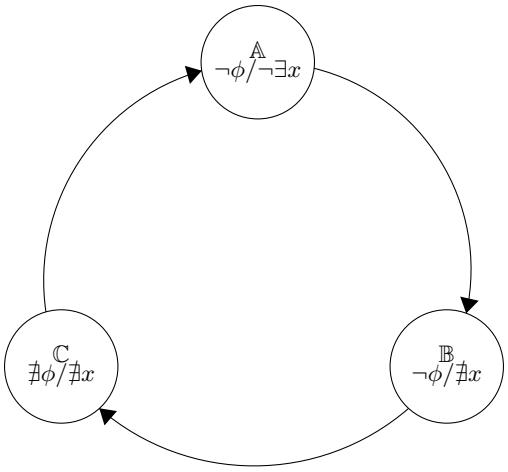



**Figure 11**. The 'Negative Existential cycle' — a typology (and proposed grammaticalisation trajectory) of standard & existential negation according to the analyticity of these markers (Croft 1991, see also Veselinova 2016.) Standard negators ¬ are used to negate both verbal $\phi$ and existential $\exists \boldsymbol{x}$ predicates in stage $\mathbb{A}$, a suppletive 'negative existential' $\nexists$ arises in stage $\mathbb{B}$ and this marker comes to mark standard negation in stage $\mathbb{C}$. 'Transitional' stages are assumed to occur between each of the labelled stages.

(101) Stage $\mathbb{A}$: analytic negative existential predication **Lahu** [lhu]

a. *šɔ̀-pɔ̄* ***mâ*** *qay*
tomorrow **NEG** go
'I'm not going tomorrow' (Matisoff 1973: 269)

b. *ɔ̀-yâ* ***mâ*** ***cɔ̀*** *sɔ̄*
time **NEG** **EX** DUR
'There's still no time.' (Matisoff 1973: 339)

(102) Stage $\mathbb{B}$: negative existential predicate (yälläm 'negex') **Amharic** [amh]

a. ***a***-*ysəbr*-***im***
**NEG**-pass.3ms.IMPF-NEG
'He doesn't/won't break.' (Leslau 1995: 303)

b. *ɨnjəra* ***yəlləmm***
bread **NEGEX**.3s
'There's no bread.' (Leslau 1995: 715)

(103) Stage ℂ: homonymous SN and negex (tágo) **Manam** [mva]

a. ***tágo*** *u-lóŋo*
**NEG**(EX) 1S.RL-hear

'I did not hear.' (Lichtenberk 1983: 385)

b. *anúa-lo* *tamóata* ***tágo*** *(*i-sóaˀi)*
village-in person **NEGEX** (*3S.RL-**EX**)

'There's noone in the village.' (Lichtenberk 1983: 499)

(104) Stage 𝔸′: emergence of an existential predicate āhe optionally disambiguates standard and existential negation

*tithə* *koṇi* *nāhi* *(āhe)* **Marathi** [mar]
there anyone NEG (EX)

'There isn't anyone there' (Croft 1991: 12)

The Pama-Nyungan data provided here give further evidence for the cross-linguistic validity of the N∃C, although, we will also see evidence of contact-induced change in the negative domains of some languages which are not clearly captured by the Cycle as previously formulated.

※

This essay is organised as follows: section 5.1 provides an overview of typological generalisations that can be made of negation marking in Australian languages. Paticular attention is paid to the semantics of the category of the so-called "privative case" (PRIV) – for which I propose a semantics. In effect, PRIV will be modelled as a negative existential predicate. I draw on the proposals of Itamar Francez (2007) and Louise McNally (1998, 2016) for the semantics of existential propositions in developing this analysis. As we will see, this formalism provides a way of understanding the diachrony of the N∃C.

Section 5.2 describes synchronic variation and apparent semantic change within the negative domains of three subgroups of Pama-Nyungan; as we will see, nominal and clausal negation in each these subgroups is realised quite differently. § 5.2.1 investigates evidence of change, replacement and renewal of negative markers in the Thura-Yura language group of South Australia. § 5.2.2 compares the negative domains of three Yolŋu languages, highlighting evidence of expansion in

the domain of privative marking in a number of varieties. § 5.2.3 describes standard negation in Upper Arrernte, situating arguments made elsewhere in the literature (particularly Henderson 2013) that, in this language (in addition to related Arandic varieties), synchronic SN strategies are a result of reanalysis of an erstwhile nominal suffix, a set of changes that also appears to be playing out in a number of varieties of the neighbouring Western Desert dialect chain.

Ultimately, Chapter 6 shows that a primary upshot of this comparative work trades on an insight—only briefly discussed in work on the NƎC (*e.g.*, Croft 1991: 17)—that this process (at least insofar as it is actualised in these Australian languages) can largely be understood and predicted with reference to existing work on semantic change (*sc.* diachronic developments in the meaning of a given lexical item) and work that formally seeks to generalise over grammaticalisation pathways and cycles, particularly in terms of the apparent loss of indexical content inherent to the Cycle (*e.g.*, Deo 2015a,b, 2017).[89] Comparing these language families' negative domains suggests a unified, quantificational treatment of sentential and existential (nominal) negative expressions. Further, I spell out this analysis and propose a formalisation of the diachronic semantics of the NƎC.

[89]See also the distinction drawn between "functional" and "formal" cycles as applied to the Jespersen's cycle in Ahern & Clark (2017).

# Chapter 5

# The landscape of negation in Australia

## 5.1 The Australian negative domain & a semantics for the privative case

Strategies that natural languages deploy to mark negation have long attracted the attention of philosophers and linguists (see Horn 1989, 2010). In a comprehensive piece of work on the subject, Horn (1989: xiii–xiv) observes that the 'simplicity and transparency' of logical negation (*i.e.*, that function which "reverses" the truth value of a given proposition) is not recapitulated in ordinary language, where the complex behaviour of markers of negation and their interaction with other linguistic categories have long been investigated.[90]

Recent work in the functionalist tradition (*e.g.*, Miestamo 2005 a.o.) has sought to propose a typology for the behavior of 'standard negation' marking strategies across a sample of world languages (including 40 Australian varieties.) *Standard negation (SN)* is understood as those language-specific mechanisms whose function is the inversion of the truth value of a proposition associated with a given (declarative) clause. Drawing a distinction between SN and 'special negation' is warranted in view of the empirical fact that many languages have distinct formal mechanisms for the negation of nonverbal (*e.g.*, copular, existential) predications, imperatives and other types of

[90] For Horn & Wansing (2017: 1), *negation* is basically the phenomenon of "semantical opposition" – we are interested in that function which "relates an expression $e$ to another expression with a meaning that is in some way opposed to the meaning of $e$."

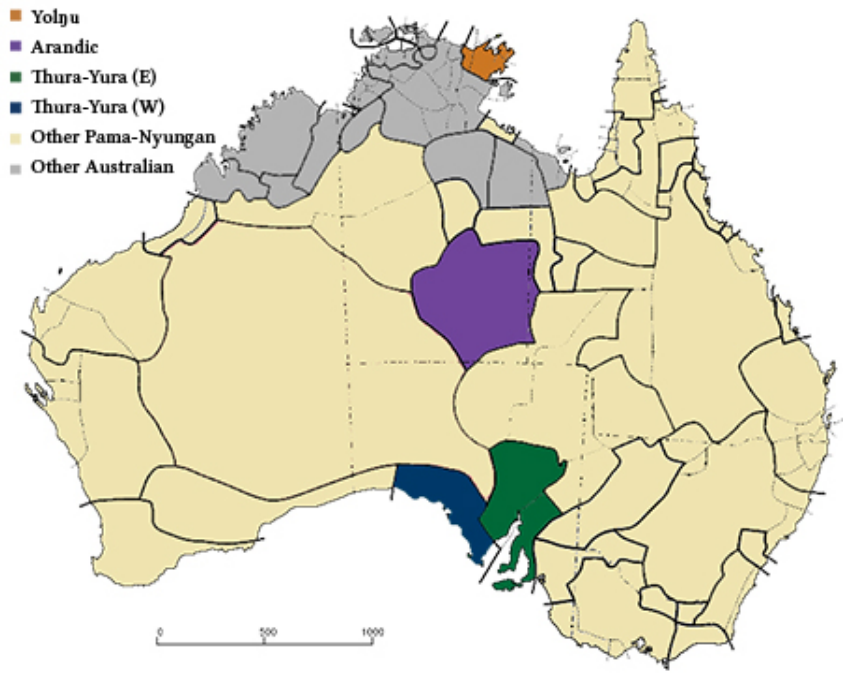



**Figure 12.** Subgrouping of Australian languages. Pama-Nyungan family in tan, with Yolŋu subgroup given in ochre, Arandic in purple and Thura-Yura divided into green (Eastern varieties) and blue (Western/Nangga varieties.)

'subclausal' negation (van der Auwera & Lejeune 2013; Horn & Wansing 2017; Miestamo 2007; Veselinova 2013).

### 5.1.1 Negation & Australia: a typological snapshot

Mentioned above, roughly 300 Australian languages have been reconstructed to a single family, Pama-Nyungan, spoken across Australia except for some regions in the north of the continent. The most recent common ancestor of these languages is esimated to have been spoken roughly five to six thousand years BP (a similar timedepth to Indo-European, see Bouckaert et al. 2018: 742). Many of these languages remain underdescribed, and consequently, typological and comparative work detailing the expression of negation across Australian languages is underdeveloped. Exceptions to this include Dixon 2002a and Phillips to appear 2021a, surveys that have turned up some generalisations about the formal and functional expression of negation in these languages. Based on the insights of these works, we might divide the 'negative semantic space' so to distinguish four

macro-categories of negator: (1) negative imperatives/prohibitives, (2) clausal/standard negators and (3) nominal negators, including specialised negative existentials and a commonly occurring 'privative' category, and (4) negative interjections. There is a substantial amount of variation in the formal exponence of each of these functions, some varieties distinguishing all four categories (*e.g.*, Bidjara [bym]), some with a single syncretic marker for all four (e.g. Dyirbal [dbl], according to Dixon 2002a: 84–table 3.3).

An exceptionful (but otherwise fairly robust) formal tendency across Australian languages is for clausal negation to be marked with a particle pre-verbally and for privative case to be encoded as a nominal suffix. We will explore the implications of this generalisation and its exceptions below, in a general overview of negation strategies in Australia, in addition to a deeper discussion of the meaning contribution of the so-called "privative case" markers in Australian languages.

### 5.1.2 "Standard" negation

This subection briefly provides some generalisations about clausal negation strategies in Australian languages. For a more comprehensive discussion of exceptions and significant interactions between SN and other aspects of the verbal complex in Australian languages, the reader is referred to Phillips to appear 2021a.

Dixon (2002a: 82) claims that "almost every Australian language marks 'not' by a non-inflecting particle which goes before the verb." He notes explicitly that this generalisation extends also to the most morphologically synthetic non-Pama-Nyungan languages spoken in the north of the continent. Negation in the Arandic subgroup of Pama-Nyungan, which provides a major exception (one of few) to this formal generalisation, and is particularly relevant for current purposes, is discussed in more detail in §5.2.3. The data from Nakkara ([nck] Arnhem, Maningrida, Eather 2011: 191) and Ngiyambaa ([wyb] Pama-Nyungan: Wiradhuric) below clearly demonstrate this generalisation. In Nakkara (105), a preverbal negative marker *korla* takes scope over a fully inflected verbal predicate (also affecting the inflectional suffix licensed by the verb, see also Ch. III below.) Further, in Ngiyambaa (106a), the preverbal SN particle *waŋa:y* takes scope over the entire sentence (crucially including the discourse anaphor *yingala:dhi-* 'because of that'), whereas it scopes underneath this item, over only the second predicate in (b), yielding two distinct propositions.

(105) Preverbal standard negation in Nakkara (Eather 2011: 191)

***Korla*** *nga-y-bburda-ma.*
**NEG** 1S.ERG-IRR-hit-INFL.NEG

'I didn't hit him.'

(106) Preverbal standard negation in Ngiyambaa (Donaldson 1980: 239)

a. ***Waŋa:y*** *yiŋgala:-dhi=dju=na* *girimiyi-la.*
**NEG** same-CIRC=1.NOM=3.ABS wake.PST-THEN

'It wasn't because of that I woke her then.'

b. *Yiŋgala:-dhi=dju=na* ***waŋa:y*** *girimiyi-la.*
same-CIRC=1.NOM=3.ABS **NEG** wake.PST-then

'Because of that I didn't wake her then.'

### 5.1.3 The "privative case" and existential predications

The privative case (PRIV) is a very robustly attested category in Australian languages (Dixon 2002a: 84).[91] Broadly speaking, it predicates the absence of some property denoted by the noun that it associates with, although the precise semantic domain of this category varies considerably across languages (*cf.* arguments for the predicative status of negative existential markers in Veselinova 2013: 139). In Nyangumarta (nna Pama-Nyungan: Marrngu), for example, *-majirri* 'PRIV' can be used to predicate absence (*i.e.* as a negative existential, see (107). Muruwari (zmu Pama-Nyungan: SE) similarly makes use of a form *-kil~-til~-tjil*, shown in (108a-b).[92] PRIV case markers are frequently antonymous to another case suffix — also often-occurring in Australian languages — usually glossed as the comitative (COMIT), proprietive (PROP) or '*having*' case. Uses of this marker are given in (109). The apparent synonymy of (108b) and (109b) demonstrate the antonymous relation between comitative and privative predications.[93]

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[91]Morphological cases with similar semantics are referred to as *abessive* and/or *caritive* in other literatures (*e.g.* for Uralic in Hamari 2011, 2015; Tamm 2015). 'Privative' is ubiquitous in Australian language description and will be used here throughout.

[92]Incidentally, Oates (1988: 77) describes this suffix as the ABESSIVE: "the opposite of the comitative in that it signifies 'lacking' or 'being without' some person of thing.' She glosses it throughout as 'lacking.'

[93]The appendix to Singerman (2018) comments on the instantiation of a very similar distribution in Tuparí ([tpr] Tupian: NW Brazil), where the suffix *-psiro* 'HAVE' is antonymous to PRIV uses of the suffix *-'om* 'NEG'.

(107) Function of *-majirri* 'PRIV' in Nyangumarta (Sharp 2004: 140)

a. *mungka-**majirri** karru-**majirri**-pa paru-**majirri** jungka jakun*
tree-**PRIV** stream-**PRIV**-CONJ spinifex-**PRIV** ground only

'There were no trees, creeks, or spinifex; only the ground (in that country.)'

b. *mirtawa mayi-**majirri***
woman vegetable-**PRIV**

'The woman is without food'

(108) Function of *-kil* 'PRIV' in Muruwarii (Oates 1988: 77-8)

a. *palanj mathan-**kil***
nothing stick-**PRIV**

'(There are no) sticks [...nothing]'

b. *ngapa-**kil**-pu-n*
water-**PRIV**-3S-NMLZR

'He has no water.' (lit. 'he-waterless')

(109) Existential function of Muruwari *-pira, -yita* '*COMIT*' (Oates 1988: 73-4)

a. *thuu kuya-**yita** wartu*
much fish-**COMIT** hole.ABS

'The river has a lot of fish in it.' (= 'There's a lot of fish in the river')

b. *wala mathan-**pira***
NEG limb-**COMIT**

'(There are) no sticks.'

Australian languages have a number of strategies to express existential and non-existence (absence) predications. (107) shows the Nyangumarta privative marker functioning as an existential negator: it predicates the absence of trees, streams and spinifex (a culturally important tussock grass) of a particular location. Additionally, *contra* a prediction made by Croft (1991: 19), it is the case in many Australian languages that "an existential sentence [can] consist solely of the noun phrase whose existence is predicated." Additionally, (107) includes an example of bare NP existential predication; the presence of *jungka* '[bare] ground' (in the relevant location) is predicated.[94] These facts immediately present a challenge to the (formal) negative existential cycle as

[94]Such constructions have also been reported elsewhere in the literature, *e.g.*, for Māori [mao] where "'existence" statements have no copula or existence verbs' (Bauer 1993: 78, cited by Chung & Ladusaw 2004 a.o). Similarly, sign

formulated: if existence predicates are frequently verbless, there is no way to formally distinguish between NEC stages 𝔸 and ℂ on the basis of synchronic data. I know of no Australian language with a *reserved* existential verb; like copular clauses, existence predications appear to frequently make use of a stance or motion verb (most frequently one that primarily means 'sit' or 'lie' and often polysemous with 'stay, live'), or are otherwise verbless.[95]

Relevantly for current purposes, then, the semantics of the privative suffix in this nonexistential use can be instructively captured by adapting existing analyses of existential propositions (*e.g.*, Francez 2007; McNally 2016). These analyses generally characterise existential predication as comprising **obligatorily** some (type of) entity whose existence is being predicated (known as the PIVOT) and some **optional** restriction (perhaps locative) on its existence (the CODA; see Francez 2007). Adapting Francez's analysis would mean treating privative noun phrases as generalised quantifiers of nonexistence. This is consonant with Croft's (1991: 18) observation about the privileged status of existential predication: representable as a logical quantifier as opposed to the one-place predicates of other stative verbs. For Croft, the relevant semantic distinction is that, where statives predicate a *property* of a given individual, existentials are taken to "[indicate] the presence or absence of the object itself." This observation — an apparent conceptual distinction between the negation of a property versus the negation of existence — forms the basis of functionalist explanation of the "constant renewal" of negative existentials at stage 𝔹 of the NEC (see also Veselinova 2016: 173).

In (110), I adapt Francez's quantificational treatment of existential predication in order to give a semantics for PRIV (Francez 2007; McNally 2011). Effectively, privative forms are taken to instantiate a negative quantificational determiner; they assert that the intersection of the two sets of individuals ($P$, $Q \in \mathfrak{D}_{\langle e,t\rangle}$) represented by their arguments is empty (Barwise & Cooper 1981: 169).

(110) **PRIV realises a negative quantifier**

a. **no** $= \lambda P_{\langle e,t\rangle} \lambda Q_{\langle e,t\rangle} . P \cap Q = \varnothing$

languages tend to allow bare-NP existential predication (see de Weert 2016: 26ff on Flemish and Finnish sign languages.). Even Marra [mec] (a language cited in Croft 1991: 14) appears to permit bare NP existentials, if Heath's (1981b: 364) translations are to be trusted.

[95]Notable, however, is the fact that these stance/motion verbs often lend particular semantic nuances to the copular and existential predications in which they participate (see e.g. Wilkinson 2012: 610-611).

b. $[\![\text{PRIV}]\!] = \lambda P_{\langle e,t\rangle}\lambda Q_{\langle e,t\rangle}.\textbf{no}(P,Q)$

$P$ and $Q$ respectively represent those properties that can serve as the "pivot" and "coda" of an existential predication. Crucially $Q$ need not have any syntactic representation, but is rather derived from context indexically (see 107a). This process, — Francez's "contextual closure" (2007: 72)) — is spelled out in (112) below. Effectively, the variable $Q$ over sets of individuals is saturated by a contextually given relation and discourse entity/set of parameters (111).

(111) **Contextual domains of entities** (from Francez 2007: 71)
For any element $\alpha \in \mathfrak{D}_\tau$, $\alpha$'s contextual domain is given as:

$$d_\alpha \underset{\text{def}}{=} \lambda y_{\tau'}[\mathcal{R}_{\langle\tau,\langle\tau',t\rangle\rangle}(\alpha, y)]$$

That is, the set of individuals $y \in \mathfrak{D}_{\tau'}$ that are related to $\alpha_\tau$ by some pragmatically-inferred relation $\mathcal{R} \subseteq \mathfrak{D}_\tau \times \wp(\mathfrak{D}_{\tau'})$

$\mathcal{R}$ might be associated, for example with some relation **loc** which takes a set of salient spatiotemporal parameters (Francez suggests that this might be represented as a tuple $st = \langle t, \ell\rangle$ and maps these to some set of entites **loc**ated within $st$ (at that place, at that time.))

For Francez, the CODA, then, plays the role of a "contextual modifier", the same type as a frame adverbial. In effect, it serves to explicitly provide that entity whose contextual domain satisfies $Q$ (78). For example, in (107b), the privative phrase is contextually "closed" by $d_{\textit{mirtawa}}$ — some set of things related (perhaps possessed) by *mirtawa* 'the woman.'

A truth-conditional analysis of one privative-marked noun (*mungka* 'tree') from (107a) is provided in (112) below; each step is spelled out in prose.

(112) **'There were no trees (in that country)': deriving (107a)**

a. *mungka-majirri*
tree-PRIV

b. $[\![\textit{mungka}]\!]_{\langle e,t\rangle} = \lambda x_e.\text{Tree}(x)$

c. $[\![\textit{mungka-majirri}]\!]_{\langle\langle e,t\rangle,t\rangle} = \lambda Q_{\langle e,t\rangle}\left[\textbf{no}(\lambda x[\text{Tree}(x)], Q)\right]$
The privative-marked NP *mungka-majirri* 'tree-PRIV' is a generalised quantifier: it states that there exists nothing in the domain in the intersection of the set of trees ($\lambda x.\text{Tree}(x)$) and some other property $Q$ (which will be provided by the context of utterance, *sc.* Francez's *contextual domain* $d_\alpha$ (2007: 71)).

d. Contextual closure
$[\![\textit{mungka-majirri}]\!]^c = \textbf{no}\big(\lambda x[\text{Tree}(x)], d_\alpha\big)$
$= \textbf{no}\big(\lambda x[\text{Tree}(x)], \lambda y[\textbf{loc}(st_c, y)]\big)$
***Q*** is then saturated by $d_{st_c}$: the "set of things related [...] to the spatiotemporal parameters" being predicated of (*viz.* those things related to a particular patch of *warrarn* 'country' in the past, per Sharp's translation in (107a)) $d_{st_c} = \lambda y_e.\mathcal{R}(\text{'that country'}, y)$

As (112d) makes clear, in the absence of an explicit/linguistically-encoded "coda" to serve as a locus/restrictor for the privative predication, the **context** of utterance has made available an additional restriction ($d_\alpha$) as the second argument to **no**. This restriction may take the form of a function **loc**, which returns that set of things that are taken to be related to whichever salient spatiotemporal parameters the context provides.

### 5.1.4 Privatives and the NƎC

If we treat the privative marking on NPs as a type of negative existential predicate, a consequence of the NƎC is the prediction that these markers ought to eventually generalise, displacing an erstwhile standard negator (*i.e.*, PRIV markers will participate in the NƎC.) Phonological identity between privatives and SN is indeed well-attested in Australia (*e.g.*, in Bardi [bcj] (Bowern 2012) and Warrongo [wrg] (Tsunoda 2011)). In these languages, negative existential/privative predication may be syntactically distinguished from standard clausal negation by placing the general NEG particle post-nominally instead of preverbally (shown in (113), in addition to 3456(114a–b) below.)

(113) **Negation in Warrongo** ([wgu] Pama-Nyungan: Maric)

a. Senential negation with initial *nyawa* 'NEG'

***nyawa*** *ngaya* *balga-lgo* *banjo-lgo.*
**NEG** 1S.ERG hit-PURP ask-PURP
'I will not hit [him]. [I] will ask [him].' (Tsunoda 2011: 363)

b. Existential negation with postnominal *nyawa* 'NEG'

*nyawa, yarro walwa yamba.*
NEG this bad country.

*yori* ***nyawa,*** *gajarra* ***nyawa*** *worriba* ***nyawa,*** *barrbira* ***nyawa,***
kangaroo **NEG**, possum NEG sugarbag.bee NEG echinda NEG

*jagay* ***nyawa.***
sand.goanna NEG

'No, this country is no good. There are no kangaroos, no possums, no bees, no echidnas, no sand goannas [in my country].' (Tsunoda 2011: 661)

A possible example of a postnominal existential negator acquiring the function of clause-initial standard negator is found in Wirangu ([wgu] Pama-Nyungan: Thura-Yura). This scenario is described in § 5.2.1 below, along with a discussion of its potential import for theories of the NEC.

## 5.2 Negative domains & the NEC in three Pama-Nyungan subgroups

In this section, comparative and langauge-internal data from three subgroups of Pama-Nyungan, as they relate to the Negative Existential Cycle, are investigated.

§ 5.2.1 comprises a discussion of Thura-Yura — a family spoken along the South Australian coast. In Thura-Yura, we observe a likely trajectory where a suffixal privative form appears to have developed into a preverbal standard negator *maga*. In Wirangu, this has change created the conditions for the recruitment-by-borrowing of lexical material from an unrelated neighbouring language as a new privative.

§ 5.2.2 consideres data from Yolŋu Matha, a family spoken in Eastern Arnhem Land. This section considers the competition and structured variation between two markers, *yaka* and *bäyŋu* — the latter previously having been restricted to 'negative quantifier' functions. In addition to this, we consider comparative evidence which suggests that in Djambarrpuyŋu privative marker *-miriw* has expanded out of its traditional domain, to the extent that it is now showing signs of also being in competition with the preverbal negative particles. Conversely, the Ritharrŋu data show how a distinct sentential negative suffix *-ʾmayʾ* appears to have been borrowed from a neighbouring language; a finding not predicted by (unidirectional) accounts of the NEC.

Finally, § 5.2.3 examines standard negation as realised by negative suffixation in Arrernte;

a typologically unusual feature for Australian languages. It is shown that negated clauses in Arrernte are actually derived (de-verbal) nominal predicates. This fact of Arrernte appears to provide strong evidence in favour of a trajectory where the standard negation strategy in this language is an erstwhile privative (negative existential) marker *-tye=kenhe* that has completely displaced an older form (and then triggered the recruitment of a new special negator for negative existential predications *-kwenye*).

### 5.2.1 Thura-Yura: change & renewal in the negative domain

Thura-Yura is a Pama-Nyungan language family, with nine documented varieties historically centered on and around the South Australian coast. The Western varieties of these languages abut the Wati (Western Desert) family. Figure 13 describes the familial relations of the described Thura-Yura languages whereas Table 7 compares their negative lexica (including a possible reconstruction.) Examples of Wirangu negative predications are given in (114) below.[96]

**Figure 13**. A selection of the internal structure of the Thura-Yura family (spoken in South Australia) following Simpson & Hercus 2004: 183. *Nangga* is the name given to the Western subgroup whereas core-ThuraYura refers to the Eastern varieties (see Figure 12 above for the approximate geographic distribution.)

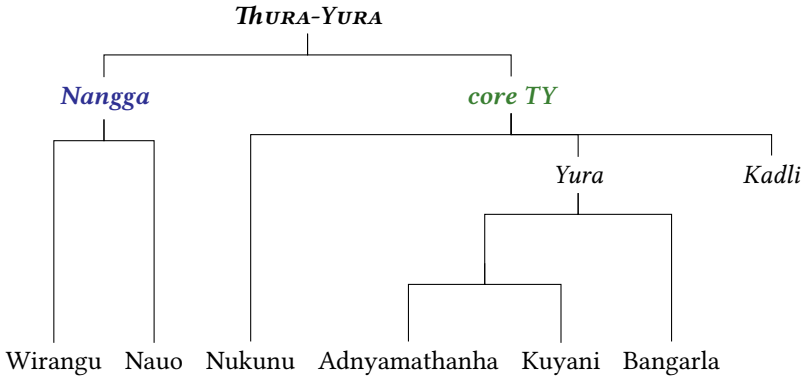


Table 7 shows (colour-coded for cognacy) four of the negative-associated lexical items in the Thura-Yura family, each of which will be discussed here. It allows for a probable reconstruction of a standard negator (or nominal negator) **maka* and/or SN **guda* in the ancestral language. Of Wirangu [wgu], Hercus (1999: 57) claims that privative morpheme *-yudu* has entered the lan-

[96]Note that (Hercus 1999: 57) describes a number of other markers with negative import in her Thura-Yura grammar (including two other lesser-used privatives, which she regards as older. *Cf.* Veselinova's (2016: 173) "constant renewal of the negative existentials."

guage as a borrowing from the Kokata language, a Western Desert dialect spoken in neighbouring territories to the North ([ktd] Pama-Nyungan: Wati). *-yudu* has largely displaced *-maga* as the form of the privative. The recruitment of a distinctive privative form (from lexical resources of a neighbouring, unrelated language) may well be taken as evidence of pressure for the privileged marking of negative existentials that is taken to motivate the beginning of the NƎC (*sc.* stage transition $\mathbb{A} \rightarrow \mathbb{B}$).

**Table 7.** Reported partitions in the negative semantic space (data adapted from Black 1917; Hercus 1992, 1999; Hercus & Simpson 1996; Schürmann 1844.) Colouring reflects hypothesised cognacy of lexical items across Thura-Yura. Dashed arrows represent borrowings from neighbouring languages, solid arrows semantic (functional) change.

| *(Wati)* | NEGQ/PRIV | SN | 'cannot'/'not yet' |
|---|---|---|---|
| Wirangu [wgu] | *-yudu*<br>*-maga* | *maga* | *guda* |
| Nauo [nwo] | ? | *makka* | |
| Bangarla [bjb] | *-maga* | *makka* | *kutta* |
| Adnyamathanha [adt]<br>Kuyani [gvy] | *pari-* | *(g)uda* | – |
| Nukunu [nnv] | *-wakanha*? | | |
| *proto-TY* | | ***maka**/***guda** | |

*Diyari*? ([dif] Karnic)

(114) **Examples of Wirangu negation strategies (from Hercus 1999)**

a. *maga* SN

*Warlba marnaardu-nga* ***maga*** *wina-rn!*
wind big-LOC **NEG** go-PRES

'(I am) not going out in a gale!' (142)

b. *-maga* privative

*Nganha gidya-**maga***
1S child-**PRIV**

'I haven't got any children.' (57)

c. *-yudu* privative (“most commonly used”)

*Nganha barnda-**yudu***
1S money-**PRIV**

‘I haven’t got any money.’ (57)

d. *guda* SN (modalised)

*Ngadhu **guda** wangga-rn*
1S.ERG **NEG**.IRR speak-PRES

‘I can’t talk (about this; it’s too embarassing.)’ (143)

Similarly, Adnyamathanha [adt] and Kuyani [gvy] have recruited *pari-* as a negative existential/predicator of absence (Hercus 1999: 141). This may also be a borrowing from the Karnic lanugages that abut Eastern Thura-Yura (e.g. Diyari [dif] *pani* ‘PRIV’, (Austin 1981, C. Bowern *p.c.*).[97] *maga* retains its function as the primary standard negator particle in Wirangu (and Bangarla [bjb]), whereas *guda* (the standard negator in Adnyamathanha and Kuyani), is restricted to a subset of negative meanings: ‘cannot’ and ‘not yet’ (note that, particularly in northern Australia, the form of negative marking is often conditioned by speaker mood/reality status (see Part III, esp. § 9 for an example of a related phenomenon.)

A potential cognate in the southern Thura-Yura (Kadli) language, Kaurna [zku] (not represented in Figure 5.2.1 for a lack of available data) *wakka-* is found (possibly fossilised) in lexical items *wakkarendi* ‘err, stray, be lost’, *wakkariapendi*, ‘forget, not think of, leave behind’, *wakkariburka* ‘ignorant person, simpleton’ (Schürmann & Teichelmann 1840: II-52).[98] All three of these words appear to be analysable; *wakka-* contributing some notion of emptiness, characteristic of an erstwhile nominal negator/privative category. Apparently, Teichelmann et al. (1840, cited in Amery 1996) give *mukandariappendi* as the form for ‘forget’ — support for potential *m~w* alternation and the cognacy of these forms.[99]

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[97]This remains to be demonstrated, but *pari-* may otherwise be cognate with Wirangu *bal-* ‘die,’ elsewhere described as a lexical source for negators (Veselinova 2013, van Gelderen this volume). An argument potentially in favour of this is found in a possibility of an example of lexical renewal likely born of euphemism; Adnyamanthana *inta-* ‘die’ appears to be cognate with Wirangu *inda-* ‘spill.’

[98]Note attested stems in *pia-**rendi*** ‘scattered, stray’, *pia-**riappendi*** ‘scatter, disperse’, ***burka*** ‘adult, man’ (Schürmann & Teichelmann 1840: II-4,38).

[99]Data for Kaurna (and other extinct varieties) is scarce, effectively limited to the lexica published by nineteenth-century missionaries, Schürmann & Teichelmann (1840). A possible reflex of **guda* is found in items like *kudmunna* ‘ignorant, not knowing’ (II-12). Additionally, Narungga *-gu* (potentially a “compound form”) appears in a number of

There are insufficient available data to adjudicate between competing hypotheses that (a) **guda* has been largely displaced by erstwhile nominal negator *maga* in Wirangu or (b) *guda* has replaced **maka* in Adnyamathana/Kuyani. Nevertheless, an analysis informed by the insights of the NƎC favours and supports (a).

Under such an analysis, Wirangu – the Thura-Yura outlier – provides a particularly clear example of a language, the negator forms of which are transitioning through the NEC. The erstwhile negative existential *-maga* has entered the domain of standard, clausal negation, adopting the morphosyntactic properties of a preverbal negative (stage $\mathbb{B} \rightarrow \mathbb{C}$),[100] and triggering the recruitment of a new privative marker from the lexical resources of a neighbouring language *-yudu* which is now in competition with the old marker (stage $\mathbb{A} \rightarrow \mathbb{B}$). The ostensible simultaneity of these changes also provides further evidence for competition between functional and formal pressures for generalisation and recruitment (*sc.* Veselinova's "constant renewal of the negative existential" (2016: 173)). Miestamo 2005: 225, Phillips to appear 2021a.)

Additionally, if the directionality of change described here is indeed on the right track, Wirangu can be shown to resist classification into any unique NƎC 'stage', transitional or "cardinal" (in which case the NƎC as described in previous work does not represent a complete linguistic typology for negative existential marking strategies.)[101]

### 5.2.2 The Yolŋu negative domain

The Yolŋu languages, a Pama-Nyungan grouping of at least six dialect clusters (roughly coterminous with sociocultural groupings) are spoken through Eastern Arnhem Land (in the far north of

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words with a meaning akin to 'blocked', according to Eira & Narungga Aboriginal Progress Association (2010: 82). Notably, compare *mina-gu* 'blind' (lit. 'eye-blocked') where the semantic connection to an inability/impossibility reading is clear.

Other negative lexical items reported here are *yakko* which appears to function as a SN marker and *-tinna* which is given as the most frequent form of 'without' (i.e. the privative.)

[100]Note that, while this change is consonant with functional grammaticalisation "generalisation", the transition from bound- to free-form is perhaps surprising in view of the (controversial) claim that grammaticalisation clines involve processes of phonetic reduction and syntactic "rigidification" (e.g. Geurts 2000). If the account described here is on the right track, the trajectory of *maga* in Wirangu constitutes a counterexample of these grammaticalization "form" paths (see Ahern & Clark 2017; van der Auwera 2008: 40 for the dissociation of "formal" and "functional/semantic" grammaticalisation processes).

[101]The issues of "assigning" the entire negative domain of a given language to a unique stage in the NƎC have been explored in some detail by (Veselinova 2016), who observes similar classificatory issues for a number of languages (*e.g.*, East Futunan [fud]: Polynesian).

the continent) by some 12,000 Aboriginal inhabitants (see Part III of the current dissertation, also Wilkinson 2012: 18*ff*). Yolŋu are strictly exogamous – each cultural group (clan) being associated with a distinct dialect, a situation that has led to a significant amount of stable linguistic variation (and, consequently, undetermined internal classification; see § 7.2, also Schebeck 2001, Bowern & Atkinson 2012: 836).

This section compares the negation systems of three distinct Yolŋu varieties: Djambarrpuyŋu [djr], Ritharrŋu [rit] and Wangurri [dhg] in view of making inferences about change in marking strategies over time. A pattern similar to that observed in Thura-Yura is shown. The key findings are tabulated in Table 8 below. The final subsection (§ 5.2.2.4) comprises a discussion of privative case semantics with particular reference to Yolŋu.

**Table 8**. Partitioning of the negative space in three Yolŋu languages.
'PROH' negates imperatives, standard negation (SN) represents 'standard negation'. 'PRIV' is taken to denote a suffix of the type described above. 'NEGQ' (Wilkinson's "negative quantifier") are independent words that appear to quantify over the NP which they modify (*i.e.*, perform (minimally) the same work as a PRIV suffix.)

| | | PROH | SN | NEGQ | PRIV |
|---|---|---|---|---|---|
| **Djambarrpuyŋu** | djr | *yaka* | *yaka*<br>*bäyŋu* | *bäyŋu* | *-miriw* |
| **Ritharrŋu** | rit | *yaka* | *-ˀmayˀ* | *yakaŋu* | *-miriw* |
| **Wangurri** | dhg | *yaka*<br>*ŋangawul*<br>*bayaŋu* | *ʔyaka*<br>*ŋangawul*<br>*ʔbayaŋu* | *ŋangawul*<br>*bayaŋu* | *-nharra* |

### 5.2.2.1 Djambarrpuyŋu

**Djambarrpuyŋu** [djr] appears to provide an example of Croft's $\mathbb{B} \sim \mathbb{C}$ transitional-stage language. Wilkinson (2012: 356) describes the coexistence of two markers: *yaka* 'NEG' and *bäyŋu* 'NEGQ' (negative quantifier): claiming that 'both occur as propositional negators,' demonstrated in the data in (115) below, from Wilkinson (2012).

(115) **Standard negation in Djambarrpuyŋu**

a. yaka *as (full) clausal negator*

***yaka*** *ŋayi dhu ga ŋutha-n ŋaṉḏi-wal bäpa-wal*
NEG 3S FUT IPFV.I grow-I mother-OBL father-OBL

'They don't grow up with (their) mother and father.' (Wilkinson 2012: 691)

b. yaka *as negator in attributive (nonverbal) predication*

***yaka*** *dhuwali ŋatha, dhuwali ŋula nhä-n dhuwali botjin*
NEG MED food MED INDEF what-SEQ that poison

'That isn't food, that's something else, that's poisonous.' (Wilkinson 2012: 560)

c. yaka *as negator in possessive construction*

*warrakan limurruŋ* ***yaka*** *dhuwal*
animal 1P.INCL.DAT NEG PROX

'This meat isn't ours/for us.' [AW 20190505]

d. bäyŋu *as clausal negator*

***bäyŋu*** *ŋarra gäthur ŋorranha manymak-kunha munhawu*
NEGQ 1S today lie.IV good-TR.IV night

'I didn't sleep well last night.' (Wilkinson 2012: 357)

The distributional difference between these two markers is twofold. According to Wilkinson, *yaka* is ungrammatical in quantificational contexts and *bäyŋu* does not appear in imperative (*i.e.* prohibitive) contexts. It seems, then, likely, that in Djambarrpuyŋu, *bäyŋu*, an erstwhile negative existential has begun to encroach further into the negation space, entering into competition with *yaka*. *bäyŋu*, with reflexes in other Yolŋu languages, derives from (fairly productive) verbal root *bäy-* 'leave.'[102] Examples of negative existential uses of *bäyŋu* are given in (116) and prohibitive uses of *yaka* in (117).

(116) **Djambarrpuyŋu negative quantification**

a. *dhipuŋur-nydja* ***bäyŋu*** *guku*
MED.ABL-PROM NEGQ honey

'From this (tree) there's no honey.' (Wilkinson 2012: 554)

[102]Note also that *-THi* 'INCH' derives absence-associated change-of-state readings: *bäy-thi* 'be left over/behind'; *bäyŋu-thi* 'be/have none, pass away, die' (Wilkinson 2012: 378). The semantics of this suffix is investigated in § 8.1.

b. *(*yaka/)**bäyŋu** ŋarra-ku gi ŋorri ŋula dhiyal wäŋa-ŋur-nydja*
*NEG/**NEGQ** 1S-DAT IPFV.II lie:II INDF PROX.LOC place-LOC-FOC
'I don't have any here' (lit. 'at this place lie (are) none of mine')
(Wilkinson 2012: 691)

c. *bili (#yaka/)**bäyŋu** limurruŋ dhuwal bäwarraŋ*
because #NEG/**NEGQ** 1d.INCL.DAT PROX animal
**Intended reading**: 'Because there's no meat for us.'
(Wilkinson 2012: 560, infelicity judgment AW20190505, cf. 115c)

Note in particular the (obligatory) contrast in the interpretation of (116c) as against (115c) where the semantics of *bäyŋu* and *yaka* come apart. Only the former is available as a negative quantifier (that is, on the negative existential reading.)

(117) **Djambarrpuyŋu imperative negation (prohibitive, see also §5.2.2.4)**
***yaka(/*bäyŋu)** waŋi!*
**NEG**(/*NEGQ) talk.II
'Don't talk!' (Wilkinson 2012: 360)

There are multiple arguments for a reconstruction of **yaka* 'NEG' to proto-Yolŋu. First is the fact that it is reported as a negative particle in all Yolŋu varieties (Schebeck 2001: 31).

Secondly, possible lexical cognates are reported in likely sisters to Yolŋu in the Western Pama-Nyungan subfamily (a monophyletic branch reconstructed in Bowern 2012: 838). Sharp (2004: 226) and O'Grady (1963: 67) both report a Nyangumarta ([nna] W. Pama-Nyungan: Marrngu) verb *-yaka-* meaning 'leave, quit.' McKelson (1974: 35) additionally gives *yaga* as an alternative (potentially emphatic) negative particle in Mangala ([mem] Marrngu). It is very possible that these Marrngu verbs are cognate with the Yolŋu negator, despite Marrngu and Yolŋu having been distantly separated for centuries. Further, Dixon (2002a: 85) lists other potential cognates to negative *yaka* from a number of other dispersed Pama-Nyungan languages.

Thirdly, the generalisations of the N∃C as formulated by Croft (1991) and Veselinova (2016 a.o.) provide a principled typological basis through which an erstwhile negative existential construction arises in a language and begins to encroach upon the functional domain of a standard (clausal) negator (transitional stage $\mathbb{B} \sim \mathbb{C}$.) If this diachronic analysis is on track it may have implications for our understanding of the characteristics of stage $\mathbb{B} \sim \mathbb{C}$: negative imperatives (prohibitives)

being one of the last 'holdouts' for an erstwhile SN marker that is threatened by competition from a negative existential or quantifier. Dixon's typology (2002a: 84) indeed entails an implicational relationship: if there is formal syncretism between privative and prohibitive marking, then these will be syncretic with the SN marker as well. Gumbaynggir ([kgs] Pama-Nyungan: Southeast; Eades 1979) and Nyawaygi ([nyt] Pama-Nyungan: Dyirbalic; Dixon 1983) are given as examples of a languages for which the prohibitive patterns distinctly from all other negative functions (a datum which is a potential indicator of a language in N∃C stage $\mathbb{B} \sim \mathbb{C}$). The Ritharrŋu data presented in §5.2.2.2 below raise a potential counterexample.

#### 5.2.2.2 Ritharrŋu

The facts outlined in Heath's description of **Ritharrŋu** (rit, 1980c) diverge in a number of significant ways from the Djambarrpuyŋu situation described above. Further, they appear to pose a potential problem for the generality/predictive power of the N∃C as formulated.[103] While a form *bayŋu* has been retained in the language (glossed as 'nothing'), there is an additional suffixal form *-ˀmayˀ* used as the "basic" (Heath 1980c: 101) general negator alongside *yaka* (the latter form is the standard means of forming prohibitives in Ritharrŋu, shown in 119).

(118) **Standard and copular negative suffixation of *-ˀmayˀ* in Ritharrŋu**

a. *wäni-na-ˀ**may**ˀ napu*
go-PST-**NEG** 1p.EXCL
'We didn't go.'

b. *munaŋa-ˀ**may**ˀ rra*
white.fellow-**NEG** 1S
'I'm not white' (Heath 1980c: 101)

(119) Prohibitive formation with *yaka* in Ritharrŋu

***yaka** nhe baŋgurlˀ-yu-ru*
**NEG** 2S return-*them*-FUT
'Don't come back!' (Heath 1980c: 76)

[103] Data provided from Heath (1980c) has been standardised to an Australianist (Yolŋu) orthography from his original IPA transcription.

Existential negation, however, is introduced by the complex form *yaka-ŋu* (shown in 120 below). This form is clearly related to the Djambarrpuyŋu SN particle described above, with archaic Yolŋu suffix *-ŋu* (described as an 'adjective ⇒ substantive' derivation by Schebeck (2001: 34), see also Wilkinson 2012: 174ff, Heath 1980c: 24.) Heath glosses *yakaŋu* as a particle meaning 'absent' (1980c: 102).[104] Recalling the possible lexical sources of pan-Yolŋu form (Table 8 *supra*) **yaka* discussed in the foregoing section, this is an appropriate translation.

(120) **Existential negation with *yakaŋu* in Ritharrŋu**

a. ***yakaŋu*** *ŋay* *dhäŋgu*
**NEGQ** 3S meat
'There's no meat.' (Heath 1980c: 102)

b. ***yakaŋu*** *ŋay* *(yaŋˀŋara)*
**NEGQ** 3S (here)
'He isn't here' (Heath 1980c: 102)

While it may be tempting to relate *bäyŋu*, as found in other Yolŋu languages, to a possibly lenited form *-ˀmayˀ*, as Heath (1980c: 102) points out, it is much more likely to be a borrowing from the geographically neighbouring language Ngandi [nid], an unrelated, non-Pama-Nyungan language also spoken in southeastern Arnhem for which *-ˀmay* is a fusional negative-cum-present tense suffix. The structure of the negative domain in Ritharrŋu (*i.e.*, the use of *-ˀmayˀ* in (zero-)copular clauses (118a) and the apparent unavailability of *-ˀmayˀ* in quantificational/existential predications) provides support for the borrowing account, which is considerably more parsimonious than an account by which the syntax, semantics, phonology and perhaps morphology of *bäyŋu* were radically reorganised into a SN suffix. If this is indeed the case, the trajectory runs counter to hypotheses of a unidirectional NEG (*e.g.*, Veselinova 2016: 146): an innovative *standard negator* has been recruited into Ritharrŋu's negative space, whereas the so-called "special

[104]Note that Heath also points out that stance predicates with copular/existential readings can also receive negative marking as in (120b′) below.

(120b′) *nhiena-ˀ**may**ˀ* *ŋay* *yaŋˀ-ŋarṛa*
sit.PRES-**NEG** 3S here
'He isn't (sitting) there' (Heath 1980c: 102)

negators" have retained an older form (Figure 14).

Whatever the providence of *-ʔmayʔ*, this is the marker of standard clausal negation whereas existential negation appears to be obligatorily marked by *yakaŋu*. Incidentally, on the basis of the limited data presented here, Ritharrŋgu, a language closely related to Djambarrpuyŋu, might *synchronically* be described as a stage $\mathbb{B}$ language *per* the negative existential typology described in this volume, although such a description plasters over the likely diachronic trajectory of Ritharrŋu negative marking.

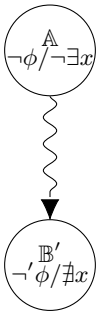


**Figure 14.** Not predicted by the N∃C, Ritharrŋu appears to have recruited an innovative clausal negator $\neg'$ into negative space. This is likely to be an effect of extended contact with an unrelated non-PN language (Ngandi [nid]).

#### 5.2.2.3 Wangurri

Finally, negation in **Wangurri** [dhg], a northern Yolŋu dialect, appears to make use an additional particle with the semantics of a general negator, *ŋangawul* in addition to *yaka* and *bayaŋu*. McLellan (1992: 195) claims that *ŋangawul* and *bayaŋu* can be used in all negative contexts and that *yaka* cannot be used as a "negative quantifier." These data are exemplified in (121) below, all adapted from McLellan (1992).

(121) a. *Negative existential use of* ŋangawul

*gulitj-ma* ***ŋangawul****-nha* *ŋanapiliŋgura* *ŋapa-ŋa* *gayŋa* *nyena*
true-DP **NEG**-DP 1p.EXCL:loc back-LOC IPFV.INFL sit.INFL

'No true ones at our backs are living (*i.e.* descendants.)' (246)

b. *Clausal negation use of* ŋangawul

*ga* ***ŋangawul*** *ŋaya* *barpuru* *nhawun* *ŋunhuŋ* *yolŋu-wuŋ* *ŋäku* *dhäwu*
and **NEG** 1S recently like that.ABL person-ABL hear.INFL story

'I didn't recently hear the story about that person.' (136)

c. *Negative imperative with* yaka

***Yaka*** *dhaŋu* *ŋäpikiʔ-murru* *garruwa*
**NEG** this white.person-PERL speak.IMP

'Don't talk through white (language)!' (195)

d. *Negative imperative with* ŋangawul/bayaŋu

***Ŋangawul/bayaŋu*** *ŋäpakiˀ-murru-m* *garrun,* *bayaŋu/ŋangawul!*
**NEG/NEG** white.person-PERL-DM speak.NEU[106] **NEG/NEG**

'Don't talk through white (language), no!' (195)

e. *Potential ambiguity between standard and negative existential readings with* ŋangawul

***Ŋangawul****-nha* *ŋaya* *rakaran* *nhangul*
**NEG**-DM 3S tell.PFV 3S.ALL

(i) 'I told him nothing.' (≈ 'There is no thing such that I told him that thing.')
(ii) 'I didn't tell him'(≈ 'It's not the case that I told him [that thing.]') (196)

The Wangurri data show competition between three separate markers and provide a series of interesting insights and questions in view of predictions the NƎC would make. The domain of *bayaŋu* (cognate with *bäyŋu* as described above) has further expanded into the prohibitive domain, behaviour that, taken in isolation, may suggest that this marker has moved further along the cycle drawing Wangurri further towards a ℂ-type system (characterised by the availability of ambiguous readings shown in 121e).

*Nangawul* appears to be an innovation. It has an unclear etymology and stands in no obvious relation to a potential cognate in any related or borrowing from any neighbouring language. Given its wholesale entry into the negative domain – that is, this lexical item's ability to negate verbal clauses, existential clauses and imperatives, it is unlikely that the grammaticalisation of this item taken in isolation can be marshalled as evidence of the NƎC. Further research on Northern Yolŋu has the potential to shed light on the change in available readings associated with *ŋangawul*, but until that point, our best hypothesis may be one of lexical replacement, where *ŋangawul* analogistically replicates the domain of the (likely older) negator *bayaŋu*, whose emergence in Yolŋu was described in §5.2.2.1.

The manifestation of the NƎC in Yolŋu is further nuanced below, when we consider additional competition from privative morphology in these languages.

[106]It is unclear whether the difference in verb inflection between *yaka-* and *ŋangawul-/bayaŋu*-prohibitive is categorical. If it is, this may be construed as additional evidence that the use of *ŋangawul/bayaŋu* for prohibitive formation is a more recent innovation (and consequently does not trigger the relatively infrequent imperative inflection.)

#### 5.2.2.4 The PRIVative in Yolŋu

All Yolŋu languages make regular use of a *privative* suffix 'PRIV' (see Table 8 above). For most languages, the phonological form of this marker is *-miriw*. The only exceptions to this are found in Dhaŋu-Djaŋu ([dhg], including Wangurri), for which the form is *-nharra* (Schebeck 2001: 34) and Yan-nhaŋu [jay] *-nharraŋu* (C. Bowern, p.c.). This latter form may be cognate with the Warluwarra [wrb] and Bularnu [yil] (Pama-Nyungan: Warluwaric) privative *-nharra(ŋu)* (Brammall 1991; Breen 1970: *e.g.*,). Warluwaric is given by Bowern & Atkinson (2012) as the most likely closest sister node to Yolŋu in Western Pama-Nyungan. If this is the case, then ***nha-* can be reconstructed as a WH-particle to these subgroups' most recent common ancestor (cf. Breen 2000: 576). It is used as the basic root WH-words and indefinites (e.g. *nhä*$_{[dhg]}$; *nhangarli*$_{[yil]}$ 'what, something') in Yolŋu and Warluwaric. *yarraba* shows up in Bularnu in some contexts as a word for 'nothing' (Breen 2000: 626, 690) – the univerbation of ***nha* and ***(y)arra* into some type of negative indefinite is therefore a possible source for the *-nhärra* privative.[107]

The etymology for *-miriw* is unclear (although it possibly stands in some relation to *miḏiku(?)* 'bad'$_{[rit]}$, 'rubbish (incl. a sororal kinship relation)'$_{[djr]/[guf]}$ and appearing in words like *miḏik-uma* 'make.badly' *miḏik-irri* 'go.badly', *noy-miḏiku'ŋu* 'feel-sad' *etc.*) In view of the facts above, we have reason to reconstruct a proto-Yolŋu privative **-nharra*, replaced by innovative *-miriw* in the bulk of contemporary (viz. non-Northern) varieties.

In § 5.1.3 above, we saw a potential semantics for canonical uses of privative marking. This semantics, which understands the privative as a quantifier that predicates nonexistence of the NP in its scope, restricted to a domain that is provided elsewhere in the discourse, suitably captures nonexistence, absence, and non-possession readings of privative NPs. This semantics for the "canonical privative", however, papers over the significant degree of semantic variation in markers described as 'privatives' in the Australianist descriptive tradition. Djambarrpuyŋu *-miriw* appears felicitous in the broad range of contexts shown in (122) below.

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[107] Further support for this etymology comes from Wakaya ([wga] Warluwaric) *-nhawerru* 'PRIV' (Brammall 1991: 36). *-werru* is the Wakaya proprietive marker (<Proto-Warluwaric **-warra* 'PROP'); consequently, *-nha-* seems to have acquired some type of negative semantics.

(122) **A broad range of meanings available to Djambarrpuyŋu [djr] *-miriw* 'PRIV'**

a. -miriw *predicating non-possession*

*weyin muka ŋarra dhuwal nhinana-ny yothu-**miriw***
long okay 1S PROX sit.III-FOC child-**PRIV**

'for a long time I lived here without children' (Wilkinson 2012: 445)

b. *Privative use of* -miriw*; synonymous with* bäyŋu 'NEGQ'

*yolŋu-ny gan nhinan warraŋul bala'-**miriw**, **bäyŋu** bala'*
people-PROM IPFV.INFL sit.INFL outside house-**PRIV** **NEGQ** house

'People used to live outside without houses, there were no houses'
(Wilkinson 2012: 443)

c. *Negative existential use of* -miriw

*bili yätjkurr ŋunha wäŋa warralŋur-nydja gapu-**miriw***
because bad DIST land NAME-FOC water-**PRIV**

'…because the place is bad. (It's) without water.' (= there's no water)
(Wilkinson 2012: 443)

d. -miriw *predicating the absence of a de-verbal property*

*maŋutji ŋorra-nha-**miriw** ŋunhayi wäŋa*
eye lie-IV-**PRIV** DIST.LOC place

'It's impossible to sleep at that place.' (Wilkinson 2012: 448)

e. *Privation of a de-verbal relation*

*l̪uka-nha-**miriw** ŋayi nunhi dharpa-ny*
eat-IV-**PRIV** 3S ENDO tree-PROM

'That tree is not edible.' (Wilkinson 2012: 446)

f. *Privation of an eventive de-verbal relation*

*djamarrkul̪i-y' marrtji lakaram baḏatju-na-**miriw***
children-ERG go.I speak.I make.mistake-IV-**PRIV**

'The children were speaking without making mistakes' (Wilkinson 2012: 449)

g. -miriw *in a subordinate clause: privation of a de-verbal property/disposition*

*…ga yolŋu-wal-nha ŋuri-kal-nha wäŋa nhä-nha-**miriw**-wal-nha miltjiri-wal-a*
and person-OBL-SEQ ANA-OBL-SEQ place see-IV-PRIV-OBL-SEQ blind-OBL-SEQ

'…and to the person who cannot see the place, the blind.' (Wilkinson 2012: 448)

h. *Negative predication (locative)*
**Context**: A response to the question 'is it inside?'

*yaka, djinawa'-**miriw***
NEG, inside-**PRIV**

'No, it isn't inside.' (Wilkinson 2012: 445)

i. *Prohibitive use*

*l̪uka-nha-**miriw**-nha dhuwali-yi-ny dhulŋuŋu-n ŋatha*
eat-IV-**PRIV**-SEQ there-ANA-PROM assigned-SEQ food

'Don't eat it, that food is for someone else.' (Wilkinson 2012: 446)

j. *Sentence fragment (likely restricted to informal use)*
**Context**: Playing a game where the researcher's pencil is grabbed off the table

Is this your pencil? ***Miriw!***
PRIV

'Is this your pencil? (There's) none!' [AW 20180731]

The data in (122) are extremely relevant for current purposes. They show how the semantic domain of the PRIV, a lexical item with the semantics of canonical negative existential, has expanded (such uses of PRIV are reportedly ungrammatical in other varieties, including Yan-nhangu [jay], Claire Bowern, *pers. comm.*). Whereas these markers are generally thought of as quantifying over a domain of individuals (a-c) above, the remaining examples (d-i) all show *-miriw* ranging over a domain of *eventualities*. Morphologically, *-miriw* is suffixed to a verbal root in the fourth inflection *-∅~-na~-nya~-nha* 'NMLZR/**IV**', ostensibly the strategy for deriving eventive nominals from verbal predicates (*sc.* nominalisation, see Lowe 1996: 103).[108] In (g), for example, *-miriw* seems to actually scope over an eventive nominal whose semantics derive from an entire VP: 'the person such that that person engages in no event of 'seeing places.' Similarly, (h) appears to mark the absence of a co-location relation between two objects. This verbless sentence gets its negative force from the privative suffix. Our common conceptions of privative marking certainly do not predict this function.[109] This phenomenon and its implications for privative semantics and theories of the NƎC

[108]See Wilkinson (2012: 630) for discussion on whether the nominalising suffix ("complementiser case") is in fact synchronically/formally identical to **IV**.

[109]Note however, that Tamm (2009, 2015) reports the parallel use of abessive suffixes and a preverbal negator in Estonian. She suggests a difference between the two strategies that is anchored in some shade of modal meaning (i.e. "a presupposition about a plan, a standard or an expectation considering a normal state of affairs"). See §6 (note 130) for more.

are further discussed in chapter 6, where we consider how the semantics for PRIV can be simply extended to account for this (ostensibly innovative) usage.

Also notable is the use of privative constructions in forming prohibitives, shown in (122i). Wilkinson (2012: 446) notes that, here, privative-marked eventive NPs express "a complete negative predication…stronger, less polite than regular imperatives." This strategy indeed seems analogous to English utterances of the type 'no smoking' and 'no eating', which indeed do carry imperative force and are constructed in a manner that appears to quantify over 'smoking' and 'eating' events in the utterance context.

This subsection has marshalled data about an evident expansion in the semantic domain of the privative marker in Djambarrpuyŋu; from predicating *absence of "things"* to predicating the *nonactualisation of events* in a given context. This consequently points to the apparent generalisation of a lexical item out of the semantic space of traditional 'negative existentials' into functions that are normally asociated with standard (or other special types of) negation. The following section on Arrernte negation will investigate an ostensibly similar phenomenon further along the cycle; one that has rendered these languages outliers with respect to typological generalisations about negation strategies in Australian languages. This section should shed further light on the 'bleaching/generalisation' pathways of special negators.

### 5.2.3 Arandic: the nominal status of negated verbals

Along with a number of other Arandic varieties, Mparntwe (Alice Springs) Arrernte ([aer] Pama-Nyungan: Arandic) is spoken in the Central Australian desert. It is one of several of Australian languages that marks negation with a verbal suffix, fused into the verbal complex and diverging from the broad characterisation of Australian languages deploying preverbal SN marking made at the beginning of this chapter. According to Wilkins (1989: 71), this negation suffix *-(t)yekenhe~-tyange*[110] 'replace[s] tense [marking]' in this language; that is, the main verb of a negated clause carries none of the tense/mood/aspect information that it does in a positive Arrernte clause — effectively an instantiation of Miestamo's negative asymmetry with respect to *finiteness* (A/Fin

[110]The form of this suffix is given as *-ety(e)=akenhe~-etayng* in Henderson 2013. I have not changed the orthography in example sentences cited here, rather opting to replicate the orthographic forms and glossing decisions of each author. The sole exception to this is standardisation to Leipzig glossing conventions and Henderson's $\text{VNeg}_{(1/2)}$ to NEG.

2005: 73ff).

In Arrernte, an inflection-bearing auxiliary from the *"existential-positional" class* (predicates with stance or motion semantics which are grammaticalised in copular and existential constructions), is then optionally introduced to encode this information as shown in (123a). (123b) gives an example of temporal information (*viz.* pastness) being (presumably) supplied by the nonlinguistic context.

(123) **Upper Arrernte (aer Pama-Nyungan: Arandic)**

a. *Anwerne-k-artweye mape-le pmere kurn-ile-**tyekenhe** ne-**ke**.*
1p-DAT-custodian PL-ERG country bad-CAUS-**NEG** be-**PST**
'Our ancestors didn't (ever) hurt the country.' (Wilkins 1989: 235)

b. *Kweye, the ng-enhe aw-**etye=akenhe***
oops 1S.ERG 2S.ACC hear-**NEG**
'Sorry, I didn't hear you' (Henderson 2013: 412)

Wilkins (1989: 235, fn 17) suggests that the negative suffix is historically derivable from 'the nominalising suffix *-(n)tye*', to which a possibly erstwhile negative form *kenhe*,[111] with reflexes in other Arandic varieties, attaches (see also Yallop 1977: 275). Support for this semi-complete univerbation is found in the fact that a number of formatives can be inserted at the boundary between the negative inflections two postulated components (see Wilkins 1989: 378*ff*), shown in (124a). Seizing on this argumentation, Henderson (2013: 411-26) goes to some lengths to demonstrate the nominal status of verbal roots inflected with *-etye=akenhe*; some of these arguments are rehearsed here in view of better understanding the diachrony of Arrernte negation, although the reader is referred to his work for more evidence in favour of this analysis.

[111] A particle *kenhe* is also reported by Wilkins (1989: 372) which is glossed as BUT and indeed appears to have the syntax of a coordinator. While the semantics may contain some element of negative/subtractive meaning, it is unclear what relation this particle bears to the verbal negator (including questions about possible directionality of semantic change or whether this is merely an example of homonymy.) In related Arandic language Kaytetye [gbb], this form is translated as 'might' (?: 424)

(124) **The status of negative inflection in Eastern/Central varieties of Arrernte**

a. En(do)cliticisation of adverbial particles in the verbal negator

*Re=atherre untyem-eke~untyeme an-err-eme angk-err-**etye**«arlke»**akenhe***
3d.NOM facing.away-DAT=REDUP sit-d-PRS speak-RECIP-**NEG**«also»

'The two of them are sitting down and not talking to each other.'

(Henderson 2013: 417)

b. Apparent ergative suffixation in cases of secondary predication (obligatory *iff* the main predicate is transitive)

*Re il-eke arlkw-**etye**=**akenhe**-ele*
3s.ERG cook-PST eat-**NEG**-ERG

'S/he cooked without eating.' (Henderson 2013: 418)

c. Negated verb form taking nominal negator

*Angk-**etye**=**akenhe**-kwenye; irnterre anthurre angk-eke*
speak-NEG-NomNEG intensely INTNS speak-PST

'(She) wasn't *not* talking; she was talking a lot.' (Henderson 2013: 416)

The sentences in (124) all suggest the emergence of a standard negation strategy out of an erstwhile special nominal negator:

(a) provides formal evidence of the complex status of *-tyekenhe*: a set of adverbial particles (including *=arlke* 'also', *=nthurre* 'really', *=ante* 'only' *etc.*) appear to be able to intervene between the 'nominalising formative' *-etye* and the 'negating formative' *=akenhe*. It should be noted that cross-linguistically, this appears to be a set of (adverbial) operators that associate with focus (e.g Jackendoff 1972; Rooth 1985). And as might be expecting, according to Wilkins (1989: 381), the locus of insertion of these particles indeed has scopal implications, compare *(ayenge) arlkwe-**tyekenhe**=ante* '(I) only didn't eat' and *(ayenge) arlkwe-**tye**«ante»**kenhe*** '(I) didn't only eat.'[112]

(b) shows the negated verb receiving ergative marking when participating in secondary predicamtion alongside a transitive verb. In this sense, the negated verb again behaves morphosyntactically identically to nominals (and unlike positive verb forms).

[112]A complete analysis of this phenomenon is outside the scope of this paper, although assuming a standard semantics for *only* (e.g. Horn 1969), the correct truth conditions can be derived by understanding *=ante* as taking wider scope over the negated predicate in the first case ('not eating' is the only thing I did), whereas it scopes narrowly in the second case ('eating' is the only thing I didn't do').

(c) shows a verb form with negative marking occurring with the privative[113] *-kwenye* in what is likely an example of metalinguistic negation (see e.g. Horn & Wansing 2017: 19 for an discussion of this phenomenon). Further work remains to be done on this topic, but this provides striking evidence for both the (semi-)nominal status of the negated verb and the renewal of a special nominal negator in Arrernte. Additionally, Veselinova (2016: 171) points out that nominalisation of lexical verbs is a component of the most common cross-linguistic 'pathway whereby negative existentials break into the domain of SN (*i.e.*, $\mathbb{B} \rightarrow \mathbb{C}$, see also ch. 6 for further discussion).

※

Data for related Arandic languages is sparse, it is therefore not possible at this time to reliably reconstruct the trajectory of negative marking in the the Eastern and Central dialects reported on here. Nevertheless, Katetye, the sole Arandic outlier (see Hale 1962; Koch 2004), is also reported to make use of a suffix *-wanenye* to negate 'actions' and to mark privative relations (Kaytetye 2012: 826). That verbal suffixation, a standard negation strategy otherwise atypical of Australian languages,[114] is found at both ends of this subgroup, suggests a scenario in which privative markers came to displace other strategies of standard negation relatively early in its history. If this analysis is on track, then we can infer that the Arandic languages have undergone a full cycle of the NEC, and that, in view of the renewal of the privative form (*-kwenye*) described in various Upper

[113] *-kwenye* is glossed by both Henderson (2013); Wilkins (1989) as a "Nominal Negator" 'NNEG', although at least Wilkins (1989: 158) treats this term as synonymous with 'PRIV'.

[114] A sole exception to this is found in the neighbouring Western Desert varieties (including Pitjantjatjara [pjt]) express standard negation by way of a nominalised verbal predicate (note that the nominaliser *-nytja* is also phonologically very similar to the Arandic nominaliser described above) and postverbal negator *wiya*, pointing to a similar trajectory (Wilmoth 2020, *pers. comm.*) This negator *wiya* is also used in privative constructions.

(i) a. *wiya* + nominalisation for sentential negation in Yangunytjatjara [kdd]

*ngayulu* *kati-nytja* *wiya,* *Anti-lu* *kati-ngu*
1S.ERG take-NMLZR NEG Andy-ERG take-PRS

'I didn't take it. Andy took it.' (Goddard 1983: 244)

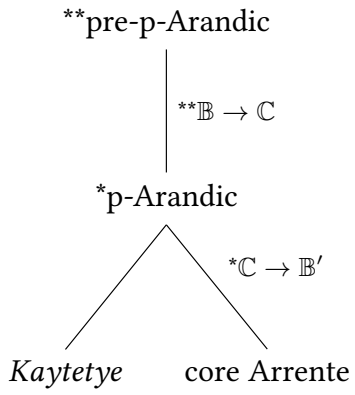
b. *wiya* + noun for negative existential in Yangunytjatjara

*mitjini* *wiya-ngka* *panya,* *iriti...*
medicine NEG-LOC ANA long ago

'(That was) in the old days, you know, when there was no medicine.' (Goddard 1983: 39)

Arrernte varieties above (a likely characteristic of stage $\mathbb{B}$), we can further postulate the recommencement of the cycle.[115] This diachronic trajectory is summarised in Figure 15. Consequently, it appears that the generalisation of a nominal negator in Arandic seems to have effected a wholesale restructuring of standard negation strategies and, consequently, the negative domain in these languages.[116]

**Figure 15**. Summary of reconstructed changes in the Arandic negative domain in terms of NEC stages ($\mathbb{A}, \mathbb{B}, \mathbb{C}$)




**i** By hypothesis, pre-proto-Arandic conforms with 'standard average Australian' preverbal SN strategies with a distinct post-nominal privative (***kenhe*) $\mathbb{B}$

**ii** In proto-Arandic (most recent ancestor to documented varieties), nominalisation plus privative suffix is repurposed as a productive negative strategy $\mathbb{C}$

- This strategy has likely been retained in Kaytetye [gbb]

**iii** A new nominal negator (*-kwenye*) emerges in core Arrernte varieties $\mathbb{B}'$

- Currently, there is insufficient evidence for an intervening $\mathbb{A}'$ stage in Arrernte.

[115]Note that a possible implication of this is the instantiation of a direct $\mathbb{C} \rightarrow \mathbb{B}'$ stage where a language with homophonous standard and existential negation directly recruits a new existential negator into the system. Given the tendency in Australian languages towards existential predication by bare NP (contra Croft 1991) or stance verb, discussed in § 5 *supra*, this may be expected.

An alternative analysis, informed by the N∃C, may involve treating the 'nominalising element' in Arandic negative suffixes as a (further) grammaticalised existential. Note for example the plausible phonological similarity between "existential-positional" verbs *-ne-* 'sit', *-nte-* 'lie' and the Kaytetye and Mpwarnte Arrernte nominalising elements *-nge, -tye*. Far from determined, such an analysis bears further research: a full diachronic account of Arandic verbal derivation is out of the scope of the current work.

[116]I make no particular claim about the form of these markers, although by hypothesis, the form of the privative in some common pre-proto-Arandic ancestor is a reflex of present day Arandic *=kenhe*.

# Chapter 6

# The NƎC and a unified semantics

The data presented in § 5.2 above demonstrate a robust, grammaticalised sensitivity to a distinction between 'standard' clausal negation and the negative existential predication (*i.e.*, predications of absence) in three distinct subgroups of Pama-Nyungan. That is, Arandic, Yolŋu and Thura-Yura languages all deploy discrete lexical and morphosyntactic devices to perform these two functions. We have also seen evidence of an ostensible diachronic tendency to flatten this distinction, as the conditions of use for negative existentials appear to relax, at which point they encroach into the domain of an erstwhile verbal negator (clearly demonstrated in the Djambarrpuyŋu data – § 5.2.2.1). By hypothesis, it is this process — the generalisation of an erstwhile PRIV marker and the concomitant competition and displacement of the functional domain of a sentential negator — that underpins the NƎC as described.

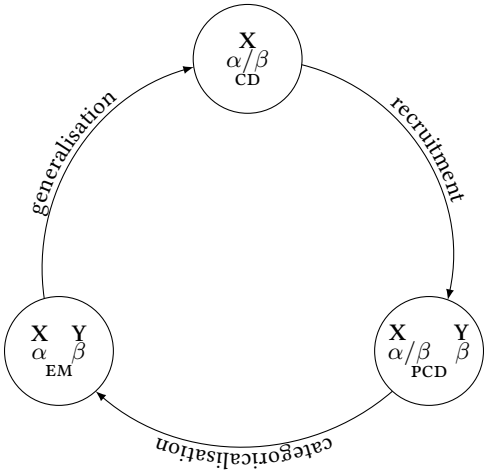
Here, I show how — on the basis of the analysis of privative proposed in § 5.1.3 — we can give a semantics that unifies PRIV and NEG. Consequently, this chapter seeks to situate the NƎC — as it appears to have been instantiated in these Australian languages — in the context of broader work on the cyclic nature of meaning change.

## 6.1 Semantic change and grammaticalisation pathways

The notion of 'grammaticalisation' – that process whereby grammatical categories arise in languages by way of the recruitment and reanalysis of lexical content – is one that has attracted a

good deal of functional typological work (*e.g.*, Bybee & Dahl 1989; Bybee et al. 1994; Dahl 1985; Heine & Kuteva 2003; Traugott 1980 a.o.). Of particular importance is the finding that, cross-linguistically, these grammatical categories evolve along diachronic pathways that appear to be constrained and unidirectional. This observation is the explicandum at the heart of much contemporary work on meaning change and one that is of significant importance for our understanding of semantics and language change. In recent years, bringing formal tools for describing the 'interpretation of functional expressions' to bear on these questions has been fruitful (see Deo 2015a for a detailed overview of this enterprise).

**Figure 16**. The structural properties of cyclical meaning change as formulated by Deo (2015b a.o.) A marker (form) **X** is ambiguous between two readings $\alpha, \beta$ at the context-dependent stage (CD), a marker **Y** is recruited to encode $\beta$ at the partially context-dependent stage (PCD), whereupon it categoricalises, such that **X** can no longer be used to encode $\beta$: now the distinction between the two meanings is explicitly marked (EM). Eventually, the domain of use for **Y** generalises at which point **Y** is now ambiguous between $\alpha, \beta$ (CD′).




Deo (2015b) provides a framework to understand the general structure of – and motivating forces behind – a cyclical change. This is shown in Figure 16 (as will be discussed below, note that this diagram is not isomorphorhic to the one in NEC diagrammatisation in Figure 11).

Insofar as the N∃C is concerned, Deo's 'context dependent' (CD) stage corresponds to Croft's "relatively unstable" stage ℂ (*i.e.*, that state of a language where negative existential markers have generalised into the domain of sentential negation.) Croft (1991: 19) claims that the motivation for this stage is the idea that '[for] predication in general, existential predication is analogous to a verbal predication.' His suggestion that 'the analogy is strengthened if there is formal parallelism' underpins formal pressure to innovate an existential predicate, returning the system to stage 𝔸.

Additionally, as has been shown elsewhere (*e.g.*, 125, also 121e above), stage ℂ negative predications can be ambiguous between the two readings; another likely source of functional pressure for the recruitment of new strategies.

The discussions of Yolŋu and Arandic above have provided some evidence for the trajectory of negative existential/privative marking as they generalise, encroaching into the functional domain of an erstwhile standard negator (transitions from 𝔸/𝔹 into stage ℂ). For example, as shown, while privative marking initially appears to be restricted to absence predications of individuals, diachronically, they seem to become available to eventive nominals. Strong evidence of this was provided from Arrernte, where all negative predicates have the syntax of non-derived nominal predications (at the expense of inflection of tense, mood and aspect categories.) Additionally, on the basis of comparative evidence, we saw that Djambarrpuyŋu *bäyŋu* appears to have had the range of negative quantifier before acquiring the general semantics of a verbal negator. In the contemporary language, *yaka* and *bäyŋu* overlap in their distribution only if this does not create an ambiguity between a standard and existential negative reading (125). The following subsection further motivates this generalisation phenomenon.

(125) **Incomplete generalisation of *bäyŋu* NEGEX in Djambarrpuyŋu )**
[AW 20190505, (repeated from 115-116)]

a. *Yaka* is incompatible with a negative existential/absence reading

*bäyŋu/#yaka limurruŋ dhuwal bäwarraṉ*
NEGEX/NEG 1p.INCL.DAT PROX meat

'We have no meat.' (lit. 'there's no meat for us here')

b. *Bäyŋu* is unavailable for sentential negation when this would generate ambiguity between existential and standard negation readings

*yaka/#bäyŋu limurruŋ dhuwal bäwarraṉ*
NEG/NEGEX 1p.INCL.DAT PROX meat

'This meat isn't ours.'

## 6.2 Unifying PRIV and NEG

In this section, I propose a unified semantic treatment for both standard and existential negation; this proposal takes both of these types of negation to involve an operation over two sets (*i.e.*,

negation as a two-place operator.) The semantic component of the changes to existential negators that are described in the NƎC are modeled as *gradual relaxation in their quantificational domains.* A generalised lexical entry for negative markers—both "nominal" (existential) and sentential—is given as (126) below.

(126) **A generalised semantics for negation**
$[\![\textsc{neg}\star]\!] = \lambda P_{\langle\sigma,t\rangle}\lambda Q_{\langle\sigma,t\rangle}.P \cap Q = \varnothing$

On this analysis, the distributional differences between privatives/nominal negators and sentential negators is simply due to differences in the *types* of the sets P, Q over which they quantify. Canonical uses of the privative (*e.g.*, those presented for Nyangumarta *-majirri* in §5.1.3 above) quantify over the domain of properties of individuals—$\mathfrak{D}_{\langle e,t\rangle}$. Those "expanded" uses of the privative, as affixed to deverbal predicates (*e.g.*, Djambarrpuyŋu *-miriw* in 5.2.2.4 above) quantify over properties of events —$\mathfrak{D}_{\langle \epsilon,t\rangle}$. This is further discussed in § 6.3 below.

Finally, sentential negators (including Arrernte *-(e)tyekenhe*) can be thought of as quantifying over *propositions* (sc. sets/properties of possible worlds)—$\mathfrak{D}_{\langle s,t\rangle}$.

## 6.3 Event-privation

We can adapt the formalism for privatives (§ 5.1.3, *p.* 116) such that *-miriw* is able to range over $\mathfrak{D}_{\langle \varepsilon,t\rangle}$, the domain of properties of events.[117] I take Djambarrpuyŋu verb stems to denote properties of events (this assumption is motivated in § 8.1.1), which can be nominalised using the **IV** marker.[118]

Shown in the examples below (and further in § 6.6.2), while still functioning as a nominal suffix, *-miriw* appears to scope over entire predicates with the same argument structure as their finite clausal counterparts. In (127), an injunction to not repeat a given story is ungrammatical when an intransitive root *WÄŊA-* 'speak' occurs with an object argument. Conversley, *dhäwu* 'story$_{(\text{ABS})}$' functions as the object of a (derived) transitive verb stem *MARŊGIKU-* 'teach' (where

[117] Here I assume a primitive set $\mathcal{E}$ containing Davidson-style event variables $e, e', e'' \ldots$. These form the 'domain of eventualities': $\mathfrak{D}_{\varepsilon}$.

[118] **IV** is a polyfunctional suffix that encodes tense and mood information as well as forming nominal stems. The tense-mood semantics of **IV** are investigated in some detail in Part III below (particularly chapter 9), although the account offered (at this stage) offers no insight that unifies the nominalising and the temporomodal usage.

the recipient of the knowledge would receive DAT-marking). We might conclude from this that, as with verb roots, nominalised predicates are taken to denote properties of events.[119]

(127) **Argument-structure of verbal roots is maintained in (nominalised) privative forms suggesting (eventive) =*miriw* scopes over an entire phrase**

*dhäwu marŋgi-ku-nha=miriw/*waŋa-nha=miriw*
story know-CAUS-**IV**=PRIV/*speak-**IV**=PRIV

'Don't let anyone know/No repeating the story!' [AW 20190502]

In view of this assumption, these uses of *miriw* can be understood as its development into something of a phrase-level affix/"derivational clitic" (Anderson 1992, 2005). On these "eventive privative" uses, *miriw* can be analysed as combining with an event description. In (128), the privative phrase *wäŋa nhänhamiriw* 'see.places-PRIV' predicated of (some) *yolŋu* 'person.'

(128) a. *yolŋu wäŋa nhänha=miriw*
person place see.**IV**=PRIV

'(the) person who doesn't see places'

b. $[\![\ \textit{wäŋa nhänhamiriw}\ ]\!] = \mathbf{no}(\lambda e.\mathbf{see}(e, \text{place}), d_\alpha)$
$= \mathbf{no}(\lambda e.\mathbf{see}(\text{place})(e), \lambda e'.\mathbf{char}(\delta_{\text{person}}, e'))$

c. That is, the intersection between the set of *eventualities of seeing places* and *the contextual domain of eventualities* $\mathbf{char}(\delta_{\text{person}}, e')$ – perhaps those that might be predicated of/taken to be **char**acteristic of the disposition of a (blind) person ($\delta_{\text{person}}$) – is empty.

Similarly, the negative existential proposition in (129) asserts that the set of 'sleeping events' and the set of events which obtain the place in question (Bali) are disjoint. Deploying Francez's definition of *contextual closure* (111), $\mathcal{Q}$ (=*miriw*'s second argument) is saturated by the contextual domain (here the set of events somehow related (by $\mathcal{R}$) to 'Bali') — $d_{\ell_{\text{bali}}} = \lambda y_\varepsilon[\mathcal{R}_{\langle\tau,\langle\varepsilon,t\rangle\rangle}(\ell_{\text{bali}}, y)]$

(129) a. CONTEXT. The speaker is talking about having been busy all day while visiting Bali.

*maŋutji ŋorranha=miriw ŋunha-yi wäŋa*
eye lie.**IV**=PRIV DIST-ANA place

'It's impossible to sleep at that place'
(lit. that place has no eye-lying) (Wilkinson 2012: 448)

[119] The idea that deverbal nominals maintain their underlying argument structure is well-suppoted: "[t]he semantic interpretation of a gerundive nominalization is straightforward in terms of the grammatical relations of the underlying proposition in deep structure" (Chomsky 1970: 187).

b. $[\![\textit{maŋutji ŋorranhamiriw}]\!]^c = \lambda\mathcal{Q}_{\langle\varepsilon,t\rangle}.\textbf{no}(\lambda e.\textbf{lie}(\text{eye})(e), \mathcal{Q})$

c. $[\![(129a)]\!]^c = \textbf{no}\big(\lambda e.\textbf{lie}(\text{eye})(e), d_{[\![\textit{ŋunhayi wäŋa}]\!]^c}\big)$
$= \textbf{no}\big(\lambda e.\textbf{lie}(\text{eye})(e), \lambda e'.\textbf{char}(\ell_{\text{bali}}, e')\big)$

d. The intersection between the set of *sleeping eventualities* $e$ and the events $e'$ taken to best characterise that place indicated by the speaker/invoked earlier in the discourse (*ŋunhayi wäŋa*: Bali), is empty.

An additional virtue of this analysis is that the apparent introduction of a modal component in these eventive privative examples can be accommodated by Francez's (2007) "contextually-determined relation" ($\mathcal{R}$): for example, **char** can be taken to relate a given individual $\alpha$ to information about its disposition, or relatedly some other relation, perhaps **endorse** can be taken to relate a given entity to the set of events that are taken to be **perm**issible or **pref**erred by some agent at that place.[120] This captures the "abrupt imperative" and related prohibitive uses (*e.g.*, (127) and (122i); both repeated below, see also Wilkinson 2012: 448).

(130) a. *dhäwu marŋgikunha=miriw!* (127), rpt'd)
story know.CAUS.**IV**=PRIV
'Don't let anyone know!' (lit. 'no story teaching!') [AW 20190502]

b. $[\![\textit{dhäwu marŋgikunhamiriw}]\!] = \lambda\mathcal{Q}.\textbf{no}(\lambda e.\textbf{teach}(\text{story})(e), \mathcal{Q})(d_\alpha)$
$= \textbf{no}\big(\lambda e.\textbf{teach}(\text{story})(e), \textbf{endorse}(\text{st}_u, e')\big)$

(131) a. *l̪ukanha=miriw ŋayi ŋunhi dharpa-ny* (130), rpt'd)
eat.**IV**=PRIV 3s ENDO tree-PROM
'That tree is inedible' (lit. that tree has no eating) (Wilkinson 2012: 448)

b. $[\![\textit{l̪ukanhamiriw}]\!] = \lambda\mathcal{Q}.\textbf{no}(\lambda e.\textbf{eat}(e), d_\alpha)$

c. $[\![(129a)]\!] = \textbf{no}\big(\lambda e.\textbf{eat}(e), d_{[\![\textit{ŋunhi dharpa}]\!]}\big)$
$= \textbf{no}\big(\lambda e.\textbf{eat}(e), \lambda e'.\textbf{perm}(\mu_{\text{tree}}, e')\big)$

d. The intersection between the set of *eating eventualities* $e$ and the events $e'$ that relate to some indicated 'tree' ($\mu$ : its subparts/its kind *etc.*) that are taken to be permissible (or perhaps advisable) is empty.

Dependence on context for the retrieval of $d_\alpha$ is further illustrated by the fact that a sentence like that in (131) could be verified in situations where eating of the relevant tree is impermissable (if

[120] Compare Condoravdi & Lauer (2017). *Endorsement* or "preferential commitment" is taken to be 'the main content of imperatives' (195).

it's culturally important), inedible (if it's poisonous) or impractical to eat from (if it's not in fruit or is too small etc.) Equally, the same tree might be described as *djatthunhamiriw* 'chop.**IV**.PRIV', for example, if it's too hard for a specific axe or *dhuḻyunhamiriw* 'hammer.**IV**.PRIV' if it's inappropriate for construction [AW 20190502/05]. In all of these cases, the retrieval of a contextual domain involves retrieving different "flavours" of $\mathcal{R}$ that relate some entity $\alpha$ to a relevant set of events.

Further, as (132) shows, the GQ-based analysis presented here correctly predicts the unavailability of a reading where the apparent modal operator is outscoped. In (a), where the negative meaning is encoded by *bäyŋu*, the sentence exhibits scopal ambiguity. Conversely, when the negative meaning is provided by =*miriw*, a reading where the modal component (as supplied by $\mathcal{R}$) outscopes negation is unavailable.[121]

(132) **Scope relations in negative existential sentences** [AW 20190501]

a. *bathi* *dhuwal* ***bäyŋu*** *biyak* *bili* *gi* *guḻguḻyurr*
basket PROX NEGQ thusly.II CPLV IPFV.II sink.II

'This basket doesn't always sink.'

b. *bathi* *gulguḻyunha-miriw*
basket sink.**IV**-PRIV

'The basket is unsinkable.' $\neg \gg \Diamond$

# 'It's possible for the basket to not sink' $*\Diamond \gg \neg$

$[\![132b]\!] = \textbf{no}\big(\lambda e.\textbf{sink}(e), \lambda e'.\textbf{char}(\text{bathi}, e')\big)$

In (132b), the contextual domain is, informally, 'the set of events that characterise the basket' (or perhaps 'those events that the basket is capable of.') In view of the GQ analysis of PRIV presented here — that is, PRIV claims that two sets are disjoint — there is no way for the negative operator to scope "under" the modal relation (**char**).

A few additional observations about apparent morphosemantic constraints on eventive *-miriw*, with particular reference to the relation between the existential "coda" and the subject of a PRIV predication are given in § 6.6.2.

[121] See Horn (2001: Ch. 5) for a discussion of the properties of affixal/incorporated negative elements

## 6.4 Negation as an impossibility operator

An outcome of this quantificational analysis (which seeks to unify existential and sentential negation as 2-place operators) is a treatment of sentential negation as a quantificational operator (as opposed to a truth functional operator over sentences, as is normally assumed.) The idea that negations can be revealingly analysed in terms of modal logics has been proposed in other literatures (see, *e.g.*, Došen 1986; Dunn 1993; Horn & Wansing 2017; Restall 1999; Wansing 2001 a.o.). In effect, logicians have traditionally treated modal operators ($\Box$ & $\Diamond$) as one-place operators, similar to negation $\neg$. Semantic treatments of modal operators in natural language enrich this analysis (in the Kratzerian tradtion), in effect modelling modals as quantifiers, asserting a relation between sets of possible worlds. In this section, I assess the plausibility of extending the two-place analysis of modal operators to negative operators.[122]

This idea is advantageous insofar as it captures observed distributional similarities between negation and (irrealis) modalities (see also Ch. 9). Assuming a standard Kripke model for current purposes—*sc.* a set of worlds, an accessibility relation and a verification function, $\mathcal{M} = \langle \mathcal{W}, \mathbb{R}, \mathfrak{v} \rangle$—a modal semantics for negation is given in (133) below. Crucially, the binary accessibility relation $\left(\mathbb{R} \subset \mathcal{W} \times \mathcal{W}\right)$ is modelled as the *compatibility relation* **C** which relates a possible state (of a world) to those that comport with the facts in that world.

(133) Negation $\neg$ as impossibility

a. $\mathcal{M},w \vDash \neg A \Longleftrightarrow \forall u.w\mathbf{C}u \rightarrow \mathcal{M},u \nvDash A$
Relative to some model $\mathcal{M}$, the negation of $A$ holds in $w$ iff $A$ fails to hold in any world $u$ that is "compatible" with $w$.

b. $[\![\textsc{neg}]\!]_{\langle\langle s,t\rangle,\langle\langle s,t\rangle,t\rangle\rangle} = \lambda p_{\langle s,t\rangle} \lambda q_{\langle s,t\rangle}.\mathbf{no}(p,q)$

On this view, in its SN the truth conditional content of NEG is that two sets of worlds are disjoint. The first set of worlds ($p$) is given by NEG's prejacent (*i.e.* the proposition over which NEG takes scope.) The second set $(q)$ is again provided by contextual closure ($d_{w*}$: *i.e.*, a set of worlds related to the reference world.)[123]

[122] Notably, Kratzer herself makes a similar proposal in 'Lumps of thought' (1989: § 6) (*i.e.*, a quantificational semantics for negation.) The motivation for this treatment, a rationale for situation semantics, intersects with that which is reviewed in Restall (1999: 60*ff*).

[123] By hypothesis, the identity of $\alpha$ could be modified by some explicit "shifter" in coda position — that is expressions of the type "in the world of Sherlock Holmes" or "in the Dreaming."

In Kratzerian terms, the compatibility relation described here should be understood, effectively, to correspond to a totally realistic modal base. That is, C maps any world "to the set of propositions which characterize it in a unique way" : $\forall w[\cap \mathbf{C} = \{w\}]$ (1981b: 296). In effect, then, the modal base is the singleton set that contains only the reference world. $p$ and $q$ will be disjoint (satisfying NEG) iff $p$ is false in $w*$.

In §5.2.2.1 (some key data repeated in 125, §6.1), I provided evidence that Djambarrpuyŋu sentential negator *bäyŋu* started life as a negative quantifier/negative existential predicate. In (134), we see additional examples of (a) an apparently retained negative existential use and (b) a sentential negation use. The truth of either sentence can be stated as conditional on a quantificational relation between two sets (the explicit "pivot" and some contextually-provided domain.)

(134) a. *bäyŋu ŋarali'*
NEGQ tobacco
'There's no tobacco.' [AW 20180731]
$[\![$*bäyŋu ŋarali'*$]\!]^c$=**no**$(\lambda x.\text{tobacco}(x), \lambda y.\textbf{loc}(\text{st}_\text{u}, y)])$

b. *bäyŋu ŋuli ŋorra-nhara-w ŋunha wäŋa* (compare to 129 above)
NEG HAB lie-IV.AUG-DAT DIST place
'There's no sleeping at that place.' [AW 20190501]
$[\![134\text{b}]\!]^c = \textbf{no}\big(\lambda w.[\![$*ŋuli ŋorranharaw ŋunha wäŋa*$]\!](w), \lambda w'.\mathbf{C}(w*, w')\big)$

Likewise, § 5.2.3 showed how, as in other Arandic varieties, Mpwarnte Arrernte realises propositional negation by means of a (complex) formative *-(e)tyekenhe* which is affixed to verb stems. This is shown again in (135) below:

(135) a. *Kweye, the ng-enhe aw-**etyekenhe***
oops 1S.ERG 2S.ACC hear-**NEG**
'Sorry, I didn't hear you' (Henderson 2013: 412)

b. $[\![$*the ngenhe awetyekenhe*$]\!]^c = \lambda q_{\langle s,t\rangle}.\textbf{no}\big(\lambda w_s.\text{I.heard.you}(w), q\big)\big(d_{w*}\big)$
$= \textbf{no}(\lambda w.\text{I.heard.you}(w), \lambda w'.\mathbf{C}(w*, w'))$

*-(e)tyekenhe* is taken to scope over the entire clause. On the analysis presented here, then, this is taken to assert that the intersection of the proposition 'I HEAR you' (viz. $\lambda w.$*I HEAR you* in $w$) and the set of worlds compatible with the reference world/for which all that is the case in $w*$ is

true (the CONTEXTUAL DOMAIN, *viz.* $\lambda w.w\ \mathbf{C}\ w*$) is empty. It obviously follows from this then that, if $p$ is not in $\cap\mathbf{C}(w*)$, then it is not the case that $p$ in $w*$.

## 6.5 Domain expansion

> 'Negation relates an expression $e$ to another expression with a meaning that is somehow opposed to the meaning of $e$' Horn & Wansing 2017

The denotation for generalised negation **NEG⋆** given in (126) above (repeated below) captures a semantics for both existential and "standard" negators; the central concern of the N∃C.

(126 rpt'd) A generalised semantics for the negative operator
$[\![\textbf{NEG}\star]\!] = \lambda P_{\langle\sigma,t\rangle}\lambda Q_{\langle\sigma,t\rangle}.\mathbf{no}(P, Q)$

A consequence of this treatment is that the usage changes in relevant lexical material are modelled as generalisations — changes to the restrictions on the domains of operators with negative semantics. This is spelled out below; recall from the discussion above (§ 5.1.3), the adoption of terminology commonly used to describe existential predication (*e.g.*, Francez 2007; McNally 2016):

**PIVOT** — represented as the set $P$ — that obligatorily encoded element 'whose existence or location is under discussion' (McNally 2016: 212)

**DOMAIN** — represented as the set $Q$ — represents the contextual domain $d_\alpha$. $\alpha$ is related to $Q$ by some contextually-determined relation $\mathcal{R}$.

**CODA** The optional *coda* phrase explicitly restricts the locus $(\alpha)$ of the contextual domain. (see Francez 2007, 2009).

Throughout this essay, I have assumed that—in the case of privative constructions of the type *subject* + *pivot-PRIV*—the subject NP fulfils the function of a coda, providing optional, explicit information about the domain of the privative predication.[124]

[124]Here I have abstracted away from the syntactic differences between this type of construction and the English-like existential predications that form the primary source of data in Francez and McNally's work. I contend that these syntactic differences are harmless to the semantic analysis described here.

Table 9 spells out how this formalism can deal with each of these three stages in the meaning of a negative element in view of clarifying how we can understand this change as a species of *domain generalisation*.

**Table 9**. Domain expansion from existential (PRIV) to standard negation (NEG)
Negative elements are analysed as quantifiers asserting that the intersection between two sets $\cap(\mathbf{P}, \mathbf{Q})$ is empty.
**P** is the obligatory expression (pivot) in the scope of NEG⋆, **Q** is a contextually retrieved domain ($d_\alpha$) optionally modified by a coda phrase. This table provides examples for each function of some possible relations that specify $d_\alpha$

| **NEG⋆** | $\lambda\mathbf{P}$ – pivot $\langle\sigma, t\rangle$ | $\lambda\mathbf{Q}$ – contextual domain $\langle\sigma, t\rangle$ |
|---|---|---|
| PRIV | $\lambda x_e.P(x)$<br>set of entities $\langle e, t\rangle$ | $\lambda y.\mathbf{loc}(st_c, y)$<br>entities in some location |
| PRIV$_\mathcal{E}$ | $\lambda e_\varepsilon.\mathcal{P}(e)$<br>set of events $\langle\varepsilon, t\rangle$ | $\lambda e'.\mathbf{loc}_\mathcal{E}(st_c, e')$<br>events instantiated at some location |
| NEG | $\lambda w_s.p(w)$<br>set of worlds $\langle s, t\rangle$ | $\lambda w'.\mathbf{C}(w*, w')$<br>worlds compatible with eval. world |

In this section, I've sought to show that a generalised quantifier-type of analysis (126) can handle both existential and sentential negation. As discussed above, these uses differ in terms of the domains over which they quantify. The next section discusses the implications of this variation and the associated diachronic trajectory for theories of grammaticalization and semantic change.

## 6.6 Grammaticalization and indexicality

The "types" of negation summarised in Table 9 can be thought of as corresponding to various stages of the N∃C: a reserved PRIV marker that realises nominal ("existential") negation as distinct from sentential negators might be construed as instantiating stage $\mathbb{B}$ of the Cycle (this is the strict distinction between the nominal suffix *-majirri* 'PRIV' and the preverbal sentential negator (*munu* 'NEG') in Nyangumarta.) Conversely, a language in which a privative marker has *displaced* a sentential negator and is responsible for both nominal/existential and sentential negation evinces stage $\mathbb{C}$. This is, by hypothesis, the case for proto-Arandic and potentially the current case in Kaytetye.[125]

[125]Croft (1991: 19) points out that stage $\mathcal{C}$ is "relatively unstable" given potential ambiguity between existential and propositional negations (again, compare constraints on non-existential readings of Djambarrpuyŋu *bäyŋu* in ambiguous

One outcome of this research is the observation that privatives which tolerate "eventive" arguments (PRIV$_{\mathcal{E}}$ in Table 9) represent a likely bridge between N∃C stages 𝔹 and ℂ. Morphosyntactically, PRIV, a noun marker, comes to modify event descriptions with nominal morphosyntax. Eventually, as in Arrernte, this strategy can become the main way of realizing sentential negation: the erstwhile privative scoping over entire propositions.

### 6.6.1 A loss of indexical content

In recent work, Deo (2017) has suggested that grammaticalisation trajectories in general are characterisable by the loss of *(discretionary) indexical content* (*e.g.,* Ernst 2016; Perry 2012). That is, reanalysed forms tend to lose their dependence on context for retrieving discourse reference.[126] Deo appeals to this notion in describing a number of cross-linguistically reported grammaticalisation pathways, including: where (distal) demonstratives gradually lose their indexical force to become markers of definiteness, specificity and eventually noun class markers (see also Greenberg 1978; de Mulder & Carlier 2011; Stevens 2007: 61). In a different domain, the progressive-to-imperfective aspect shift can also be fruitfully understood as the relaxation of a requirement, peculiar to the progressive aspect, for a specific, discourse-salient reference interval ("temporal frame", Kearns 1991) that relies on pragmatics (≈ discretionary content provided by some construal of 'speaker demonstration') for evaluation. The newly emergent (general) IMPERFECTIVE lacks this indexical/context-dependent content (see Deo 2015b; Fuchs 2020).

Crucial to the current proposal, at the core of Francez's analysis of existential propositions is their "radical context dependence" (2007: 2). That is, the interpretation of an existential predication involves explicit appeal to a contextual domain/parameter (formally represented above as $d_\alpha$). In a (bare/codaless[127]) negative existential proposition like *There's no water* (*bäyŋu gapu* or *gapu-miriw* in Djambarrpuyŋu), $d_\alpha$ is a discretionary indexical, which *may but need not* be identified with that set of things that is somehow related to [e.g ., **loc**ated at] the spatiotemporal parameters of the

contexts: (125) above.) This potential ambiguity is the source of functional pressure to distinguish these two possible readings by the "recruitment" of a new existential marker ($\mathcal{A}$).

[126]Perry's (2012: 68ff, a.o.) $2 \times 2$ typology of indexicals contrast those that: (A) depend on notions of (i) "wide" vs. (ii) "narrow" context to designate and (B) on the basis of context, either designate (i) "automatically" or otherwise (ii) require appeal to "speaker intentions". Those indexical items that require appeal to speaker intention are 'discretionary' indexicals (compare Kaplan's 'true demonstratives', see Braun 2017 for a general discussion of this literature.)

[127]*...acaudate?*

utterance context $\langle \ell_u, t_u \rangle = st_u$ (Francez 2007: 72)—that is, $\lambda y.\mathbf{loc}(st_u, y)$. The identity of the set is therefore dependent on the contextual retrieval of some relation $\mathcal{R}$ (*e.g.*, **loc**) that picks out a set of entities that relate to some pragmatically determined set of parameters.[128]

The meaning change described by the NEC seems, then, to be associated with a concomitant loss in *discretionary indexicality*. On the quantificational (modal) analysis of negation described in the previous section, the meaning contribution of a sentential negator is that its prejacent — $p \in \wp(\mathcal{W})$) — *does not intersect* with the set of worlds which are *compatible* with the actual world $\lambda w'.\mathbb{C}(w*, w')$. That is, the establishment of reference is automatic and speaker meaning (the hallmark of discretionary indexicality) isn't factored in.

### 6.6.2 A note on existential codas and the NƎC

An interesting parallel in terms of thinking about the recruitment of formal mechanisms for existential predication is the observation that existential *there* in English is homonymous with deictic *there* (a discretional indexical par excellence.) This is suggestive of some functional connection between existential propositions and notions of indexicality, referenced above. Indeed, formal similarities between locative/existential predications have been observed elsewhere, Freeze, who suggests that "froms like English existential *there* are locative" (1992: 554).

Relatedly, Francez 2007-style treatments of existential predications (like that adopted here), crucially make reference to their context dependence (formally represented as a contextual parameter $d_\alpha$). This captures the intuition that the utterance of an existential proposition relies on **wide, discretionary** construals of context for domain restriction and evaluation: a bare-existential proposition *there are no sticks* cannot be evaluated without reference to speaker's intentions: most likely, but not necessarily, to be identified with the contextual parameters of the utterance (perhaps the spatiotemporal conditions under which it was uttered: $\alpha = st_u$.)

As shown above however, explicit restrictions on $d_\alpha$ can also be supplied by way of a "coda." Examples are given for Djambarrpuyŋu in (136), where the 'coda' is underlined.

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[128] Following from fn 126, note that these are the characteristics of discretionality: "narrow" discretionality iff $\alpha$ is identified with the utterance parameters, otherwise "wide" in Perry's taxonomy.)

(136) **Absence predications in Djambarrpuyŋu: CODA underlined**

a. *Gapuwiyak* *guya-miriw*
PLACE fish-PRIV

'There are no fish in Gapuwiyak. / Gapuwiyak is fishless.'

b. *Bäyŋu* *guya* *Gapuwiyak (guḻun-ŋur)*
NEGQ fish PLACE (stomach-LOC)

'There are no fish in Gapuwiyak (in the waterholes).'

The availability of coda phrases additionally provides a syntactic location for the subject in the "eventive-privative" sentences that have been described above. In (137), the privative phrase predicates that *events* of a particular type (*viz.* that event described by the privative-marked verb form) are not **char**acteristic of whichever entity or location is specified in the coda position.

(137) **"Eventive-privatives" in Djambarrpuyŋu: CODA underlined**

a. *ḻukanha-(mirr/**miriw**)* *maranydjalk*
eat.IV-PROP/PRIV stingray

'The stingray is edible/inedible.' [AW 20190502]

b. ***bäyŋu**n* *dhaḻakarr* *marrtjinyara-w*
NEGQ.FOC space move.IV-DAT

'There's no space to move≈there's no moving in the space'

c. *dhuwali mulmu* ***bäyŋu*** *ŋuli* *nhärranha*
MED grass **NEG** HAB burn.IV

'That grass would never burn.'

d. *nhärranha-**miriw*** *dhuwal mulmu*
burn.IV-**PRIV** PROX grass

'(Even in a fire) That grass is unburnable.' [AW 20190501/02]

As shown in the discussion of the Yolŋu privative (§ 6.3) *-miriw* appears to attach to an entire nominalised (event-denoting) verb phrase, suggesting the reanalysis of this form as "phrasal morphology" (*i.e.*, a special clitic, see Anderson 2005.) Events of the type described by the privative phrase then are then taken to be related (by $\mathcal{R}$) to some set of events associated with the coda (which is realised as grammatical subject).

Importantly, the nature of this association is underspecified: while the absence (non-obtention)

of the type of event denoted in the privative phrase is predicated of the subject, the type of relation that actually obtains between the subject and this set of events is variable. Contextually-retrieived $\mathcal{R}$ is locus of the (pragmatically ambiguous) modal reading of propositions containing an eventive-privative. As shown above, it can be interpreted as a relation of co-location, permission, speaker preference *etc.*

At the "eventive-privative" stage, however, there appear to be a number of interpretive constraints (for example, on the relation between the subject (coda) and a privative property.) Developing a better understanding of these constraints remains a topic for further investigation, although ought to provide insights into the apparently concomitant expansion in the domain of erstwhile privatives/nominal negators as they develop into SN operators. (138), for example, provides tentative evidence that a transitive/unergative subject argument is not in the scope of =*miriw*: potentially additional evidence that =*miriw* ought to be modelled as merging before agent arguments.

(138) **Agents/transitive subjects are apparently not in the scope of eventive privative =*miriw***

a. # *ŋarra ḻukanh-**miriw***
1S eat.**IV**-PRIV

**INTENDED**. 'I'm not eating.'
**AVAILABLE**. 'I'm poisonous/inedible.' [AW 20190502]

b. * *ŋunha weṯi djumurr'yunha-**miriw***
DIST wallaby hop.**IV**-**PRIV**

**INTENDED**. 'That wallaby (is injured and) can't jump.'

Conversely, compare the trajectory of Djambarrpuyŋu's erstwhile negative quantifier *bäyŋu*, where such constraints don't exist: *bäyŋu* taking scope over an entire inflected proposition. Similarly, in Arrernte, we saw data suggesting that *-tye=kenhe* has completed the PRIV → NEG cycle; remaining morphosemantic constraints on the syntactic unit to which it attaches appear to be removed.

## 6.7 Conclusion

In view of providing a formal perspective on theNegative Existential Cycle, this chapter has comprised a diachronically- and comparatively-informed discussion of change and variation in the negative domain informed by three geographically distant and temporally deep subgroups of the Pama-Nyungan family of Australian languages. Each of these case studies suggests nuances and provides further insights into the formulation of the N∃C as discussed in the work of Croft (1991) and Veselinova (2016 a.o). Of particular interest is the relationship between the privative case—which I have argued represents the morphologisation of a negative existential predicate—and standard negation.

We have seen that the expansion of the domain of the negative existential construction predicted by the N∃C ($\mathbb{B} \rightarrow \mathbb{C}$) can be understood as a diachronic *generalisation* in its semantics. Generalisation refers to that stage in a grammaticalisation cycle where '[a functional expression] is diachronically reanalyzed as instantiating a broader, more general functional expression at a later stage…involv[ing] a systematic expansion in the domain of application [for that expression]' (Deo 2015a: 187). The treatment of the privative given above, for example, has shown how, in multiple language groups, the domain of this marker has expanded. Broadly speaking, whereas at an initial state, PRIV seems to quantify over a domain of properties of individuals $\mathfrak{D}_{\langle\langle e,t\rangle,\langle\langle e,t\rangle,t\rangle\rangle}$, it comes to quantify over properties of eventualities and, in some instances, further generalises to quantify over propositions (*sc.* properties of worlds; the domain of modals, and possibly, negative operators, see Horn & Wansing 2017: 34*ff*.) Importantly, even if restrictions on the type of the sets is relaxed, the *relation* ($\mathfrak{no}$) that is taken to hold between the sets being quantified over is identical (*i.e.* **no** $=_{\text{def}} \lambda\mathcal{P}_{\langle\sigma,t\rangle}\lambda\mathcal{Q}_{\langle\sigma,t\rangle}.\mathcal{P} \cap \mathcal{Q} = \varnothing$).[129,130]

The negative domains of Australian languages provide an opportunity to nuance our understanding of the N∃C, and perhaps grammaticalisation paths more generally. In view of how robustly Australian languages draw a formal distinction between clausal negation (overwhelmingly

[129] Kiefer (2015: 609) observes that the Hungarian cognate does attach to verbal bases but is restricted to transitive stems with eventive semantics. This is an observation with potential implications for future work on the grammaticalisation pathway for privative marking.

[130] Similarly, Tamm (2015: 416) observes that 'abessive negation' in Estonian is a strategy that (unlike the distribution of cognates elsewhere in Uralic) also permits of clausal-type negative (SN-like) uses and carries a 'presupposition of an intention [to instantiate the abessive-marked predicate.]' In view of potential modal analyses of negators mentioned here, the emergence of this reading is extremely interesting.

with a pre-verbal particle) and absence predications (overwhelmingly with a nominal suffix), deviations from this tendency are likely indicators of systemic formal and functional change in the negative domain. To the extent that a diachronic relationship can be drawn between the lexical material used to encode each of these categories, semantic change can likely be inferred from deviations from this pattern. Furthermore, in view of the strikingly distinct morphosyntactic properties of pre-verbal particles and nominal suffixes, the displacement of standard negation markers by negative existentials (*esp.* privatives) calls for an account of this 'functional' cycle, one that foregrounds the possibility of semantic reanalysis and meaning similarity between these categories: indeed as has been suggested in the foregoing discussion, there is good reason to conceive of a subset relation between existential and standard negation.

Here I have argued that:

1 Sentential negation can be assigned a single lexical entry, accounting for apparent polysemy emerging as nominal negators encroach into the domain of sentential negation.

2 This change can be characterised as a generalisation in the quantificational domain over which negative quantifiers range if permit for an analysis of sentential negators as two-place operators.

Finally, I have suggested that:

3 This treatment unites the NƎC with independent observations about the trajectories of semantic change: namely that they are associated with a *loss of discretionary indexicality* (a decreased reliance on the pragmatics for reference establishment).

# Part III

# Reality status & the Yolŋu verbal paradigm

## Introduction

Yolŋu Matha is a Pama-Nyungan language (sub)family spoken in northeast Arnhem Land, a region of northern Australia. Varieties exhibit a range of significant functional and formal variation in verbal inflectional paradigms, notably with respect to temporal phenomena (notably "cyclic" tense) and interactions between the semantic domains of temporality, modality, aspect and polarity which — in view of the semantic diversification within the family and areal evidence of convergence — point to a history of contact-induced change.

This essay (part III of the present dissertation) addresses the semantics of the inflectional paradigm and the expression of temporality and modality, particularly in the Western Dhuwal-Dhuwala (WD) language — a Yolŋu Matha dialect cluster. Temporomodal expression in WD is characterised by a number of phenomena that, as we will see, have significant import for semantic and pragmatic theory, touching on the meaning contribution of tense, modality, aspect and negation. The WD verbal paradigm consists of four inflectional categories, a semantic treatment of which is eschewed in existing descriptions (*i.e.*, Lowe 1996; van der Wal 1992; Wilkinson 2012, *see also* Waters 1989.) Each of these descriptions provide descriptions of the distribution and apparent multifunctionality of each category, while avoiding a unified analysis of how they partition WD's TMA domain.

Of particular interest are **cyclic tense** and **asymmetric negation**, each of which receives a treatment here. Data that exemplify these basic phenomenal patterns in Djambarrpuyŋu [djr] — a Western Dhuwal variety as spoken in the community of Ramingining — are presented below.

In (139), the first (I) inflection (shown in *a* & *c*) is compatible with present and pre-today past reference. It is, however, incompatible with same-day past temporal reference, which is categorically associated with the third (III) inflection. That is, the time spans/temporal frames that are compatible with I (and III) will be shown to be *discontinuous*. This is taken to represent an instantiation of cyclic tense.

(139) **Temporal reference and verbal inflection in Western Dhuwal [djr]**

a. *ŋarra ga nhä-**ma** mukulnha (dhiyaŋ bala)* [present]
1s ipfv.I see-I aunt-acc now
'I see/am looking my aunt (right now).'

b. *ŋarra nhä-**ŋal** mukulnha gäthur* [SAME DAY PAST]
1S see-III aunt-ACC today
'I saw my aunt this morning.'

c. *ŋarra nhä-**ma** mukulnha barpuru* [PRE-TODAY PAST]
1S see-I aunt-ACC yesterday
'I saw my aunt yesterday.'

The other SECOND (II) and FOURTH (IV) inflections, meanwhile, co-occur with particles including *dhu* 'FUT' and *balaŋ* 'MOD'. Shown below, II is licensed in future predications, whereas IV is used in a range of modal sentences with past reference (*e.g.*, counterfactual predications.)

(140) **Verbal inflection and modal particles in Western Dhuwal [djr]**

a. *ŋarra dhu nhä-**ŋu** mukulnha goḏarr* [FUTURE]
1S FUT see-II aunt.ACC tomorrow
'I'll see my aunt tomorrow.'

b. *ŋarra balaŋ nhä-**nha** mukulnha gäthur* [COUNTERFACTUAL]
1S MOD see-IV aunt.ACC today
'I should've seen my aunt this morning.'

(141) shows the effects of sentential negation (*bäyŋu* 'NEG') on the licensing conditions for each of the inflections: that is, in negative contexts II (available in positive future contexts, *e.g.*, 140a) and IV (available in positive modal sentences — *e.g.*, counterfactual predications, *e.g.*, 140b) correspond to I and III respectively. In most situations, I and III are **incompatible** with negative polarity. This is taken to reflect an ASYMMETRY in the marking of reality status with respect to negation ("asymmetric negation", following Miestamo 2005).

(141) **Negation interacting with inflection category in Western Dhuwal [djr]**

a. *bäyŋu ŋarra gi nhä-**ŋu** mukulnha dhiyaŋ bala* [PRESENT]
NEG 1S IPFV.II see.II aunt.ACC now
'I don't see my aunt (right now).'

b. *bäyŋu ŋarra nhä-**nha** mukulnha gäthur* [SAME-DAY PAST]
NEG 1S see-IV aunt.ACC today
'I didn't see my aunt this morning.'

c. *bäyŋu ŋarra nhä-**ŋu** mukulnha barpuru* [PRE-TODAY PAST]
NEG 1S see-II aunt.ACC yesterday
'I saw my aunt yesterday.'

Figure 17 comprises a (colourised) reproduction of Wilkinson's schematisation of the functional domain (and collocation features) of each Djambarrpuyŋu inflection (2012: 326). This diagram bespeaks the nontriviality of the distribution (and, therefore, the semantic value) of each inflectional category. Discussion of the phenomena characterising the WD verbal paradigm (*viz.* asymmetric negation and (particularly) "cyclic" tense) are all-but-absent from the linguistics literature: as mentioned, the inflections have eluded anything resembling a unified (compositional) analysis. This essay, then, seeks to marshal relevant data in view of developing a proper treatment of these phenomena and enriching theories of temporal and modal displacement in natural language.

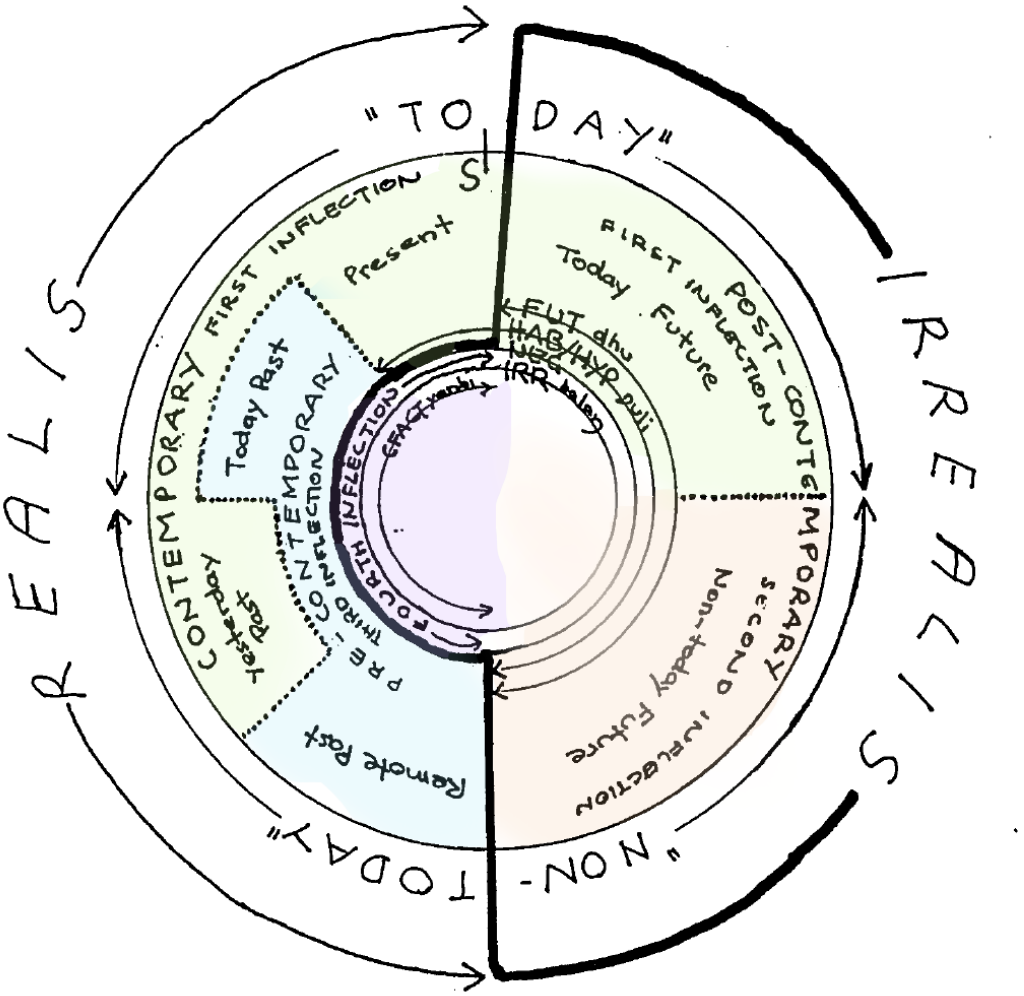
Chapter 7 provides background on Yolŋu Matha and the morphology of these languages' verbal paradigms, orienting the discussion around connections between temporal and modal concepts (particularly intention, prediction and futurity) and notions of relative grammatical "prominence" of tense, mood and aspect (*cf.* Bhat 1999).

Subsequently, data further demonstrating the expression of temporomodal distinctions and the interpretive intricacies of WD's paradigm semantics, focussing on a number of morphosemantic phenomena exhibited in the language are provided in chapters 8 and 9 below.

In light of these data, uniting the analyses of the previous two chapters, chapter 10 represents a proposal for a formal treatment of the paradigm on the basis of two semantic features: a temporal one – *NON-FINAL INSTANTIATION* – and a modal one – *METAPHYSICAL NONVERIDICALITY*. As we will see, the notion of **branching times** —introduced in chapter 1 and deployed in the analysis of *bambai* (ch. 4) — permits for a motivated, unified account of the ostensibly disparate sets of usage contexts that license each of WD's four inflectional categories. The essay concludes by considering the landscape of semantic variation across varieties of Yolŋu Matha, suggesting that the WD system has arisen as a consequence of reanalysis and contact-induced meaning change.

**Figure 17.** Melanie Wilkinson's (2012: 326) schematisation of the complex semantic space associated with each of the four inflectional categories in Djambarrpuyŋu. My colourisation.

Corresponding to the discussion above, I and III represent subintervals covering the past domain, instantiating CYCLIC AND METRICAL TENSE whereas the set of inflections available to negative (NEG) clauses is a subset of that for positive clauses (NEGATIVE ASYMMETRY.)



# Chapter 7

# Background

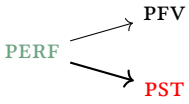
## 7.1 Grammars of TMA: the notion of "prominence"

In a 1999 monograph, Shankara Bhat posits a typological parameter along which languages variably assign prominence to TENSE, ASPECT or MOOD. For Bhat, determining which of these grammatical macrocategories a given language appears to assign "prominence" to gives rise to a number of generalisations about characteristics of that language's grammar ("correlatable characteristics"). In particular, he suggests that, in a language where $\mathcal{C}$ is given grammatical prominence, notions belonging to the other two categories tend to be "viewed in terms of [$\mathcal{C}$]" (1999: 7).

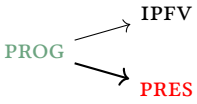
An important consequence of this typology, in which languages can be classified and differentiated on the basis of these three broad types, is the implication that languages can "move between them" — that is observable, synchronic variation across this parameter points to a history of reanalysis of, for example, temporal categories as modal ones. While Bhat does not explore this consequence of his typology in detail, he does point to observations in the grammaticalisation literature that have demonstrated "cross-categorial change" — that is, situations where lexical material denoting some temporal, modal or aspectual category come to be reanalysed conveying meaning about a category in another semantic domain. Bhat suggests, for example, that the well-attested alternative grammaticalisation trajectories described by Bybee et al. (1994) (among others) and represented in Figure 18 are determined by the "prominence" that a given language accords

to either temporal or aspectual distinctions (1999: 182). Of course, this treatment to some degree begs the question. In a given pair of related languages, what is it that underpins the change from, *e.g.*, a perfect marker in $\mathcal{L}$ developing into to perfective marking in $\mathcal{L}_1$ versus into a past-tense marking in $\mathcal{L}_2$?

**Figure 18.** Two examples of attested meaning change between the aspectual and temporal domains




**(a)** PERF grams develop into PFV markers (e.g. Condoravdi & Deo 2015 for Indo-Aryan) or PST markers (e.g. Schaden 2012 a.o.)




**(b)** PROG grams develop into IPFV markers (see Deo 2015b) or PRS markers (e.g. Heinrichs 2002 for Neo-Aramaic)

### 7.1.1 Futurity and mood-prominence

Bhat marshalls data from Tibeto-Burman to show that "mood-prominent" languages have a tendency to grammaticalise a FUTURE/NONFUTURE distinction. He points in particular to Manipuri (`mni` Tibeto-Burman: Manipur), where this tense distinction appears to have "developed from an earlier realis-irrealis modal distinction" (1999: 19). Semantic connections between modal and future concepts are further suggested by frequently-attested semantic change pathways between, for example, expressions of intention and obligation (*sc.* bouletic/deontic necessity) and futurity (and then to epistemic modality, *e.g.*, Bybee & Pagliuca 1978; Bybee et al. 1991, 1994; Kuteva et al. 2019b).[131] In her account of the diachrony (and "instability") of future expression in Romance, for example, Fleischman (1982: 31, 75, 106) claims that as future markers become "more temporalized" (which she connects to their agglutination), functional pressure to recruit novel modal constructions emerges — an early conceptualisation of a grammaticalisation cycle/"spiral."[132]

Additional evidence of meaning change along future/modal pathways is to be found in Indo-European. According to Fortson (2010: 106): the PIE "subjunctive was probably a future tense",

[131] Bybee, Pagliuca & Perkins (1991) hypothesise that the "age" of a future marker (FUTAGE) can be assessed in view of its semantic domain. In effect, this amounts to a "pathway": DEONTIC → CIRCUMSTANTIAL → FUTURE → EPISTEMIC *etc.*

[132] The notions of "constant renewal" (in addition to "unidirectionality" & "irreverability" that underpins cyclic change was discussed in relation to the "Negative Existential Cycle" in Part II. Some authors have reformulated cycles as "spirals" in order to more accurately conceptualise the recruitment of new lexical material often via periphrastic constructions, to explicitly mark conceptual categories "vacated" in the process of meaning change (Haspelmath 2000 attributes this metaphor to von Gabalentz 1901.)

he notes • that this form is continued as the subjunctive of Indo-Iranian, Greek and Celtic and, • descends as the future in Latin (as it also likely did probably in Vedic (214)).

As suggested in § 1.2.1, going back to Aristotle, it is well understood that the future has a dually temporal and modal character. That is, the truth of a future predication has frequently been analysed as changing with the passage of time — "'future contingent" statements can be neither true nor false' (Thomason 1970: 265). Consequently, utterances about the future are often associated with predictive illocutionary force (this was a major theme guiding the analysis in Part I).

Consequently, contemporary formal treatments often embrace a modal semantics for "future" operators: one that departs from the earlier, priorian tense logic type approaches where truth is defined relative to time and — the mirror image of PAST — FUTURE is a sentential operator that serves to locate their prejacent subsequent to evaluation time.[133] Modal accounts of future, then, often tend to take future-oriented morphology to universally quantify over a modal base. Thomason (1970: 274) proposes a "supervaluation"-based semantics for future-tensed predication as follows:[134]

(142) $$[\![\textsc{fut}\ p]\!]^{w,t} = \begin{cases} 1 \leftrightarrow & \forall w'\big[w' \approx_t w \rightarrow \exists t'[t \prec t' \wedge p(w')(t')]\big] \\ 0 \leftrightarrow & \forall w'\big[w' \approx_t w \rightarrow \nexists t'[t \prec t' \wedge p(w')(t')]\big] \\ & \text{undefined otherwise} \end{cases}$$

FUT $p$ is true if there's a time $t'$ in the future of all metaphysical alternatives to $w$ at $t$ at which $p$ holds and false if there is no such time. (That is, it presupposes that the truth or falsity of a future utterance is uniformly determined at all metaphysical alternatives to $w$ at $t$.)

As described earlier in this dissertation (*e.g.*, § 1.2.1, *p.* 12*ff*), $\cap{\approx_t}w$ represents all "historical alter-

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[133] Of course, as discussed in § 1.2.1, Arthur Prior was crucially concerned about this asymmetry between the future and the past, departing over the course of his career from an earlier belief in future determinism and developing branching time models concerned with the indeterminate nature of the future (see Copeland 2020 and also Copley 2009: 13).

Generally speaking, on a deterministic view of the future, future morphemes can be ununderstood to universally quantify over an epistemic modal base ("possible candidates for the (preordained) future as far as I'm concerned", *cf.* Giannakidou & Mari 2018), whereas on non-deterministic views they quantify over a metaphysical modal base ("possible futures consistent with assumptions about metaphysical facts governing the world.")

[134] This following Copley's (2009: 14) conversion of Thomason's account based on "histories" (which effectively imply sets of historical alternatives) into an equivalent one that speaks in terms of possible worlds. Thomason himself develops $\mathcal{T} \times \mathcal{W}$ frames in a 1984 paper. See also §1.2.1 and (Stojanović 2014) for discussion and an overview of different semantic approaches to the "future contingents" problem.

natives to $w$ at $t$" (an equivalence class of worlds with identical histories to $w$ up to $t$) — in effect equivalent to a *metaphysical conversational background* (see § 1.2.1.)

Given how central this metaphysical assumption will be to the analysis, the approach taken by this chapter recasts this possible worlds formalism in terms of branching futures/times models. As in chapter 4's treatment of the distribution of *bambai*, this will hopefully allow us to perspicaciously cash out the distinctions between the domains of REAL and NONREAL eventualities. That is, a metaphysical conversational background $\cap\approx_i$ will be representable by an equivalence class of branches, undivided until $i$, that represent metaphysically possible developments of the world from $i$.

### 7.1.2 Negation and mood

Miestamo (2005, 2007) develops a broad cross-linguistic typology of sentential negation, focussing in particular on the manifestation, distribution and classification of "asymmetric" negation — a class of phenomena where negative sentences have a non-trivially different morphosyntactic structure than positive ones — that is, the shape of a negative sentence diverges from its affirmative counterpart beyond the presence/absence of an overt negative element.

So, whereas, for a lanugage with a symmetric negation (S) system, negative clauses are only distinguished by the presence of a NEG operator (as in RW, § 7.3.1), there are a number of ways for a language to display asymmetric negation (A) ("subtypes" of A). These phenomena in particular include the loss of morphosemantic distinctions ("paradigmatic neutralization") or disjoint formal paradigms for TMA marking in negative versus positive clauses ("different systems"; 2005: 51–5).

Of particular relevance for current purposes is the A/NONREAL subtype: languages which have 'grammaticalized the fact that negation belongs to the realm of the non-realized' — that is, negative and modal operators are shown to interact formally in a number of ways Miestamo (2005: 208). According to Miestamo, this particular genre of asymmetric negation phenomenon is notably overrepresented in the languages of Australia (and, to a lesser extent, New Guinea, leading him to describe A/NONREAL as a "circumpacific phenomenon" (2005: 192, 411)). Phillips (to appear 2021a: §2.2) provides an overview of a number of mood-based (and other) negative asymmetry phenomena in Australian languages.

In many of these languages, A/NONREAL is manifested as the **neutralisation** of a grammatical distinction between REALIS and IRREALIS modalities in negative clauses.[135] That is, ±REALISED is associated with a morphosyntactic distinction in positive clauses that is not available in negative ones. Perhaps implied by the label *A/NONREAL*, Miestamo tellingly finds no examples of the opposite pattern, *i.e.*, "there are no cases where the affirmative is marked for a category denoting nonrealized states of affairs while the corresponding negative uses a form marking realized states of affairs" — he formulates this as an "implicational universal" and relates it to typological discussion about the marked status of negation (2005: 96–7).[136]

Shown in the Gurrgoni (gge, Maningrida: Arnhem) data in (143), a reality status distinction morphologically realised in positive clauses (a-b) is not available to its negative counterpart (143c), which is obligatorily irrealis-marked and ambiguous between a modal and non-modal reading. As we will see below, a similar phenomenon is exhibited in some varieties of Yolŋu Matha (notably those varieties closer to Maningrida.)

(143) **Interactions between negation and mood marking in Gurrgoni**

a. Past-tensed (nonmodal)

*nji-weki-**ni***
2s-talk-PRECONTMP

'You talked.'

b. Past-tensed (modalised)

*nji-weki-**yarni***
2s-talk-**IRR1**

'You might have talked.'

c. Negative past-tensed

*galu nji-weki-**yarni***
NEG 2s-talk-**IRR1**

'You didn't/mightn't have talked.' (adapted from Green 1995: 307)

Irrealis markers are broadly taken to realise semantic operators which displace the instantiation of a given eventuality into the realm of the nonrealised. That is, in uttering an *irrealis*

[135] Miestamo points out that this conception of "reality status" is to be construed as a broad "distinction relating to realized and non-realized states of affairs" (2005: 96).

[136] See Miestamo (2005: 107–8) for discussion of a possible counterexample of this generalisation in Wubuy.

proposition, a Speaker does *not* assert (*i.e.*, commit themself) to the truth of a (basic) proposition in the "actual world." Relatedly, the basic contribution of negative operators is to deny the truth of a given proposition, that is, they commit the speaker to the NONREALISED status of some predicate. For this reason, sentential negtion has been described as an ANTIVERIDICAL operation — roughly, $\varphi$ and $\neg\varphi$ denote disjoint situations.

Consequently, for languages exhibiting A/NONREAL, irrealis and negative operators can be thought of as performing conceptually-related functions — *viz.* indicating that a given proposition is *not* being asserted, that the speaker is *not* committing to a fact in the actual world: "the association between negation and non-reality on the formal level iconically reflects the association between negation and non-reality on the functional level" (Miestamo 2005: 208, see also Givón 1978; Horn 2001 a.o.) The semantic property which underpins this (functional) "association" is explored in further detail in Ch. 9 below under the label of **nonveridicality**.

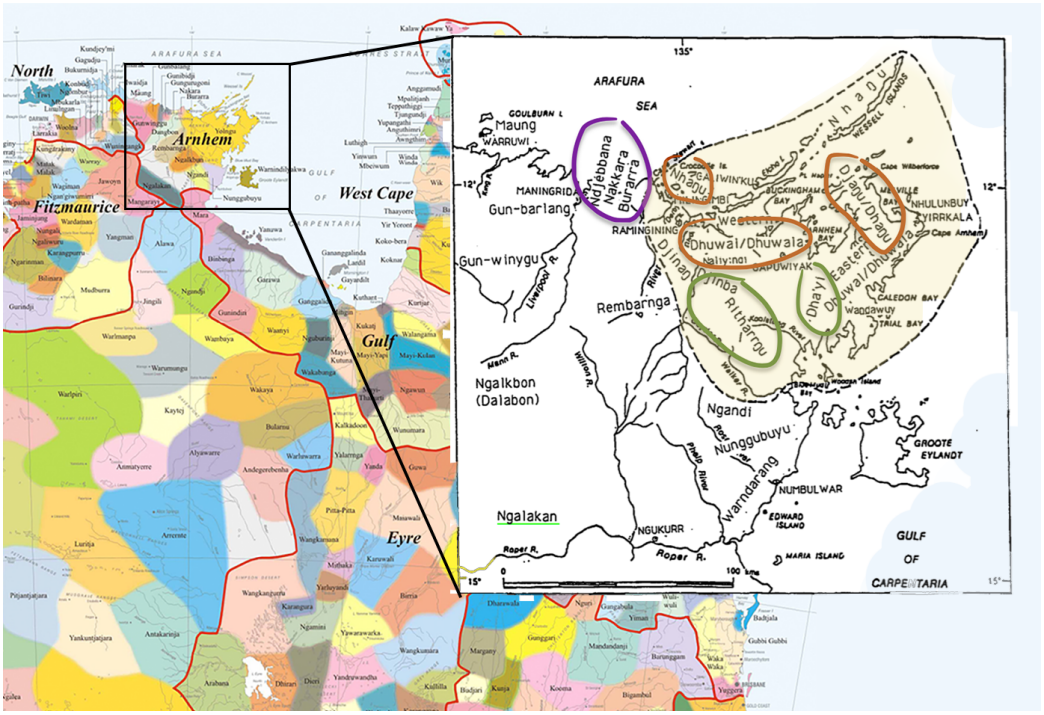
Ultimately, then, a language exhibiting (this subtype of) *asymmetric* negation has grammaticalised some semantical connection between negation and another conceptual domain (*sc.* mood, nonveridicality). Conversely, languages with *symmetric* negation: those that do not structurally distinguish negative from affirmative sentences (except for the presence of a negative operator) can be thought of as simply extending ("analogising") the morphosyntax of an affirmative sentence (Miestamo 2005: 201–2).

It is on these functional grounds that negation and mood interact; predicting parametric variation across languages (*i.e.*, in $\mathcal{L}$, is NEG considered an IRR(-licensing) category?) The interaction between negation and irrealis-aligned modalities that is exhibited in A/NONREAL languages, and the non-attestation of like effects where affirmation and irrealis-modalities pattern together to the exclusion of negation, evinces this conceptual connection.

## 7.2 Yolŋu Matha

Yolŋu Matha is a small language (sub)family spoken in North-Eastern Arnhem Land, in the Northern Territory of Australia (map provided in Figure 19, see also discussion in § 1.4). It is a subgroup of the larger Pama-Nyungan family, representing something of an enclave in Northern Australia; surrounded by a diversity of unrelated languages.

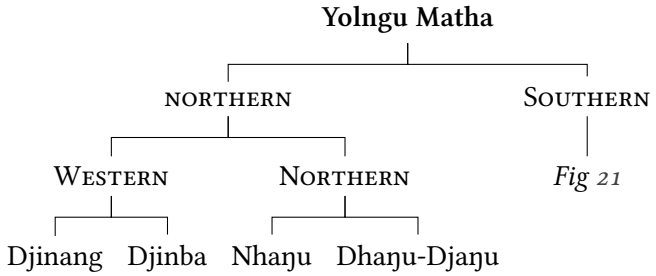
**Figure 19**. Traditional language communities in Northern Australia (Horton 1996).Yolŋu Matha is the gold coloured area within the square in the primary map.
**Inset**. Northeast Arnhem land (colourised from Wilkinson 2012: 2. Yellow shading indicates the *Yolŋu Wäŋa* (homeland). Brown and green circles indicate the contemporary distribution of Yolŋu languages investigated. Purple circling indicates the neighbouring (but genetically unrelated) Maningrida language family.




Most Yolŋu linguistic phylogenies posit a high-level split between into three subgroups (see Bowern (ed.) forthcoming: *x*) for an overview of different classifications.) This is schematised in Figure 20. Yolŋu society is traditionally organised according to a moiety system — that is, the Yolŋu universe is organised into two wide-ranging subdomains, *Yirritja* and *Dhuwa* — and continues to be strictly exogamous with respect to moiety. Given that each Yolŋu clan is associated with a single patrilineal moiety and corresponding language variety, households are necessarily multidialectal, one member of a couple speaking a *Yirritja* lect, the other speaking a *Dhuwa* lect. Children inherit their father's moiety (and language), and marry into their mother's moiety (see also Williams 1986: 62*ff*). This chapter focuses primarily on a number of Southern Yolŋu varieties (see Fig 21).

As indicated in the diagram, the *Dhuwal* and *Dhuwala* groupings effectively represent the distinct clan-lects of a single speech community — associated with *Dhuwa* and *Yirritja* moieties

**Figure 20**. A broad phylogenetic classification of Yolŋu subgroups, following Schebeck 2001; Waters 1989; Wilkinson 2012 a.o. with some adaptation following Bowern (ed.) treats "WESTERN" as belonging to a NORTHERN clade (forthcoming: *x*).




respectively. Incidentally, Wilkinson (2012) points out that the degree of similarity between Western Dhuwal and Dhuwala (WD: those varieties spoken around Milingimbi and Ramingining) are more closely related to one another than either is to Eastern Dhuwal and Dhuwala (*Miwatj*: those varieties spoken in eastern *Yolŋuw wäŋa*, around Yirrkala/Nhulunbuy and Gapuwiyak.) I assume that this fact is representable phylogenetically and has been represented in Figure 21.

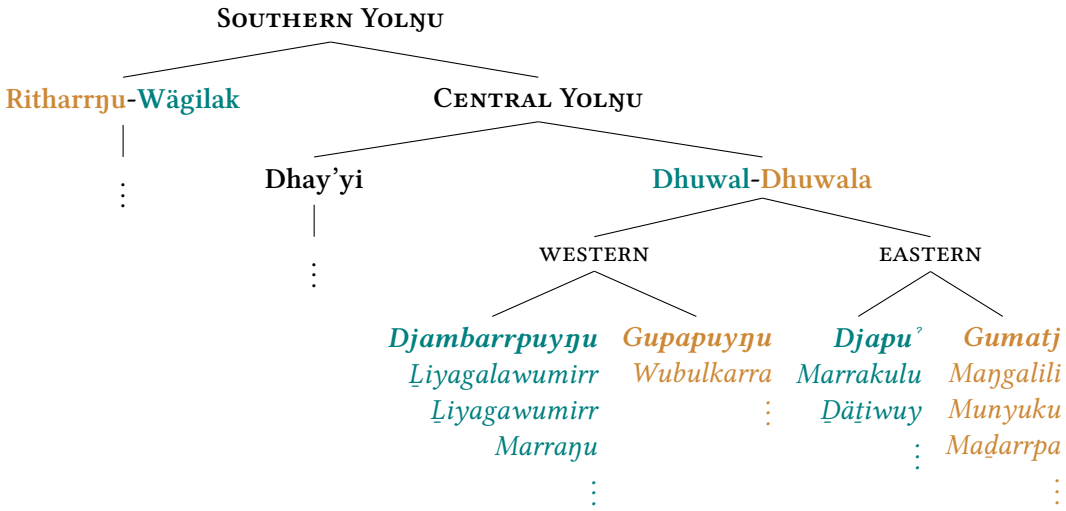
### Moiety & sociolinguistic variation

The primary distinction between Dhuwal and Dhuwala varieties, which cross-cuts the language area results from a semi-productive apocope rule which appears to apply predominantly to a range closed-class items, particularly case marking and inflectional suffixes (investigated in Morphy 1977, see also Wilkinson 2012: 94*ff* for further details, including a discussion of differences in the application of the apocope rule between WD and *Miwatj* varieties.)

As previously stated, both moieties — *Dhuwa* and *Yirritja* — and their respective *matha* — *Dhuwal* and *Dhuwala* — are represented in the consultants whose grammaticality judgments constitute primary data for this dissertation (and the empirical basis of the analysis which I lay down in the forthcoming chapters.) I reproduce this sentence data faithfully throughout; when referring to a shared grammatical item, any divergence in the phonological form of given items is indicated in parentheses.[137]

[137]Examples: *balaŋ(u)* 'MOD', *mak(u)* 'EPIST' , *dhiyaŋ(u)* 'PROX.ERG', *-mirr(i)* 'PROP', *-lil(i)* 'ALL', *-ŋur(a)* LOC, *ŋäthil(i)* 'previously.'

**Figure 21.** Varieties ('clanlects'/*matha*/dialects) associated with Dhuwa-Yirritja moieties in the context of Southern Yolŋu languages (following Wilkinson 2012: 13). Some adaptation following Schebeck (2001: 15) and Bowern (2021) (ed.) who does not claim that SOUTHERN and CENTRAL form a single clade (forthcoming: *x*).




Examples of the formal consequences of Dhuwal apocope on the verbal paradigm are indicated in parentheses in Table 11 (*p.* 177) below. The table gives examples of the verb paradigm for each of the major Djambarrpuyŋu conjugation classes as described by Wilkinson (2012: 306*ff*) (parentheses give the corresponding verb group number assigned by Lowe 1996 for Gupapuyŋu.)

## 7.3 The Yolŋu verb: Typology & morphosemantics

With the exception of the Western Yolŋu varieties (*i.e.*, Djinaŋ & Djinba, see Schebeck 2001; Waters 1989), Yolŋu varieties are largely mutually intelligible (Heath 1981a; Morphy 1983). Yolŋu languages have verbal paradigms which are at least partially cognate and likely reconstructable to a proto-system (Schebeck 2001, see comparative reconstruction pilot work by Bowern 2009). All varieties have between three and six different inflectional classes; each inflection is responsible for encoding (combinations of) temporal (tense/aspect) and modal information — as described above, it is the semantics of these inflections with which we will be primarily concerned in this component part of the dissertation. The form of each inflection additionally varies depending on the conjugation class associated with a given verb stem (or derivational suffix) — authors of de-

scriptions of various Yolŋu varieties having identified between three (*e.g.*, Waters 1989 on Djinba & Djinba) and nine (*e.g.*, Lowe 1996 on Gupapuyŋu) distinct conjugation classes.

In view of demonstrating the structure of a Yolŋu verbal paradigm, in this section, I present a brief overview of the morphosemantics of the range of inflectional classes in Ritharrŋu-Wägilak (RW) — the southernmost variety of Yolŋu Matha and a close relative of Dhuwal — on the basis of new data elicited in the field, in addition to Heath's (1980a) description of Ritharrŋu.

### 7.3.1 The Ritharrŋu-Wägilak paradigm

According to Heath (1980a: 60–75), the Ritharrŋu-Wägilak (RW) verbal paradigm distinguishes six main conjugation classes, each of which marks four inflectional categories. These inflections establish a three-way tense distinction between the PAST, PRESENT and FUTURE. He describes the fourth category as the PAST POTENTIAL, supplying data of the latter's use in counterfactual situations. The paradigm is represented in table 10, while the data in (144) demonstrate the (straightforward) temporal semantics of each of these inflectional categories.[138]

**Table 10.** Examples of conjugation patterns for the Ritharrŋu-Wägilak [rit] verbal paradigm (adapted from Heath 1980a: 63–6)

| CLASS | STEM | *PRS (I)* | *FUT (II)* | *PST*[139] *(III)* | *CFACT (V)* |
|---|---|---|---|---|---|
| 1 | 'GO' | *wäni* | *wäni* | *wäni-**na**/-**nya*** | *wäni-**ya*** |
| 2 | 'EAT' | *l̪uka* | *l̪uk-**i*** | *l̪uka-**nha*** | *l̪uk-**iya*** |
| 3 | 'CHASE' | *ŋupa* | *ŋupa-**ru*** | *ŋupa-**na*** | *ŋupa-**ra*** |
| 4 | 'HOLD' | *gatha-**ŋ*** | *gaṯu-**lu*** | *gatha-**(la)ra*** | *gatha-**la*** |
| 5 | 'PUSH' | *djaranydju-**n*** | *djaranydju-**ru*** | *djaranydju-**na*** | *djaranydju-**ra*** |
| 6B | 'PROTECT' | *gunga-**ma*** | *gungu-**ŋu*** | *gunga-**wala**/-**nha*** | *gunga-**wa*** |

In the examples that follow, each of RW's four inflections is indicated with a Roman numeral, in line with the conventions used for glossing WD throughout (incl. in the introduction to this Part of the dissertation, which alluded to the motivations for this convention). This highlights the the cognacy of the RW and WD paradigms. Note also that Heath's PAST POTENTIAL (≒ CFACT) is *not* cognate with WD IV. It is glossed here as V (see also § 10.2).

[138] Many thanks to Salome Harris for collecting questionnaire-data from Wägilak and Ritharrŋu in Ngukurr, mid-2019.

[139] Where there are two forms given for the PST marker, Heath (1980a) is ambivalent about the semantic characteristics of each form — *i.e.*, whether they are synonymous or whether they represent a defective distinction. We will provide further (amphichronic) evidence for the latter perspective in § 10.2.

(144) **The temporal interpretation of each inflectional class in Wägilak [rit]**

a. ***nhäma*** *rra yakuthi mukulnha* [PRESENT]
see.I 1s now aunt.ACC
'I'm looking at my aunt currently.' [RN 20190520]

b. *goḏarrpuy ŋarra* ***nhäŋu*** *mukulnha* [FUTURE]
tomorrow 1s see.II aunt.ACC
'I'll see my aunt tomorrow.' [DW 20190522]

c. *ripurru-mirri ŋarra* ***nhäwala*** *mukulnha* [YESTERDAY PAST]
yesterday 1s see.III aunt.ACC
'I saw my aunt yesterday.' [RN 20190522]

Further, (145) shows the modal uses of FUT and CFACT inflections. In (145a-b), II is compatible with a number of modal (*e.g.*, deontic, conditional) readings, including in imperative utterances. Similarly, CFACT is compatible with a range of "modal-for-the-past"/counterfactual readings, as shown by Heath's translation in (145c).

(145) **The FUTURE and PAST POTENTIAL/COUNTERFACTUAL in modalised contexts in Ritharrŋu-Wägilak**

a. *blijiman ŋay waŋa-na: "gulu-****rru*** *nhe yiŋ'-ŋiri=dhi wäŋa-ya. Yakaŋu nhe*
policeman 3s say-III stay-II 2s DIST-LOC=FOC home-PROM NEG 2s
***wäni****-'may garra nhe git lokdap-****urru****"*
go.II-NEG *garra* 2s *get* locked.up-II
'The policeman said you must stay here at home. Don't go (anywhere) or you'll be locked up.' [RŊ 20190520 18']

b. ***wäni*** *nhe*
go.II 2s
'You can/should/will go.' (or 'Go!') (Heath 1980a: 104)

c. *wäni-****ya*** *nhe*
go-V 2s
'You could/should/would/were about to go.' (Heath 1980a: 104)

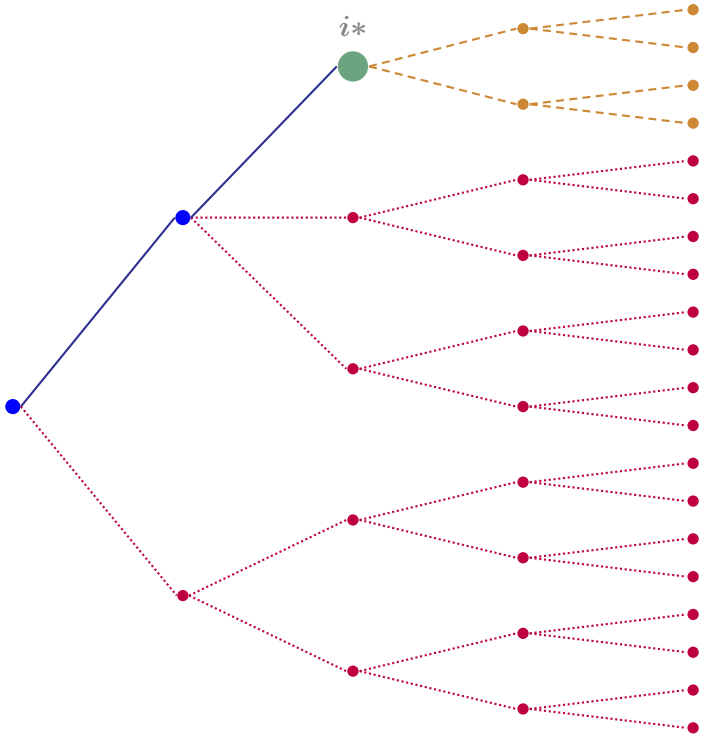
This distribution can be straightforwardly represented by appealing to the "modal trichtomy" (that is, modelling branching time as composed of an *actual, potential* and *counterfactual* domain, *cf.* von Prince (2019); von Prince et al. (forthcoming) — introduced in §1.2.1, compare (11), *p.* 15.)

Effectively, Ritharrŋu-Wägilak's four inflections can be thought of as a partition of a branching-time. This is shown in (146) and schematised in Figure 22.

(146) **Domains of the four inflections in Ritharrŋu-Wägilak, given a branching time frame $\mathfrak{U} = \langle \mathcal{I}, \prec \rangle$ and an evaluation index $i*$**

$[\![\textsc{prs}]\!]^{i*}$ : actual present $\{i \mid i = i*\}$
$[\![\textsc{fut}]\!]^{i*}$ : potential $\{i \mid i \succ i*\}$
$[\![\textsc{pst}]\!]^{i*}$ : actual past $\{i \mid i \prec i*\}$
$[\![\textsc{cfact}]\!]^{i*}$ : counterfactual $\{i \mid \langle i, i* \rangle$ is unordered by $\prec\}$

**Figure 22.** Ritharrŋu-Wägilak's verbal paradigm partitions the branching frame/modal domain (modelled as a set of partially-ordered indices.) Solid, dashed and dotted branches correspond to the ***actual, potential and counterfactual*** domains respectively. Colour-coding indicates which `rit` inflection each index is associated with (compare 146).




As an example then, the contribution of PRS (following standard assumptions about tense) is taken to be the restriction of the instantiation time of a given predicate ($P$)'s to (actual) indices that overlap with the present: *i.e.*, PRS($P$) is true iff $P$ holds at $i*$.

### 7.3.2 The central Arnhem linguistic area

This section has so far sought to familiarise the reader with the basic structure of a Yolŋu Matha verbal paradigm, taking the example of the Ritharrŋu-Wägilak (Southern Yolŋu) variety (itself to be revisited in § 10.2.)

In the sections that follow, we turn to a description of the distribution of the inflectional categories in Western Dhuwal-Dhuwala (WD). As we will see (and as shown in the introduction to this part of the dissertation), there are a number of phenomena that complicate a unified treatment of the semantics of the WD paradigm. Introduced above, these phenomena include a CYCLIC TENSE system and ASYMMETRIC NEGATION.

Importantly, these phenomena are not exhibited in most Yolŋu lanuages, including those varieties phyletically closest to WD, *viz.* Ritharrŋu-Wägilak, as well as the *Miwatj* (eastern) varieties of Dhuwal-Dhuwala centered around Yirrkala (compare Figures 20 & 21). Similar patterns are, however, characteristic of the non-Pama-Nyungan languages of Maningrida — Burarra, Gurrgoni, Nakkara and Ndjébanna. Varieties of Djinaŋ (a Western Yolŋu outlier) are spoken in the Maningrida community and its outstations. The Ramingining community — traditionally Ganalbingu land (a *Yirritja* Djinba moiety) — is approximately 100km east of Maningrida. Djinaŋ, Djinba and WD (the westernmost varieties of Dhuwal-Dhuwala) all exhibit the cyclicity and asymmetric negation that is characteristic of the grammars of the Maningrida languages.

In view of the sustained contact between the non-Pama-Nyungan Maningrida languages and the (geographically) western varieties of Yolŋu Matha, it is assumed here that these two properties are examples of areal phenomena that characterise the languages of central Arnhem Land (see appendix 2 of Waters 1989 for a short investigation of this perspective.)

※

I will argue that these two phenomena — *cyclic tense* and *asymmetric negation* (w/r/t reality status marking) — are undergirded by the grammaticalisation of two semantical properties: **NON-FINAL INSTANTIATION** and **NONVERIDICALITY** respectively. The remainder of this chapter provides a description of the distribution of WD's four inflectional categories and how they appear to relate to the marking of temporal and modal ("reality status") information.

Cyclic tense and asymmetric negation will be further precised, and couched in a more detailed discussion of the expression of temporal and modal categories in WD (chapters 8 and 9 respectively.) A formal proposal (in terms of branching times) for the semantics of the WD verbal paradigm is then presented in chapter 10.

## 7.4 Verbal inflection in Western Dhuwal(a)

TMA distinctions in Western Dhuwal(a) are partially encoded in a paradigm that distinguishes four 'inflections', which are cognate with a number proto-Yolŋu inflections according to the reconstructions provided by Bowern (2009). Unlike for Ritharrŋu-Wägilak, summarised above (§ 7.3), work on Dhuwal(a) varieties—most notably Beulah Lowe's notes and lessons on Gupapuyŋu (first published in 1960) and Melanie Wilkinson's 1991 Djambarrpuyŋu reference grammar [republished & cited here as Lowe 1996; Wilkinson 2012 respectively]—has tended to eschew a metalinguistic gloss for these inflections, given the ostensible non-unifiability of their semantics:[140] the distribution of each of these inflectional categories is discussed in greater detail in this section. In addition to these inflections, the labour of encoding temporal and modal relations in WD is shared by a (closed) class of auxiliaries, which appear to interact with the verbal paradigm.

Further complicating the exposition of this (and a feature across Yolŋu Matha varieties, see § 7.3), is the fact that there are a number of *conjugation (sub)classes*: Lowe (1996) enumerates nine classes. The (more detailed) description by Wilkinson (2012) shows that these correspond to three larger conjugation classes — the *Ø*-, *N*- and *Ny*-classes — each associated with a number of subclasses,[141] in addition to "non-inflecting" and (semi-)irregular categories (Wilkinson 2012). The paradigm for six WD verbs, taken to be representative of distinct different conjugation patterns is given in Table 11.[142]

Above, I alluded to Beulah Lowe's eschewal of a "semantic description" for each of the four

[140]Relatedly, in his treatment of Djinaŋ and Djinba, Waters (1980, 1989) glosses the function-in-context of each inflection, perhaps implying a polysemy treatment of each inflection in these languages: "[In Djinaŋ, t]here are twelve semantic categories for every verb, which are coded by seven suffixal forms. Consequently, five of the forms each code two different semantic categories…" 1980: 142

[141]Wilkinson identifies 14 distinct inflectional patterns in addition to a "non-inflecting" class (2012: 307).

[142]NB: as described above, the Yolŋu varieties under investigation here include Djambarrpuyŋu [djr – Western Dhuwal ] and Gupapuyŋu [guf – Western Dhuwala]. These are treated as sociolectal varieties with a shared grammar (see discussion in § 137, *p.* 170 above.)

**Table 11.** Examples of the paradigm of four morphological TMA inflections in Djambarrpuyŋu [djr] and (Gupapuyŋu [guf] suffixes in parentheses).
[djr] data and classification from Wilkinson (2012); [guf] data and classification from *Gupapuyŋu* (1996).

| Class | *Example* | I | II | III | IV |
|---|---|---|---|---|---|
| $\emptyset_i$ (2) | *marrtji* 'go' | *marrtji* | *marrtji* | *marrtji**n(a)*** | *marrtji**nya*** |
| $\emptyset_a$ (3) | *l̪uka* 'consume' | *l̪uk**a*** | *l̪uk**i*** | *l̪uka**n(a)*** | *l̪uka**nha*** |
| $\emptyset_{rr}$ (4) | *waṉḏirr(i)* 'run' | *waṉḏi**rr(i)*** | *waṉḏi* | *waṉḏi**n(a)*** | *waṉḏi**nya*** |
| N (5) | *l̪upthun* 'wash' | *l̪uphtu**n*** | *l̪upthu**rr(u)*** | *l̪upthu**rr(una)*** | *l̪upthu**na*** |
| $N_L$ (6) | *gurrupan* 'give' | *gurrupa**n*** | *gurrupu**l(u)*** | *gurrupa**ra*** | *gurrupa**na*** |
| Ŋ (7) | *nhäma* 'see' | *nhä**ma*** | *nhä**ŋu*** | *nhä**ŋal(a)*** | *nhä**nha*** |

inflectional classes, also followed by Melanie Wilkinson. Throughout, these categories will be glossed with bold-faced Roman numerals, following the conventions established by Lowe (see also Table 12, which adapts Wilkinson's summary of glossing decisions made by other grammarians.)

**Table 12.** Summary of metalinguistic descriptors deployed by a number of grammarians for the four inflectional classes in a number of Dhuwal/Dhuwala varities, adapted from Wilkinson (2012: 336).

| | | I | II | III | IV |
|---|---|---|---|---|---|
| Wilkinson 2012 | djr | First | Second | Third | Fourth |
| Lowe 1996[143] | guf | Primary | Secondary | Tertiary | Quartenary |
| Tchekhoff & Zorc 1983 | djr | Base | Future | $Past_1$ | $Past_2$ |
| Heath 1980c | dwu | Pres/Fut | Fut/Imp | Past | Past Remote |
| Morphy 1983[144] | Djapuˀ | Unmarked | Potential | Perfective | Past Non-indicative |

In the following subsections, I provide examples of the functional domains of each of the four inflections in Western Dhuwal-Dhuwala and other lexical material relevant to encoding TMA relations in this language.

[143] Van der Wal 1992 adopts the same labelling scheme as Lowe (1996) although her analysis of the distribution of each of Gupapuyŋu's inflectional classes seems to diverge somewhat from Lowe's.
Additionally, Buchanan (1978) assumes the same scheme in her description of Djambarrpuyŋu.

[144] According to Amery (1985), Morphy's description is also assumed in Ross's 1968 description of Gumatj [gnn] clauses (*non vidi*), although evidently a distinct fifth category is used for the Imperative in this variety. Amery's own work on Dhuwaya (dwy; a Yolŋu koine spoken around Yirrkala) also assumes Morphy's system (minus the 'past non-indicative.')

### 7.4.1 The Primary inflection

The 'primary' inflection (I), cognate with inflections in other Yolŋu languages which have been described as "unmarked" or "base", surfaces in predications that are interpreted with any of PRESENT, PAST or FUTURE reference. Here I provide examples of I-inflected clauses receiving each of these temporal interpretations.

(147) **Present-reference encoded with I**

a. *Ŋunhi-y ŋunhi ḏirramu* ***nhina*** *ga*
ENDO-ERG TEXD man sit.I IPFV.I
'There that man is sitting.' (Tchekhoff & Zorc 1983: 856)

b. *Ŋarra ga* ***l̪uka*** *gapu (dhiyaŋu bala)*
1S IPFV.I consume.I water ENDO.ERG then
'I'm drinking water at the moment.' [DhG 20190405]

The sentences given in (147) show the compatibility between present temporal reference and the I inflection: in both cases, the event described by the predicate — *nhina* 'sit.I' and *l̪uka* 'consume.I' — is understood as contemporaneous with speech time. In each sentence, imperfective marking (*ga* 'IPFV') is obligatory in order to establish present reference (see §8).

In addition to those present-referring sentences in (147), the data in (148) show compatibility between I and past time reference. In each of these examples, the events described by the predicates—*e.g.*, the arrival event described by *ŋayatham* in (148b)—*precede* speech time. Similarly, the two past events in (c) both receive I inflection. The instantiation times of both of these events are further restricted (to the recent past) by temporal frame adverbs, *e.g.*, *barpuru* ≈ 'yesterday'.

(148) **Past-reference encoded with I**

a. *bäru-yi-****rri*** ***barpuru*** *nhuma-laŋgu rra ŋunhi-li-yi ga ŋäṉḏi-w ŋarra*
crocodile-INCH-I **yesterday** 2P-DAT 1S ENDO-LOC-ANA and MO-DAT 1S
***barpuru*** *l̪arr-****uma*** *ga nhuma rraku l̪akara-****ma***
**yesterday** search.for-I and 2P 1S.DAT tell-I
'Yesterday, I (appeared/became) for you as a crocodile there. And I was looking for my mum and you told me (where she was.)' (van der Wal 1992: 107)

b. *ga* ***ŋayatham*** *ŋunha baṉ'thula-wuy ŋayambalk*
and reach.I DIST PLACE-ASSOC place
'And (then we) reached the place (associated with) Baṉthula.' (Wilkinson 2012: 461)

c. *ḏirramu-wal yothu-wal bäpa-'mirriŋu-y rrupiya **barpuru** djuy'yu-**n***
man-OBL kid-OBL father-KINPROP-ERG money **yesterday** send-I
*märr **barpuru** ga **barpuru** **buna**-ny dhiyal-nydja*
**somewhat yesterday** and **yesterday** arrive.I-PROM PROX.ERG-PROM
'The father sent money to the boy recently and it arrived here yesterday'
(Wilkinson 2012: 343)

Finally, the examples in (149) below show the compatibility of I-inflected verb forms and FUTURE temporal reference. In these contexts, the presence of *dhu* — the FUTURE marker — is obligatory in order to establish future reference.

(149) **Future-reference encoded with I**

a. *yalala ŋarra dhu nhokal lakara-**m***
later 1S FUT 2S.OBL tell-I
'Later (today) I'll tell you.' (Wilkinson 2012: 373)

b. *dhiyaŋ bala walal dhu **buna**, yalala*
now 3P FUT arrive.I later
'They are coming later today.' (Wilkinson 2012: 256)

c. Deontic force with dhu+I
*Way! Nhe dhu gurruka-**m** helmet! Rom ga **waŋa**.*
Hey! 2S FUT wear-I *helmet* law IPFV.I say.I
'Oy! You wear a helmet! The law says so! [AW 20170730]

In each of these three sentences, the event described by the predicate is understood to obtain in the future of speech time (modulo additional constraints on imminence/immediacy, to be described in the next subsection.)

What we have seen here, then, is that I is compatible with temporal reference at, prior to, and subsequent to the moment of speech: on the basis of this evidence, we might conjecture that it has no temporal semantics.

### 7.4.2 The Secondary inflection

Like I, the Secondary inflection (II) has a range of uses. It is notably obligatory when predicating of future times beyond the current day and is the main strategy for forming imperative sentences.

(150) **Future-reference encoded with II**

a. Co-occurring with *dhu* 'FUT'

*yalala-ŋu-mirri-y* *ŋula nhätha* *ŋarra* **(dhu)* *nhokal* *lakara-**ŋ***
later-*ŋu*-PROP-ERG sometime 1S FUT 2S-OBL tell-II

'I'll tell you sometime later on' (Wilkinson 2012: 346; neg. judg. – DhG 20190405)

b. Infelicity of I with non-today future

*Barpuru* *goḏarr* *ŋarra* *dhu* *nhä(-**ŋu**/#-**ma**)*
funeral tomorrow 1S FUT see(-II/#-I)

'I'll see the funeral tomorrow' [AW 20180730]

c. dhu+I implies same-day future

*walal* #*(dhu)* ***buna*** *yalala*
3P #(FUT) arrive.I later

'They'll arrive later.'
SPEAKER COMMENT: You're talking about *yalala*; not tomorrow, sometime today.

The two sentences in (150) show how II is used in concert with the particle *dhu* to establish future temporal reference. A notable contrast between (149a) and (150a) is the apparently obligatory retrieval of a TODAY-reference time for I-inflected futures, as against a BEYOND-TODAY-reference time for II-inflected futures.[145] Effectively, this distinction seems to be one place where the grammar of Dhuwal(a) grammaticalises "temporal remoteness" (Comrie 1985; Dahl 1985 referred to elsewhere in the literature as "metrical tense" *e.g.*, Chung & Timberlake 1985: 204).[146]

(151) shows the compatibility of II with a (future-oriented) possibility reading. Modal particles including *balaŋ(u), ŋuli* and *bäynha* are responsible for the 'weakening' or 'downtowning' of the speaker's commitment to the prejacent proposition.

(151) **Future possibilities marked with II**

a. *Ŋarra* *ŋuli* ***bäynha*** *dhiŋgu-**ŋ*** *ŋawulul-yu*
1S HYP MOD die-II smoke-ERG

'I might die from the smoke.' (Buchanan 1978: 164)

[145] Wilkinson (2012: 347) gives an example of a speaker using a *dhu*-II structure in the context of a narrative she is telling, signalling that she 'will (return to the time of the old people).' Wilkinson takes this as evidence of an association between II and the irrealis. This generalisation is pursued in detail in this chapter.

[146] Although, with regard to the *Miwatj* Dhuwal varieties that he investigates, Heath (1980c: 39) suggests that the II future in (his FUT/IMP) encodes a type of "normative nuance" (a clear extention of imperative flavour into future assertions.)

b. *ŋayi bala* ***balaŋu*** *bukthu-**rru***
3s MVTAWY MOD break-II
'It (the recorder) might break.' [DhG 20190417]

II is additionally used to encode imperative clauses (152). Shown in (152b), negative imperatives (probibitives) are treated identically.[147]

(152) **Imperative force with II**

a. *wäy! gurtha ŋunha, nhawi, ḏutji män-**ŋu**, bakmara-**ŋu***
hey! fire(wood) DIST what's.it firesticks get-II break-II
'Hey! Get that firewood, what's it, those firesticks, and break them.'
(van der Wal 1992: 114)

b. *yaka walala-ŋ buku-bakamara-**ŋ***
NEG 3p-DAT head-break-II
'Don't answer them!' (Wilkinson 2012: 360)

c. *nhä-**ŋu** nhanŋu dhurrwara!*
look-II 2s.DAT door
'Look at her mouth!' [AW 20180731]

Here, II-marked predicates have been shown to be compatible with **future** temporal reference. They co-occur with *dhu* (which we analyse as a FUTURE particle) to establish instantiation of the predicate subsequently to the day of utterance. II also occurs in imperative utterances and in (future-oriented) modal constructions with present perspective (151).

### 7.4.3 The Tertiary inflection

The Tertiary inflection (III) is generally associated with predications about the PAST. An important caveat, however, is that this inflection is infelicitous when describing RECENT events instantiated BEFORE THE CURRENT DAY. The examples in (153) below show the compatibility between III and a reference time that is 'earlier today. In (153d-e), apparent complementary distribution between I and III provides evidence of the categoricity of this distribuitional constraint.

[147] Although, as discussed in Ch. II (see also Phillips forthcoming *Oxford Guides* contribution), the use of privative-marked nominals is another common, more "indirect" directive convention.

(153) **Today past and the III inflection**

a. *Gäthur ŋayi **marrtjin** räli Galiwin'ku-ŋur*
today 3s go.III hither PLACE-ABL

'[Earlier] today he came from Galiwin'ku.' (Buchanan 1978: 150)

b. *Bili ŋayi **marrtjin** dhipuŋur natha-ŋur nyan'thuna-ŋur*
COMPL 3s go.III PROX.ABL food-ABL eat.IV-ABL

'He's already gone from having lunch here.' (Buchanan 1978: 150)

c. *dhiyaŋu bili goḏarr'mirri ga-**na** dhärra-**na** märrma' malwan, bala*
PROX.ERG CPLV morning.PROP IPFV-III stand-III two *sp. Malvaceae* MVTAWY
*ŋayi Ŋarritjnydja wurrth-**urruna**.*
3s *MÄLK*.PROM pull-III

'Earlier this morning, there were two trees standing [there], then Ŋarritj pulled them up.' [DB 20190405]

d. **Infelicity of III with RECENT PAST**

*barpuru ŋarra nhä**(-ma/*-ŋala)** ḏetuŋ*
yesterday 1s see**(-I/#-III)** buffalo

'I saw a buffalo yesterday.' [MD 20180802]

e. **Infelctity of I with TODAY PAST**

*gathura ŋarra nhä**(#-ma/-ŋala)** ḏetuŋ dhukarra-ŋura*
today 1s see#-I/III buffalo road-LOC

'I saw a buffalo down the road today' [MD 20180802]

(153a) shows the compatibility between temporal frame adverbial (TFA) *gäthur(a)* 'today' and III in `djr`, which leads to an temporal interpretation of 'earlier today.'[148] However even in the absence of a TFA, the event described in (b) is interpreted as having been instantiated EARLIER.TODAY/in the immediate past of speech time. Nonetheless, as the data in (154) show, a description of III as 'hodiernal/same-day past' tense marker is inadequate.

[148]Note however that the reckoning of TFA *gäthur(a)* differs to that of English and other familiar languages as shown in (`[neg-pst.munha]`), where *gäthur munhawa* 'today nighttime' is interpreted as "last night" and still triggers III marking on the verb.

(154) **Remote past and the III inflection**

a. CONTEXT. A dreamtime myth.

*bäru* *ga-**na*** *marrtji-**na*** *beŋuru* *Ḏulkarri'garri-ŋuru*
crocodile IPFV-III go-III INDF.ABL PLACE-ABL

'The crocodiles came from Ḏulkarri'garri.' (Van der Wal 1992: 111)

b. *(Ŋathili)* *ŋarra* *marrtji-**na*** *Sydney-lili*
before 1S go-III Sydney-ALL

'I went to Sydney long ago.' [DhG 20190504]

c. CONTEXT. The speaker is describing a locality as it was in her youth.

*märrma'* *ga-**n*** *malwan-dja* *dhärra-**n*** *yindi* *maṉḏa-ny*
two IPFV-III hibiscus-PROM stand-III big 3d-PROM

'Two big hibiscus flowers were (growing).' (Wilkinson 2012: 339)

Unlike the HODIERNAL temporal interpretations that the sentences in (153) receive, the sentences in (154) involve reference to the 'REMOTE PAST.' In (154a-b),the instantiation time of the predicate is restricted by frame adverbials: *ŋäthil(i)*, which picks out a time 'in the distant past; prior to/earlier than (some other time)' (Wilkinson 2012: 158), in addition to and *rarrandharryu* 'dry season':[149] The cooccurrence of these expressions restricts the predicate being questioned to *a prior dry season.* Conversely, the declarative sentence in (154c) requires no adverbial specification. A REMOTE PAST interpretation arises as a result of the III inflection in concert with information in the discourse context (*sc.* a narrative that the speaker is telling about her childhood.) (c) will be able to retrieve a same-day past interpretation as well, with sufficient pragmatic support.

The ostensible discontinuity of the times that predicates receiving I and III inflection can refer to has been described in preceding literature as **CYCLIC TIME REFERENCE** (Comrie 1985: 88). In her treatment of Burarra [bvr], Glasgow (1964) draws a distinction between "tense" and "frame of reference" ("timescale" for Green 1987: 48). These, in effect, amount to categorical interpretive interactions between morphological marking and sets of contexts. The interaction between these can be understood as giving rise to a reference interval. This style of analysis has been adopted and developed by others working on Maningrida languages (Eather 2011: 165 for Nakkara [nck],

[149]The suffix *-Thu* (*-yu* as a postsonorant allomorph), glossed here as ERG is used to mark ergative NPs as well as instrumental (INSTR) NPs and to form TFAs out of nominals TEMP.

Green (1995) for Gurr-goni [gge] and McKay (2000) for Ndjébanna [djj].) The interpretation of interacting "tense" morphology and reference frames is schematised in Table 13.

**Table 13.** A Glasgow 1964-style analysis of **past-time restrictions** introduced by the verbal inflections, adapted for the Dhuwal(a) data. I and III inflections correspond to Eather's **contemporary** and **precontemporary** "tenses" ("precontemporary" is Eather's (2011: 166) relabelling of Glasgow's "remote" tense.)

| | | FRAME | |
|---|---|---|---|
| | | **today** | **before today** |
| INFL | I | now | yesterday/recently |
| | III | earlier today | long ago |

Additionally, there exists a set of psychological predicates that are frequently translated into English as present-tensed stative verbs which also (obligatorily) appear with III. Examples are given in (155).

(155) **Apparent present reference with III**

a. *ŋarra dhuwal/dhika djawaryu-**rr**/rerrikthu-**rr**/djanŋarrthi-**n***
1S PROX/INDEFP be.tired-III/be.sick-III/be.hungry-III
'I'm (a bit) tired/sick/hungry' (Wilkinson 2012: 278)

b. *bili djawar'yu-**rr**-a*
CPLV be.tired-III
'They're already tired' (Wilkinson 2012: 365)

c. *ŋarra dhu dhuwal lakara-m ŋunhi nhä ŋarra nhä-**ŋal** dhiyaŋ bala*
1S FUT PROX tell-I ENDO what 1S see-III PROX.ERG MVTAWY
'I'll tell you what I see right now.' (Wilkinson 2012: 366)

Wilkinson (2012: 365–6) observes that the use of III here "appears to invoke a general temporariness to the state," noting that the state is ""achieved" and current relative to the moment of speech." That is, the (ostensibly stative) predicates themselves in fact denote state *changes*.[150] This observation is cashed out in § 8.1.

[150] A potential reflex of this phenomenon may be found in the previous use of perfect forms to denote currently-holding states in a number of Indo-European daughter languages (Gk. *ολωλά* lose.1S.PERF 'I'm lost', Skt. *jujóṣa* 'take.a.liking.to.PERF.3S' 'they enjoy', Lat *meminit* remember.PERF.3S 'they remember'). Further, present reference in the Hittite *ḫi*-verb class is marked with a reflex of the Indo-European PERF. In view of these facts, Fortson (2010: 103–5) notes that the semantics of proto-IE PERFECT morphology has been reconstructed as *stative*. Thanks to Ashwini for this observation.

### 7.4.4 The Quaternary inflection

The Quaternary inflection (IV) has a broad range of uses in Dhuwal(a) varieties that correspond in part to categories described in Australian languages including *past potentialis* (Heath 1980b), *past counterfactual* McKay (2011), *[past] irrealis* (Austin 1998: 159) *etc.* It co-occurs with modal auxiliaries (especially *ŋuli* 'HAB' and *balaŋ(u)* 'IRR') in order to describe past habituals (156) and hypothetical/counterfactual descriptions as in (157).

(156) **IV in PAST HABITUAL predications**

a. *Ŋayi* ***ŋuli*** *märra-**nha*** *ŋunhi* *meṉḏuŋ-nha*
3s HAB get-IV ENDO snail-ACC

'She would (used to) get (collect) snails' (Buchanan 1978: 147)

b. *...ŋorra-**nha*** *walal* ***ŋuli*** *marrtji-**nya*** *ŋunhi-li-yi,*
lie-IV 3p HAB go-IV TEXD-LOC-ANA

*galku-**na*** *walal* ***ŋuli*** *ga-**nha*** *gapuw* *wirwiryu-**na**+ra-w*
wait-IV 3p HAB IPFV-IV water-DAT turn-NMLZR-DAT

'They would be lying there, they would be waiting for the water to stir.'
(DjB: Djon 5:4)

(157) **Past modal (counterfactual) predications with IV marking**

a. *waṯuy* ***balaŋu*** *l̪uka-**nha*** *chocolate*
dog.ERG MOD eat-IV chocolate

'The dog might have eaten (been able to eat) the chocolate.' [DhG 20190413]

b. CONTEXT. Speaker had a toothache.

*barpuru* *balaŋ* *ŋarra* *bala* *dentist-kal* *marrtji-**nya*** *dhiyak*
yesterday MOD 1s MVTAWY dentist-OBL go-IV PROX-DAT

'Yesterday I should have gone to the dentist for a filling' (Wilkinson 2012: 353)

c. *Yaka* *balaŋ* *nhe* *marrtji-**nya*** *Darwin-lil*
NEG MOD 2s go-IV Darwin-ALL

'You should not go to Darwin.' (Buchanan 1978: 164)

d. *Walanydja* *balaŋ* *ŋarraku* *l̪ukuny* *gulk'mara-**nha**...*
3p.PROM MOD 1s.DAT foot.PROM cut.CAUS-IV

'They were going to/would have cut off my foot...' [AW 20190422]

These data demonstrate the relationship between the IV inflection and combinations of past temporal reference and various modal/aspectual operators which encode varieties of "non-actual" reality status.[151]

In this section, we have only considered "positive" clauses. Below—in Ch. 9—we see how the picture of WD inflection we have developed here complexifies significantly under negation (data showing these effects was also presented in the introduction to this part of the dissertation.)

### 7.4.5 Summary

As mentioned above, a number of authors investigating the languages of the area have eschewed assigning a metalinguistic label to the four inflectional categories that are realised on Western Dhuwal-Dhuwala verbs. This is due to the data's apparent resistance to an analysis where each marker realises some unified semantic category (*i.e.*, PAST, PRESENT etc.)

It is a contention of the current work, then, that:

- this difficulty is due to the interplay of CYCLIC TENSE and the NEGATIVE ASYMMETRY in reality status marking, and
- each inflection class can be understood as encoding the status of a predicate with respect to two semantic properties:

  ***Precontemporaneity.*** (a temporal property) the predicate holds non-finally within a given temporal frame that relates its instantiation time $i_c$ to the utterance time $i*$.

  ***Nonveridicality.*** (a modal property) there are historic alternatives to the reference index $i_c$ along which the predicate doesn't hold.

Detail about these phenomena and their implications for an analysis WD verbal semantics are provided below — chapter 8 describing temporal expression and chapter 9 describing modal expression.

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[151] NB: in addition to these inflectional functions, IV (and related forms) are additionally used in deriving nominals from verbal predicates (*i.e.*, as a NOMINALISER NMLZR.) Throughout this part of the dissertation, both inflectional and nominaliser functions of this suffix will be invariably glossed as IV (this does not imply any commitment at this stage to a monosemy account of *these* distributions; a semantics for the derivational uses of IV is not further considered here.)

Wilkinson's diagramatic representation (2012: 326) of the relevant distributional features and how they are partitioned by the inflectional system was reproduced as Figure 17 (*p. 162* above).

A compositional analysis for WD's four inflectional categories is proposed on the basis of the discussion in the forthcoming chapters. Chapter 8 is an investigation of temporal expression and the *cyclic tense* phenomenon, while chapter 9 investigates modal expression with particular attention to the semantics and pragmatics of negation.

As suggested above, the WD paradigm is taken to inflect information about TENSE and MOOD on verbs; this is presented in chapter 10, along with additional discussion of complex clause phenomena and a diachronic perspective on the complexities of the WD paradigm.

# Chapter 8

# Temporal interpretation & cyclic tense

### DISTINGUISHING I FROM III

In § 7.4, I provided a description of the distributional facts of the four 'inflectional classes' of Dhuwal(a). As we saw, these inflections are in a paradigmatic relation; that is, all finite verbs receive exactly one inflection.[152] In the Western Dhuwal-Dhuwala varieties (as in other Yolŋu languages) verbal inflections play a central role in temporal expression. This chapter will be primarily concerned with understanding the expression of temporal categories in WD, and in particular the semantic properties that distinguish between the licensing of I and III.

The basic function of inflections I and III in determining the temporal location of a predicate, for example, is shown in (158).

(158) **Temporal contributions of I and III**

a. PRESENT TEMPORAL REFERENCE with I

| *gäthura* | *ŋarra* | **(**ga**)* | *nhina-∅* | *wäŋaŋura* |
|---|---|---|---|---|
| today | 1S | IPFV.I | sit-I | home.LOC |

'I am staying at home today.'

[152] The formal identity of some inflections in particular conjugation classes notwithstanding. *marrtji* for example is taken to be formally ambiguous between 'go.I' and 'go.II'. Similarly, the "non-inflecting" class consisting of 15 borrowed items (*e.g. djäma* 'work', *riŋimap* 'ring up', see Wilkinson 2012: 308) will be taken to be defective verb stems, ambiguous between all four inflected forms.

These predicates can all co-occur with the auxiliary *GA* 'IPFV' (or in serial verb constructions) which is still inflected as expected.

b. Past temporal reference with III

*gäthura ŋarra ga-**na** nhina-**na** wäŋaŋura*
today 1s ipfv-III sit-III home.loc

'I was sitting at home (earlier) today.'

The data in (158) suggest *prima facie* a present-past distinction encoded by I and III respectively (which, as we saw in the discussion of Ritharrŋu-Wägilak in § 7.3, is a reasonable analysis for the cognate paradigm in Yolŋu varieties.)[153] However, as discussed in § 7.4, data of the type shown in (159) quickly throw up problems for a straightforward account of these inflections as tense markers.

(159) **Temporal contributions of I and III (non-today frame)**

a. Recent past with I

*Ŋarra l̪uk-**a** mänha barpuru*
1s drink-I water yesterday

'I drank water yesterday.' [BM 20190405]

b. Remote past with III

*Ŋunhi ŋarra yothu yäna, ŋarra marrtji-**na** Sydney-lili*
endo 1s child only, 1s go-III Sydney-all

'When I was a kid, I went to Sydney.' [BM 20190405]

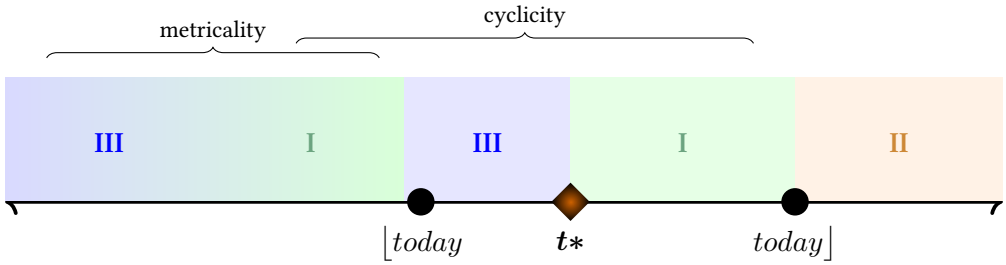
The data in (159) show that a *temporal remoteness* (or a *"metrical/graded tense"*) distinction is manifested in WD.[154] Inflection of predicates with III encodes some notion of "remoteness", grammatically partitioning the past domain by locating the relevant eventuality at some point in the (subjectively) distant/remote past. Wilkinson notes that "the "switch-over" point is not associated with an absolute time. In being flexible, it is thus possible for the same temporal distance to be coded by either [I or III]" (2012: 343). This point is taken back up in § 8.3.1.

When integrating the data in (158) and (159), and on the (natural) assumption of a model where moments/intervals of time are linearly ordered (*cf.* § 1.2), the intervals to which I- and III-inflected predicates can refer are discontinuous. Figure 23 schematises this discontinuity.

[153]Note additionally that *ga* is obligatory with present reference; this is discussed in § 8.1 below.

[154]See Comrie (1985: Ch. 4) for an overview of temporal remoteness systems. Cross-linguistic data on temporal remoteness mechanisms are the subject of recent work including Bohnemeyer 2018; Cable 2013; Hayashi & Oshima 2015; Klecha & Bochnak 2016 and Martin 2010 a.o.

**Figure 23.** Past-time temporal expression in the Yolŋu Matha varieties of Central Arnhem, demonstrating two descriptive phenomena: (a) cyclicity — the interspersion/discontinuity of I and III forms and (b) metricality — the (subjective) division of the past domain between these two forms. $\lfloor today \rfloor$ indicates the boundaries of the day of utterance. $t*$ is utterance time.




While Comrie (1985: 89) recommends 'appeal to its rarity as an excuse for according it [cyclic tense] marginal status in the theory', the current work contends that we should be desirous of a unified semantics for each of the verbal inflections.

As described in §7.4.3, previous accounts of this phenomenon have described the data in terms of the oppositions between two binary categories: **(a)** "contemporary" (I) vs. "precontemporary" (III) *tense* marking and **(b)** a contextually-provided TODAY" and NON-TODAY reference frame. This inflection-reference frame interaction was shown in Table 13 (*p.* 184); each cell of which is represented by one of the datapoints in (158–159). This schema—originally due to Glasgow (1964) for Burarra data [bvr]—has been adopted and adapted by numerous other authors for describing the distribution of verbal inflections in Maningrida languages (see Eather 2011; Green 1987, 1995 for Nakkara [nck], Burarra [bvr] and Gurrgoni [gge] respectively.)

The following sections consider the status of the WD verbal inflections and the relation that they bear to temporal expression. In § 8.1, I consider the expression of present reference and imperfectivity in WD and how these properties interact with a number of features of the lexical semantics of WD verbal predicates (*Aktionsart*). In § 8.2, I discuss past predication as it relates to temporal remoteness. Both of these sections provide details relevant to motivating a cyclic tense analysis of the WD verbal paradigm.

In view of these facts, § 8.3 comprises a discussion of cyclic tense and proposes the relevance of NONFINAL INSTANTIATION in establishing temporal reference in WD. This is then further motivated in § 8.4.

## 8.1 Aspectuality & the WD verb stem

> [T]he present is like the window of a railway carriage in which we are sitting. If it were an infinitesimal slit we could not see out properly, and we could not see the countryside laid out with its features in their proper relations; but since it has a width light can enter and we can see each thing in relation to the next and so form for ourselves a picture of the whole… (Hamblin 1972: 325)

The obligatory occurrence of aspect auxiliary *ga* 'IPFV.I' with present-tensed event descriptions has led some authors (*e.g.*, Heath 1980c: 46) to describe this item as a present-tense marker.[155] As we will see here, this is not the most parsimonious analysis of the Dhuwal-Dhuwala inflectional system. The categorical appearance of *GA* 'IPFV' — a fully-inflecting auxiliary (conjugation class 3/$\varnothing_a$ compare Table 11) — (or other less frequent aspect morphology) in present-referring sentences is, I will argue, an epiphenomenon of the well-understood incompatibility between PRESENT and PERFECTIVE (*e.g.*, Comrie 1976: 66*ff*, Smith 1997: 110, Malchukov 2009; Schaden 2011; de Wit 2016 a.o.) in concert with a LEXICAL CONSTRAINT on the situation aspect (*Aktionsart*) of verbal predicates in Western Dhuwal(a).

### 8.1.1 The WD verb as a property of events

An analysis that treats *ga* as encoding PRESENT tense can be promptly dismissed by data such as those in (160) where the reference time for each sentence is clearly located in the past of utterance time (hence compatibility with past-referring temporal frame adverbials.)

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[155] Compare with Table 12. Note that Heath suggests that 'the [temporal] value of [I and II] depends on context, including the presence of particles' (1980c: 38) He does not attempt a compositional analysis of the verbal inflections. Additionally, in various texts *ga* (similarly to *gan*) is glossed as a DURATIVE marker (*e.g.*, 1980c: 183, see also 46). He does, however, suggest that in various dialects of Dhuwal (particularly Djapu', the variety that seems to diverge more from the Western Dhuwal(a)) that marking this category is uncommon (and in fact the auxiliary may be inflection-invariant.)

While in this Dhuwal sketch, Heath reports working with Djambarrpuyŋu and Djapu' speakers, he also indicates having conducted this work with four speakers in communities including Ngukurr and Numbulwar (the far south-eastern extent of *Yolŋuw wäŋa*.) He additionally suggests that these speakers are connected to the Eastern Arnhem communities of Gapuwiyak and Yirrkala communities. Consequently, it is plausible that his description is more representative of Eastern Dhuwal (*Miwatj*) varieties than of WD.

Heath's Gapuwiyak Dhuwal consultant Roy/N̲atlima, aged ca. 20 during Heath's elicitation in Ngukurr 1973–1977 is, in fact, the RIJ cited here for the Ritharrŋu translations and judgments.

(160) ***ga*** **'IPFV.I' in past-referring sentences**

a. ***barpuru*** *ŋali* ***ga*** *waŋanha-mi-**rr***
**yesterday** 1d.INCL **IPFV.I** speak.**IV**-RECIP-**I**

'We were speaking to each other yesterday.' [AW 20190426]

b. *nhä nhe* ***ga*** *djäma* ***barpuru****?*
what 2s **IPFV.I** work **yesterday**

'What were you doing yesterday?' [DhG 20190413]

c. ***ŋäthili*** ***dhuŋgarra-y*** *djäma ŋarra* ***ga*** *shopŋura*
**previous** **year-ERG** work 1s **IPFV.I** shop.LOC

'Last year I was working at the shop.' [DB 20190416]

In fact, there is significant evidence that all verbal predicates in WD (or at least those varieties spoken in Ramingining) are lexically event-denoting. This has already been suggested by the data in (155), where stative concepts like BE SICK and BE TIRED appear to in fact be *implicated* by (de-nominal) **III**-inflected verb forms (*rirrikthurruna* literally 'I became sick'⇝ 'I am (currently) sick'). This phenomenon is shown again in (161a). Explicit predications about current states may require periphrasis (*e.g.*, the nominal predication in 161b). Meanwhile, the *ga*-marked I form (c) results in a state-change reading.

(161) ***rirrikthun*** **'sick': state or state-change denoting?**

a. *Ŋarra rirrik-thu-**rruna***
1s sick-VBLZR-**III**

'I'm sick.' [DB 20190405]

b. *Ŋarra dhäkay-ŋänha-mirri* *rirrikthu-**n***
1s feeling.ERG-hear.**IV**-PROP sick-INCH-**I**

'I'm feeling sick.' [DB 20190405]

c. *Dhuwala ŋarra ga* *rirrikthu-**n***
PROX 1s IPFV.I sick-INCH-**I**

'I'm getting sick.' [DB 20190405]

Relatedly, in (162), *gutharra* is understood to be in the process of asking for food in view of her current 'hunger' state. That her hunger holds in the present is an implicature of a past-tensed eventuality (state-change) of 'becoming hungry.'

(162) djaṉṉarrthin 'hungry': post-state & present-predication

*Gutharra-y* ***ga*** *waŋ-**a*** *märi-nha* *ŋatha-wa* *bili* *ŋayi* *djaṉŋarr-**thi-na***
DaCh-erg ipfv.I speak.I MoMo-acc food-dat because 3s hunger-inch-III

'*Gutharra* asks *märi* for food because she's hungry.' [WG 20171208][156]

As well as derived (de-nominal) verbs, simplex verbal stems with psychological/perception semantics — *e.g.*, *nhäma* 'see', *dharaŋan* 'understand', *guyaŋa* 'think' — seem to lexically encode *events*. When predicating of a presently-holding eventuality/state, these verbs require imperfective marking. Otherwise, a III-inflected form appears to implicate that the post-state of the event described by the predicate still holds. This is shown for *nhäma* 'see' in (163) below. In these cases an (eventive) predicate denotes a bounded, telic type of situation: an ACHIEVEMENT in the sense of Vendler (1957) or HAPPENING per Bach (1986). Relatedly, the IPFV-marked use of *wäwungum* 'promise' in (164) below appears to be the standard way of encoding a performative (commissive) speech act.[157]

(163) ***nhäma*** **'see': perception as a telic event**

a. *Ŋarra* *nhä-**ŋala*** *wuŋgan*
1s see-III dog

'I see the dog.' (lit. 'I saw the dog') [DB 20190405]

b. *Ŋarra* #*(ga)* *nhä-**ma*** *wuŋgan* *dhiyaŋu* *bala*
1s #(ipfv.I) see-I dog endo.erg mvtawy

**Intended**. 'I'm watching the dog currently.' [DB 20190405]

(164) **Performative reading of *wäwungum* 'promise' requires imperfective marking**

*(dhiyaŋ* *bala)* *ŋarra* **(ga)* *wäwun-gum* *(ŋunhi* *napurr* *dhu* *yaka'yurr* *CDP)*
prox.erg mvtawy 1s ipfv.I promise-caus.I endo 1p.excl fut neg.vblzr.II CDP

'(Right now,) I promise (that we will eliminate [the Community Development Program].)'
[AW 20190428]

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[156]This example is the title of Waymamba Gaykamaŋu's [WG] Gupapuyŋu translation of a Djambarrpuyŋu text composed by Galathi Dhurrkay (15 Oct. 2014) for CDU's Yolŋu Studies program.

[157]Compare to treatments of English performatives, which are generally unavailable with progressive marking: a fact that Condoravdi & Lauer (2011) attribute to the absence of a culmination entailment in progressive-marked accomplishment predicates.

Relatedly, Wilkinson (2012: 557) describes a 'minor' lexical category that she refers to as "adjectival"-predicates. This is a closed class of three frequently-occurring predicates which all denote stative properties (translating as lexical statives whose semantics correspond to a species of *psych verb* cross-linguistically): *djäl* 'want, like', *marŋgi* 'know' and *dhuŋa* 'not.know.'[158] Morphosyntactically, each takes an intransitive frame (selecting for a NOM experiencer and DAT theme) and, like other nonverbal predicates/stative properties, resists aspect marking. As with other nominal elements, productive suffixation (notably *-thirr(i)* 'INCH.I', *-kum(a)* 'CAUS.I' and *-thun/-'yun* VBLZR.I) is available to derive verbal forms (intransitive and transitive, respectively.) The contrast between the two continuations in (`[latjin]`) below shows the incompatibility between stative predicate *djäl* 'like' and aspect marking (`[latjin.bare]`), which, conversely, is obligatory for the derived verbal predicate in (`[latjin.inch]`), corresponding to the observations made above about state change predicates.

A similar effect is shown for the predicate *marŋgi* 'know' (166), where the eventive ("change of state") semantics of the verbal predicate *marŋgithirr(i)* 'learn ≈ come to know' are transparent.

(165) deftagexlatjin**Stative *djäl* 'like, want': incompatible with *ga* 'IPFV' marking**

*Ŋäthili* *ŋarra* *bäyŋu* ***djäl*** *l̪atjin'-gu…*
previously 1S NEGQ like mangrove.worm-DAT
'I didn't used to like *l̪atjin*…

a. … *dhiyaŋunydja bala* *ŋarra* *(*ga)* ***djäl*** *l̪atjin'-gu*
now 1S (*IPFV) like *l̪atjin*-DAT

b. … *dhiyaŋunydja bala* *ŋarra* **(ga)* ***djäl-thi-rri*** *l̪atjin'-gu.*
now 1S *(IPFV) like-INCH-I *l̪atjin*-DAT
'…now I do like them.' [DhG 20190417]

(166) **Stative *marŋgi* 'know': incompatible with *ga* 'IPFV' marking**

a. *Ŋarritjan* *(*ga)* ***marŋgi*** *Baŋaḏi-wa*
*MÄLK* (*IPFV.I) know *MÄLK*-DAT
'*Ŋarritjan* knows *Baŋaḏi*.' [DhG 20190417]

[158] These verbs also have a range of circumstantial modal readings (ability, bouletic, preferential), perhaps predictable given their propositional attitude-type semantics. Examples of these readings are given in (167), and additionally in Wilkinson (2012: 648).

b. *Dhiyaŋu bala Wamuttjan* ***ga*** ***marŋgi-thi-rri*** *Bäŋaḏi-wa*
now *MÄLK* IPFV.I know-INCH-I *MÄLK*-DAT
'*Wamuttjan* is getting to know (learning about) *Baŋaḏi*.' [DhG 20190417]

Similarly, the stative predicate *dhuŋa* resists aspectual marking. (167a) shows the establishment of a (remote past) reference time with a subordinate temporal clause while (b) shows how the corresponding verb form (as with its counterparts in the examples above) requires explicit imperfective marking for a present stative predication.

(167) **Stative *dhuŋa* 'ignorant'**

a. *Ŋunhi ŋarra yothu yän, ŋarra* ***dhuŋa*** *l̪upl̪upthunara-w*
ENDO 1S child only, 1S ignorant swim.IV-DAT
'When I was a kid, I couldn't swim.' [AW 20190429]

b. CONTEXT. I decline an invitation to dance at a forthcoming ceremony.
i. — *Ŋarra* ***dhuŋa*** *girritjinara-w*
1S ignorant dance.IV-DAT
ii. — *Bili nhe* ****(ga)*** ***dhumbal'yu-n*** for the step/the beat.
because 2S *(IPFV.I) not.know-I DAT
— 'I don't know how to dance (at the *buŋgul̪*).'
— 'Because you don't know the steps, the beat.' [AW 20190429]

The behaviour of these nonverbal predicates (*i.e.*, their resistance to explicit aspect marking) is consistent with cross-linguistic behaviour of stative predicates.[159]

So far in this section, we have seen evidence of an organising principle in W. Dhuwal(a) where all verbal (inflecting) predicates lexically encode eventive (dynamic) situations which are temporally bound (*i.e.*, have endpoints). This principle is formulated in (168).

(168) **VERBAL STEMS AS INHERENTLY EVENTIVE IN W. DHUWAL(A)**
W. Dhuwal(a) verbal predicates denote properties of events.

[159]By way of examples (of incompatibilities between stative predicates and explicit marking of viewpoint aspect distinctions):

- The infelicity on progressive-marking of stative verbs in English (e.g. Dowty 1979: 55, Taylor 1977: 205 a.o.)
- Whereas dynamic verbs in Russian all appear with imperfective and (inflected) perfective stems, the latter is unavailable for stative verbs (Smith 1997: 227).
- In Navajo, 'overt viewpoint [aspectual] marking' only occurs in non-stative sentences (Smith 1997: 297).

See also Bohnemeyer & Swift (2004) for a typological consideration of the relation between viewpoint aspect and the inherent aspectual properties of verbs (or, the "sensitivity" of aspect marking to verb class.)

As mentioned above (compare the Hamblin quote, *p.* 191 above), situations that obtain in the present 'must be open and unbounded, without endpoints… ongoing events; particular states and general states' Smith (2008: 230). This is formulated as a basic pragmatic principle as the constraint in (169).

(169) **THE *BOUNDED EVENT* CONSTRAINT**
Bounded situations cannot be located at Speech Time. (Smith 2008)

A consequence of the interaction of the two contraints in (168) and (169) is that **unmodified verbal stems** (which, in WD, obligatorily denote bounded, eventive situations) **are infelicitous with present temporal reference**. As we have seen in the above examples, W. Dhuwal(a) encodes stative eventualities/situation types by way of three strategies:

(170) a. nominal predications,

b. post-state implicatures (invited by sentences that contain derived or simplex past-denoting predicates) or

c. the explicit marking of imperfectivity (normally with inflecting auxiliary *ga* 'IPFV' (or stance/motion verbs, see Wilkinson 2012: 369) or with the habitual marker *ŋuli* 'HAB'.)

Dowty (1979, 1986) — along with Taylor (1977) — defines criteria for progressive marking and stative sentences which theorise that "no matter what the aspectual class of the lexical verb", any progressive-marked sentence will be stative. These conditions, laid out in Dowty (1986: 42-4), are recapitulated in (171) below:

(171) a. **STATIVE CRITERION (the 'subinterval property')**
$\textsc{stative}(\varphi) \leftrightarrow \varphi(\imath) \rightarrow \forall \imath' \big(\imath' \sqsubseteq \imath \rightarrow \varphi(\imath')\big)$
A sentence $\varphi$ is stative iff it follows from the truth of $\varphi$ at $\imath$ that $\varphi$ is true at all of $\imath$'s possible subintervals $\imath'$

b. **A SEMANTICS FOR THE PROGRESSIVE**
$\textsc{prog}(\varphi)(\imath) \leftrightarrow \exists \imath' \big(\imath' \sqsupset \imath \wedge \varphi(\imath')\big)$ The progressive form of $\varphi(\imath)$ is true iff there is some proper superinterval $\imath'$ at which $\varphi$ is tue.

That progressive-marked sentences necessarily meet the stative criterion is deduced in (171c) below.

(171) c.. ***Theorem***. *Progressive-marked sentences entail stativity (the subinterval property holds.)*

| | | |
|---|---|---|
| i. | $\textsc{prog}\varphi(i)$ | *PREMISE* |
| ii. | $\exists i' \sqsupset i \wedge \varphi(i')$ | (171b), i. |
| iii. | $\forall i''(i'' \sqsubseteq i \rightarrow i'' \sqsubseteq i')$ | def. $\sqsubseteq$, ii. |
| iv. | $\textsc{prog}\varphi(i'')$ | (171b), i,ii i. |
| v. | $\textsc{prog}\varphi(i) \rightarrow \forall i''\big(i'' \sqsubseteq i \rightarrow \textsc{prog}\varphi(i'')\big)$ | i,iii,iv |
| vi. | $\textsc{stative}\big(\textsc{prog}\varphi(i)\big)$ | (171a) $\square$ |

All this is to suggest that all WD verbal predicates denote properties of (bounded) events, a class of situations that are incompatible with present temporal reference. Nominal predication (including the adjectival and locative predicates) and sentences with imperfective marking denote states. Consequently, in WD, all verbal predicates obligatorily cooccur with *ga* 'IPFV.I' when referring to a presently-holding state.

### 8.1.2 Modelling predication in WD

In view of modelling the patterns described above, our ontology will contain a *domain of eventualities* $\mathfrak{D}_\varepsilon$ partitioned into stative and eventive subtypes. Variables over events will be notated $e$, over states $s$, summarised in (172).

(172) $\mathfrak{D}_\varepsilon \begin{cases} \mathcal{E}_\epsilon & \text{eventive situations} \quad e, e', e'', e''' \\ \mathcal{E}_s & \text{stative situations} \quad s, s', s'', s'''\ldots \end{cases}$

Verb stems are then understood to denote sets of events $\langle \varepsilon_e, t\rangle$. These obligatorily combine with an aspectual operator (*e.g.*, *GA* 'IPFV' or $\varnothing$ 'PFV') to yield a property of intervals $\langle \imath, t\rangle$. Following the neo-Davidsonian approach assumed in Deo (2015a), these operators "map properties of [events] to sets of intervals relative to which these predicates are instantiated via existential quantification over the Davidsonian event variable" (11).

Above, we saw examples of derived (de-nominal) verbs with change-of-state semantics. Whereas we have seen that nominal predicates are often used to encode stative situation types, productive suffixation — *-'THu-* 'VBLZR', *-THi-* 'INCH', *-ku-/-THa-* 'TR' and *-mara-* 'CAUS'[160] — derives inflect-

[160]The forms of these suffixes are subject to significant allomorphy. I generalise over each category following the proposals of Wilkinson (2012: § 7.5). That is, *e.g.*, the suffix *-'THu* 'VBLZR' is realised as *-'yu/-'thu/-'dhu* depending on the shape of the stem.

ing verbal predicates with accordingly eventive semantics.[161] Wilkinson (2012) demonstrates the paradigmatic relation between these predicates. A number of examples of these verbal derivations are given in Table 14 below (predominantly from Wilkinson's description) and formal proposals for the contributions of a number of these operators are given in (173) below.[162]

**Table 14**. Morphological derivation of inflecting eventive predicates

| STATIVE PREDICATE | | *-THi* 'INCH' | |
|---|---|---|---|
| *baṉḏany* | 'shallow' | *baṉḏany-dhin* | 'dry up.I' |
| *gorrmur* | 'hot' | *gorrmur-'yin* | 'get hot, have fever.I' |
| *buthalak* | 'yellow' | *buthalak-thin* | 'be(come).yellow.I' |
| *biyaṉi* | 'fear' | *biyaṉi-thin* | 'be.frightened.I' |
| *marŋgi* | 'knowledge' | *marŋgi-thin* | 'learn.I |
| **STATIVE PREDICATE** | | ***-THu*** **'VBLZR'** | |
| *warwu* | 'sorrow' | *warwu-'yun* | 'worry, feel.upset.I' |
| *bilma* | 'clapstick' | *bilma-'yun* | 'use.clapstick.I' |
| *ŋaḏi* | 'discontent' | *ŋaḏi-'yun* | 'sulk.I' |
| *ḏiltji* | 'back' | *ḏiltji-yun* | 'bend.over.I' |
| *bulnha* | 'slowly' | *bulnha-yun* | 'slow.downI' |
| **STATIVE PREDICATE** | | ***-ku/-THa*** **'TR'** | |
| *baṉḏany* | 'shallow' | *baṉḏany-kuma* | 'dry.I' |
| *dhunupa* | 'straight' | *dhunupa-kuma* | 'put.right.I' |
| *marŋgi* | 'knowledgeable' | *marŋgi-kuma* | 'teach.I |
| *galki* | 'close' | *galki-kuma/-than* | 'bring.close.I' |
| *rrambaŋi* | 'together' | *rrambaŋi-yan* | 'join.I' |
| **STATIVE PREDICATE** | | ***-mara*** **'CAUS'** | |
| *ḏiltji* | 'back' | *ḏiltji-marama* | 'turn.onto.back.I' |
| *bulnha* | 'slowly' | *bulnha-marama* | 'slow.down.I' |

Broadly, the data in table 14 appear to suggest two "pairs" of derivational suffixes: ⟨*-THi, -ku*⟩ and ⟨*-THu, -mara*⟩, where the first item in each pair derives an intransitive verb and the second a transitive one. In general, it appears to be a property of a given stem (predicate) which pair of suffixes is selected for (this is likely a diagnostic of word class, tentatively evincing an class of adjectives associated with the first pair.)

[161] According to Dowty (1972, 1979), statives are in fact the "basic" predicate type which composes with a finite number of [situation] aspectual operators/connectives to yield predicates of events.

[162] The semantics for *-'THu* 'VBLZR' is less transparent. Discussed in Wilkinson (2012: 375–9), this less productive suffix involves deriving "delocutive" uses in addition to a number of other apparently metonymic denominal constructions. Wilkinson also describes -MARA- as a CAUSATIVE suffix (383–7). In this respect, how its semantics differ to *-ku~-THa* 'TR' is not totally clear.

(173) **The functions of verbal derivation**

a. **A semantics for *-THi* 'INCHoative'**

i. $\textsc{become}\,\varphi(i) \underset{\text{def}}{=} \exists j[j \underset{\text{init}}{\sqsubset} i \wedge \neg\varphi(i)] \wedge \exists k[k \underset{\text{fin}}{\sqsubset} i \wedge \varphi(i)]$

A formula BECOME $\varphi$ is true at $i$ if $\varphi$ is both: true at a final subinterval $k$ and false at an initial subinterval($j$). (Adapting liberally from Dowty 1979)

This is diagrammatised in Figure 24. [163]

ii. $[\![\text{ -THi }]\!]_{\langle\langle\varepsilon_s,t\rangle,\langle\varepsilon_\epsilon,t\rangle\rangle} = \lambda P^s.\lambda e[\textsc{become}(P^s)(e)]$

*-THi* 'INCH' is a situation operator which takes a property of states $P^s \subseteq \mathcal{E}$ and returns the set of events BECOME $P^s \subseteq \mathcal{E}_\epsilon$.

b. **A semantics for *-ku~-THa* 'TRansitiviser'**

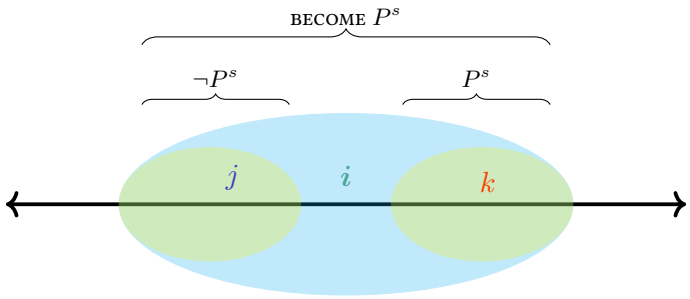
$[\![\text{-THu}]\!]_{\langle\langle\varepsilon_s,t\rangle,\langle e,\langle\varepsilon_e,t\rangle\rangle\rangle} = \lambda y\lambda P^s.\exists e[\textsc{cause}(y, \textsc{become}(P^s)(e))]$

*-THu* 'TR' is a situation operator which takes a property of states $P^s$ and returns a function from individuals (agents/causers) to events

$(\lambda y.y$ CAUSE BECOME $P^s \subseteq A \times \mathcal{E}_\epsilon)$

Relevantly for current purposes, the nominal predicates in the first column of Table 14 are all state-denoting and, consequently, are incompatible with verbal inflections and imperfective marking (*sc.* *GA*). As (173) shows, on a neo-Dowtian treatment, when verbs are derived from these stative predicates, an eventive interpretation is generated. This captures the intuition that **predicates of events, in effect, denote changes in state over time** ("dynamicity").

**Figure 24.** Truth conditions for state change operator BECOME (adapted from Dowty 1979)




This treatment further demonstrates the unavailability of present temporal reference with eventive predication which we've been concerned with so far in this section. Given that even-

[163] This predicate, labelled COME ABOUT in Dowty's dissertation (1972: 45*ff*) appeals to a dense series of moments in time before being updated to an interval semantics in 1979: 139ff, following Bennett & Partee (2004). Where Dowty appeals to an initial/final overlap relation ($\circ$), here I replace that with notions of initial/final subintervals which seems to partially avoid some of the problems he discusses (140-2). Nevertheless, as formulated here the definition is still too weak and does permit for $i$'s theoretically unbounded length. Dowty partially solves this by stipulating that $i$ is the largest interval for which these properties hold.

tive predicates of the BECOME-type assert the achievement of a **state-change** over time, reference to an entire, bounded eventuality of this type must be located within an extended interval in which both $P$ and $\neg P$ hold.

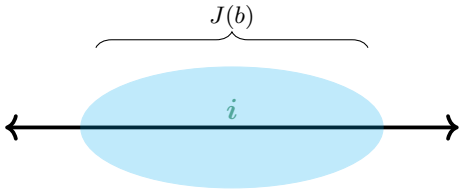
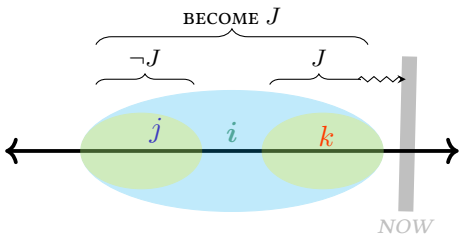
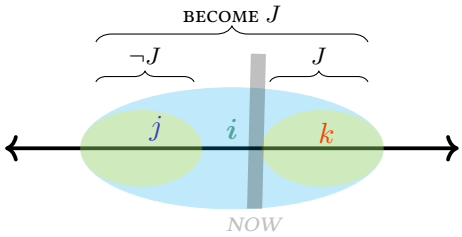
In this section, then, so far we've made the following observations:

i. W. Dhuwal(a) verbal predicates denote properties of events;

ii. Eventive predication is incompatible with present-reference;

iii. Stative predications (which are present-tense compatible and resist aspectual modification) involve one of the three strategies given in (170), spelled out in Table 15 below.

**Table 15.** Strategies for achieving present temporal reference in W Dhuwal(a)
$J$ denotes *DJAWAR-* 'tiredness', $b$ denotes the individual *Baŋaḍi*.
Note that the ordering relation between speech time and event time is taken to be encoded by the inflection. This is not completely represented in this table.

| TYPE | EXAMPLE | SCHEMA |
|---|---|---|
| **nominal** | *baŋaḍi djawar-mirr*<br>*MÄLK* tired-PROP<br>$\lambda s.Jb(s)$ |  |
| **post-state** | *baŋaḍi djawar-yu-rr(una)*<br>*MÄLK* tired-VBLZR-**III**<br>$\lambda s.\exists e[\textsc{become}(Jb)(e) \wedge \tau(e) \prec$ **now**$](s)$ |  |
| **imperfective** | *baŋaḍi ga djawar-yu-n*<br>*MÄLK* IPFV.I tired-VBLZR-I<br>$\lambda s.\exists e[\textsc{become}(Jb)(e) \wedge \tau(e) \sqsupset$ **now**$](s)$ |  |

## 8.2 Talking about the past

Perhaps the most important distinction between I and III is that events that are described as holding at intervals **that include the time of speech** (***t*∗**) are felicitious only with I, modulo the caveats about post-state predication discussed in the section above.

In this (and the previous) chapter, however, we've seen that *past* temporal reference for eventive predicates in WD is compatible with *either* I or III inflection. This is clearly demonstrated again by the conjoined, past-referring sentences in (175a–b) below.

(175) **Past reference with I and III (conjunction)**

a. [ *ŋarra ḻuk-**a** mänha barpuru* ] *ga* [ *ŋarra ḻuk-**ana** mänha dhiyaŋu bili* ]
1s drink-I water yesterday and 1s drink-III water PROX.ERG CPLV

'I drank water yesterday and I drank water just before (earlier today).'
[DB 20190405]

b. *ŋarra barpuru munhagu ŋarra **ḻuka** djinydjalma' ga roŋanmara-**ŋala***
1s yesterday night 1s eat.I crab and return.CAUS-III
*bäpawa märr ŋayi dhu **ḻuka** dhiyaŋu bala goḏarrmirri*
father-DAT so 3s FUT eat.I PROX.ERG MVTAWY morning

'I ate some crab last night and this morning brought some back for Dad so that he can eat (some).' [DB 20190416]

Ultimately, we can think of the temporal intervals (*i.e.*, range of possible times) made available by each inflection as follows (this is unpacked in greater detail in the following subsection & including schematically in Figure 25, *pg.* 206 below.)

(176) **Reference intervals compatible with I and III**

I $\tau(e)\circ$ **[**RECENT PAST , END.day-of-speech**)**
I is compatible with event descriptions with temporal reference from the RECENT PAST through the end of the day of utterance

III $\tau(e)\circ$ **(**REMOTE PAST , time-of speech**]** III is compatible with event descriptions with past temporal reference (up until, but not including speech-time.)

Below, we consider various options for theorising the distributional differences between (and meaning contribution of) I and III.

### 8.2.1 An attempt at an aspect-based analysis

In WD, I is most clearly distinguished from III by its compatibility with present temporal reference. Additionally, as shown in the discussion of Ritharrŋu-Wägilak in § 7.3, cognates of WD's I in closely related Yolŋu varieties clearly realise a PRESENT TENSE operator (that is, these cognates are compatible only with present temporal reference.) In view of these facts, a possible model of the distribution of I and III, might take the basic meaning of I to be that of a present tense marker.

Shown throughout, an "off-the-shelf" lexical entry, where the semantic contribution of I is to restrict the instantiation time of the event to *intervals overlapping with speech-time* is untenable in view of I's compatibility with past-reference (*cf.* the RW paradigm presented in § 7.3.1). Consequently, an analysis of I-as-PRESENT would need to be able to invoke some notion akin to the *EXTENDED NOW* (XNOW), *sc.* "a time interval reaching back from the time of utterance" (Cover 2010: 49).[164]

A consequence of an analysis of this type would be that, past-referring utterances with I-morphology must be understood "not [as locating] a situation at some definite point in the past, but only to offer it as relevant to the current situation", a semantic domain traditionally associated with the ANTERIOR or PERFECT aspect (Bybee et al. 1994: 62, underlining added).

Appeal to the notion of an XNOW has been deployed in a number of influential accounts of the English present perfect (notably McCoard 1978; Portner 2003 a.o.) to explain both: • intuitions about the 'current relevance' of present perfect predications and, importantly • "the present perfect puzzle" (see Klein 1992; Schaden 2009), *i.e.*, the incompatibility of the present perfect with TFAS for the past (*e.g.*, **I have eaten a few hours ago.*)

Of course, as we've already seen, this account struggles with the WD data. I frequently co-occurs with TFAS-for-the-past. *E.g.*, *barpuru/yawungu* 'yesterday.') YESTERDAY-reference, meanwhile does *not* cooccur with III in the varieties under investigation. This is shown again in (177):

[164]Note that this definition of XNOW differs somewhat from (is a subset of) the XNOW formalised in Stump 1985: 225, for whom it is taken to be a relation between *any* arbitary interval $i$ such that $\text{XNOW}(i) = \{i' \mid i' \underset{\text{final}}{\sqsupseteq} i\}$.

(177) **Interactions between I and III and recent past-denoting TFA *barpuru***

a. *ḏirramuwal yothuwal bäpa'mirriŋuy rrupiya barpuru* ***djuy'yu-n,*** ***märr***
man.OBL child.OBL father.KINPROP.ERG money yesterday send-I kinda

***barpuru***
yesterday

*ga* ***barpuru*** ***buna****-ny* *dhiyal-nydja.*
and yesterday arrive.I-PROM PROX.LOC-PROM

'The father sent money to the boy recently and it arrived here yesterday.'
(Wilkinson 2012: 343)

b. * *ŋarra ga-na* ***l̲uka-na*** *barpuru*
1S IPFV-III consume-III yesterday

INTENDED. 'I was drinking water yesterday.' [DhG 20190405]

Given that TFAs for the past ought to be compatible with past-tense marking and incompatible with present-tense marking, the PRES/PST analysis of these inflectional categories makes counterfactual predictions (infelicity with I and felicity with III, *cf. 177a–b).*

On the basis of this data, we can dismiss an analysis that treats I as PRES-denoting and accounts for the *recent past* uses as emerging out of a PERFECT/ANTERIOR reading of the present.

On the other hand, the compatibility of III with SAME-DAY PAST reference and with the change-of-state readings described above are evocative of the "recent past" and "persistent situation" readings that are often taken to characterise perfect constructions (Comrie 1976: Ch. 3). Given that III's cognates in other Yolŋu varieties are associated with past tense, it is worth briefly contemplating whether III's current distribution might have arisen due to some variety of a PERFECT-to-PERFECTIVE/PAST type grammaticalisation trajectory.[165] For example, the data are evocative of the distribution of (erstwhile) perfect constructions in varieties of Peninsular Spanish apparently undergoing the "aoristic drift" — where the perfect is compatible with certain recent past (*e.g.*, SAME DAY) contexts and competes with the older preterite form in these contexts (*see also*, Howe 2006 and, for Catalan, Curell i Gotor 1990: 115*ff*.)

This phenomenon and its relevance for an analysis of the Yolŋu data presented here is further considered in the subsection below (§ 8.2.2).

[165]The "pathway" PERF → PFV has been referred to as the "Aoristic drift" (Schaden 2009, 2012). See Schwenter (1994) for the Alicante variety of Peninsular Spanish, Condoravdi & Deo (2015) for the instantiation of this pathway in Indo-Aryan.

### 8.2.2 A disjunctive semantics?

A consequence of these data for theories of tense is that, if we assume an "off-the-shelf" account of tense marking as encoding a restricted indefinite (or alternatively a temporal pronoun/presupposition regarding the relation between a contextually-provided reference time and the time of speech), we are left with disjunctive lexical entries for each of I and III; semantics for which are sketched below in (178).

(178) **A polysemy treatment of the temporal contribution of I and III**

a. $[\![\ \text{I}\ ]\!]^c = \lambda t : \begin{cases} t \in \textit{today}' \leftrightarrow t \circ t_0 & .\, t \quad \text{[NONPAST]} \\ t \notin \textit{today}' \leftrightarrow t \prec t_0 \wedge \mu(t, t_0) < s_c & .\, t \quad \text{[RECENT PAST]} \end{cases}$

I enforces a presupposition that: the reference time $t$ coincides with speechtime $t_0$, **OR** if $t$ does NOT fall within the interval *today*, then the temporal distance by which $t$ precedes $t_0$ is ***below*** *some contextually provided standard* $s_c$

b. $[\![\text{III}]\!]^c = \lambda t : \begin{cases} t \in \textit{today}' \leftrightarrow t \prec t_0 & .\, t \quad \text{[TODAY PAST]} \\ t \notin \textit{today}' \leftrightarrow t \prec t_0 \wedge \mu(t, t_0) > s_c & .\, t \quad \text{[REMOTE PAST]} \end{cases}$

III enforces a presupposition that: for a reference time $t$ that falls within the interval '*today*', then it precedes speechtime $t_0$, **OR**
if $t$ does NOT fall within the interval '*today*', then the temporal distance by which $t$ precedes $t_0$ is ***above*** *some contextually provided standard* $s_c$

In effect, the "disjunctive presupposition" account captures the descriptive facts of the "cyclic" tense systems that characterise western Arnhem languages and the TENSE-FRAME interactions of Glasgow 1964 *et seq.* (see Table 13, *pg.* 184). It treats each of I and III as having two possible denotations which are adjudicated by the contextual retrieval of a topic time $t$ and a process of "checking" whether $t$ falls within a privileged interval, *viz. today* (DAY-OF-SPEECH).

In favour of an approach that directly references the day-of-utterance, typologically, there appears to be some evidence in favour of a DAY-OF-SPEECH interval with linguistic consequences. In a well-known example, for a number of Romance languages, "present perfect" constructions have generalised into simple PERFECTIVE or PAST tense markers (the so-called "Aoristic drift" see Schaden 2009, 2012). In an ostensible transition stage, the use of the present perfect with past temporal reference is restricted to the day of speech (*HODIERNAL* temporal reference (< Lat. *hōc diē* 'this day'); Comrie 1985; Dahl 1985). This phenomenon is shown for Alicante Spanish in (179) below where, according to Schwenter (1994), there are very few recorded utterances of the type

given in (179b), particularly among younger speakers.[166] That is, the *perfect construction* (179a) competes with/blocks the simple past in predications about the same-day past. Schwenter's data points to the loss of a grammaticalised PERFECT, the two past tenses now rather encoding differential temporal remoteness (*sc.* metricality.)

(179) **In Alicante Spanish, the (erstwhile) present perfect assumes a PFV reading (restricted to same day utterances)**

a. (Erstwhile) *Perfect* construction functioning as same-day past-perfective

*Hoy me he levantado a las siete*
today me have.1S arisen at the seven
'Today I have got up at 7 o'clock.'

b. Preterite/simple past is degraded in same-day past predications for Alicante speakers.

*% *Hoy me levanté a las siete*
today me arose.3S at the seven
'Today I got up at 7 o'clock.' (Schwenter 1994: 91)

Specific HODIERNAL forms are cross-linguistically reasonably robust; additionally attested in African, American and Australian languages according to Comrie (1985: 87), TODAY/BEFORE TODAY (daily cycles) representing the most common "cut-off point" for grammaticalised "degrees of remoteness", along with a (more vague) subjective distinction between 'RECENT' and 'NON-RECENT' (see also Botne 2012). Both of these thresholds appear to be grammaticalised in WD.

The translation of the "Glaswegian" semantics for tense systems of this type given in (178), then, appears to be descriptively sound (*i.e.*, the analysis in Glasgow 1964). It is, however, undermotivated and inadequate insofar as it makes no claims or predictions about, *e.g.*, the emergence of these phenomena in WD and offers no explanation of the ostensibly implausible fact that a number of abstract morphological categories (*e.g.*, I), which are spelled out in a number of different ways across multiple conjugation classes, are consistently ambiguous between two different readings. I therefore take a lexical entry that unifies these uses to be a desideratum; this is the goal of the

[166] As suggested above, a similar distinction appears to be drawn in Catalan, where the majority of *perfect* uses establish hodiernal reference ('narrate[s] events if they have taken place within the last twenty-four hours') according to Curell i Gotor (1990: 236–7). While Curell i Gotor claims that *perfects* are obligatory if making past reference to the day of speech, she points out that (presumably older) non-hodiernal uses signal current relevance/resultative/persistent situation readings, as would be expected (198*ff*).

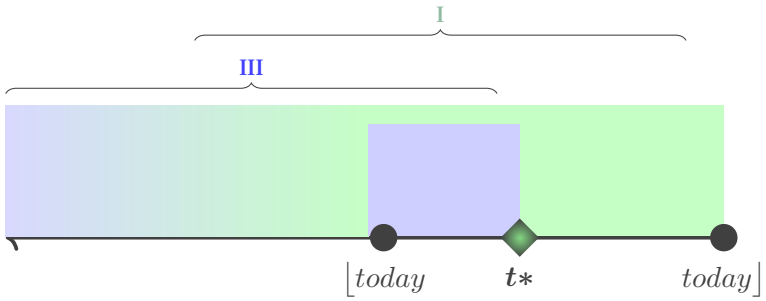
This may point to an areal diffusion of the innovation/grammaticalisation of perfective/hodiernal past readings of the perfect construction through the *Països Catalans*.

remainder of this chapter.

## 8.3 Proposal: A cyclic tense system

The beginning of this chapter (see also figure 23, *pg.* 190) identified two major issues for an analysis of temporal reference in this language: METRICALITY — the encoding of the temporal distance/remoteness of the runtime of an eventuality from speech time — and CYCLICITY — the discontinuity of available reference intervals. These will be treated in turn.

**Figure 25.** W. Dhuwal(a) predicates inflected with I and III make overlapping reference intervals available. They are both felicitous with past predications.




### 8.3.1 Metricality (temporal remoteness) in the past

In the past number of years, formal semanticists have paid attention to the tense systems of languages that appear to grammaticalise multiple PAST and FUTURE tenses according to (subjective/perceived) remoteness of reference time from speech time (*e.g.*, Cable 2013; Hayashi & Oshima 2015; Klecha & Bochnak 2016; Mucha 2015.)[167] That is, grammars that pay attention to temporal distinctions that are *more fine-grained*.

Grammaticalised remoteness distinctions, attested across a wide sample of world languages, are particularly well represented in Bantu (Botne 2012; Dahl 1983; Mucha 2017; Mucha & Fominyam 2017). As an example, Gikũyũ ([kik] Bantu: Central Kenya) is described as having a system of temporal remoteness morphemes (TRMS): four for the past and two for the future. For Cable (2013), a TRM is taken to constrain the instantiation time of the predicate that it modifies. Cable's TRMS

[167] Also Bohnemeyer 2018 investigates temporal remoteness marking in Yucatec Maya [yua], which he nonetheless takes to represent a "tenseless" language.

are analysed as identity functions over sets of events that enforce a presupposition of temporal remoteness (180).

(180) **Gikũyũ *CURRENT* temporal remoteness morpheme according to Cable (2013)**
$[\![\text{CUR}]\!]^{g,t*} = \lambda e : \tau(e) \propto \text{day surrounding } t* \,.\, e$
CUR denotes an identity function on events, one whose domain is restricted to events whose runtime $\tau(e)$ overlaps $(\propto)$ with the day surrounding the utterance time $t*$
(Cable 2013: 253)

Similarly, Cable's IMM 'immediate past' and NRPST 'near past' make presuppositions that the runtime of the described event overlaps with intervals that are related to utterance time $(t*)$ in some lexically-specified way (by way of the associated functions IMPST and REC respectively, both modelled as mapping $t*$ to some interval in the past of $t*$.)

As is now clear (recall (159) above, see also § 7.4.3), WD varieties draw a distinction between the REMOTE and RECENT past that appears to be at least partially subjective and context-sensitive. The use of I and III to encode a remoteness distinction is shown in the discourse in (181). *Wämut*'s recent sighting of a *l̪atjin* 'mangrove worm' predictably is encoded with I, whereas in (181b), an earlier sighting is encoded with III (which additionally contrasts with the past-habitual reading in (c) which receives IV-marking; this is further discussed in Ch. 9.)

(181) **CONTEXT**. Wämut has been living in Sydney for a long time. Visiting Ramingining, he's speaking to his *gathu* about *l̪atjin*.

a. last week, *baman'nha* *ŋarra* *nhä-**ma*** *l̪atjin* *bili* *ŋarra* *ga-**n*** *barrku*
prior-SEQ 1S see-I *teredo* because 1S IPFV-III far
*nhina-**n***.
sit-III
'Last week I saw *l̪atjin*, I had been living far away.'

b. *ŋäthil/baman'* *ŋarra* *ga-**n*** *nhä-**ŋal***
previously 1S IPFV-III see-III
'I saw one long ago.'

c. *nhä-**nha*** *yan* *ŋarra* *li* *ga-**nha*** *ŋunhi* *ŋarra* *yothu* *yan*
see-IV just 1S HAB IPFV-IV ENDO 1S child just
'I used to see them when I was a kid.' [AW 20190422]

As mentioned above, Wilkinson (2012: 343) points out that "the "switch-over" point [from I 'RECENT' to III 'REMOTE'] is not associated with an absolute time." She provides the examples reproduced here in (182). Notable is the fact that, while both discourses are making reference to events that happened last year, the father-dying event in (182a) receives I-marking,[168] whereas the brother-working one (b) receives III.

(182) **LAST YEAR temporal frames licensing I and III**

a. *way* *marŋgi* *nhe* *ŋarra-kalaŋa-w* *bäpa-'mirriŋu-w-nydja* *ŋunhi* *ŋayi*
hey know 2S 1S-OBL-DAT father-KINPROP-DAT-PROM ENDO 3S
*dhiŋga-**ma**-ny* ***ŋuriŋi*** ***bala*** ***dhuŋgarra-y***
die-I-PROM ENDO.ERG MVTAWY year-ERG
'Hey, did you know my father who died last year?' (Wilkinson 2012: 343)

b. *nhä* *nhokiyin-gal* *wäwa-'mirriŋu-y* *warkthu-**rr*** ***ŋäthil*** ***rarranhdharr-yu***
what 2S.EMPH-OBL brother-KINPROP-ERG work-III before summer-ERG
'What did your brother do last summer?' (Wilkinson 2012: 343)

Wilkinson shows the untenability of analyses of this particular distinction in WD terms of "specific" and "non-specific" past reference (which she attributes to Waters 1989: 178 and Lowe 1996) based on both items' compatibility with similar temporal frame devices and contextual support. She also suggests "relevance" as a potential criterion requiring further investigation. We will have more to say about this in the next section (§8.4).

This subsection has considered how WD handles predication about events instantiated **before the day of utterance**. We have seen evidence that a subjective measure of temporal remoteness adjudicates between I and III inflections, where the latter tends to make reference to more temporally distant/remote past predications. This type of distinction is generally thought to be couched in human experience, indexing "restrictions of human memory, lifespan, or cultural elements such as myths" (Botne 2012: 544).

This explanation (appeal to temporal remoteness) is compatible with III's REMOTE PAST functions. Nevertheless, as shown above, this inflection is also felicitous with hodiernal (including immediate) past reference — that is, as well as signalling maximal temporal remoteness of a past

[168] Recall (§ 8.1.1) that the matrix predicate *marŋgi* 'know' is a stative (non-inflecting/non-verbal) predicate; the temporal reference with which these forms are grammatical is not constrained by their morphology.

event, III-marking is obligatory for descriptions of past events which obtained *least remotely* from the present. This will require a different account and is the topic of the next subsection.

### 8.3.2 Cyclicity — discontinuous temporal reference

A more significant problem for the description of WD temporal reference is apparent "discontinuity" of the intervals with which I and III are licensed.

The philosophical literature has interrogated a number of metaphoric conceptions of the nature of time: perhaps most relevantly for current purposes LINEAR (unidirectional temporal flow from past into future) and CYCLIC metaphors. "Cyclic" temporal phenomena are exemplified illustrated by the predictable recurrence of natural situations, including circadian (day-night) and annual/seasonal cycles (*e.g.*, discussion in Whitrow 1980 and Fraser 1987). The previous section, for example, included a discussion of the apparent relevance of the DAY OF UTTERANCE in the metrical tense systems of a selection of natural languages. Having observed that these natural cyclic phenomena provide the basis for remoteness distinctions cross-linguistically, Comrie (1985: 88) hypothesises the existence of grammars that "recycle" remoteness distinctions.[169]

Data in § 8.3.1 showed that, in PREHODIERNAL predication, III indicates a greater degree of remoteness from the utterance context than I. Conversely, in HODIERNAL (same-day) predications, I indicates overlap with speech-time, whereas III indicates temporal displacement to the past of utterance time. In one way or another, then, both uses of III appear to be associated with the *nontrivial displacement* of an event description from a contextually-provided locus (the time associated with a given speech act.) This provides the seeds of an explanation of the categorical infelicity of I with SAME DAY PAST reference (and the epiphenomenal discontinuity in the temporal reference range of I.) Data demonstrating this pattern have been presented above (*e.g.*, 175), an additional minimal pair given as (183) below.

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[169] Comrie (1985) points to Burarra (bvr Maningrida) the language analysed in Glasgow (1964) that resembles the WD system under investigation here, compare § 8.4) in addition to Kiksht [wac], a Chinook variety with a significantly different tense system (see Botne (2012: § 7) for an overview of apparent reflexes of cyclic tense in the Kiksht system and similar systems in Mituku (zmq Bantu D: E. DRC)) and Bolia (bli Bantu C: W. DRC). Bybee et al. (1994: 104) point to the example of Palantla Chinantec (cpa Oto-Mangue: Oaxaca) where the range of one past tense marker *ka-* is felicitous with IMMEDIATE and PRE-TODAY past reference, where *na-* is felicitous only with (earlier) TODAY temporal reference (according to Merrifield 1968: 25).

(183) **Temporal discontinuity: Reference times felicitous with III do not strictly precede those felicitous with I.**

a. Degraded I with HODIERNAL PAST reference

*l̪uk-a*(**na**)* *ŋarra* *gapu* *(gäthura)*
drink-*I/III 1S drink (today)

'I drank some water (ten minutes ago).'

b. Degraded III with YESTERDAY PAST reference

*ŋarra* *l̪uk-**a**(*na)* *gapu* *barpuru*
1S eat-I/*III water yesterday

'I drank water yesterday.' [DhG 20190405]

Comrie (1985) consequently terms this phenomenon *CYCLICITY*, given that it emerges as a result of the recapitulation of a similar correspondence between form and function (the range of III precedes the range of I) in both HODIERNAL and PREHODIERNAL discourse contexts.

#### 8.3.2.1 Event instantiation — modelling assumptions

Previous descriptions have seized on the demonstrably broad distribution of I to assign it metalinguistic labels including BASE and NEUTRAL (these were summarised in Table 12). Below, I propose a lexical entry for the meaning contribution of I and III, which draws on principles of pragmatic blocking in order to derive the distribution exhibited in WD.

In § 8.1, I motivated a treatment of WD verbal predicates (stems) as properties of events — that is, they'll be taken to denote expressions of type $\langle \varepsilon, t \rangle$. These are then taken to be the input of aspectual operators, which existentially bind the event variable, outputting a proposition (a characteristic function of indices.) Denotations for aspect operators, including inflecting aspectual auxiliary *GA* 'IPFV' and a covert neutral/PFV operator are given below in (184).[170]

(184) **Denotations for WD aspectual operators**

a. $[\![ \textit{GA} ]\!] = \lambda P_{\langle \varepsilon,t \rangle} \lambda i \,.\, \exists e[P(e) \wedge \tau(e) \sqsupset i]$

b. $[\![ \varnothing_{\text{PFV}} ]\!] = \lambda P_{\langle \varepsilon,t \rangle} \lambda i \,.\, \exists e[P(e) \wedge \tau(e) \sqsubset i]$

[170] Of course there are considerably more sophisticated treatments of aspect in the semantics literature (e.g., Deo 2009; Dowty 1979 a.o.) Nothing in the forthcoming analysis is reliant on the one provided here, which is similar to that described in Taylor (1977).

So, WD aspect morphology then takes a property of events and maps it to a property of indices. *GA* 'IPFV' asserts that the reference index $(i)$ is contained within the event's runtime $\tau(e)$. Conversely, the absence of an aspect auxiliary in a verbal predication is associated with the inverse relation: that is, 'PFV' asserts that $\tau(e)$ is contained within $i$.[171]

A maximally underspecified lexical entry for I is given in (185) below. On this treatment, I is taken to be semantically vacuous.[172] Effectively, it is an identity function that "passes" a reference index $i$, provided by context ($c$), up the derivation. The contextual parameter $c$ is assumed to be a tuple containing relevant contextual information. On this approach, temporal reference is provided by a pronoun-like object which "anchors" the proposition (the hallmarks of a "referential" theory of tense semantics, *e.g.*, Kratzer (1998) *et seq*).

(185) notably makes no restrictions on the nature of the relation between $i$ (the reference index) and utterance time $i*$. This is motivated by the data shown above, where I is felicitous with PAST, PRESENT and FUTURE reference (modulo a number of distributional restrictions to be discussed below.)

(185) **A general denotation for the FIRST inflection**

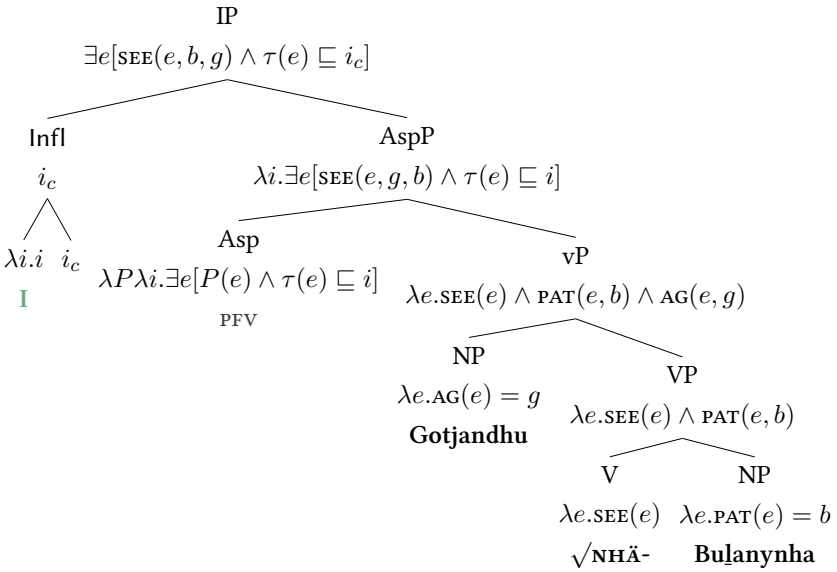
$$[\![ \text{I} ]\!]^c = \lambda i \, . \, i$$

A derivation for a transitive I-sentence is given in (186). This sentence is incompatible with present reference given the constraints described in the previous section: namely that *NHÄ-* 'see' denotes a property of events. Seeing as eventive properties (and perfective event descriptions) are inherently bounded, they are incompatible with (inherently non-bounded) present reference (this fact shown in 8.1). Future reference is also ruled out for pragmatic reasons to be discussed in the following chapters. The possible range of event times can be further constrained by past-denoting TFAs (*e.g.*, *barpuru* 'yesterday.')

[171] On Bohnemeyer & Swift 2004's (2004: 277) account of "default aspect", the perfective reading of dynamic predicates (*i.e.*, all WD verbs) emerges as a pragmatic (Q-based) implicature.

[172] See Sauerland (2002) for a related proposal for the English PRESENT.

(186) *Gotjan-dhu nhä-**ma** Buḻany-nha*
*MÄLK*-ERG see-I *MÄLK*-ACC
'Gotjan saw Buḻany.'




In effect, here I have proposed a trivial semantics for I: the contribution of I being to "pass up" a reference index that is assigned by context $i_c$. Below, we account for its competition with III within the past domain.

#### 8.3.2.2 Non-final instantiation

Of course, as shown at length above, I does not appear with either TODAY PAST or REMOTE PAST situations. I model this incompatibility as emerging from a blocking effect associated with the relative assertoric strength of III (which, unlike I has *bona fide* past temporal semantics albeit with additional use restrictions.)

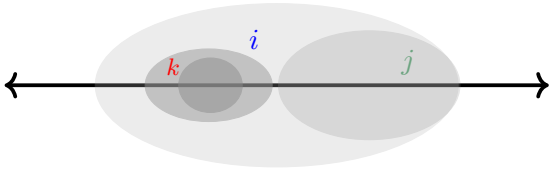
Above, the verb inflection (I) in effect denotes an INSTANTIATION RELATION between a contextually-supplied reference time and a property of indices (*i.e.*, the output of an aspectual operator.)[173]

NONFINAL INSTANTIATION is a subcase of the PROPERTY INSTANTIATION relation which holds only if the $P$-event **does not overlap** with the end of the reference interval $i$. This relation is defined in (187) and schematised in Figure 26.

[173]The PROPERTY INSTANTIATION relation is used by Condoravdi & Deo (2015); Deo (2006) in part to model the divergent behaviours of different types of predicates (eventive *vs.* stative *vs.* temporal) with aspect operators. Given that the data with which we are concerned here involves the output of aspectual operators (that is, only with *temporal* properties), $\textsc{inst}(P,i) = P(i)$.

(187) **Non-final instantiation** (Condoravdi & Deo 2015: 279)
Defined iff $j \underset{\text{FINAL}}{\sqsubset} i$;
$$\textsc{NfInst}(P, i, j) \leftrightarrow \exists k(\textsc{Inst}(P, k) \wedge k \sqsubseteq i \wedge k \prec j)$$

**Figure 26.** NfInst holds between a property $P$, some interval $i$ and one of its **final subintervals** $j$ iff $P$ is INSTANTIATED at some other subinterval $k$ that wholly precedes the final subinterval $j$.




Having stipulated that the interval corresponding to $i$ in the above definition is saturated by either *today* or *before today*, a discourse context makes salient two reference intervals (frames, F) which correspond to the CONTEMPORARY/PRECONTEMPORARY distinction described for the inflectional systems of the Maningrida languages (Eather 2011; Glasgow 1964; Green 1995). CONTEMPORARY eventualities are those that are situated in a FINAL subinterval of the reference frame $\{j \mid j \underset{\text{FINAL}}{\sqsubseteq} \mathtt{F}_c\}$. PRECONTEMPORARY eventualities are situated in a NONFINAL subinterval of $i_c$, i.e. $\{k \mid k \underset{\text{NONFIN}}{\sqsubset} \mathtt{F}_c\}$. These intervals are summarised in Table 16 below.

**Table 16.** Instantiation intervals $j, k$ partition the temporal frame in which $i_c$ is located.

| INTERVAL TYPE | | TODAY frame | FORE-TODAY frame |
|---|---|---|---|
| **frame** | $\mathtt{F}_c$ | $\{i \mid i \sqsubseteq \text{today}'\}$ | $\{i \mid i \prec \text{today}'\}$ |
| CONTEMPORARY | $\boldsymbol{j} \underset{\text{FINAL}}{\sqsubseteq} \mathtt{F}_c$ | *dhiyaŋ bala* 'now' | *barpuru* 'recently' |
| PRECONTEMPORARY | $\boldsymbol{k} \underset{\text{NONFIN}}{\sqsubset} \mathtt{F}_c$ | *dhiyaŋ bili* 'now' | *baman'* 'previously' |

The contemporary interval, then, is associated with speech-time in hodiernal contexts (*i.e.*, when the discourse provides a F within the day-of-utterance) and with relative/subjective recency in prehodiernal contexts (when the discourse context provides values F prior to day-of-utterance). These "contemporary" intervals are relevant to WD temporal grammar: 'overlapping with speechtime' and 'recently' corresponding to TODAY and BEFORE TODAY respectively:

**The TODAY frame** Any arbitrary final subinterval $j$ of $(today, i*)$ necessarily overlaps with speech time.[174] From this, we can simply derive the incompatibility of III with PRESENT-referring event descriptions: all non-final subintervals of $(today, i*]$ forcibly exclude $i*$. As a result, NFINST$(P, [today, i*), j)$ yields the TODAY PAST distribution for III.

**The NONTODAY frame** Further, the "subjective" nature of the RECENT v. REMOTE distinction (shown in §8.3.1) also falls out of this treatment. In principle, given that the BEFORE-TODAY frame has no left boundary, NFINST makes available any subinterval of $i_c$ that does not include its right edge. As a result, the duration of final subinterval $j$ is contextually determined, presumably adjudicated by what the Speaker considers to count as CONTEMPORARY in a given discourse context.

Strong judgments of infelicity for III with a class of temporal frame adverbials—most clearly *barpuru/yawungu* 'yesterday', *e.g.*, (b) —points to a conventionalised principle of "minimum duration" for $j$ in these contexts. While these adverbials are glossed as 'yesterday', it can be demonstrated that they are compatible with a wider range of RECENT PAST interpretations. See also the variable interpretations of *barpuru* (and its composition with *märr* 'somewhat' in ex. 177 above.)

Adapting Condoravdi & Deo's NFINST, and armed with two pairs of possible reference frame/final-subinterval, we can then define a PRECONTEMPORANEITY relation which — *cf.* the entry for I in (185) — holds of an index $i$ at a fixed set of contextual parameters $c$. A definition of this relation is provided in (188) along with a proposal for the semantic contribution of III. In view of this relation, the division of the (nonfuture) temporal domain between I and III (again, at a fixed context) is schematised in Figure 27.

(188) **III as encoding precontemporaneity**

a. **Precontemporaneity**
$\textsc{precontemp}_c(P) \stackrel{\text{def}}{=} i \sqsubseteq \mathtt{F_c} \wedge i \prec j_{\mathtt{F}}$

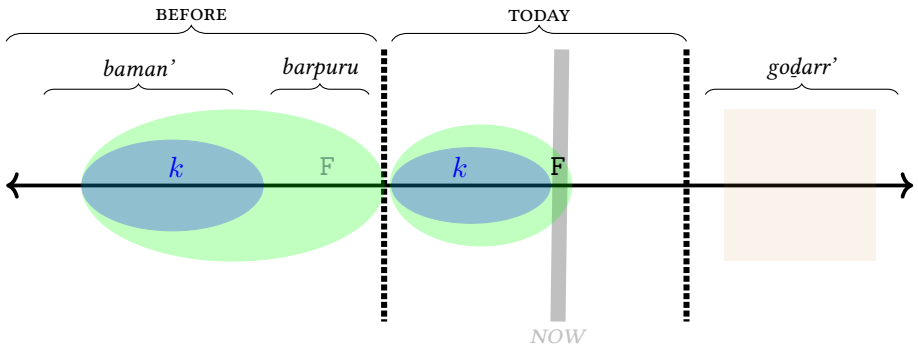
[174] $j \underset{\text{FINAL}}{\sqsubseteq} (today, i*] \leftrightarrow j \circ i*$
Simply, all final subintervals of the interval $(today, i*]$ contain $i*$ (by def. $\underset{\text{FINAL}}{\sqsubseteq}$)

Given a fixed utterance context ($c$), a given reference index $i$ is *precontemporaneous* iff $i$ precedes $j_{\mathrm{F}}$ — a final subinterval of the utterance's reference frame $\mathrm{F}_{\mathtt{i}_c}$.

b. **A denotation for the THIRD inflection**

$$[\![\textbf{III}]\!]^c = \lambda i : \textsc{precontemp}_c(i) \,.\, i$$

**Figure 27.** Appealing to 'precontemporary instantiation' to provide a unified entry for the temporal reference of III. III is licensed iff the index at which $P$ holds is contained within either of the intervals labelled $k$.
References to the interval $j_{\mathrm{F}}$ in this section correspond to $\{\mathrm{F} - k\}$




#### 8.3.2.3 A MAXIMIZE PRESUPPOSITION (pragmatic blocking) account

In view of the lexical entry for III proposed above, the infelicity of I-inflected predicates with REMOTE and TODAY PAST instantiation times then emerges as a result of pragmatic blocking. It is well known that oppositions between specific and general meanings give rise to a division of pragmatic labour in which the general form is conventionally restricted to the complement of the domain of the specific form (Deo 2015a, citing Horn 1984 & Horn & Abbott 2012). A related principle, MAXIMIZE PRESUPPOSITION (due to Heim 1991, implemented in Ippolito 2003; Sauerland 2009 a.o.) expands this reasoning into the presupposition domain. A formulation of MAXPRESUPP is given in (189) below.

(189) **MAXIMIZE PRESUPPOSITION** (the notion of "implicated presuppositions" as formulated in Sauerland 2002, 2004)
Presuppose as much as possible in your contribution to the conversation (2004: 19)

> If a scalar alternative $Y$ of $X$ has more, or stronger, presuppositions than $X$, $X$ presupposes that the inherent presuppositions of $Y$ aren't satisfied. (2002: 13)

Given that $[\![\text{I}]\!] \supsetneq [\![\textbf{III}]\!]$,[175] a scale $\langle \text{I}, \textbf{III} \rangle$ obtains between these two inflections.

That is, a sentence of the form $\text{I}(\varphi)$ (Q-)implicates that the presuppositions of $\big(\textbf{III}(\varphi)\big)$ cannot be satisfied in $c$. As a consequence, while the lexical entry for I provided in (185) provides for the instantiation of the predicate at any contextually-specified index $i_c$; in competition with the presuppositionally stronger **III**, I is felicitous only with indices located in a FINAL SUBINTERVAL of F (*i.e.*, those green areas $(\text{F} - k)$, posterior to $k$, in Figure 27 above). The blocking of I's realisation of the PRECONTEMPORARY INSTANTIATION relation by **III** (that is, a precontemporaneity **antipresupposition** that I makes on $i$) is derived in (190) below.

(190) **Pragmatic strengthening of I**

$$
\begin{aligned}
[\![\text{I}]\!]^c(P) &\rightsquigarrow \textsc{Inst}(P, i_c) \setminus [\![\textbf{III}]\!]^c(P) && \text{(i)}\\
&\rightsquigarrow \textsc{Inst}(P, i_c) \setminus \textsc{Inst}(P, i_c) \wedge i \sqsubseteq \text{F} \wedge i_c \prec j_{\text{F}_c} && \text{(ii)}\\
&\rightsquigarrow \textsc{Inst}(P, i_c) \wedge \neg(\textsc{inst}(P, i_c) \wedge i \sqsubseteq \text{F}_c \wedge i \prec j_{\text{F}}) && \text{(iii)}\\
&\rightsquigarrow \textsc{Inst}(P, i_c) \wedge \neg(i \sqsubseteq \text{F} \wedge i_c \prec j_{\text{F}}) && \text{(iv)}\\
&\rightsquigarrow \textsc{Inst}(P, i_c) \wedge i_c \not\prec j_{\text{F}} && \text{(v)}
\end{aligned}
$$

> I realises property instantiation but, via competition with the more specific (informative) form–**III**–its use is pragmatically restricted to the relative complement of **III**'s domain ***(i)***. That is, the relative complement of PRECONTEMPORARY INSTANTIATION ***(ii)***. Therefore I is felicitously used **only when** the reference interval provided by context **does not** precede $j_{\text{F}}$ (a contextually-supplied final subinterval of the reference frame, as described above.) $P$ is therefore instantiated at some subinterval of $j_{\text{F}}$ ***(v)***.
> Negation of the other conditions of **III** would lead to contradiction (premise, *iii*; def. F, *iv*).

Given the blocking and strengthening effects described here, I and **III** are in complementary distribution. Where **III** requires PRECONTEMPORARY instantiation of $i$ (relative to F), the use of I is taken to implicate a presupposition of FINAL/CONTEMPORARY INSTANTIATION (compare the domains of the (pre)Contemporary tenses in Table 16, *p. 213* above.)

---

[175] Given that I makes no presuppositions on the contextually-supplied temporal value of the evaluation index $i$. **III**, however, preupposes *precontemporaneity* (i.e. restricts the location of $i$ relative to some super interval F.) That is to say, that the presuppositions of I are weaker than those of **III** **or** the range of indices available to I are a proper superset or those available to **III**.

## 8.4 Theorising cyclic tense & the status of $\mathtt{F}_c$

The sections above have proposed a semantic analysis of temporal operators in WD, including an eventive semantics for verbal stems and a treatment of the (actual) nonfuture domain (that is, reference to the PRESENT and PAST) as partitioned by the FIRST and THIRD inflectional categories in the verbal paradigm (I and III.)

The temporal discontinuity of the reference intervals licensed by each of these inflections (schematised in Figures 23/25/27) is understood in terms of a notion of a (PRE)CONTEMPORARY distinction which operates over either a hodiernal or pre-hodiernal "reference frame" (an observation initially due to Glasgow's treatment of Burarra and subsequent work on the non-Pama-Nyungan languages of Maningrida/West Arnhem.)

The linguistic relevance of a *day-of-speech*/HODIERNAL interval (operationalised here as a reference "frame" – $\mathtt{F}$ – in which the reference index $i$ is located) finds cross-linguistic support in the literature on temporal remoteness/metric tense (examples given in § 8.3.1). Digging deeper, the "cut-off" between hodiernal and prehodiernal frames can be shown not to fully align with *natural* temporal phenomena (that is a moment of switchover — sunset/midnight/sunrise — from III-marked pasts to I-marked pasts can be shown to not be crisply identifiable.) In each of the examples in (191) the relevant "day of utterance" (licensing III) appears to more closely align with the subject's circadian/sleep-wake cycles when these diverge from "natural" circadian phenomena.

(191) **III is licensed given an event description whose runtime extends beyond the "natural" span of the DAY OF UTTERANCE**

a. *mukul ga-**na** warkth-**urruna** yäna beŋuru bili **barpuru** ga dhiyaŋgu*
aunt IPFV-III work-III EMPH INDF.ABL CPLV yesterday and PROX.ERG
*bala ŋayi ŋorra-**na**-nha*
MVTAWY 3S lie-III-SEQ

'Aunty was working from yesterday right through until now and she's (just) gone to sleep.' [DB 20190405]

b. *walu gärri-**na**; ŋarra ga-**na** warkth-**urruna** yäna*
sun enter-III 1S IPFV-III work-III only

'After the sun set, I was working all night.' [DB 20190405]

c. *märi'mu ga ŋorr-a yän bili ŋayi djaḏaw'-mara-**ŋal**.*
FaFa ipfv.I lie-I emph cplv 3s dawn-caus-III

*ŋayi ga-**n** marrtji-**n** […] beŋur dabala'ŋur*
3s ipfv-III go-III indf.abl gamble.abl

'Grandpa is still asleep because he was up past dawn. He was walking back (because his car had broken) from playing cards.' [AW 20190410]

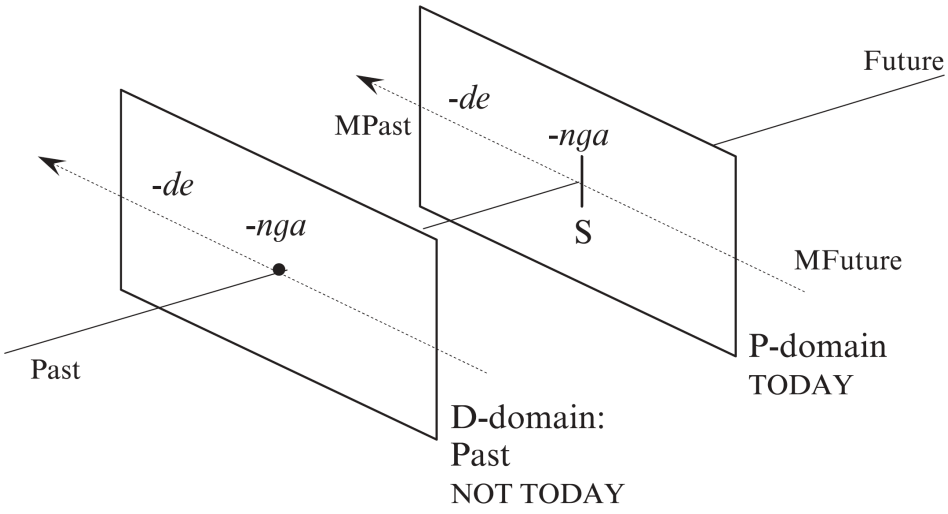
How and why would a tense system like that analysed in this chapter emerge? Of the Palantla Chinantec system (see fn 169, *p.* 209), Bybee et al. (1994: 104) suggest that competition between a "hodiernal past [*-na*] and an anterior [*-ka*] (with current relevance)" for control of the same-day past domain may have led to the discontinuity in the span of reference times available to *-ka*. Given the compatibility of I with nonpast reference, as well as the fact that the reference intervals with which both I and III are compatible are temporally discontinuous, an explanation along these lines is untenable for WD. Below we consider two possible (and perhaps relatable) approaches to this question: the mentalist "cognitive domains" framework and énonciation-theoretic insights on shifty evaluation time.

### 8.4.1 "Cognitive domains"

Botne & Kershner (2008: 154, *passim*) argue that the complex temporal remoteness systems exhibited in a number of Bantu languages are reflexes of multidimensional, nonlinear conceptions of the temporal domain. They model this by positing multiple "cognitive domains" that differ in terms of the inclusion or exclusion of a deictic centre (*i.e.*, p-domain *v.* d-domain, mnemonics for "primary" and "dissociated" respectively.) For them, English unmarked verb forms locate an event within the p-domain (accounting for futurate and historical present uses, where Ø-inflection is apparently compatible with non-present time.) That all Ø-marked predicates involve reference to events that occur "within the timespan of the cognitive world [that includes the deictic center]" (152). English tense marker -ed conversely is taken to displace an event into the past, to a cognitive domain excluding the deictic centre. They use this "cognitive domains" model in order to supply a motivation for (apparent) temporal remoteness distinctions drawn in Bantu and to explain a number of related effects.

The "cognitive domains" approach converges with the one described here insofar as "seemingly

**Figure 28.** Burarra's [bvr] tense system as understood in the "cognitive domain" approach of Botne & Kershner 2008 (209). "MPast/MFuture" refer to the authors' proposed "tenor" relations (the P-domain's corollary of tense.) *-de* and *-nga* correspond respectively to III and I in WD.




discontinuous tenses are continuous within their domains." Taking up the example of Burarra (bvr, that Maningrida language on which the system described by Glasgow 1964 was based with *-ŋa* 'CONTEMPORARY' and *-de* 'PRECONTEMPORARY' distinction), Botne & Kershner effectively recast the TODAY/NON-TODAY "frames" as corresponding to their P- and D-domains respectively (2008: 209, see also Figure 28.) Presumably they'd make a similar claim WD's I and III.[176]

### 8.4.2 *Énonciation*, diachrony & functional unity

For all the talk of reference frames and cognitive domains, how much closer are we to understanding the motivations for the encoding of complex temporal remoteness systems of a grammaticalised cyclic tense system?

A number of linguists working on temporal/aspectual distinctions made in IndoEuropean languages have drawn Benveniste's distinction between "narrative" (*récit/histoire*) and *discours* modes (*plans d'énonciation*).[177] To take one example, Duchet & Përnaska's (2016) study of the usage do-

[176]Although how these remoteness distinctions are drawn appears to vary across Burarran and Yolŋu varieties (Rebecca Green, *pers. comm.*) Additionally, Bowern (2006) points out differences in the organisation of cyclic tense in Yan-nhaŋu [jay] as against the Burarran system. It is unclear whether Botne & Kershner's system has the resolution to account for these types of distinctions.

[177]Where "***l'énonciation historique*** *[...] s'agit de la présentation des faits survenus à un certain moment de temps,*

mains of the Albanian [sqi] *AORIST* and *PERFECT* suggests the possible utility of this broad *"énonciative"* dichotomy in understanding the distibution of these forms.[178] While past-referring event descriptions in narrative contexts are the *locus classicus* of the *Aorist*, Duchet & Përnaska show that, in discourse contexts, this form is associated with a number of other uses — including the description of present-holding result states and "immediate future" accomplishments. The *Perfect* — traditionally encoding "presently relevant result states" (co-occurring frequently with TFAs that include speech time ('today/this week/this year'), and used in narratives with a "hot news" reading — also has a range of anterior-type uses: describing states (possibly) occurring prior to (AORIST-)marked past events.

Relatedly, in a survey of remoteness distinctions, Dahl (1983: 116*ff*) identifies a number of languages that appear to treat past differently in "narrative contexts," going on to propose a number of cross-linguistic generalisations that seek to motivate a "tendency to neutralize distance distinctions in narrative contexts." Drawing on a proposed distinction between narrative and discursive contexts, it is conceivable the two reference frames (TODAY/PRE-TODAY) featuring into our analysis of WD temporal reference, in some sense, correspond respectively to **conversational** and **narrative** modes.

That is, in **conversational** contexts, described events are likely to bear a more immediate relation to the present. Here, a discourse is likely to be concerned with a distinction between PAST and NONPAST. Conversely, in **narrative** contexts (accounts of exclusively past events), the distinction between events that held in a REMOTE, inaccessible past versus those that held in a relatively RECENT one; one that, by virtue of its temporal proximity, more closely resembles the here-and-now.[179] This usage evokes the phenomenon of the "narrative/historic present" — a commonly attested use cross-linguistically (see Carruthers 2012 for an overview).[180] A similar usage of the

*sans aucune intervention du locuteur dans le récit*" and ***discours*** constitutes "*toute énonciation supposant un locuteur et un auditeur, et chez le premier l'intention d'influencer l'autre en quelque manière*"

("**Narrative** comprises the presentation of facts already having occurred at a given moment in time, without any intervention on the part of the speaker" whereas **discourse** is understood as "any utterance that presupposes a speaker and a hearer, where the former intends on influencing their interlocutor in some way.")

(Benveniste 1966: 238–42; translation and emphasis mine.)

[178]That is, the synthetic 'AORIST' (*e kryer e thjeshtë*) and the periphrastic 'PERFECT' *(e kryer)* form 'HAVE+past participle' respectively.

[179]Compare Waters' observation (in his description of Djinaŋ's TODAY/REMOTE PAST) that "few stories are set in the time context of the same day as the speech event" (1989: 188).

[180]Cited by Carruthers (2012: 312), Facques claims that the historic present "permet de maintenir l'illusion d'une

PRES (or NONFUTURE) is also pointed out by Stirling (2012), who shows its extensive use in Kalaw Lagaw Ya [mwp], where it functions as a past perfective in narrative contexts.[181,182]

This observation is quite clearly borne out in narratives that contain quoted dialogue, triggering "shifts" in the reference frame. One example from a Gupapuyŋu picture book *Dhäwu mala Ŋurruṉaŋgalpuy* [Stories of the Ancestors] *№3* involves such a reference frame shift. The quoted discourse portion appears to refer the events (past and future) of the day of utterance (that is the day of the mother's speech event established by the first (narrative) clause.[183]

(192) **Quoted dialogue in a narrative context inducing reference frame shift**

*nhanŋu ŋäṉḏi'mirriŋunydja waŋa-**na**-na:*
3S.DAT mother.KINPROP.PROM say-III-SEQ

*"Go, gäma'kama-na nhuma dhu girriny'tja mala, nhakuna munhdhurrnydja*
bring.REDUP-I-SEQ 2P FUT thing.PROM PL like gift.PROM

*ŋayi waku. Ga ŋunhi dhu yolthu warrpam' gurrupan ŋunhi nhaku ŋarra*
3S DA and ENDO FUT who.ERG all give.I ENDO what.DAT 1S

*ŋäŋ'thu-**rruna**, ga ŋuriŋiyi dhu märrama wakunhanydja ŋarraku."*
ask-III and ENDO.ERG.ANA FUT get.I DA.ACC.PROM 1S.DAT

'…then her mother said: "Okay, bring stuff, gifts for my daughter. And whoever brings everything that I asked for, that person gets my daughter."'

[Mätjarra (MG) [trans.] 1981]

On this account, then, the emergence of *cyclic tense* of the type exhibited in the languages of Maningrida and the westernmost Yolŋu varieties (*viz.* Djinaŋ, Djinba and WD) can be explained in terms of a categoricalisation of these two "reference frames" that are closely associated with different modes of language use. This corresponds to a hypothetical analysis where:

- Language is used for conversation (pertaining to the eventualities that relate to the here-and-now) and for storytelling (pertaining to events completed prior to the here-and-now)

---

perspective simultanée du récit, déjà induite par l'emploi du present" (" allows the illusion to be maintained that the events and the narrative are simultaneous, an illusion already created by use of the present") (2007: 250–1, Carruthers' translation.)

[181]This type of usage is apparently widespread in Arnhem Land languages (*e.g.*, Bednall 2019 for Anindilyakwa [aoi])

[182]Additionally, Pancheva & Zubizarreta's tenseless analysis of Guaraní relies on an evaluation shifting parameter which they relate to English uses of the narrative present with past reference: a usage restricted however to narrative contexts (2019b).

[183]The I-marked clauses here all refer to the same-day future. This function of I is investigated in § 9.5 below.

- The function of a PAST-tense is to signal the settledness and completeness of an event vis-à-vis utterance time. The function of PRESENT tenses indicates that the runtime of an event overlaps with utterance time.

- The PAST/PRESENT distinction gets reanalysed as PRECONTEMPORARY/CONTEMPORARY: that is, PAST/PRESENT relative to a given reference frame (as determined by context (functions) of the utterance.)

### 8.4.3 Aspect & temporal interpretation

As shown in § 8.1, WD verb stems have a strictly dynamic (state change) semantics, a fact that seems to correspond with the recruitment of new strategies for encoding aspectual and modal information (primarily through preverbal auxiliaries and particles.)[184] The development of this analytic TMA marking system in Dhuwal-Dhuwala is likely to be related to the emergence of a "cyclic tense" system where I (the erstwhile 'PRS') now obligatorily co-occurs with *ga* 'IPFV' in order to encode present reference. Compare this fact to the incompatibility between present reference and achievement predicates, where a sentence of the type exemplified in (193) is only available with either a historic present or immediate future reading (an observation following Vendler 1957: 147).

(193) *Now they find the treasure/win the race/reach the summit*

(194) a. *ŋarra *(ga) **l̪uka** mänha (dhiyaŋu bala)*
1S IPFV.I drink.I water now
'I'm drinking water (now).' [DB 20190405]

b. *ŋarra *(dhu) **l̪uka** mänha (dhiyaŋu bala)*
1S FUT drink.I water now
'I'm going to drink water (now).' [DB 20190405]

c. *ŋarra **l̪uka** mänha (barpuru)*
1S drink.I water yesterday
'I drank water yesterday.' [DB 20190405]

[184] Whereas an explicit aspectual (±IPFV) distinction is actually grammaticalised in the Djinaŋ verbal paradigm, a feature not shared by other Yolŋu languages. Bowern (2009) suggests that this is likely a result of the univerbation inflectional suffixes and aspectual particles.

This resembles the situation in WD (194), where I necessarily co-occurs with *ga* 'IPFV.I' or *dhu* 'FUT' to encode present (progressive) or immediate future reference respectively. In the absence of either of these markers, only the RECENT (NON-TODAY) PAST reading is felicitous.

The relationship between the emergence of cyclic tense in WD and evidence for a wholesale restructuring of the language's aspectual system remain a subject for considerable further work and analysis.

In view of the semantics for I and III above, this section has considered possible candidates for functional motivations for the notion of the "reference frame" and the "recycling" or "temporal discontinuity" of tense markers that characterise cyclic tense. On the basis of these considerations, (195) formulates a hypothesis for the emergence of a cyclic tense system of the type described here.

(195) DIACHRONIC HYPOTHESIS.
**Cyclicity as the grammaticalisation of text type**
The cyclic tense phenomena exhibited in WD and related languages are a result of the reanalysis of PRESENT- and PAST-tense markers' apparently divergent usage in conversational versus narrative contexts

## 8.5 Conclusion

This chapter has provided analyses for a number of phenomena related to the temporal interpretation of WD predicates. Of particular importance for developing an analysis of the WD paradigm and WD's tense system is the notion of PRECONTEMPORARY INSTANTIATION, a motivation for which was the primary focus of § 8.3.

Drawing on descriptions from Glasgow (1964) and subsequent treatments of the languages of western and central Arnhem Land (Eather 2011; Green 1987, 1995; Waters 1989; Wilkinson 2012), we proposed a formal treatment of the notion of the "reference frame" — effectively a HODIERNAL/PREHODIERNAL dichotomy in the NONFUTURE ("REALIS/ACTUAL") domain which corresponds to a superinterval of the reference time.

It was argued that the contribution of **III** (the PRECONTEMPORARY) is to constrain reference time to a NON-FINAL subinterval of the contextually-supplied reference frame. Via blocking, instantiation of predicates inflected with **I** are felicitous only within the complement of **III**'s range within the realis domain. That is, **I** — an inflection compatible with present, past and future reference — is an unmarked form, temporally neutral in its semantics (compare to treatments of the present, *e.g.*, Carruthers 2012; Fleischman 1990.[185])

The following chapter extends the account to **II** and **IV** — the irrealis categories.

[185]Also Dahl's generalisation that "[i]t is almost always possible to use the least marked indicative verb form in a narrative past context" (1983: 117, *apud* Dahl 1980 *n.v.*)

# Chapter 9

# Modal interpretation & NEGATIVE ASYMMETRY

## DISTINGUISHING ⟨I, III⟩ FROM ⟨II, IV⟩

The basic distributional facts for II and IV were described in § 7.4. As shown there, verb stems receive II-marking in future-oriented predications (including imperatives), whereas IV-marking is associated most clearly with counterfactual predications and other modal claims with past temporal reference. On the basis of these data, these two inflectional categories appear to be associated with *non-realised* events; and it is this property that distinguishes them from the I- and III-marked verbs described in the previous chapter (ch. 8).

In this chapter, we interrogate the nature of this apparent "reality status" distinction drawn in WD (as it is in other Yolŋu Matha varieties) and the expression of mood, modality and modal operators in WD more broadly. The distinction between ⟨I, III⟩ and ⟨II, IV⟩ is ultimately to be understood as one of VERBAL MOOD. One phenomenon of particular interest is that of an apparent kinship between negative operators (sentential negators) and modal operators as they are realised in WD. It is this kinship that looks to undergird *asymmetric negation* in WD with respect to the marking of reality status; a description of this phenomenon is the goal of § 9.1.

## 9.1 Sentential negation and paradigm neutralisation

As shown in our discussion of the Negative Existential Cycle in Yolŋu Matha (§ 5.2.2, see *p.* 126), Djambarrpuyŋu has two particles—*yaka* and *bäyŋu*—which both realise standard negation (*i.e.*, that operator whose effect is to reverse the truth value of a given proposition.) The primary distributional distinction between these is that only *yaka* is used to generate negative imperatives (prohibitives) whereas only *bäyŋu* is found in negative existential/quantificational contexts (116–117). Of interest for current purposes however, is the fact that both of these sentential negators can be shown to directly interact with verbal inflection.

Descriptively, as shown in the data in (196–197), negation appears to trigger a "switch" from the 'realis-aligned inflections' (I and III) to their 'irrealis counterparts' (respectively II and IV). As shown, these latter categories otherwise turn up predominantly in *hypothetical* or *counterfactual* contexts. As we will see, this points to an analysis where the Western Dhuwal-Dhuwala inflectional system encodes a *reality status*-based distinction that is neutralised in negated sentences (see also discussion in Wilkinson 2012: 356). This effect — which we term a "negative asymmetry" (specifically A/NONREAL, following Miestamo 2005) — was introduced above (§ 7.1.2, compare the Gurr-goni gge data in 143) and is summarised below in Table 17. Here, we develop a theory of the negative asymmetry as an epiphenomenon of a kinship between NEGATIVE and (other) IRREALIS operators.

| POLARITY | |
|---|---|
| −NEG | +NEG |
| I<br>II | II |
| III<br>IV | IV |

**Table 17.** Neutralisation of I and III inflections under negation.

The following examples in (196) show how sentences that receive I-marking in positive sentences — encoding temporal reference to the present or recent past (Ch. 8) — instead receive II-marking under the scope of negation. Each example contains a predication about the present or about the recent past (normally the domain of I, as described in the previous chapter.) In the presence of a negative operator, however, the verb receives II-marking.

(196a-b), for example, presents a near-minimal pair, where the inflection received by a predicate with present reference "switches" from I to II under negation.

(196) **Exponence of present and recent past reference as II under negation**

a. *Nhaltja-**n** **ga** limurru-ŋgu-ny rom waŋ-**a**?*
do.how-I IPFV.I 1p.INCL-DAT-PROM law say-I

'What does our law say?' (DjB: Luk 14.3)

b. ***yaka** **gi** **biyak** rom waŋ-**i***
NEG IPFV.II do.thusly.II law say-II

'That's not how the law is/what the law says.' (Wilkinson 2012: 357)

c. ***bäyŋu** ŋarra **gi** nhä-**ŋu***
NEGQ 1S IPFV.II see-II

'I can't see (it).'
COMMENT. 'I didn't see (it) (yesterday)' is also an available reading. [AW 2018030]

d. *Ŋarra **gi** bäyŋu maḻŋ'mara-**ŋu** waṭu (ŋarraku).*
1S IPFV.II NEG appear.CAUS-II dog 1S.DAT

*Bili ŋayi **ga** nhin-**a** wäŋaŋura*
CPLV 3S IPFV.I sit.I house.LOC

'I can't find my dog. It lives in the house.' [DhG 20190417]

e. *Ŋarra ga djäl-thi-**rri** giritjirrinyara-wu,*
1S IPFV.I want-VBLZR-I dance.NMLZR-DAT

*yurru ŋarra bäyŋu-nha **girritji***
but 1S NEG-SEQ dance-II

'I was wanting to dance (at the *buŋguḻ* yesterday) but I didn't dance (because I'd hurt my leg yesterday.)' [DhG 20190417]

Similarly, in contexts where the temporal reference of the event description predicts that the verb will receive III-inflection — following our description from Ch. 8, when referring to the same-day (HODIERNAL) or the remote past — when co-occurring with a negative particle (*yaka/bäyŋu*), the verb instead receives IV-inflection. This is shown by the data in (197).

Again, (197a-b) represents a minimal pair where negative marking triggers a "switch" from III to IV inflection. (c) shows the negation of an immediate past event licensing IV inflection, (d) shows how a negated, IV-inflected predicate can be embedded under a propositional attitude predicate to encode a false belief, and (e) an example of a negated description of the remote past

receives IV inflection.

(197) **Exponence of TODAY PAST and REMOTE PAST reference as IV under negation**

a. *gathur munhagumirr ŋarra nhä-**ŋal** warrakan*
today morning 1S see-III bird
'I saw a bird this morning.' [FW 20180802]

b. *gathur munhagumirr **bäyŋu** ŋarra nhä-**nha** warrakan*
today morning NEGQ 1S see-IV bird
'I didn't see a bird this morning.' [FW 20180802]

c. CONTEXT. Speaker has dropped a coin.
*Way! **Bäyŋu** ŋarra nhä-**nha**?*
Hey! NEGQ 1S see-IV
'Ah! You didn't see (it, did you)?' [AW 20180830]

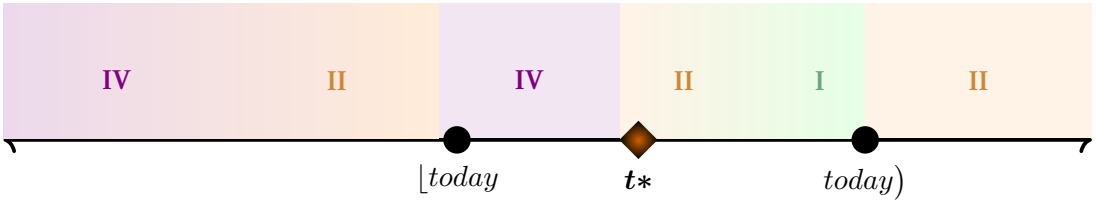
d. CONTEXT. I'm at work explaining to my coworker why my *galay* 'wife' is angry at me.
*Ŋarraku miyalk maḏakarritj-thi-**na** bili ŋayi ga **guyaŋa** ŋarra ga-**nha***
1S.DAT wife anger-INCH-III CPLV 3S IPFV.I think.I 1S IPFV-IV
*bäyŋu djäma*
NEG work
'My wife got angry because she thought I wasn't working today.' [DhG 20190417]

e. CONTEXT. The speaker grew up in the desert.
***bäyŋu** ŋarra ŋuli ga-**nha** nhä-**nha** (waltjaṉ) ŋunhi ŋarra yothu yän*
NEG 1S HAB IPFV.IV see.IV rain ENDO 1S child just
'When I was young, I hadn't seen [rain]/never saw [rain].' [AW 20190501]

The data in (196–197) evince a species of NEGATIVE ASYMMETRY that is manifested in WD. That is, from the four inflections which are available for encoding temporal and modal information in WD, only two (*viz.* II and IV) are felicitous in sentences that are negated by *yaka* or *bäyŋu*. Figure 29 schematises the relationship between temporal reference and inflection selection in **negative clauses** (*cf.* Fig. 23, *p.* 190.)

Further complicating things, while III is categorically ruled out in negative sentences, I "survives" when (and only when) the predicate refers to the SAME-DAY FUTURE. That is, the I/II distinction is *not* neutralised in negative sentences with reference to events happening later on the day of utterance (whereas the distinction *is* neutralised in all NONFUTURE contexts.) Examples are

**Figure 29.** Apparent interactions between temporal relations and reality status in Djambarrpuyŋu: cyclicty and metricality under negation.




provided in (198-199).

(198) **Future marking is unaffected by polarity/the presence or absence of sentential negation**

a. I with SAME-DAY FUTURE reference "survives" negation

*ŋarra (yaka) ŋunha* ***dhu*** *l̪uk-**a** dhiyaŋ bala*
1S (NEG) FUT DIST eat-I now

'I will (not) eat them [*l̪atjin*] right now.' [AW 20190422]

b. POST-HODIERNAL referring predicates receive II-inflection

*(bäyŋu) ŋarra* ***dhu*** *bul̪'yu-**rr** barpuru*
NEG 1S FUT play-II tomorrow

'I will (not) play [football] tomorrow.' [AW 20190429]

(199) **A minimal pair: I changes to II in present-referring negative sentences**

a. Positive present predication with I

*(dhiyaŋ bala) ŋarra* ***ga*** *nhä-**ma** mukulnha*
now 1S IPFV.I see-I aunt.ACC

'I'm watching my aunt (right now).'

b. Negative present predication with II

*(dhiyaŋ bala)* ***bäyŋu*** *ŋarra* ***gi*** *nhä-**ŋu** mukulnha*
now NEG 1S IPFV.II see-II aunt.ACC

'I don't/can't see my aunt (right now).' [AW 20190501]

## 9.2 The meaning of the modal particles

In § 7.4, we saw that predicates which receive II- and IV-inflection co-occur with some operator that encodes some flavour of irrealis-associated meaning — suggesting what Palmer (2001: 145) labels a "joint marking system" (*i.e.*, that reality is multiply indicated, in this case by suffixation in addition to a preverbal particle.)

For II, these are predominantly represented by *dhu* 'FUT' and *balaŋ(u)* 'IRR' in addition to clauses with imperative syntax. IV tends to co-occur with *balaŋ* 'IRR' in addition to *ŋuli* 'HAB'.[186] Importantly, and as we will see, these expressions all appear to lexicalise strictly **root** (circumstantial/non-epistemic) modalities (*contra* claims in van der Wal 1992: 123).

This section seeks to model the irrealis domain using the "branching time framework" introduced in § 1.2 in order to propose a semantics for WD modal particles. This will permit for forming a set of generalisations over the distribution of II and IV.

### 9.2.1 *dhu*: irreality and the FUTURE

Shown above (predominantly in § 7.4.2), *dhu* 'FUT' occurs in sentences with future temporal reference – with either I or II marking, depending on whether the reference time of the proposition is the same as the day of speech or beyond. This is shown again by the data in (200).

Relatedly, the data in (201) show that *dhu* appears to also be compatible with other circumstantial modalities; for example, with (a) deontic, (b) bouletic and (c) teleological readings. In all these contexts, we can model *dhu* as universally quantifying over (a subset of) a circumstantial modal base.

(200) ***dhu* 'FUT' encoding future tense with I- and II-inflections**

a. *barpuru goḏarr ŋarra* ***dhu*** *nhä-**ŋu***
funeral tomorrow 1S FUT see-II
'I'll watch the funeral tomorrow.'

[186] As in § 7.4, I adopt the (metalinguistic) labels FUT for *dhu* (following Wilkinson 2012) and MOD for *balaŋ(u)*. As we will see, these descriptions aren't necessarily completely semantically adequate, but will be sufficient for current purposes. Wilkinson (2012) glosses *ŋuli* as 'HAB' or 'HYP' depending on its apparent function in the clause (as a marker of HABITUALITY or of a conditional antecedent ("HYPOTHETICALITY").)

b. *mukul* ***dhu*** ***gi*** *nhin-**i*** *raŋi-ŋur* *goḏarr*
aunt FUT IPFV.II sit-II beach-LOC tomorrow
'Aunty will be sitting on the beach tomorrow.' [AW 20190409]

c. *limurru* ***dhu*** *l̪uk-**a*** *maypal* *yalala* *milmitjpa*
1d.EXCL FUT consume-I shellfish later evening
'We're having shellfish this evening.' [DhG 20190417]

(201) ***dhu*** 'FUT' **and other flavours of modal necessity**

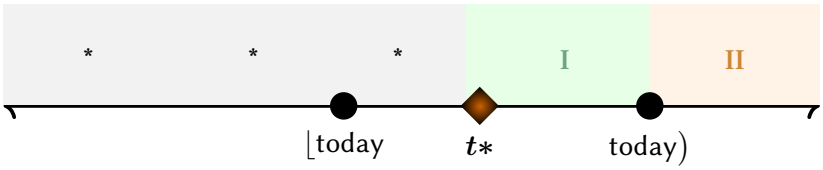
a. *Way! Nhe* ***dhu*** *gurruk-**ama*** *djoŋgu'!*
Hey! 2s FUT carry-I hat
'Hey! You must wear a helmet!' [DhG 20190405]

b. *djamarrkuḻi* ***dhu*** *yaka* *wurraŋatjarra'**y-irr***
children FUT NEG cruel.INCH-I
'The children mustn't be disobedient.' [AW 20190429]

c. *ŋarra* ***dhu*** *plane-dhu* *marrtji,* *bili* *mutika-miriw*
1s FUT plane-ERG go-I|II CPLV car-PRIV
'I'll have to go by plane because I don't have a car.' [AW 20190429]

Suggested in § 7.4.2, *dhu* appears exclusively in *future-oriented* predications, apparently *with present perspective* (that is, in predications about the future as calculated at speechtime, see Condoravdi 2002.) The relation between temporal reference and inflection in *dhu*-marked sentences is schematised in Figure 30.

**Figure 30.** (In)compatibility of modal particle *dhu* 'FUT' with temporal reference & inflectional category.




On the basis of this range of usage, we have reason to treat *dhu* as a modal expression. Here we adopt the quantificational (pragmatic domain restriction) approach to modal semantics introduced in § 1.2.2 and adapt an analysis in the style of Condoravdi's (2002; 2003 a.o.) unified treatment of *woll* on its 'future auxiliary' and modal uses. This is reproduced in (202) below (see also Abusch 1998 a.o.)

(202) **Denotation of English necessity modal *woll*** (Condoravdi 2002: 71)

$$[\![\textit{woll}]\!]^{\text{MB}} = \lambda P \lambda w \lambda t \,.\, \forall w' \big[ w' \in \text{MB}(w,t) \rightarrow \text{AT}\big([t,\_), w', P\big)\big]$$

*woll* asserts that, in all worlds $w'$ accessible from $w$ (those in the modal base MB, evaluated at $t$), $P$ holds **at or after** $t$ in $w'$.

In (202), we assume that *woll*-claims involve asserting that $P$ obtains AT some interval $[t,\_]$ whose left-bound is the evaluation time. In the *Branching Times* treatment that is being deployed here, so far an **index** $i$ has been taken as possibly referring to an **interval** which encloses the temporal trace of the event (as in perfective claims — $i \sqsupset \tau(e)$) or which is enclosed within a temporal trace (as in imperfective claims — $i \sqsubset \tau(e)$.) Intervals are modelled as a chain which is related to the runtime of the predicate (compare fn 8, *p.* 10 above.) The function $\mathfrak{e}$ (mnemonic for *earliest*) will be taken to relate an interval to its **left boundary** — this is represented in (203).

(203) **The left-boundary function** (compare Beaver & Condoravdi 2003)
$\mathfrak{e}(\boldsymbol{\imath}) = i \in \boldsymbol{\imath}$ s.t. $\forall i' [i' \in \boldsymbol{\imath} \rightarrow i \preccurlyeq i']$
Given an interval $\boldsymbol{\imath}$ — formally, a totally ordered set of indices — $\mathfrak{e}(\boldsymbol{\imath})$ picks out the "left boundary" or $\prec$-minimal ("earliest") element of that set.

The different "flavours" of *dhu* can be modelled using a standard ordering semantics (introduced above, § 1.2.2/*p.* 17.) The contextual parameter *c* makes available a number of conversational backgrounds against which *dhu* is interpreted — namely a circumstantial modal base $\underset{\text{CIRC}}{m}$ and some type of ordering source $o$.

The function BEST selects the "best" worlds in a circumstantial modal base, according to how well they conform with whatever set of propositions is returned by $o$. Depending on which ordering source is provided by context, these conversational backgrounds can be thought of as sets of:

- speaker expectations (STEREOTYPICAL ordering sources, in the case of FUTURE/prediction uses),
- relevant rules & regulations (in the case of *deontic* uses),
- relevant desires (in the case of *bouletic* uses),
- relevant goals/ends (in the case of *teleological* uses) *etc.*

Ultimately, then, *dhu* is "pragmatically ambiguous" between (at least) the types of readings described here and depends for its interpretation on the successful retrieval of an ordering source. This is a desirable consequence given, for example, the availability of a future/prediction reading of (201c) as well as the teleological reading provided in the translation above.

Despite the range of modal flavours available to *dhu*, it is still subject to an apparent incompatibility in WD modal particles and **epistemic** readings/conversational backgrounds.[187] That *dhu* selects for a non-epistemic modal base (compare Kratzer 1981b) is modelled by assuming that *dhu* presupposes that the discourse context $c$ makes available an appropriate ordering source, in addition to some relevant set of circumstances (see also Matthewson 2016; Peterson 2010; Rullmann et al. 2008) a.o.)

(204) **Lexical entry for *dhu* 'FUT'**
*dhu* is only defined if context makes available a circumstantial modal base $m$
$[\![dhu]\!]^c = \lambda P \lambda i : \forall b\big[b \in \underset{o}{\textsc{best}}\big( \cap m(\mathfrak{e}(i)) \big) \rightarrow \exists^b i'[i' \succcurlyeq i \wedge P(i')]\big]$
*dhu* $P$ asserts that – in the best branches of the modal base (according to some ordering source $o$) – there will be some index $i'$ — a successor to $i$ — at which the property $P$ holds.

### 9.2.2 *balaŋ(u)* & modal claims

In addition to *dhu*, WD deploys a number of other modal particles: *balaŋ/balaŋu* 'MOD' the most frequently occurring among them. *balaŋ(u)* occurs with verbal predicates categorically inflected for either II (as in the set of examples in 205) or IV (shown in 206).

The distinction in interpretation between these two sets of data is the *temporal interpretation* of the modal. In all cases, *balaŋ(u)*, appears to receive a root possibility reading. Similarly to *dhu*, then, we model *balaŋ(u)* as a quantifier over a (subset of a) circumstantial modal base. Whereas II-marking induces a future possibility reading, co-occurrence with IV-marking tends to encode varieties of past possibility (including counterfactual) readings.

A number of examples of predications about possible (future) events are shown in (205). These examples show that a range of predictive/modal "strengths" are available to *balaŋ*-sentences (the

[187] A proposal for extending the analysis to epistemic modals is contained in § 10.1 below (including additional data showing the incompatibility of modal particles and epistemic readings.)

speaker's apparent confidence in the instantiation of the predicate.) Modal particles can also co-occur ("stack"): in (205c–d), in both cases, the presence of multiple modals appears to decrease the force of the claim.[188]

(205) ***balaŋ(u)*** **'MOD' and II-inflection**

a. *ŋarra* ***balaŋu*** *l̪uk-**i**/(*-a)* *gapu,* *ŋanydja* *monuk* *ŋayi* *gapu*
1S MOD consume-II/*I water but saline 3S water
'I would drink some water but this water's salty.' [DhG 20190405]

b. *ŋarra* *ŋuli* *ga* *bitjan* *bili* *warguyun* *ŋunhi* recorder ***balaŋu*** *bakthu-**rru***
1S HAB IPFV.I thus.I CPLV worry.I ENDO recorder MOD break-II
'I'm always worried that the recorder will/could break.' [DhG 20190417]

c. *ŋarra* ***balaŋu*** *(bäynha)* *dhiŋg-**uŋu*** *ŋawalul'yu*
1S MOD (MOD) die-II smoke.ERG
'I could die from the smoke.' [DhG 20190405]

d. *ŋayi* ***balaŋ*** ***dhu*** *djaṉŋar-**thi***
3S MOD FUT hunger-INCH.II
'It (the cat) might get hungry.' [AW 20190429]

Predications about "past possibilities" are indicated by the co-occurrence of *balaŋ(u)* and IV as seen in (206). A counterfactual reading is available to each of the three sentences. In conditionals (i.e., those counterfactual predications with an explicit antecedent) both clauses are inflected with IV – an example is given in (207c).

(206) ***balaŋ(u)*** **'IRR' and IV-inflection**

a. *nhe* ***balaŋu*** *malkthu-**nha***
2S MOD accompany-IV
'You should/would have gone with (him).' [DhG 20190413]

b. *ŋarra* *gana* *guyaŋa-na* *wa̱tuy* ***balaŋu*** *l̪uka-**nha*** *chocolate*
1S IPFV.III think-III dog.ERG MOD eat-IV chocolate
'I'd thought the dog might/would eat the chocolate.' [DhG 20190413]

[188] The meaning of *bäynha* (glossed here also as MOD) is unclear. Wilkinson (2012: 670) analyses this item as *bäy-nha* 'until-SEQ', although my consultant treats it as virtually synonymous with *balaŋu*. Buchanan (See also 1978: 164).

c. *ŋarra-nha* ***balaŋu*** *l̪uku walala mitthu-**na**... yurru ŋarra manymak-thirri*
1s-ACC IRR foot 3p cut-IV but 1s good-INCH.I
'They would have amputated my foot, but I got better.' [DhG 20190417]

In explicit conditional statements, both antecedent and consequent are marked with a modal particle. *Ŋuli* (glossed here as HYP, see fn 186) normally seems to mark antecedent clauses, although as shown in b, the co-ordination of two *balaŋ(u)*-clauses also seems to give rise conditional interpretation (compare the discussion of *modal subordination* phenomena in Part I (§ 3.1.))

(207) **Conditional constructions licensing II and IV inflection (in indicative and counterfactual contexts respectively)**

a. *ŋarra* ***dhu*** *wargu-**yurr**,* ***ŋuli*** *ŋarra* ***dhu*** *bäyŋu gurrup-**ulu** ŋatha butjigitnha.*
1s FUT worry-VBLZR.II HYP 1s FUT NEG give-II food cat.ACC
*ŋayi* ***dhu/balaŋ*** *djan̪ŋar-**thi**.*
3s FUT/MOD hunger-INCH.II
'I'd be worried if I didn't feed the cat. It would/could get hungry (if I didn't.)'
[AW 20190429]

b. *ŋarra* ***balaŋu*** *l̪uk-**i**, ŋarra* ***balaŋu*** *rirrikth-**urru***
1s MOD eat-II 1s MOD get.sick-II
'If I eat (it), I might be sick.' (Lowe 1996: 196)

c. CONTEXT. Despite Mum's imprecations to feed the cat, I maintained a poor feeding ethic. The cat is now emaciated and Mum suggests:[189]
***Ŋuli balaŋu*** *nhe ŋatha gurrupa-**nha** butjigit-nha, ŋayi* ***balaŋu*** *ŋutha-**nha***
HYP MOD 2s food give-IV cat-ACC 3s MOD grow-IV
'Had you fed the cat, it would have grown.' [DhG 20190405]

Unlike *dhu* 'FUT', then, *balaŋ* sentences appear to be compatible with past temporal reference, which is always indicated by IV marking. That is, temporal remoteness distinctions of the type described in chapter 8 — which, as shown in § 9.1 were preserved in negative clauses — are neutralised in these modal contexts. A clear example is given in (208), where a predicate describing the same non-realised event (going out yesterday to collect *maypal*) receives II inflection when occurring with a negative marker (*bäyŋu*) but IV when occurring with a modal particle (*balaŋ*).

[189] No cats were harmed in the making of these examples.

Figure 31 gives another schematic representation of the relations between temporal reference and inflectional suffix, this time in contexts with the root possibility modal *balaŋ(u)*.

(208) **Temporal remoteness phenomena are not exhibited in modal contexts**

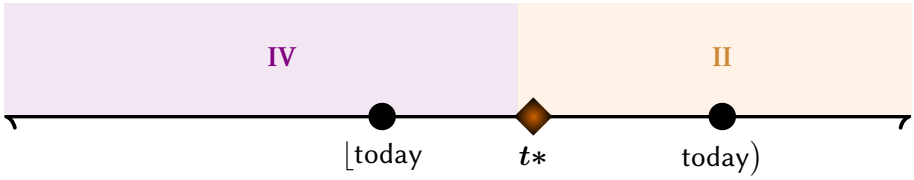
*barpuru* *ŋarra* *guyaŋ-**a*** *balaŋ* *limurr* *bu-**nha*** *maypal…*
yesterday 1s think-I MOD 1p.INCL hit-IV shellfish

*yurru* *bäyŋu* *napurru* *bu-**ŋu*** *maypal*
but NEG 1p.EXCL hit-II shellfish

'Yesterday, I thought we would collect shellfish, but we didn't collect shellfish.'

[AW 20190429]

**Figure 31**. Compatibility of modal particle *balaŋ* 'MOD' with temporal reference & inflectional category.




The distinction between the temporal interpretations in II- and IV-inflected clauses then in effect reflects the distinction drawn by Condoravdi (2002) between *present* and *past* TEMPORAL PERSPECTIVE respectively. For Condoravdi (2002: 62*ff*), temporal persepctive is the time at which some modal claim is calculated. A counterfactual predication like (206c), for example, is taken to communicate that 'we are now located in a world whose past included the (unactualized) possibility of a foot amputation. In Condoravdi's terms then, *balaŋ* in the scope of IV realises a "modal for the past" or a "modal for the present" under the scope of II.

On the basis of these data then, (209) represents a proposal for a lexical entry that captures the contribution of *balaŋ(u)* 'MOD'. Note that *balaŋ(u)* is also taken to differ from *dhu* 'FUT' in terms of the "force" of the modal quantification it realises.[190]

(209) **Lexical entry for *balaŋ* 'MOD'**

[190]It is likely that the modal force associated with *balaŋ* is actually somewhat variable (it is with *balaŋ*, for example, that counterfactual necessity is expected to be marked.) There are multiple proposals for how to deal with variable-force modal expressions, treating them as universal quantifiers over modal bases that have been further restricted by either a contextually-retrieved choice function or some additional ordering source(s). While some further discussion of these analyses is given in § 10.1.2, a proper description and treatment of these intricacies of *balaŋ*'s semantics will turn out to be inconsequential for our proposal of WD's inflectional semantics.

*balaŋ* is only defined if context makes available a circumstantial modal base $m$
$[\![balaŋ]\!]^c = \lambda P \lambda i\,.\, \exists b\big[b \in \underset{o}{\textsc{best}}\big( \cap \underset{\textsc{circ}}{m}(\mathfrak{e}(i))\big) \wedge \exists^b i'[i' \succcurlyeq i \wedge P(i')]\big]$
*balaŋ* $P$ asserts that – along some branch $b$, one of the best within a modal base calculated at $\mathfrak{e}(i)$ (according to some ordering source $o$) – there will be some index $i'$ — a successor to $i$ — at which the property $P$ holds.

*balaŋ(u)* functions, then, as a modal with respect to both present *and* past temporal perspectives (corresponding to "indicative" and "subjunctive" readings respectively.) Modelling *balaŋ*'s semantic contribution as that of an existential quantifier over a modal base evaluated at a reference time $i$ captures this lability (Condoravdi 2002, 2003 a.o.) As we will see in the forthcoming section, IV and II then guarantee that $i$ is either past or nonpast relative to utterance time. On this account, the truth conditions for (206c) are given in (210).

(210) ***balaŋu* on a counterfactual reading (past temporal perspective contributed by IV)**
**(206c, repeated)**

*ŋarra-nha* ***balaŋu*** *l̪uku* *walala* *mitthu-**na***
1s-ACC IRR foot 3p cut-IV

'They would have amputated my foot.' [DhG 20190417]

$[\![(206c)]\!]^c$ is defined iff the presuppositions of IV are met (these entail that $c$ assign $i$ to a predecessor of evaluation time (that is, utterance time: $i \prec i*$). $c$ must also provide a circumstantial modal base $\underset{\textsc{circ}}{m}$. If defined, (206c) is true iff:

$$\exists b\big[b \in \underset{o}{\textsc{best}}\big( \cap \underset{\textsc{circ}}{m}(\mathfrak{e}(i))\big) \wedge \exists^b i'[i' \succcurlyeq i \wedge \text{They amputate Speaker's foot at } i']\big]$$

That is: iff, given some past index $i$ (in this case, guaranteed by IV, context has provided one before now) along one of the most salient branching futures from that time (as determined by conversational backgrounds *m, o*), there is a successor index ($i'$) at which the speaker had his foot amputated.

※

In this section we have proposed a semantics for WD modal particles in terms of branching times semantics (including a modal semantics for the future marker *dhu*.) Crucial are the following observations about their interpretation:

- Modal particles select for a CIRCUMSTANTIAL (therefore **realistic**) conversational background (a variety of metaphysical modal base.)[191,192]

- Following treatments of English modals (*e.g.*, *WOLL* and *may*, compare Condoravdi 2002, 2003), WD modals are treated as quantifiers over contextually supplied conversational backgrounds that "uniformly expand the time of evaluation [$i'$] forward" (2003: 12).

Armed with a semantics for the modal particles with which the "irrealis-aligned" II and IV co-occur, we now turn to a treatment of the meaning of these inflectional categories.

## 9.3 Semantics of "NONREALISED" inflections

Wilkinson suggests that "[v]ery generally, one can describe [II and IV] as essentially IRREALIS, while [I and III] are essentially REALIS" (2012: 345, emphasis added.) In this section, we consider this claim, interrogate the opposition between REALIS and IRREALIS and survey the literature on *verbal mood* before proposing a treatment that distinguishes these categories in WD.

### 9.3.1 On the status of "reality status"

Various authors in the functional-typological tradition have identified a semantic category in REALITY STATUS, (perhaps) to be distinguished from MOOD and (perhaps also from) MODALITY (see Bowern 1998; Chafe 1995; Elliott 2000; McGregor & Wagner 2006; Michael 2014; Mithun 1995; Roberts 1990b.) For these authors, significant utility is to be found in drawing a broad dichotomy between REALIS and IRREALIS: that is, propositions can be taken as either a description of eventualities that correspond with observed/observable reality versus a description of a hypothetical, imagined, non-actualised eventuality. Consequently, for its defenders, IRREALIS can be conceived of as whatever semantical concept might be taken to collect: future, modalised and conditional predications and imperatives, in addition (for some languages) to negative and habitual predications and interrogatives (see also Givón 1994; Palmer 2001; Plungian 2005; von Prince, Krajinović & Krifka forthcoming).

[191] A modal base $m : \mathcal{I} \to \wp(\mathcal{I})$ is realistic iff $\forall i : i \in \cap m(i)$ (following Kratzer 1981b: 295).

[192] See Ch. 10 for a discussion of epistemic modal expressions.

Conversely, the concept of REALITY STATUS and the *realis/irrealis* distinction have also been roundly criticised by a number of authors, predominantly due to the fact that few languages appear to grammaticalise the realis/irrealis contrast as a "binary morphological distinction" as well as the apparent heterogeneity of these categories cross-linguistically (*cf.* the Oceanic data in von Prince et al. forthcoming). That is, the semantic domain of an IRREALIS marker on as analysed in one language tends to include and exclude parts of the semantic domain of others; the notion itself therefore has been criticised as **too imprecise to be useful** (see Bybee et al. 1994: 238, *apud* Foley 1986: 158*ff*. See also, *e.g.*, Bybee 1998; de Haan 2012; Portner 2018.) Of course, the actual semantic contribution of any given class of marker can vary radically across languages, whence the difficulty in providing a unified semantics for, *e.g.*, the Romance subjunctive.

On the basis of cross-linguistic data, Cristofaro (2012: 138*ff*) argues that languages crucially tend to draw a distinction between 'as-yet unrealized' and 'non-realized (in the past)' – *i.e.*, these domains are grammaticalized separately (*cf.*von Prince et al.'s survey (forthcoming: § 3) of Oceanic mood systems). She deploys this observation to argue against an empirical basis for a unified IRREALIS category — suggesting that the "multifunctionality" for a given form ought to be attributable to "contextual inference" or "generalization" rather than furnishing evidence of the semantic import a dichotomous reality status category.[193] In an analytic decision perhaps emblematic of this difficulty, Portner & Rubinstein (2012: 467) appeal to a necessity to "invoke grammaticalization" in their analysis of subjunctive-selecting predicates in Romance — suggesting that in at least some cases (*sc.* for some predicates) the INDICATIVE/SUBJUNCTIVE distinction is semantically inert.

### 9.3.2 Verbal mood

Despite the apparent definitional difficulties with REALITY STATUS, the co-occurrence constraints between the "irrealis-aligned inflections" II and IV and modal expressions described above (*e.g.*, *dhu* and *balaŋ(u)*) suggest a semantic treatment of these inflections that aligns with current analyses of verbal mood. In investigating verbal mood, semanticists have predominantly investigated

[193]Further, Cristofaro explicitly takes issue with what she has identified as an inference that linguists have made where the notion of irreality "plays some role in [the use of irrealis-denoting forms]" (2012: 132), which she attributes to a broader methodological issue in the discipline — *viz.* that "**description of observed grammatical patterns should be kept distinct from the formulation of explanatory generalizations about these patterns**, including generalizations about particular grammatical categories" (2012: 145, emphasis added).

the "subjunctive" paradigms of various European languages; where subjunctivity is taken to be "obligatory and redundant" : that is, dependent on a range of irrealis-aligned (modal) operators, predominantly propositional attitudes (Palmer 2001).[194]

Portner (2018: § 2.2) identifies two broad sets of intuitions about the semantics of verbal mood (predominantly on the basis of the INDICATIVE-SUBJUNCTIVE contrast in a number of European languages) which have driven analytic work. These analyses hinge on either semantics of **comparison** or on **truth in a designated set of worlds**. Comparison-based approaches claim that, iff a given predicate involves a non-empty ordering source (*i.e.*, involves comparison & relative rankings of possible worlds), it will select for a subjunctive complement. Truth-based approaches generally claim that the function of the INDICATIVE is to assert the truth of a given clause in some set of worlds — in effect, the *realis* domain.[195] On the basis of this generalisation, Giannakidou (*e.g.*, 2016; Giannakidou & Mari 2021 *i.a.*) takes the subjunctive to indicate "nonveridicality" with respect to a proposition — that is, it indicates that there exists at least one world in a given set of worlds (a modal base, $M$) in which that proposition is not true (211, although *cf.* Wiltschko (2017).)

(211) $M$ is **nonveridical** w/r/t $p$ iff
$\exists w'[w' \in M \wedge w' \in \neg p]$ (see Giannakidou 2016: 190)

Portner (2018: 71) argues, these two intuitions ought to be unifiable (the *"proto-standard theory of mood"*, see also Portner & Rubinstein 2012, 2018) given that ordering semantic approaches effectively designate a "most relevant" set of worlds in the modal base which can be taken to be the set of worlds for which truth is being asserted in indicative-marked clauses. Drawing inspiration from a number of these approaches, we can posit a semantics that captures intuitions about the "irrealis"-alignment of the II and IV inflections.

In effect, I will take II and IV to realise the temporal contribution of I and III respectively (as

[194] Chung & Timberlake (1985: 238) explicitly suggest an equivalence between REALIS and the INDICATIVE. See also Matthewson 2010 on the Sťáťimcets (`lil` Salish: British Columbia) "subjunctive" and for a discussion (following Palmer 2001) of a proposed distinction between SUBJUNCTIVE and IRREALIS as grammatical categories.

In large part, authors seem to treat the distinction as stemming from the fact that SUBJUNCTIVE morphology is often restricted to syntactically subordinate clauses (i.e. the complement of particular verbal predicates) — likely in addition to established descriptive traditions for European languages (see also Mauri & Sansò 2016: 169*ff*, *cf.* Matthewson (2010: 13, fn 9) who takes issue with this criterion.) This issue is described in further detail below (§9.3.3).

[195] Portner (2018) takes comparison-based analyses to be exemplified in Anand & Hacquard 2013; Giorgi & Pianesi 1997; Portner & Rubinstein 2012; Villalta 2008 and truth-based analyses to include Farkas 1992, 2003; Giannakidou 2011; Huntley 1984; Portner 1997; Quer 2001. Although as noted here, for him the "current state of the art in mood semantics" appears to unite/"treat as correct" both of these observations.

proposed in Ch. 8), while also enforcing a presupposition of **nonveridicality** with respect to the instantiation of an event introduced by a given predicate. This hypothesis is summarised in (212) and spelled out in the section below.

(212) **Licensing conditions for the IRR inflections** [to be further refined]

a. II and IV are the irrealis counterparts of the temporal inflections I and III (that is, they impose the same set of temporal constraints on the instantiation of their prejacent.)

b. They additionally presuppose (a species of) **nonveridicality** with respect to the modal frame of the local clause.[196]

### 9.3.3 An IRREALIS mood

The discussion above draws on the literature on VERBAL MOOD, an enterprise which attempts to capture intuitions about the meaning contrasts between the INDICATIVE and SUBJUNCTIVE categories of (almost exclusively) European languages.[197]

In his comparison of IRREALIS and SUBJUNCTIVE as putative grammatical categories, Palmer (2001: 185) in part attributes these distinct metalinguistic conventions to "different traditions": claiming that, at their core, each signals "non-assertion" in some sense (*passim*). Palmer does, however, note an apparent difference in how these terms tend to be uses; namely insofar as, "[SBJV] is generally redundant only in subordinate clauses, where the subordinating [predicate] clearly indicates the notional feature" (*e.g.*, *faut* 'be.necessary' in 213a). Conversely, IRR is frequently found in matrix clauses, co-occurring with other modal ("notionally irrealis") expressions (*ka-* 'OBLIG' in 213c; 2001: 186)

(213) **On one treatment of the distinction, SUBJUNCTIVE mood is generally licensed by an embedding predicate where IRREALIS mood can be licensed by a modal operator in a matrix clause**

a. SUBJUNCTIVE marking in dependent clause [French `fra`]

*Il* *faut* *qu'*[ *=il* *se* ***taise*** ]
3s be.necessary.INDIC COMP=3s R/R be.quiet.**SBJV**

'It's necessary that he be quiet.'

[196] See also the "locality of binding" principle (Percus 2000: 201, Hacquard 2010: 99.)

[197] Although, as mentioned Matthewson (2010) argues that mood morphology in Sťáťimcets [`lil`] is a realisation of a SBJV category (mentioned also fn 194).

b. SUBJUNCTIVE marking in dependent clause [Italian ita]

*Credo* *che* [ *lei* *sia* *stanca* ]
believe.1s.INDIC 3sf be.3s.SBJV tired.f

'I think she's tired.' (Quer 2009: 1783, my glossing)

c. IRREALIS marking in matrix clause [Caddo cad]

*kas-**sa**-náyʔaw*
OBLIG-3AG.IRR-sing

'He should/is supposed to sing.' (Chafe 1995: 356, also cited in Palmer 2001: 186)

Crucially, the (irrealis) semantics of an embedding predicate *does not* license the IRREALIS categories in WD. Attitude predicates with canonically subjunctive-licensing (*e.g.*, nonfactive) semantics like 'want' *djäl(thirr(i))* do not in themselves license an IRR-aligned inflection (whereas the presence of a modal particle *dhu/balaŋ* in the same clause does.

(214) **Desiderative embedding predicate doesn't license mood shift in WD**

a. *walal* *ga* *djälthi-rr* [ *walala-ny* *dhu* ***gäma*** *hunting-lil* *wämut-thu* ]
3p IPFV.I want-I 3p-PROM FUT take.I *hunting*-ALL *MÄLK*-ERG

'They want that Wämut take them hunting.' (Wilkinson ms:23)

b. *ŋurik* *ŋarra* *djäl* *guya-w* [ *ŋunhi* [ *(ŋayi)* *d̲arrkthu-**rr*** *Wämut-nha* ]]
ENDO.DAT 1s want fish-DAT ENDO (3s) bite-III *MÄLK*-ACC

'I want(ed) that that fish bit Wämut.' (Wilkinson *ms.*:22)

Similarly, the IRREALIS categories don't appear to be licensed by other propositional attitudes (*bäyŋu märr-yuwalkthin* 'not believe') or in speech reports (FID), even where the (lexical semantics of the) embedding predicate entails the speaker's commitment to the falsity of the complement clause (215b-c).

(215) **Other embedding predicates don't license mood shift**

a. *Ŋayi* *bäyŋu* *ŋarranha* *märr-yuwalkthi-nha* [ *ŋunhi* [ *ŋarra* *ga-**na***
3s NEG 1s.ACC faith-true.INCH-IV ENDO 1s IPFV-III
*warkth-**urruna*** ]]
work.VBLZR-III

'She (my *galay* 'wife') doesn't believe me that I was working.' [DhG 20190417]

b. *ministay* *nyäl̲'yu-rruna* [ *ŋunhi* [ *gapmandhu* *dhu* *limurrunha*
minister.ERG lie-III ENDO government.ERG FUT 1pINCL.ACC
***gunga'yun*** ]]
help-I

'The minister lied that the government would help us.' [DhG 20190417]

c. *ministay* *nyäl̲'yu-rruna* [ *ŋunhi* [ *gapmandhu* *limurrunha* *gunga'yu-**rruna*** ]]
minister.ERG lie-III ENDO government.ERG 1pINCL.ACC help-III

'The minister lied that the government had helped us.' [DhG 20190417]

Given that the mood-shift in WD inflections appears to be triggered within the clause by root modals (to the exclusion of subordinating attitude predicates), diverging from the canonical distribution of subjunctive morphology in European languages, we have reason (following Palmer 2001) to treat the mood category inflected on WD verbs as IRREALIS. The nature of the irrealis mood and its relation to modal operators is further developed in the remainder of this chapter; the question of syntactic subordination is investigated in additional detail in chapter 10.

## 9.4 Metaphysical nonveridicality

The WD (root) modal expressions described in § 9.2 above (*e.g.*, *dhu* and *balaŋu*) both have the following properties:

i They take a predicate *P* in their scope,

ii They retrieve a "restriction" from context (the modal base — a subset of the metaphysically possible branching futures relative to the evaluation index $i$),

iii They assert that *P* holds at a successor index to the $i$.

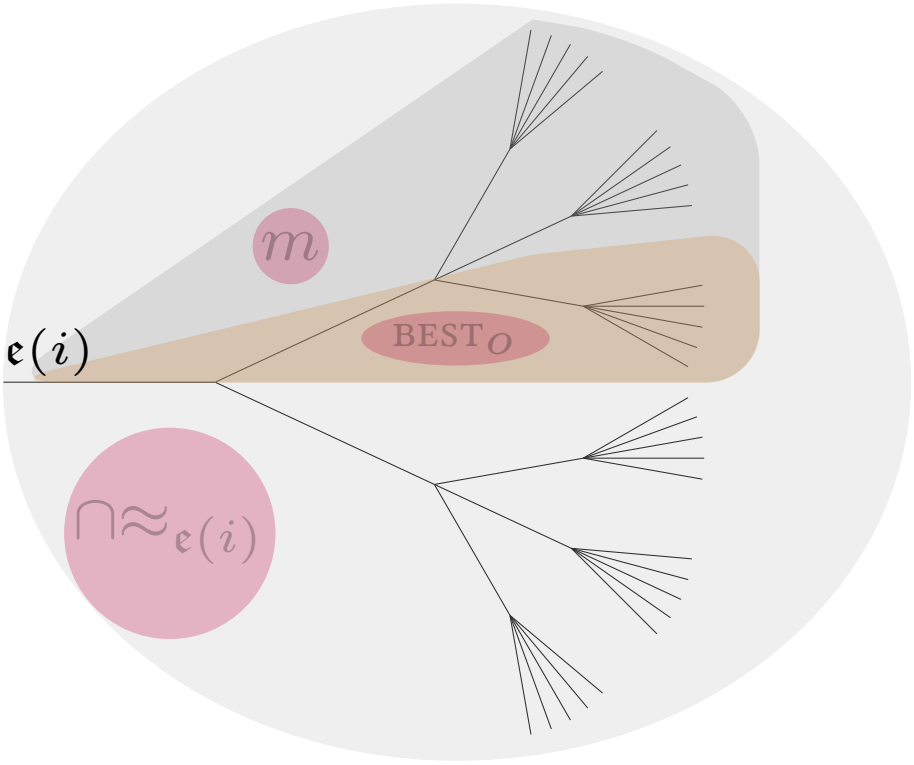
That is, clauses that contain (at least) one of these modal particles represent quantificational propositions over a **subset** of metaphysical alternatives to an evaluation index.

The *Branching Times* models as introduced in § 1.2 capture the "right-branching" property of metaphysical possibility. That is, for any given index, there is a settled past (a single branch) and an unsettled future (multiple metaphysical alternatives.)

Property iii of the modals described above requires that the contribution of *dhu* and *balaŋu* includes the forward displacement of the $P$ relative to $i$. It follows from this that the modals quantify over (nonsingular) sets of branches.

Further, per property ii, *dhu* and *balaŋ* both quantify into **subsets** of those branching futures (metaphysical modal bases.) They assert instantiation of $P$ in all/some of the branches in those subsets (for example, in the case of a deontic reading, those that best conform with the law as determined by $i*$ [the utterance index] $-\{b \mid b \in \underset{\textit{deontic}}{\textsc{best}}\big(\underset{\textsc{circ}}{\cap} m(i*)\big)\}$.)

**Figure 32.** Given an index $i$, modal particles quantify into a subset of its metaphysical alternative branching futures $\cap\approx_i$. The subset is determined by conversational backgrounds $m, o$ — depicted here in ochre. *balaŋ* 'IRR' (*dhu* 'FUT') claim that there is some (all) successor index/indices to $i$ along one of the ochre-shaded branches at which the prejacent ($P$) holds.




On this analysis, clauses with modal particles (MPs) — either *dhu* and *balaŋ* — make a claim about a **proper subset** of the metaphysical alternatives to $i$: namely that, somewhere in that subset, their prejacent holds at some index posterior to $i$.

Consequently, MP-clauses are compatible with a situation in which the claim is **false** at some of $i$'s metaphysical alternatives. Indeed, the presence of a MP can be shown to **implicate** the falsity of its prejacent in some of $i$'s metaphysical alternatives.

This "upper-bounding implicatum" — namely that if S asserts $P$ of the subset, then it was not assertable at the superset (because otherwise S would have done so) — follows naturally from basic Gricean principles (see Horn 1984 a.o.)[198]

### 9.4.1 A nonveridical semantics for IRREALIS

In § 9.3.2 above, following Giannakidou (1995; 1998 *et seq.*) we introduced a definition (211) for **nonveridicality** as a relation that holds between a modal base (a set of branches) and a proposition. Additionally, following Condoravdi (2002); Kaufmann (2005); Kaufmann, Condoravdi & Harizanov (2006), a.o., in § 1.2 and Part I, the related notions of *settledness* and the *presumption of settledness* — ways of understanding the asymmetry of past and future — were introduced. A branching times translation of *settledness* was given in (8′), repeated below.

(216) **Settledness-at-$i*$ for $P$** (branching times) [repeated from 8′, *p. 14*]
$\forall b_1, b_2 \in \cap\approx_{i*} : \exists^{b_1} i' \exists^{b_2} i'' \left[ i' \simeq i'' \wedge [P(i') \leftrightarrow P(i'')] \right]$
A property $P$ is settled at an evaluation index $i*$ **iff** for any arbitrary pair of branches $b_1, b_2$ that represent metaphysical alternatives to $i*$, there is a pair of copresent indices $i', i''$ such that $P$ holds at $i'$ iff it also holds at $i''$ (that is, $P$ is identically determined at co-present alternative indices.)

As with the proposed entries for I and III (185 and 188 above) respectively, the IRREALIS inflections will be taken to impose a presupposition on the "index pronoun" which is supplied by context. In view of the discussion above, (217) contains a proposal for a definition of the notional category of IRREALIS (at least as far as it relates to apparent WD conceptions/grammaticalisations).

(217) **A relation between an evaluation index and a predicate: The contribution of IRREALIS mood as nonveridicality**

$$\textsc{irr} \stackrel{\text{df}}{=} \exists b \in \cap\approx_{\mathfrak{e}(i)} \wedge \exists^{b} i' [i \preccurlyeq i' \wedge \neg P(i')]$$

IRR, a relation between an evaluation index $i$ and a predicate $P$, is satisfied if there exists some $i'$ along one of $i$'s metaphysical alternatives (as calculated at the left boundary of $i$) at which $P$ doesn't hold.
That is, IRR holds iff $P$ is not positively settled/historically necessary at $i$.

---

[198] *Viz.* Horn's Q-principle, the source of the inference pattern where an utterance of *It's possible that Jean solved the problem* (which asserts that Jean's solving the problem was at least a possibility) licenses the implicature that *(for all S knows,) Jean solved the problem* (1984: 15).

Crucially, as described above, *dhu* and *balaŋ*, both of which make a claim about a proper subset of $\cap\approx_i$ are therefore both compatible with (and indeed implicate) that there is some $i' \in \cap\approx_i$ at which their prejacent doesn't hold (that is, the modal particles can be described as NONVERIDICAL operators.)[199]

Given that II and IV are only felicitous in the presence of one of these nonveridical operators, their distribution is apparently restricted to irrealis claims. On the basis of its distributional facts in addition to this definition (217), a lexical entry for II is proposed in (218), where the inflection enforces a nonveridicality presupposition on the (contextually assigned) reference index with respect to *P*.[200]

(218) **A denotation for the SECONDARY inflection as encoding nonveridicality**

$$[\![\text{II}]\!]^c = \lambda i : \exists b \in \cap\approx_{\mathfrak{e}(i)} \wedge \exists^b i'[i \preccurlyeq i' \wedge \neg P(i')] \,.\, i$$

II enforces a presupposition on the evaluation index, whose metaphysical alternatives must be nonveridical with respect to *P*.

(219) ***dhu* satisfies the *irrealis* presupposition**

*ŋuriŋi* *bala* *waltjaṉ'dhu,* *ŋarra* *dhu* ***roŋiyi***
ENDO.ERG MVTAWY rain.ERG 1S FUT return.II

'I'll come back next rainy season.' [MG 20180802]

a. $[\![\textit{ŋarra roŋiyi-}]\!]^c = \lambda i.\exists e(\textsc{i.return}(e) \wedge \tau(e) \sqsubset i)$

b. $[\![\textit{dhu}]\!]^c(\mathbf{a}) = \lambda P \lambda i : \forall b\big[b \in \underset{o}{\textsc{best}}\big( \cap \underset{\textsc{circ}}{m}(\mathfrak{e}(i)) \big) \rightarrow \exists^b i'[i' \succeq i \wedge P(i')]\big](\mathbf{a})$

c. $[\![\textit{ŋarra dhu roŋiyi-}]\!]^c =$
$\lambda i.\forall b\big[b \in \underset{o}{\textsc{best}}\big( \cap \underset{\textsc{circ}}{m}(\mathfrak{e}(i)) \big) \rightarrow \exists^b i'[i' \succcurlyeq i \wedge \exists e(\textsc{i.return}(e) \wedge \tau(e) \sqsubset i')]\big]$

d. $[\![\textit{ŋarra dhu roŋiyi}]\!]^c =$
$: \exists b \in \cap\approx_{\mathfrak{e}(i)} \wedge \exists^b i'[i \preccurlyeq i' \wedge \neg \textsc{i.return}(i')]$
$\cdot \forall b\big[b \in \underset{\text{s'typ}}{\textsc{best}}\big( \cap \underset{\textsc{circ}}{m}(\mathfrak{e}(i)) \big) \rightarrow \exists^b i'[i \preccurlyeq i' \wedge \exists e(\textsc{i.return}(e) \wedge \tau(e) \sqsubset i')]\big]$

[199] This description is somewhat sloppy for the sake of exposition; more precisely, what I mean by "there is some $i' \in \cap\approx_{\mathfrak{e}(i)}$" here is that there is some $i' \in \bigcup_{b \in \cap\approx_{\mathfrak{e}(i)}} b$.

[200] Further discussion about the presuppositional status of these felicity conditions is provided below (esp. §9.5.)

> In words: *ŋarra dhu roŋiyi* 'I will return' is true if all the **best** branching futures (as evaluated at $\mathfrak{e}(i_c)$) contain a successor index $i'$ in which the speaker returns.
> It is only defined if context supplies an index $i_c$ for which there is a metaphysical alternative $b$ along which the speaker *doesn't* return at some (contextually-restricted) successor index to $\mathfrak{e}(i_c)$.

As explained above, the fact that *dhu*-clauses make an assertion that some predicate (the speaker's return next wet season)[201] holds of in a *subset* of branches in the metaphysical modal base $\cap\approx_{\mathfrak{e}(i_c)}$ Q-implicates that, indeed, this predicate *does not* hold at all branches. That is to say that *dhu* claims satisfy IRR.

Below we propose a semantics for WD negative operators in view of explaining the "negative asymmetry" described in § 9.1 — *i.e.*, why is it that I and III are (generally) disallowed in all negated clauses, modalised or otherwise? As we will see, this is the payoff of describing a class of *nonveridical* operators.

### 9.4.2 Negation & irrealis

In light of the proposal introduced above, we model clausal negators *bäyŋu* and *yaka* as scoping under inflection. Shown above, the "irrealis" categories, II and IV presuppose that the instantiation of some event is *unsettled* — that is, the metaphysical alternatives to the evaluation index $i$ are **nonveridical** with respect to INFL's prejacent.

(220) **CONTEXT**. Speaker has broken his leg.

| *bäyŋu* | *ŋarra* | *dhu* | *marrtji* | *diskolili,* | *bili* | *bäyŋu* | *ŋarra* | ***gi*** | *marrtji* |
|---|---|---|---|---|---|---|---|---|---|
| NEG | 1S | FUT | go | disco.ALL | CPLV | NEG | 1SD | IPFV.II | go.II |

'I'm not going to the disco because I can't walk (at the moment.)'
(lit. 'I'm not walking) [MG 20180802]

Given the distributional similarities between (root) modals and *yaka/bäyŋu* in WD — being that they both license IRR — in this section, I propose a semantics that unifies WD NEGATIVE and MODAL expressions (*sc.* a class of **NONVERIDICAL operators**.) Recalling the discussion in Part II

[201] Note here that the temporal frame specified by *ŋuriŋi bala waltjaṉ'dhu* ≒ 'next wet season' must be taken to **directly** restrict the event time $i'$ — while modals are modelled as indefinite advancements instantiation/event time, it is still assumed that the range of possible times must be contextually restricted (an instantiation of the *ParteeProblem*™, see also Ogihara (*e.g.*, 1996, 2007) *et seq.* for treatments of this issue.)

(§ ??), this style of analysis highlights the similar effects of negative and modal operators, and a possible payoff for a construing of all nonveridical operators as quantifiers over metaphysical alternatives (and therefore IRR-licensers).

*Bäyŋu P* asserts that no totally realistic metaphysical alternative to $i$ is such that $P$ is instantiated at $i$.[202] This is shown in (221).

(221) **A lexical entry for WD negation**

a. $[\![bäyŋu]\!]^c = \lambda P_{\langle s,t\rangle}\lambda i.\nexists b[b \in \underset{\{b*\}}{\text{BEST}}(\cap\approx_i) \wedge \exists^b i'[i' \simeq i \wedge P(i')]$
Given a property $P$ and reference time $i$, 'NEG' (WD: *bäyŋu*/*yaka*) asserts that there is no index $i'$, co-present with $i$ and along a branch that is completely consistent with what is the case at $i$, at which $P$ holds.

Note that this quantification is trivial; NEG is taken to quantify over a conversational background that contains propositions that are the case at/properly describe $i$ (the "totally realistic" conversational background of Kratzer (1981b: 295) — $\cap f(w) = \{w\}$.) Consequently, given the modal domain established by these conversational backgrounds, $\forall i'[i' \simeq i* \rightarrow i' = i*]$. As a result of this, the lexical entry given above ought to be truth conditionally equivalent to (221b):

(221) b. $[\![bäyŋu]\!]^c = \lambda P\lambda i.\neg P(i)$

The entry for NEG given in (221a) aligns with those for the other modals both in terms of:

- its type (that is, the shape of the lexical entry), as well as
- the fact that, like the other modal particles, NEG indicates that the speaker/attitude holder fails to assert that $P$ is instantiated at all metaphysical alternatives to $i$ — satisfying the shared presupposition of the irrealis moods II and IV.

Further, the use of *bäyŋu* on an apparently dynamic (inability) reading may provide further support to a modal-like treatment of WD negative operators. In (222a), the contribution of *bäyŋu* might be understood as negatively quantifying over a circumstantial modal base that minimally contains facts about *waku*'s abilities/body/dispositon *etc.* A similar pattern is shown in (222b),

[202] Note that this diverges from Krifka (2015, 2016) where Daakie's REALIS NEGATION and POTENTIALIS NEGATION (*ne* and *(te)re*) are both treated as "modalit[ies] in [their] own right[s]."

where the physical abilities of the wallaby (which apparently exclude jumping) are at issue.[203]

(222) **Apparent inability readings of *bäyŋu***

a. CONTEXT. My nephew's broken his leg. I ask if he's going out tonight:

*bäyŋu ŋarra dhu marrtji discolil bili* ***bäyŋu*** *ŋarra gi marrtji*
NEG 1S FUT go disco.ALL CPLV NEG 1S IPFV.II go.II

'I won't go to the disco because I can't walk.' [MG 20180802]

b. CONTEXT. We see an injured wallaby.

*ŋunha weṭi* (#? *yaka/*) ***bäyŋuny*** *(dhu) gi djumurr'djumurr'yurr*
DIST wallaby NEG (FUT) IPFV.II hop~ITER.II

'That wallaby can't jump properly.' [AW 20180731]

As shown above in § 9.1, the relative distribution of II and IV appears to mirror the temporal ranges of I and III respectively: an analysis of this distinction having been proposed in Chapter 8. Consequently, we model IV as containing BOTH the NONVERIDICALITY and the PRECONTEMPORARY presuppositions (223). A semantic derivation for a simple negative past sentence is then given in (224).

(223) **A denotation for the QUARTERNARY inflection as enforcing both *precontemporaneity* and *irrealis* presuppositions**

$$[\![\text{IV}]\!]^c = \lambda i : i \sqsubseteq \mathtt{F}_c \wedge i \prec j_{\mathtt{F}} \wedge \exists b \in \cap{\approx}_{\mathfrak{e}(i)} \wedge \exists^b i'[i \preccurlyeq i' \wedge \neg P(i')] \,.\, i$$

IV presupposes that the reference index $i$ is non-final with respect to the reference frame $\mathtt{F}_c$ **and** its metaphysical alternatives are nonveridical with respect to $P$.

(224) ***bäyŋu* satisfies the *irrealis* presupposition**

***bäyŋu*** *ŋarra* ***nhänha*** *mukulnha (goḏarr'mirr)*
NEG 1S see.IV aunt.ACC (morning.PROP)

'I didn't see aunty (this morning).' [AW 20190501]

[203] The contrast between *yaka* and *bäyŋu* suggested by AW in (222b), where *yaka* is dispreferred for the negation of a modal (ability) property is interesting for current purposes in view of the hypothesis of *bäyŋu*'s history as a negative quantifier/negative existential that was presented in Part II, as well as the present analysis of negative existentials as quantifiers/2-place operators (an idea invoked again in (??) above). Further investigation of this contrast may lend support to both these diachronic observations as well as a synchronic treatment that emphasises the kinship between MPS and negative operators in WD.

a. $[\![\textit{ŋarra}\ \textit{NHÄ-}\ \textit{mukulnha}]\!]^c = \lambda i\ .\ \exists e(\textsc{i.see.aunty}(e) \wedge \tau(e) \sqsubset i)$

b. $[\![\textit{bäyŋu}]\!]^c(\mathbf{a}) = \lambda P \lambda i\ .\ \neg P(i)$

c. $[\![\textit{bäyŋu ŋarra}\ \textit{NHÄ-}\ \textit{mukulnha}]\!]^c = \lambda i.\nexists e(\textsc{i.see.aunty}(e) \wedge \tau(e) \sqsubset i)$

d. $\mathbf{c}\ \left([\![\textbf{IV}(i)]\!]^c\right) = \mathbf{c}\ \left(i_c : \textsc{precontemp}_c(i_c) \wedge \exists b \in \cap\approx_{\mathfrak{e}(i_c)} \wedge \exists^b i'[i_c \preccurlyeq i' \wedge \neg P(i')]\right)$

e. $[\![\textit{bäyŋu ŋarra nhänha mukulnha}]\!]^c =$

$$: \textsc{precontemp}_c(i_c) \wedge \exists b \in \cap\approx_{\mathfrak{e}(i_c)} \wedge \exists^b i'[\mathfrak{e}(i) \preccurlyeq i' \wedge \neg\nexists e[\textsc{i.see.aunty}(e) \wedge \tau(e) \sqsubset i']\ .\ \nexists e[\textsc{i.see.aunty}(e) \wedge \tau(e) \sqsubset i_c]$$

That is: given a context $c$, an utterance of (224) is true iff there is no event of the speaker seeing *mukul* 'aunty' included in $i_c$.
Further, (224) presupposes (*i.e.*, it is defined iff) $i_c$ (the reference index assigned by context) satisfies **precontemporaneity and** for which the speaker's not seeing *mukul* is **not** a historic necessity of the beginning of that reference interval ($\mathfrak{e}(i)$).

Not derived here, *goḏarr'mirr(i)* 'this morning' provides a temporal frame, restricting the event time to non-final intervals of the day of speech. Assuming $i_c$ overlaps with the morning of the day of speech, (224) satisfies PRECONTEMP) (as well as the truth conditions of the TFA).

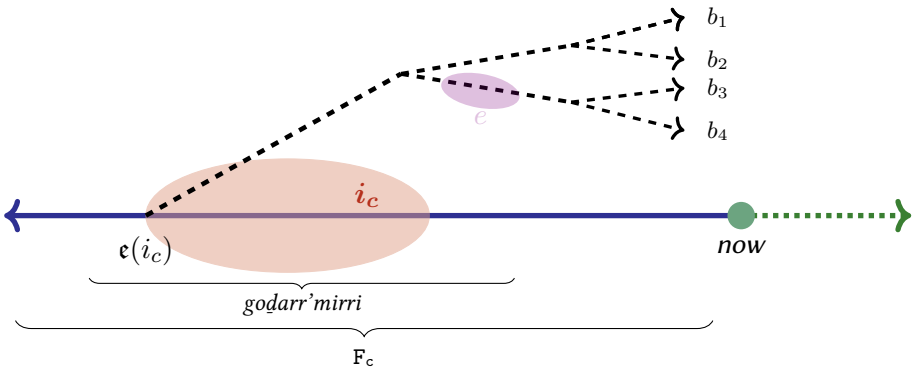
The irrealis presupposition included in **IV** is satisfied iff there the discourse context supports an alternative at which the corresponding affirmation (*viz.* that the Speaker saw *mukul*) held (perhaps made salient by a prior expectation that the Speaker was in fact meant to see his Aunty this morning.) This idea — *viz.* 'asymmetric" constraints on the felicity of a given negative sentence in discourse as against its corresponding affirmation — is further elaborated below.

Assuming that this presupposition is satified, the sentence will be true iff there was no event on the morning of the day of speech in which the speaker saw *mukul.* A diagramatic representation of this is given in Fig. 33.

### What does a negative sentence presuppose? : Polarity "asymmetrism"

As described in considerable detail in Horn 2001 (esp. § 1.2), the idea of some "asymmetry" between positive and negative sentences, and debate over this topic, has a centuries-long history. The claim at issue essentially boils down to what is referred to as the Paradox of Negative Judgment: whereas an affirmative statement concerns some fact about the world, a negative one "declares what it is not, and how can this express what it is?" (Horn 2001: 49, citing Joseph 1916: 171).

**Figure 33.** The contribution and licensing of IV in negative contexts: a branching times schema of (224)




This figure is a (partial) representation of $\cap\approx_{\mathfrak{e}(i_c)}$ in (224): the sentence is true only if there is **no** event of the speaker seeing *mukul* in the morning, within $i_c$.
Further, the inflection — IV — presupposes that whatever value is assigned to $i_c$ satisfy:

PRECONTEMPORANEITY. $i_c$ is located non-finally within $\mathrm{F_c}$ (that is before speech-time on the day of utterance.)

IRREALIS. There is some metaphysical alternative to $\mathfrak{e}(i_c)$ (here, an index within $\cup\{b_1, b_2, b_3, b_4\}$) at which the speaker *does* see *mukul* — *i.e.*, an active possibility at the beginning of $i_c$.

In this figure, the presupposition is satisfied given that an event of *mukul*-seeing ($e$) obtained at some $i' : i' \succcurlyeq \mathfrak{e}(i_c)$

Horn refers to those theorists who have defended a view of negative judgments as "second-order affirmations" (relative to their corresponding positive judgments) as *"asymmetricalists."* One way that this asymmetry has been theorised is by way of a claim that "negative speech acts are presuppositionally more marked than their corresponding affirmatives" (Givón 1978: 70), specifically insofar as"every negative statement presupposes an affirmative, but not vice versa" (Horn 2001: 64).

Theories of linguistic negation as inducing some presuppositional content derive from the intuition that, given the uninformativity of a negative predication (in view of the fact that there is an infinity of properties that *do not* hold of a given individual), negative sentences' canonical function is that of *denial* in a given discourse context. As such, an utterance of $\neg\varphi$ generally seems to reflect a belief on the part of the speaker that their interlocutor is familiar with and may

be entertaining the possibility that $\varphi$ (see Givón 1978: 70,109).[204]

In this chapter, we have seen data which shows how negative operators appear to satisfy the same set of conditions as modal operators in WD in terms of licensing the use of the II and IV inflections. I have argued that II and IV are licensed whenever the IRREALIS presupposition is satisfied; that is, whenever there is some metaphysical alternative to the evaluation index at which the prejacent to the inflection *does not hold.*

As shown above (224 and Fig. 33), on the analysis proposed here, the IRR presupposition triggered in IV makes salient the fact that, at the beginning of the reference interval, there existed active metaphysical alternatives at which IV's prejacent *was* instantiated. That is, IRR is satisfied in ***bäyŋu*** *ŋarra* ***nhänha*** *mukulnha goḏarr'mirr* 'I did**n't** **see** aunty this morning' given the apparent availability in the discourse context of the possibility of the speaker seeing their aunty in the future of $i_c$.

In this sense, the linguistic *phenomenon* of asymmetric negation with respect to reality status marking (Miestamo's A/NONREAL, which is exhibited in WD, can be thought to correspond to the *theoretical* perspective of an asymmetry between negative propositions and (corresponding) affirmative ones, chronicled in Horn (2001) — that is, that negative propositions are formally and functionally "marked" with respect to positive ones; particularly insofar as the former make salient a corresponding affirmation.[205]

⁂

In terms of the branching times framework, then, the function of NEGATIVE operators can in a sense be assimilated with modals. As an example, in the case of negated predications about the past, indices at which the basic proposition holds are not ones that are consistent with, or $\prec$-accessible to speech time ($i*$), but involve predicating into branches that are taken to have been $\approx$-accessible at the beginning of a contextually-assigned reference time ($i_c \prec i*$). That is, the NEGATIVE PAST can be assimilated into the COUNTERFACTUAL domain (as defined by von Prince

[204] Horn (2001: 60–4) traces this idea — *viz.* that "negation presupposes an affirmation against which it is directed and cannot be understood except through affirmation" — back at least as far as the ancients, into the thought of philosophers from backgrounds as diverse as Parmenides, Śaṇkara, Ibn Sina & Aquina.

[205] Thanks to Ashwini for an especially productive discussion about this distinction.

et al. a.o.)

### 9.4.3 A temporomodal interaction

The analysis described above emphasises the distributional similarities between negative operators in WD and the modal particles *dhu* and *balaŋ(u)*, in view of assimilating these classes into a category of "nonveridical operators", it is also worth considering distributional differences between them, demonstrated in (225) below, repeated from (208) above (compare also Figs 29/31 above).

(225) **Neutralisation of temporal remoteness distinctions with *balaŋ(u)* 'IRR'**

| *barpuru* | *ŋarra* | *guyaŋ-a…* | ***balaŋ*** | *limurr* | *bu-**nha*** | *maypal.* |
|---|---|---|---|---|---|---|
| yesterday | 1s | think-I | IRR | 1d.EXCL | hit.IV | shellfish |

| *Yurru* | *bäyŋu* | *napurru* | *bu-**ŋu*** | *maypal* |
|---|---|---|---|---|
| but | NEG | 1p.EXCL | hit-II | shellfish |

'Yesterday, I'd thought we might/would collect shellfish, but we didn't collect shellfish.' [AW 20190429]

The three predicates in (225) — each of which receives YESTERDAY PAST temporal reference — are each inflected differently. Note in particular that while *BUMA* 'hit, kill, collect (shellfish)' is inflected with II in a negative context (II being the "negative counterpart" of I), it receives IV-marking in a non-negative modal context (with *balaŋ*). In effect, the temporal remoteness effects in the past are lost in modal contexts, but not in negative predications.

A proper treatment of this effect is outside the scope of the current work. However, it is possible that this is a reflex of a greater degree of temporal vagueness in modal predications. In itself, this may then also constitute an instantiation of the typological generalisation that fewer temporal distinctions are grammaticalised in irrealis-aligned paradigms (*e.g.*, the Romance subjunctive) than in realis-aligned ones, (see Horn 2001; Miestamo 2005: 156). Givón (1978) in fact gives examples of a number of Bantu languages whose temporal remoteness systems are flattened in negative clauses (compare the ChiBemba example in (226) below.)

(226) **Loss of temporal remoteness distinctions under negation in ChiBemba** ([bem] Bantu: NE Zambia)

a. *N-kà-boomba*
'I will work tomorrow.'

b. *N-ká-boomba*
'I will work after tomorrow.'

c. *Nshi-kà-boomba*
'I will not work.'

d. **Nshi-ká-boomba*

This temporal vagueness is also reflected the denotations assumed here for modal expressions (which involve the 'forward expansion of the time of evaluation' (and are dependent on further contextual information for the identification of the timespan of an eventuality (Condoravdi 2003: 12)).

## 9.5 Maximize Presupposition returns: The same-day future

The "same-day future", both in positive and negative clauses systematically receives I-inflection — this is the only time in which I co-occurs with a negative operator (compare Fig 29.) This phenomenon is illustrated by the data in (227–228).

(227) **Negated same-day future predications fail to license irrealis-mood shift (unlike negated present predications)** [AW 20190501]

a. *ŋarra* ***(yaka)*** ***dhu*** *nhä-**ma*** *mukulnha* [ (NEG) SDF ]
1S (NEG) FUT see-I aunt.ACC
'I will (won't) see aunty (tonight).'

b. *(goḏarr)* *ŋarra* ***(yaka)*** ***dhu*** *nhä-**ŋu*** *mukulnha* [ (NEG) FUT ]
tomorrow 1S (NEG) FUT see-II aunt.ACC
'Tomorrow I will (won't) see aunty.'

c. *(dhiyaŋ bala)* ***bäyŋu*** *ŋarra* ***gi*** *nhä-**ŋu*** *mukulnha* [ (NEG) PRES ]
(now) NEG 1S IPFV.II see-II aunt.ACC
'At the moment, I'm not looking at aunty.'

(228) **No effect of negation on verbal inflection in same-day futures**

a. *Ŋunhi* *ŋarra* ***dhu*** ***bäyŋu*** *l̪uk-**a***, *ŋarra* ***dhu*** *rirrikthu-**n***
HYP 1S FUT NEG consume-I 1S FUT sick-INCH-I
'If I don't drink (water) (soon), I'll get sick.' [AW 20190409]

b. ***yaka*** *ŋarra* ***dhu*** *l̪uplupthu-**n*** *bili* *bäru* *ŋuli* ***ga*** *l̪uk-**a*** *yolŋu'yulŋu*
NEG 1S FUT swim-I CPLV crocoodile HAB IPFV.I eat-I people
'I'm not going to swim; crocodiles eat people.' [AW 20190428]

Recent work on futurate constructions (see *e.g.*, Copley 2008, 2009 *et seq.*, Kaufmann 2002, 2005) formalises an intuition that these constructions involve some "presumption of settledness" or "certainty condition."[206] While the WD same-day future construction is not technically a morphosyntactic futurate,[207] analysis of these devices may shed potential insight on the (functional) motivation for this phenomenon.

The surprising contrast between a I-inflected later-today future (227a) and an IRR-inflected present (c), then, becomes less surprising when we consider that the latter eventuality is situated at a counterfactual index and consequently licenses an irrealis-aligned inflection (II).[208] The same-day future, in which *dhu* and I co-occur, can in effect be understood as a **grammaticalised futurate construction**. *Dhu* requires an evaluation index ($c$ provides $i*$, which, again, is "passed up" into the derivation by I) and obligatorily advances the instantiation time of the eventuality into the future of $i*$; the unexpected occurrence of I implicates the "presumed settledness" of its prejacent in context.

Given that the instantiation and non-instantiation of a given event are, in principle, equally plannable; both positive and negative claims about the same-day future are treated as equally metaphysically "actual" and therefore equally assertable.

**Antipresuppositional: *realis* as an epiphenomenon.** Above, we have modelled irrealis mood as a presupposition of unsettledness built into the semantics for II and IV. These inflections are generally obligatory in irrealis contexts (as triggered by nonveridical operators) in view of general pragmatic principles (*viz.* MAXIMIZE PRESUPPOSITION) — that same notion that was invoked in accounting for the blocking of I by the "stronger" III in assertions about precontemporary events.)[209]

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[206] Kaufmann (2002) cites commentary including Comrie (1985); Dowty (1979) among numerous others on this distinction. See also Copley (2008: note 1)

[207] Copley (2008: 261) defines *futurates* "sentence[s] with no obvious means of future reference that nonetheless conveys that a future-oriented eventuality is planned, scheduled or otherwise determined.' Given that same-day futures in WD are obligatorily indicated with *dhu*, they shouldn't be described as futurate.

[208] We would model this (227c) in a parallel fashion to (224), schematised in figure 33 above. Context/I provides the utterance index as reference index and consequently metaphysical alternatives are evaluated at $\mathfrak{e}(\textsc{know}_{i*})$: that is, *I'm not seeing my aunty right now* presupposes the existence of a salient possibility ($i' \succcurlyeq \mathfrak{e}(\textsc{know}_{i*}) \rightsquigarrow i' \simeq i*$) at which it's-not-the-case that I'm not seeing her now.

[209] A operationalisation of scalar implicature (*i.e.*, using a "weaker" alternative Q-implicates that the speaker was not in a position to use its "stronger" counterpart, *e.g.*, Horn 1984), MAXIMIZE PRESUPPOSITION is a formulation of a pragmatic principle that appears to be originally due to Heim (1991) and further developed by Percus (2006); Sauerland

That is, whenever an expressed proposition is *nonveridical* — that is, presumed unsettled in the context of evaluation, the IRREALIS presupposition is satisfied. By virtue of MAXPRESUPP, I and III **antipresuppose** nonveridicality; their infelicity in unsettled contexts is explained by virtue of blocking by "parallel (or *Alt*-familial) structures" — II and IV both of which that presuppose nonveridicality.[210]

The analysis of the same-day future, then, is based on the hypothesis that predications about the same-day future — even if these are, *sensu stricto*, claims about properties of future ('POTENTIAL') indices — receive a "NON-IRREALIS" inflection (I) in view of their plannability/plannedness and their "presumed settledness" **at the utterance index**. For this reason, we might model IRR (*viz.*, the proposition that there be a metaphysical alternative at which *P* does not hold) as presuppositional (that is non-asserted/non-truth-conditional.)

We return to this component of the analysis in chapter 10 below.

## 9.6 Conclusion: motivating NONVERIDICALITY and IRREALIS MOOD

This chapter has proposed that II and IV (to the exclusion of I and III) encode the IRREALIS — treated here as a verbal mood.

At its core, the IRREALIS is taken to be associated with a class of NONVERIDICAL OPERATORS — modelled here as a set of predicate modifiers that indicate that the question of whether a given property (their prejacent) has been resolved as true (and is therefore assertable) has (or had) not been established in the discourse context.

As such, WD's category of NONVERIDICAL OPERATORS — namely FUT, MOD and NEG — were given a semantics that was consistent with the falsity of their prejacent in some metaphysical alternative to the evaluation index.[211] The distinctive contribution of the IRREALIS inflections, then, is that they impose a **presupposition** on the (contextually-supplied) index of evaluation: namely

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(2009) a.o. See also § 8.3.2.3.

[210]What appears to be an early implementation of a notion of *antipresupposition* apparently due to Percus (2006), who credits Kai von Fintel with introducing the term (fn. 12).

[211]Note that this chapter has not considered the occurrence of past habitual predications (marked with *ŋuli* 'HAB.') I leave a proper treatment of habituals to future work. Properties shared between habitual predications and IRREALIS/SUBJUNCTIVE moods is cross-linguistically well-attested and is discussed in existing literature (*e.g.*, Boneh & Doron 2008; Ferreira 2016; Giannakidou 1995; von Prince et al. 2019b).

that there exists some conceivable, metaphysically consistent alternative “branch” at which their prejacent is false.

# Chapter 10

# An analysis of the WD paradigm

The previous two chapters have proposed a semantics for WD's four inflectional categories in terms of a *Branching Times* framework. Each inflection is taken to represent information about **tense** and **verbal mood**, which has been modelled as a partial (identity) function, imposing presuppositions on a reference index. As described in chapters 8 and 9 respectively, the content of these presuppositions is *precontemporaneity* and *nonveridicality*.

Table 18 summarises the $(2 \times 2)$ semantic features that are encoded by each inflection.

**Table 18.** The contributions of WD's four inflectional categories

| | | MOOD | |
|---|---|---|---|
| | | −IRREALIS | +IRREALIS |
| TENSE | −PRECONTMP | I | II |
| | +PRECONTMP | III | IV |

Shown above, each of WD's four inflectional categories lexicalises a binary tense and binary mood feature — described above, these features are modelled as the presence or absence of an associated presupposition (PRECONTEMPORARY and IRREALIS respectively.)

The inflections are then modelled as partial (identity) functions $(\mathcal{I} \to \mathcal{I})$, each of whose domain is a subset of $\mathcal{I}$ (*i.e.*, $\mathfrak{D}_s$: the domain of (evaluation) indices.) The subsets of $\mathcal{I}$ that constitute the domains of each inflection are spelled out in (229). Note, of course, that each is relativised to a context $c$ — a tuple that is assumed contains relevant information about (at least) the utterance parameters and the reference time.

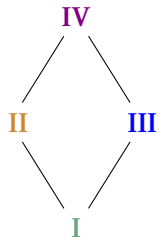
(229) **Domains of the four inflections in WD, given a branching time frame $\mathfrak{T} = \langle \mathcal{I}, \prec \rangle$ and an evaluation context $c$**

| | | |
|---|---|---|
| $[\![$ I $]\!]^c$ : | general | $\mathcal{I}$ |
| $[\![$ II $]\!]^c$ : | irrealis | $\{i \mid \textsc{irr}_c(i)\}$ |
| $[\![$ III $]\!]^c$ : | precontemporary | $\{i \mid \textsc{precontemp}_c(i)\}$ |
| $[\![$ IV $]\!]^c$ : | precontemporary irrealis | $\{i \mid \textsc{irr}_c(i) \wedge \textsc{precontemp}_c(i)\}$ |

Described in the previous chapters (esp. §§ 8.3.2.3 and 9.5), the synchronic distribution of the four inflectional categories is then accounted for on the basis of (anti)presuppositions and competition between the four categories.

On this analysis, then, I presupposes the least/imposes the fewest constraints on the reference index supplied by context ($i_c$), whereas IV is the presuppositionally "strongest" inflection. Consequently, the four inflections represent a set ("family") of alternatives to one another that can be partially ordered by unilateral entailment (effectively, a two-dimensional Horn scale.) This is also represented as a Hasse diagram below (Fig. 34): in effect, $\alpha$ **blocks** $\beta$ iff $\alpha$ unilaterally entails $\beta$.

**Figure 34. MaxPresupPoset $\langle \textsc{infl}, \Rightarrow \rangle$**: Blocking relations between the inflectional categories. Given a reference index $i_c$, speakers select the form with the most specific presuppositions that can be satisfied in context.




The domain of each inflection can be represented in terms of a branching time model (230); schematised in Fig. 35 (compare this to the analysis of Ritharrŋu-Wägilak in § 7.3.1 — *i.e.*, (146) on *p. 174 above.*) Figure 35 is a diagrammatic representation of a branching time frame ($\mathfrak{T}$) over which the domain of each inflection is superimposed.[212] Note the general domain of I; due to MaxPresupp, where domains intersect, that which "presupposes the most" (fig. 34) is felicitous.

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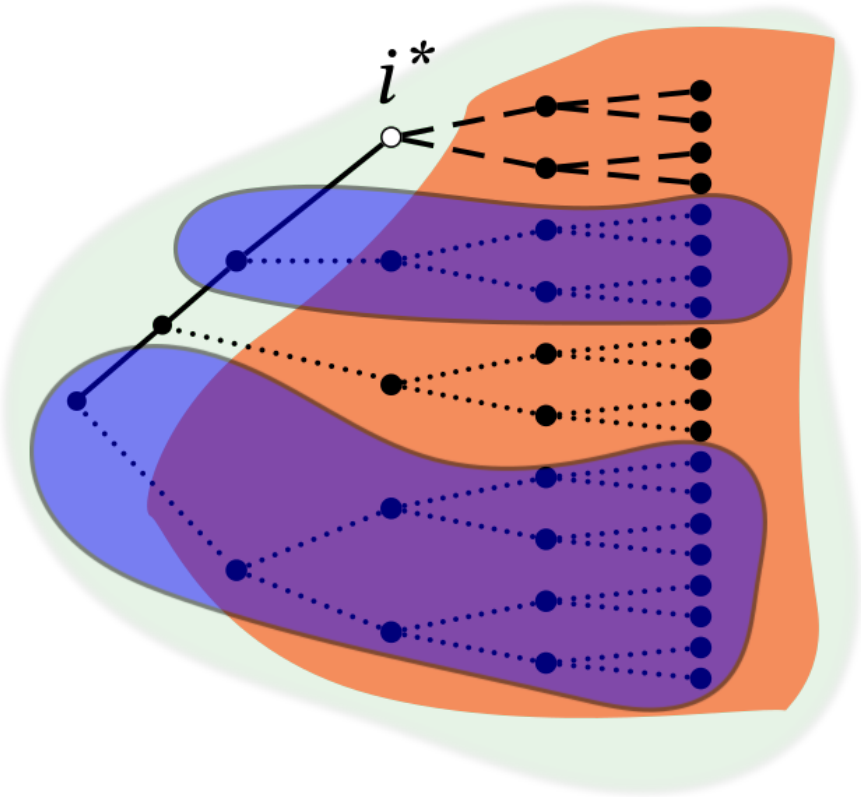
[212] Thanks to Kilu von Prince for the diagram template. Compare this diagrammatisation to von Prince (2019); von Prince et al. (2019b), von Prince et al. *i.a.*

**Figure 35**. The WD inflectional categories are modelled as partial identity functions over $\mathcal{I}$. The (approximate) domains of each are projected over a Branching Times frame, where $i*$ is the evaluation index.
Due to competition between the four inflections, the less specific items are taken to be degraded/blocked (*i.e.* they antipresuppose) subsets of $\mathcal{I}$ in which their domain intersects with a more specific competitor.




In § 9.2, it was suggested that WD modal particles select for varieties of *circumstantial* modal bases (and receive "root" modal readings.) That is, they appear to be incompatible with epistemic readings. Relatedly, epistemic modal expressions (notably *mak(u)* 'maybe, perhaps') *do not* license the appearance of IRREALIS inflections.

The remainder of the present chapter picks up on a few additonal phenomena, laying tentative hypotheses (subject to futher investigation) before concluding this (sub)part of the dissertation.

In § 10.1, I briefly consider data with apparent epistemic modal expressions and complement clauses in view of fine-tuning our notion of NONVERIDICALITY and considering how well the above-mentioned characterisation of *irrealis* as nonassertoric fits the WD data.

In § 10.2, I return to an explicit discussion of the contrasts between WD temporomodal expression, the primary focus of Part III, and the (largely cognate) system of Ritharrŋu-Wägilak (which was introduced in § 7.3.1.)

## 10.1 Assertoric force

A lot of the scholarship on verbal mood has concentrated on the generalisation that distinctions in this domain appear to correlate with illocutionary force: that is *realis*-aligned categories are the province of ASSERTIONS, whereas *irrealis* mood is associated with (various flavours of) *non-assertion* (*e.g.*, Bybee & Fleischman 1995; Palmer 2001) and evaluations of the "information value" contained in a given utterance (*e.g.*, Lunn 1995).[213] That is, previous analyses have suggested that, for example, SUBJUNCTIVE inflection on *P* is taken to indicate that the speaker is not asserting/willing to commit themselves to *P*.

In keeping with these treatments, chapter 9, the contribution of WD IRR has been modelled as a presupposition that its prejacent is not settled, therefore not knowable, therefore not felicitously assertable. One area where the distribution of IRR noticibly diverges from the SBJV as described in previous work is its apparent insensitivity to epistemic modals and subordinating predicates (*e.g.*, propositional attitudes) — compare (230).

(230) ***possible* as a SBJV-governor in French** [fra]

*Il est possible que cet échantillon* ***soit*** *dissou dans l'eau*
3s is possible COMP that sample **be.SBJV** dissolved in the.water
'It's possible that the sample is dissolved in the water.' (Portner & Rubinstein 2012: 467)

Below, we briefly explore the relevant WD data in view of fine-tuning the generalisation over IRR licensing conditions.

[213] This relationship with illocutionary force is the common property that unites "verbal" (*(ir)realis*) and "sentential" mood (*interrogative, imperative, declarative, performative…*) — for Portner: "MOOD is [that] aspect of linguistic form which indicates how a proposition is used in the expression of modal meaning" (2018: 4).

### 10.1.1 Epistemic modality in WD

The data in (231) show uses of WD epistemic *mak(u)* in a context that supports a a necessity and (c) possibility reading. Note in (231c) that the root modal *balaŋ* 'MOD' is judged as infelicitous in an epistemic-supporting context.[214]

(231) ***Mak*** **'EPIST' encoding various strengths of epistemic modality**

a. **CONTEXT**. It's the middle of the schoolday, I ask Albert where *yapa* is.

*bäyŋu ŋarra nhänha nanya; **mak** ŋayi ŋunha golŋurnha*
NEG 1S see.IV 3S.ACC EPIST 3S DIST school.LOC.SEQ

'I haven't seen her; but [it's 2, so] she must be at school.' [AW 20190429]

b. **CONTEXT**. The lights in Grace's window are on.

***mak** ŋayi ŋunhiyi*
EPIST 3S ENDO.LOC

'She must be at home.' [MG 20180802]

c. **CONTEXT**. I'm trying to find mum.

*Wanha balaŋ ŋäma'?*
where MOD Mo

***mak**/# balaŋ golŋur, **mak** wäŋaŋur...*
EPIST/~~MOD~~ school.LOC EPIST home.LOC

'Whereabouts could mum be?'
'Maybe at school, maybe at home...' [AW 20190429]

In addition, unlike the modal particles *dhu* and *balaŋ*, *mak* 'EPIST' is completely invisible to the inflectional paradigm, similarly to the embedding predicates described above, but diverging from the class of modal particles. Wilkinson (2012: 685) describes a class of "propositional particles" which includes *mak* (as well as *yanbi/yanapi* 'erroneously' and *warray* 'indeed.') These particles each apparently serve a variety of modal functions, although none *per se* triggers irrealis mood marking.[215] Examples are given in (231).

[214] Recall that in § sec:balaŋ *balaŋ*(u) was modelled as presupposing the contextual availability of a circumstantial/metaphysical modal base, predicting the unavailability of epistemic readings.

[215] According to Wilkinson (2012: 686), *yanbi* "occurs only with [II] and [IV]..." whereas repeated elicitations with consultants in Ramingining failed to reproduce this. This is likely to represent a dialectal difference within WD varieties (or otherwise a reanalysis of *yanbi/yanapi*.) It was suggested to me by consultants that *yanapi* and *warray* are "*Miwatj* word[s]"; *i.e.*, less frequent use in the speech of Ramingining WD speakers [*e.g.*, MG 20180802]. The Dhuwal(a) spoken at Galiwin'ku, the source of the bulk of Wilkinson's data, seems to be at the boundary of western and *miwatj* varieties,

(232) **Epistemic *mak(u)* doesn't license mood shift in WD**

a. *maku* ***ga*** ***nhina*** *raŋiŋura* *maku* *bäyŋu.* *Yaka* *marŋgi.*
EPIST IPFV.I sit.I beach-LOC EPIST NEG NEG know

'Maybe she's at the beach, maybe not. Dunno.' [DB 20191416]

b. *Dhuwali-yiny* *ŋayi* *mak* *bitja-**rr**-yiny* *waŋ-**an**,* *bili* *limurr* *bäyŋu*
MED-ANA.PROM 3s EPIST do.thusly-III-ANA.PROM speak-III CPLV 1p.INCL NEG
*ŋula* *ŋatha* *märra-nha.*
INDF food take-IV

'Maybe he said that because we didn't bring any food.' [DjB: Mathyu 16:7]

c. *"Maku* *maḻagatj* *maṉḏaŋgu* *barpuru* *bu-na* *wäŋa* *bäymaŋu"*
EPIST monster 3d.DAT yesterday arrive.I place eternal

"The totemic ancestor from the mythic place probably came to them yesterday."
[(Lun'pupuy 1974)]

### 10.1.2 *mak(u)* as an force modifier

An influential approach to the question of what an assertion *is* or *does* frames them in terms of "speaker commitment." That is, in performing an assertoric (more broadly, "constative", in Searle's terminology) speech act, a speaker "makes [them]self responsible for [the proposition's] truth" (Peirce 1934, cited in MacFarlane 2011; see also Brandom (1983); Williamson (1996) a.o.)[216] This perspective has been formulated as a communicative convention, *e.g.* (233), following Lauer (2013: 105), Condoravdi & Lauer (2011: 157):[217]

(233) **Declarative convention**
A speaker who utters a declarative $\varphi$ in a context $c$, publicly commits themself to behave as though they believe $[\![\varphi]\!]^c$

In recent work, Krifka has pointed to evidence that "[some] epistemic adverbials and discourse particles are not part of the proposition to be communicated, but rather are tools to manage to commitment of the speaker" (2019: 84). Given an apparent need to distinguish between syntactically-

which may suggest an explanation to this variation.

[216]These ideas have roots in the *Begriffsschift* (Frege 1879): Krifka (2019: 83) recalling that an assertion is composed of a thought (proposition) $(-\varphi)$ and a **judgment** of the truth of that thought $(|)$ — whence the sequent notation $\vdash \varphi$.

[217]Other commitment theorists have advocated for a wholesale removal of "speaker belief" from models of assertion — Krifka (2019: 78), *e.g.*,cites Moore's paradox in support of this perspective.

represented linguistic items that modify propositions versus (the illocutionary force of) speech acts, several authors have argued for representing these items in the "left periphery" (CP layer) of the clause.[218]

On these types of accounts, the LF of a simple (unembedded) clause is essentially taken to be headed by a silent operator (ASSERT or $\vdash$) which takes a (fully-inflected) proposition as its sister.[219] Ideas about the illocutionary force and norms of assertion are formalised by modelling $\vdash$ as comprising a covert doxastic modal anchored by the actual world ($\sim_\alpha$) (Kaufmann 2005) or an update function on a speaker's public commitments/beliefs and (ultimately) the common ground (Krifka 2015; Lauer 2013).

A precise formulation of this operator's (these operators') semantics is not necessary for current purposes; what follows (234) represents a rough proposal in view of clarifying the nature of the METAPHYSICAL/OBJECTIVE NONVERIDICALITY property described above.

(234) **An assertability relation**
$[\![\text{ASSERT}]\!]^c = \lambda p \lambda i. \cap \sim_{\mathtt{S}} i \subseteq p$
$\sim$ is an accessibility relation that, given a speech index $i$ returns all the propositions that the Speaker S of the utterance will publicly commit to at that index.
ASSERT states that $p$ follows from this set.

The force of this modal can additionally be weakened by epistemic possibility adverb *mak(u)*. For Krifka, epistemic adverbs modify the level to which a given judge is certain about/willing to commit to the truth of a given proposition (2021: 12).[220] Given its apparent variable modal force, *maku* takes an accessibility relation (*e.g.*, ASSERT) as its sister and returns a subset of the modal base it picks out. Following Matthewson 2010; Rullmann et al. 2008 a.o., force-variable modality is modelled as universal quantification over a a (contextually-determined) subset of the modal base (as determined by a "contextually given" choice function $f_c$.) The size of the output of $f_c$ is proportional to the strength of the assertion. *maku*-modified assertions are therefore also

[218] In a number of ways, these and related proposals represent a revival of the motivations of Ross's *Performative Hypothesis* (1970), having focussed on addressing many of the objections of that original version.

[219] Compare, for example, to the assumptions made in Alonso-Ovalle & Menéndez-Benito 2003; Hacquard 2010; Kaufmann 2005, A similar strategy (in the spirit of update semantics) is adopted by Krifka (2016: 570), where ASSERT is taken to perform an operation on a common ground. See also references in Hacquard (2010: 102).

[220] Krifka (2021) decomposes the C-layer of the clause into an Act-, Commitment- and Judgment-Phrase, each of which "hosts different kinds of modifiers and heads, and have different interpretations" (30).

compatible "with cases that introduce a proposition and its negation" (Krifka 2021: 13, compare (232a) above.)

(235) ***maku*** **'EPIST' as a judgment modifier** (syncategoramatic)
$[\![maku\ \textsc{assert}]\!]^c = \lambda p \lambda i.f_c(\cap\sim_\alpha i) \subseteq p$

### 10.1.3 Embedding predicates

§ 9.3.3 presented data that emphasised differences between the IRREALIS mood as realised in WD and the SUBJUNCTIVE as it's realised in a number of Indo-European languages. IE subjunctives are predominantly licensed in *complement clauses*, where an embedding predicate entails that its complement is nonfactual or otherwise non-asserted (see discussion in Palmer 2001). Most accounts of IE subjunctives treat mood morphology as having no semantics of its own; the modal readings of subjunctive-marked complement clauses being specified by the lexical semantics of a matrix predicate which governs/selects for either a SUBJUNCTVE or INDICATIVE complement (see also Portner 2018: ch. 2).

For current purposes, the crucial observation is that IRREALIS morphology in WD never appears to be licensed by the lexical semantics an embedding predicate, including those whose meaning is equivalent to those of prototypical subjunctive governors (*e.g.*, *djälthirri* 'want') and antifactives (predicates that entail the falsity of their complement, *e.g. nyaḻ'yun* 'lie') — see (236). In these cases, the properties of NONVERIDICALITY discussed in ch. 9 — roughly, settled truth in the discourse context — are ostensibly met, although IRR is not licensed.[221]

[221]Perhaps relatedly, Wilkinson (ms) identifies a small class of predicates that participate in apparent serial verb constructions. In the example below *baḏatjun* 'miss' entails the nonrealisation of *wuthun* 'hit.'

(i) *ŋunhi wämut-thu baḏatj-urr wuthu-**rr** warrakan'-nha*
ENDO *MÄLK*-ERG miss-III hit-III animal-ACC
'Wämut failed to hit the animal.' (Wilkinson ms: 30)

(236) **Matrix predicates which entail nonveridical complements do not license the irrealis**

a. *ŋurik* *ŋarra* *djäl* *guya-w* [ *ŋunhi* [ *(ŋayi)* *d̲arrkthu-**rr*** *wämut-nha* ]]
ENDO.DAT 1S want fish-DAT ENDO (3S) bite-III *MÄLK*-ACC

'I want that that fish bit Wämut/I want(ed) the fish to have bitten Wämut.'
(Wilkinson ms: 22)

b. *ministay* *nyäl̲'yurr* [ *ŋunhi* [ *gapman'dhu* ***ga-n*** ***gurrupa-r*** *djäma*
minister.ERG lie.INCL.III ENDO government.ERG IPFV-III give-III work

'The minister lied that the government had been creating jobs.' [AW 20190428]

Below, we consider the properties of *maku*-type propositional modifiers and these embedding predicates—both of which appear to induce nonveridicality in their complement—in view of unifying these data with the analysis of irrealis mood proposed above.

### 10.1.4 Revisiting *nonveridicality*

Here, IRREALIS has been formalised as a presupposition that there is some branch within the set of metaphysical alternatives (as calculated at a contextually-assigned reference time) along which inflection's prejacent (*P*) doesn't hold. That is, the presuppositions of IRREALIS inflections are satisfied when a metaphysical modal base is **nonveridical** with respect to *P*.

In Ch. 9, we saw that this presupposition is satisfied when *P* has been modified by some local (clausemate) nonveridical operator, particularly NEG, MOD or FUT. Of course, as formulated, epistemic modal adverbs and nonveridical attitude predicates, speech verbs *etc.* also give rise to a proposition that is not asserted by the speaker as a settled truth.

#### 10.1.4.1 Locality

In § 10.1.2, I proposed that *mak* — the particle that encodes (various strengths of) epistemic modality — explicitly modifies the illocutionary force of an utterance (Krifka 2021's "judgment" modifier.) Well-established cross-linguistic generalisations about the syntactic behaviours and interpretive conventions that distinguish epistemic from root modals have suggested that epistemic operators take high scope over other inflectional categories whereas other modal (*i.e.*, flavours of circumstantial modality) take low scope (*e.g.*, Hacquard 2010 and references therein.) That is, INFL c-commands MOD/FUT/NEG to the exclusion of EPIST.

The relevance of locality in the licensing of IRR is also supported by the fact that the nonveridical semantics of various nonfactive embedding predicates is invisible to INFL. § 10.1.3 (and 9.3.3) provided data showing that, even when inflecting a clause that is the complement of one of these predicates (and consequently the embedded proposition is neither asserted nor a historical necessity at evaluation time), IRR is still licensed only if it c-commands one of the modal particles.

An emergent syntactic generalisation, then, is that the IRR categories require that an irrealis-licensing element (nonveridical operator) be in the c-command domain of INFL.

#### 10.1.4.2 *Objective nonveridicality*

The class of modal particles that we have considered here are all taken to displace an event description into the "realm of the unrealized." Branching Times models — deployed extensively in this dissertation to model metaphysical possibility (*sc.* historic necessity/the observation that the actual past, as opposed to the future, is settled) — have provided a tool with which to understand this claim.

Broadly speaking, given an utterance index, *dhu* 'FUT' displaces a predicate into the *potential* domain, *bäyŋu/yaka* into the *counterfactual domain* and *balaŋ* into either of these (the "*irrealis* domain" more broadly, following von Prince et al. forthcoming).

In all of these cases, the common ground in a given discourse context is compatible with metaphysical alternatives at which $P$ does not hold. That is, in context, $P$ is not positively determined/settled/is not a historic necessity. The **nonveridicality** of $P$ (which, I have argued, is presupposed by IRR) is a **metaphysical fact** at $i*$ — that is, "it cannot be known which way [the issue] will be settled" (Condoravdi 2002: 79; note that the analysis of IRR licensing relies on the same principles as the disambiguation of *bambai* in Part I.)

The function of *mak*, meanwhile, is to signal the nonveridicality of an ***epistemic*** state with respect to a given proposition. That is, it is taken to indicate a property of the speaker's attitude (their level of commitment) with respect to the truth of a proposition (which may or may not be true at $i*$ and may or may not be settled at $i*$.) In all the examples in (232), for example, the truth value of the embedded proposition in the actual world ($i*$) is settled, even if the speaker's belief

state is diverse with respect to its truth (see also Condoravdi 2002: 79).[222]

The invisibility of judgment modification to INFL suggests that "subjective nonveridicality" is inconsequential from the standpoint of IRR semantics. That is (perhaps *contra* claims of verbal mood distinctions being reflexes of an assertion/non-assertion dichotomy), IRR is only licensed when the truth of a given proposition is **objectively nonverifiable** ("*presupposed* to be settled") in view of the nature of (and our understanding of) metaphysical possibility.

The irrelevance of epistemic/judgment modification in licensing IRR is in fact compatible with the definition given in (217) above, which features in the denotations for the IRR mood inflections, realised as II and IV. As shown there, IRR mood is concerned with the availability of some *metaphysical alternative* ($b \in \cap\approx_{i'}$) along which $\neg P$. When making a predication about some index *preceding* the utterance ($i' \in \cap\preccurlyeq i*$), it is presupposed that the facts about any given $P$ are settled/uniform across metaphysical alternatives ("the fixity of the past".) Conversely, when making a predication about some $i' \notin \cap\preccurlyeq i*$: *i.e.*, the *irrealis* domain (von Prince et al. forthcoming), the common ground does not presuppose the settledness of $P$. Following Condoravdi (2002: § 4), this is because, given a fixed utterance index $i*$:

- In potential cases $i* \prec i_e$: there are branches along which $P$ holds and branches along which it doesn't. That is $\cap\approx_{i_c}$ (where the time of evaluation $i_c \succcurlyeq i*$) is (necessarily) **diverse** with respect to $P$.

- In counterfactual cases, $P$ is asserted to hold in a branching future of a preceding index. That is $\cap\approx_{i_c}$ where $i_c \prec i*$. Again, this modal base is diverse — $P$ is asserted to hold along some (*non-actual*) branch in $\cap\approx_{i_c}$ and it is implicated that $P$ doesn't hold along any metaphysical alternative to utterance index $\cap\approx_{i*}$ (Condoravdi 2002: 86).

Consequently, "**objective**" nonveridicality requires an "anchor" at which metaphysical alternatives to the *actual present* ($i*$) are considered (this is implied by von Prince's trichotomy §1.2.1, see also fig 35.) IRR is licensed if, relative to $i*$, $P$ **is not** a historic necessity.

[222] That is, a given judge's epistemic state may be diverse w/r/t whether or not some proposition is true while simultaneously it is known that the truth of $P$ is settled/knowable/historical fact.

#### 10.1.4.3 Indexicality & indexical shift

In this section, we've additionally seen evidence that embedded clauses can describe nonrealised events without receiving IRR marking, a point of contrast to the licensing conditions of Indo-European subjunctives. Crucially, oftentimes a speaker doesn't assert (*i.e.*, commit themself to the truth-in-$i*$ of) a proposition denoted by an embedded clause (a property shared by irrealis clauses, as discussed above.) In neither example in (236), for example, does the speaker commit themself to the truth-in-$i*$ of the subordinate clause.

A proper treatment of subordination is a matter for future work, although the effects (or lack thereof) of nonfactive predicates on mood inflection in complement clauses ought to be unifiable with the current analysis. Theories of reference generally assume a rule that MATRIX CLAUSES are evaluated with respect to the parameters of a given utterance. *I.e.*, the time, world, location, discourse participants *etc.* are **automatically** set by/identified with the utterance context (see Tonhauser 2011 for an implementation.) In a similar spirit to the proposal here, Pancheva & Zubizarreta (2019a) model evaluation and topic times as entering a derivtion at the C- and T-levels respectively.

The ASSERT operator described above (§10.1.2) is assumed, then, to apply by way of some type of commitment closure rule that applies to matrix clauses. That is, in matrix clauses, components of the utterance context saturate variables in the clause's LF and it is the speaker of the utterance who commits themself to the truth of the proposition (*cf.* Krifka 2021). The idea in Krifka (2021: § 4) is that embedding predicates host subordinate clauses which contribute information about evaluation parameters that are distinct from "the speaker's commitment slate." For example, the subordinate clause in (236a) is evaluated with respect to "the speaker's ideal worlds" and the subordinate clause (236b) is evaluated with respect to "the minister's commitment worlds." In these cases then, *nonveridicality* is taken to be evaluated with respect to an evaluation index which is shifted by some operator which scopes over INFL.

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A proper treatment of the relation between the REALIS-IRREALIS distinction and judgment modification, complex clause phenomena & indexical shifting is a topic remaining for future work. What

I have sought to show, however, is that IRR is licensed iff INFL **takes scope over** a nonveridical operator — that is, an operator that introduces metaphysical alternatives that are diverse with respect to the instantiation of the predicate — *i.e.*, the basic proposition (that some property of intervals holds at $i_c$) is not a historic necessity, given the utterance context.

## 10.2 Semantic change in Southern Yolŋu

The two key phenomena exhibited in WD which are described in this work are not manifested in most other Southern Yolŋu (SY) varieties (including, for example, Ritharrŋu-Wägilak, compare § 7.3.1.)

As suggested by the glossing decisions summarised in Table 12 above, existing descriptions of Eastern *(Miwatj)* Dhuwal(a) varieties (Heath 1980c; Morphy 1983) do not appear to exhibit the cyclic tense or mood neutralisation effects described above for WD.[223] Additionally, Melanie Wilkinson observes that these effects appear to be variable in the Djambarrpuyŋu varieties spoken further east in Galiwin'ku (Elcho Island) and aren't manifested in *Miwatj* varieties more generally (2012: 359*ff*, 431; *pers. comm.*) These phenomena *are*, however, robustly exhibited in the westernmost Yolŋu varieties (Djinaŋ and Djinba, see Waters 1989: 192) — strongly evidence of an areal effect. Here we briefly survey the synchronic variation between WD and some neighbouring varieties in view of forming a diachronic account of the Yolŋu Matha inflectional paradigm.

### 10.2.1 Semantics of the Ritharrŋu-Wägilak verbal paradigm

Ritharrŋu-Wägilak (data provided in in § 7.3.1 – *p.* 172) do not show any evidence of cyclic tense phenomena or a relationship between verbal mood and negation.

In keeping with the glossing conventions adopted by Heath (1980a), inflections cognate with WD I, II and III are robustly associated with present, future and past reference respectively. These facts (examples of which are repeated below [with negation alternation added] from § 7.3.1) are polarity independent (negation generally marked by verbal enclitic =*'ma'*). Original field data collected in Ngukurr 2019 is cited with each example.

[223] Though there is an incompatibility between *yaka* 'NEG' and III in Djapu (Eastern Dhuwala), according to Morphy (1983: 72), possible evidence of an earlier stage in the emergence of the asymmetry.

(237) **Cognate of I as RW 'PRES'** (144a rpt'd)

***nhäma(='ma')*** *rra yakuthi mukulnha*
see(=NEG) 1S PROX.ERG aunt.ACC

'I'm (not) looking at my aunt currently.' [RN 20190520]

Additionally, Ritharrŋu imperatives are formally identical to corresponding future predications/predictions (1980a: 76) — this is shown in (238).

(238) **Cognate of II as FUT with IMP uses** (144b rpt'd)

a. *go̲darrpuy ŋarra* ***nhäŋu(='ma')*** *mukulnha*
tomorrow 1S see.II=**NEG** aunt.ACC

'I will (not) see my aunt tomorrow.' [DW 20190522]

b. ***l̲uki*** *nhe!*
eat.II 2S

'Eat it!' (OR 'you'll eat it') (Heath 1980a: 76)

c. *yaka nhe baŋgul̲'-yu-**rru***
NEG 2S return-VBLZR-II

'Don't come/go back!' (Heath 1980a: 76)

(239) **Cognate of III as a general PAST tense** (144c rpt'd)

a. *gätha ŋarra* ***nhäwala(-'ma')*** *mukulnha* **[TODAY]**
today 1S see.III-**NEG** aunt.ACC

'I saw (didn't see) my aunt this morning.' [RN 20190522]

b. *ripurru-mirri ŋarra* ***nhäwala(-'ma')*** *mukulnha* **[YESTERDAY]**
yesterday 1S see.III-**NEG** aunt.ACC

'I saw (didn't see) my aunt yesterday.' [RN 20190522]

Heath (1980a: 74-5) glosses Ritharrŋu's fourth inflectional category as PAST POTENTIAL. Heath's PAST POTENTIAL, is not cognate with WD's IV inflection (the "precontemporary irrealis.") Conversely, Heath identifies an alternation in the past paradigm that is made in a number of Ritharrŋu conjugation classes (compare table 10, *p.* 172). That is, the Ritharrŋu PAST is cognate with either III or IV, depending on the conjugation class. Further, within this category, when two forms are available (one apparently cognate with III and the other with IV), he provides a number of examples which suggest tentative evidence of a semantic distinction between these:

> *wäni-na* is usual for 'went', but *wäni-nya* can be used to indicate habitual or substantially prolonged activity, especially in the distant past [...but] these semantic distinctions [are limited to a minority of verb stems,] are not rigorous and not all textual examples fit with my remarks above. (Heath 1980a: 75)

Perhaps lending further tentative support to Heath's analysis, in predications about the ***remote past*** (for verbs that maintain a split), speakers split between the two past forms (PST$_{III}$ & PST$_{IV}$) documented by Heath — glossed here according to each inflection's cognacy with WD, *i.e.*, **III** and **IV** respectively. That is, in elicitation, a distinction between **III** and **IV** appears for speaker RN but *not* for AL, pointing to a near-complete merger of **III** and **IV** in Ritharrŋu-Wägilak.

(240) **Interspeaker variation in the grammaticalisation of habituality in the RW past domain**

a. Past habituals with **IV**-cognate marking

*ŋarra yothu-ganyaŋ', nhä-**nha**(-'ma') ŋarra ŋuli mukul-ŋ'nha-ya*
1S child see-PST$_{IV}$-(NEG) 1S HAB aunt.1S.ACC-PROM

'When I was young, I would (n't) see my aunt.' [RN 20190522]

b. Remote past with PAST (**III**) marking

*nhä-**wala** ŋarra yothu'thaŋ'dja mukulnhaya*
see-PST$_{III}$ 1S child-TEMP-PROM aunt-ACC-PROM

'When I was young I saw/would see my aunt.' [AL 20190522]

Heath also indicates that that Ritharrŋu's FUTURE (cognate with II) and PAST POTENTIAL (no WD cognate, glossed here as **V**)[224] categories appear to be variable in terms of modal force. This is indicated by (Heath's translations in) the examples in (241) below. Note that the equivalent sentences in WD would require a modal particle in order to be well-formed.

(241) **FUTURE and PAST POTENTIAL in modalised contexts in Ritharrŋu**

a. ***wäni** nhe* (145b rpt'd)
go.II 2S

'You can/should/will go.' (or 'Go!')

b. *wäni-**ya** nhe* (145c rpt'd)
go-V 2S

'You could/should/would/were about to go.' (adapted from Heath 1980a: 104)

[224]For Bowern (2009), the Ritharrŋu PSTPOT is retained from a distinct inflectional category, reconstructable to Proto-Yolŋu. Relatedly, implied in Heath (1980a: 20,23,104), the PSTPOT may be (historically) derived from II and an additional suffix. The compatibility of these reconstructions is not further considered in this dissertation.

This same disparity between WD and Wägilak is demonstrated in the data in (242). Here, II 'FUT' is shown to be compatible with a number of root modalities and different shades of modal strength. In all cases, displacement into to the POTENTIAL domain is exclusively conveyed by the inflection (unlike in WD where this is primarily the responsibility of a modal particle.)

(242) **Wägilak FUTURE (II) with variable modal flavour/force**

a. *blijiman ŋay waŋa-na:* (145a rpt'd)
policeman 3s say-III

*"gulu-**rru** nhe yiŋ'-ŋiri=dhi wäŋa-ya. Yakaŋu nhe **wäni**-'may garra nhe git lokdap-**urru**"*
stay-II 2s DIST-LOC=FOC home-PROM NEG 2s go.II-NEG *garra* 2s *get* locked.up-II

'The policeman said you must stay here at home. Don't go (anywhere) or you'll be locked up.' [RŊ 20190520 18']

b. ***wäni** lima Numbulwar-li'-ya ŋatha lima märra-**wu**, wo djuḻ-kurru?*
go-II 1p.INCL PLACE-ALL-PROM food 1p.INCL get-II or road-PERG

'Should we go to Numbulwar to get food or (continue) along the road?'
[PW 20190520 25']

An important difference between the WD varieties described above and the Ritharrŋu-Wägilak data presented here, then, is the absence of dedicated lexical material (particles and auxiliaries) encoding modal and aspectual meaning in the latter. Consequently, the verbal paradigm itself is the primary grammatical device that RW deploys to encode relevant temporal and modal distinctions (it is unclear what, if any, conventional devices for encoding viewpoint aspect are available in RW morphosyntax.)

A distinctive difference is the observation that sentential negation has no effect on the tense-mood inflection of a given clause in RW. So the variety of "counterfactuality" introduced by a negative operator — key to the analysis of the WD irrealis laid out above — is apparently invisible to RW inflection.

Recalling the discussion (§ 9.3.2) of the cross-linguistic heterogeneity of *irrealis* as a category (exemplified by the fact that not all languages with a described realis-irrealis distinction treat negation the same way.)

This difference might be modelled as a contrast in the scope-taking behaviour of RW *-'may'*

as against WD *bäyŋu/yaka* — Mithun (1995) makes a similar suggestion in her discussion of the different relationships between "reality status" marking and negation in Central Pomo [poo] as against Caddo [cad].

### 10.2.2 Morphosemantic change

On the basis of these data, we can formulate a number of hypotheses about semantic change in the inflectional domains of these closely related Southern Yolŋu varieties.

**The role of contact.** In view of the extended language contact situation between Western Yolŋu varieties and the Arnhem languages spoken around Maningrida (a major West Arnhem indigenous community), the ostensible semantic reorganisation of the Yolŋu inflectional paradigm is likely to be a function of this language contact. Support for this observation is found in the fact that the neutralisation of mood distinctions in negated clauses is a phenomenon that is attested in a number of the non-Pama-Nyungan languages of northern Australia (Arnhem Land in particular).[225]

Similarly, with the exception of the Maningrida family (Burarra, Gun-narpta Gurr-goni, Nakkara, Ndjebanna), I am not aware of any languages other than the (geographically) western varieties of Yolŋu Matha (*e.g.*, Djinaŋ, Djinba, WD and Yan-nhaŋu) that exhibit (their own versions of) the distinctive cyclic tense phenomenon analysed for WD in Ch. 8.[226] What's more, (geographically) intermediate Dhuwal-Dhuwala varieties, particularly the Galiwin'ku Djambarrpuyŋu varieties described in Wilkinson (2012) (and perhaps the Djapu' (Eastern Dhuwal variety) spoken in Yirrkala and described in Morphy (1983)) exhibit possible transition phenomena.

In particular, the absence of these features in other Pama-Nyungan (*i.e.*, in genetically related Australian languages) languages suggests that this paraidgm reorganisation in the western vari-

[225] Australian Languages in which this type of asymmetry is manifested in Miestamo's (2005: 411) sample include: Burarra, Laragia, Mangarrayi, Maung, Tiwi, Warndarang, Wubuy, Nyulnyul, Ngarinyin, Wambaya — 10 of the 15 non-Pama-Nyungan languages he surveys. He claims that Australia is the only geographic region for which this particular asymmetry is particularly well-represented (192). Note that these ten varieties are *all* non-Pama-Nyungan spoken in the northern part of the continent.

[226] Comrie (1985: 75) refers to the description of Burarra tense marking (Glasgow 1964) as his sole example of "cyclic tense."

eties is a function of this stable contact with their Maningrida/Burarran neighbours.[227,228]

**Lexical reorganisation**. A potential hypothesis underpinning this change is that, with the advent of cyclic temporal reference, I — the erstwhile PRESENT tense — comes to fail to reliably encode a distinction between past and present temporal reference. Consequently, there is a greater reliance on other lexical material (particularly *GA* 'IPFV') to disambiguate past and present events (given the well-understood incompatiblity between present reference and perfectivity.) Note the vivid contrast with Ritharrŋu-Wägilak, where it's not clear that there is any grammatical device that distinguishes imperfective from perfective descriptions in the past.

This shift in the division of TMA labour in favour of free preverbal elements results in a decreasing semantical burden for the inflectional paradigm in general. Described above, no root modals are reported in Ritharrŋu-Wägilak, whereas modal particles *dhu, balaŋ(u)* etc. are largely responsible for specifying modal meaning in contemporary WD. This (partial) redundancy of the inflectional paradigm then leads to an analysis of the irrealis-aligned inflections (II and **IV**) as containing an irreality presupposition (which is satisfiable by a root modal operator.) In effect, as I have argued in this dissertation, II and **IV** come to mark the (objective) **nonveridicality** — *i.e.*, the unsettledness and *unknowability* — of a proposition (their prejacent) in a given discourse context.

The distinctive negative asymmetry, then, emerges as a consequence of this semantic reorganisation. Given that negation can be taken to encode a species of *counterfactuality* (insofar as the truth of an assertion of the type $\neg p(i)$ requires that $p$ not be a realised (let alone known) fact of $i$), negative operators also satisfy nonveridicality.

Further, in § 9.4.2, this is linked to a related observation that 'negative sentences (in some sense) presuppose the discourse-salient possibility of the corresponding affirmative' which is then denied in the actual world.

The current analysis of nonveridicality, in concert with an "asymmetricalist" treatment of negative sentences, may then explain the apparent reanalysis of negative operators as predicate mod-

[227]Green (2003) shows that these languages represent a single subgrouping within a larger "Arnhem" family.

[228]An alternative hypothesis — "western Yolŋu as a relic area" — would be that an ancestral form of Yolŋu Matha developed these features as a contact phenomenon that were subsequently/gradually lost in varieties spoken in Eastern *Yolŋuw wäŋa*. Further work is required to satisfactorily distinguish between these alternatives.

ifiers of a class with other modal operators which satisfy the presuppositions of irrealis mood inflections.

As above, a proper understanding of these phenomena and their development is likely to require a deeper understanding of the variation in strategies of encoding of TAMP categories and in the morphosemantic intricacies in the verbal paradigms domains of Yolŋu languages.

## 10.3 Conclusion

In a nutshell, the proposal laid out at the beginning of the current chapter (developed on the basis of argumentation in the previous two) proposes a $2 \times 2$ paradigm whereby WD's four inflections encode (colexify) a tense distinction (±NONFINAL INSTANTIATION, capturing *cyclicity*) and a mood one (±IRREALIS.) The inflections themselves are analysed as abstract semantic operators that denote (partial) identity functions, effectively encoding a presupposition that a contextually-supplied reference index has one or both of these tense/mood properties. This semantics in tandem with a general pragmatic principle (MAXPRESUPP, itself an implementation of Gricean reasoning about cooperation in communication.)

The current chapter has advanced a number of hypotheses to be precised in future work:

***1.*** I have proposed that the robustly tense-prominent systems of other Yolŋu languages (conserved in, *e.g.*, Ritharrŋu-Wägilak) have been radically restructured under the influence of Western Arnhem languages which also exhibit distinctive morphosemantic phenomena including *cyclic tense* and a paradigmatic *negative asymmetry* with respect to mood (or "reality status") marking.

***2.*** I've claimed that IRREALIS inflections are licensed when there is a nonveridical operator **in their c-command domain** (that is, over which they take scope.)
This itself is taken to be a syntactic reflex of the "objectivity" of a nonveridicval claim — *i.e.*, these operators in the scope of INFL indicate that their prejacent is not a *settled* fact (that is a *"historic necessity"* vis-à-vis the evaluation index; its negation is a metaphysical possibility.

In view of these phenomena, the synchronic distribution of verbal inflections in WD seems to suggest that its paradigm expresses modal and reality status distinctions "more systematically" than it does temporal ones — Bhat's **mood-prominence** (1999: 136). Bhat (1999: 183) makes a number of generalisations which he takes to be "correlatable" with mood prominence, including the

grammaticalisation of temporal remoteness[229] and the development of a future/nonfuture tense distinction:[230] features exhibited (to varying degrees) in WD.

Chapter 8 comprised a formal treatment of the expression of temporal categories in WD, drawing on theories of tense and lexical and grammatical aspect. Included here is a proposal for a motivated formal analysis of typologically uncommon CYCLIC TENSE phenomena — that is, the contribution of apparent tense markers whose domain is discontinuous with respect to a totally-ordered set of times. This proposal (§ 8.3) effectively represents an attempt to specify the CONTEMPORARY vs. PRECONTEMPORARY distinction due to Glasgow (1964) and subsequent Burraranists.

As discussed in § 9.3, the typological literature has entertained a significant amount of debate about the explanatory utility and adequacy of notions of REALITY STATUS and the REALIS/IRREALIS dichotomy. A major reason for this is the hugely heterogenous set of assumptions made by different scholars about the semantic domain and breadth of the irrealis domain (*e.g.*, Mithun who points out that while, "negatives are systematically categorized as Irrealis [in Caddo]" (1995: 380), negation has no effect on reality status marking for Central Pomo and Amele.) A compositional treatment of the inflectional/mood systems of irrealis languages has the potential to establish/formalise intuitions about the unifiability (or otherwise) of the IRREALIS as a cross-linguistic grammatical category (see also von Prince et al. for a recent defense of IRREALIS as a "comparative concept.")

In view of explaining the variety of NEGATIVE ASYMMETRY exhibited in WD, then, Chapter 9 has provided one of the first formal proposals for a compositional semantics for an apparent IRREALIS MOOD, joining previous accounts (*e.g.*, Krifka 2016,Matthewson 2010,[231] von Prince et al. 2019a). It also represents the first formal treatment of mood in an Australian language. As we have seen, the distribution and licensing conditions of mood morphology in WD (as with the Vanuatuan languages described by those authors mentioned above) diverge sharply from the more familiar indicative-subjunctive distinctions of European languages; the locus of virtually all existing work

[229]Bhat describes the marking of temporal distance as "a "modal" tendency in the sense that these distinctions of temporal distance correspond to [certainty…] One can be more certain about a past event that took place today than one that took place yesterday or last year" (1999: 183).

[230]While WD doesn't have an obvious 1-to-1 FUT vs. NFUT contrast, we have seen how predications at ACTUAL indices are systematically inflected differently to POTENTIAL ones. Relatedly I has been shown to be broadly compatible with NONFUTURE reference.

[231]Though as stated above, Matthewson (2010: 13) argues that the relevant mood morphology in Sʕáʕimcets ought to be treated as a SUBJUNCTIVE (As distinct from REALIS.) NB. Matthewson explicitly excludes "obligatory and redundant" occurences of the subjunctive from her analysis (2010: 26).

on verbal mood.

# Chapter 11

# General conclusions

The three essays that constitute this dissertation have sought to provide new data, analytic perspectives and insights of how the conceptual domains of modality, temporality and negation interact. In particular, each represents an investigation of some dimension of irreality. This concluding section briefly rehearses the main findings of each component before discussing the dissertation's uniting themes and broader theoretical implications.

## 11.1 Summary of the dissertation

**Part I** showed how an Australian Kriol future-oriented temporal frame expression has developed APPREHENSIONAL meaning. From advancing the temporal reference of its prejacent (SUBSEQUENTIALITY-marking), *bambai* has come to encode possibility and negative speaker affect. Further, it is a discourse anaphor that appears to, by default, restrict its modal base to (a subset of) the negation of some foregoing proposition. It was shown that the identification of this domain restriction is a pragmatic process, involving reasoning about alternatives.

Crucially, as analysed here, the apprehensional reading of *bambai* arises categorically when its prejacent is **presumed unsettled** (in the sense of Condoravdi 2002). In view of this observation, I develop a monosemous, unified treatment of the meaning contribution of *bambai*; it receives a temporal frame adverbial reading in settled contexts and an apprehensional one in unsettled con-

texts. In both cases, *bambai* advances the index $i$ at which the eventuality its prejacent describes is instantiated. Ultimately, the modal meaning conventionally associated with apprehensional readings can be construed as having resulted from an (R-based) implicature: a predication $P$ about something unsettled is unassertable, if the index $i$ to which *bambai* has advanced $P$ is NON-ACTUAL then $P(i)$ can't be settled, therefore $P(i)$ can't be being asserted. I've referred to this reasoning process as (emerging out of) the **omniscience restriction** (*pp.* 73/89). As a consequence of (iterations of) this reasoning process, and by virtue of semantic reanalysis ("the algebraic backbone of meaning change" (Eckardt 2006)), *bambai* is reanalysed as the locus of modal (apprehensional) displacement.

**Part II** proposed a formal semantic treatment of the Negative Existential Cycle — a grammaticalisation cycle described in the typological literature where nominal negators develop into sentential negators. I showed that the generalisation of PRIVATIVE case morphology in a number of Australian languages can be understood as an instantiation of this cycle. By formally treating PRIV as a (negative) generalised quantifier, the N∃C can be conceived of as a stemming from the generalisation in the quantificational domain of this operator.

Trading on insights about existential predications from Francez (2007, 2009), this account of privative marking and of the N∃C emphasises the radical context dependence of negative existential claims (modelled as Francez's *contextual closure* — the pragmatic retrieval of a domain into which the absence of some entity is being predicated.) The "in part or in whole" dependence on utterance context to retrieve a domain restriction is a widely recognised property of quantificational elements (see Roberts 1995: 661). Worth noting is that an explicit *coda* phrase is better modelled as a "contextual modifier" rather than directly supplying the quantificational domain in an existential proposition.

So while negative existentials (including privative markers) are canonically understood as predicating the absence of some individual concept in a contextual domain, closer investigation shows that their use diachronically expands to predicating the *noninstantiation* of some eventive concept in a contextual domain (and scoping over phrase-level constituents). A further extension, namely predicating the nonobtention of a given proposition (and scoping over an entire sentence),

sees these quantificational operators entering the domain of standard (truth-conditional) negation. That is, the NƎC gets a treatment in terms of the *generalisation* of a quantifier, modelled as the *expansion* in that quantifier's domain (hence the types of entities over which it scopes) and a concomitant loss of this "radical context dependence."

A consequence of this unified treatment of PRIV and NEG, then is a semantics that emphasises the kinship between negative and quantificational (*sc.* modal) operators and couches the NƎC in terms of this kinship. Further, this treatment serves as an clear illustration of the potential that diachronic data have for shedding additional light on puzzling synchronic phenomena.

**Part III** comprised an formal treatment of the verbal paradigm semantics of the Western Dhuwal-Dhuwala language. As observed there, previous descriptions of these (and related) languages have (explicitly or otherwise) avoided unified characterisations of the WD's four inflectional categories, eschewing a metalinguistic gloss (*e.g.*, Lowe 1996) or attributing to each form multiple meanings (*e.g.*, Waters 1989).

Confusing an analysis of WD verbal inflection is the presence of "cyclic tense" — a phenomenon where the temporal intervals licensing particular inflections appear to interrupt each other — and a variety of "asymmetric negation" (Miestamo's A/NONREAL) — where the ±IRREALIS mood distinction drawn on WD verbal predicates is neutralised in negative predications. By assuming the "branching time" framework familiar from work on intensional logic and appealing to other notions from the formal literature, a compositional account that unifies the disparate distribution of each of WD's four inflectional categories is proposed.

Chapter 8 accounts for the expression of temporal categories in WD. Proposing an analysis of the aspectual properties of verb stems and verbal predication, I've argued that the verbal paradigm realises a ±PRECONTEMPORARY feature which accounts for the observed "cyclicity", unifying the discontinuous temporal spans associated with each inflectional category. It was further claimed that the grammaticalisation of precontemporaneity emerges out of different usage conventions in narrative as against discursive modes.

In view of explaining the species of A/NONREAL exhibited in WD, chapter 9 motivates another property, *(objective) nonveridicality*, which underpins the second distinction (±IRREALIS) drawn in

WD's verbal paradigm. In one of the first formal treatments of "reality status"/an IRREALIS verbal mood, I effectively suggest that IRR-aligned inflections presuppose the *non-settledness* of the event whose instantiation is described in their prejacent; that same property that was shown to license apprehensional readings of *bambai* in Part I.

As in Part II, then, a result of this analysis is a semantics for negation that emphasises this operation's "kinship" with (root) modal operators. This makes a number of predictions, some of which are clearly desirable, others remain untested and are wanting of further investigation in order to appropriately restrict the generalisation. In any case negative and modal particles (MPS) are united insofar as they indicate that their prejacent is not to be asserted as a true, actual fact. In this respect, these operators all satisfy *nonveridicality*; explaining the manifestation of A/NONREAL in WD. This account further trades on insights that, in some sense negative sentences "suppose" the corresponding affirmation: a claim that Horn refers to as the *"Asymmetry thesis*" (2001: § 3). On this view, as do MPS, negative operators somehow invoke the possibility of their prejacent in a given discourse context.

## 11.2 Implications

Shown above, the three components of this dissertation are united in terms of their theoretical foci and their methodologies. Each project has taken data from Australian languages as its empirical basis, including data collected in the field via targeted elicitation. Each has considered a number of phenomena at the intersections of temporality, modality and negation in view of theorising the connections between these semantic domains and understanding their role in "displacing" discourse away from the utterance context — the here, now and actual.

Deploying tools from the formal semantic and model-theoretic/symbolic logic traditions has promoted the development of a systematic and precise understanding the meaning contributions of cross-linguistic phenomena and the relations between them. Modelling the meaning of a linguistic expression in terms of its truth-conditional contribution is an extremely powerful tool for developing deeper insights into the space of linguistic variation and the nature of language change. By assuming (as we did in Part I) that the two primary readings of *bambai* — *viz.* as an apprehensional and as a TFA — derive from a single (semantically unambiguous) meaning, we gain insights

into a common meaning that underpins them, can develop precise hypotheses about the pragmatic principles underpinning both synchronic distribution and diachronic changes, and we have a way of comparing the semantics of this marker (and its meaning change trajectory) to expressions that serve (ostensibly) similar functions in other languages.

Similarly, a unified treatment of nominal (existential) and sentential negation in Part II provides a way of making precise the functional similarities between these classes of expression and sheds light on the structure of a conceptual domain and the linguistic variation (synchronic and diachronic) that realises associated concepts. The payoff of a treatment of negative operators that highlights their kinship with natural language quantification were again brought to bear in Part III, where their association with modal operators has clear linguistic reflexes — namely in the fact that they, like MPs, license irrealis mood.

Generally, the assumption that, in principle, the WD inflections make a uniform contribution to the meaning of a given sentence permitted us to develop an understanding of the language's inflectional system and its mechanisms of temporal and modal displacement. While the analyses of the WD system are of course heavily influenced by existing theories of the semantics of tense and mood, the difficulty in applying many of the generalisations made in this literature can also be taken to indicate the degree to which models of particular grammatical categories are "overfitted" to data from European languages. We should take this to underscore the importance of variationist approaches in linguistics, and the rigorous examination of understudied language, to developing nuanced and complete theories of human language. Further, this is an urgent enterprise in view of mass language endangerment, particularly in indigenous communities.

## 11.3 Envoi

As indicated in each of the component parts in the dissertation, the proposals and results of the work undertaken here uncover further questions that demand further investigation of the meaning of intensional and negative operators and how and why these change diachronically.

For example, the application of the formal treatments of the PRECONTEMPORARY tense and the IRREALIS mood to other languages, particularly those of western Arnhem Land and other varieties of Yolŋu Matha ought to reveal both • how generalisable the treatment of the WD paradigm is

to apparent reflexes in other languages, and • further insights into the variation space for these types of systems as well as their historic development. Chapter 8 presented a hypothesis about the development of cyclic tense systems on the basis of the grammaticalisation of features associated with particular registers/stylistic modes. The further development of hypothesis, particularly while considering the differences in the manifestation of cyclicity in other 'cyclic tense' languages is a particularly fertile area for future work. While the "emergence" of a CONTEMPORARY/PRECONTEMPORARY distinction can well be attributed to contact and to the (partial) levelling of a *narratif/discours* distinction, are these explanations sufficiently powerful to predict (or account for) the parametric variation exhibited between WD and its neighbours?

In Chapter 6, the subtle relationship between 'privative predicates' and their subjects (or codas) was raised in conjunction with a undertheorised observations about apparent morphotactic and/or thematic constraints on the "eventive privative." This again, is an area for further investigation which is sure to be revelatory and crucial for the further development of an understanding of generalisation processes: both as they relate to the NƎC and to grammaticalisation/cyclic change more broadly.

Chapters 6 and 9 both propose an (asymmetricalist) treatment of negative operators as quantificational, effectively shunting NEG into the modal domain, where they quantify trivially over the properties of an evaluation world/index. The motivations for this treatment ought to be clear (*i.e.*: • it permits for a uniform treatment of existential and sentential negation, • it predicts similar IRR-licensing behaviour (*sc.* the satisfaction of nonveridicality) between MPS and NEG). Nevertheless, the assimilation of negative and modal operators into a single "nonveridical" class makes some predictions (of broader similarities in their behaviour) that aren't borne out. Further work is of course needed to better address these issues concerning 'without doubt, the most maligned of the logical connectives' (Horn 1984: 45).

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