

DOCTORAL DISSERTATION

**At the intersection of temporal &
modal interpretation:**
Essays on irreality
[working title]

A Dissertation
to be Presented to the Faculty of the Graduate School
of
Yale University
in Candidacy for the Degree of
Doctor of Philosophy

by
Josh Phillips
BInSt (Hons I*) (UNSW)
, MPhil (Yale)

Committee

Claire Bower (c.)	Yale U.
Veneeta Dayal	Yale U.
Cleo Condoravdi	Stanford U.
Ashwini Deo	Ohio State U.
Hadas Kotek	MIT (alum.)

DEPARTMENT OF LINGUISTICS
YALE UNIVERSITY
DRAFT FOR JANUARY 22, 2021

Contents

0	Introduction	1
0.1	Chapter structure	2
0.2	Formal theories of displacement	4
0.2.1	Indeterminist tense logic: on future contingents & branching times	5
	The mechanics	6
	Branches	6
	The “co-present”	7
	Settledness	8
	Von Prince’s modal trichotomy	10
0.2.2	Modal auxiliaries as quantifiers: Kratzer 1977 <i>et seq.</i>	10
	Quantifying over \mathfrak{T}	12
0.3	A note on the “amphichronic program”	13
0.4	Data & glossing conventions	13
I	The emergence of apprehensionality in Australian Kriol	14
1	<i>bambai</i> as an apprehensional	15
1.1	Introduction	15
1.1.1	Background	16
1.2	Apprehensionality cross-linguistically	17
1.2.1	Apprehensionality as a semantic domain	18
1.2.2	Apprehensionality in the Kriol context	21
1.2.3	Temporal frame adverbs and apprehensionality	23
1.3	The distribution of <i>bambai</i>	25
1.3.1	Temporal frame use	26
1.3.2	Apprehensional use	29
1.3.2.1	<i>p bambai q</i> : the conditional use	29
	Indicative ‘nonimplicational.’	29
	Counterfactual ‘nonimplicational.’	31
1.3.2.2	<i>bambai</i> as a modal adverbial	33
	Apprehensive counterfactual	34

<i>if</i> -Conditionals	35
1.3.3 Summary	37
1.4 Apprehensional readings emerge in subsequential TFAs	38
<i>bambai</i> and conditional modality	39
<i>bambai</i> and apprehensional expressive content	41
2 The antecedent <i>p</i>: restriction and partition	44
3 A semantics for <i>bambai</i>	46
3.1 Subsequentiality	46
3.2 ‘Settledness’ & intensionalisation	47
3.2.1 Deriving the subsequential reading	49
3.2.2 Deriving the apprehensional reading	51
3.2.2.1 the omniscience restriction.	53
3.3 Use conditions	54
3.4 Conclusion	55
II Semantics of the Negative Existential Cycle	56
4 The landscape of negation in Australia	57
4.1 Introduction	57
4.2 The Australian negative domain & a semantics for the privative case	59
4.2.1 Negation & Australia: a typological snapshot	60
4.2.2 “Standard” negation	60
4.2.3 The “privative case” and existential predications	61
4.2.4 Privatives and the NĒC	65
4.3 The negative domains & the NĒC in three Pama-Nyungan subgroups	66
4.3.1 Thura-Yura: change & renewal in the negative domain	67
4.3.2 The Yolŋu negative domain	70
4.3.2.1 Djambarrpuyŋu	71
4.3.2.2 Ritharrŋu	73
4.3.2.3 Wangurri	75
4.3.2.4 The PRIVative in Yolŋu	77
4.3.3 Arandic: the nominal status of negated verbals	80
5 The NĒC and a unified semantics	84
5.1 Semantic change and grammaticalisation pathways	84
5.2 Unifying PRIV and NEG	86
5.3 Event-privation	87
5.4 Negation as an impossibility operator	89
5.5 Domain expansion	90
5.6 Grammaticalization and indexicality	91

5.6.1	A note on existential codas and the NĖC	93
5.7	Conclusion	94
III	Reality status & the Yolŋu verbal paradigm	97
6	Introduction	98
6.0.1	Futurity and mood-prominence	98
6.0.2	Negation and mood	100
6.0.3	Yolŋu Matha	100
6.1	Verbal inflection in Western Dhuwal(a)	101
6.1.1	The Primary inflection	103
6.1.2	The Secondary inflection	105
6.1.3	The Tertiary inflection	107
6.1.4	The Quaternary inflection	109
6.1.5	Summary	110
6.1.6	Cyclic tense	111
6.2	Sentential negation: <i>yaka</i> & <i>bäyŋu</i>	112
6.3	The realm of the nonrealized	116
6.3.1	The branching time framework	116
6.3.2	Semantics of modal particles	117
6.3.3	Semantics of the “NONREALISED” inflections	121
6.3.3.1	Subjunctivity	123
6.3.3.2	Modelling assumptions	124
6.3.3.3	Nonveridicality as presupposition	126
6.3.3.4	The proposal in action	127
6.3.4	Negation	128
6.3.5	The same-day future	129
6.4	Semantic change in Southern Yolŋu	130
6.4.1	Semantics of the Ritharrŋu-Wägilak verbal paradigm	131
6.4.2	Morphosemantic change	133
6.5	Conclusion	135
	General conclusion	137
	Bibliography	139

Chapter 0

Introduction

DISPLACEMENT has been proposed as 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). Linguistic work — descriptive, pedagogical, theoretical — has traditionally 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 into cross-linguistic data; a challenge for linguistic theory, and one that a growing body of literature is identifying (*e.g.*, Condoravdi 2002, Hacquard 2006, Laca 2012, ? among many others).

The body of this dissertation consists of four 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 (*e.g.*, Anderson 2016, Deo 2015a, Kiparsky 2006, see also § 0.3).

The role of this introduction is to introduce (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.

The essays variously consider data from English and 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 (*e.g.*, Stirling and Dench’s special issue of *Aust. J. Linguist.* 32, Bednall’s thesis on Anindilyakwa temporal and modal expression, Bowler 2014, Kapitonov 2018 a.o.), this continent, hugely linguistically diverse, has received little attention in formal semantic theory. As we will see, data from these languages promises to challenge and enrich the methodological and theoretical toolbox of formal semantics.

0.1 Chapter structure

This dissertation comprises four chapters that are related but distinct. While they can each be read as independent pieces of work that tackle discrete linguistic phenomena, the methodological tools, assumptions and upshots of each chapter are mutually informing. As described above, the four chapters 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, irrealis and counterfactuality. Here, I provide a brief abstract of each of the dissertation’s constituent chapters.

Chapter I provides a first formal semantic account of “**apprehensionality**”, paying particular attention to an apparent meaning change trajectory, where future-oriented temporal expressions develop modal readings. In order to get at this, the Chapter describes and accounts for the changes in the distribution of the Australian Kriol adverb *bambai*. An observation originally due to Angelo and Schultze-Berndt (2016, 2018), *bambai* started its life as a temporal frame adverbial (‘soon, shortly thereafter’) and has developed so-called “apprehensional” uses. In many contexts *bambai* is translatable as ‘otherwise’ – on account of its reliance on accommodation processes, the account defended here treats *bambai*-type apprehensives as discourse anaphors that involve the modal subordination of their prejacent to elements of foregoing discourse (*cf.* ch. ??). The chapter provides a detailed explanation of the range of uses available to *bambai* in both its temporal and modal functions. On the basis of this, I propose a lexical entry that unifies these uses, in so doing, offering an account of the emergence of explicitly modal readings in a future-oriented (“subsequential”) temporal adverb, as well as a semantics for apprehensional marking.

In **Chapter ??**, we propose an analysis of the meaning and interpretation constraints on the English lexical item *otherwise*. Drawing on a proposal by Webber et al. (2001), we treat *otherwise* as a “discourse anaphor”, that is, an adverbial

that signals ‘discourse relations between adjacent discourse units’ (Webber et al. 2001:1). In order to model its contribution, we argue that the antecedent is accommodated from the pronounced utterance preceding *otherwise* and can be furnished by any of the propositions (*sc.* sets of worlds) that serve to restrict the context set of this utterance, crucially deploying the “modal subordination” framework due to Roberts (1989 *et seq.*) in order to account for this. We appeal to information structural notions, and in particular to the notion of a current “Question under Discussion”, in determining the nature of the antecedent. Consequently, the chapter constitutes a **dynamic analysis of a discourse anaphor** (*sc.*, one that considers the development of discourse participants’ information states over time) that additionally accounts for its flexible distribution and previously unobserved limitations on its use.

Part II comprises a first semantic treatment of **the Negative Existential Cycle** (NĒC), 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 sentential negation. Here I propose a treatment where the PRIVATIVE—a grammatical category described in many Australian languages (*e.g.*, Dixon 2002)—is taken to realise the semantics of a negative existential. Diachronically, I provide evidence that erstwhile privatives generalise into sentential negators: an instantiation of the NĒC, giving a unified semantics for nominal and verbal negation. I take this cycle to provide support for a treatment of **negation as a two-place (modal) operator** and additionally suggest that this cycle can be united with general observations made in the grammaticalisation literatures regarding the functional pressures underpinning meaning change.

Part III comprises a description and analysis of the encoding of mood/“reality status” in Western Dhuwal/a (WD)—a variety (or set of varieties) of Yolŋu Matha spoken in northern Arnhem Land. Unlike neighbouring varieties, WD exhibits **cyclic tense** (a species of *metricity*/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. This chapter provides a semantics for WD’s four inflectional categories (in particular their modal contribution) which captures and predicts the negative asymmetry. Central to the analysis is the idea that the inflections encode 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 modal predicate modifier. In WD, the negative particles *yaka* and *bäyŋu* are two such modal expressions. In this sense, the account converges with observations made in Chapter II, *viz.* it advocates for a treatment of sentential negators and modal

expressions as a natural class. These two phenomena (to varying degrees) represent areal features of the languages of central Arnhem Land. Chapter III concludes with a note discussing change and variation with respect to the semantics of verbal inflections in varieties of Yolŋu Matha.

The remainder of this introduction introduces key assumptions and formal tools that will be used to analyse each of the phenomena introduced above. Additionally, each chapter separately engages with relevant literature.

0.2 Formal theories of displacement

As indicated above, the four chapters that constitute the primary contribution of this dissertation comprise four 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 be a particularly successful semantic 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). 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.

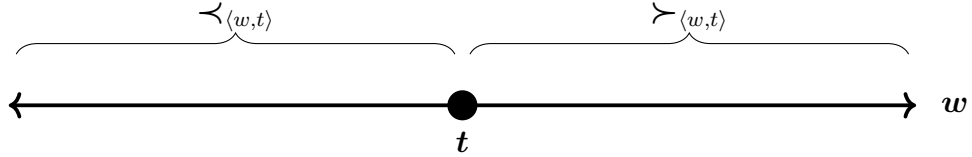
Formal approaches to semantics are largely developed from traditions of mathematical logic (*e.g.*, Montague 1970, see Janssen 2016 for an overview.) Importantly, the first formal temporal logics (*e.g.*, Prior 1957 *et seq.*) build on the frameworks of modal logic, in particular the notion of *possible worlds semantics*. Where a possible world w is an imaginable state of affairs, a possible ‘way the world could be’, 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.

Prior (1958 *et seq.*) analogised Past and Future 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).¹ In the case of temporal operators, the relevant accessibility relation \mathcal{R} is provided

¹See Copeland (2002, 2020) and Markoska-Cubrinovska (2016) for more on the foundational contributions of Arthur Prior to the development of modal (esp. tense) logic.

by \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 linearly ordered set of times $t, t', t'' \dots \in \mathcal{T}$. The sets of times made 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 et al. 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 1 below.)

- (1) **PAST** $_t \varphi = \exists t' \in \prec_{\langle w, t \rangle} \wedge \varphi(t')$
PAST φ 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 φ held at t' .

0.2.1 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 about future times — an intuition frequently attributed to Aristotle’s example of tomorrow’s sea battle (*De Interpretatione*, Ch. 9, see Øhrstrøm and Hasle 1995 for a review of the thinking around this issue.) Widely adopted and developed, the development of branching time models is attributed to Arthur Prior and (a 17-year old) Saul Kripke (see also Ploug and 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. 1967:121ff): namely an *Ockhamist* versus a *Peircian* conception of the truth of tensed propositions.²

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.”³ (Potential) futures, then, are calculated from with respect to a given evaluation time. Broadly speaking, $\mathbf{Fut}_t\varphi$, 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 φ is true (see Thomason 1970:267).⁴ 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 (*e.g.*, 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 \prec . In effect, this set \mathcal{I} can be recast as comprising a set of world-time pairs $\langle w, t \rangle \in \mathcal{W} \times \mathcal{T}$ (the so-called “parallel worlds” model).⁵

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 2 below.

Branches A branch $b \ni i$ which runs through any $i \in \mathcal{I}$ is a (maximal) linearly \prec -ordered subset of \mathcal{I} . In this sense, a branch can be taken to correspond to a possible

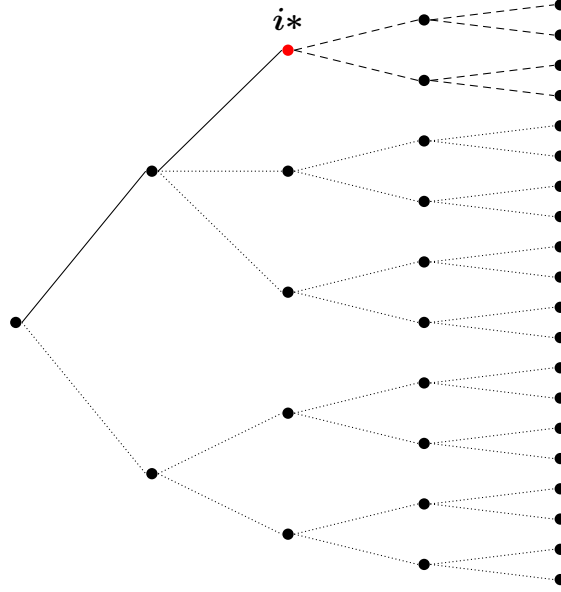
²In adopting these descriptors – recast in Burgess 1978 as the *actualist* and *antactualist* schools respectively – Prior alludes to observations made in William of Ockham's tract *De Prædestinatione* (1945 [ca. 1322-4]) and by Charles Sanders Peirce (*e.g.*, Collected Works, Vol 6, ¶368). The primary inflection 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 (1967:126ff) formalises and give a detailed comparison of these two systems (also additional discussion in Nishimura 1979, Øhrstrøm and Hasle 1995, 2020 including the so-called “Leibnizian” extensions made to the Ockhamist system.)

³“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 refers to “routes”: this terminology 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 and 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 (Zanardo 1996).

⁴In fact, on Thomason's modified, trivalent account of truth valuation, a given sentence is generally true at α iff it is true in all $h \in \mathcal{H}_\alpha$ (*i.e.* all those histories h that run through α) (1970:274ff). Thomason (1984) uses B_t equivalently. Tedeschi (1981:247) uses a closely related strategy.

⁵For discussion of the related set of objects $\mathcal{W} \times \mathcal{T}$ -frames — adopted in Condoravdi (2002), Kaufmann (2005), Kaufmann et al. (2006) a.o.— and a comparison with branching times, see Rumberg 2016a, Thomason 1970, 1984.

Figure 2. 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”.



world/a possible course of events. If $i \doteq \langle w, t \rangle$, then some b which contains i is formally a linearly ordered set of indices effectively modelling a timeline/set of possible development of a given world through time $\{\langle \langle w, t \rangle, \langle w, t' \rangle, \langle w, t'' \rangle, \dots, \langle w, t_n \rangle \rangle\}$.⁶ I will refer to these indices, which constitute the members 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 relations \succ, \preceq, \succeq).

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

Given that there are, in-principle, infinite possible futures for a given index, B_i will be taken to represent the set of all possible branches b that run through (that is, contain) a given index i ($b, b', b'', \dots \ni i$).

The “co-present” Øhrstrøm and Hasle (2020) additionally point out that, for Krifka, these points are “ranked” with respect to one another — where each “rank”/layer of the tree constitutes an equivalence class of “co-present” indices (modally accessible in a $\mathcal{W} \times \mathcal{T}$ -model, see Kaufmann et al. 2006:95).⁷ That is, indices that are

⁶Note 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 and Partee 2004, Dowty 1982, Landman 1991 a.o.) – this is also suggested in Dowty 1977 and Tedeschi 1981, which proposes an interval semantic formalism for branching futures.

⁷Similarly, Belnap et al. (2001:194ff) distinguish between *moments* (=indices) and *instants*, where the latter are partitions of a tree structure that represent “[a] horizontal counterpart of histories (=branches).”

nether successors or 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,^{8,9} Thomason and 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, they define an (anti)posteriority relation that holds between indices that aren’t branchmates:

(3) (Anti)posteriority (Thomason and Gupta 1980:311)

- a. i is **posterior** to j iff there is some copresent index of j (say, j') that is a successor to i $i \succ j \Leftrightarrow \exists j'[j' \simeq j \wedge i \succ j']$
- b. i is **antiposterior** \nprec 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 “right-linear”, depicting ‘our notion of necessity *given* the past, [where] only one past, the actual one, is possible’ (Burgess 1978:159).¹⁰

Settledness/historical necessity is normally expressed in terms of **historical alternatives**. This refers to the notion of equivalence classes of possible worlds ($\approx_t \subseteq \mathcal{W} \times \mathcal{W}$) : 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 (4) which will permit for a formal definition of settledness is given as (5).

⁸A 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 and Thomason 1970.

⁹This formalism, related to the alternativeness relation (\approx) of Thomason (1984:149), has a similar outcome/motivation to 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 Krifka’s observation referenced above, “rank” can be measured using a function $d : \mathcal{I} \rightarrow \mathbb{N}$ that returns the how many “nodes” a given index is from a defined “origin” node – equivalence classes are then given by $\approx = \lambda i \lambda i'. d(i) = d(i')$.

¹⁰That is, for any index there is only one unique sub-branch representing its history:
 $\forall a, b, b' [(b \prec a \wedge b' \prec a) \rightarrow (b \prec b' \vee b = b' \vee b \succ b')]$ (Landman 1991:105).

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

- a. $\forall t[\approx_t \text{ is an equivalence relation}]$

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.** $\forall w, w', t, t' [(w \approx_t w' \wedge t' \prec t) \rightarrow w \approx_{t'} w']$

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 (4b) 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 \preceq is monotonic (compare 4b').

(3) b'. **monotonicity of \preceq**

$$\forall i, i', i'' [(i' \preceq i \wedge i'' \preceq i) \rightarrow [i' \preceq i'' \vee i'' \preceq i' \vee i = i'']]$$

Importantly, the notion of historical necessity/alternativeness is deployed in linguistic semantics to capture a number of natural language phenomena (e.g., Condoravdi 2002, Kaufmann 2002). One such is Condoravdi's settledness condition, where a set of worlds (the context set) is the set of historical alternatives to w

(5) **Settledness for P .**

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

$$AT([t_0, _], w', P) \leftrightarrow AT([t_0, _], w'', P) \quad (\text{Condoravdi 2002:82})$$

A property P (*e.g.* an eventuality) is settled in a reference world w' iff P holds at a reference time t_0 in all of w' 's historical alternatives w'' as calculated at t_0 .¹¹

Once again, and drawing on the relations described above, this relation between context set and property can be recast in a branching-time model where an index i^* as in (5').

¹¹The AT relation holds between a time, world and an eventive property iff $\exists e[P(w)(e) \wedge \tau(e, w) \subseteq t]$ — *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 perspicuity, I abstract away from (davidsonian) event variables in this section.

(4') **Settledness for P** (branching times)

$$\forall b \left[b \in B_{i^*} \rightarrow \exists i' \left[i' \in b \wedge \forall i'' \left[i'' \simeq j \wedge [AT(i', P) \leftrightarrow AT(i'', P)] \right] \right] \right]$$

A property is settled at an evaluation index i^* iff all branches running through evaluation time i^* contain a co-present index $j \in \cup \simeq i'$ such that P is instantiated at j in all or none of these branches.

Von Prince's modal trichotomy As a consequence of this, Von Prince (2017, 2019) establishes a neat formal trichotomy between the ACTUAL, POTENTIAL and COUNTERFACTUAL domains by appealing to this framework (see also Rumberg 2016b:41). This is reproduced in (6). Each these domains is a subset of \mathcal{I} , partitioned by \prec .

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

- a. The ACTUAL (past/present) = $\{i \mid i \prec i^*\}$
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 = $\{i \mid i \text{ is unordered by } \prec \text{ w/r/t } i^*\}$
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 of these partitions is represented in Figure 2 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.)

0.2.2 Modal auxiliaries as quantifiers: Kratzer 1977 *et seq.*

Building on the tense logics introduced above, following (Kratzer 1977, 1981, 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 (7) below.

(7) 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 (7a-b) arise as a consequence of different **restrictions** that are made over the set of possible worlds. In effect, the deontic reading (7a) 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 (7b) 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 linguistic 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 et al. 2006).

A sentence of the form *must* φ asserts that φ 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* φ makes a weaker claim, namely that the truth of φ is *compatible* with those worlds. That is, *must* is a universal quantifier and *can* is an existential quantifier over possible worlds (8).

(8) The semantics of necessity/possibility modal auxiliaries (adapting from Kratzer 1977:346)

- a. $\llbracket \text{must} \rrbracket = \lambda f \lambda p \lambda w. \forall w' [w' \in \cap f(w) \rightarrow w' \in p]$
must p is true in given a modal base $f(w)$ if p follows from $f(w)$
- b. $\llbracket \text{can} \rrbracket = \lambda f \lambda p \lambda w. \exists w' [w' \in \cap f(w) \wedge w' \in p]$
can p is true in 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.” The formal implementation of orderings and comparisons of sets of worlds (or branches) is discussed in the main part of this dissertation.

could be enriched to
distinguish **modal**
bases and **ordering**
sources but unclear if
this is nec. at this
point?

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 $\text{DEONT}(i)$, 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 \mathcal{B}_i — i.e. a subset of those branches that run through i .

Proposals for Branching-theoretic lexical entries for the English modal auxiliaries in (8) are modified accordingly below.

(8') Proposed modification to semantics for modal auxiliaries (8) for \mathfrak{T} -frames.

- a. $\llbracket \text{must} \rrbracket = \lambda f \lambda p \lambda i. \forall b \ni i [b \in \cap f(i) \rightarrow \exists i' : i' \in b \wedge p(i')]$
must p is true if, along all the branches through i that are selected by the modal base $f(i)$, there is a branchmate i' such that p holds at i' .
- b. $\llbracket \text{can} \rrbracket = \lambda f \lambda p \lambda i. \exists b \ni i [b \in \cap f(i) \wedge \exists i' : i' \in b \wedge p(i')]$
can p is true if, there is some branch running through i , which is selected by the modal base $f(i)$ 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 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. 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.¹²

¹²Rullmann et al. (2008), for example show that, in Státimcets ([111] Salish: British Columbia), deontic and epistemic modals are separately lexified whereas quantificational force is contextually determined. A similar phenomenon is exhibited in Western Dhuwal(a), see Part III.

0.3 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 language 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 α comes to denote β , then γ *etc.* as an independent development across languages separated in space and time (see Deo 2015a, Eckardt 2011). In view of these robust cross-linguistic tendencies emerges the question of what is driving this change and *why*. 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.¹³ It is a goal, then, of the current research to contribute insights into the ætiology of these changes and to consider what, if any, light they may shed on the universal “structure” of the semantical domains that are investigated here.

0.4 Data & glossing conventions

Each of the four chapters in this dissertation makes use of (novel and published) data from different sources. Example sentences are glossed following (modified) Leipzig conventions (all adopted conventions listed on *pg.* ??).

Much of the Australian Kriol and Yolŋu Matha data was elicited between 2016 and 2019 from native speakers in Arnhem Land (in particular the Ngukurr and Ramingining communities) and Darwin. Where data is sourced from published material, a numbered bibliographic citation is provided. Where data is sourced from original fieldwork, the consultant’s initials and date of recording are provided in square brackets — *e.g.*, [JP 20201216].

¹³See also James Leow’s recent (2020) dissertation where he reports change in the modal necessity domain of Cuban Spanish.

Part I

The emergence of apprehensionality in Australian Kriol

Chapter 1

bambai as an apprehensional

1.1 Introduction

‘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 and Schultze-Berndt 2016 in which apprehensional readings emerge from erstwhile temporal frame adverbials that encode a relation of SUBSEQUENTIALITY between a discourse context and the eventuality described by the prejacent predicate.

Consider the contributions of *bambai* in the Australian Kriol sentence pair in (9):

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

a. **Subsequential reading of bambai**

yuwai! bambai ai gaman jeya!

yes! *bambai* 1s come there

‘Yeah! I’ll be right there!’

b. **Apprehensional reading of bambai**

najing, im rait! bambai ai gaan binijim main wek!

no 3s okay *bambai* 1s NEG.MOD finish 1s work

‘No, that’s okay! (If I did,) I mightn’t (be able to) finish my work!’

[GT 20170316]

To be explicated in this chapter, while the reading of *bambai* in (9a) roughly translates to ‘soon, in a minute’, this reading is infelicitous in (9b), where *bambai* is a discourse anaphor which contributes a shade of apprehensional meaning (i.e. indi-

cates that the Speaker’s hypothetically joining for dinner may have the undesirable possible outcome of him not finishing his work.) This chapter is concerned with the emergence of APPREHENSIONAL readings of the temporal frame adverbial *bambai* in Australian Kriol. Beginning with a brief overview of “apprehensionality” as a linguistic category (§3.2), it: describes the distribution of these two readings (synchronically, when do apprehensional readings “emerge” in context, (§ 1.2.3), considers how apprehensionality emerges out of so-called “subsequentiality” markers diachronically (§ 1.4), and proposes a unified meaning component for the two readings (§ 3).

1.1.1 Background

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

As shown in 9, Australian Kriol (hereafter Kriol *simpliciter*) has retained this function: in (10), *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’.

- (10) *main dedi imin go la det shop ailibala bambai imin*
 my father 3s=PST go LOC the shop morning **bambai** 3s=PST
kambek bla gugum dina bla melabat
 come.back PURP cook dinner PURP 1p.EXCL

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

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

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

In addition to the familiar ‘subsequential’ use provided in (10), *bambai* appears to have an additional, ostensibly distinct function as shown in (11) below.

- (11) **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 (11), the speaker asserts that if he doesn’t consume coffee then he may subsequently fall asleep at his workplace. In view of this available reading, Angelo and Schultze-Berndt (2016) describe an ‘apprehensive’ use for Kriol *bambai* — a category that is encoded as a verbal inflection in many Australian languages and is taken to mark an ‘undesirable possibility’ (256). In this case, *bambai* is plainly not translatable as an adverbial of the ‘soon’-type shown in (10). Rather, it fulfills the function of a discourse anaphor like ‘otherwise’, ‘or else’ or ‘lest’ (see also Webber et al. 2001, ?).

This chapter proposes a diachronically-informed and unified semantics for Kriol *bambai*. It begins with section 1.2, which motivates the grammatical category of ‘apprehensional epistemics’ as described in typological literatures. Section 1.2.3 describes the function and distribution of Kriol *bambai*, both in its capacity as a subsequential temporal frame adverbial (§1.3.1) and its apparent apprehensional functions (§1.3.2). Section 3 proposes a unified semantics for *bambai* and discusses the grammaticalisation of apprehensional meaning while section 3.4 concludes.

1.2 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 and Schultze-Berndt 2016:258). While descriptive grammars of these languages amply make use of these and similar categories,³ Lichtenberk (1995), Angelo and Schultze-Berndt (2016, 2018) and Vuillermet (2018) represent the few attempts to describe these markers as a grammatical category).⁴

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

⁴An edited collection on *Apprehensional constructions*, edited by Marine Vuillermet, Eva Schultze-Berndt and Martina Faller, is forthcoming via Language Sciences Press. The papers in this volume similarly seeks to address this gap in the literature.

1.2.1 Apprehensibility as a semantic domain

In the first piece of published work dedicated to the properties of apprehensional marking, Lichtenberk (1995) claims that the To'abaita ([mlu] Solomonian: 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. Shown here in (12), he distinguishes: (a) **apprehensive-epistemic** function, a **fear** function (b) and (c-d) **precautioning** functions.

(12) Apprehensional marking in To'abaita

a. **Apprehensive modal** $\Diamond p$

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

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

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

b. **Embedding under predicate of fearing** **FEAR**($\Diamond p$)

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

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

c. **Precautioning ("AVERTIVE" function)** $\neg p \rightarrow \Diamond q$

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)

d. **Precautioning ("in-case" function)** $\neg p \rightarrow \Diamond(R(q))$

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)

(12a) functions as a possibility modal encoding negative speaker attitude vis-à-vis the eventuality described in its prejacent (i.e. opening the oven in vain). This reading also obtains under the scope of a predicate *ma'u* 'fear' in (12b). 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 preadjacent (the following clause), which is interpreted as a possible future eventuality, similarly to the English archaism *lest*. In the *avertive* function $p\ ada\ q$ — translated as ‘*p* otherwise/or else *q*’— a conditional-like reading obtains: if *p* doesn’t obtain, then *q* may ($\neg p \rightarrow \blacklozenge q$). In “in-case” uses, while *q* is interpreted as a justification for the utterance of *p*, there is no reasonably inferrable causal relation between the two clauses. For AnderBois and Dąbkowski (2020), “in-case” uses involve some distinct “contextually inferrable” proposition *r* from which *q* follows. Effectively, if *p* doesn’t obtain, then some *r* (a consequence of *q*) may. In (12d), failing to take umbrellas might result in getting wet (should we get caught in the rain). 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 preadjacent 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 *kwajejje* ‘AVERTIVE’ 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.

Drawing on comparative evidence (*viz.* with Lau ([11u] Solomonic: Malaita) and other SE Solomonic languages), Lichtenberk argues that the apprehensional functions of *ada* are a result of the grammaticalisation of an erstwhile lexical verb with meanings ranging a domain ‘see, look at, wake, anticipate’ that came to be associated with warning and imprecation for care on the part of the addressee, before further developing the set of readings associated with the present day APPR marker (1995:303-4).

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

Adopting this taxonomy, AnderBois and Dąbkowski (2020) focus their attention on the “adjunct” uses of the A’ingae ([con] NW Amazon) apprehensional en-

clitic *-sa'ne*. That is, they model the contribution of *-sa'ne* in its functions as • a *precautioning* marker, analysed as encliticising to (subordinate) clauses (13a-b), compare To'abaita (12c-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 (14).

(13) Adjunct uses of apprehensional *-sa'ne* in A'ingae

(AnderBois and 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)

(14) AnderBois and Dąbkowski's (2020:382) semantics for A'inge apprehensional adjunct uses of *-sa'ne* (on its avertive/*lest*-like reading)

$\llbracket -sa'ne \rrbracket = \lambda q. \lambda p. \lambda w : \exists i [\text{RESP}(i, p)]. p(w) \wedge \forall w' \in \text{GOAL}_{i,p}(w) : \neg q(w')$

Supposing that some agent *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 and 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, "inferred" proposition *r*. On the basis of the apparent loosening of morphosyntactic restrictions between each 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.⁵

⁵Beyond the adjunct uses analysed here, A'inge *-sa'ne*, Dąbkowski and AnderBois (ms) additionally report uses corresponding to the APPREHENSIVE and COMPLEMENTIZER uses described above.

1.2.2 Apprehensibility in the Kriol context

Dixon (2002:171) refers to the presence of nominal case morphology that marks the AVERSIVE as well as the functionally (and sometimes formally, see Blake 1993:44) related verbal category of apprehensionals as ‘pervasive feature of Australian languages’ and one that has widely diffused through the continent.^{6,7} 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 (16) below are all adapted from ?.

(16) Apprehensional marking in Diyari

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

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

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

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

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

‘I’m afraid some reptile may bite me’ (228)

Examples are replicated below. It is not immediately clear what alternations to the semantics in (14) would be required 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*. 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 somewhat different path.

(15) Non-adjunct uses of =*sa’ne* (Dąbkowski and AnderBois ms:3)

- a. COMPLEMENTISER use

tsai-ye-sa’ne
 bite-pass=APPR

‘You might get bitten.’

- b. APPREHENSIVE use

tsama ña dañu=sa’ne-khe dyuju-je-ya
 but 1s be hurt-APPR-thus be afraid-IPFV-ver

‘I was afraid I’d get hurt.’

⁶Dixon in fact attributes the paucity of work/recognition of this linguistic category to ‘grammarians’ eurocentric biases’ (171).

⁷Aversive 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 and Dąbkowski 2020, Vuillermet 2018)

- d. *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 (16) 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).⁸ In all cases, the predicate over which *-yathi* scopes is **modalised** and expresses a proposition that the speaker identifies as ‘unpleasant or harmful’ (?227). Little work has been undertaken on the emergence of these meanings.⁹

As we will see in the following sections, apprehensional uses of preposed *bam-bai* in Kriol have a strikingly similar distribution and semantic import to the apprehensional category described in the Australianist and other typological literatures. Angelo and Schultze-Berndt (2016) focus their attention on demonstrating the cross-linguistic attestation of a grammaticalisation path from (sub)sequential temporal adverbial to innovative apprehensional marking. They suggest that, for Kriol, this innovation has potentially been supported by the presence of like semantic categories in Kriol’s Australian substrata. Data from virtually all attested languages of the Roper Gulf are shown in (17). 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 ($\diamond p$).

(17) Apprehensional/aversive marking in Roper Gulf languages

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-ḍaṅgu-yuṇ ṇaṛa-waṭi-ji, a-waṭu-ḍu aguṛa-mili?-ṇu-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)

⁸Austin claims that these clauses are invariably ‘structurally dependent’ (230) on a ‘main clause’ (viz. the antecedent.) We will see in what follows a series of arguments (to some degree foreshadowed by Lichtenberk (1995: 307)) to eschew such a description.

⁹Dixon (2002:171) and Blake (1993:44) are partial exceptions although these both focus on syncretism in case marking rather than dealing explicitly with the diachronic emergence of the apprehensional reading.

c. **Ngalakan**

garku buru-ye mele-ŋun warŋ'warŋ'-yi'
 high 3ns-put **APPR**-eat.PRES crow-ERG

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

d. **Rembarrnga**

ŋaran-mə?-ŋam? ŋa-na lanə ɾalk
 3s>1p.INCL-**APPR**-bite.PRES 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-!a ɳariya-yur, wuniŋgi ŋula ɳingu-way
 go-IMP 3s-ALL **lest** NEG 3s>2s-give.FUT

'Go to him, or else he won't give it to you.'

(Heath 1981:187, cited also in A&SB:284)

g. **Mangarayi**

bargji Ø-ŋama balaga ña-way-(y)i-n
 hard 2s-hold **lest** 2s-fall-MOOD-PRES.

'Hold on tight lest you fall!'

(Merlan 1989:147, cited also in A&SB:284)

As shown in (17), there is a diversity of formal strategies deployed (or combined) in these languages to realise apprehensional meaning: suffixation inside the verbal paradigm (17a-b), prefixation to the verb stem (17b-d), a separate apprehensional particle (17e-g).

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.

1.2.3 Temporal frame adverbs and apprehensionality

Angelo and 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 1.1 (partially adapted from Angelo and 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 and Schultze-Berndt (2016:288) additionally suggest that there is some evidence of apprehensional function emerging in the *bambai* cognates reported in Torres Strait Broken, [tcs], Hawai’ian Creole [hwc] and Norf’k.

Table 1.1. Etyma and polysemy for apprehensional modals

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

Compare these uses of Mangarayi *baɭaɭaga~baɭaga* in (18) to (17g) above. In (18a), Merlan (1989:138) notes that the temporal frame uses of *baɭaɭaga*—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, *baɭaga* 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.

(18) **Mangarayi**

- a. *ɔayi ŋa-yirri-wa-ya-b gurrji, baɭaɭaga ga-ŋa-wa-n*
 NEG 1s>3s-see-AUG-PNEG long.ago **today** 3-1s>3s-go.to.see-PRES

‘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 baɭaga yag*
 quickly ask-IMP **before** go

‘Ask him quick before he goes.’

(Merlan 1989:147, cited also in A&SB: 284)

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

- c. *a-ŋaʎa-yag* ***baʎaga*** *miʎilitma*
 HORT-1p.INCL-go **before** sunset

‘Let’s go before the sun sets.’ (Merlan 1989:147)

- d. *ŋiñag* *ŋaʎa-bu-n* *guruuggurug-bayi*, ***wuɾay*** *doʔ*
 PROH 1p.INCL-kill-PRES white.people-FOC **later** shoot
a-ŋayan-ma
 IRR-3s>1p.INCL-AUX

‘We can’t kill white people. Later on they might shoot us.’
 (Merlan 1989:147)

(19) Marra

- wayburi* *jaj-gu-yi* ***wuninggi***: *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.’
 (Heath 1981:360)

Note additionally the apparently apprehensional use of *wuɾay* ‘later’ in (18d). While Merlan makes no mention of the “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.

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

1.3 The distribution of *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 and Schultze-Berndt ([A&SB], 2016) and the Kriol Bible ([KB], The Bible Society in Australia 2007) in addition to elicitation from, and conversations with, native speakers of Kriol recorded in Ngukurr predominantly in 2016 and 2017.

1.3.1 Temporal frame use

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

Formally, we can model the contribution of temporal expression by assuming a set \mathcal{T} of points in time which are all strictly ordered with respect to each other chronologically. This is represented by a PRECEDENCE RELATION \prec (where $t_1 \prec t_2 \leftrightarrow t_1$ precedes t_2). A TFA like *today*, then, is a predicate of times: it picks out all the points in time between the beginning and the end of the day of utterance. In the sentence *Mel ate today*, the TFA restricts the instantiation time of the eating event (t_e) to this interval. That is, *Mel ate today* is true iff Mel ate at t_e and $t_1 \prec t_e \prec t_2$.

This can be represented using an interval notation as $t_e \in [t_1, t_2]$.

As discussed in §1.1, 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 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 preadjacent 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 (20).

- (20) 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

3s woman have TR girl **bambai** girl big ATTR 3s

nao'wa catch him, him méloa have em bun-ngilla.

husband catch 3s 3s pregnant have TR girl

By-and-by *nimm big fellow, by-and-by bun-ngilla big fellow, him*

bambai boy big ATTR **bambai** girl big ATTR 3s

catch him.

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_ℓ. Then, when the girl_ℓ had grown up, her husband got her_ℓ pregnant, she_ℓ 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, (20) 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 (20), 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. 10), the SUBSEQ-denoting function of *bambai* shown here has been retained in Kriol. This reading is shown again in the two sentences in (21). The schema in (21c) provides an informal representation of this context-dependent, "subsequential" temporal contribution.

- (21) 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
 1p.EXCL PST all move there now sit there now **bambai**
elikopta bin kam deya na, detlot deya na garra kemra
 helicopter PST come 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 ————— 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 (21a) 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 prejacet 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 $t_e \in \{t'_e : t_r \prec t'_e \prec t^+\}$.¹⁰ The subsequent verse *Bambai na lb bin abum najawan lilboi* (KB Jen 4:2) ‘Soon after *that*, Eve had another boy’ further displaces the birth event of Abel. Subsequential TFAs are distinguished by this ‘near future’ restriction, underpinned by a set of conversational expectations

¹⁰This 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 prejacet had better have obtained for the whole sentence to be judged true. See §3 for further discussion of this device.

over reasonable degrees of “soonness.”

Here we have seen an overview of the semantic contribution of *bambai* in its capacity as a ‘subsequential’ TFA. A discussion of apprehensional uses follows.

1.3.2 Apprehensional use

In his survey of “apprehensional modality”, Lichtenberk describes apprehensionals like To’abaita *ada* as having a dual effect on their prejacent: *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’ (1995:295-6). While we are not committed to Lichtenberk’s metalinguistic labels at this stage (to be further investigated below), a modal meaning for Kriol *bambai* is shown below. We will see how use diverges from the subsequential/temporal frame uses described so far.

1.3.2.1 *p bambai q* : the conditional use

Indicative ‘nonimplicational.’ Angelo and Schultze-Berndt (2016:272ff) observe that apprehensional *bambai* occurs with both: an ‘admonitory’ illocutionary force in a precautioning/warning sense (*e.g.* 22a); in addition to declarative illocutionary acts where the speaker formulates a prediction of undesirable eventuality as the possible outcome of some discourse situation (*e.g.* 22c).

The sentence data in (22) demonstrate how *bambai*-sentences are used to talk about undesirable possible future eventualities. Modelling this, we enrich the time model introduced in the previous subsection by postulating a set of *possible worlds* \mathcal{W} . Following standard assumptions, a “proposition” ($p \in \mathcal{W} \times \{\mathbb{T}, \mathbb{F}\}$) is a set of possible worlds, namely those in which it is true (*e.g.* Kratzer 1977, Kripke 1963, Stalnaker 1979, *a.o.*)

Generally speaking, the construction *p bambai q*, on its apprehensional reading, appears to be encoding converse nonimplication between its arguments: ‘if some situation *p* doesn’t obtain in *w*, then the (unfortunate) situation described in *q* might’ ($\neg p(w) \rightarrow \blacklozenge q(w)$). Additional data showing these uses is shown in (22) below.

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

Ey! bambai₁ yundubala breikim thet motika, livim. bambai₂ dedi
Hey! bambai 2d break DEM car leave bambai Dad
graul la yu
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 ritjibat mi na bambai ai kili yu ded en mi nomo*
 2s stop chase.IPFV 1s EMP **bambai** 1s kill 2s dead and 1s NEG
leigi meigi yu braja jeikab nogudbinji
 like make 2s 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*
 1s IRR go LOC shop PURP buy food **bambai** 1s (POSS) have
no daga ba dringgi main medisin
 no food PURP drink my medicine

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

In (22a), 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 ($\neg p \rightarrow \blacklozenge q$) — 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 (22a), appears to have a similar function, although has no overt sentential antecedent.¹¹ 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. (a) shows a similar use. (22c) provides an example of an apprehensional/LEST-type reading occurring in a narrative context: here the Speaker identifies a possible unfortunate future situation in which she has no food with which to take her medicine. Here, in uttering the *bambai* clause, she asserts that such an eventuality is a possible outcome should she fail to go to the shop to purchase food. This reading is robustly attested in contexts where the antecedent is modified by some irrealis operator. The example from (11) is repeated below as (23): here *bambai* makes a modalised claim: if κ is a set of worlds in which I drink coffee at t' (and $\bar{\kappa}$ is its complement), then an utterance of (23) asserts that $\exists w \in \bar{\kappa} : \text{I sleep by } t^+ \text{ in } w$.

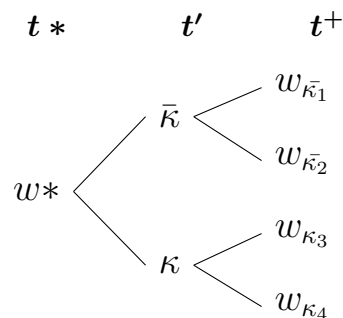
¹¹In reconstructing this sentence context, a consultant unprompted introduced an explicit antecedent: *gita burru det mutika, bambai yu breigim im* ‘get off the car! Otherwise you might break it!’ [GT 20170316]

- (23) 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 $\{w' \mid w' \in \bar{\kappa}\}$. In those worlds where he fails to drink coffee, there exist possible futures $(w_{\neg\kappa_1} \vee w_{\neg\kappa_2})$ in which he is asleep by some future time t^+ .

Of particular note is this behavior 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.) This appears to be categorical. This is demonstrated in (24) below, where a SUBSEQ reading of *bambai* is infelicitous. Only the apprehensional reading is available, where the preajacent *mi gurrumuk* 'I fall asleep' is interpreted as a possible outcome of **not** watching a film.

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

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

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

Available reading: I'll watch a film, otherwise I may fall asleep

The relationship between the antecedent clause and the context on which *bambai* is anaphoric is further discussed below in §§2.

Counterfactual 'nonimplicational' *bambai* similarly receives an apprehensional reading in subjunctive/counterfactual contexts: those where an alternative histori-

cal reality is considered (see, e.g., von Fintel 2012). (25) below provides an example of apprehensional *bambai* in one such context.

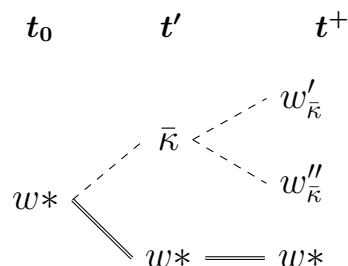
In (25), the Speaker identifies that in some alternative world (w') in which he behaved differently to the way in which he did in the evaluation world ($w' \not\approx w^*$)¹² — namely one in which the event described in the antecedent failed to obtain — there is a (significant) possibility that he would have slept at work. Consequently, and comparably to the example (24) above, *bambai* modalises its prejacent: it asserts that $\exists w'[w' \notin \kappa \wedge \text{I sleep by } t^+ \text{ in } w']$.

- (25) a. *ai=bin dringgi kofi nairram bambai ai bina silip~silip-bat*
 1s=PST drink coffee night **bambai** 1s PST:IRR sleep~DUR-IPFV
la wek
 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 not drink coffee at t' — $\{w' \mid w' \in \bar{\kappa}\}$. The Speaker asserts that there are some possible near futures to $\langle t', w_{\bar{\kappa}} \rangle$ in which he falls asleep by some time t^+ , posterior to t' .

The Kriol apprehensional data described so far is intuitively unifiable and bears some amount of syntactic similarity to familiar conditional constructions (*i.e.*, that of an “infix” two-place relation between two propositions.) For all examples we have seen so far, *bambai* introduces an predicate that describes an eventuality q which construes as undesirable for the speaker. It appears to that this eventuality is a *possible, foreseeable* future outcome of some other contextually provided proposition, which is often interpreted as the negation of a previous clause.

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 those contexts where the prejacent is understood to be being asserted of a future time ($t_e \succ t^*$) or a different world ($w' \not\approx w^*$), those where the Speaker could not possibly have access to a determinate set of facts, the Speaker **R**-implicates

¹²A definition and further discussion the \simeq -relation (“historical alternative to”) is given in (4).

(see Horn 1984) that they are making a prediction; the entire proposition construes as modalised. The reference world and time are provided by some tensed or modalised antecedent proposition, linguistically overt or otherwise. Of additional interest is the fact that, in the examples we have seen so far, the instantiation of the predicate that is modified by *bambai* appears to be a potential consequence of the non-instantiation of the antecedent to *bambai*. This observation is further spelled out in §3.2 below. We turn first to additional, “apprehensive” uses of *bambai*.

1.3.2.2 *bambai* as a modal adverbial

In contrast to these ‘nonimplicational’ or precautioning (*i.e.* LEST/‘in case’-type) readings presented immediately above, *bambai* also appears to function as an epistemic adverbial with apprehensional use conditions: Lichtenberk’s “*apprehensional-epistemic*” function and Vuillermet’s “*apprehensive*”.¹³ 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 to demonstrate that (unlike apprehensive markers in other languages), syntactically speaking, *bambai* is **not** a subordinator: it doesn’t introduce a dependent clause (e.g., Blühdorn 2008, Cristofaro 2005). Consider first the elaboration of (23) in (26) below. Here there is no explicit linguistic antecedent for *bambai*, whereas its prejacent encodes an unfortunate future possibility.

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

- A. *yu wandi kofi muliri?*
 2s want coffee KINSHIP.TERM
 ‘Did you want a coffee, *muliri*?’
- B. *najing, im rait muliri! bambai ai kaan silip bobala!*
 no 3s okay KINSHIP.TERM **bambai** 1s NEG:IRR sleep poor
Ai mait weik ol nait... garram red ai...
 1s might awake 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 (27) below, **B** deploys *bambai* to the same effect in two single-clause utterances; each encoding an unfortunate future possibility.

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

¹³Note however that *bambai*₁ in (22a) also represents a use like this.

- 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]

Additionally, in (28) below, Lichtenberk’s (1995) “epistemic downtoning” function is clearly shown, *bambai* behaving as a species of possibility modal (*bambai* $q = \blacklozenge q$). 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.)

- (28) **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.’ [A] 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 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/it’s gonna be Hanna*, see also Condoravdi 2003, Werner 2006, Winans 2016.) Giannakidou and 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 always encode epistemic necessity. We will have further observations to make on these facts below.

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 (29), *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 usage in (28), *bambai* appears to behave here as an apprehensive modal, encoding an unfortunate possible eventuality.

- (29) *Wotfo yu nomo bin jingabat basdam, bambai ola men bina*
 why 2s NEG PST think before, **APPR** all man PST:IRR
silipbat garram yu waif? Yu bina meigim loda trabul blanga
 sleep.IPFV with 2s wife 2s PST:IRR make much trouble DAT
melabat
 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]

if-Conditionals In contrast to the 'nonimplicational' (*i.e.* precautioning/LEST-type) readings presented immediately above, Kriol also forms conditional sentences using an English-like *if... (then)* construction. The two sentences in (30) give examples of an indicative and subjunctive *if*-conditional, where *bambai* modifies the consequent clause (the "apodosis.")

- (30) 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*
 if 1s=NEG=PST-IRR drink the coffee **bambai** 1s([#]=NEG)=PST-IRR
gurrumuk jeya
 be.asleep there

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

(This reading is available if *=ni(m)o* 'NEG' is omitted) [GT 16032017]

The contrast between (30a,b) and their *if*-less counterparts in (23a;25a) respectively, 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 (30) diverge sharply from this interpretation. That is, each of the *if p, bambai q* sen-

tences in (30) asserts a straightforward conditional $p \rightarrow \blacklozenge q$: should the antecedent proposition hold (have held), then q may (have) obtain(ed).

In this respect, similarly to the monoclausal uses presented in this subsection, *bambai* appears to be behaving truth conditionally as a modal expression encoding possibility. The MODAL DOMAIN 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. Kratzer 1979, Lewis 1975, von Stechow 1994).

Apprehensionality: competition with *marri* As with the other uses discussed in this subsection, then, *bambai* functions as a possibility adverbial whose domain can be restricted by the presence of an *if*-clause. As a possibility adverbial, *bambai* has entered into the semantic domain of other Kriol lexical items including *marri* ‘maybe’. Crucially though, the examples in (31-32) below serve to evince the perseverance of apprehensional expressive content in these syntactic frames. In (31a), 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.¹⁴

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

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

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

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

‘If I go on holiday, my dog may die’ \nrightarrow I’m likely to cancel my holiday
[A] 04082017]

Here, the contrast between (a) and (b) is attributable to the expressive content of *bambai* (e.g. Kaplan 1999). That *bambai* licenses an implicature that the Speaker is considering cancelling her holiday to tend to her sick pet, an inference that isn’t invited by neutral epistemic counterpart *marri* provides strong evidence of the semanticisation of *bambai*’s expressive content (similar to ‘sincerity’- or ‘use-conditions’ for a given lexical item.) The extent of this process is further evinced in (32) below, where the selection of *marri* instead of *bambai* gives rise to a conventional implicature that the Speaker’s utterance of (32) ought not be interpreted as the expression of a desire to prevent her daughter’s participation in the football game.

¹⁴In this second example with *marri*, the consultant suggests that (in contrast to (a)): *tharran jeya im min yu garra gu la holiday* ‘that one means you’ll go on your holiday.’

(32) **Context:** I am cognizant of the possibility that my daughter injures herself playing rugby.

#Context: I am uncomfortable with the likelihood of my daughter injuring herself playing rugby.

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

‘If she plays footy my daughter may break her leg’ \nrightarrow [so she shouldn’t play]
 [AJ 04082017]

Based on this evidence, we may conclude that the ostensible encroachment of *bambai* into the domain of epistemic adverbials has given rise to a privative dyad (i.e. ‘Horn scale’, see Horn 1984: 33-8) of the type $\langle \textit{marri}, \textit{bambai} \rangle$ — that is, an utterance of *marri p* conventionally implicates that the Speaker was not in a position to utter *bambai p*. That is, the meaning of the ‘weaker’ expression comes (via hearer-based/ Q -implicature) to represent the relative complement of the stronger in a given semantic domain: here that the neutral epistemic adverbial comes to conventionally implicate *non-apprehensional* readings/modalities:

$$\llbracket \textit{marri} \rrbracket \approx \Diamond \setminus \llbracket \textit{bambai} \rrbracket$$

1.3.3 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 (33).

(33) **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 ($w' \simeq w^*$) (i.e., in **factual, nonfuture** contexts).
- b. In other (**nonfactual**) contexts (that is, in predications that fail to satisfy SETTLEDNESS) apprehensional readings “emerge”.
- c. In apprehensional contexts, LEST-type uses occur in a *p bambai q* construction. Here, $\Diamond q$ is interpreted relative to $\neg p$

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^*/\textit{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* give 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 1.2 below.

Table 1.2. Semantic operators¹⁵ that give rise to modalised readings of *bambai*

GLOSS	Form	Example
IRREALIS	<i>garra</i>	<i>airra dringgi kofi bambai mi gurrumuk</i> ‘I’ll have a coffee or I might fall asleep’
NEGATIVE IRREALIS	<i>kaan</i>	<i>ai kaan dringgi kofi bambai mi nomo silip</i> ‘I won’t have a coffee or I mightn’t sleep’
C’FACTUAL	<i>bina</i> PST:IRR	<i>aibin dringgi kofi nairram bambai aibina gurrumuk</i> ‘I had a coffee last night or I might’ve passed out’
IMPERATIVE	∅	<i>yumo jidan wanpleis bambai mela nogud</i> ¹⁶ ‘Youse sit still or we might get cross’
PROHIBITIVE	∅ [nomo] IMPR	<i>nomo krosim det riba, bambai yu flodawei</i> ‘Don’t cross the river or you could be swept away!’
GENERIC	∅	<i>im gud ba stap wen yu confyus, bambai yu ardim yu hed</i> ‘It’s best to stop when you’re confused, or you could get a headache’
NEGATIVE GENERIC	∅ [nomo] GEN	<i>ai nomo dringgi kofi enimo, bambai mi fil nogud</i> ‘I don’t drink coffee anymore or I feel unwell’
CONDITIONAL	<i>if</i>	<i>if ai dringgi kofi, bambai ai kaan silip</i> ‘If I have coffee, then I mightn’t sleep’

1.4 Apprehensional readings emerge in subsequen- tial TFAs

Here I consider a number of linguistic factors that appear to have contributed to the emergence of apprehensional readings of TFAs. As shown in §1.2.3, this meaning change pathway (and apparent polysemy between temporal and apprehensional uses) has been observed by a handful of other authors (Angelo and Schultze-Berndt 2016, 2018, Boogaart 2020) on the basis of data including German *nachher* and Dutch *straks* in addition to Kriol *bambai* (see also Kuteva et al. 2019:427-8). Parallels between *bambai* and *straks*, for example, are shown in the contrast between a subsequential and apprehensional reading in (34) below.

(34) The *straksconstructie* in Dutch (see also Boogaart 2020)

¹⁵This is not intended to suggest that these operators are in any way semantic primitives, Table 1.2 is to be read as a non-exhaustive list of linguistic devices that appear to associate with nonfactual mood.

¹⁶This example due to Dickson (2015:168 [KM 20130508]).

- 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 3.50, 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 be closed!'

[Mireille L'Amie, *p.c.* 20200130]

bambai and conditional modality Numerous authors (*e.g.*, Blühdorn 2008, Culicover and Jackendoff 1997, Harder 1995, Klinedinst and Rothschild 2012, Schmerling 1975, Stukker and Sanders 2012 *a.o.*) have investigated the semantic dependencies that often obtain between clauses that are *syntactically coordinate*. These include the "conditional readings" of *and* and *or*, in addition to asyndetic constructions of the type: *John comes, I leave* (where my departure is interpreted as a consequence of his arrival.) In these cases, although the second clause is interpreted as being "semantically subordinate" to the first, this relation is not made explicit in the syntax (see Ch. ?? and also Roberts 1989, 1990a, 2020 for discussion and an implementation of "modal subordination".)

Relatedly, consider the parallels between interrogative and conditional clauses (operationalised in an information structure framework in § ?? above.) The functional motivation for these appears to be that conditional apodoses (consequent clauses) can be understood as answering a "question" posed by the antecedent/protasis. This is clearly demonstrated for Danish by Harder (1995:101-2), replicated in (35) below.

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

A. *Kommer du i aften?*

Are you coming tonight?

B. *ja*

Yes

A. *Så laver jeg en lækker middag*

Then I'll cook a nice dinner.

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

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

Harder (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.”

Consider the discourses in (36-38) below.

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

A. *gita la jeya!*
get off LOC there!

B. *ba wani?*
why?

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

‘Get off of there [...why?...] In a minute, you’ll break the car!’[GT 16032017]

(37) **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?...] In a minute, you’ll be swept away!’[GT 16032017]

(38) **Context:** A snake slithered past A’s leg.

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

B. *ba wani?*
why?

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

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

In all of the short discourses above, the translation provided elucidates the capacity of the temporal properties of *bambai qua* sequential TFA to implicate additional nontemporal properties of the relation between the clauses it links. In each of the examples, A’s response identifies an eventuality that might obtain in the near future (of the speech-time for (36-37) and of the slithering/frightening-time for (38)).

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 (36), 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 (Geis and Zwicky 1971:see).

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

- (39) 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 [39a] When one clause refers to a non- past event or to a state, the reading is typically causal, as in [39c] and [39d], but the causal reading is not required, as [39b] indicates. The contrastive readings in [39b] signal polysemy, i.e. conventionalized meanings, not just conversational. (1991:195)

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" (*viz.* e_1 causes e_2).

***bambai* and apprehensional expressive content** Crucially, apprehensionals additionally conventionally implicate information about the Speaker's attitude vis-à-vis their prejacent. Angelo and Schultze-Berndt (2016) propose that:

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

Synchronically, the apprehensional reading frequently occurs embedded under a predicate of fearing or with a directive/prohibitive antecedent all of the examples (36-38) also show examples of this. Relatedly, Boogaart (2020:192ff) 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*. The selection of a subsequential TFA instead of a different epistemic adverbial in some unsettled context invites the inference that the Speaker is negatively disposed to the event described in the prejacent.

Marshalling cross-linguistic evidence of this path of change,¹⁷ 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.’ What’s more, tracking the facts for *bambai* presented above, these TFAs appear to have encroached into the semantic domain of epistemic adverbials, where they are reported to encode negative speaker affect with respect to their prejacent (relative to the other members of these semantic domains.)^{18,19}

Additionally, *nachher* appears to have acquired a similar semantics to *bambai*,²⁰ shown by its felicity in the discourse in (40) below, where, tracking ⟨*marri, bambai*⟩, *nachher* appears to have encroached into the semantic domain of *vielleicht* ‘perhaps.’ In these contexts, *nachher* asserts negative speaker attitude with respect to its prejacent in terms relative to neutral *vielleicht* (Hanna Weckler, p.c.).

(40) A two-participant discourse in German

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

¹⁷See also Angelo and Schultze-Berndt 2018 for these observations and insightful comments about the properties of these adverbials in Kriol and German. Related observations are made for Dutch by Boogaart (2020).

¹⁸Thanks to Hanna Weckler and Mireille L’Amie for discussion of German and Dutch intuitions respectively.

¹⁹Compare 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 to read 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]

²⁰Although see Angelo and Schultze-Berndt (2018:30) for a discussion of distributional differences between these two items.

- B** *warum?*
why?
- A₂** *nachher wird die Party noch abgesagt!*
nachher INCH the party *noch* cancelled

'I hope it doesn't rain today [...why?...] Then the party might be cancelled!'
- B₂** *nein, das ist nicht möglich*
no, that is not possible
- B'₂** *#nein, das wäre gut!*
no, that would.be good
- B''₂** *ja, das ist möglich aber das wäre nicht so schlimm!*
yes, that is possible but that would.be NEG so bad!

Similarly to the Kriol data, German *nachher*, a TFA encoding subsequenceality, has developed the characteristics of an apprehensional epistemic, a likely consequence of frequent embedding in the discourse contexts discussed above. Following the literature on expressive content and use-conditional semantics (e.g. Gutzmann 2015, Kaplan 1999, Potts 2007), it is fruitful to model the 'negative speaker attitude' component of the meaning of apprehensionals as a conventional implicature, inhabiting a second semantic "dimension"—connected to but distinct from the truth conditions set out above. The infelicity of (40B₂)'s utterance shows that negation cannot target this component of Speaker meaning, an argument for its treatment as a non-truth-conditional, not-at-issue component of the semantics: the domain of CONVENTIONAL IMPLICATURE. The proposals of Gutzmann (2015), McCready (2010), Potts (2007) (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. Borrowing the informal "fraction notation" deployed by these authors, we can tease apart the asserted and implicated components of the *bambai* clause in (38) – this is given in (41).

- (41)
$$\frac{S \text{ is worried about/negatively disposed to snake bites}}{S \text{ might have been about to be bitten by a snake}}$$

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

Chapter 2

The antecedent *p*: restriction and partition

We have seen throughout that *bambai* can give rise to readings of implicational relations between the two propositions. §3.2 defended an analysis of *bambai* that claims that the TFA and modal uses emerge from reasoning about the speaker's information state with respect to the realisation (sc. settledness) of the predicate it modifies. The following discussion sketches a way to reconcile these observations.

As discussed in some detail in Chapter ??, a fruitful way of conceiving of conditionals is as a type of modality, where the quantificational domain of the modal is explicitly restricted. This is achieved by intersecting a (contextually-retrieved) modal base with a proposition (*viz.* that proposition denoted by the conditional antecedent) (Kratzer 2012, von Stechow 1994).

The “precautioning” uses described here (*i.e.*, those of the form *p bambai q* are interpreted as introducing an eventuality which is a possible consequence of the antecedent subject's failure to attend to some situation which is described in the antecedent clause (roughly $\neg p(w) \rightarrow \blacklozenge q(w)$). In other words, these uses of *bambai* strongly resemble those of *otherwise*, as described in Ch. ?? (with the addition of apprehensional expressive content and apparent differences in modal force).

For the now-familiar example in (11 [=23]) above, as shown above, the presence of *garra* in the antecedent clause triggers an unsettled predication, yielding an apprehensional reading of the *bambai* clause. *bambai* merges with an anaphoric proposition (which is linguistically overt in the current example but need not be), taking its complement as a restrictor to the modal base (yielding m^+ to borrow Kratzer's (1981) notation). The denotation for (11) is given in (42) below.

$$(42) \quad \llbracket \textit{bambai mi gurrumuk} \rrbracket^c = \exists w' \in \text{BEST}_o(m^+, t, w) \wedge \text{subseq}(\text{PASS.OUT}, t, w') \\ \text{Where } m^+ = \{w' \mid w' \in \bigcap (m_{\text{meta}}(w) \cup \text{DRINK.COFFEE})\}$$

The treatment as described in the current subsection is not, however, complete. A problem persists in understanding the relationship that the overt linguistics

tic clausal antecedent bears to the proposition on which *bambai* is anaphoric. It is plainly not, for example, the case that the complement of *airra dringgi kofi* ‘I must drink coffee’, is the proposition on which provides the restriction on the conversational background that is being quantified over. Such a treatment would incorrectly yield an interpretation truth-conditionally identical to: ‘I will fall asleep if it is not the case that I must drink coffee.’ This particular question may be solvable by adopting a modal subordination approach following Roberts 1989 *et seq.*

Similarly, as discussed in §1.3.2.2, with *if...bambai* constructions, there appears to be no additional operation performed upon the *if*-marked antecedent — that is, the *if*-marked antecedent predicate is precisely the proposition upon which *bambai* is anaphoric.

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

Chapter 3

A semantics for *bambai*

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

3.1 Subsequentiality

§1.3.1 showed how Kriol has retained the temporal frame uses of *bambai* derived from ‘by-and-by.’ For Dowty (1979, 1982), time adverbials are taken to denote sets of sets of temporal intervals. A frame adverbial¹ then, takes a predicate and says that its instantiation is contained in a given temporal interval. Following assumptions made by Kamp (1971:238ff) and Johnson (1977:115), Dowty (1979:29ff) 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 prejacent with respect to some contextually-provided reference time. (43) represents a proposal to capture this relation.

(43) **SUBSEQUENTIAL INSTANTIATION** (intensionalised)

$$\text{SUBSEQ}(P, t_r, w) \stackrel{\text{def}}{=} \exists t' : t_r \prec t' \wedge P(t')(w) \wedge \mu(t_r, t') \leq s_c$$

A subsequentiality relation SUBSEQ holds between a predicate P , reference time t_r and reference world w iff the P holds in w at some time t' that follows t_r .

Additionally, it constrains the temporal distance $\mu(t_r, t')$ between reference

¹The term “temporal frame adverbial” due to Bennett and Partee 2004, and equivalent to “locating adverbial” for Kamp and Reyle 1993:613)

and event time to some value below a contextually-provided standard of ‘soon-ness’ s_c .

maybe the t' variable
could be not
existentially bound?

The relation between a contextually-provided standard and measure function $\mu(t_1, t_2)$ analysis² builds in a truth-condition that captures variable intuitions about the falsity of a statement such as *Eve fell pregnant then shortly afterwards gave birth to a son* in some situation where the birth of Cain succeeds the pregnancy described in the antecedent clause by some contextually inappropriate length of time (e.g. ninety years.) An additional advantage is that, in appealing to a pragmatically retrieved standard, we allow for faultless disagreement between interlocutors, in case speaker and addressee retrieve divergent standards of soonness from the discourse context (as in (44) below).

(44) **Fry.** When will that be?

Glurmo. Soon enough.

Fry. That’s not soon enough.

(‘Fry and the Slurm Factory’, *Futurama*)

In (44), the source of the disagreement between Glurmo and Fry appears to be the contextual standard (s_c) that each of them retrieves.

In its capacity as a TFA then, *bambai* can be thought of as realising a subsequential instantiation relation, as shown in (45) below.

(45) **Lexical entry for *bambai* (TFA)**

$$\llbracket \textit{bambai} \rrbracket^c_{\text{def}} = \lambda P. \text{SUBSEQ}(P, t_r, w)$$

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.

3.2 ‘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 §1.3.2 above, the concept of **settledness** was introduced, as deployed by Con-
doravdi (2002) and otherwise well established in the literature. Thomason traces the notion of historical necessity to Aristotle and Jonathan Edwards (1984:138)

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

(see also Kamp 1979). The notion is deployed to similar effect in Giannakidou and Mari (2018) in their modal account of the future tense. The primary intuition is that some property (be it of times or eventualities) P is settled just in case it is a fact in the evaluation world that the truth of P resolves at a given time.

Settledness/historical necessity is normally expressed in terms of **historical alternatives**. This refers to the notion of equivalence classes ($\simeq_t \subseteq \mathcal{W} \times \mathcal{W}$ 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 (46) and, on the basis of this, a formal definition of settledness is given as (47).

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

- a. $\forall t[\simeq_t \text{ is an equivalence relation}]$
 All world-pairs in \simeq_t (at an arbitrary time) have identical pasts up to that time.
 Their futures may diverge.
 The relation is symmetric, transitive and reflexive (*i.e.*, an equivalence relation).
- b. **monotonicity.** $\forall w, w', t, t'[(w \simeq_t w' \wedge t' \prec t) \rightarrow w \simeq_{t'} w']$
 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)

(47) **Settledness for P .**

$$\forall w' : w' \in cg, \forall w'' : w' \simeq_{t_0} w'' : \\ AT([t_0, _], w', P) \leftrightarrow AT([t_0, _], w'', P) \quad (\text{Condoravdi 2002:82})$$

A property P (*e.g.* an eventuality) is settled in a reference world w' iff P holds at a reference time t_0 in all of w' 's historical alternatives w'' as calculated at t_0 .³

Here, I defend a claim that the modalised meaning component of apprehensional readings of *bambai* arise in part (*i.e.*, Lichtenberk's *epistemic downtoning* — the ‘epistemic’ component of APPR markers) due to the conventionalisation of an R -based implicature that the Speaker is making a modalised claim when they make any predication that is epistemically unsettled. Given Horn's \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 (particularly an premonitory one, cf. § 1.4) about some unsettled eventuality on its possible truth in

³The AT relation holds between a time, world and an eventive property iff $\exists e[P(w)(e) \wedge \tau(e, w) \subseteq t]$ — *i.e.* if the event's runtime is a subinterval of t in w (Condoravdi 2002:70). This can accommodate stative and temporal properties with minor adjustments (see *ibid.*). For the sake of perspicuity, I abstract away from (davidsonian) event variables in this section.

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 subsequentality 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, 1981, 2012) lies in the claim that the interpretation of modalised propositions relies on ‘conversational backgrounds’: that they quantify over sets of worlds retrieved by an ‘accessibility relation’ which is *contextually* made available. The entry in (48) proposes a unified, modalised semantics for *bambai*.

- (48) $\llbracket \textit{bambai} \rrbracket^c = \lambda m \lambda o \lambda P. \exists w' [w' \in \mathbf{best}_{o(w)}(m, t_*, w*) \wedge \text{SUBSEQ}(P, t_r, w')]$
bambai asserts that there exists some world w' in a set of worlds that are optimal with respect to a contextually-determined modal base 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 (43) above) holds between that world w' , the prejacent P , and a reference time provided by the utterance context t_r .

With the entry in (48), 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 or (presently) unverifiable — state-of-affairs. Spelled out below, the availability of multiple readings to *bambai*-sentences is modelled as compatibility with a range of conversational backgrounds (cf. Kratzer 2012:55ff).

3.2.1 Deriving the subsequential reading

The so-called subsequential TFA use of *bambai* follows from general norms of assertion: given that the speaker is predicating about a settled property, her context set is understood as veridical and the assertion is taken to be factual (cf. the (super)maxim of quality: “try to make your contribution one that is true” (Grice 1991:27)).

In these cases the intensional contribution of *bambai* can be captured by claiming that it quantifies (trivially) over a *metaphysical* modal base and an empty ordering source (see Kratzer 2012).⁴

- (49) **A veridical conversational background: *bambai*’s subsequential reading**

⁴In her treatment of Marathi present tense marking, Deo (2017b) makes similar appeal to veridical vs. nonveridical conversational backgrounds to capture ostensible polysemy associated with these (present-tense) forms.

- a. $\cap m_{\text{meta}}(w)(t) = \{w' \mid w' \simeq_t w\}$
 A metaphysical modal base m_{meta} retrieves the set of propositions that are **consistent** with a world w at a given time t .
 Consequently, the intersection of these propositions returns the set of **historical alternatives** to w at the given evaluation time t .
- b. $o_{\text{empty}}(w) = \emptyset$
 An empty ordering source o_{empty} contains no content (propositions) and hence induces no ordering over the modal base.
- c. Because the ordering source is empty, the function $\text{best}_{\emptyset}(m_{\text{meta}}, t, w)$ simply returns $\cap m_{\text{meta}}(w)$: a set of worlds which are historical alternatives to w at t .

Given that, by the definition in (46), historical alternatives have “identical pasts” to one another, in factual, past-tensed contexts, the metaphysical modal base over which *bambai* quantifies (trivially) are identical to the evaluation world. This is derived for (50) below (the sentence simplified from (10) above)

(50) **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 dinner

‘My dad went to the shop, **then** he made lunch’ [AJ 23022017]

- a. **Taking *bin* ‘PAST’ to restrict t to before speech time t^***

$$\llbracket \text{bin} \rrbracket^c = \text{PST} = \lambda t : t \prec t^*.t$$

bin is an partial identity function from times to times, defined only if a given (reference) time precedes speech time

- b. **Meaning of the first clause**

$$\begin{aligned} \llbracket \text{main dedi go la det shop} \rrbracket(\text{PST}) &= \lambda t \lambda w. \text{GO.SHOPPING}(t)(w) \\ &= \lambda w : t \prec t^*. \text{GO.SHOPPING}(t)(w) \end{aligned}$$

Defined only if $t' \prec t^*$, the first clause asserts that the event of Dad’s trip to the shop occurs at a contextually-retrieved time t' .

- c. **Meaning of the second clause (*bambai*’s prejacent)**

$$\llbracket \text{im gugum dina} \rrbracket^c(\text{PST}) =: t'' \prec t^*. \text{MAKE.LUNCH}(t'')(w)$$

- d. **Meaning of *bambai* & substitution of meaning of (c) for λP**

$$\begin{aligned} \llbracket \text{bambai} \rrbracket^c &= \lambda m \lambda o \lambda P. \exists w' [w' \in \text{best}_{o(w)}(m, t, w) \wedge \text{SUBSEQINST}(P, t_r, w')] \\ \llbracket \text{bambai imin gugum dina} \rrbracket^c &= \lambda m \lambda o : t'' \prec t^*. \exists w' [w' \in \text{best}_o(m, t_r, w*) \\ &\quad \wedge \text{SUBSEQINST}((\text{MAKE.LUNCH}(t'')(w)), t_r, w)] \end{aligned}$$

e. **substitution of conversational backgrounds m, o**

$$\llbracket \text{bambai imin gugum dina} \rrbracket^c =: t'' \prec t * . \exists w' [w' \in \mathbf{best}_{\emptyset}(m_{\text{meta}}, t_r, w*) \\ \wedge \text{SUBSEQINST}((\text{MAKE.LUNCH}(t'')(w)), t_r, w)]$$

Given that MAKE.LUNCH is instantiated prior to speech time $t*$, the modal component of *bambai* involves quantifying over a veridical conversational background, *sc.* $\{w' \mid w' \simeq_{t*} w*\}$ (*per* general pragmatic principles/assertoric norms, *e.g.*, Grice's quality maxim.)

MAKE.LUNCH is in the SUBSEQ relation with t_r in w' in a historical alternative t_* to $w*$.

f. **Spelling out the SUBSEQUENTIAL INSTANTIATION relation (cf. 43)**

$$\llbracket \text{bambai imin gugum dina} \rrbracket^c =: t'' \prec t_r . \exists w' [w' \in \mathbf{best}_{\emptyset}(m_{\text{meta}}, t*, w*) \\ \wedge \exists t'' [t_r \prec t'' \wedge \text{MAKE.LUNCH}(t'')(w') \wedge \mu(t_r, t'') \leq s_c]]$$

The SUBSEQ component of *bambai*'s meaning further restricts the instantiation time (t'') of MAKE.LUNCH: it asserts • that a contextually-retrieved reference time t_r precedes t'' and • that the temporal distance between those two times is below some contextual standard (“soonness”).

Note that, in (50f), it is exactly the same mechanism responsible for establishing the interclausal anaphoric relation between *im* and *main dedi* is responsible for the the equation of t_r with SHOPPING-time ($\lambda t. \text{GO SHOPPING}(t)$). In Kampian (discourse representation theoretic) terms (1993:Ch. 5) (also adopted in, *e.g.* Partee 1984) a new time referent has been introduced into the discourse by the first clause, which is accessible from the second, where it is equated with the reference time t_r .

3.2.2 Deriving the apprehensional reading

In unsettled contexts, *bambai* selects for a nonfactual/nonveridical modal base (whether epistemic or metaphysical) and a stereotypical ordering source. These backgrounds are formalised in (51), adapting liberally from (Kratzer 2012:37-40 i.a.)

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

- a. $\bigcap_{\text{meta}} m(w)(t) = \{w' \mid w' \simeq_t w\}$
(As above) a metaphysical modal base m_{meta} is a function that retrieves the set of historical alternatives to w at t .
- b. $o_{\text{s'typ}}(w) = \{p \mid p \text{ will hold in the 'normal' course of events in } w\}$.
A stereotypical ordering source is a set of propositions that can be taken to hold in the “normal course of events” (Kratzer 1981:295).

- c. $o_{s'typ}(w)$ then induces an ordering $\leq_{o_S(w)}$ on the modal base:
 $\forall w', w'' \in \bigcap f_{epist}(w)(t) : w' \leq_{g(w)} w'' \leftrightarrow \{p : p \in g(w) \wedge'' \in p\} \subseteq \{p : p \in g(w) \wedge w' \in p\}$
 For any worlds w' and w'' , w' is ‘at least as close to an ideal’ than w'' with respect to $s'typ(w)$ (i.e. it is at least as close ‘normal course of events’) if all the propositions of $o(w)$ true in w'' are also true in w' .
- d. **Best**($m_{meta}, o_{s'typ}, t, w$) then returns just that subset of historical alternatives to w^* that are closest to what might be judged as a “normally-unfolding course of events” in w^* .

I've written to cleo and have a number of things to work out/add on the choice of epistemic modal base, especially given the apparent problems this will pose for counterfactuals. This draws largely from Giannakidou and Mari (2018), while trying to harmonise this with observations made at the end of Condoravdi (2002) (21feb email exch.)

We can now derive the proper semantics for a “precautioning” use of *bambai*, as in (11), repeated here as (52).

(52) 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

(adapted from the semantics forr WOLL cited in Condoravdi 2002:71)⁵
 Given a modal base m , ordering source o and an evaluation time & world t^*, w^* :

$$\llbracket garra \rrbracket = \lambda P \forall w' [w' \in \text{BEST}_o(m, w^*, t^*) \rightarrow \text{AT}((t^*, \infty], w', P)]$$

garra takes a predicate P and says that P holds in the future of t of all best-according-to- o worlds in the modal base.

b. Meaning of the first clause

$$\llbracket airra dringgi kofi \rrbracket = \forall w' [w' \in \text{BEST}_o(m, w^*, t^*) \rightarrow \text{AT}((t^*, \infty], w', \text{DRINK.COFFEE})]$$

c. meaning of the second clause

$$\llbracket mi gurrumuk \rrbracket^c = \lambda t \lambda w. \text{PASS.OUT}(t)(w)$$

d. Meaning of *bambai* & substitution of meaning of (c) for λP

$$\begin{aligned} \llbracket bambai \rrbracket^c &= \lambda m \lambda o \lambda P. \exists w' [w' \in \text{best}_{o(w)}(m, t, w) \\ &\quad \wedge \text{SUBSEQINST}(P, t_r, w')] \end{aligned}$$

$$\begin{aligned} \llbracket bambai mi gurrumuk \rrbracket^c &= \lambda m \lambda o. \exists w' [w' \in \text{best}_o(m, t, w) \\ &\quad \wedge \text{SUBSEQ}(\text{PASS.OUT}, t_r, w')] \end{aligned}$$

⁵A satisfactory analysis of the semantics of *garra* (glossed here as ‘IRR’) is beyond the scope of this work. It is treated 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 necessity modal and glossed as IRR.

e. **substitution of conversational backgrounds m, o**

$$\llbracket bambai\ mi\ gurrumuk \rrbracket^c = \exists w' [w' \in \mathbf{best}_S(m_{\text{meta}}, t^*, w^*) \\ \wedge \text{SUBSEQINST}(\text{PASS.OUT}, t_r, w)]$$

In this instance, where the reference time retrieved from context is in the **future of speech time** (i.e. some time in an interval following speech time — $t_r \in (t^*, \infty]$), the modal base m is **diverse with respect to the SUBSEQ property** — that is, the property $\text{SUBSEQ}([\lambda t' \lambda w. \text{PASS.OUT}(t')(w)], t_r, w)$ is **not settled in w^*** .

f. **Spelling out the SUBSEQUENTIAL INSTANTIATION relation (cf. 43)**

$$\llbracket bambai\ mi\ gurrumuk \rrbracket^c = \exists w' [w' \in \mathbf{best}_S(m_{\text{meta}}, t^*, w^*) \\ \wedge \exists t' [\text{PASS.OUT}(t')(w') \wedge \mu(t_r, t') \leq s_c]]$$

The SUBSEQ component of *bambai*'s meaning asserts the instantiation of PASS.OUT at some time (t'). t' is preceded by a contextually-retrieved reference time t_r : • t_r is identified as some time in the interval $[t^*, \infty)$ (i.e. the instantiation time of DRINK.COFFEE) and • the temporal distance between those two times is below some contextual standard ("soonness").

The crucial difference then, that distinguishes the pure (actualised) subsequential reading from the apprehensional one is that the property described by the pre-jacent is **settled by t^* in w^*** — that is, in all historical alternatives to the evaluation world, the event described by MAKE.LUNCH in (50) holds. Conversely, the context **fails to satisfy** settledness for PASS.OUT in (52). As claimed in (e), it satisfies the *diversity condition* (Condoravdi 2002:83):

(53) **Diversity condition w/r/t pre-jacent in (52)**

$$\exists w', w'' \in \cup \simeq_{t^*} w^* : \text{AT}((t^*, \infty], w', \text{PASS.OUT}) \wedge \neg \text{AT}((t^*, \infty], w'', \text{PASS.OUT})$$

There are metaphysical alternatives to w^* at t^* where the event described by the pre-jacent to *bambai* in (52) holds and others where it doesn't hold.

3.2.2.1 the omniscience restriction.

Crucially, in the apprehensional cases presented above, those where predications about unsettled states of affairs timeline has been triggered (perhaps by one of the operators presented in Table 1.2 (*p.38* above)), modalisation with respect to a non-settled property cannot reasonably select for the set of conversational backgrounds presented in (51). 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.)⁶

This condition allows us to unify the modalised and non-modalised readings of *bambai*: iff utterance context satisfies the diversity condition, the modal reading “emerges.”

3.3 Use conditions

In §1.4, we saw how (along with the illocutionary “downtowning” analysed immediately above), the expressive content of *bambai* appears to be a result of frequent occurrence of *bambai* (and similar subsequential TFAs) in contexts of “precautioning” and fearing. In these cases, *bambai* behaves as a discourse anaphor: a connective whose truth-conditional contribution is asserting that the eventuality described in its prejacent obtains subsequently to a contextually salient time made available in the discourse context.

In that section I additionally provided data from other languages where a subsequential TFA appears to have undergone similar functional change, developing apprehensional expressive content. German *nachher* is one such item. In (40), we saw how the expressive content of *nachher* appears to be not-at-issue: Pott’s “nondisplaceability” criterion for identifying use-conditional semantic 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.” The previous section discussed the truth-conditional contribution of *bambai*, providing the lexical entry in (48) above. Following the proposal in Kaplan (1999) where a “use-conditional proposition” is understood to denote a set of contexts, Gutzmann (2015, following a suggestion in Portner 2007) appeals to a model with parallel types, interpretation functions and composition rules for both truth- and use-conditions that allow for the interaction of these condition types while distinguishing these two “dimensions” of meaning.

The use-conditional contribution of *bambai* (as suggested in §1.4) can then be informally stated as (54).⁷

- (54) $\llbracket \textit{bambai} p \rrbracket^u = \{c : c_s \text{ is negatively disposed to } p \text{ in } c_W\}$
bambai *p* is expressively correct in a context where the speaker c_s is negatively disposed to *p* in w^*

⁶Compare this also to the epistemic constraint discussed in Kaufmann (2002).

⁷This use condition is comparable to the condition proposed by AnderBois and Dąbkowski (2020): $\forall w' \in \text{GOAL}_{i,p}(w) : \neg q(w')$ (I.e. that some proposition *p* is performed/caused by *i* in order to achieve the speaker’s goals (in which $\neg q$ holds))

In this case, *bambai p* can be taken to conventionally implicate a proposition of the form given in (54), in addition to the asserted/truth conditional content presented in the above subsections.

3.4 Conclusion

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

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

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

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

Part II

Semantics of the Negative Existential Cycle

Chapter 4

The landscape of negation in Australia

4.1 Introduction

This chapter brings the observations of the ‘negative existential cycle’ (see Croft 1991, Veselinova 2013, 2016, this volume among others.) 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 (Bower 2010). Some 90% ($N \approx 290$) of the languages spoken on the Australian mainland have been reconstructed to the Pama-Nyungan family (see also Bower and 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: the Negative Existential Cycle (NEC). Here, explicit markers of existential negation¹ emerge (stage $\mathcal{A} \rightarrow \mathcal{B}$), encroach into the semantic domain of an erstwhile general negative marker (stage $\mathcal{B} \rightarrow \mathcal{C}$), and finally displace the latter, becoming a standard negation marker without the formal or functional features of an existential negator (stage $\mathcal{C} \rightarrow \mathcal{A}$; see Croft 1991, Veselinova 2016 a.o.) The Pama-Nyungan data provided here give further evidence for the cross-linguistic validity of the NEC, although, we will also see evidence of contact-induced change in the negative domains of some languages which are not clearly captured

¹For 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.

by the Cycle.

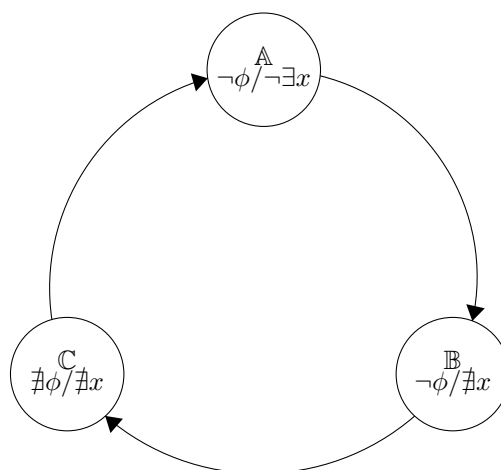


Figure 4.1. The ‘Negative Existential cycle’ — a typology (and proposed grammaticalisation trajectory) of standard & existential negation according to the analyticity of these markers (Croft 1991, see also Veselinova 2016.) Standard negators \neg are used to negate both verbal ϕ and existential $\exists x$ predicates in stage \mathbb{A} , a suppletive ‘negative existential’ \ddagger 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.

This chapter is organised as follows: Section 4.2 provides an overview of typological generalisations that can be made of negation marking in Australian languages. Particular attention is paid to the semantics of the category of the so-called “privative case” – for which I propose a semantics. Section 4.3 comprises investigations about apparent semantic change in 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. § 4.3.1 investigates evidence of change, replacement and renewal of negative markers in the Thura-Yura language group of South Australia. § 4.3.2 compares the negative domains of three Yolŋu languages, highlighting evidence of expansion in the domain of privative marking in a number of varieties. § 4.3.3 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, Section 5 shows that a primary upshot of this comparative work trades on an insight, only briefly discussed in work on the NEC (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

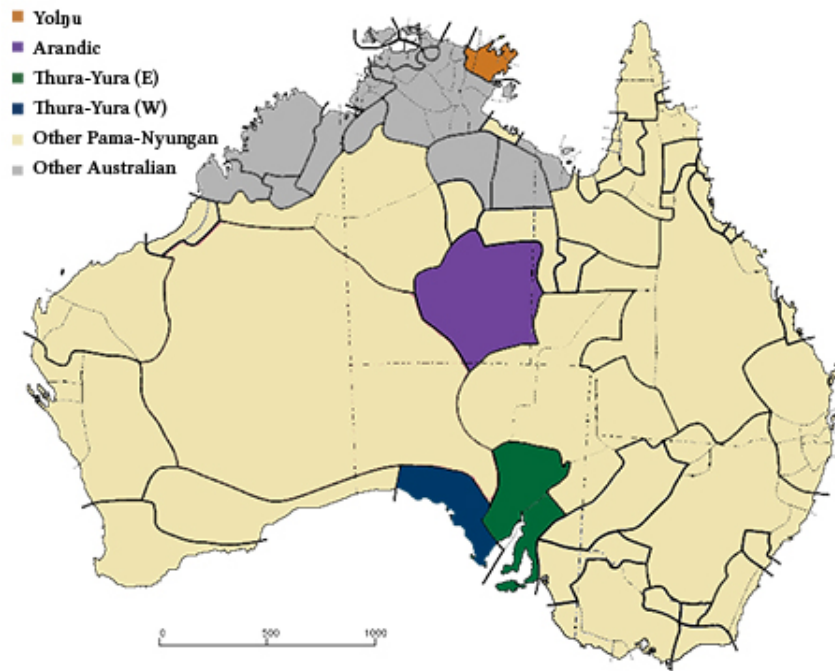


Figure 4.2. Subgrouping of Australian languages. Pama-Nyungan family in tan, with Yolngu subgroup given in ochre, Arandic in purple and Thura-Yura divided into green (Eastern varieties) and blue (Western/Nangga varieties.)

the Cycle (e.g. Deo 2015a,b, 2017a).² (§ 5.1). 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 NEC (§ 5.6).

4.2 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.³

²See also the distinction drawn between "functional" and "formal" cycles as applied to the Jespersen's cycle in Ahern and Clark (2017).

³For Horn and 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*."

Recent work in the functionalist tradition (Miestamo *e.g.*, 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 ‘subclausal’ negation (Horn and Wansing 2017, Miestamo 2007, van der Auwera and Lejeune 2013, Veselinova 2013).

4.2.1 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 estimated 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 2002 and Phillips 2021, 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 exponents 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 2002:84–table 3.3).

An exceptional (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.

4.2.2 “Standard” negation

This subsection 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 2021.

Dixon (2002:82) 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 §4.3.3. The data from Nakkara ([nck] Arnhem, Maningrida, Eather 2011:191) and Ngiyambaa ([wyb] Pama-Nyungan: Wiradhuric) below clearly demonstrate this generalisation. In Nakkara 55, 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.) In (56a), 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.

(55) *Preverbal standard negation in Nakkara* (Eather 2011:191)

Korla *nga-y-bburda-ma.*

NEG 1s.ERG-IRR-hit-TNS.NEG

‘I didn’t hit him.’

(56) *Preverbal standard negation in Ngiyambaa* (Donaldson 1980:239)

a. **Waŋa:y** *yingala:-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. *Yingala:-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.’

4.2.3 The “privative case” and existential predications

The privative case (PRIV) is a very robustly attested category in Australian languages (Dixon 2002:84).⁴ 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

⁴Morphological 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.

Nyangumarta ([nna] Pama-Nyungan: Marrngu), for example, *-majirri* ‘PRIV’ can be used to predicate absence (*i.e.* as a negative existential, see (57). Muruwari ([zmu] Pama-Nyungan: SE) similarly makes use of a form *-kil~-til~-tjil*, shown in (58a-b).⁵ PRIV case markers are frequently antonymous to another case suffix, frequently occurring in Australian languages, usually glossed as the comitative (COMIT), proprietive (PROP) or ‘*having*’ case. Uses of this marker are given in (59). The apparent synonymy of (58b) and (59b) demonstrate the antonymous relation between comitative and privative predications.⁶

(57) *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’

(58) *Function of -kil ‘PRIV’ in Muruwari* (Oates 1988:77-8)

- a. *palanj mathan-kil*
 nothing stick-PRIV
 ‘(There are no) sticks [...nothing]’
- b. *ngapa-kil-pu-n*
 water-PRIV-3.SG-NMLZR
 ‘He has no water.’ (lit. ‘he-waterless’)

(59) *Existential function of Muruwari -pira, -yita ‘COMIT’* (Oates 1988:73-4)

- a. *thuu kuya-yita wartu* [Muruwari]
 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* [Muruwari]
 NEG limb-COMIT
 ‘(There are) no sticks.’

⁵Incidentally, Oates (1988:77) describes this suffix as the ABESSIVE: “the opposite of the comitative in that it signifies ‘lacking’ or ‘being without’ some person or thing.” She glosses it throughout as ‘lacking.’

⁶The 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’.

Australian languages have a number of strategies to express existential and non-existence (absence) predications. (57) 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, (57) includes an example of bare NP existential predication; the presence of *jungka* ‘[bare] ground’ (in the relevant location) is predicated.⁷ These facts immediately present a challenge to the (formal) negative existential cycle as 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.⁸

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 (60), I adapt Francez’s quantificational treatment of existential predication in order to give a semantics for PRIV (Francez 2007, ?). Effectively, privative forms are taken to instantiate a negative quantificational determiner; they assert that the intersection of the two sets of individuals ($P, Q \in \mathcal{D}_{\langle e, t \rangle}$) represented by their ar-

⁷Such 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 and Ladusaw 2004 a.o). Similarly, sign 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 (1981:364) translations are to be trusted.

⁸Notable, 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).

guments is empty (Barwise and Cooper 1981:169).

(60) PRIV realises a negative quantifier

- a. $\mathbf{no} = \lambda P_{\langle e,t \rangle} \lambda Q_{\langle e,t \rangle} . P \cap Q = \emptyset$
- b. $\llbracket \text{PRIV} \rrbracket = \lambda P_{\langle e,t \rangle} \lambda Q_{\langle e,t \rangle} . \mathbf{no}(P, Q)$

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 57a). This process, — Francez’s “contextual closure” (2007:72) — is spelled out in (62) below. Effectively, the variable Q over sets of individuals is saturated by a contextually given relation and discourse entity/set of parameters (61).

(61) **Contextual domains of entities** (from Francez 2007:71)

For any element $\alpha \in \mathcal{D}_\tau$, α ’s contextual domain is given as:

$$d_\alpha = \lambda y_{\tau'} [\mathcal{R}_{\langle \tau, \langle \tau', t \rangle \rangle}(\alpha, y)]$$

That is, the set of individuals $y \in \mathcal{D}_{\tau'}$ that are related to α_τ by some pragmatically-inferred relation $\mathcal{R} \subseteq \mathcal{D}_\tau \times \wp(\mathcal{D}_{\tau'})$

\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 entities **located** 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 (57b), the privative phrase is contextually “closed” by $d_{mirtawa}$ — some set of things related (perhaps possessed) by *mirtawa* ‘the woman.’

A truth-conditional analysis of one privative-marked noun (*mungka* ‘tree’) from (57a) is provided in (62) below; each step is spelled out in prose.

(62) a. *mungka-majirri*
tree-PRIV

- b. $\llbracket mungka \rrbracket_{\langle e,t \rangle} = \lambda x_e . \mathbf{Tree}(x)$
- c. $\llbracket mungka-majirri \rrbracket_{\langle \langle e,t \rangle, t \rangle} = \lambda Q_{\langle e,t \rangle} [\mathbf{no}(\lambda x [\mathbf{Tree}(x)], Q)]$

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 ($\lambda x . \mathbf{Tree}(x)$) and some other property Q (which will

be provided by the context of utterance, *sc.* Francez’s *contextual domain* d_α (2007:71)).

$$d. \llbracket \text{mungka-majirri} \rrbracket^c = \mathbf{no}(\lambda x[\mathbf{Tree}(x)], d_\alpha)$$

$$= \mathbf{no}(\lambda x[\mathbf{Tree}(x)], \lambda y[\mathbf{loc}(st_c, y)])$$

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 (57a))

$$d_{st_c} = \lambda y_e. \mathcal{R}(\text{‘that country’}, y)$$

As (62d) 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 as the second argument to **no**. This restriction may take the form of a function **loc**, which returns that set of things which are taken to be related to whichever salient spatiotemporal parameters the context provides.

4.2.4 Privatives and the NEC

If we treat the privative marking on NPs as a type of negative existential predicate, a consequence of the NEC is the prediction that these markers ought to eventually generalise, displacing an erstwhile standard negator (*i.e.*, PRIV markers will participate in the NEC.) Phonological identity between privatives and SN is indeed well-attested in Australia (*e.g.*, Bardi [bcj] (Bower 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 (63) as well as (64a–b) below.)

(63) Negation in Warrongo ([wgu] Pama-Nyungan: Maric)

a. Senential negation with initial *nyawa* ‘NEG’

nyawa *ngaya balga-lgo banjo-lgo.*

NEG 1.SG.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

kangaroo NEG, possum NEG sugarbag.bee NEG echinda

nyawa, jagay nyawa.

NEG 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 § 4.3.1 below, along with a discussion of its potential import for theories of the NĖC.

4.3 The negative domains & the NĖC in three Pama-Nyungan subgroups

In this section, comparative and language-internal data from three subgroups of Pama-Nyungan, as they relate to the NĖC, are investigated.

§ 4.3.1 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.

§ 4.3.2 considers 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 *-[?]may[?]* appears to have been borrowed from a neighbouring language; a finding not predicted by (unidirectional) accounts of the NĖC.

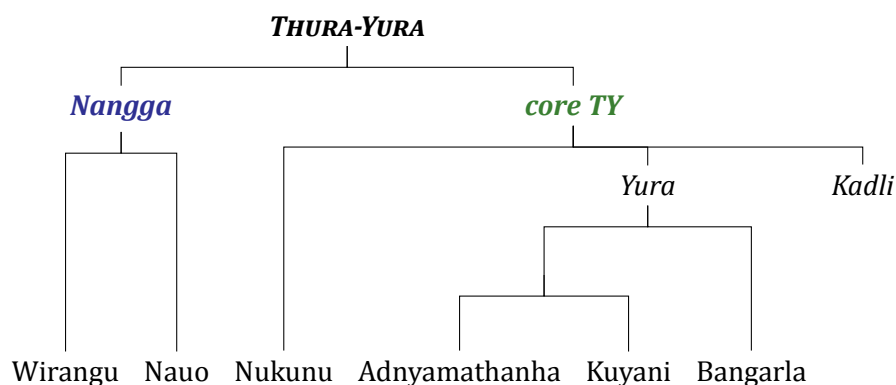
Finally, § 4.3.3 examines standard negation as realised by negative suffixation in Arrernte; a typologically unusual feature for Australian languages. It is shown that negated clauses in Arrernte are actually derived (de-verbal) nominal predicates. This fact of Arrernte appears to provide strong evidence in favour of a tra-

jectory 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*).

4.3.1 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 4.3 describes the familial relations of the described Thura-Yura languages whereas Table 4.1 compares their negative lexica (including a possible reconstruction.) Examples of Wirangu negative predications are given in (64) below.⁹

Figure 4.3. A selection of the internal structure of the Thura-Yura family (spoken in South Australia) following Simpson and Hercus 2004:183. *Nangga* is the name given to the Western subgroup whereas core-ThuraYura refers to the Eastern varieties (see Figure 4.2 above for the approximate geographic distribution.)



⁹Note 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."

Table 4.1. Reported partitions in the negative semantic space (data adapted from Black 1917, Hercus 1992, 1999, Hercus and 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]		<i>-yudu</i> <i>-maga</i>	<i>maga</i>	<i>guda</i>
Nauo [nwo]		?	<i>makka</i>	
Bangarla [bjb]		<i>-maga</i>	<i>makka</i>	<i>kutta</i>
Adnyamathanha [adt] Kuyani [gvy]		<i>pari-</i>	<i>(g)uda</i>	–
Nukunu [nnv]		<i>-wakanha?</i>		
<i>proto-TY</i>			<i>*maka/*guda</i>	
<i>DIYARI?</i> ([dif] Karnic)–				

Table 4.1 shows (colour-coded) 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 language 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 NEC (sc. stage transition $A \rightarrow B$).

(64) 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
1.SG child-PRIV

'I haven't got any children.' (57)

- c. **-yudu privative** (“most commonly used”)

Nganha barnda-yudu

1.SG money-PRIV

‘I haven’t got any money.’ (57)

- d. **guda SN (modalised)**

Ngadhu guda wangga-rn

1.SG.ERG NEG.IRR speak-PRES

‘I can’t talk (about this; it’s too embarrassing.)’ (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 languages that about Eastern Thura-Yura (e.g. Diyari [dif] *pani* ‘PRIV’, (Austin 1981, C. Bowerman *p.c.*).¹⁰ *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

A potential cognate in the southern Thura-Yura (Kadli) language, Kurna [zku] (not represented in Figure 4.3.1 for a lack of available data) *wakka-* is found (possibly fossilised) in lexical items *wakkarendi* ‘err, stray, be lost’, *wakkariappendi*, ‘forget, not think of, leave behind’, *wakkariburka* ‘ignorant person, simpleton’ (Schürmann and Teichelmann 1840:II-52).¹¹ 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.¹²

There are insufficient available data to adjudicate between competing hypothe-

¹⁰This 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; Adnyamathanha *inta-* ‘die’ appears to be cognate with Wirangu *inda-* ‘spill.’

¹¹Note attested stems in *pia-rendi* ‘scattered, stray’, *pia-riappendi* ‘scatter, disperse’, *burka* ‘adult, man’ (Schürmann and Teichelmann 1840:II-4,38).

¹²Data for Kurna (and other extinct varieties) is scarce, effectively limited to the lexica published by nineteenth-century missionaries, Schürmann and 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 words with a meaning akin to ‘blocked’, according to Eira and 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.)

ses 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 NEC 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 $B \rightarrow C$),¹³ 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 $A \rightarrow B$). 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 2021.)

Additionally, if the directionality of change described here is indeed on the right track, Wirangu can be shown to resist classification into any unique NEC ‘stage’, transitional or “cardinal” (in which case the NEC as described in previous work does not represent a complete linguistic typology for negative existential marking strategies.)¹⁴

4.3.2 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 the continent) by some 12,000 Aboriginal inhabitants (see Wilkinson 2012:18ff, Bower 2009). 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 undetermined internal classification, see Schebeck 2001, Bower and 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 4.2 below. The final subsection (§4.3.2.4) comprises a discussion of privative case semantics

¹³Note 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 and Clark 2017, van der Auwera 2008:40 for the dissociation of “formal” and “functional/semantic” grammaticalisation processes).

¹⁴The issues of “assigning” the entire negative domain of a given language to a unique stage in the NEC 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).

with particular reference to Yolŋu.

Table 4.2. Partitioning of the negative space in three Yolŋu languages.

‘PROH’ negates imperatives and 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 [dʒr]	<i>yaka</i>	<i>yaka</i> <i>bäyŋu</i>	<i>bäyŋu</i>	<i>-miriw</i>
Ritharrŋu [rit]	<i>yaka</i>	<i>-ʔmayʔ</i>	<i>yakaŋu</i>	<i>-miriw</i>
Wangurri [dhg]	<i>yaka</i> <i>ŋangawul</i> <i>bayaŋu</i>	<i>ʔyaka</i> <i>ŋangawul</i> <i>ʔbayaŋu</i>	<i>ŋangawul</i> <i>bayaŋu</i>	<i>-nharra</i>

4.3.2.1 Djambarrpuyŋu

Djambarrpuyŋu [dʒr] appears to provide an example of Croft’s $B \sim C$ 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 (65) below, from Wilkinson (2012).

(65) a. *yaka* as (full) clausal negator

yaka *ŋayi dhu ga ŋutha-n ŋaŋdi-wal bäpa-wal*
NEG 3.SG FUT IPFV.INFL grow-INFL 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 limurrŋ yaka dhuwal
 animal 1.PL.INCL.DAT **NEG** PROX

‘This meat isn’t ours/for us.’

[AW 20190505]

d. *bäyŋu as clausal negator*

bäyŋu *ŋarra gäthur ŋorranha manymak-ku nha munhawu*
NEGQ 1.SG today lie.INFL good-TR.INFL 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 that *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.’¹⁵ Examples of negative existential uses of *bäyŋu* are given in (66) and prohibitive uses of *yaka* in (67).

(66) *Djambarrpuyŋu negative quantification*

- a. (**yaka/*)**bäyŋu** *ŋarra-ku gi ŋorri ŋula dhiyal*
 *NEG/NEGQ 1.SG-DAT IPFV.INFL LIE:INFL INDEF PROX.LOC
wäŋa-ŋur-nydja
 place-LOC-FOC

‘I don’t have any here’ (lit. ‘at this place lie (are) none of mine’)(Wilkinson 2012:691)

- b. *bili* (*#yaka/*)**bäyŋu** *limurruŋ dhuwal bäwarran*
 because #NEG/NEGQ 1.DL.INCL.DAT PROX animal

Intended reading: ‘Because there’s no meat for us.’

(Wilkinson 2012:560, infelicity judgment AW20190505, cf. 65c)

(67) *Djambarrpuyŋu imperative negation (prohibitive, see also §4.3.2.4)*

yaka(/*bäyŋu) *waŋi!*
NEG(/*NEGQ) talk.INFL

‘Don’t talk!’ (Wilkinson 2012:360)

There are multiple arguments for a reconstruction of **yaka* ‘NEG’ to proto-Yolŋu. First, 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 Nyangu-

¹⁵Note 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).

marta ([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 (2002:85) lists other potential cognates to negative *yaka* from a number of other dispersed Pama-Nyungan languages.

Thirdly, the generalisations of the NEC as formulated by Croft (1991) and Veselina (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 $B \sim C$.) If this diachronic analysis is on track it may have implications for our understanding of the characteristics of stage $B \sim C$: 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 (2002:84) 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: Dyrbalic; 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 NEC stage $B \sim C$). The Ritharrŋu data presented in §4.3.2.2 below raise a potential counterexample.

4.3.2.2 Ritharrŋu

The facts outlined in Heath’s description of **Ritharrŋu** (rit, 1980c) diverge in a number of significant ways from the Djambarrpuynŋu situation described above. Further, they appear to pose a potential problem for the generality/predictive power of the NEC as formulated.¹⁶ While a form *bayŋu* has been retained in the language (glossed as ‘nothing’), there is an additional suffixal form *-[?]may[?]* 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 69).

(68) *Standard and copular negative suffixation of -[?]may[?] in Ritharrŋu*

- a. *wäni-na-[?]may[?] napu*
 go-PST-NEG 1.PL.EXCL
 ‘We didn’t go.’

¹⁶Data provided from Heath (1980c) has been standardised to an Australianist (Yolŋu) orthography from his original IPA transcription.

- b. *munan̩a-ʔmayʔ rra*
white.fellow-NEG 1s

‘I’m not white’

(Heath 1980c:101)

(69) *Prohibitive formation with yaka in Ritharrŋu*

- yaka nhe ban̩gurlʔ-yu-ru*
NEG 2.SG return-them-FUT

‘Don’t come back!’

(Heath 1980c:76)

Existential negation, however, is introduced by the complex form *yaka-ŋu* (shown in 70 below). This form is clearly related to the Djambarrpuyn̩u 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).¹⁷ Recalling the possible lexical sources of pan-Yolŋu form (table 4.2 *supra*) **yaka* discussed in the foregoing section, this is an appropriate translation.

(70) *Existential negation with yakaŋu in Ritharrŋu*

- a. *yakaŋu ŋay dh̩an̩gu*
NEGQ 3.SG meat

‘There’s no meat.’

(Heath 1980c:102)

- b. *yakaŋu ŋay (yan̩ʔŋara)*
NEGQ 3.SG (here)

‘He isn’t here’

(Heath 1980c:102)

While it may be tempting to relate *b̩ayŋu*, as found in other Yolŋu languages, to a possibly lenited form *-ʔmayʔ*, 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 *-ʔmay* is a fusional negative-cum-present tense suffix. The structure of the negative domain in Ritharrŋu (*i.e.* the use of *-ʔmayʔ* in (zero-)copular clauses (68a) and the apparent unavailability of *-ʔmayʔ* in quantificational/existential predication) provides support for the borrowing account, which is considerably more

¹⁷Note that Heath also points out that stance predicates with copular/existential readings can also receive negative marking as in (70b’) below.

(70b’) *nhiena-ʔmayʔ ŋay yan̩ʔŋarra*
sit.PRES-NEG 3.SG here

‘He isn’t (sitting) there’

(Heath 1980c:102)

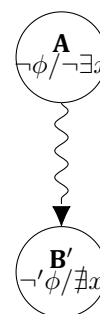
parsimonious than an account by which the syntax, semantics, phonology and perhaps morphology of *bäyŋu* were radically reorganised into a SN suffix. If this is indeed the case, the trajectory runs counter to hypotheses of a unidirectional NEC (e.g., Veselinova 2016:146): an innovative *standard negator* has been recruited into Ritharrŋu’s negative space, whereas the so-called “special negators” have retained an older form (Figure 4.4).

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, Ritharrŋu, a language closely related to Djambarrpuyŋu, might *synchronically* be described as a stage *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 4.4. Not predicted by the NEC, Ritharrŋu appears to have recruited an innovative clausal negator *-ʔ* into negative space. This is likely to be an effect of extended contact with an unrelated non-PN language (Ngandi [nid]).

4.3.2.3 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 (71) below, all adapted from McLellan (1992).



(71) a. *Negative existential use of ŋangawul*

gulitj-ma ŋangawul-nha ŋanapilingura ŋapa-ŋa gayŋa nyena
 true-DP NEG-DP 1.PL.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
 and NEG 1.SG recently like that.ABL person-ABL hear.INFL
dhäwu
 story

‘I didn’t recently hear the story about that person.’ (136)

c. *Negative imperative with yaka*

Yaka *dhaŋu ŋäpiki²-murru garruwa*
NEG this white.person-PERL speak.IMP

‘Don’t talk through white (language)!’ (195)

d. *Negative imperative with ŋangawul/bayaŋu*

Ŋangawul/bayaŋu *ŋäpaki²-murru-m garrun, bayaŋu/ŋangawul!*
NEG/NEG white.person-PERL-DM speak.NEU¹⁹ 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 3.SG 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 NEC 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 71e).

Ŋangawul 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 NEC. 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 §4.3.2.1.

The manifestation of the NEC in Yolŋu is further nuanced below, when we consider additional competition from privative morphology in these languages.

¹⁹It 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.)

4.3.2.4 The PRIVATIVE in Yolŋu

All Yolŋu languages make regular use of a *privative* suffix ‘PRIV’ (see Table 4.2 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. Bown, p.c.). This latter form may be cognate with the Warluwarra [wrb] and Bularnu [yil] (Pama-Nyungan: Warluwaric) privative *-nharra(ŋu)*. Warluwaric is given by Bown and 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. ?: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 *-nharra* privative.²⁰

The etymology for *-miriw* is unclear (although it possibly stands in some relation to *miḍiku(?)* ‘bad’_[rit], ‘rubbish (incl. a sororal kinship relation)’_{[djɾ]/[guf]} and appearing in words like *miḍik-uma* ‘make.badly’ *miḍik-irri* ‘go.badly’, *noy-miḍiku’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 §4.2.3 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 (72) below.

(72) A broad range of meanings available to Djambarrpuyŋu [djɾ] *-miriw* ‘PRIV’

a. *-miriw* *predicating non-possession*

weyin muka ŋarra dhuwal nhinana-ny yothu-miriw
 long okay 1.SG PROX sit.III-FOC child-PRIV

‘for a long time I lived here without children’ (Wilkinson 2012:445)

²⁰Further 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.

- b. *Privative use of -miriw; synonymous with bāyŋu 'NEGQ'*

yolŋu-ny gan nhinan warraŋul bala'-miriw, bāyŋu 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 wāŋa 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 wāŋa
 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*

luka-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*

djamarrkuḷi-y' marrtji lakaram baḍatju-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 wāŋa nhā-nha-miriw-wal-nha
 and person-OBL-SEQ ANA-OBL-SEQ place see-IV-PRIV-OBL-SEQ

miltjiri-wal-a
 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**luka-nha-miriw-nha dhuwali-yi-ny dhulhunu-n natha*

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 tableIs this your pencil? *Miriw.*

PRIV

‘Is this your pencil? (There’s) none!’

[AW 20180731]

The data in (72) 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 Bower, p.c.). 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 *-Ø~-na~-nya~-nha* ‘IV’, ostensibly the strategy for deriving eventive nominals from verbal predicates (*sc.* nominalisation, see Lowe 1996:103). 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.²¹ We will see 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 (72i). Wilkinson (2012:446) notes that here, privative-marked eventive NPs express “a complete negative predication...stronger, less polite than regular imper-

²¹Note 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 §5 (note 11) for more.

atives.” 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 Djambarrpuyngu; 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 associated 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.

4.3.3 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*²² ‘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 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 (73a). (73b) gives an example of temporal information (*viz.* pastness) being (presumably) supplied by the nonlinguistic context.

(73) 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)

²²The 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 VNeg_(1/2) to NEG.

- 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*,²³ 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 1989:378ff), shown in (74a). 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.

(74) 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
 3.DL.NOM facing.away-DAT=REDUP sit-.DL-PRES 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
 3.SG.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 INTENS speak-PST

‘(She) wasn’t *not* talking; she was talking a lot.’

(Henderson 2013:416)

²³A 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)

The sentences in (74) suggest some convincing arguments for 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). 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-ty«ante»kenhe* ‘(I) didn’t only eat.’²⁴

Ex. (74b) shows the negated verb receiving ergative marking when participating in secondary predication alongside a transitive verb. In this sense, the negated verb again behaves morphosyntactically identically to nominals (and unlike positive verb forms).

Interestingly, (74c) shows a verb form with negative marking occurring with the privative²⁵ *-kwenye* in what is likely an example of metalinguistic negation (see e.g. Horn and 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. $B \rightarrow C$, see also §5 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,²⁶ 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

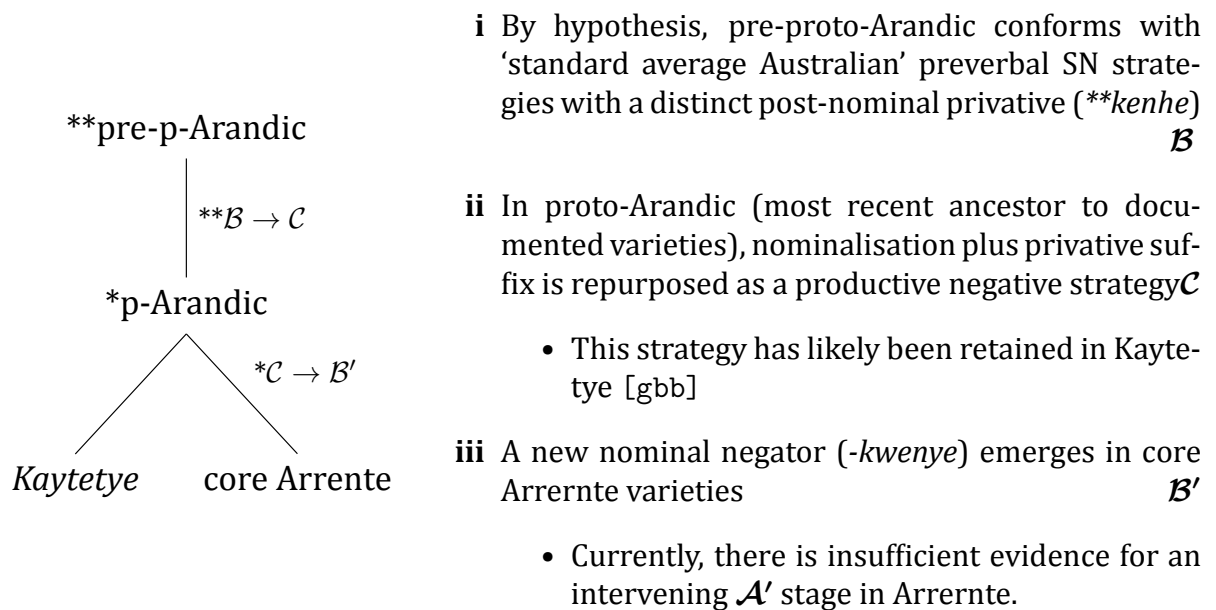
²⁴A complete analysis of this phenomenon is outside the scope of this paper, although assuming a standard semantics for *only* (e.g. Horn 1969), the correct truth conditions can be derived by understanding *-ante* as taking wider scope over the negated predicate in the first case (‘not eating’ is the only thing I did), whereas it scopes narrowly in the second case (‘eating’ is the only thing I didn’t do’).

²⁵*-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’.

²⁶A sole exception to this is found in the neighbouring Western Desert varieties (including Pitjantjatjara [pjɪt]) 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 (Sasha Wilmoth, *pers. comm.*, 2020) This negator *wiya* is also used in privative constructions.

the privative form (*-kwenye*) described in various Upper Arrernte varieties above (a likely characteristic of stage \mathcal{B}), we can further postulate the recommencement of the cycle.²⁷ This diachronic trajectory is summarised in Figure 4.5. 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.²⁸

Figure 4.5. Summary of reconstructed changes in the Arandic negative domain in terms of NEC stages (\mathcal{A} , \mathcal{B} , \mathcal{C})



(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-PRES

‘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)

²⁷Note that a possible implication of this is the instantiation of a direct $\mathcal{C} \rightarrow \mathcal{B}'$ 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 §2.2 *supra*, this may be expected.

An alternative analysis, informed by the NEC, 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 Mparante 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.

²⁸I 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 5

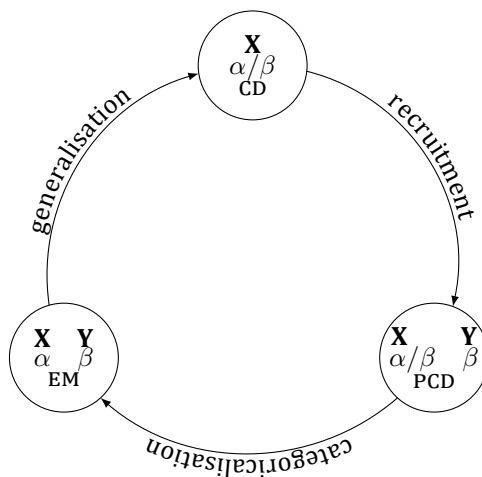
The NĒC and a unified semantics

The data presented in § 4.3 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. This sensitivity is manifested in the cross-linguistic tendency to deploy/recruit 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 (*e.g.* Yolŋu). By hypothesis, it is these two processes that underpin the NĒC as described. This section proposes a semantics that unifies PRIV and NEG and seeks to situate the NĒC – as it appears to have been instantiated in these Australian languages – in the context of broader work on the cyclical nature of meaning change.

5.1 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 and Dahl 1989, Bybee et al. 1994, Dahl 1985, Heine and 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 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 5.1. The structural properties of cyclical meaning change as formulated by Deo (2015b a.o.) A marker (form) **X** is ambiguous between two readings α, β at the context-dependent stage (CD), a marker **Y** is recruited to encode β at the partially context-dependent stage (PCD), whereupon it categoricallises, such that **X** can no longer be used to encode β : 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 α, β (CD').



Deo (2015b) provides a framework to understand the general structure of – and motivating forces behind – a cyclical change. This is shown in Figure 5.1 (as will be discussed below, note that this diagram is not isomorphoric to the one in NEC diagrammatisation in Figure 4.1).

Insofar as the NEC 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.*, 75, also 71e 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 (75). The following subsection further motivates this generalisation phenomenon.

(75) Incomplete generalisation of *bäyŋu* NEGEX in Djambarrpuyŋu (repeated from (65-66) above) [AW 20190505]

- a. *bäyŋu*/#*yaka* *limurruŋ* *dhuwal* *bäwarran*
NEGEX/NEG 1p.INCL.DAT PROX meat

‘We have no meat.’ (lit. ‘there’s no meat for us here’)

- b. *yaka*/#*bäyŋu* *limurruŋ* *dhuwal* *bäwarran*
NEG/NEGEX 1p.INCL.DAT PROX meat

‘This meat isn’t ours.’

5.2 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 NEC are modeled as *gradual relaxation in their quantificational domains*. A generalised lexical entry for negative markers—both “nominal” (existential) and sentential—is given as (76) below.

(76) A generalised semantics for negation

$$\llbracket \text{NEG}^* \rrbracket = \lambda P_{\langle \sigma, t \rangle} \lambda Q_{\langle \sigma, t \rangle} . P \cap Q = \emptyset$$

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 §4.2.3 above) quantify over the domain of properties of individuals— $\mathcal{D}_{\langle e, t \rangle}$. Those “expanded” uses of the privative, as affixed to deverbal predicates (e.g., Djambarrpuyŋu *-miriw* in 4.3.2.4 above) quantify over properties of events— $\mathcal{D}_{\langle e, t \rangle}$. Finally, sentential negators (including Arrernte *-(e)tyekenhe*) can be thought of as quantifying over *propositions* (sc. sets/properties of possible worlds)— $\mathcal{D}_{\langle s, t \rangle}$.

5.3 Event-privation

The idea is to put in relevant data to that intermediate stage here. This is copied from a footnote

We can adapt the formalism for privatives (§4.2.3, p.61) such that *-miriw* is able to range over $\mathcal{D}_{\langle \epsilon, t \rangle}$, the domain of properties of events (here I use $e, e' \in \mathcal{E}$ — variables over \mathcal{D}_{ϵ} /eventualities.) I take Djambarrpuyŋu verb stems to denote properties of events, which can be nominalised using the **IV** marker.¹ Shown in the examples below (and further in § 5.6.1), 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 (77), an injunction to not repeat a given story is ungrammatical when an intransitive root *wäŋa* ‘speak’ occurs with an object. We might conclude from this that, as with verb roots, nominalised predicates are taken to denote properties of events.²

- (77) Argument-structure of verbal roots is maintained in (nominalised) privative forms suggesting (eventive) *-miriw* scopes over an entire phrase

*dhäwu marŋgi-ku-nha=miriw/*wäŋa-nha=miriw*
 story know-CAUS-**IV**=PRIV/*speak-**IV**=PRIV

‘Don’t let anyone know/No repeating the story!’ [AW 20190502]

- (78) a. *yolŋu wäŋa nhänha=miriw*
 person place see.**IV**=PRIV
 ‘person who doesn’t see places’
 b. $\llbracket \text{yolŋu wäŋa nhänhamiriw} \rrbracket = \mathbf{no}(\lambda e.\mathbf{see}(e, \text{place}), d_{\alpha})$
 $= \mathbf{no}(\lambda e.\mathbf{see}(\text{place})(e), \lambda e'.\mathbf{char}(\delta_{\text{person}}, e'))$
 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 **characteristic** of the disposition of a (blind) person (δ_{person}) – is empty.

- (79) a. *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)

¹**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 Ch ??, although the account offered (at this stage) offers no insight that unifies the nominalising and the temporomodal usage.

²The idea that deverbal nominals maintain their underlying argument structure is well-supported: “[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. $\llbracket \text{maŋutji ŋorranhamiriw} \rrbracket = \lambda \mathcal{Q}_{(\varepsilon, t)}. \mathbf{no}(\lambda e. \mathbf{lie}(\text{eye})(e), \mathcal{Q})$
- c. $\llbracket (79a) \rrbracket = \mathbf{no}(\lambda e. \mathbf{lie}(\text{eye})(e), d_{\llbracket \text{ŋunhayi wāŋa} \rrbracket})$
 $= \mathbf{no}(\lambda e. \mathbf{lie}(\text{eye})(e), \lambda e'. \mathbf{char}(st_{wāŋa}, e'))$
- 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 wāŋa*), 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 α to information about its disposition, or relatedly some relation **perm** can be taken to relate a given entity to the set of events that are permissible at that place. This captures the "abrupt imperative" and related prohibitive periphrasess uses (e.g., (77=80) and (72i=81) below, see Wilkinson 2012:448).

- (80) a. *dhāwu marŋgikunha=miriw!*
 story know.CAUS.**IV**=PRIV
 'Don't let anyone know!' (lit. 'no story teaching!') [AW 20190502]
- b. $\llbracket \text{dhāwu marŋgikunhamiriw} \rrbracket = \lambda \mathcal{Q}. \mathbf{no}(\lambda e. \mathbf{teach}(\text{story})(e), d_{\alpha})$
 $= \lambda \mathcal{Q}. \mathbf{no}(\lambda e. \mathbf{teach}(\text{story})(e), \mathbf{perm}(st_u, e'))$
- (81) a. *lukanha=miriw ŋayi ŋunhi dharpa-ny*
 eat.**IV**=PRIV 3s ENDO tree-PROM
 'That tree is inedible' (lit. that tree has no eating)
 (Wilkinson 2012:448)
- b. $\llbracket \text{lukanhamiriw} \rrbracket = \lambda \mathcal{Q}. \mathbf{no}(\lambda e. \mathbf{eat}(e), d_{\alpha})$
- c. $\llbracket (79a) \rrbracket = \mathbf{no}(\lambda e. \mathbf{eat}(e), d_{\llbracket \text{ŋunhi dharpa} \rrbracket})$
 $= \mathbf{no}(\lambda e. \mathbf{eat}(e), \lambda e'. \mathbf{perm}(\text{dharpa}, e'))$
- d. The intersection between the set of *eating eventualities* e and the events e' that relate to some indicated 'tree' (its subparts/its kind...) that are taken to be permissible is empty.

Further, as (82) shows, the GQ-based analysis presented here correctly predicts the unavailability of a reading where the apparent modal operator is outscoped. Where (a) exhibits scopal ambiguity, a reading where the modal component (supplied by \mathcal{R}) outscopes negation is not found in (b).³ A few additional observations about constraints on eventive *-miriw* are given in § 5.6.1.

³See Horn (2001:Ch. 5) for a discussion of the properties of affixal/incorporated negative elements

(82) Scope relations in negative existential sentences [AW 20190501]

- a. *bathi dhuwal bäyŋu biyak bili gi gulgulyurr*
 basket PROX NEG thusly.II CPLV IPFV.II sink.II

‘This basket doesn’t always sink.’

- b. *bathi gulgulyunha-miriw*
 basket sink.IV-PRIV

‘The basket is unsinkable.’

‘The basket can not sink’

[[82b]] = **no**($\lambda e.$ **sink**(e), $\lambda e'.$ **char**(*bathi*, e'))

$\neg \gg \Box$

$*\Box \gg \neg$

I manipulated the (a) example here, bringing two judgments together. Is this unkosher? I can split them back up again.

5.4 Negation as an impossibility operator

An outcome of this quantificational analysis (which unifies existential and sentential negation as 2-place operators) is a treatment of sentential negation as a modal operator (as opposed to a truth functional operator over sentences, as is normally assumed.) The idea that negations can be analysed as modal operators has been proposed in other literatures (see, *e.g.*, Došen 1986, Dunn 1993, Horn and 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 tradition), in effect modelling modals as quantifiers, asserting a relation between sets of possible worlds. In this section, I assess the utility of extending the two-place analysis of modal operators to negative operators.⁴

This idea is advantageous insofar as it captures observed behavioural similarities between negation and (irrealis) modalities. Assuming a standard Kripke model for current purposes—*viz.* a set of worlds, an accessibility relation and a verification function, $\mathcal{M} = \langle \mathcal{W}, \mathbb{R}, \mathbf{v} \rangle$ —a modal semantics for negation is given in (83) below. Crucially, the binary accessibility relation ($\mathbb{R} \subset \mathcal{W} \times \mathcal{W}$) is modelled as the *compatibility relation* \mathbb{C} which relates a possible state (of a world) to those that comport with the facts in that world.

(83) Negation \neg as (alethic) impossibility

- a. $\mathcal{M}, w \models \neg A \iff \forall u. w \mathbb{C} u \rightarrow \mathcal{M}, u \not\models A$

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. $[[\text{NEG}]]_{\langle \langle s, t \rangle, \langle \langle s, t \rangle, t \rangle \rangle} = \lambda p_{\langle s, t \rangle} \lambda q_{\langle s, t \rangle}. \mathbf{no}(p, q)$

⁴Notably, 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 (1999:60ff).

In § 4.3.3, we saw how, as in other Arandic varieties, Mpwarnte Arrernte realises propositional negation by means of a formative *-(e)tyekenhe* which is affixed to verb stems. This is shown again in (84) below:

- (84) a. *Kweye, the ng-enhe aw-etyekenhe*
 oops 1s.ERG 2s.ACC hear-NEG
 ‘Sorry, I didn’t hear you’ (Henderson 2013:412)
- b. $\llbracket \text{the ngenhe awetyekenhe} \rrbracket = \lambda q_{\langle s, t \rangle} . \mathbf{no}(\lambda w_s . \text{I heard you}(w), q)$
 $= \mathbf{no}(\lambda w . \text{I heard you}(w), \lambda w' . w' \mathbb{C} w^*)$

-(e)tyekenhe is taken to scope over the entire clause. On the analysis defended here, then, this is taken to assert that the intersection of the proposition ‘I HEAR you’ (viz. $\lambda w . \text{I HEAR you in } w$) and the set of worlds compatible with the reference world w^* (the CONTEXTUAL DOMAIN, viz. $\lambda w . w \mathbb{C} w^*$) is empty.

5.5 Domain expansion

‘Negation relates an expression *e* to another expression with a meaning that is somehow opposed to the meaning of *e*’

Horn and Wansing 2017

The denotation for generalised negation **NEG*** given in (76) above (repeated below) captures a semantics for both existential and “standard” negators; the central concern of the NEC.

(76 rpt’d) A generalised semantics for the negative operator

$$\llbracket \mathbf{NEG}^* \rrbracket = \lambda P_{\langle \sigma, t \rangle} \lambda Q_{\langle \sigma, t \rangle} . \mathbf{no}(P, Q)$$

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. Table 5.1 spells out how this formalism can deal with each of these three stages in the meaning of a negative element, clarifying how we can understand this change as a species of *generalisation*. Recall from the discussion above, 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)

CODA — represented as the set Q — represents the contextual domain d_α . This can be optionally restricted by a *coda* phrase which represents the locus (α) of the contextual domain (see Francez 2007, 2009). α is related to Q by some contextually-determined relation \mathcal{R} .⁵

Table 5.1. Domain expansion from existential (PRIV) to standard negation (NEG) Negative elements are analysed as quantifiers asserting that the intersection between two sets P, Q is empty.

NEG*	λP – pivot $\langle \sigma, t \rangle$	λQ – contextual domain $\langle \sigma, t \rangle$
PRIV	$\lambda x_e.P(x)$ set of entities $\langle e, t \rangle$	$\lambda y.\mathbf{loc}(st_c, y)$ entities in some location
PRIV _{\mathcal{E}}	$\lambda e_{\mathcal{E}}.\mathcal{P}(e)$ set of events $\langle \mathcal{E}, t \rangle$	$\lambda e'.\mathbf{loc}_{\mathcal{E}}(st_c, e')$ events instantiated at some location
NEG	$\lambda w_s.p(w)$ set of worlds $\langle s, t \rangle$	$\lambda w'.\mathbf{C}(w*, w')$ worlds compatible with eval. world

As shown in (84), a generalised quantifier-type of analysis (76) 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 change for theories of grammaticalization and semantic change.

5.6 Grammaticalization and indexicality

The “types” of negation summarised in Table 5.1 can be thought of as corresponding to various stages of the NEC: a reserved PRIV marker that realises nominal (“existential”) negation as distinct from sentential negators might be construed as instantiating stage \mathcal{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 \mathcal{C} . This is, by hypothesis, the case for proto-Arandic and potentially the current case in Kaytetye.⁶

One outcome of this research is the observation that privatives which tolerate “eventive” arguments (PRIV _{\mathcal{E}} in Table 5.1) represent a likely bridge between NEC stages \mathcal{B} and \mathcal{C} . Morphosyntactically, PRIV, a noun marker, comes to modify event

⁵Note however that in the case of privative constructions of the type *subject + pivot-PRIV*, the subject NP is taken to serve as coda (and the privative phrase as an (non)existential predicate.) The current paper abstracts 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.

⁶Croft (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 Djambarrpuyngu *bäyhu* in ambiguous contexts: (75) 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}).

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.

In recent work, Deo (2017a) has suggested that grammaticalisation trajectories in general are characterisable by the loss of (*discretionary*) *indexical content* (e.g., Perry 2012, 2017). That is, reanalysed forms tend to lose their dependence on context for retrieving discourse reference.⁷ 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 de Mulder and Carlier 2011, Greenberg 1978, 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 (\approx 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_α). In a (bare/codaless⁸) negative existential proposition like *There’s no water* (*bäyŋu gapu* or *gapu-miriw* in Djambarrpuyŋu), d_α is a discretionary indexical, which *may but need not* be identified with that set of things that is somehow related to [e.g., **located at**] the spatiotemporal parameters of the 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.⁹

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 automatically set and speaker meaning (the hallmark of discretionary indexicality) isn’t factored in.

⁷Perry’s (2012:68ff, a.o.) 2×2 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.)

⁸...*acaudate*?

⁹Following from fn 7, note that these are the characteristics of discretionality: “narrow” discretionality iff α is identified with the utterance parameters, otherwise “wide” in Perry’s taxonomy.)

5.6.1 A note on existential codas and the NĖC

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 *e.g.*, Freeze 1992). 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_α). This captures the intuition that the utterance of an existential proposition relies on **wide, discretionary** construals of context for domain restriction and evaluation: an bare-existential proposition *there are no sticks* cannot be evaluated without reference to speaker’s intentions: most likely, but not necessarily, 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_α can also be supplied by way of a “coda.” Examples are given for Djambarrpuyŋu in (85), where the ‘coda’ is underlined.

(85) *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 (*gułun-ŋur*)
NEGQ fish PLACE (stomach-LOC)

‘There are no fish in Gapuwiyak (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 (86), the privative phrase predicates that *events* of a particular type (*viz.* that event described by the privative-marked verb form) are not **characteristic** of whichever entity or location is specified in the coda position.

(86) *“Eventive-privatives” in Djambarrpuyŋu: CODA underlined*

- a. lukanha-(mirr/miriw) maranydjalk
eat.NMLZR-PROP/PRIV stingray

‘The stingray is edible/inedible.’

[AW 20190502]

- b. *bäyjun dhaḷakarr marrtjinyara-w*
 NEGQ.FOC space move.NMLZR-DAT

‘There’s no space to move≈there’s no moving in the space’

- c. *dhuwali mulmu bäyju ḡuli nhärranha*
 MED grass NEG HAB burn.IV

‘That grass would never burn.’

- d. *nhärranhamiriw 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 (§ 5.3) *-miriw* appears to be attach to an entire nominalised (event-denoting) verb phrase, suggesting the re-analysis 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). Contextually-retrieved \mathcal{R} is locus of the (pragmatically ambiguous) modal reading of propositions containing an eventive-privative. What’s more, there are a number of constraints on the types of relations that are made available.

- (87) a. *#ḡarra ḷukanhamiriw*
 1s eat.IV-PRIV

INTENDED. ‘I’m not eating.’

AVAILABLE. ‘I’m poisonous/inedible.’ [AW 20190502]

constraints on
 permissible coda-pivot
 relations/thematic roles
 obviously aren’t worked
 out here. Can keep
 trying or drop this.

In Arrernte, where *-tye=kenhe* has completed the PRIV → NEG change, remaining morphosemantic constraints on the syntactic unit to which attaches appear to be removed.

5.7 Conclusion

In view of providing a formal perspective on the Negative 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 Negative Existential Cycle as discussed in the work of Croft (1991) and Veselinova (2016 a.o). Of particular interest is the relationship be-

tween 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 \exists C ($\mathcal{B} \rightarrow \mathcal{C}$) 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 $\mathcal{D}_{\langle\langle e,t \rangle, \langle\langle e,t \rangle, t \rangle\rangle}$, 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 and Wansing 2017:34ff.) Importantly, even if restrictions on the type of the sets is relaxed, the *relation* (**no**) that is taken to hold between the sets being quantified over is identical (*i.e.* $\text{no} =_{\text{def}} \lambda \mathcal{P}_{\langle\sigma, t \rangle} \lambda \mathcal{Q}_{\langle\sigma, t \rangle} . \mathcal{P} \cap \mathcal{Q} = \emptyset$).^{10,11}

The negative domains of Australian languages provide an opportunity to nuance our understanding of the N \exists C, and perhaps grammaticalisation paths more generally. In view of how robustly Australian languages draw a formal distinction between clausal negation (overwhelmingly 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 sen-

¹⁰Kiefer (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.

¹¹Similarly, 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.

tential negation.

- 2 This change can be characterised as a generalisation in the quantificational domain over which negative quantifiers range and that, consequently,
- 3 We can fruitfully conceive of sentential negators as two-place operators.

Finally, I have suggested that:

- 4 This treatment unites the NEC 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

Chapter 6

Introduction

In a 1999 monograph, 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” 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 prominence, notions belonging to the other two categories tend to be “viewed in terms of \mathcal{C} ” (7).

An important consequence of developing 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-categorical 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 suggest, for example, that the well-attested alternative grammaticalisation trajectories described by Bybee et al. (1994) (among others) and represented in Figure 6.1 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. perfect marking to perfective marking for \mathcal{L}_1 versus past-tense marking in \mathcal{L}_2 ?

6.0.1 Futurity and mood-prominence

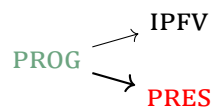
Bhat marshalls data from Tibeto-Burman to show that “mood-prominent” languages have a tendency to grammaticalise a FUTURE/NONFUTURE distinction. He points to Manipuri, where this tense distinction appears to have ‘developed from an earlier realis-irrealis modal distinction’ (1999:19). The same verbal suffix *-le* is a future

Figure 6.1. Two examples of attested meaning change between the aspectual and temporal domains

(a) PERF grams develop into PFV markers (e.g. Condoravdi and 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 PRES markers (e.g. Heinrichs 2002 for Neo-Aramaic)



tense marker in Manipuri, whereas Bhat (1999:67ff) shows that in related Mao Naga, it encodes irrealis modality, occurring in a number of modal, counterfactual and evidential constructions.

Additionally, going back to Aristotle, the truth of a future predication has frequently been analysed as changing with the passage of time — that is “future contingent” statements can be neither true nor false’ (Thomason 1970:265). Consequently, these utterances about the future are often associated with predictive illocutionary force. 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.¹ Modal accounts of future, then, generally tend to take future-oriented morphology to universally quantify over a modal base. Thomason (1970:274) proposes that the semantics of a future-tensed predication is as follows:²

$$(88) \quad \llbracket \text{FUT } p \rrbracket^{w,t} = \begin{cases} 1 \leftrightarrow & \forall w' [w' \simeq_t w \rightarrow \exists t' [t < t' \wedge p(w')(t')]] \\ 0 \leftrightarrow & \forall w' [w' \simeq_t w \rightarrow \neg \exists t' [t < t' \wedge p(w')(t')]] \\ \text{undefined otherwise} \end{cases}$$

FUT p is true if there’s a time t' in the future of all metaphysical alternatives to w at t which p holds and false if there is no such time.

Note that this semantics draws on the mechanics for futurity introduced in Ch. I above. *I.e.*, $\cup \simeq_t w$ is an equivalence class of worlds with identical histories to w

¹This is not to suggest that Arthur Prior was unconcerned with this asymmetry between the future and the past — indeed, over the course of his career he departs from an earlier belief in determinism and develops 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 understood to universally quantify over an epistemic modal base, whereas on non-deterministic views they quantify over a metaphysical modal base.

²This 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.

up to t — equivalent to Kratzer's *metaphysical modal base*.

6.0.2 Negation and mood

Developing a broad cross-linguistic typology of sentential negation, Miestamo (2005:208) proposes a class of languages (A/NONREAL) which have 'grammaticalized the fact that negation belongs to the realm of the non-realized.' In many languages this means that a grammatical distinction between REALIS and IRREALIS modalities, drawn in positive clauses, is *neutralised* in negative clauses. If irrealis markers are taken as operators which displace the instantiation of a given eventuality into the realm of the nonrealized, we can think of this semantic space as including or excluding negative declaratives. It is on these functional grounds that negation and mood interact; predicting parametric variation across languages.

6.0.3 Yolŋu Matha

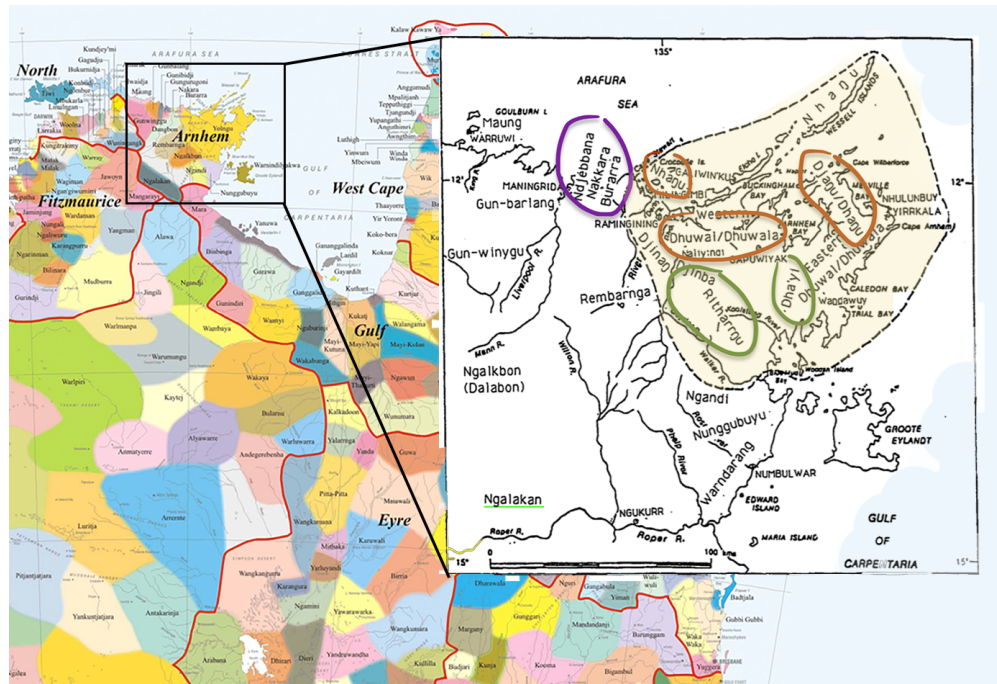
Yolŋu Matha is a small language family spoken in North-Eastern Arnhem Land, in the Northern Territory of Australia. The family is a subgroup of the larger Pama-Nyungan family, representing something of an enclave in Northern Australia; surrounded by a diversity of unrelated languages.

Most Yolŋu linguistic phylogenies posit a high-level split between Western, Northern and Southern subgroups. This is schematised in Figure 6.3. Yolŋu society is traditionally organised according to a moiety system — *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 language variety, households are necessarily multidialectal, one member of a couple speaking a *Yirritja* lect, the other speaking a *Dhuwa* lect. This chapter focuses primarily on a number of Southern Yolŋu varieties (see Fig 6.4).

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 respectively. Incidentally, Wilkinson (2012) points out that the degree of similarity between Western Dhuwal and Dhuwala are more closely related to one another than either is to Eastern Dhuwal and Dhuwala (I assume that this fact is representable phylogenetically and has been represented in Figure 6.4). The primary distinction between Dhuwal and Dhuwala varieties results from a productive apocope rule (Morphy 1977:51, see also Wilkinson 2012:94ff for further details.). The formal consequences of Dhuwal apocope on the verbal paradigm are partially indicated in parentheses in Table 6.1 below. The table gives examples of the verb paradigm for each of the major Djambarrpuyŋu conjugation classes as described by Wilkinson (2012:306ff) (parentheses give the corresponding verb group number assigned by Lowe (1996) for Gupapuyŋu.)

right this is the
classification in Wilk 91
which follows Dixon 80
presumably? Claire's
phylogeny is different in
a number of ways. how
to handle?

Figure 6.2. 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 Wänja* (homeland). Brown and green circles indicate the contemporary distribution of Yolŋu languages investigated. Purple circling indicates the neighbouring (but genetically unrelated) Maningrida language family.



6.1 Verbal inflection in Western Dhuwal(a)

TMA distinctions in 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). Work on Dhuwal and Dhuwala varieties (notably Lowe 1996, Wilkinson 2012) has tended to eschew a metalinguistic gloss for these inflections, given the ostensible non-unifiability of their semantics: the distribution of each of these inflectional categories is discussed in greater detail in what follows. In addition to these inflections, the labour of encoding TMA relations is shared by a (closed) class of auxiliaries, which appear to interact with the verbal paradigm.

Further complicating the exposition of this, is the fact that there are a number of *conjugation (sub)classes*: Lowe (1996) identifies nine classes. The (more detailed) description by Wilkinson (2012) shows that these correspond to three larger conjugation classes — the \emptyset -, *N*- and *Ń*-classes — each associated with a number of subclasses,³ in addition to “non-inflecting” and (semi-)irregular categories Wilkin-

³Wilkinson appears to identify 14 distinct inflectional patterns in addition to a “non-inflecting” class (1991: 307).

Figure 6.3. A broad phylogenetic classification of Yolŋu subgroups, following Schebeck 2001, Waters 1989, Wilkinson 2012 a.o.

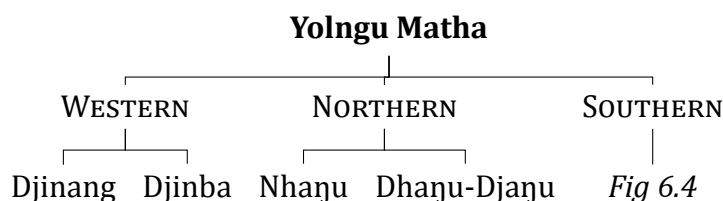
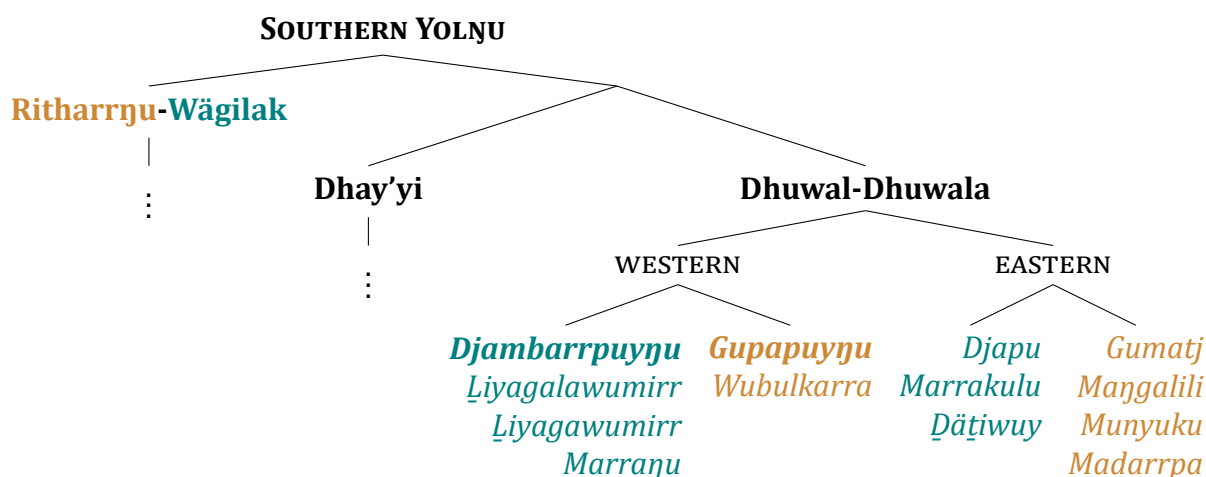


Figure 6.4. Varieties (dialects) of **Dhuwal-Dhuwala** in the context of the Southern Yolŋu languages (following Wilkinson 2012:13) with some adaptation following Schebeck 2001:15.



son (2012). The paradigm for four WD verbs, taken to be representative of four different conjugation patterns is given in Table 6.1.

Above, I alluded to Beulah Lowe's eschewal of a "semantic description" for each of the four inflectional classes, also followed by Melanie Wilkinson. In the following subsections, I provide examples of the functional domains of each of the four inflections in Dhuwal-Dhuwala and other lexical material relevant to encoding TMA relations in this language. Throughout, these categories will be glossed with bold-faced Roman numerals, following the conventions established by Lowe (see also Table 6.2, which adapts Wilkinson's summary of glossing decisions made by other grammarians.)

Figure 6.5 comprises a (colourised) reproduction of Wilkinson's schematisation of the functional domain and collocation features of each Djambarrpuyŋu inflection. Data exemplifying the distribution of WD's four inflectional categories is provided in the subsections below in conjunction with a discussion of the approximate range of each.

⁴van der Wal 1992 adopts the same labelling scheme as Lowe 1996 although her analysis of the distribution of each category diverges somewhat.

Class	Example	I	II	III	IV
\emptyset_i (2)	<i>marrtji</i> ‘go’	<i>marrtji</i>	<i>marrtji</i>	<i>marrtjin(a)</i>	<i>marrtjinya</i>
\emptyset_a (3)	<i>luka</i> ‘consume’	<i>luka</i>	<i>luki</i>	<i>lukan(a)</i>	<i>lukanha</i>
\emptyset_{rr} (4)	<i>wandirr(i)</i> ‘run’	<i>wandirr(i)</i>	<i>wandi</i>	<i>wandin(a)</i>	<i>wandinya</i>
N (5)	<i>lupthun</i> ‘wash’	<i>luphtun</i>	<i>lupthurr(u)</i>	<i>lupthurr(una)</i>	<i>lupthuna</i>
N_L (6)	<i>gurrupan</i> ‘give’	<i>gurrupan</i>	<i>gurrupul(u)</i>	<i>gurrupara</i>	<i>gurrupana</i>
N _J (7)	<i>nhäma</i> ‘see’	<i>nhäma</i>	<i>nhänu</i>	<i>nhänal(a)</i>	<i>nhänha</i>

Table 6.1. Examples of the paradigm of four morphological TMA inflections in Djambarrpuyŋu [djr] and (Gupapuyŋu [guf] resyllabification in parentheses). [djr] data and classification from Wilkinson (2012); [guf] data and classification from Gupapuyŋu (1996).

	I	II	III	IV
Wilkinson 2012 djr	FIRST	SECOND	THIRD	FOURTH
Lowe 1996 guf ⁴	Primary	Secondary	Tertiary	Quaternary
Tchekhoff and Zorc 1983 djr	Base	FUTURE	Past ₁	Past ₂
Heath 1980c dwu	Pres/Fut	Fut/Imp	Past	Past Remote
Morphy 1983 (Djapu)	Unmarked	Potential	Perfective	Past Non-indicative

Table 6.2. Summary of metalinguistic descriptors deployed by a number of grammarians for the four inflectional classes in a number of Dhuwal/Dhuwala varieties, adapted from Wilkinson (2012:336).

6.1.1 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 about the present, past and future. Here I provide examples of I-inflected clauses receiving each of these temporal interpretations.

(89) *Present-reference encoded with I*

a. *Nunhi-y nunhi dirramu nhina ga*

ENDO-ERG TEXTD man sit.I IPFV.I

‘There that man is sitting.’ (Tchekhoff and Zorc 1983:856)

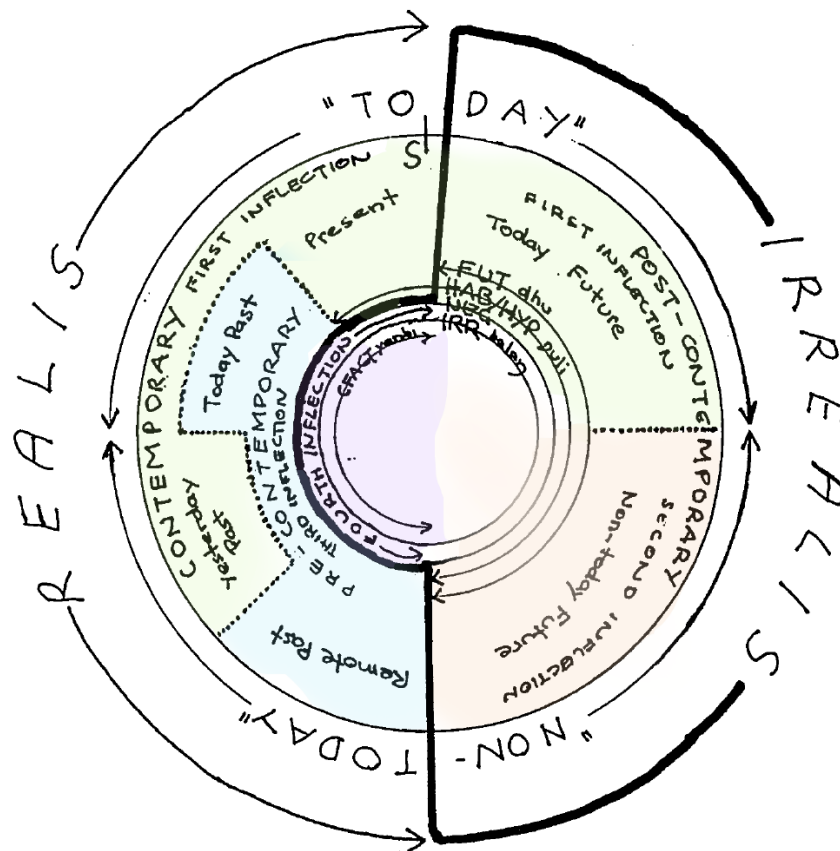
b. *Narra ga luka gapu (dhiyanu bala)*

1s IPFV.I consume.I water ENDO.ERG then

‘I’m drinking water at the moment.’ [DhG 20190405]

The sentences given in (89) show the compatibility between present temporal reference and the I inflection: in both cases, the event described by the predicate (*nhina* ‘sit.I’ and *marrtji* ‘go.I’) — in both cases modified by the aspectual auxiliary

Figure 6.5. Melanie Wilkinson's (2012:326) schematisation of the complex semantic space associated with each of the four inflectional categories in Djambarrpuyu. My colourisation.



ga — is understood as being contemporaneous with speech time.

(90) *Past-reference encoded with I*

- a. *ga* ***ṇayatham*** *ṇunha baṇ'thula-wuy ṇayambalk*
and reach.I DIST PLACE-ASSOC place

'And (then we) reached the place (associated with) Baṇthula.'

(Wilkinson 2012:461)

- b. *ḍirramu-wal yothu-wal bāpa-'mirriṇu-y rrupiya barpuru dju'y'u-n*
man-OBL kid-OBL father-PROP-ERG money yesterday send.I
mārr 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)

In addition to those present-referring sentences in (89), the data in (90) show compatibility between **I** and past time reference. For both examples, the events described by the predicates (*e.g.*, the seeing event described by *nhāma* in (a)) *precede* speech time. Similarly, the two past events in (b) both receive **I** inflection. The instantiation times of both of these events are restricted by the temporal frame adverb *barpuru* ≈ ‘yesterday.’

Further, the examples in (91) above, show the compatibility of **I**-inflected verb forms and FUTURE temporal reference.

(91) *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* (see §??)
Way! Nhe dhu gurruka-m helmet! Rom ga wana.
 Hey! 2s FUT wear-**I** helmet law IPFV.**I** say.**I**
 ‘Oy! You wear a helmet! The law says so!’ [AW 20170730]

In both sentences, the event described by the predicate is understood to obtain in the future of speech time (modulo additional constraints on imminence/immediacy described below). In these sentences the presence of FUT marker *dhu* is apparently obligatory in order to establish future reference.

6.1.2 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.

(92) *Future-reference encoded with II*

- a. Co-occurring with *dhu* ‘FUT’
yalala-ŋu-mirri-y ŋula nhātha 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)

b. Infelicity of **I** with non-today future

Barpuru godarr ŋarra dhu nhä(-ŋu/-ma)*
 funeral tomorrow 1s FUT see(-**II**/*-**I**)

‘I’ll see the funeral tomorrow’

[AW 20180730]

The two sentences in (92) show how **II** is used in concert with the particle *dhu* to establish future temporal reference. A notable contrast between (91a) and (92a) is the apparently obligatory retrieval of a TODAY-reference time for **I**-inflected futures, as against a (probable) BEYOND-TODAY-reference time for **II**-inflected futures.⁵ 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 and Timberlake 1985:204).⁶

(93) shows the compatibility of **II** with a (future-oriented) possibility reading. Modal particles including *balan(u)*, *ŋuli* and *bäynha* are responsible for the ‘weakening’ or ‘downtowning’ of the speaker’s commitment to the prejacent proposition.

(93) a. *Ŋarra ŋuli **bäynha** dhingu-ŋ ŋawulul-yu*
 1s HYP MOD die-**II** smoke-ERG

‘I might die from the smoke.’

(Buchanan 1978:164)

b. *ŋayi bala **balan**u bukthu-rru*
 3s MVTAWY IRR break-**II**

‘It (the recorder) might break.’

[DG 20190417]

II is additionally used to encode imperative clauses (94). Shown in (94b), negative imperatives (prohibitives) are treated identically.⁷

(94) Imperative force with **II**

a. *wäy! gurtha ŋunha, nhawi, dutji 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)

⁵Wilkinson (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.

⁶Although Heath (1980c:39) suggests of the **II** future in Dhuwal Proper (his FUT/IMP) that this form encodes a type of “normative nuance” (a clear extension of imperative flavour into future assertions.)

⁷Although, as discussed in Ch. II (see also Phillips ms. ‘Negation (in Australian Languages)’)) the use of privative-marked nominals is another common, more “indirect” strategy.

- 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]

6.1.3 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 (95) below show the compatibility between **III** and a reference time that is ‘earlier today.’

(95) *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’t’huna-ŋur*
 COMPL 3s go.**III** PROX.ABL food-ABL eat.**IV**-ABL
 ‘He has already gone from having lunch here.’ (Buchanan 1978:150)
- c. Infelicity of **III** with RECENT PAST
barpuru ŋarra nhä(-ma/-ŋala) detuŋ*
 yesterday 1s see(-**I**/[#]-**III**) buffalo
 ‘I saw a buffalo yesterday.’ [MD 20180802]
- d. Infelctity of **I** with TODAY PAST
gathura ŋarra nhä([#]-ma/-ŋala) detuŋ dhukarra-ŋura
 today 1s see[#]-**I/III** buffalo road-LOC
 ‘I saw a buffalo down the road today’ [MD 20180802]

(95a) shows the compatibility between temporal frame adverbial (TFA) *gäthur(a)* ‘today’ and **III** in djr, which leads to an temporal interpretation of ‘earlier today.’⁸

⁸Note 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.

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 (96) show **III** cannot be properly described as a ‘hodiernal past.’

(96) *REMOTE PAST and the **III** inflection*

- a. *nhä nho-kiyin-gal wäwa-’mirriṅu-y warkthu-rr ṅäthil rarrandharr-yu*
 what 2s-EMPH-OBL bro-PROP-ERG work-**III** before dry season-ERG

‘What did your brother do last summer?’ (Wilkinson 2012:343)

- b. CONTEXT. The speaker is describing a locality as it was in her youth.

märrma’ ga-n malwan-dja dhärra-n yindi maṇḍa-ny
 two IPFV-**III** hibiscus-PROM stand-**III** big 3d-PROM

‘Two big hibiscus flowers were (growing).’ (Wilkinson 2012:339)

- c. CONTEXT. A man is telling a story from long ago . His friend’s dog has spotted a water goanna.

...ṅunhi wurkaḍi-y nhä-ṅal-na ṅinya dharpa-lil-a ṅal’yu-na nhäwi
 ENDO NAME-ERG see-**III** 3s.ACC tree-ALL-SEQ ascend-**III** whatsit
wan’kawu-ya
 water.goanna-ANA

‘Wukaḍi watched it scramble up into a tree, the water goanna.’

(Heath 1980c:193)

Unlike the HODIERNAL temporal interpretations that the sentences in (95) receive, the two sentences in (96) are evaluated to obtain in the ‘REMOTE PAST.’ In (96a), the instantiation time of the predicate is restricted by two frame adverbials: *ṅäthil(i)*, which picks out a time ‘in the distant past; prior to/earlier than (some other time)’ (Wilkinson 2012:158) and *rarrandharryu* ‘dry season’.⁹ The cooccurrence of these expressions restricts the predicate being questioned to *a prior dry season*. Conversely, the declarative sentence in (96b) requires no adverbial specification. A REMOTE PAST interpretation arises as a result of the **III** inflection alone, which is precised pragmatically by the discourse context (*sc.* a narrative that the speaker is telling about her childhood.) (b) will be able to retrieve a same-day past interpretation as well, with sufficient contextual 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 1983:88). In her treatment of Burarra [bvr], Glasgow (1964) draws a distinction between ‘tense’ and ‘frame of reference’ (‘timescale’ for Green

⁹The 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.

1987:48). The interaction between these is, in effect, taken to give rise to a reference interval. This analysis has been adopted and developed by others working on Maningrida languages (Eather (2011:165) for Nakkara [nck], Green (1995) for Gurr-goni [gge] and McKay (2000) for Ndjébanna [dj.j].) The interpretation of interacting “tense” morphology and reference frames is schematised in Table 6.3.

		FRAME	
		today	before today
INFL	I	now	yesterday/recently
	III	earlier today	long ago

Table 6.3. 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.)

6.1.4 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 *balan(u)* ‘IRR’) in order to describe past habituals (97) and hypothetical/cal/counterfactual descriptions as in (98).

- (97) a. *Ŋayi ŋuli mār-ra-nha ŋunhi meŋduŋ-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, galku-na walal*
 lie-**IV** 3p HAB go-**IV** TEXTD-LOC-ANA wait-**IV** 3p
ŋuli ga-nha gapuw wirwiryu-na+ra-w
 HAB IPFV-**IV** water-DAT turn-NMLZR-DAT
 ‘They would be lying there, they would be waiting for the water to stir’
 (DB Djon 5:4)
- c. *waɬuy balanu luka-nha chocolate*
 dog.ERG IRR eat-**IV** chocolate
 ‘The dog could’ve/must’ve eaten the chocolate.’ [DG 20190413]

- (98) a. CONTEXT. Speaker had a toothache.

barpuru balan narra bala dentist-kal marrtji-nya dhiyak
 yesterday IRR 1s MVTAWY dentist-OBL go-IV PROX-DAT

‘Yesterday I should have gone to the dentist for a filling’

(Wilkinson 2012:353)

- b. *Yaka balan nhe marrtji-nya Darwin-lil*
 NEG IRR 2s go-IV Darwin-ALL

‘You should not go to Darwin.’

(Buchanan 1978:164)

These data demonstrate the relationship between the **IV** inflection and combinations of past temporal reference and various modal and aspectual operators.

6.1.5 Summary

As mentioned above, a number of authors have eschewed assigning a metalinguistic label to the four inflectional categories that are realised on Western Dhuwal verbs. This due to the data’s apparent resistance to an analysis where each marker realises some unified semantic category (*i.e.*, PAST, PRESENT etc.) Wilkinson’s diagrammatic representation of the relevant semantic categories and how they are partitioned by the inflectional system is reproduced as Figure 6.5.

Ultimately, a consequence of this distribution gives rise to a phenomenon which Comrie (1985:83) refers to as “cyclic tense”: where a given verbal inflectional category appears to be licensed by “discontinuous intervals.” These licensing intervals are schematised in Figure 6.6. On the basis of these data, a formalisation of the observations made by Glasgow 1964 *et seq.* (those summarised in Table 6.3) can be represented as (99) below, where the domains of each of these inflections are discontinuous intervals.¹⁰ *today* : $\mathcal{T} \rightarrow \wp(\mathcal{T})$ is that function which returns the interval spanning from the beginning until the end of the day of utterance.¹¹

- (99) **A polysemy treatment of the temporal contribution of I and III (to be rejected)**

$$\text{a. } \llbracket \mathbf{I} \rrbracket^c = \lambda P \lambda t^* . \exists t' \begin{cases} t \in \text{today} \leftrightarrow t \succeq t^* & . P(t') & [\text{NONPAST}] \\ t \prec \text{today} \leftrightarrow \mu(t, t^*) < s_c & . P(t') & [\text{RECENT PAST}] \end{cases}$$

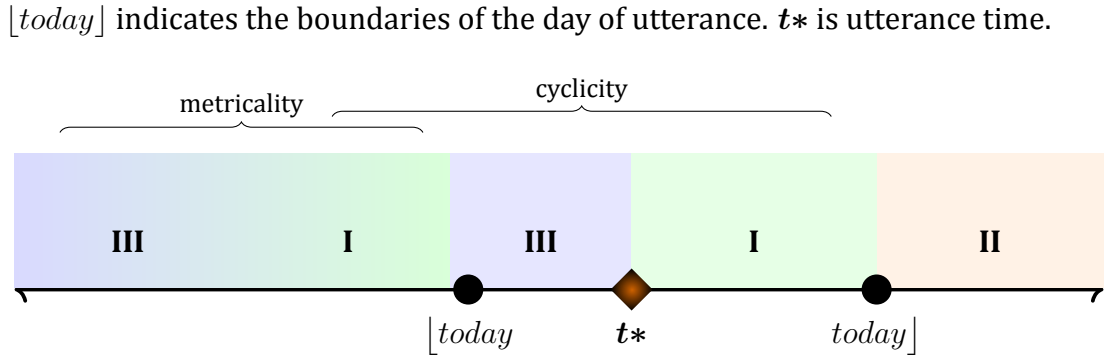
I asserts that *P* holds at *t* where:

EITHER the reference time *t* doesn’t precede speech time *t**,

¹⁰NOTE that the disjunctive semantics given in (99) is not intended to represent a proper treatment of these inflectional categories in Djambarrpuyu. This is a topic of current and ongoing work which is sadly out of the scope of the current dissertation.

¹¹The basics of this treatment of temporal metricality (or “remoteness”) converge to some degree with Cable’s 2013 proposal for Gikūyū tense and Klecha and Bochnak on Luganda tense.

Figure 6.6. Past-time temporal expression in the Yolŋu Matha varieties of Central Arnhem, demonstrating two descriptive phenomena: (a) cyclicity — the interspersal/discontinuity of **I** and **III** forms and (b) metricality — the (subjective) division of the past domain between these two forms.



OR if t PRECEDES *today*, then the temporal distance by which t precedes t^* is **below** some contextually provided standard s_c

$$\text{b. } \llbracket \text{III} \rrbracket^c = \lambda P \lambda t^*. \exists t' \begin{cases} t \in \text{today} \leftrightarrow t' \prec t^* & . P(t') & [\text{TODAY PAST}] \\ t \prec \text{today} \leftrightarrow \mu(t', t^*) > s_c & . P(t') & [\text{REMOTE PAST}] \end{cases}$$

III asserts that P holds at t where:

EITHER the reference time t falls within *today*, in which case it precedes speechtime t^* ,

OR if t PRECEDES *today*, the temporal distance by which t precedes t^* is **above** some contextually provided standard s_c

6.1.6 Cyclic tense

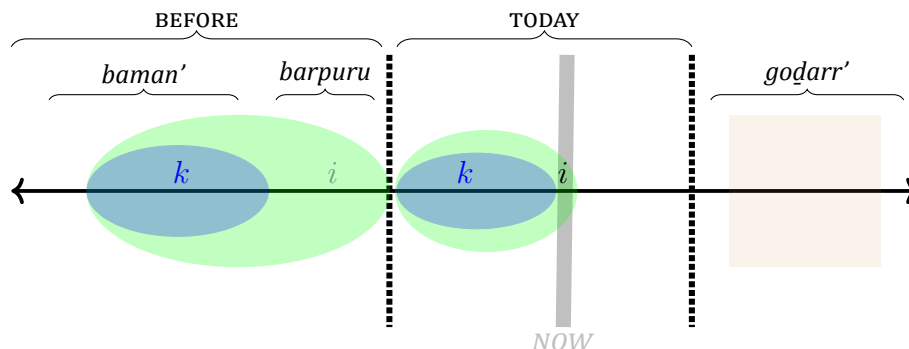
While the lexical entries given in (99) are descriptively adequate, they are also arbitrary and disjunctive. Here, I will claim that **I** and **III** differ because **III** (compatible with strictly past temporal reference) presupposes that **non-final instantiation** (NFI) of its prejacent (cf. Condoravdi and Deo 2015).

Context makes available two possible reference intervals i_c : **TODAY** and **PRE-TODAY**. **III** situates its prejacent within a nonfinal subinterval of i_c . The infelicity of **I**-inflected predicates with **REMOTE** and **TODAY PAST** instantiation times then emerges as a result of pragmatic blocking. It is well demonstrated 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 and Abbott 2012).

(100) An NFI-based attempt at a lexical entry for the **THIRD** inflection

$$\llbracket \text{III} \rrbracket^{g,c} = \lambda P \lambda i_c : \exists j [j \sqsubseteq_{\text{FINAL}} i_c. \text{NFINST}(P, i_c, j)]$$

Figure 6.7. Appealing to ‘nonfinal instantiation’ to provide a unified entry for the temporal reference of **III**



The context makes available either a TODAY or PRETODAY interval i_c . **III** presupposes the existence of a final subinterval j . **III** asserts that P is instantiated at some subinterval of i that wholly precedes j (i.e. that $\text{NFINST}(P, i_c, j)$ holds.)

Meanwhile, as demonstrated above, **II** and **IV** both appear to co-occur with modal particles. Predications about the future (beyond the day of utterance *today*) obligatorily occur with *dhu* ‘FUT’ and receive **II** inflection. As shown in §6.1.2, however, *dhu*+**II** can also receive a range of modal necessity readings; suggesting a treatment of *dhu* as a circumstantial modal.¹²

So far, we have only considered “positive” clauses. In the section that follows, we see how the picture of WD inflection we have developed here complexifies significantly under negation.

6.2 Sentential negation: *yaka* & *bäyṇu*

Discussed in Ch. 4.3.2, Djambarrpuyṇu has two negative particles, *yaka* and *bäyṇu*, both of which are deployed for standard negation (i.e. those particles 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 *bäyṇu* is found in negative existential/quantificational contexts. Both of these sentential negators, however, interact with verbal inflection.

Descriptively, as shown in the data in (101-102), negation appears to trigger a “switch” from the ‘realis-aligned inflections’ (**I** and **III**) to their ‘irrealis counterparts’, (**II** and **IV**) which otherwise turn up predominantly in hypothetical or counterfactual contexts. Effectively, this evinces a reality status-based distinction

¹²In view of the range of readings available to *dhu*, van der Wal (1992:110) glosses this particle as MOD.

that is neutralised in negated sentences (see also Wilkinson 2012:356) for Western Dhuwal(a). This is schematised below in Table 6.4.

POLARITY	
–NEG	+NEG
I	II
III	IV

Table 6.4. Neutralisation of **I** and **III** inflections under negation.

The following examples in (101) show how sentences that receive **I**-marking in positive sentences — encoding temporal reference to the present or recent past — instead receive **II**-marking under the scope of negation. Each example contains a predication about the present or about the recent past, each receiving **II**-marking under negation. (a-b) presents a near-minimal pair, where a predicate with present reference “switches” inflection from **I** to **II** under negation.s

(101) *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?’ (DB 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)’ also available.
[AW 2018030]
- d. *Ŋarra gi bäyŋu maŋŋ’mara-ŋu waŋu (ŋarraku). Bili ŋayi ga*
1s IPFV.**II** **NEG** appear.CAUS-**II** dog 1s.DAT CPLV 3s IPFV
nhin-a wäŋaŋura
sit.**I** house.LOC
‘I can’t find my dog. It lives in the house.’ [DG 20190417]

- e. *Ŋarra ga djäl-thi-rri giritjirrinyarawu, yurru ŋarra bäyŋu-nha*
 1s IPFV.I want-VBLZR-I dance.NMLZR-DAT but 1s NEG-SEQ
girritji
 dance-II

‘I was wanting to dance (at the *bungu* yesterday) but I didn’t dance
 (because I’d hurt my leg yesterday.)’ [DG 20190417]

Similarly, in contexts where the temporal reference of the event description predicts that the verb will receive **III**-inflection — that is the same-day or the remote past —, when under the scope of a negative particle (*yaka/bäyŋu*), the verb instead receives **IV**-inflection. This is shown by the data in (102), where (a-b) represents a minimal pair, negative marking triggering the “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.

(102) *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! Did you see (it)?’ [AW 20180830]
- d. **CONTEXT.** I’m at work explaining to my coworker why my *galay* is angry at me.
Ŋarraku miyalk maḍakarritj-thi-na bili ŋayi ga guyaŋa ŋarra
 1s.DAT wife anger-INCH-III CPLV 3s IPFV.I think.I¹⁴ 1s
ga-nha bäyŋu djäma
 IPFV-IV NEG work
 ‘My wife got angry because she thought I wasn’t working today.’
 [DG 20190417]

- e. **CONTEXT.** The speaker grew up in the desert.

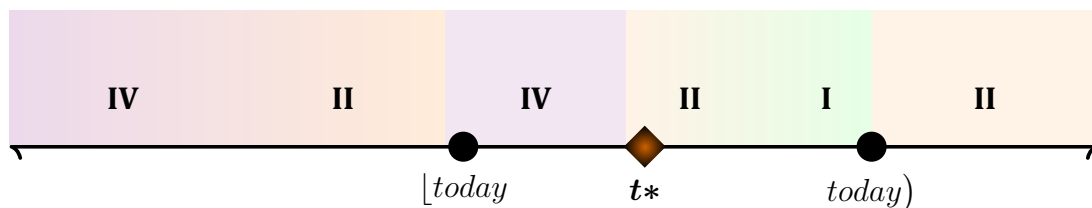
bäyŋu ŋarra ŋuli ganha nhä-nha (waltjaŋ) ŋunhi ŋarra yothu
 NEG 1s HAB IPFV see.IV rain ENDO 1s child
yän
 just

‘When I was young, I hadn’t seen [rain]/never saw [rain].’

[AW 20190501]

The data in (101-102), demonstrate the interaction between temporal reference and negative polarity in WD, consistent with Miestamo’s A/NONREAL class — the distinction between *realized* and *nonrealized* states of affairs is neutralised in negative contexts in WD. We can then provide a modified version of Figure 6.6 to give the parallel diagram in Figure 6.8. The differences between these two diagrams schematise the effects of negation on the licensing of particular WD inflectional categories.

Figure 6.8. Apparent interactions between temporal relations and reality status in Djambarrpuyŋu: cyclicity and metricality under negation.



Note additionally the surprising occurrence of a **I**-marked interval in Fig 6.8. Predications about the SAME-DAY FUTURE — which receive **I**-marking in positive sentences — appear to be “immune” to the neutralising effects of negation, exemplified by data including (103). We return to a discussion of this fact §6.3.5.

- (103) a. *Nunhi ŋarra dhu bäyŋu luk-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 luplupthu-n bili bäru ŋuli ga luk-a*
 NEG 1s FUT swim-I CPLV crocodile HAB IPFV.I eat-I
yolŋu’yulŋu
 people
 ‘I’m not going to swim; crocodiles eat people.’ [AW 20190428]

6.3 The realm of the nonrealized

So far we have seen that predicates which receive **II**- and **IV**-inflection co-occur with some operator that encodes some flavour of irrealis-associated meaning — what Palmer (2001:145) labels a “joint marking system.” For **II**, these are predominantly represented by *dhu* ‘FUT’ and *balan(u)* ‘IRR’ in addition to clauses with imperative syntax. **IV** tends to co-occur with *balan* ‘IRR’ in addition to *ɣuli* ‘HAB’.¹⁵ As we will see, these expressions all appear to lexicalise strictly **root** (non-epistemic) modalities (contra van der Wal 1992:123).

This section begins with a brief review of the “branching time framework” before providing an overview of the semantics of WD modal particles and forming a set of generalisations over the distribution of inflections **II** and **IV** in WD.

6.3.1 The branching time framework

Authors working in intensional semantics have, in recent work, deployed a “branching time” framework in order to model relationships between temporal and modal reference (some of this work was introduced in Chapter I). Here, I spell out a number of basic assumptions that will ultimately assist in formalising temporal and modal expressions in WD. One of the primary payoffs of the branching time is the formalisation of Prior’s observations about the asymmetries of the past and the future (see also Copeland 2020, Dowty 1977, Thomason 1970, 1984). The version I adopt here follows closely from recent work on the realis-irrealis distinction (Krifka 2016, von Prince 2019) and other insights about temporal and modal interaction (e.g. Condoravdi 2002, Ippolito 2013, a.o.)

A branching-time frame $\mathfrak{U} = \langle \mathcal{I}, \prec \rangle$ assumes a partially ordered set of indices \mathcal{I} — in effect world-time pairs $\langle w, t \rangle$. A branch (similar to “history” for other authors (Dowty 1977, Thomason 1970)) $b \ni i$ through any $i \in \mathcal{I}$ is a linearly ordered subset of \mathcal{I} — that is, where $i = \langle w, t \rangle$,
 $b \ni i = \{ \langle w, t \rangle, \langle w, t' \rangle, \langle w, t'' \rangle, \dots, \langle w, t_n \rangle \}$. A branch, then, effectively models the possible development of a given world through time.¹⁶

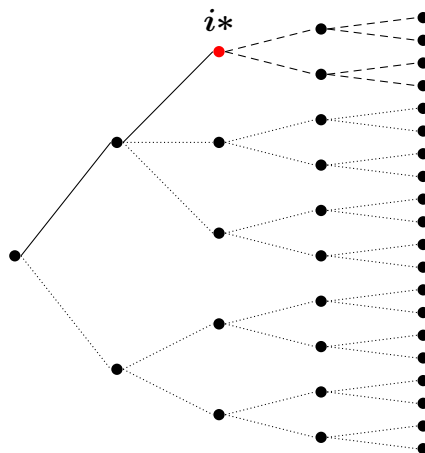
Von Prince (2017, 2019) establishes a formal trichotomy between the **ACTUAL**, **POTENTIAL** and **COUNTERFACTUAL** domains by appealing to this framework. This is reproduced in (104).

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

¹⁵I adopt the (metalinguistic) labels FUT and IRR as glosses for *dhu* and *balan(u)* following Wilkinson (2012). As we will see, these descriptions aren’t necessarily completely adequate, but will be sufficient for current purposes.

¹⁶Note that these frameworks normally take indices to represent world-time pairs. I assume that this model can be extended relatively straightforwardly to capture interval semantic notions (Bennett and Partee 2004, Dowty 1982, Landman 1991:e.g. a.o.).

Figure 6.9. A branching times frame following von Prince (e.g., 2019:591). Vertically aligned indices are taken to index the same time.



- a. The ACTUAL (past/present) = $\{i \mid i \preceq i^*\}$
Compare this notion to the equivalent one of *metaphysical alternatives to w at t* introduced in Ch. I: $\{w' \mid w \approx_t w'\}$.
- b. The POTENTIAL (future) = $\{i \mid i \succ i^*\}$
- c. The COUNTERFACTUAL = $\{i \mid i \text{ is unordered w/r/t } i^*\}$

6.3.2 Semantics of modal particles

Shown in §6.1.2, *dhu* ‘FUT’ occurs in sentences with future temporal reference (105). Relatedly, the data in (106) show that *dhu* appears to also be compatible with other circumstantial modalities; in a deontic (a), bouletic (b) and teleological (c) context. In all these contexts, we can model *dhu* as universally quantifying over a (subset of) a circumstantial modal base.

(105) ***dhu* ‘FUT’ encoding future tense with I- and II-inflections**

- a. *barpuru goḍarr ṇarra dhu nhä-ṇu*
funeral tomorrow 1s FUT see-II
‘I’ll watch the funeral tomorrow.’
- b. *mukul dhu gi nhin-i raṇi-ṇur goḍarr*
aunt FUT IPFV.II sit-II beach-LOC tomorrow
‘Aunty will be sitting on the beach tomorrow.’ [AW 20190409]

- c. *limurru dhu luk-a maypal yalala milmitjpa*
 1d.EXCL FUT consume-I shellfish later evening

‘We’re having shellfish this evening.’ [DG 20190417]

(106) ***dhu* ‘FUT’ and other flavours of modal necessity**

- a. *Way! Nhe dhu gurruk-ama djongu’!*
 Hey! 2s FUT carry-I hat

‘Hey! You must wear a helmet!’ [DG 20190405]

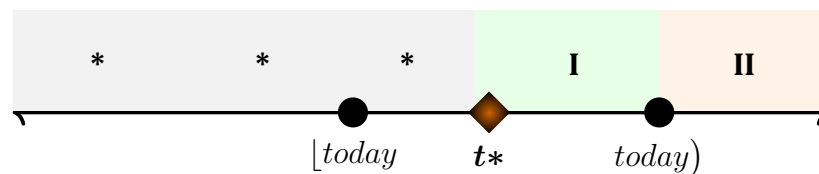
- b. *djamarrkuḷi dhu yaka wurraṇatjarra’y-irr*
 children FUT NEG cruel.INCH-I

‘The children mustn’t be disobedient.’ [AW 20190429]

- c. *ṇarra 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]

Figure 6.10. (In)compatibility of modal particle *dhu* ‘FUT’ with temporal reference & inflectional category.



On the basis of this range of usage, we might adopt the following lexical entry for *dhu*, treating this particle as a modal expression and adapting the meaning of *will* provided in Condoravdi (2002, 2003). The function BEST selects the best worlds in a circumstantial modal base, according to a set *o* of: • speaker expectations (in the case of FUTURE uses), • relevant rules & regulations (in the case of *deontic* uses), • relevant wants (in the case of *bouletic* uses) or • in view of achieving relevant ends (in the case of *teleological* uses) *etc.* We lexically specify the modal base on account of the apparent incompatibility between WD modal particles and epistemic conversational backgrounds (e.g. Kratzer 2012, Peterson 2010 a.o.).

- (107) $\llbracket dhu \rrbracket = \lambda o \lambda m \lambda P \lambda i : \forall b \ni i [b \in \underset{o}{\text{BEST}}(\underset{\text{CIRC}}{\cap m(i)}) \rightarrow \exists i' \in b [i' \succeq i \wedge \text{AT}(P, i)]]$
dhu *P* asserts that – in the best branches that contain the reference index ($b \ni i$) (according to some ordering source *o*) – the property *P* is instantiated in the at some index *i'* that is a successor to *i*.¹⁷

¹⁷The relation “Instantiation” (also given as AT) is taken to hold between a property of events, a

In addition to *dhu*, WD deploys a number of other modal particles: *balan(u)* ‘IRR’ the most frequently occurring among them. *balan(u)* occurs with verbal predicates categorically inflected for either **II** (shown in 108) or **IV** (shown in 109).

The distinction in interpretation between these two sets of data is the *temporal interpretation* of the modal. In all cases *balan(u)* appears to trigger existential quantification over a circumstantial modal base, although whereas **II**-marking induces a future interpretation of the predicate, **IV**-marking induces a past possibility (including counterfactual) reading.

balan may be better
glossed as just MOD,
where IRR is reserved to
describe verbal mood.

(108) *balan(u)* ‘IRR’ and **II**-inflection

- a. *ɲarra balanu (bäynha)*¹⁹*dhiŋg-uŋu nawalulyu*
1s IRR (MOD) die-**II**
‘I could die from the smoke.’ [DG 20190405]
- b. *ɲarra balanu luk-i gapu, ɲanydja monuk ɲayi gapu*
1s IRR consume-**II** water but saline 3s water
‘I would drink some water but this water’s salty.’ [DG 20190405]
- c. *ɲarra ɲuli ga bitjan bili warguyun ɲunhi recorder balanu*
1s HAB IPFV-**I** thus-**I** CPLV worry-**I** ENDO recorder IRR
bakthu-rru
break-**II**
‘I’m always worried that the recorder will/could break.’ [DG 20190417]

(109) *balan(u)* ‘IRR’ and **IV**-inflection

- a. *nhe balanu malkthu-nha*
2s IRR accompany-**IV**
‘you should/would have gone with (him).’ [DG 20190413]
- b. *ɲarra gana guyaŋa-na waɬuy balanu luka-nha chocolate*
1s IPFV-**III** think-**III** dog.ERG IRR eat-**IV** chocolate
‘I’d thought the dog might/would eat the chocolate.’ [DG 20190413]

time, and a world when there is some event of a given type that is contained within that time:

$$\text{INST}(P, w, t) = \exists e[P(e) \wedge \tau(e, w) \sqsubseteq t]$$

See also Condoravdi (2003), Condoravdi and Deo (2015) a.o.

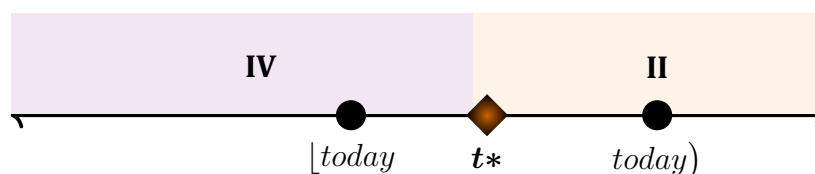
¹⁹Here I treat *bäynha* as semantically identical to *balan(u)*.

- c. *ɲarra-nha balaju luku walala mitthu-na... yurru ɲarra*
 1s-ACC IRR foot 3p cut-IV but 1s
manymak-thirri
 good-INCH.I

‘They would have amputated my foot, but I got better.’

[DG 20190417]

Figure 6.11. Compatibility of modal particle *balaju* ‘IRR’ with temporal reference & inflectional category.



On the basis of these data then, we propose a lexical entry for *balaju(u)* as in (110) below. *balaju(u)* is taken to differ from *dhu* in terms of the “force” of the modal quantification it realises, in addition to its lability with respect to instantiation time.

$$(110) \quad \llbracket balaju(u) \rrbracket = \lambda o \lambda m \lambda P \lambda i. \exists b \ni i' [b \in \underset{o}{\text{BEST}}(\underset{\text{CIRC}}{\cap m(i)}) \wedge \exists i' \succeq i \wedge \text{AT}(P, i)]$$

Defined iff the modal base *m* is circumstantial, *balaju(u)* *P* is true iff one of the best (according to *o*) branches *b* that contains the reference index.....

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 (2002:62ff), temporal perspective is the time at which some modal claim is calculated. A counterfactual predication like (109c), for example, communicates that ‘we are now located in a world whose past included the (unactualized) possibility of a foot amputation. The contribution of *balaju* is spelled out in (111).

- (111) *balaju* on a counterfactual reading (past temporal perspective contributed by **IV**)

ɲarra-nha balaju luku walala mitthu-na
 1s-ACC IRR foot 3p cut-IV

‘They would have amputated my foot.’

[DG 20190417]

$$\llbracket (109c) \rrbracket^c \text{ iff } \exists i', i'' [i' \prec i_c \wedge \exists b \ni i' [b \in \text{MB}(i') \wedge i'' \succ i' \wedge \llbracket (109c) \rrbracket^{i''}]]$$

In words: at an evaluation index, the proposition is true if, in the past of that index, there was some future index at which the proposition is true.

6.3.3 Semantics of the “NONREALISED” inflections

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 Bower 1998, Chafe 1995, Elliott 2000, McGregor and 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).²⁰

Conversely, the concept of REALITY STATUS and the *realis/irrealis* distinction has also been roundly criticised by a number of authors, predominantly due 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. That is, the semantic domain of an IRREALIS marker on the basis of the analysis of one language tends to include and exclude parts of the semantic domain of others (see Bybee et al. 1994:238, *apud* Foley 1986:158ff. 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 (2012:138ff) argues that there languages crucially tend to draw a distinction between ‘as-yet unrealized’ and ‘non-realized (in the past)’ – *i.e.*, these domains are grammaticalized separately. 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. Relatedly, Portner and Rubinstein (2012:467) make a parallel observation regarding a potential 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 inert.

Nevertheless, the co-occurrence constraints between the “irrealis-aligned inflections” II and IV and modal expressions described above (*e.g.*, *dhu* and *balan(u)*)

²⁰Conversely, Cristofaro (2012) explicitly takes issue with the inference that linguists have made that the notion of irrealis “plays some role in [the use of irrealis-denoting forms]” (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” (145).

suggest a semantic treatment of these inflections that aligns with current analyses of verbal mood — those where the “subjunctive” paradigms of various European languages are taken to be “obligatory and redundant” — dependent on a range of irrealis-aligned (modal) operators, predominantly propositional attitudes (Palmer 2001).²¹ 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: analyses that hinge on the semantics of **comparison** versus **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.²² On the basis of this generalisation, Giannakidou (2016), Giannakidou and Mari 2021) a.o. take 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 in which that proposition is not true (schematised in 112.)

- (112) 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 and 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 take **II** and **IV** to realise the temporal contribution of **I** and **III** respectively, while also enforcing a presupposition of **nonveridicality** with respect to the eventuality introduced by given predicate. This hypothesis is summarised in (113) and spelled out in the section below.

²¹Chung and Timberlake (1985:238) explicitly suggest an equivalence between REALIS and the INDICATIVE. See also Matthewson 2010 on the Státimcets “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 and Sansò 2016:169ff, *cf.* Matthewson (2010:13, fn 9) who takes issue with this criterion).

²²Portner (2018) takes comparison-based analyses to be exemplified in Anand and Hacquard 2013, Giorgi and Pianesi 1997, Portner and 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.

(113) **Licensing conditions for IRR**

- 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 prejacents).
- b. They additionally presuppose **nonveridicality** with respect to the modal frame of the local clause²³

6.3.3.1 **Subjunctivity**

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)²⁴ European languages. In his comparison of IRREALIS and SUBJUNCTIVE as putative grammatical categories, Palmer (2001:186) in part attributes these distinct metalinguistic conventions to different “different traditions”, but also notes that an apparent difference between the categories; namely that, “[SBJV] is generally redundant only in subordinate clauses, where the subordinating verb clearly indicates the notional feature.” Conversely, IRR is frequently found in matrix clauses, co-occurring with other modal expressions.

(114) a. French SUBJUNCTIVE

Il faut qu'il se taise
 3s be.necessary.INDIC COMP=3s R/R be.quiet.SBJV

‘It’s necessary that he be quiet.’

b. Caddo IRREALIS

kas-sa-náy?aw
 OBLIG-3AG.IRR-sing

‘He should/is obliged to sing.’ (Chafe 1995:356)

Crucially, WD inflections are **not sensitive to** embedding predicates. Canonical subjunctive-licensing predicates like ‘want’ do not in themselves trigger an IRR-aligned inflection.

(115) Desiderative embedding predicate doesn’t license mood shift in WD

(Wilkinson:23)

²³See also the “locality of binding” principle in Percus 2000:201, Hacquard 2010:99.

²⁴As mentioned Matthewson (2010) describes mood morphology in Státimcets that she argues is a realisation of a SBJV category.

- 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.’

- b. *ηuriki waṭu-w ηarra ga djälthi-rr ηayi dhu ḍarrkthu-n*
 ENDO.DAT dog-DAT 1s IPFV.I want.I 3s FUT bite-I
nhuna-ny
 2s.ACC.PROM

‘I want of that dog that it bite you.’

- c. From Djr bible Mäk 6:19.

Bala ηayiny ηunhi miyalktja ηoy-dhär-ra-na-n nhanṇu
 MVTAWY 3s.PROM ENDO woman.PROM soul-stand-III-SEQ 3s.DAT
Djon-gu-ny, ga djälthinany ηayi
 John-DAT-PROM and want-INCH-III 3s IPFV.III kill-IV-DAT-SEQ
gan bunharawnha nhanṇu murrkay’kunharawnha
 3s.DAT hard-CAUS.IV.DAT-SEQ EMPH but
yan, yurr bäyṇu.
 NEGQ

‘So that woman was upset with John and she was desirous of his violent death.’

Similarly surprising, as with embedding predicates the epistemic adverb *mak(u)* is also completely invisible to the inflectional paradigm.

- (116) Epistemic *mak(u)* doesn’t license mood shift in WD

maḱu ga nhina raṇṇura maḱu bäyṇu. Yaka marṇgi.
 EPIST IPFV.I sit.I beach-LOC EPIST NEG NEG know

‘Maybe she’s at the beach, maybe not. Dunno.’ [DB 20191416]

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 and epistemic modal expressions), 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.

6.3.3.2 Modelling assumptions

I assume that verbs in WD denote properties of events $\langle \varepsilon, st \rangle$. These are bound by aspectual operators, which existentially bind the event variable and map them to

a-b actually don’t
 demonstrate this
 because they’re
 embedding
 dhu-sentences anyway
 (which is in itself
 otatable given the future
 orient of want
 predicates
 x-linguistically)

temporal properties $\langle i, st \rangle$ (a standard assumption, see Kratzer 1998). Denotations for aspect operators, including the inflecting auxiliary *GA* ‘IPFV’ and a covert PFV operator are given below in (117).²⁵

(117) Denotations for WD aspectual operators

- a. $\llbracket GA \rrbracket = \lambda P_{\langle \varepsilon, st \rangle} \lambda i. \exists e [P(e) \wedge \tau(e) \sqsupset i]$
- b. $\llbracket PFV \rrbracket = \lambda P_{\langle \varepsilon, st \rangle} \lambda i. \exists e [P(e) \wedge \tau(e) \sqsubset i]$

WD aspect morphology existentially binds the event variable in a property of events, mapping it to a property of indices. *GA* ‘IPFV’ asserts that the reference index (*i*) is contained within the event’s runtime $\tau(e)$, \emptyset ‘PFV’ asserts that $\tau(e)$ is contained within *i*.

The WD (root) modal expressions (*e.g.*, *dhu* and *balanu*, described in 107 & 110 above) take a predicate *P* in their scope and determine the subset of relevant worlds (indices) in which *P* holds. That is, they express a restriction over the modal base, in effect encoding **objective nonveridicality**.

Additionally, The LF of a simple (unembedded) clause is taken to be headed by a silent ASSERT operator (similar assumptions made in Alonso-Ovalle and Menéndez-Benito 2003, Hacquard 2010, Kaufmann 2005) which takes an inflected proposition as its sister.²⁶ This approach effectively formalises (some) ideas about the illocutionary force and sets of norms that apply to assertoric speech acts (*e.g.* Brandom 1983, Williamson 1996 a.o.) by postulating a covert doxastic modal which is anchored by the actual world i^* . \sim_α is a doxastic accessibility relation anchored to some individual $\cap \alpha$.

(118) **An assertability relation**

$$\llbracket \text{ASSERT} \rrbracket_{\langle s, \langle s, t \rangle \rangle} = \lambda i. \cap \sim_\alpha i$$

ASSERT is an accessibility relation that, given a speech index *i* returns all the propositions that are believed/“assertable” by a given judge α at that index.

The force of this model can additionally be weakened by epistemic possibility adverb *mak(u)*. Given its apparent variable modal force, *mak* 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 (contextually-determined) subset of the modal base (as determined by a “contextually given” choice function f_c .)

²⁵Of 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).

²⁶A similar strategy (in the spirit of update semantics) is adopted in Krifka 2016:570, where ASSERT is taken to perform an operation on a common ground. See also references in Hacquard 2010:102.

Modal strength, then, is proportional to the proportion of the modal base that is understood to be quantified over.

(119) **Epistemic possibility**

- a. $\llbracket mak(u) \rrbracket_{\langle \langle s, \langle s, t \rangle, \langle s, \langle s, t \rangle \rangle \rangle} = \lambda r_{\langle s, \langle s, t \rangle \rangle} . f_c(r)$
- b. $\llbracket maku \rrbracket(\llbracket ASSERT \rrbracket) = \lambda i . f_c(\cap \sim_\alpha i)$

With these assumptions in place, we can propose lexical entries for the verbal inflections.

6.3.3.3 Nonveridicality as presupposition

The WD inflections, then, all denote partial functions. They provide temporal information about a given proposition by existentially binding the time variable (compare 99, replicated in 120).

Additionally, the nonveridicality constraint is modelled as a presupposition that the truth of the inflected sentence does not follow from (that is, it is unsettled) in the evaluation context: in a simple/matrix clause, the evaluation context is to be understood to be anchored to the speakers belief state in the actual world.

- (120) a. $\llbracket II \rrbracket = \lambda P_{\langle s, t \rangle} \lambda i_s : \exists i' \in \cap \approx_i \wedge \neg P(i') . P(i)$
II presupposes that there is some metaphysical alternative to the reference index i at which P doesn't hold.
 It asserts that P holds at i .
- b. $\llbracket IV \rrbracket = \lambda P_{\langle s, t \rangle} \lambda i_s : \exists i' \in \cap \approx_i \wedge \neg P(i') \wedge \exists j \sqsubseteq_{\text{final}} i . \text{NFINST}(P, i, j)$
IV presupposes that there is some metaphysical alternative to the reference index i which P doesn't hold and asserts that P is instantiated at some non-final subinterval of i .

This actually doesn't get the temporal stuff to come out right, it seems to require stuff to be instantiated at speech time. Need to add another index (see cyclic tense stuff.)

Effectively here are the concerns:

- circumstantial modals *dhu*, *balan* quantify over circ conv bkgd. *dhu* is future oriented. *balan* is force-variable.
- negation can be taken to quantify over compatible worlds.
- these operators need to license the irrealis.
 - Confusingly, cyclic tense is neutralised under *balan*. To summarise:
 - *dhu* occurs with **II** (except SDF-I)
 - *balan* occurs with **II** with nonpast persp or **IV** with past persp

– *bäyŋu* (NEG) occurs with **IV** when negating a **III**-past or **II** when negating a **I**-past (except SDF-I)

- the intuition is that they are nonveridical in some objective way.
- epistemic modals (*mak(u)*) **do not** license the irrealis.
- propositional attitudes **do not** in themselves license the irrealis.
- the immediate/today future with **dhu does not** license the irrealis, (including under negation) the intuition is because these future predications are assertable..

Conditionals: not sure where these are from

(121) a. *wäniya* *ŋay* *ŋunbalaya* *bulu*, *ŋayi* *guyupiya* [SBJV]
go.IV 3s that way again 3s die.IV

‘If he had gone that way, he would’ve died’

b. *wäni* *ŋay* *ŋunbalaya* *bulu*, *ŋayi* *guyupi* [COND]
go.II 3s that way again 3s die.II

‘If he goes that way, he’ll die’

6.3.3.4 The proposal in action

(122) *maku* *ŋarra* *dhu* *gi* *nhäŋu* *mukulnha*
EPIST 1s FUT IPFV.II see.II aunt.ACC

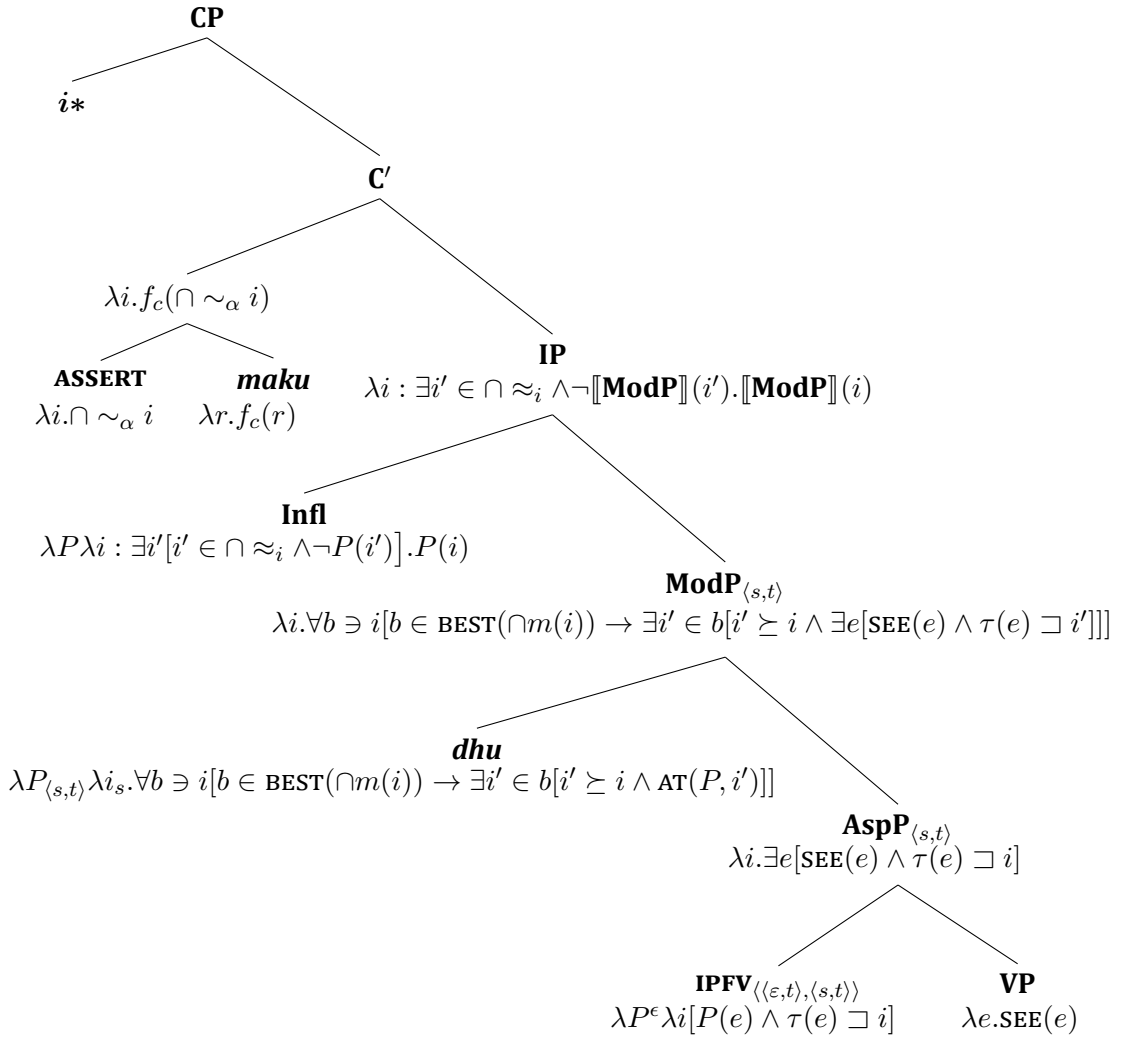
‘Maybe I’ll be seeing aunty’

$$\pi : \exists i' \in \cap \approx_{i*} \wedge \neg \forall b \ni i' \left[b \in \text{BEST}_o(\cap \text{CIRC}(i)) \rightarrow \exists i'' \in b [i'' \succeq i' \wedge \exists e [\text{SEE}(e) \wedge \tau(e) \sqsupset i'']] \right]$$

Presupposes that at some metaphysical alternative to i^* , *ŋarra dhu NHÄ- mukulnha* ‘I’ll be seeing my aunt’ doesn’t hold.

$$f_c(\cap \sim_{\text{Spkr}} i^*) \models \forall b \ni i^* \left[b \in \text{BEST}_o(\cap \text{CIRC}(i)) \rightarrow \exists i' \in b [i' \succeq i^* \wedge \exists e [\text{SEE}(e) \wedge \tau(e) \sqsupset i']] \right]$$

Some subset (as defined by f_c) of the speaker’s doxastic alternatives at the speech index i^* verify the (modal) claim: ‘For all of the best branches (according to m, o) that pass through i^* , there is some successor index i' which is contained by the run time of an event of my seeing my aunt.’



Infl maybe needs to introduce variable that wants an acc. relation in order to introduce the assertability stuff in the C-layer. Kaufmann does this with \emptyset much lower down in the derivation.

6.3.4 Negation

In light of the proposal introduced above, we can model clausal negators *bäyηu* and *yaka* as scoping over the AspP but below inflection. As 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 preajcent.

Given the distributional similarities between (root) modals in and *yaka/bäyηu* in WD, we have independent support (in addition to that described in Chapter II) to propose a modal semantics for these negative particles.

As in Ch. II, on this type of analysis, a modal treatment of *yaka/bäyηu* involves a compatibility relation \mathbb{C} . *Bäyηu* P asserts that no world compatible with the state of affairs at i is such that P is instantiated at i .²⁷ This is shown in (123)

$$(123) \quad [\text{NEG}]^c = \lambda P_{\langle s, t \rangle} \lambda i. \nexists w' [w' \in \cap \mathbb{C}(w) \rightarrow \text{AT}(P, i)]$$

The entry for NEG given in (123) aligns with those for the other modals both in terms of • its type (that is, the shape of the lex entry) as well as • in terms of the fact that like the

²⁷Note 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].”

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. In terms of the branching times framework negative operators can be interpreted as situating the reference index in the COUNTERFACTUAL domain.

A wrinkle

While much of this analysis emphasises distributional similarities between negative operators in WD and the modal particles *dhu*, *balan(u)*... in view of assimilating the former into a “modal operator” class, it is also worth considering distributional differences between them, demonstrated in (124) below (compare also Figs 6.8/6.11 above).

(124) Neutralisation of temporal remoteness distinctions with *balan(u)* ‘IRR’

barpuru *ɲarra* *guyaŋa...* *balan* *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 that we might collect shellfish, but we didn’t collect shellfish’
 [AW 20190429]

The three predicates in (124) — 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 *balan*). In effect, the temporal remoteness effects in the past are lost in modal contexts, but not in negative predica-

6.3.5 The same-day future

The same day future, both in positive and negative clauses receives I-inflection — this is the only place where the neutralisation doesn’t happen.

(125) Negated same-day future predications fail to license irrealis-mood shift (unlike negated present predications) [AW 20190501]

- a. *ɲarra* (*yaka*) *dhu* *nhä-ma* *mukulnha*
 1s (NEG) FUT see-I aunt.ACC
 ‘I will (won’t) see aunty (tonight).’
- b. (*goɖarr*) *ɲarra* (*yaka*) *dhu* *nhä-ŋu* *mukulnha*
 toomorrow 1s (NEG) FUT see-II aunt.ACC
 ‘Tomorrow I will (won’t) see aunty.’

- c. (dhiyaŋ bala) bāyŋu ŋarra gi nhā-**ŋu** mukulnha
 now 1s (NEG) FUT see-**II** aunt.ACC

‘At the moment, I’m not looking at aunty.’

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”²⁸ While the WD same-day future construction is not technically a morphosyntactic futurate,²⁹ analysis of these devices can shed potential insight on the (functional) motivation for this phenomenon.

The surprising contrast between (125a) and (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**). The same-day future, in which *dhu* and **I** co-occur can in effect be understood as a **grammaticalised futurate construction**. While *dhu* obligatorily advances the instantiation time of the eventuality, 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, they are both asserted to be metaphysically “actual.”

this needs to be

foregrounded as

support for treating the

nonveridicality

condition on **II/IV** as

presuppositional

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 modal (incl. negative) operators) in view of general pragmatic principles (viz. MAXIMIZE PRESUPPOSITION.³⁰) The analysis of the same-day future, then, is based on the hypothesis that the same-day future — even if it’s taken to inflect a property of future (POTENTIAL) indices — receives a NON-IRREALIS inflection (**I**) in view of **Q**-implicating plannability and “presumed settledness.”

6.4 Semantic change in Southern Yolŋu

The negative asymmetry described above, exhibited in WD varieties, is not manifested in most other Southern Yolŋu (SY) varieties. As suggested by the glossing decisions summarised in Table 6.2 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.³¹ Additionally, Melanie Wilkinson observes that these effects appear to be variable in the Djambarrpuyŋu varieties spoken further east in Gali-

²⁸Kaufmann (2002) cites commentary including Comrie (1985), Dowty (1979) among numerous others on this distinction. See also Copley (2008:note 1)

²⁹Copley (2008:261) defines *futures* “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.

³⁰A 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 (2009) a.o.

³¹Though 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.

win'ku (Elcho Island) and aren't manifested in *Miwatj* varieties more generally (2012:431, 359ff; *pers. comm.*) These phenomena *are*, however, exhibited in the westernmost Yolŋu varieties (Djinan 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.

6.4.1 Semantics of the Ritharrŋu-Wägilak verbal paradigm

Ritharrŋu and Wägilak, the southernmost SY varieties also provide examples of the absence of sensitivity to negation in the inflectional paradigm. The data below demonstrate how, 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, a fact that survives under negation (generally marked by verbal enclitic =*'ma'*). Examples of these are given in (126-128). Heath notes that the Ritharrŋu imperatives are formally identical to corresponding future predications (1980a:76) — this is shown in (127).

- (126) **nhäma(-'ma')** *rra yakuthi mukulnha* [PRESENT]
 see.**I-NEG** 1s now aunt.ACC
 'I'm (not) looking at my aunt currently.' [RN 20190520]

- (127) a. *godarrpuy ŋarra nhäŋu(-'ma')* *mukulnha* [FUTURE]
 tomorrow 1s see.**II-NEG** aunt.ACC
 'I will (not) see my aunt tomorrow.' [DW 20190522]
- b. **luki** *nhe!*
 eat.**II** 2s
 'Eat it!' (OR 'you'll eat it') (Heath 1980a:76)
- c. *yaka* *nhe bangul'-yurru*
 NEG 2s return-VBLZR.**II**
 'Don't come/go back!' (Heath 1980a:76)

- (128) a. *gätha ŋarra nhäwala(-'ma')* *mukulnha* [TODAY PAST]
 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 PAST]
 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 the "irrealis past" marker **IV** in WD. Conversely, Heath identifies an alternation in the past paradigm that is made in a number of Ritharrŋu

conjugation classes. 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 suggests tentative evidence of a semantic distinction between these. Providing a number of examples, he suggests that:

wāni-na is usual for ‘went’, but *wāni-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 forms documented by Heath — PAST_{III}/PAST_{IV} (i.e., those inflections cognate with WD **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.

- (129) a. Past habituals with **IV**-cognate marking

ŋarra yothu-ganyan̄, 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’tan̄’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: **V**)³² categories appear to be variable in terms of modal force. This is indicated by the examples in (Heath’s translations, 130) and (131) below.

- (130) FUTURE and PAST POTENTIAL in modalised contexts in Ritharrŋu

(adapted from Heath 1980a:104)

- a. *wāni nhe*
go.**II** 2s

‘You can/should/will go.’ (or ‘Go!’)

- b. *wāni-ya nhe*
go-**V** 2s

‘You could/should/would/were about to go.’

³²For 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.

(131) Wägilak FUTURE (II) with variable modal flavour

- a. *blijiman* *ɲay wāŋa-na* “*gulu-rru* *nhe* *yiŋ’-ɲiri=dhi* *wāŋa-ya*. *Yakaŋu*
 policeman 3s say-III stay-II 2s DIST-LOC-FOC home-PROM NEG
nhe wāni-‘may *garra* *nhe* *git* *lokda-urru*”
 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.’ [RN 20190520 18’]

- b. *wāni* *lima* *Numbulwar-li’-ya* *ɲatha* *lima* *mār-ra-wu*, *wo*
 go-II PLACE-ALL-PROM food 1p.INCL food get-II or
djuḷ-kurru?
 road-PERG

‘Should we go to Numbulwar and (should we) 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 is the absence of TMA particles in the latter. Consequently, the verbal paradigm itself is the primary grammatical device that R-W deploys to encode relevant temporal, modal and aspectual distinctions. Von Prince’s branching-time trichotomy provides a neat way of describing the domain of each inflection (described in 104, p.117 above). This is summarised in (132): the four inflections draw a clear distinction between the present and past, in addition to the ‘as-yet-unrealised’ and ‘nonrealized’ (cf. Cristofaro 2012), discussed above.

(132) **Domains of the four inflections in Ritharrŋu-Wägilak**

- [[I]]^{i*} ‘PRES’ : ACTUAL PRESENT {*i* | *i* = *i**}
- [[II]]^{i*} ‘FUT’ : POTENTIAL {*i* | *i* > *i**}
- [[III]]^{i*} ‘PST’ : ACTUAL PAST {*i* | *i* < *i**}
- [[V]]^{i*} ‘PSTPOT’ : COUNTERFACTUAL {*i* | *i* = *i**}

A distinctive difference, of course, central to this chapter, is the observation that sentential negation has no effect on the tense-mood inflection of a given clause in R-W; the type of “counterfactuality” introduced by a negative operator — key to the analysis of the WD irrealis laid out above — is apparently invisible to mood selection. Recall that the cross-linguistic heterogeneity of *irrealis* as a category (exemplified by the fact that for some (nall) languages, the category is said to be licensed by negation.)

This difference might be modelled as a contrast in the scope-taking behaviour of R-W -‘may’ as against WD *bäyŋu/yaka* — Mithun (1995) makes a similar suggestion in her discussion of the relationship between “reality status” marking and negation in Central Pomo as against Caddo.

6.4.2 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. 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).³³ 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 (Djinan, Djinba and WD) that exhibit the distinctive cyclic tense phenomenon briefly described earlier.³⁴ The absence of these features in other Pama-Nyungan (genetically related) languages suggests that this paradigm reorganisation in the western varieties is a function of this stable contact with their Maningrida/Burarran neighbours.^{35,36}

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 incompatibility 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 imperfective 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. While no root modals are reported in Ritharrŋu-Wägilak, in contemporary WD, *dhu*, *balan(u)* etc. are responsible for encoding modality. This (partial) redundancy of the inflectional paradigm then leads to an analysis of the irrealis-aligned inflections (**II** and **IV**) as containing an irrealis presupposition (which is satisfiable by a root modal operator.) In effect, they **II** and **IV** come to mark the **nonveridicality**, *sc.* the *unknowability* of their prejacent in a given 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 $\neg p(w)$ requires that *p* not be a realised (let alone known) fact of *w*), negative operators also satisfy nonveridicality. In view of these

³³Australian 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.

³⁴Comrie (1985:75) refers to the description of Burarra tense marking (Glasgow 1964) as his sole example of “cyclic tense.”

³⁵Green (2003) shows that these languages represent a single subgrouping within a larger “Arnhem” family.

³⁶An 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 *wāŋa*. Further work is required to satisfactorily distinguish between these alternatives.

facts of the language, then, sentential negators (*viz. yaka, bāyŋu*) are reanalysed as predicate modifiers of the same type as (other) modal operators which license the irrealis mood inflections.

6.5 Conclusion

In this chapter, I have proposed a semantics for the four inflectional categories that are obligatorily marked on Western Dhuwal(a) verbs. These are given in (133).

(133) Semantics for the inflectional paradigm of WD

- a. $\llbracket \text{I} \rrbracket^{i*} = \lambda P \lambda i. P(i)$
 $\llbracket \text{II} \rrbracket^{i*} = \lambda P \lambda i : \exists i' [i' \in \cap \approx_i \wedge \neg P(i')] . P(i)$
 $\llbracket \text{III} \rrbracket^{i*} = \lambda P \lambda i : \exists j [j \sqsubseteq_{\text{FINAL}} i. \text{NFINST}(P, i, j)]$
 $\llbracket \text{IV} \rrbracket^{i*} = \lambda P \lambda i : \exists i' [i' \in \cap \approx_i \wedge \neg P(i')] \wedge \exists j [j \sqsubseteq_{\text{FINAL}} i. \text{NFINST}(P, i, j)]$
- b.
- | | -IRR | +IRR |
|---------|------|------|
| -NFINST | I | II |
| +NFINST | III | IV |

In a nutshell, the proposal laid out in (133) proposes a 2×2 paradigm where WD's four inflections encode $\pm \text{NONFINAL INSTANTIATION}$ (capturing *cyclicity*) and $\pm \text{IRREALIS}$. 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 cyclic tense and asymmetric negation phenomena. The bulk of the chapter has been devoted to showing that the *IRREALIS* inflections are licensed when there is a modal operator in their c-command domain (*i.e.*, an operator that indicates that its prejacent is not a settled fact of the evaluation world.)

As a result 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 remoteness³⁷ and the development of a future/nonfuture tense distinction:³⁸ features exhibited (to varying degrees) in WD.

- Djapu (E Dhuwal) could be like a midpoint bw Wag and the West.
- modal particles pick up the slack as mood/inflections do less of the lifting (matthewson's comparisons of salish and european)

³⁷Bhat 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).

³⁸While certainly WD has no 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.

As discussed in § 6.3.3, 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 heterogeneous set of assumptions made by different scholars about the semantic domain and breadth of the irrealis domain (e.g., Mithun (1995:380) who points out that while, “negatives are systematically categorized as Irrealis [in Caddo]”, 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.

This chapter, then, has provided one of the first formal treatments of an apparent IR-REALIS MOOD, joining previous accounts (e.g., Krifka 2016, Matthewson 2010,³⁹ Von Prince et al. 2019). 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 on verbal mood.

³⁹Though as stated above Matthewson (2010:13) argues that the relevant mood morphology in Stáímcets ought to be treated as a SUBJUNCTIVE (As distinct from REALIS.) *N.b.* also that Matthewson explicitly excludes “obligatory and redundant” occurrences of the subjunctive from her analysis (26).

General conclusion

The four essays that constitute this dissertation have sought to provide new data, analysis and insights of how the conceptual domains of modality, temporality and negation interact. In particular, each represents an investigation of some dimension of irreality.

Part I showed how an Australian Kriol future-oriented temporal frame expression has developed APPREHENSIONAL meaning. From advancing the temporal reference of its pre-jacent (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.

Relatedly, chapter ?? develops a “dynamic” account for the interpretation of *otherwise* on the basis of contemporary theories of **modal subordination** (Roberts 1989, 1995, 2020) and **information structure** (e.g. Roberts 2012). Building on existing treatments of *discourse anaphora* (Kruijff-Korbayová and Webber (2001), Webber et al. (2001)), we propose to treat a sentence of the form *p otherwise q* as asserting both *p* and *if not p*, $\Box q$. The second conjunct has the form of a conditional — i.e. *q* is *modally subordinate* to the negation of some proposition related to *p*, calculated from discourse context. Chapter ??, then, constituted an exploration of a lexical item that encodes negative conditionality and requires a pragmatic/discourse structure-sensitive modal restriction (one of several available readings to *bambai*.)

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 instantiates this cycle. By analysing PRIV as a (negative) generalised quantifier, the NEC can be conceived of as stemming from the generalisation in the quantificational domain of this operator. A consequence of this unified treatment of PRIV and NEG is a modal semantics for sentential negation.

Finally, Part III comprised an account of verbal mood semantics in the Western Dhuwal(a) language, including a type of “asymmetric negation” where the \pm 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. As in Part II, an apparent quantificational semantics for negation makes a number of felicitous predictions.

In this dissertation, I hope to have made a contribution to the following related enterprises:

- 1 The pay-off of deploying tools from the formal semantics and symbolic traditions in de-

veloping a systematic and precise understanding the meaning contributions of cross-linguistic phenomena as well as “grammaticalisation” trajectories and synchronic variation.

Particularly crucial from the perspective of the empirical phenomena treated here is the insight that temporal and modal logics are intimately related, a fact that predicts visible interactions between linguistic tense and modal operators.

- 2 The importance and utility of rigorous investigation of understudied (and particularly threatened) language varieties and typological phenomena in developing a nuanced and complete theory of natural language semantics.

Bibliography

- Ahern, C. and Clark, R. (2017). Conflict, cheap talk and Jespersen's cycle. *Semantics & Pragmatics*, 10(11):1–40.
- Alonso-Ovalle, L. and Menéndez-Benito, P. (2003). Some epistemic indefinites. In Kadowaki, M. and Kawahara, S., editors, *Proceedings of North-East Linguistic Society (NELS) 33*, pages 1–12, Amherst.
- Amery, R. (1996). Kaurua in Tasmania: a case of mistaken identity. *Aboriginal History*, 20:24–50.
- Anand, P. and Hacquard, V. (2013). Epistemics and attitudes. *Semantics & Pragmatics*, 6:1–59.
- AnderBois, S. and Dąbkowski, M. (2020). A'ingae ʔsa'ne APPR and the semantic typology of apprehensional adjuncts. In *Proceedings of SALT 30*, pages 371–91. Linguistic Society of America.
- Anderson, S. R. (2005). *Aspects of the Theory of Clitics*. Oxford University Press, Oxford.
- Anderson, S. R. (2008). The Logical Structure of Linguistic Theory. *Language*, 84(4):795–814.
- Anderson, S. R. (2016). Synchronic versus diachronic explanation and the nature of the language faculty. *Annual Review of Linguistics*, 2:11–31.
- Angelo, D. and Schultze-Berndt, E. (2016). Beware bambai – soon it may turn apprehensive. In Meakins, F. and O'Shannessy, C., editors, *Loss and Renewal: Australian languages since contact*, pages 255–296. Mouton de Gruyter, Berlin.
- Angelo, D. and Schultze-Berndt, E. (2018). Syntactically independent but pragmatically dependent: precautioning temporal markers. In *Syntax of the World's Languages*, Paris.
- Austin, P. K. (1981). *A Grammar of Diyari, South Australia*. SOAS, London.
- Austin, P. K. (1998). Temporal reference, tense and aspect in Australian aboriginal languages. In Nagano, Y., editor, *Jikan to kotoba: Time and Language*, pages 143–169. National Museum of Ethnology, Osaka.
- Barwise, J. and Cooper, R. (1981). Generalized quantifiers and natural language. *Linguistics and Philosophy*, 4(2):159–219.

- Bauer, W. (1993). *Maori*. Routledge, London; New York.
- Bednall, J. (2019). *Temporal, aspectual and modal expression in Anindilyakwa, the language of the Groote Eylandt archipelago, Australia*. Phd thesis, ANU/Paris VII.
- Belnap, N., Perloff, M., and Xu, M. (2001). *Facing the Future*. Number February. Oxford.
- Bennett, M. and Partee, B. H. (2004). Towards the Logic of Tense and Aspect in English. In *Compositionality in Formal Semantics: Selected Papers by Barbara H. Partee*, chapter 4, pages 59–109. Blackwell.
- Bermúdez-Otero, R. (2015). *Amphichronic explanation and the life cycle of phonological processes*.
- Bhat, D. N. S. (1999). *The Prominence of Tense, Aspect and Mood*. John Benjamins, Amsterdam.
- Binnick, R. I. (1991). *Time and the verb : a guide to tense and aspect*. Oxford University Press.
- Black, J. M. (1917). Vocabularies of three South Australian native languages – Wirrung, Narinyeri and Wongaidya. *The Transactions of the Royal Society of South Australia*, XLI:1–13.
- Blake, B. (1993). Verb affixes from case markers : some Australian examples. *La Trobe working papers in linguistics*, 6:33–58.
- Blühdorn, H. (2008). Subordination and coordination in syntax, semantics, and discourse: Evidence from the study of connectives. In Fabricius-Hansen, C. and Ramm, W., editors, *'Subordination' versus 'Coordination' in Sentence and Text*, pages 59–85. John Benjamins, Amsterdam.
- Boogaart, R. (2009). Een retorische straks-constructie. In Boogaart, R., Lalleman, J., Mooijart, M., and van der Wal, M., editors, *Woorden wisselen. Voor Ariane van Santen bij haar afscheid van de Leise universiteit*, volume 20. SNL-reeks, Leiden.
- Boogaart, R. (2020). *Expressives in Argumentation: The Case of Apprehensive Straks ('Shortly') in Dutch*. Springer International Publishing.
- Bouckaert, R. R., Bower, C., and Atkinson, Q. D. (2018). The origin and expansion of Pama-Nyungan languages across Australia. *Nature Ecology & Evolution*.
- Bower, C. (1998). Towards a typology of irrealis marking in modality. In Ingram, J., editor, *Selected papers from the 1998 Conference of the Australian Linguistic Society*.
- Bower, C. (2009). Conjugation class stability: Charting the history of conjugation classes in Yolngu languages.
- Bower, C. (2010). Correlates of Language Change in Hunter-Gatherer and Other 'Small' Languages. *Language and Linguistics Compass*, 4:665–679.
- Bower, C. (2012). *A grammar of Bardi*. Mouton de Gruyter, Berlin; Boston.

- Bowern, C. and Atkinson, Q. D. (2012). Computational phylogenetics and the internal structure of Pama-Nyungan. *Language*, 88:817–845.
- Bowler, M. (2014). Conjunction and disjunction in a language without 'and'. *Semantics and Linguistic Theory*, 24:137–155.
- Brammall, D. (1991). *A comparative grammar of Warluwaric*. PhD thesis, Canberra.
- Brandom, R. (1983). Asserting. *Noûs*, 17(4):637–650.
- Braun, D. (2017). Indexicals.
- Breen, J. G. (2000). *Bularnu Grammar and Dictionary*. Institute for Aboriginal Development, Alice Springs, NT.
- Buchanan, D. (1978). Djambarrpuyŋu clauses. In *Papers in Australian Linguistics 11*, volume 51, pages 143–177.
- Burgess, J. P. (1978). The unreal future. *Theoria*, 44(3):157–179.
- Bybee, J. (1998). "Irrealis" as a Grammatical Category. *Anthropological Linguistics*, 40:257–265.
- Bybee, J. and Dahl, Ö. (1989). The creation of tense and aspect systems in the languages of the world. *Studies in Language*, 13:51–103.
- Bybee, J., Perkins, R. D., and Pagliuca, W. (1994). *The evolution of grammar: Tense, aspect, and modality in the languages of the world*. University of Chicago Press, Chicago.
- Cable, S. (2013). Beyond the past, present, and future: towards the semantics of 'graded tense' in Gĩkũyũ. *Natural Language Semantics*, 21(3):219–276.
- Chafe, W. L. (1995). The realis-irrealis distinction in Caddo, the Northern Iroquoian Languages, and English. In Bybee, J. and Fleischman, S., editors, *Modality in Grammar and Discourse*, pages 349–66. John Benjamins, Amsterdam.
- Chomsky, N. (1970). Remarks on nominalization. In Jacobs, R. and Rosenbaum, P., editors, *Reading in English Transformational Grammar*, chapter 12, page 184. Waltham.
- Chung, S. and Ladusaw, W. A. (2004). *Restriction and saturation*. MIT Press, Cambridge, MA.
- Chung, S. and Timberlake, A. (1985). Tense, aspect, and mood. In Shopen, T., editor, *Language Typology and Syntactic Description*, volume III: Gramm, pages 202–258. Cambridge University Press, Cambridge.
- Clark, R. (1979). In search of Beach-la-mar: towards a history of Pacific Pidgin English. *Te Reo*, 22:3–64.
- Comrie, B. (1983). *Language Universals and Linguistic Typology*. Blackwell, Oxford.
- Comrie, B. (1985). *Tense*. Cambridge University Press, Cambridge.

- Condoravdi, C. (2002). Temporal Interpretation of Modals: Modals for the Present and for the Past. In Casillas, L., Clark, B., and Kaufmann, S., editors, *The construction of meaning*. CSLI publications, Stanford.
- Condoravdi, C. (2003). Moods and Modalities for Will and Would. In *Amsterdam Colloquium 2003*, pages 1–16, Amsterdam.
- Condoravdi, C. and Deo, A. (2015). Aspect shifts in Indo-Aryan and trajectories of semantic change. In Gianollo, C., Jäger, A., and Penka, D., editors, *Language Change at the Syntax-Semantics Interface*, pages 261–92. Mouton de Gruyter, Berlin.
- Copeland, B. J. (2002). The genesis of possible worlds semantics. *Journal of Philosophical Logic*, 31(2):99–137.
- Copeland, B. J. (2020). Arthur Prior.
- Copley, B. (2008). The Plan's the Thing: Deconstructing futurate meanings. *Linguistic Inquiry*, 39(2):261–274.
- Copley, B. (2009). *The semantics of the future*. Routledge, New York.
- Creissels, D. (2014). Existential predication in typological perspective (ms.).
- Cristofaro, S. (2005). *Subordination*. Oxford University Press.
- Cristofaro, S. (2012). Descriptive notions vs. grammatical categories: Unrealized states of affairs and 'irrealis'. *Language Sciences*, 34(2):131–146.
- Croft, W. (1991). The Evolution of Negation. *Journal of Linguistics*, 27:1–27.
- Culicover, P. W. and Jackendoff, R. (1997). Semantic Subordination despite Syntactic Coordination. *Linguistic Inquiry*, 28(2):195–217.
- Dąbkowski, M. and AnderBois, S. (ms). The apprehensional domain in A'ingae (Cofán). In Vuillermet, M., Schultze-Berndt, E., and Faller, M., editors, *Apprehensional Constructions*. Language Sciences Press, Berlin.
- Dahl, Ö. (1985). *Tense and Aspect Systems*. Blackwell, Oxford; New York.
- de Haan, F. (2012). Irrealis: fact or fiction? *Language Sciences*, 34(2):107–130.
- de Mulder, W. and Carlier, A. (2011). The grammaticalization of definite articles. In Heine, B. and Narrog, H., editors, *The Oxford Handbook of Grammaticalization*. Oxford University Press, Oxford.
- de Weert, D. (2016). Existential sentences in Flemish Sign Language and Finnish Sign Language. *Suomen Kielitieteellinen Yhdistys Journal of Linguistics*, 29:7–38.
- Deo, A. (2009). Unifying the imperfective and the progressive: Partitions as quantificational domains. *Linguistics & Philosophy*, 32(5):475–521.
- Deo, A. (2015a). Diachronic Semantics. *Annual Review of Linguistics*, 1:179–197.

- Deo, A. (2015b). The semantic and pragmatic underpinnings of grammaticalization paths: The progressive to imperfective shift. *Semantics and Pragmatics*, 8:1–52.
- Deo, A. (2017a). Fine-tuning the progression of grammaticalization paths. In *Meaning in Flux workshop, October 12-14*. Yale University, New Haven.
- Deo, A. (2017b). Marathi tense marking: a window into the lexical encoding of tense meanings.
- Dickson, G. (2015). *Marra and Kriol: the loss and maintenance of knowledge across an language shift boundary*. PhD thesis, Canberra.
- Dixon, R. M. W. (1983). Nyawaygi. In Dixon, R. M. W. and Blake, B. J., editors, *The Handbook of Australian Languages*, volume 3, pages 430–522. The Australian National University Press, Canberra.
- Dixon, R. M. W. (2002). *Australian languages: their nature and development*. Cambridge University Press, New York.
- Donaldson, T. (1980). *Ngiyambaa: the Language of the Wangaaybuwan*. Number 29. Cambridge University Press, Cambridge.
- Došen, K. (1986). Negation as a modal operator. *Reports on Mathematical Logic*, 20:15–27.
- Dowty, D. R. (1977). Toward a semantic analysis of verb aspect and the English ‘imperfective’ progressive. *Linguistics & Philosophy*, 1(1):45–77.
- Dowty, D. R. (1979). *Word Meaning and Montague Grammar*. Kluwer, Dordrecht.
- Dowty, D. R. (1982). Tenses, time adverbs, and compositional semantic theory. *Linguistics and Philosophy*, 5(1):23–55.
- Dunn, J. M. (1993). Star and Perp: Two treatments of negation. *Philosophical Perspectives*, 7:331–357.
- Eades, D. (1979). Gumbaynggir. In Dixon, R. M. W. and Blake, B. J., editors, *The Handbook of Australian Languages*, volume 1, pages 244–361. The Australian National University Press, Canberra.
- Eather, B. (2011). *A grammar of Nakkara (Central Arnhem Land coast)*. Lincom, Munich.
- Eckardt, R. (2011). Semantic Reanalysis and Language Change. *Language and Linguistics Compass*, 5:33–46.
- Eira, C. and Narungga Aboriginal Progress Association (2010). *Fragments of Budderer's waddy: a new Narungga grammar*. Pacific Linguistics, Canberra.
- Elliott, J. R. (2000). Realis and irrealis: Forms and concepts of the grammaticalisation of reality. *Linguistic Typology*, 4(1):55–90.

- Farkas, D. F. (1992). On the Semantics of Subjunctive Complements. In Hirschbühler, P. and Koerner, E. F. K., editors, *Romance Languages and Modern Linguistic Theory*, pages 69–104, Amsterdam. Mouton.
- Farkas, D. F. (2003). Assertion, belief and mood choice. In *Workshop on Conditional and Unconditional Modality, ESSLLI*, Vienna.
- Foley, W. A. (1986). *The Papuan languages of New Guinea*. Cambridge University Press, Cambridge.
- Francez, I. (2007). *Existential Propositions*. PhD thesis, Stanford University, Stanford.
- Francez, I. (2009). Existentials, predication, and modification. *Linguistics & Philosophy*, 32(1):1–50.
- Freeze, R. (1992). Existentials and Other Locatives. *Language*, 68(3):553–595.
- Fuchs, M. (2020). *On the Synchrony and Diachrony of the Spanish Imperfective Domain: Contextual modulation and semantic change*. Phd dissertation, Yale U.
- Geis, M. L. and Zwicky, A. M. (1971). On invited inferences. *Linguistic Inquiry*, 2(4):561–6.
- Geurts, B. (2000). Explaining grammaticalization (the standard way). *Linguistics*, 38(4):781–788.
- Giannakidou, A. (2011). (Non)veridicality and Mood Choice: Subjunctive, Polarity, and Time. In Musan, R. and Rathert, M., editors, *Tense across Languages*, pages 59–90. De Gruyter, Berlin; Boston.
- Giannakidou, A. (2016). Evaluative subjunctive and nonveridicality. In Blaszcak, J., Giannakidou, A., Klimek-Jankowska, D., and Migdalski, K., editors, *Mood, Aspect, Modality Revisited*, chapter 5. University of Chicago Press, Chicago.
- Giannakidou, A. and Mari, A. (2018). A unified analysis of the future as epistemic modality: The view from Greek and Italian. *Natural Language and Linguistic Theory*, 36(1):85–129.
- Giannakidou, A. and Mari, A. (2021). *(Non)veridicality in grammar and thought. Mood, modality and propositional attitudes*. The University of Chicago Press, Chicago.
- Giorgi, A. and Pianesi, F. (1997). *Tense and aspect: From semantics to morphosyntax*. Oxford University Press, Oxford; New York.
- Givón, T. (1994). Irrealis and the subjunctive. *Studies in Language*, 18(2):265–337.
- Glasgow, K. (1964). *Frame of reference for two Burera tenses*.
- Goddard, C. (1983). *A semantically-oriented grammar of the Yankunytjatjara dialect of the Western Desert Language*. Phd thesis, ANU.
- Green, R. (1987). *A sketch grammar of Burarra*. PhD thesis, Canberra, ACT.
- Green, R. (1995). A Grammar of Gurr-goni (North Central Arnhem Land). (June):352.

- Green, R. (2003). Proto-Maningrida within Proto-Arnhem: evidence from verbal inflectional suffixes. In Evans, N. D., editor, *The non-Pama-Nyungan languages of Northern Australia: comparative studies of the continent's most linguistically complex region*, chapter 13, pages 369–421. Pacific Linguistics, Canberra.
- Greenberg, J. H. (1978). How does a language acquire gender markers? In Greenberg, J. H., editor, *Universals of Human Language*, volume 3: Word St. Stanford University Press, Stanford, CA.
- Grice, H. P. (1991). *Studies in the Way of Words*. Harvard University Press, Cambridge, MA; London.
- Gutzmann, D. (2015). *Use-Conditional Meaning: Studies in Multidimensional Meaning*. Oxford University Press, Oxford.
- Hacquard, V. (2006). *Aspects of Modality*. Phd dissertation, Massachusetts Institute of Technology, Cambridge, MA.
- Hacquard, V. (2010). On the event relativity of modal auxiliaries. *Natural Language Semantics*, 18:79–114.
- Hale, K. (1962). Internal relationships in Arandic of Central Australia. In Capell, A., editor, *Some linguistic types in Australia (Handbook of Australian languages part 2)*, number 7, pages 171–183. University of Sydney, Sydney.
- Hamari, A. (2011). The abessive in the Permic languages. *Suomalais-Ugrilaisen Seuran Aikakauskirja (Journal of the Finno-Ugric Society)*, 93:37–84.
- Hamari, A. (2015). Negation in Komi. In Miestamo, M., Tamm, A., and Wagner-Nagy, B., editors, *Negation in Uralic Languages*, pages 238–263. John Benjamins, Amsterdam.
- Harder, P. (1995). Subordinators in a semantic clause structure. In Devriendt, B., Goossens, L., and van der Auwera, J., editors, *Complex Structures: A Functionalist Perspective*, pages 93–118. De Gruyter, Berlin ; New York.
- Harris, J. (1986). Northern Territory Pidgins and the Origin of Kriol.
- Heath, J. (1978). *Ngandi grammar, texts and dictionary*. Australian Institute of Aboriginal Studies, Canberra.
- Heath, J. (1980a). *Basic Materials in Ritharngu: grammar, texts and dictionary*. Pacific Linguistics, Canberra.
- Heath, J. (1980b). *Basic Materials in Warndarang: grammar, texts and dictionary*. Pacific Linguistics, Canberra.
- Heath, J. (1980c). *Dhuwal (Arnhem Land): texts on kinship and other subjects with grammatical sketch and dictionary*, volume 23. Canberra.
- Heath, J. (1980d). *Nunggubuyu Myths and Ethnographic Texts*. Australian Institute for Aboriginal Studies, Canberra.

- Heath, J. (1981). *Basic Materials in Mara: grammar, texts and dictionary*. Pacific Linguistics, Canberra.
- Heim, I. (1991). Artikel und Definitheit. In *Semantik: Ein internationales Handbuch der zeitgenössischen Forschung*, chapter 22, pages 487–535.
- Heine, B. and Kuteva, T. (2003). On contact-induced grammaticalization. *Studies in Language*, 27:529–572.
- Heinrichs, W. (2002). Peculiarities of the verbal system of Senāya within the framework of North-Eastern Neo-Aramaic. In “*Sprich doch mit deinen Knechten aramäisch, wir verstehen es!*”: 60 Beiträge zur Semitistik : Festschrift für Otto Jastrow zum 60. Geburtstag, pages 237–68. Harrassowitz, Wiesbaden.
- Henderson, J. (2013). *Topics in Eastern and Central Arrernte Grammar*. LINCOM, Munich.
- Hercus, L. A. (1992). *A Nukunu Dictionary*. s.n, Canberra.
- Hercus, L. A. (1999). *A grammar of the Wirangu language from the west coast of South Australia*. Pacific Linguistics, Canberra.
- Hercus, L. A. and Simpson, J. (1996). Contact with Western Desert language and its effect on the Thura-Yura languages of South Australia.
- Horn, L. R. (1969). A presuppositional analysis of only and even. In *Proceedings of CLS 5*, pages 98–107. Chicago Linguistics Society, Chicago.
- Horn, L. R. (1984). Towards a new taxonomy for pragmatic inference: Q-based and R-based implicature. In Schriften, D., editor, *Meaning, Form and Use in Context: Linguistic Applications*. Georgetown University Press, Washington, D.C.
- Horn, L. R. (1989). *A natural history of negation*. University of Chicago Press, Chicago.
- Horn, L. R. (2001). *A natural history of negation*. Centre for the Study of Language and Information, Stanford, 2nd edition.
- Horn, L. R. (2010). WJ-40: Implicature, truth, and meaning. *International Review of Pragmatics*, 1(1):3–34.
- Horn, L. R. and Abbott, B. (2012). “the,a”: (in)definiteness and implicature. In Kabasenche, A., O’Rourke, M., and Slater, M., editors, *Reference and Referring*, pages 325–356.
- Horn, L. R. and Wansing, H. (2017). Negation.
- Horton, D. R. (1996). Aboriginal Australia Wall Map.
- Huntley, M. (1984). The semantics of English imperatives. *Linguistics and Philosophy*, 7(2):103–133.
- Ippolito, M. (2013). *Subjunctive conditionals: A linguistic analysis*. MIT Press, Boston.
- Jackendoff, R. (1972). *Semantic interpretation in generative grammar*. MIT Press.

- Janssen, T. M. V. (2016). Montague Semantics.
- Johnson, M. R. (1977). *A semantic analysis of Kikuyu Tense and Aspect*. PhD thesis.
- Kamp, H. (1971). Formal Properties of 'Now'. *Theoria*, 37(3):227–73.
- Kamp, H. (1979). Events, Instants and Temporal Reference. In Bäuerle, R., Egli, U., and von Stechow, A., editors, *Semantics from different points of view*, pages 376–. Springer, Berlin.
- Kamp, H. and Reyle, U. (1993). *From Discourse to Logic: Introduction to modeltheoretic Semantics of natural language, formal logic and Discourse Representation Theory*. Springer, Dordrecht.
- Kapitonov, V. (2018). Degrees and scales of Kunbarlang. In *Semantics of TripleA 5*, Tübingen. University of Tübingen.
- Kaplan, D. (1999). The meaning of ouch and oops: Explorations in the theory of meaning as use.
- Kaufmann, S. (2002). The Presumption of Settledness. *Chicago Linguistic Society*, 38(2):313–328.
- Kaufmann, S. (2005). Conditional truth and future reference. *Journal of Semantics*, 22(3):231–280.
- Kaufmann, S., Condoravdi, C., and Harizanov, V. (2006). Formal approaches to modality. In Frawley, W., editor, *The Expression of Modality*, pages 71–106. De Gruyter.
- Kearns, K. S. (1991). *The semantics of the English progressive*. Phd dissertation, MIT.
- Kiefer, F. (2015). The privative derivational suffix in Hungarian: a new account. In Miestamo, M., Tamm, A., and Wagner-Nagy, B., editors, *Negation in Uralic Languages*, pages 601–614. John Benjamins, Amsterdam.
- Kiparsky, P. (2006). The Amphichronic Program v s. Evolutionary Phonology. *Theoretical Linguistics*, 32:217–236.
- Kiparsky, P. (2015). New perspectives in historical linguistics. In Bower, C. L. and Evans, B., editors, *The Routledge Handbook of Historical Linguistics*, pages 64–103. Routledge.
- Klecha, P. and Bochnak, M. R. (2016). Temporal remoteness and relativity. In Hammerly, C. and Prickett, B., editors, *Proceedings of North-East Linguistic Society (NELS) 46*, pages 213–26.
- Klinedinst, N. and Rothschild, D. (2012). Connectives without truth tables. *Natural Language Semantics*, 20(2):137–175.
- Koch, H. (2004). The Arandic subgroup of Australian languages. In Bower, C. and Koch, H., editors, *Australian Languages: Classification and the Comparative Method*, number 249, chapter 6, pages 127–150. John Benjamins, Amsterdam; Philadelphia.

- Kratzer, A. (1977). What ‘must’ and ‘can’ must and can mean. *Linguistics and Philosophy*, 1:337–355.
- Kratzer, A. (1979). Conditional necessity and possibility. In Bäuerle, R., Egli, U., and von Stechow, A., editors, *Semantics from different points of view*, pages 117–47. Springer, Berlin, Heidelberg.
- Kratzer, A. (1981). The Notional Category of Modality. In Eikmeyer, H.-J. and Rieser, H., editors, *Words, worlds, and contexts: New Approaches in Word Semantics*, pages 38–74. Walter de Gruyter, Berlin; NY.
- Kratzer, A. (1989). An investigation of the lumps of thought. *Linguistics and Philosophy*, 12(5):607–653.
- Kratzer, A. (1991). Modality. In von Stechow, A. and Wunderlich, D., editors, *Semantics: An international handbook of contemporary research*, pages 639–650. de Gruyter, Berlin.
- Kratzer, A. (1998). More Structural Analogies Between Pronouns and Tenses.
- Kratzer, A. (2012). *Modals and Conditionals*. OUP, Oxford.
- Krifka, M. (2015). Temporal and Modal Reference in Daakie (Ambrym, Vanuatu). *Proceedings of SemAAA*, 1.
- Krifka, M. (2016). Realis and non-realis modalities in Daakie (Ambrym, Vanuatu). In *Proceedings of SALT*, volume 26, pages 566–583.
- Kripke, S. A. (1963). Semantical Analysis of Modal Logic I: Normal modal propositional calculi. *Zeitschrift für mathematische Logik und Grundlagen der Mathematik*, 9:67–96.
- Kruijff-Korbyová, I. and Webber, B. L. (2001). Information structure and the Interpretation of “otherwise”. In Kruijff-Korbyová, I. and Steedman, M., editors, *European Summer School for Language, Logic and Computation Workshop on Information Structure, Discourse Structure and Discourse Semantics*, pages 67–83, University of Helsinki.
- Kuteva, T., Heine, B., Hong, B., Long, H., Narrog, H., and Rhee, S. (2019). *World Lexicon of Grammaticalization*. Cambridge University Press, Cambridge, 2nd edition.
- Laca, B. (2012). On modal tenses and tensed modals. In Nashida, C. and Russi, C., editors, *Building a Bridge Between Linguistic Communities of the Old and the New World: Current research in tense, aspect, mood and modality*.
- Landman, F. (1991). *Structures for Semantics*. Studies in Linguistics and Philosophy. Springer Netherlands, Dordrecht.
- Leow, J. A. (2020). *An amphichronic analysis of modals of necessity in Cuban Spanish*. Phd dissertation, The Ohio State University.
- Lewis, D. (1975). Adverbs of Quantification. In Keenan, E. L., editor, *Formal Semantics of Natural Language*, pages 178–88. Cambridge University Press.

- Lichtenberk, F. (1995). Apprehensional Epistemics. In Bybee, J. and Fleischman, S., editors, *Modality in Grammar and Discourse*. John Benjamins, Amsterdam.
- Lowe, B. M. (1996). *Grammar Lessons in Gupapuyyu*. Yolngu Studies, CDU, Darwin, NT.
- Markoska-Cubrinovska, A. (2016). Possible worlds in “The Craft of Formal Logic”. *Synthese*, 193(11):3459–3471.
- Matthewson, L. (2010). Cross-linguistic variation in modality systems: The role of mood. *Semantics & Pragmatics*, 3:1–74.
- Mauri, C. and Sansò, A. (2016). The linguistic marking of irrealis and subjunctive. In Nuyts, J. and van der Auwera, J., editors, *The Oxford Handbook of Modality and Mood*, chapter 9, pages 166–195. Oxford.
- McCready, E. (2010). Varieties of conventional implicature. *Semantics and Pragmatics*, 3(8):1–57.
- McGregor, W. B. and Wagner, T. (2006). The Semantics and Pragmatics of Irrealis Mood in Nyulnyulan Languages. *Oceanic Linguistics*, 45:339–379.
- McKay, G. R. (2000). Ndjébanna. In Dixon, R. M. W. and Blake, B. J., editors, *The handbook of Australian languages*, volume V, pages 155–354. Oxford University Press?, Melbourne?
- McKay, G. R. (2011). *Rembarrnga, a language of central Arnhem Land*. LINCOM, Munich.
- McKelson, K. (1974). *Studies in Mañala*. s.n, s.l.
- McLellan, M. (1992). *A Study of the Wangurri Language*. PhD thesis, Sydney.
- McNally, L. (2016). Existential Sentences Crosslinguistically: Variations in Form and Meaning. *Annual Review of Linguistics*, (2):211–31.
- Menzel, C. (2017). Possible worlds.
- Merlan, F. C. (1983). *Ngalakan grammar, texts and vocabulary*. Number 89. Pacific Linguistics, Canberra.
- Merlan, F. C. (1989). *Mangarayi*. Routledge, London.
- Michael, L. (2014). The Nanti reality status system: Implications for the typological validity of the realis/irrealis contrast. *Linguistic Typology*, 18(2):251–288.
- Miestamo, M. (2005). *Standard Negation: The Negation of declarative verbal main clauses in a typological perspective*. Mouton de Gruyter, Berlin; New York.
- Miestamo, M. (2007). Negation – An Overview of Typological Research. *Language and Linguistics Compass*, 1:552–570.
- Mithun, M. (1995). On the relativity of irreality. In Bybee, J. and Fleischman, S., editors, *Modality in Grammar and Discourse*, pages 367–88. John Benjamins, Amsterdam.

- Montague, R. (1970). Universal Grammar. *Theoria*, 36(3):373–398.
- Morphy, F. (1977). Language And Moiety: Sociolectal Variation in a Yu:ngu Language of North-East Arnhem Land. *Canberra Anthropology*, 1(1):51–60.
- Morphy, F. (1983). Djapu, a Yolngu dialect. In Dixon, R. M. W. and Blake, B. J., editors, *Handbook of Australian Languages*, pages 1–140.
- Nishimura, H. (1979). Is the semantics of branching structures adequate for chronological modal logics? *Journal of Philosophical Logic*, 8(3):469–475.
- Oates, L. F. (1988). *The Muruwari Language*. Pacific Linguistics, Canberra.
- Ockham, W. (1945). *The Tractatus de prædestinatione et de præscientia Dei et defuturis contingentibus*, volume 11. Franciscan Institute publications, St Bonaventure, NY, with a stu edition.
- O’Grady, G. N. (1963). *Nyangumata Grammar*. PhD thesis, Bloomington.
- O’Grady, G. N., Voegelin, C. F., and Voegelin, F. M. (1966). Languages of the World: Indo-Pacific Fascicle Six. *Anthropological Linguistics*, 8(2):1–197.
- Øhrstrøm, P. and Hasle, P. F. V. (1995). *Temporal Logic: From Ancient Ideas to Artificial Intelligence*. Kluwer, Dordrecht.
- Øhrstrøm, P. and Hasle, P. F. V. (2020). Future Contingents.
- Palmer, F. R. (2001). *Mood & Modality*. Cambridge University Press, Cambridge, 2nd edition.
- Parkhouse, T. A. (1895). Native tribes of Port Darwin and its neighbourhood. In *Australasian Association for the Advancement of Science, Brisbane*, s.l. s.n.
- Partee, B. H. (1984). Nominal and temporal anaphora. *Linguistics & Philosophy*, 7:243–281.
- Peirce, C. S. *The Collected Papers of Charles Sanders Peirce*. Belknap Press, Cambridge, MA, electronic edition.
- people, K., Turpin, M., and Ross, A. (2012). *Kaytetye to English Dictionary*. IAD Press, Alice Springs, NT.
- Percus, O. (2000). Constraints on some other variables in syntax. *Natural Language Semantics*, 8(3):173–229.
- Percus, O. (2006). Antipresuppositions.
- Perry, J. (2012). *Reference and Reflexivity*. CSLI, Stanford, CA, 2nd edition.
- Perry, J. (2017). The semantics and pragmatics of indexicals. In Hale, B., Wright, C., and Miller, A., editors, *A Companion to the Philosophy of Language*, volume II, chapter 38, pages 970–89. Wiley, West Sussex, 2nd edition.

- Peterson, T. (2010). *Epistemic Modality and Evidentiality in Gitksan at the Semantics-Pragmatics Interface*. Phd thesis, University of British Columbia.
- Phillips, J. (2021). Negation. In Bowern, C., editor, *The Oxford Handbook of Australian Languages*, chapter 34. Oxford University Press, Oxford.
- Phillips, J. and Kotek, H. Discourse anaphoric otherwise: Information structure & modal subordination.
- Ploug, T. and Øhrstrøm, P. (2012). Branching time, indeterminism and tense logic: Unveiling the Prior-Kripke letters. *Synthese*, 188(3):367–379.
- Plungian, V. A. (2005). Irrealis and modality in Russian and in typological perspective. In Hansen, B. and Karlík, P., editors, *Modality in Slavonic languages: new perspectives*, pages 135–46. Otto Sagner, Munich.
- Portner, P. (1997). The semantics of mood, complementation, and conversational force.
- Portner, P. (2007). Imperatives and modals. *Natural Language Semantics*, 15(4):351–383.
- Portner, P. (2018). *Mood*. Oxford University Press, Oxford.
- Portner, P. and Rubinstein, A. (2012). Mood and Contextual Commitment. In Chereches, A., editor, *Semantics and Linguistic Theory*, volume 22, pages 461–87.
- Portner, P. and Rubinstein, A. (2018). Contextual commitment and semantic composition: Mood selection with desire predicates.
- Potts, C. (2007). The expressive dimension. *Theoretical Linguistics*, 33:165.
- Prior, A. N. (1957). Time and Modality.
- Prior, A. N. (1958). The syntax of time distinctions. *Franciscan Studies*, 18(2):105–20.
- Prior, A. N. (1967). *Past, Present, and Future*, volume 6: Scienti. Oxford University Press, Oxford.
- Quer, J. (2001). Interpreting mood. *Probus*, 13(1):81–111.
- Reichenbach, H. (1947). The Tenses of Verbs.
- Restall, G. (1999). Negation in relevant logics (How I stopped worrying and learned to love the Routley Star). In Gabbay, D. M. and Wansing, H., editors, *What is Negation?*, pages 53–76. Kluwer, Dodrecht.
- Roberts, C. (1989). Modal Subordination and Pronominal Anaphora in Discourse. *Linguistics & Philosophy*, 12:683–721.
- Roberts, C. (1990a). *Modal subordination, Anaphora, and Distributivity*. Garland Press, New York.

- Roberts, C. (1995). Domain restriction in Dynamic Semantics. In Bach, E., Jelinek, E., Kratzer, A., and Partee, B. H., editors, *Quantification in Natural Languages*, volume II. Dordrecht, Kluwer.
- Roberts, C. (2012). Information structure in discourse: Towards an Integrated Formal Theory of Pragmatics. *Semantics & Pragmatics*, 5.
- Roberts, C. (2020). Modal subordination: It would eat you first! In Gutzmann, D., Matthewson, L., Meier, C., Rullmann, H., and Zimmerman, T. E., editors, *The Wiley Blackwell Companion to Semantics*. Wiley Blackwell.
- Roberts, J. R. (1990b). *Modality in Amele and other Papuan languages*, volume 26. Yale University Library.
- Rooth, M. (1985). *Association with focus*. Phd dissertation, University of Massachusetts, Amherst.
- Rullmann, H., Matthewson, L., and Davis, H. (2008). Modals as distributive indefinites. *Natural Language Semantics*, 16(4):317–357.
- Rumberg, A. (2016a). Transition Semantics for Branching Time. *Journal of Logic, Language and Information*, 25(1):77–108.
- Rumberg, A. (2016b). *Transitions toward a Semantics for Real Possibility*. PhD thesis.
- Sauerland, U. (2009). Implicated Presuppositions. In Steube, A., editor, *The discourse potential of underspecified structures*, pages 581–600. De Gruyter Mouton, Berlin.
- Schaden, G. (2012). Modelling the “Aoristic Drift of the Present Perfect” as Inflation: An essay in historical pragmatics. *International Review of Pragmatics*, 4(2):261–292.
- Schebeck, B. (2001). *Dialect and Social Groupings in Northeast Arnhem Land [sic]*. LINCOM, Muenchen.
- Schmerling, S. F. (1975). Asymmetric conjunction and the rules of conversation. In Cole, P. and Morgan, J. L., editors, *Speech acts*. Academic Press, New York.
- Schultze-Berndt, E., Ponsonnet, M., and Angelo, D. (2019). The semantics of modal markers in North Australian Kriol.
- Schürmann, C. W. (1844). A Vocabulary of the Parnkalla language, spoken by the natives inhabiting the western shores of Spencer’s Gulf. (To which is prefixed a collection of grammatical rules, hitherto ascertained._.
- Schürmann, C. W. and Teichelmann, C. G. (1840). *Outlines of a Grammar, Vocabulary and Phraseology of the Aboriginal language of South Australia, spoken by the natives in and for some distance around Adelaide*. By the authors, at the native location, Adelaide.
- Sharp, J. (2004). *Nyangumarta: a language of the Pilbara region of Western Australia*. Pacific Linguistics, Canberra.

- Simpson, J. and Hercus, L. A. (2004). Thura-Yura as subgroup. In Bower, C. and Koch, H., editors, *Australian Languages: Classification and the Comparative Method*, chapter 8, pages 179–206. John Benjamins, Amsterdam; Philadelphia.
- Singerman, A. R. (2018). Negation as an exclusively nominal category. *Language*, 94(2):432–467.
- Stalnaker, R. C. (1968). A Theory of Conditionals. *Ifs*, pages 41–55.
- Stalnaker, R. C. (1979). Assertion. In Cole, P., editor, *Syntax and Semantics*, volume 9. Academic Press, New York.
- Stalnaker, R. C. and Thomason, R. H. (1970). A semantic analysis of conditional logic. *Theoria*, 36(1):23–42.
- Stevens, J. (2007). *The Old English Demonstrative: A Synchronic and Diachronic Investigation*. PhD thesis, Cleveland.
- Stirling, L. and Dench, A. (2012). Tense Aspect Modality and Evidentiality in Australian Languages: Foreword. *Australian Journal of Linguistics*, 32(1):1–6.
- Stukker, N. and Sanders, T. (2012). Subjectivity and prototype structure in causal connectives: A cross-linguistic perspective. *Journal of Pragmatics*, 44:169–190.
- Tamm, A. (2009). Cross-categorical abessive in Estonian. In *Case in and across languages*, pages 89–90, Helsinki, August 27–29.
- Tamm, A. (2015). Negation in Estonian. In Miestamo, M., Tamm, A., and Wagner-Nagy, B., editors, *Negation in Uralic Languages*. John Benjamins, Amsterdam.
- Taylor, B. (1977). Tense and continuity. *Linguistics and Philosophy*, 1(2):199–220.
- Tchekhoff, C. and Zorc, R. D. (1983). Discourse and Djambarrpuyŋu: three features. *Linguistics*, 21(6):849–878.
- Tedeschi, P. J. (1981). Some evidence for a branching-futures model. In *Syntax and Semantics 14: Tense and Aspect*, pages 239–70. Academic Press.
- Teichelmann, C. G., Schürmann, C. W., and Simpson, J. (1840). *Kaurna vocabulary*. AIATSIS, Canberra.
- The Bible Society in Australia (2007). *Holi Baibul: the Bible in the Kriol of North Australia*. Bible Society in Australia Inc., Minto, NSW.
- Thomason, R. H. (1970). Indeterminist time and truth-value gaps. *Theoria*, 36(3):264–281.
- Thomason, R. H. (1984). Combinations of Tense and Modality. In Gabbay, D. and F. G., editors, *Handbook of Philosophical Logic, vol. II: Extensions of Classical Logic*, pages 135–165. Reidel, Dordrecht.

- Thomason, R. H. and Gupta, A. (1980). A Theory of Conditionals in the Context of Branching Time. In Harper, W. L., Stalnaker, R. C., and Pearce, G., editors, *Ifs*, pages 299–322. Springer, Dordrecht.
- Traugott, E. C. (1980). Meaning-change in the development of grammatical markers. *Language Sciences*, 2(1):44–61.
- Traugott, E. C. and Heine, B. (1991). *Approaches to Grammaticalization*. John Benjamins, Amsterdam; Philadelphia.
- Troy, J. (1994). *Melaleuka: A history and description of New South Wales Pidgin*. PhD thesis, Australian National University.
- Tsunoda, T. (2011). *A grammar of Warrongo*. Mouton de Gruyter, Berlin; Boston.
- van der Auwera, J. (2008). The Jespersen Cycles. In Van Gelderen, E., editor, *Cyclical change*, chapter 3, pages 35–71. John Benjamins, Amsterdam.
- van der Auwera, J. and Lejeune, L. (2013). The prohibitive.
- van der Wal, A. E. (1992). *Structure and Function in Gupapuyñu: a Yolŋu dialect of North-east Arnhemland*. PhD thesis, University of Newcastle, NSW.
- Veselinova, L. N. (2013). Negative existentials: A cross-linguistic study. *Rivista di Linguistica*, 25(1):107–145.
- Veselinova, L. N. (2016). The negative existential cycle viewed through the lens of comparative data. In van Gelderen, E., editor, *Cyclical Change Continued*, Linguisk Aktuell. John Benjamins.
- Villalta, E. (2008). Mood and gradability: An investigation of the subjunctive mood in Spanish. *Linguistics and Philosophy*, 31(4):467–522.
- von Fintel, K. (1994). *Restrictions on quantifier domains*. PhD thesis, Amherst.
- von Fintel, K. (2012). Subjunctive conditionals. In Russell, G. and Fara, D. G., editors, *The Routledge companion to philosophy of language*, pages 466–477. Routledge, NY.
- von Prince, K. (2017). Paradigm-induced implicatures of TAM markers: The case of the Daakaka distal. In Truswell, R., Cummins, C., Heycock, C., Rabern, B., and Rohde, H., editors, *Proceedings of Sinn und Bedeutung 21*, pages 969–984.
- von Prince, K. (2019). Counterfactuality and past. *Linguistics and Philosophy*, 42(6):577–615.
- Von Prince, K., Krajnović, A., Krifka, M., Guérin, V., and Franjeh, M. (2019). Mapping Irreality : Storyboards for Eliciting TAM contexts. In *Proceedings of Linguistic Evidence 2018: Experimental data drives linguistic theory*, pages 187–207, Tübingen. University of Tübingen.

- Vuillermet, M. (2018). Grammatical fear morphemes in Ese Ejja. *Studies in Language*, 42(1):256–293.
- Wansing, H. (2001). Negation. In Goble, L., editor, *The Blackwell Guide to Philosophical Logic*, chapter 18, pages 415–36. Blackwell, Malden, MA.
- Waters, B. E. (1989). *Djinang and Djinba – A grammatical and historical perspective*. Pacific Linguistics, Canberra.
- Webber, B. L., Stone, M., Joshi, A., and Knott, A. (2001). Anaphora and Discourse Semantics. Technical report.
- Werner, T. (2006). Future and non-future modal sentences. *Natural Language Semantics*, 14(3):235–255.
- Wilkins, D. P. (1989). *Mparntwe Arrernte (Aranda): Studies in the Structure and Semantics of Grammar*. Phd thesis, Australian National University.
- Wilkinson, M. P. Complement clauses in Djambarrpuyŋu.
- Wilkinson, M. P. (2012). *Djambarrpuyŋu: a Yolŋu variety of Northern Australia*. LINCOM, Munich.
- Williamson, T. (1996). Knowing and asserting. *Philosophical Review*, 105(4):489–523.
- Wilmoth, S. (2020). Negation as a nominal property in Pitjantjatjara. In *Conference of the Australian Linguistic Society*.
- Winans, L. D. (2016). *Inferences of will*. Phd dissertation, UCLA.
- Wurm, S. A. (1972). *Languages of Australia and Tasmania*. Mouton, The Hague.
- Yallop, C. (1977). *Alyawarra: An Aboriginal Language of Central Australia*. Australian Institute of Aboriginal Studies., Canberra.
- Zanardo, A. (1996). Branching-time logic with quantification over branches: The point of view of modal logic. *The Journal of Symbolic Logic*, 61(1):1–39.