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On the tense-aspect/modality Interaction in non-Pama-Nyungan languages: A comparative account of the Anindilyakwa, Iwaidja and Murrinh-Patha modal systems

Patrick Caudal / Robert Mailhammer / James Bednall / Rachel Nordlinger*

1. Introduction

The topic of this paper¹ is a detailed comparative investigation of the modal systems of Iwaidja, Anindilyakwa and Murrinh-Patha. Capitalizing on (Bednall 2020), and fieldwork on the Iwaidja modal system conducted over the past few years, it will proceed to compare those recent findings with preexisting analyses of the Murrinh-Patha tense-aspect-modality (TAM) system, in particular (Nordlinger & Caudal 2012), as well more ancient analyses of Iwaidja (Pym & Larrimore 1979) and Anindilyakwa (van Egmond 2012).

Given (Verstraete 2005; Verstraete 2006)'s seminal concept of “composite mood marking” (which has had a significant impact among ‘Top Enders’ too²), and the fact that those three languages possess discontinuous morphological marking for their TAM forms, we will try and determine here whether it could, or could not, be legitimately applied to them, and to other languages with a similar morphological make-up, both within and without Australia. The key question we want to ask is – what type of morphology to semantics interface should be applied to such forms? One obvious major issue is compositionality – does morphological discontinuity in modal

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² Fieldwork linguists specializing in languages spoken in the Top End of Australia, especially non-Pama-Nyungan languages, frequently use this term when affectionately referring to fellow linguists having worked in remote communities of Northern Australia.

inflections rhyme with compositionality? And more specifically, can we ascribe separate aspectuo-temporal vs. modal meanings to certain segments of said discontinuous forms, and construe the overall meaning of modal inflections by combining the meanings of these hypothetical sub-elements? E.g., can we treat them as separate tense-aspect vs. modal morphemes? And if it turns that ‘composite mood marking’ actually does not apply to the languages of our sample, then – what of the semantics of the relevant modal inflections: does it nevertheless exhibit distinct aspectuo-temporal and modal ingredients, and what can we say about their interactions?

Answering those questions is particularly relevant to understand how tense-aspect and modality are connected in the type of language here investigated, both formally (w.r.t. the morphology to semantics interface) and semantically/pragmatically.

With respect to the respective morphological complexity of the three languages in our sample and compositionality, we will establish the following key facts:

- Iwaidja has a morphologically complex inventory of modal prefixes and suffixes used in combination with each other as well as together with modal adverbs/particles, similar to Ilgar/Garig (Evans 2000), without any re-entrance of realis past vs. present tense suffixal exponents into modal forms (i.e. there is no ‘past vs. present modal’ formal opposition), so that any compositionality is ruled out in the tense-aspect/modality interaction whereas
- the Anindilyakwa modal system crucially involves a (partial) combination of past vs. present-related suffixed exponents, along with an irrealis modal prefixed exponent, essentially used to produce present vs. past irrealis readings, in a seemingly transparent way. In addition to this, Anindilyakwa offers a dedicated negative circumfixal modal paradigm, and a deontic-imperative prefix only combining with a present temporal suffix (thus undermining the system’s compositionality)
- at first sight, the Murrinh-Patha modal system, like Anindilyakwa, seems to offer a modicum of compositionality in the tense-aspect interaction, notably due to the re-entrance of the imperfective augment (=dha) in irrealis and past imperfective paradigms; however, as we will see, there are several facts relating to other paradigms (in particular other irrealis paradigms) which militate against such a compositional approach.

Our first main claim will be that despite these surface differences, all three TAM systems should be analyzed as involving single discontinuous TAM morphs (not a combination of two separate tense-aspect vs. modality morphs), with some amount of apparent semantic transparency in the tense-aspect/modality interaction in Anindilyakwa and Murrinh-Patha, but not real compositionality (*pace* (Verstraete 2005; Verstraete 2006)). From the perspective of the semantic diversity and semantic structure of inflectional modal meanings in these languages, we will demonstrate that although some significant divergences can of course be observed, especially among ‘present’ inflectional modals, it is more than counterbalanced by a striking number of semantic convergences among ‘past’ inflectional modals, and the interaction

with negation. We will also show that aspectual parameters and actualistic readings of modals constitute key factors when trying to better analyze the tense-aspect/modality interaction in such languages. We will suggest that this is also reflected on the existence of recurrent trends in the semantic organization of modal categories in other Arnhem Land languages, and beyond.

1.1. *Theoretical background*

We will assume in what follows a standard semantic approach to modality, whereby the semantics of modals should comprise two main semantic ingredients (cf. e.g. (Matthewson & Truckenbrodt 2018): (i) force/strength (which, assuming a Kratzerian (Kratzer 1991) type of quantificational account of modals, would be implemented using weak vs. strong quantifiers; this can also be captured resorting to e.g. scalar-probabilistic accounts of modals, e.g. à la (Lassiter 2014) or à la (Portner & Rubinstein 2016)) and (ii) flavour (which correspond to the non-quantificational/scalar, lexical meaning of modals; cf. the Kratzerian notion of ‘modal bases’). Although this will not be investigated here in details, it is worthwhile noting that Australian languages have been claimed (cf. e.g. (Bednall 2023)) to pattern like e.g. Indigenous American languages (and unlike many Indo-European languages) in that they do not lexicalize modal force/strength; i.e., force contrasts as found in English *must* (necessity) vs. *might* (weak possibility) are primarily a contextual matter in Australian languages. We will also assume that modal inflections as well as modal verbs and auxiliaries are stative event predicates, as the case in numerous works stressing the importance of viewing modals as *bona fide* event predicates (Homer 2011; Caudal 2012; Ferreira 2014; Homer 2021).³

Following a commonly received idea in language typology pioneered in e.g. (Bybee 1998) where irrealis is not necessarily conceived as a single, monolithic category found across languages, and opposed to another, single realis category also found across languages, but rather as a wide semantic notional domain with possibly some language-specific variation, potentially embodied by multiple grammatical markers (e.g. different inflections) endowed with meanings pertaining to the domain of irrealis meaning, standing in opposition to another multiplicity of marker endowed with realis meanings (also possibly realized as different inflections).

Like in much of the existing theoretical literature, we will in particular distinguish between two main types of irrealis grammatical markers: those capable of contributing so-called ‘foreclosed’, ‘past irrealis’ or counterfactual meanings, and those capable of contributing ‘open’, ‘present irrealis’, non-counterfactual meanings. By counterfactual, and assuming a possible-world type of semantic model, we really mean possible worlds that

³ The main difficulty for such an approach lies in handling the scope relations between tense and the event denotation for various modal flavours; some authors claim that epistemic modals ‘outscope’ tense-aspect operators, while others claim that they don’t. See e.g. (Hacquard 2010; Homer 2013; Rullmann & Matthewson 2018) for a discussion of a very complex issue, which we will here set aside.

are given as absolutely inaccessible given a certain current context and/or past history (i.e., not merely very unlikely, but still attainable worlds); all other irrealis meanings refer to accessible possible worlds. Note that in many formal semantic works, ‘counterfactual’ has really been used as a cover term for irrealis – see e.g. (Lewis 1973; Ippolito 2003; Arregui 2009; Romero 2014), a.o. Our definition is broadly similar to that of ‘present’ or ‘open counterfactual’ vs. ‘past’ or ‘foreclosed counterfactual’ in the latter terminological tradition, or ‘the possible’ vs. ‘the counterfactual’ in (von Prince, Krajinović & Krifka 2022). By foreclosed counterfactuals, we will refer to the meaning of irrealis marked expressions, such that the proposition under the scope of such a modal belongs with utterly inaccessible worlds, and is implied to be untrue (1).⁴ *Vice versa*, open counterfactual meanings is associated with modalized propositions which, while they are nevertheless untrue for the contextually relevant world-time pair, may be accessible at some ulterior possible world (however unlikely this might be) (2). Note that in e.g., contemporary Germanic and Romance languages, two-past counterfactuals always qualify as foreclosed, and one-past counterfactuals (often) qualify as open counterfactuals.⁵ However, one-past counterfactuals also seem to be able to have foreclosed interpretations, including in structures where normally *don’t* have such readings; this is particularly true when they mark individual-level stative clauses as in (3). Of course, it is worthwhile bearing in mind that Australian languages – and languages in our sample – do not offer similar contrasts between one and two-past counterfactuals; as we will see, this is in fact a key fact.

- (1) If I had been rich, I would have bought a huge mansion.
- (2) If I were rich, I would buy a huge mansion.
- (3) If I were you, I would be thrilled. (Karawani, Kauf & Zeijlstra 2019: 212)

We will assume that ‘irrealis’ is an appropriate cover category for modal meanings as found in our small language sample, in that it can be distinguished from a set non-modal *realis* meanings. It should also be noted that we regard *mood* as a cover term referring to modal markers, but not as a notional category, nor their semantic content – for which we will rather use the term *modality*.

⁴ We will in fact argue that ‘past’ is, in fact, a somewhat unfortunate label, as not all foreclosed counterfactual modals can be associated with a *bona fide* past anchoring; rather, past conditions in modals (if present diachronically or synchronically) seem to serve the purpose of somehow rendering some possibility *irrevocably* inaccessible.

⁵ This generalization does not apply across the diachrony of both Romance and Germanic languages, and does not apply to some current modal constructions (e.g. biclausal conditionals with *imperfetto* protases in Italian, or conditional structures with *imparfait* marking other than *si P, Q* biclausal constructions in French; see (Caudal 2018a) for a discussion).

We will claim that in our small sample (and in fact, in very many Indigenous Australian languages), present vs. past irrealis categories (or open vs. foreclosed modals, if you will) as usually semantically pointing to two distinct *clusters*⁶ of modal meanings – with some exceptions, where one single modal inflection exhibits reading pertaining to both clusters; this is for instance the case of the Bininj Gun-wok irrealis inflection, which admits both open (4) and foreclosed irrealis (5) readings (Evans 2003a: 372–376), as well as the ‘irrealis 2’ (I2) inflection in Mawng, which admits present irrealis, deontic/directive readings (6), on top of past irrealis, counterfactual readings, past admonitive readings, avertive readings, negative past readings and avertive readings (7) (Singer 2006: 62).

- (4) *Nungka wanjh Ø-ra-yi werkwerrk.*
 He then 3P-gO-IRR quickly
 ‘He should go soon.’
- (5) *bi-ma-yi Na-burlanj gun-mak.* (Bininj Gun-wok)
 3/3hP-marry-IRR ma-[skin] IV-good
 ‘She should have married straight, to a Naburlanj man.’ (Evans 2003:375)
- (6) *"An-kakujpi-na! Karlapuk! La arukin arruni-ngartpanpu-ø!"*
 2sg-be.silent-I2 shoosh! CONJsnake 3MA/1pl.in-attack-I1
 "Be quiet! Shoosh! Or else the serpent might attack us!" (Singer 2006 :62)
- (7) *Ja karrkpin ja alakaraj ing-errka-nyi.*
 MA big MA fishing.spear 3FE/3MA-spear-I2
 ‘She tried to spear it with a big spear’ ((Capell & Hinch 1970: 80) in (Singer 2006:62))

It is worthwhile noting that across Australian languages, the open irrealis cluster seems to be covered by multiple synthetic inflections, plus some periphrastic ones, whereas the foreclosed irrealis cluster is generally covered by a single synthetic inflection, also appearing in periphrastic inflections and sometimes complemented with unrelated periphrastic modal inflections cf. (Caudal 2023), notably some sort of past indicative combined with a modal particle or clitic.

We take the *realis/irrealis* divide not to align strongly with *illocutionary force* and clause typing, in that both irrealis and realis can in principle mark any type of clause, and any speech act type. However, modal markers can, in some languages, impact discourse contextual and discourse structural

⁶ See (Caudal 2023) for a related use of the concept, where the ‘irrealis-avertive cluster’ designates what we call here the foreclosed irrealis, which seems to overwhelmingly comprise an avertive meaning, through one or several (inflectional) forms.

parameters connected to speech act types; this is particularly obvious is one regards e.g. rhetorical relations as functions over speech act referents, as in the case of the SDRT formalism (see (Asher & Lascarides 2003)) For instance, if one considers (Roberts 1989)'s notion of 'modal subordination' illustrated in (8), where speech act referent β appears to be modally dependent from speech act referent α (assuming that speech acts can be reified in the SDRT fashion, cf. (Asher & Lascarides 2003)), then it appears natural to view conditionals, and from there, all inferential modals – e.g. epistemics – and evidentials, as essentially discursive issues in need of a treatment at the semantics/pragmatics interface. Interestingly, this is exactly how (Ciardelli 2022) proposes to re-cast (Kratzer 1977; Kratzer 1981; Kratzer 1991)'s analysis of modals and conditionals as Generalized Quantifiers, i.e. as operators combining an intensional contextual parameter (the restrictor) and a (modalized) proposition (the nuclear scope) analysis inspired by the notion of modal subordination à la (Roberts 1989), (9) ; see also (Fintel & Gillies 2015) for a somewhat similar discursive twist on Krater's original idea.

(8) A wolf might come in (α). He would eat you first (β).

(9) Modal_operator [intensional_context parameter]_{restrictor}
[proposition]_{nuclear scope}

Although we will not discuss evidentiality at length here, as it seems to be mostly lacking specific very clear grammatical expressions in our sample (unlike in e.g. Arandic or Ngumpin-Yapa languages, see Browne & Enever, this volume), it is important to specify that we do not wish to here endorse a strong theoretical view concerning the relationship between evidentiality and modality – a well-known theoretical hurdle for specialists of these categories. Some argue for a complete disjointness of the two categories (see e.g. : (De Haan 1999; Aikhenvald 2004)), some for some kind of overlap (some modals are evidentials, or some evidentials have a modal component of meaning) (Faller 2002; Squartini 2004; Matthewson, Davis & Rullmann 2008), while others argue for a principled inclusion of one category into the other – notably by treating e.g. *epistemic modals as a subset of evidentials* (von Fintel & Gillies 2010) – or a principled identification of epistemic modals with evidentials, and vice versa (Matthewson, Davis & Rullmann 2008)

This paper focusing on the tense-aspect / modality interaction, we will notably investigate how temporal and aspectual conditions can be identified in the various readings found for at least some present vs. past irrealis forms. Counterfactual meanings are a notoriously difficult phenomenon in this respect, as we will, as is evidenced by strong variations (and frequent divergences) within relevant theoretical and formal analyses of irrealis forms across languages of the world, particularly in that they frequently (but not systematically) involve a joint aspectual, temporal and modal marking. Or at least a joint aspectual and modal marking, or joint temporal and modal marking, depending on languages. In the case of the three languages here studied (and in fact, in many other non-Pama-Nyungan languages presenting similar discontinuous morphs), our main point will be that morphological structure – which often, turns out to be unanalyzable as

involving different morphs – does not reflect on the actual semantic complexity of the modal meanings involved, including their aspectuo-temporal content; this is the result of both complex morphologization processes, and semantic change, resulting in a discontinuous morph.

But we should also stress that while such a discontinuous marking is a common morphological configuration in non-Pama-Nyungan languages (cf. e.g. Jaminjung, (Schultze-Berndt 2000), Dalabon (Evans & Merlan 2003), Mawng (Singer 2006), Ngarnka (Osgarby 2018: 20), a.o.), it is by no means systematic. See for instance Ngan'gityemerri (Reid 2011), Amurdak (Mailhammer 2009), which possess mere TAM prefixes even though they are related to languages with discontinuous TAM morphs of the type investigated here; see also Maningrida languages, which seem to only involve TAM suffixes. Such systems, we believe, only differ from the type here studied by the nature of morphology involved – in both cases, we have a simplex morphology (in spite of appearances, in the case of discontinuous morphs), encoding a complex TA-M content. But the complexity of the meaning associated with these forms is fairly similar, and also involves significant interactions between aspectuo-temporal meaning and modal meaning. Or to put it differently, that semantic complexity does not map onto morphological complexity (i.e., does not involve separate morphemes, with completely autonomous contributions).

Many non-Pama-Nyungan languages possess several distinct morphological modal paradigms, described using various terms in the literature (e.g., 'future', 'potential', 'optative', 'irrealis'...). While we will delve deep into the semantics of any of them in particular here, nor offer a theoretical semantic overview of modality in these languages, we will offer some general observations about the 'semantic mapping' of each TAM system. This is notably relevant to understanding how tense and aspect information combines with modal information in said systems.

1.2. Main objective of the paper

Following notably (Verstraete 2005)'s seminal study of 'composite mood marking' in non-Pama-Nyungan languages, the concept appears to have gained traction in the literature, and to have become relatively commonly used. However, its precise definition, from the perspective of (i) morphological analysis and (ii) the morphology to semantics interface, remains problematic. Verstraete (2005:224), observes that "In the majority of non-Pama-Nyungan languages, mood is not marked in one specific slot in the morphological structure of the verb, but spread over at least two slots, marked by a combination of morphemes in a prefix and a suffix slot". Verstraete (2005:225) further argues that "most non-Pama-Nyungan languages show a primary subdivision between an irrealis-type prefix and a realis-type prefix (or absence of a prefix [...])", the latter being used in most "non-modalized structures" – i.e. indicative clauses, denoting actual events. Finally, Verstraete (2005:225) claims that "within the broad semantic range covered by the irrealis prefix, moreover, there is usually a further subdivision of modal meanings in terms of combinations with different types of tense suffixes: [...] the counterfactual type is usually set apart from the other types of modality in terms of a basic contrast between past and non-past tense

suffixes.” He also very specifically claims that it is endowed with “formal compositionality” (p. 225) – but at the same time observes that in some languages, modal suffixes can also appear in the same slot as past vs. present tense suffixes (such as the potential *-yan* suffix in Wardaman), which we believe to be difficult to reconcile with a compositional account the tense-aspect / modality interaction in Australian languages – so that we believe that Verstraete’s (2005) original notion of “composite mood marking” should be revised in significant ways.

We will fact argue that Verstraete’s (2005) analysis should be revised with respect to (i) compositionality and (ii) the role of aspectual conditions in the semantics interplay between aspectuo-temporal and modal meanings of irrealis forms. Concerning (i), we will suggest that while some languages in our small sample exhibit what seems to be compositionality, it is really at best limited to a limited number of tense-aspect/modality paradigms, and that as a result, it is best seen as a matter of relative *transparency* of said paradigms (but not real compositionality). Concerning (ii), we will show that a number of semantic phenomena (in particular what we will refer to as *postmodal* readings of modal forms, using a term coined in (van der Auwera & Plungian 1998)) cannot be accounted for without incorporating aspectual meaning into a semantic account of irrealis forms in our sample.

To establish (i) and (ii), the paper will proceed as follows: section §2 will provide a detailed review of the morphology to semantics interface of synthetic inflections in Iwaidja, Murrinh-Patha and Anindilyakwa; §3 will then focus on some periphrastic modal inflections identified for these languages. Finally, §4 will offer some tentative theoretical observations about modal as well as postmodal readings, and will suggest that they should be indeed grounded in a theory of the tense-aspect / modality interaction. The picture emerging from this inventory will be one of a series of morphologically ‘atomic’ categories – namely modal categories – in the sense of (Blevins 2016), rather than complex/composite signs, whose semantics should nevertheless comprise multiple semantic ingredients, including – and crucially so – tense and aspect. In particular, we will argue that this semantic complexity spanning the aspectuo-temporal and modal (as well as postmodal) domains, stems from the fact that modals, regardless of their morphological nature (periphrastic or synthetic) behave crucially like event predicates, i.e. require temporal (and aspectual) information to be processed. Some tentative diachronic observations will be made to further substantiate this claim, as we will additionally claim that semantic change tends to deploy in ways further shedding light on the importance of the tense-aspect/modality interaction in the modal domain.

2. Synthetic verbal inflections in Iwaidja, Anindilyakwa and Murrinh-Patha, and the modality / tense-aspect interaction

We will begin our theoretical journey through the modal landscape of our language sample by describing and then analyzing some key properties of synthetic modal inflections of Iwaidja, Anindilyakwa, and Murrinh-Patha. To this effect, we will take a broad look at the respective synthetic

tense/aspect/mood (TAM) systems of these languages, in order to determine whether or not some manner of ‘composite mood marking’ à la (Verstraete 2005) can be ascribed to them, i.e. with two defining properties: (i) a tendency (at least) to encode aspectuo-temporal meanings via suffixed exponents, and modal meanings via prefixed exponents and (ii) compositionality.

This study should be replaced in the broader context of discontinuous TAM marking – a term we will use in lieu of Verstraete’s (2005) concept of ‘composite mood marking’ – found across many non-Pama-Nyungan, Northern Australian languages. It should first be noted that many non-Pama-Nyungan languages possess several distinct morphological modal paradigms. Various terms have coined in the Australianist literature to refer to the corresponding categories; although obviously, one should not assume that identical modal categories should be found across non-Pama-Nyungan languages (let alone Australian languages as a whole), it may be possible to come up with useful comparative cover terms to relate them (while indicating as well to what extent each language-specific instantiation of each comparative category, semantically differs from said comparative category). This will be very much our assumption here, as we will make apparent. For instance, an irrealis present category capable of receiving both hypothetical/future/futate and deontic/imperative readings, and commonly found across non-Pama-Nyungan languages, has been dubbed ‘future’, ‘potential’, ‘optative’, ‘irrealis’, or some other term, depending on authors. We will propose to refer to these various inflections as ‘present irrealis/counterfactual’, or ‘open counterfactual’ inflections.

Paradigms typically involve discontinuous morphological marking, with two exponents realized on two disjoint positions in the verb template. In Iwaidja (7) and in Anindilyakwa (8), this involves a pronominal portmanteau combining TAM and pronominal marking (*Pro*), found in position 1 – a type of morphological configuration commonly observed across non-Pama-Nyungan languages:

(10) Anindilyakwa verb template⁷

1	2	3	4	5	6	7	8	9
Pro.(TAM ₁)	QUANT	BEN	IBP	stem	CAUS/REFL/RECIP	TAM ₂	ma	CASE

(11) Iwaidja verb template:

1	2	3	4
Pro.(TAM ₁)	stem	REDuplication	TAM ₂

⁷ TAM: ‘tense, aspect, modality’; ‘Pro’: pronominal; QUANT: quantificational marker; BEN: beneficiary, IBP: incorporated body part, CAUS: causative; REFL: reflexive; RECIP: reciprocal

(12) Murrinh-Patha verb template⁸

1	2	3	4	5	6	7	8	9
CS.SUBJ./ TAM ₁	SUBJ.NUM/ OBJ	RR	IBP/ APPL	LEXS	TAM ₂	ADV	SUBJ.NUM/ OBJ.NUM	ADV

But are these TAM_{1/2} exponents separate morphemes? Or does each of these pairings constitute an instance of discontinuous morpheme (cf. the concept of ‘distributed exponence’ in (Carroll 2016), or that of ‘constructional morphology’ in (Booij 2010))? This is really a key question we need to answer for each of the languages in our sample.

2.1 Iwaidja synthetic inflections

Our description of the Iwaidja TAM system is based on extensive fieldwork conducted over a decade (2013-2023) by R. Mailhammer and P. Caudal, mostly in the Minjilang community (Crocker Island, Northern Territory). It departs from (Pym & Larrimore 1979)’s more ancient description in several important ways, but for want of space, we will not discuss them here.

We can decompose the Iwaidja verb template as in (13) – where RED stands for ‘REDuplication’, and TAM₁ and TAM₂ are the prefixed vs. suffixed exponents conveying TAM information:

- (13) [Portmanteau prefix (Deixis+TAM₁+Subject (+Object))]-[Verb Root]-
[RED]-[TAM₂]

Iwaidja is a head-marking language. Two types of verbs are differentiated in terms of their morphology, namely transitive and intransitive verbs. Transitive verbs express the Subject and Object in a portmanteau prefix, whereas the prefixes of intransitive verbs only express the Subject even if the verbs are divalent and have a second argument, cf. (14).

- (14) a. *nga-* *ngartbuni* *-Ø*
1.SG.PREF₁- fall -PRES
‘I fall.’
- b. *ri-* *lda-Ø*
3SG.M>3SG.PRED₁- eat-PRES
‘He eats.’
- c. *w-* *arrganyu* *-Ø* *nuwung*

⁸ CS.SUBJ.TENSE: Portmanteau encoding classifier stem, subject agreement and tense;

SUBJ.NUM: Subject number marker; OBJ: Object agreement marker; RR:

Reflexive/Reciprocal marker; IBP: Incorporated body part; =APPL: Applicative marker;

LEXS: Lexical stem; ADV: Adverbial; OBJ.NUM: Object number marker

3SG.PRED₁- carry in arms -PRES₂SG.OBL.PRON
 'He/she/it is carrying you in his/her/its arm' (Pym & Larrimore
 1979: 84)

The following table gives a synthetic overview of the various sets of prefixed (TAM₁) and suffixed (TAM₂) paradigms, where *PREF_m-* and *-SUF_n* are arbitrary, provisional names for these exponents:⁹

Table 1: overview of TAM prefixes & suffixes in Iwaidja

TAM ₂ \ TAM ₁	-PR	-ANT	-PIPFV	-OPT	-FUT	-RMOD	-PCF
PREF ₁ -	Present	Anterior	Past imperfective	Present irrealis	X	X	X
PREF ₂ -	X	X	X	X	Present irrealis	X	
PREF ₃ -	X	X	X	X	X	Present irrealis	Past irrealis

Seven meaningful synthetic paradigms involving prefix / suffix components were identified during our fieldwork:

1. PREF₁- ~ -PR: the indicative present
2. PREF₁- ~ -ANT: an aspectually underspecified anterior tense, fairly similar to the English simple past in that it can receive imperfective viewpoint readings with atelic verbs, vs. perfective viewpoint readings with telic verbs; in the latter case, it can also have resultative, perfect flavour, given appropriate modifiers or contexts)
3. PREF₁ ~ -PIPFV: an indicative past imperfective
4. PREF₁- ~ -OPT: a present modal inflection, with directive (hortative and imperative) uses, apprehensive-epistemic uses, and *bona fide* optative-volitional uses (cf. English 'I wish P')
5. PREF₂- ~ -FUT : a present modal inflection with directive/deontic uses, as well as proximative/predictive uses
6. PREF₃- ~ -RMOD : a present modal inflection also with directive deontic uses, as well as capacitative uses

⁹ Semantically grounded names of TAM exponents are nevertheless provided on the suffixed part, for ease of reference. These are:

- pr: present
- ant: anterior
- pipfv: past imperfective
- opt: optative
- fut: future
- rmod: root modal
- pcf: past counterfactual

See below for further morphological and semantic details.

7. $PREF_3-$ ~ -PCF : a past modal inflection, with volitional, proximative and avertive uses (Caudal 2023), as well as past hypothetical and past counterfactual uses, including admonitive uses ('X should have V-ed').

An obvious theoretical question at this stage is – do the prefixes and suffixes contribute separate meanings, or do they form a single, though discontinuous, morphological unit, i.e. constitute an instance of so-called distributed exponence (Carroll 2016) ?

Table 1 makes it clear that:

1. $Pref_2-$ is not re-entrant anywhere in the inflectional system, so there is no analytical advantage to assume that its combination with $-Suf_3$ (*-fut*) does not form a unique but discontinuous exponent (a circumfix, if you will)
2. $Pref_1-$ vs. $Pref_2-$ / $Pref_3-$ cannot be understood as marking an indicative/irrealis split, as $Pref_1-$ can associate both with an indicative (e.g. $Pref_1-\sim -SUF_1 = Pref_1-\sim -pr$) and with an irrealis interpretation ($Pref_1-\sim -SUF_4 = Pref_1-\sim -opt$), while $Pref_2-$ / $Pref_3-$ only ever associate with irrealis; therefore, the indicative/irrealis divide cannot be constrained solely by means of prefixes, and must be determined at the level of $PREF_m-\sim -SUF_n$ combinations
3. Furthermore, as we will see, the two $PREF_3-$ paradigms ($PREF_3-\sim -SUF_6$ and $PREF_3-\sim -SUF_7$) do not have the same irrealis meanings; this demonstrates that prefixes are not only unable to discriminate irrealis vs. indicative meanings, but also to discriminate between different subtypes of irrealis meanings
4. None of the suffixed exponents can combine with more than one prefixed exponent, so that there is no analytical advantage to assuming a compositional account; on the contrary, such an analysis sounds very *ad hoc*, while assuming that we are here dealing with distributed exponence (i.e. circumfixal paradigms) appears to be the only natural option.

Let us go through a specific illustration. The series of prefixes ($PREF_1-$) that are found in the present tense are also found in the optative, for instance. Therefore, the prefix they share cannot be marked for the indicative/irrealis opposition, i.e. modality. Additionally, (5) also contrasts with (6), which expresses the past counterfactual (*-pcf*) in terms of modal (but also temporal) content. This further confirms that prefixes are non-discriminating for modality. In effect, suffixes alone are sufficient for all TAM discrimination purposes (i.e. w.r.t. to both tense-aspect and modality), and given that none of them appears in more than one prefix + suffix combination, these combinations are the only legitimate locus for encoding TAM information, and the Iwaidja inflectional TAM morphology is an instance of distributed exponence.

- | | |
|-------------------------------|---------------|
| (15) <i>ri-</i> | <i>lda-ng</i> |
| 3SG.M>3SG.PREF ₁ - | eat-OPT |

'He might eat.'

- (16) nani- lda-∅
 3SG.M>3SG.PREF₃- EAT-PCF
 'He was going to eat it'.

To summarize, Iwaidja prefix and suffix combinations are obviously non compositional since each prefix involved in a compositional marking would contribute a separate meaning), the best analysis is to treat those prefixed and suffixed exponents as forming a unit from the point of view of form-meaning pairings, i.e. as a 'minimal sign' (Blevins 2016) in this language.

2.2 Anindilyakwa synthetic inflections

Let us now turn to the Anindilyakwa TAM system, focusing again on its synthetic inflections. Its make-up is substantially different from that of Iwaidja, at least at first sight. Four different series of TAM-pronominal prefixes combine with five series of TAM suffixes; out of twenty theoretically possible combinations, only eleven are attested. Unlike Iwaidja, the synthetic Anindilyakwa TAM inflectional system exhibits a substantial re-entrance of both prefixes and suffixes. In particular, the *REAL-*, *IRR-* and *DEON-* prefixes respectively combine with three, four and three suffixes¹⁰ (assuming a 'zero', phonologically silent suffix). One could evidently assume, as (Bednall 2020) does, that

At the same time though, Anindilyakwa possesses a clear instance of a discontinuous modal morpheme, namely *NEG.NPST-* ~ *-NEG.NPST*, where both the prefixed element and the suffixed element are unique, i.e. do not combine with any other exponent to form a separate inflectional paradigm ; e.g. **REAL-* ~ *-neg.pst* and **IRR-* ~ *-NEG.NPST* are not grammatical inflectional markings.

- **REAL-* ~ *-pot* prima facie semantically explicable
 - ... BUT not **DEON-* ~ *-PST*
- Partial compositionality ?
- Does not bring any gain to the description of the system, and looks *ad hoc*...

Table 2: overview of TAM prefixes & suffixes in Anindilyakwa

	<i>-NPST</i>	<i>-PST</i>	<i>-∅</i>	<i>-POT</i>	<i>-NEG.NPST</i>
<i>REAL-</i>	IND Present	Past IND	IND Present+Past	*	*
<i>IRR-</i>	MOD present MOD	MOD past	Present+Past MOD	Present MOD	*
<i>DEON-</i>	Present CF	*	Present MOD	Present	*

¹⁰ These are in fact, infixes appearing on the right-hand side of the verb template, and can surface as suffixes in some cases only (cf. the TAM₂ position in (10)). For the sake of simplicity, we will nevertheless call them 'suffixes'.

			(*Past?)	MOD	
NEG.NPST-	*	*	*	*	Present MOD

2.3 Murrinh-Patha synthetic inflections

The third TA/M system we need to discuss is that of Murrinh-Patha; our description will be primarily based on data discussed in (Nordlinger & Caudal 2012). The Murrinh-Patha TAM system (see *Table 3*) involves two main morphological TAM slots, in position 1 (classifier stem alternation) and position 6 of the verb template (12) (TAM suffix). Six different classifier stem/‘prefix’ series in position 1 combine with four different TAM infixes in position 6 (they can be followed by other morphological exponents, so we cannot treat them as suffixes in the general case)– we are assuming that the morphologically null suffix constitutes a morphological class in its own right; for the sake of simplicity, we will treat it as a zero exponent, as this enables to treat it on a par with exponents contrasted with what really constitutes a reduced form of the verb.

Out of 24 theoretically possible combinations, only 8 are attested in our data. 5 out of 6 prefixes associate with a single suffix; the 6th combines with 3 out of 4 suffixes in position 4. Two position 6 infixes (*-nu* and *-nukun*) associate with a unique classifier stem (TAM3-‘future’ and TAM6-‘future irrealis’), the two other suffixes (*-∅* and *-dha*) combine with two prefixes.

Table 3: overview of discontinuous TAM marking in Murrinh-Patha

Position 6 \ Position 1	<i>-∅</i>	<i>-dha</i>	<i>-nu</i>	<i>-nukun</i>
TAM1 (‘non-future’)	Non-future	*	*	*
TAM2 (‘past imperfective’)	*	Past Imperfective	*	*
TAM3 (‘future’)	*	*	Future	*
TAM4 (‘past irrealis’)	*	Past irrealis (readings ^{***})	*	*
TAM5 (‘existential’) ¹¹	Existential	*	*	*
TAM6 (‘future irrealis’)	Conditional Epistemic / deontic modal / directive	Present deontic / directive	*	Apprehensive (deontic+ epistemic)

¹¹ (Mansfield 2019) calls this inflection ‘authoritative’, and argues that it conveys the speaker’s commitment to the validity of the proposition uttered (i.e., in terms of ‘epistemic stance’).

Given the above picture, it seems difficult to invoke overall compositionality for such a morphological TAM system, as at least two series of exponents in position 6, associate with a unique classifier stem form in position 1. Re-entrance is non-existent for two infixes, and most classifier stem forms in position 1 also require a unique infix in position 6 – only TAM6 combines with several infixes. This exponent exhibits at once the widest distribution, both formally and semantically. While associated with multiple modal meanings (epistemic, deontic, directive and apprehensive), it seems to only mark a present type of modal meaning.

- (17) Kura na-watha-ya! (Murrinh-Patha)
 CLF:WATER 2SGS.HANDS(8).FUTIRR-make-DM
 ‘You make the tea!’ (Nordlinger & Caudal 2012: 108)

It is also unclear why position 1 / position 6 combinations of exponents are ruled out, at least on semantic grounds. For instance, it's unclear why the seemingly apprehensive infix *-nukun* does not combine with other exponents in position 1 – e.g. TAM3 or TAM4. Apprehensive morphology is thus crosslinguistically known to be usable in counterfactual contexts and in combination with forms expressing past irrealis meanings, cf. the Nakkara periphrastic apprehensive inflection in (7), combining particle *korla* with the past counterfactual/past irrealis inflection.

- (18) (we built a huge fire ...) korla minja namunja ya-bburba-ma
 APPR flies 3>3.IRR+follow.food-PCT
 ‘We built a huge fire, otherwise the flies would have hung around’
 (Nakarra) (Eather 1990: 347)

This suggests that overall, some combinations are semantically conventional and well-established, while others are not, on arbitrary grounds.

While it is possible that such combinations are in fact rare, and not represented in our data rather than impossible, this remains potentially a genuine concern for a compositional theory of ‘composite mood marking’ in Murrinh-Patha. Especially other published works on Murrinh-Patha does not seem to provide any data illustrating said missing combinations; see e.g. (Mansfield 2014; Mansfield 2019; Mansfield 2020).

In spite of the above argumentation, one could try and maintain that the distribution of infixes *-∅* and *-tha* with certain position 1 markers is semantically motivated, and could constitute a ‘core’ compositional sub TAM system – as has been suggested above already for Anindilyakwa. However, this becomes quickly problematic once we try to generalize the type of meaning that should be ascribed to position 1 vs. 6. Consider for instance the position 6 infix *-dha*. It marks a variety of both modal and non-modal inflectional paradigms: the past imperfective (TAM2 + *-tha*) (19), the past irrealis (TAM4 + *-tha*) (20) and what seems to be some kind of present irrealis/present counterfactual paradigm (TAM6+ *-tha*) (21).

- (19) *ngarde-rerte-dha-ngime* (Murrinh-Patha)
 1DUS.BE(4).PIMP-hit(RDP)-PIMP-PC.F
 ‘We were knocking (shellfish off the reef).’ (Nordlinger & Caudal 2012:98)
- (20) *ngay-dha ngatha-ka me-mawatha-dha-wa*
 1SG-PIMP if-FOC 1SGS.HANDS(8).PSTIRR-rectify-PIMP-EMPH
 ‘If it had have been me, I would have rectified it.’ (Street & Street 1989)
- (21) *ku thina-thi-dha-ya*
 CLF:ANIM 2SGS.HEAT(27).FUTIRR-cook-PIMP-DM
 ‘Why don’t you cook it?’ (Nordlinger & Caudal 2012:108)

It follows from this distribution that *-tha* cannot encode any temporal information, as it marks both present and past paradigms.

In turn, this implies that all the relevant position 1 markers must have temporal anchoring; for instance, TAM2 must encode a past anchoring, and TAM6 a present anchoring. This would mean that position 1 cannot be a purely modal position, and it must be at least temporo-modal (and possibly aspectuo-temporo-modal). In the best-case scenario, we could argue that *-tha* is only endowed with aspectual meaning. But then, this cannot be true of all elements in position 6: some must have modal meaning, if we insist on treating them as semantically autonomous morphemes – this is notably the case of the apprehensive infix *-nukun*, cf. (22). This is a serious problem if we want to main some kind of ‘composite mood marking’ analysis, which requires a compositional analysis of TA/M interaction at the morphology to semantics interface. Both position 1 and position 6 appear to play in determining temporal (or aspectuo-temporal) and modal meaning. Additionally, if we take *-tha* to have a purely aspectual meaning, then it becomes really unclear why it shouldn’t combine with the future classifier stem (TAM3). If we analyze futures are a presently anchored type of modal of the predictive/doxastic type,¹² such a combination should be perfectly licit. But that doesn’t seem to be the case, and semantically, this does not seem to make sense. This, too, is a serious problem for a ‘composite mood’-style, compositional approach to the distribution of position 1 vs. position 6 TAM markers.

- (22) *ke-nhi-bath-nukun!*
 3SGS.poke:RR(21).FUTIRR -2SGO-cook-LEST
 ‘It might burn you!’ (Nordlinger & Caudal 2012:84)

¹² This the currently predominant assumption concerning the formal/theoretical analysis of futures, cross-linguistically; cf. e.g. (Bochnak 2019; Cariani 2021) (as opposed to ‘temporal’ analyses, such as e.g. (Kissine 2008)), see also clear diachronic facts such as the development of Romance futures, where historically present imperfective morphology seems to be re-entrant in their development. This even still transparent to speakers in contemporary French.

Last but not least, in combination with negation the following uses are attested (all other combinations are unattested in Rachel Nordlinger's field data): TAM4 + *-dha* can convey negative past events ('you didn't P') OR negative admonitives ('you shouldn't have P') – cf. (23), et ses lectures (a) vs. (b).

(23) *marda the-na-mut-tha palngun.*

(Murrinh-Patha)

NEG 2SGS.POKE(19).PSTIRR-3S.M.BEN-give-PIMP FEMALE

a. 'You didn't give him that girl.'

b. 'You shouldn't have given him that girl.' (Nordlinger & Caudal

2012:106)

- TAM6 + $-\emptyset$ convey prohibitive ('don't P!') or negative deontic ('you shouldn't P')

(24) *mere thu-ngi-bat!*

NEG 2SGS.SLASH(23).FUTIRR-1SGO-hit

'Don't hit me!' (Nordlinger & Caudal 2012:107)

- TAM6 + *-nukun* convey single clause deontic apprehensives ('don't do P [or else Q]', with undesirable possibility Q left implicit)
- TAM6 + *-nu* conveys negative future (predictive modal)

The fact that negation combines with certain paradigms to convey meanings normally associated with other paradigms (for instance, NEG + TAM6 + *-nu* conveys future meaning, which should be expressed by NEG+TAM3 + *-nu*), is also highly suggestive that positions 1 and 6 do not contribute meaningful, separate TAM morphemes, but really constitute discontinuous morphs very much those found in Iwaidja and Anindilyakwa.

2.4 Interim conclusion

The above review of the TAM systems of Iwaidja, Anindilyakwa and Murrinh-Patha seems to suggest that they cannot be characterized as illustrating 'composite mood marking' in the sense proposed in (Verstraete 2005; Verstraete 2006). While some markers (e.g. *-tha* in Murrinh-Patha, or the Anindilyakwa present vs. past suffixes) appear to have some kind of transparent function in marking particular types of meanings (imperfective meaning for *-tha*, present vs. past temporal anchoring for the Anindilyakwa suffixes), one cannot argue for a principled, general compositional analysis of the underlying TAM morphology as a whole. Notably because it is impossible to characterize the relevant discontinuous positions in the verb templates of these languages as purely aspectuo-temporal (or even aspectual) vs. modal.

3. Periphrastic modal inflections: a first glimpse into the modality / tense-aspect interaction

In addition to their polysynthetic modal inflections, at least some of the languages of our sample appear to offer what seems to constitute periphrastic modal inflections. This will offer us our first glimpse into how tense-aspect and modal information interact w.r.t. morphology in these languages.

3.1 *Iwaidja periphrastic inflections*

Recently collected data¹³ indicates that Iwaidja possesses constructions that appear to form a periphrastic modal system complementing its well-established inflectional system. (Pym & Larrimore 1979) only identifies particles *maju* and *mana* (which they respectively treat as an adverbial vs. a conjunction; while *maju* is clearly a preverbal particle, *mana* can be either a particle (preverbally) or an adverb (postverbally) depending on its syntax). *Maju* is most striking with respect to its distribution with tenses; with the future, it can take on an evidential/pretense reading ('X looks like P') (25), or an open volitional reading (26). With either the anterior (27)-(28) or past counterfactual (29), it can take a past volitional/avertive reading; it can even combine with the present tense to form what seems to be a present avertive-conative ('trying to do something, but so far in vain') inflection (32). Interestingly, while past avertives (27)-(29) seem to correlate with a past proximative-volitional modal ('tried to' translations are an implication of the volitional component of meaning, 'nearly V-ED' a variant of the proximative), it seems difficult to characterize it in aspectual terms; one could argue that it derives from a past imperfective viewpoint meaning, but at the same time, whatever modal state held in the past, it was soon interrupted.

(25) *maju abana-wirradbi*
 mod 1sg>3sg.fut-knead-fut
 'I'll pretend to knead it.' (Pym & Larrimore 1979:244)

(26) *maju abana-marta nganduwulang*
 mod 1sg>3s-fut-save.for-fut 1sg-3sg=pers-mother
 'I'm going to save (some) for my mother' (Pym & Larrimore 1979:238)

(27) *malany maju nganba-ldakani-ny ngara*
 Why mod 3f.sg>1sg.ant-make.sad-ant 1sg.pr-go-pr
baraka, ngaldalmalangkajangkaj.
 DEM 1SG.PR-feel.betrayed.by.spouse -PR
 'Why has she tried to/did she want to make me sorry, I'm (already)
 feeling sick in the stomach about what she did.' (Iwaidja dictionary)

¹³ Long-term fieldwork was conducted by P. Caudal and R. Mailhammer on Iwaidja modal categories in 2013-2014, 2018-2019, and 2023, thanks to funding through a variety of joint projects.

- (28) maju birdirłkbu-ny. Nganduka a-bi-ny?
 mod 3sg.ant-struggle.free-ant int 3sg.ant-do-ant ?
 ‘He tried to struggle free but in vain.’ [= ‘and to what effect?’]
 (Iwaidja Dictionary)
- (29) maju ngan-ambija-na
 mod 1sg.pcf-laugh-pcf
 ‘I was going to laugh (but I didn’t)’ (Pym & Larrimore 1979: 76)

The above data demonstrates that *maju*-based periphrastic modals can have a variety of temporal anchorings. The fact that *maju* can combine with the future inflection (itself arguably a present modal inflection in isolation, with predictive-doxastic, futurate and deontic/directive uses¹⁴) to convey an evidentiality-related,¹⁵ pretense-play use or a present volitional/futurate use, contrasts with its appearing in combination with the past counterfactual inflection to encode avertives (27) (where speaker bemoans a vain attempt at causing him to feel bad, as he was *already* feeling bad), including without volitional content. Note that the very peculiar nature of at least some of the meanings encoded by those <*maju* + inflection> combinations, particularly the pretense-play, rather suggests that they are conventionalized uses, not straightforwardly and compositionally derivable from the particle and the inflection: indeed, *maju* does not seem to have a very clear meaning on its own.¹⁶ (29) demonstrates that *maju* hasn’t retained an volitional content in such structures, and that indeed, the combination of *maju* plus the past counterfactual inflection has been reanalyzed as a general avertive inflection with past proximative/futurate flavour (and not a volitional-only avertive, i.e. a frustrative in (Caudal 2023)’s terms). Given the latter fact, it does not seem reasonable to assume that *maju*-based periphrastic structures can be regarded as compositional.

¹⁴ We are here following a now predominant theoretical approach to futures, which does not treat them as *temporal* but as *modal inflections*, whereby so-called ‘temporal’ uses involve a predictive/doxastic modal meaning, anchored in the present (vs. in the past for ‘future-in-the-past’ uses); cf. e.g. (Cariani 2021).

¹⁵ Pretense-play uses of modal/evidential forms are crosslinguistically well-known, and also found in Australian languages – including Iwaidja in our sample. See also Mparntwe Arrernte, whose evidential/doxastic particle *akwala* also has pretense-play uses. Cf. (Caudal, Henderson & Faller 2011). Pretense-play uses of modals/evidentials can be analyzed as instances of deliberate ‘self-deception’ (Gendler 2007) – see e.g. (Kaiser 2022) and (Caudal, Henderson & Faller 2011) for independently proposed, similar analyses.

¹⁶ While (Pym & Larrimore 1979: 76–77) gloss *maju* as ‘intent’, they provide examples where *maju* cannot have a volitional meaning (69). The Iwaidja dictionary describes its lexical meaning as being obviously difficult to pin down, listing multiple, rather unrelated modal meanings: ‘perhaps, hopefully; intention’.

From particle *maju* and *ngamin* (the first person of the present tense of the ‘say’ root), a complex particle *ngamin maju* with non-compositional, arbitrary meanings (no saying event is ever involved)¹⁷ has been construed. Like *maju*, it is compatible with both past and present inflections, whether indicative or modal. In combination with the anterior inflection (i.e., an aspectually underspecified past) (30) and the past counterfactual inflection (31),¹⁸ it encodes so-called ‘mistaken thoughts’ (or ‘mistaken beliefs’, cf. (McGregor 2023)), a postmodal reading with an actualistic content insofar as it entails an actual negative past event.

(30) *maju ngamin* *ba warrki angkuwany*
 MOD1 the man ANT.3SG.drown.ANT
mardngalk ruka rtadbihi
 COV.drown that creek
 ‘I thought that he was drowning at that creek’ [but he didn’t]
 [speaker’s translation] (TAIM 190604MM_Modality_2 00:31:00.772 –
 00:31:27.717)

(31) *ngamin maju* *nani-ldalku-nyi* *arlirr*
 MOD 3SG>3SG.PCF-cut-PCF tree
 ‘I thought he was gonna cut that arlirr’ [but he didn’t]
 [speaker’s translation] (TAIM-20230709-Avertivity#2 – 00:08:24.881 –
 00:08:26.913)

An interesting fact is that according to dictionary data, both *maju* and *ngamin maju* can combine with the so-called ‘root modal’ inflection¹⁹. With *maju*, this seems to encode some kind of present avertive, (32); the combination with the root modal makes sense insofar it has capacity readings. With *ngamin maju*, the resulting combination seems to involve some kind of ‘wishful thinking/hope about P’, attitudinal meaning²⁰ – possibly with a doxastic modal dimension, as it seems to encode a belief that some possibility might materialize. It has an implicative meaning comparable to English verb *hope* (hence its rendering as ‘hope, hopefully’) –

¹⁷ Moreover, *ngamin maju* being perceivable as a present tense-marked structure, its combination with past modal inflections (cf. (31)) would be temporally problematic.

¹⁸ (31) is the only occurrence of that complex modal particle with reverse order *maju ngamin*. This might be consequence of the fact that *ngamin* is clearly perceived by speakers as an inflected verb, so that *maju* being a particle, could appear on its left.

¹⁹ It is unclear why we find another root modal marking on *ganang-urrwu* (3fsg>3sg.rmod-see-rmod). This could be a matter of agreement within a complement clause, or clause-linking construction under a perception verb.

²⁰ One of our informants confirmed that *ngamin maju* could combine with the root modal inflection, but it was a bit unclear what the intended meaning was in his mind.

this could explain why it combines with a capacitative inflection, as 'hope' verbs are known to select for specific moods/modal marking (Silk 2018).

- (32) *maju* *aldakijba-Ø* *lda kalmu* *mudika*
 MOD 1SG.CMOD-pass-CMOD CONJ HIGH.QUANTITY caR
 'I'm trying to pass, but there's too much traffic.' (Iwaidja dictionary).
- (33) *ngamin maju* *nani-winybu-Ø...* *but arlarrarr*
 MOD 3SG>3SG.RMOD-wash-RMOD but no
 'I thought he was going to wash it but ..karlu [no]' [speaker's translation] (TAIM-20230709-Avertivity#1+ANG-V 00:35:59.425 - 00:36:10.713)
- (34) *ja-wani* *ju-ka-n* *alan, ngamin maju*
 1SG.DIST.PR-sit-PR 1SG.DIST.PR-look-PR ROAD MOD
ana-yanyjing *ana-wulaku-Ø.*
 1SG>3SG.RMOD-see-RMOD 3SG.RMOD.PROX-come.down-RMOD
 'I'm sitting there looking at the road, hoping to see someone come down.' (Iwaidja dictionary) [= hoping I might be able to see someone]
- (35) *nga-wani* *ng-uka-n* *jumung,* *ngamin maju*
 1SG.PR-sit-PR 1SG.PR-WAIT-PR OBL.3SG, MOD
an-aya-nyjing *ganang-urrwu.*
 3FSG>3SG.RMOD-see-RMOD 3FS.G>3SG.RMOD-burn-RMOD
 'I'm sitting here waiting for her. Hopefully I might be able to see her lighting the fire.' (Iwaidja dictionary)

It should be noted that if assumed *maju* and *ngamin maju* to compositionally combine with inflections in the above configurations, some of them would be difficult to reconcile with a unique semantic content applicable to these particles in all of their uses. For instance, *maju* and *ngamin maju* cannot be taken to encode past avertive meanings, as they both also appear in structures with a non-actualistic, non-postmodal, present modal reading. The shift from a present modal to a past postmodal, (negative) actualistic readings of both *maju* and *ngamin maju* could be attributed to the inflections they combine with in such readings, but the specifics of said reading are difficult to predict on the basis of a monosemous reading ascribed to each of these particles – e.g., why does *ngamin maju* + *RMOD* encode the reading it has? Also, and quite tellingly, our informants rejected the combination of *ngamin maju* with the future inflection; this does not seem semantically explainable in a straightforward way, since *maju* can combine with the future (26). Or to put in a nutshell – it seems quite plausible that most, if not all of the above instances of periphrastic modals, have an arbitrary semantics, alongside with conventionalized association with certain inflections.

Let us now turn to two other particles capable of combining with past inflections to encode negative actualistic, avertive readings, namely *wurrkany* and *wartuj*. *Wurrkany* ('was about it/seemed to') only marks modal utterances with a past temporal anchoring – in effect a past postmodal, avertive reading. It preferentially associates with verbs in the past counterfactual (PCF), cf. (36), and sequence-of-tense effects can appear on serial verbs combined with *wurrkany*, cf. (37). It can combine with untensed adjectival forms (cf. *burruli* 'good' in (38)), in which case it encodes a mistaken belief/perception sort of reading ('X looked Adj, but wasn't Adj'). We suspect this reading obtains in combination with stative verbs as well, but this needs to be investigated more closely. Additionally, it can combine with a verb in the anterior tense (ANT) (an English simple past-like past tense) and still produce an utterance avertive reading (Kuteva 1998) (39).

- (36) *wurrkany nanilda* *ba walij ba*
 MOD 3MSG>3SG.PCF-eat-PCF DET food CONJ
karlu riwany
 NEG 3MSG>3SG.ANT-eat-ANT
 '[The dog] looked (deceptively) like he was going to eat the food, but he didn't eat it' (TAIM_190604MM_Modality_1.eaf@00:30:21.204)
- (37) *wurrkany nanimalanma* *janara*
 MOD 3SG>3SG.PCF-drive-PCF 3SG.PCF.DIST-go-PCF
 'He was going to/tried to go fishing [by driving] [but he didn't go]'
 (TAIM_190604MM_Modality_1.eaf@00:14:58.321)
- (38) *wurrkany ruka mudika burruli*
 MOD that car good
 'This car looked deceptively good [as it's broken now]'
 (TAIM_190604MM_Modality_2.eaf@00:05:23.344)
- (39) *wurrkany awukung* *ba walij rardudban*
 MOD 1SG>3SG.ANT-GIVE-ANT DET FOOD 3MSG>3SG.ANT-
 LEAVE.BEHIND-ANT
 'I tried to give him food but he left it behind.'
 (TAIM_190604MM_Modality_1@27:43)

Wurrkany does not combine with verbs in the future inflection (*pace* claims made in the Iwaidja dictionary by B. Birch); speakers systematically rejected our attempts, and corrected the corresponding utterances to a past counterfactual form, cf. (40) and (41). The reason for this incompatibility might be temporal, as in contrast, our informants appear to accept combinations of *wurrkany* with the future inflection, and endow the resulting structure with an avertive meaning.

- (40) A: Can you say **wurrkany banimalamanma* [*mudika*]?
 MOD 3SG>3SG.FUT-drive-FUT [a car]

(TAIM 190604MM_Modality_1 – 00:13:41.731 - 00:13:44.631)

B: *wurrkany nani-malamanma* [informant corrected linguist A]

MOD 3SG>3SG.PCF-drive-PCF

'he nearly drove/wanted to drive/tried to drive the car'

(TAIM 190604MM_Modality_1 – 00:14:53.741 - 00:14:57.271)

- (41) A: Can I say **nanguj wurrkany banildalkung [arlirr]?*
 yesterday MOD 3SG>3SG.FUT-cut-FUT [a tree]
 (TAIM-20230709-Avertivity#2 – 00:09:21.980 - 00:09:27.352)

B: *wurrkany nani-ldalku-nyi arlirr* [informant corrected A]

mod 3sg>3sg.pcf-cut-pcf tree

'he nearly cut/wanted to cut/tried to cut the tree' (TAIM-20230709-Avertivity#2 – 00:09:27.376 - 00:09:29.684)

Wartuj appears to have a negatively oriented semantics close to that of *wurrkany*, with a distinct negative evidential twist, as it mostly expresses (i) a doubtful possibility (42)-(43) or (ii) that something deceptively looked like it was going to happen, but did not happen (44). *Wartuj* differs from *wurrkany* in that it can combine with the future inflection, and can have present modal readings. For want of more detailed data we will not say more here; however it should be noted that this an additional periphrastic modal with postmodal, (negative) actualistic readings – and contributes to making this type of phenomenon extremely salient in the Iwaidja grammar of modality.

- (42) *wartuj yabanara... mana*
 mod 3sg.dist.fut-go-fut maybe
 'Maybe he's going to go'
 (TAIM-20230709-Avertivity#2 – 00:12:46.407 - 00:12:49.280)

- (43) *wartuj yabanara or imalda yawaran*
 MOD 3SG.DIST.FUT-go-FUT ALREADY 3SG.DIST.ANT-GO-ANT
 'Maybe [doubtful] he's going... or he's already gone' [speaker's translation]
 (TAIM-20230709-Avertivity#2 – 00:13:03.142 - 00:13:04.625
 00:13:06.186 - 00:13:07.846)

- (44) *wartuj naniwuni [murlk] lda karlu.* (Iwaidja)
 MOD 3SG>3SG.PCF-hit.kill-PCF [fly] CONJ NEG
 'It [deceptively] seemed he was going to kill the fly...but no'
 (TAIM-20230709-Avertivity#2 – 00:15:06.083 - 00:15:07.708)

To summarize the most important observations in this subsection, it appears that Iwaidja offers a very rich series of periphrastic modal paradigms, where it is impossible to tease apart modal and aspectuo-temporal meanings. One cannot associate either of these types of meanings with separate

morphological units. On the contrary, from the onset, at least some of these modal particles (cf. *wurrkany*) being morphologically past,²¹ the resulting periphrases had a rigid temporal anchoring on top of having various types of modal/postmodal meanings. Indeed, even synchronically, *wurrkany* is homophonous with a verb form - the third singular anterior (past) form of *burrka*- 'dream'; if it is actually cognate with it, this might explain its 'unreal/misguided perception' readings. Numerous actualistic readings – mostly negative ones, plain avertives, or 'mistaken belief/thoughts' with an avertive flavour – were identified in our survey of periphrastic modals in Iwaidja. This is perfectly in line with hypothesis that aspect (here, imperfective aspect, as 'proximative' renderings are common in speaker's translation, cf. e.g. (31), (33), (36), (43), a.o.) – not just tense – must play a key role in the semantics of foreclosed counterfactuals in Australian languages.

The morphosyntactic and semantic properties of *wurrkany* are probably the most significant to our analysis. They very clearly support Osgarby's (2018) idea that non-Pama-Nyungan inflectional modals derive from morphologized modal particles/clitics *via* lexically separate 'auxiliaries' (rather than a single verb template, *contra* e.g. (Evans 2003b)). But they also suggest that Osgarby's analysis cannot apply *as is* to Iwaidjan languages, as *wurrkany* forms a clearly past modal periphrasis. In order to apply to an item like *wurrkany*, Osgarby's theory should be amended so as to incorporate temporal parameters in the original meaning associated with such an auxiliary. The systematic pastness of *wurrkany* periphrases contrasts with the temporal variation observed with *maju*, *ngamin maju* and *wartuj*-based periphrases, where both present and past-anchored readings can be found.

3.2 Murrinh-Patha periphrastic modals

According to (Mansfield 2014: 446), Murrinh-Patha also exhibits combinations of modal particles or clitics with inflections – which seem to constitute potential periphrastic modal inflections. The most striking of those is clitic =*nukun*, which also appears in its morphologized form as infix -*nukun* (position 6 of the verb template) as part of the discontinuous apprehensive inflection (in combination with the TAM6 'future irrealis' exponent in position 1). Very strikingly, as a position 6 exponent, -*nukun* appears both on verbs conveying apprehensive-epistemic clauses (it then associates with an implicit order) and deontic-epistemic apprehensive clauses (it then associates with implicit negative possibility; it conveys and order and a threat, cf. English *don't you dare P!*). In the latter case, it is claimed in

²¹ *Wurrkany* is transparently a verb form, probably a third singular anterior (past) form of *burrka*- 'dream'. This might explain how it developed those unreal/misguided perception and mistaken belief readings. 'Dream' appears to sometimes be lexical cradle from which modal/evidential/mirative meanings can be derived across languages, including in many idioms, cf. Engl. 'pinch me I'm dreaming!', Fr. 'mais je rêve!' (negatively oriented mirative) vs. 'pincez-moi je rêve !' (positively oriented mirative), etc. See also (Delancey 2012), which mentions the use of mirative forms in Kham when reporting dreams.

(Nordlinger & Caudal 2012; Mansfield 2014) that the apprehensive inflection must be associated with a negation. Rather strikingly, clitic =*nukun* can directly mark negation mere in (47), which achieves a reading apparently identical to that of its morphologized realization in (46)). This is a perfect illustration of the frequent ‘fluidity’ of the delineation between particles/clitics vs. affixes (or morphological exponents on the verb template itself).

Semantically speaking, if the apprehensive inflection clitic or infix can mark either deontic-apprehensive mono-clausal structures, or epistemic-apprehensive mono-clausal structures, then its modal meaning is underspecified. But if it must associate with an overt negation and negative directive/prohibitive meanings (and cannot encode ‘positive directive imperative meanings’) in mono-clausal deontic-apprehensive uses, then these cannot be compositional: we are then here faced with an entrenched type of meaning. Finally, it should be stressed that the distribution of /=*nukun* in illustrates the evolution cline whereby particles can become clitics, and then morphologized into affixes; cf. (Osgarby 2018).

(45) *ke-nhi-bath-nukun!* (Murrinh-Patha)

3SGS.poke:RR(21).FUTIRR -2SGO-cook-LEST
 ‘It might burn you!’ (Nordlinger & Caudal 2012:84)
 (>Implicit order: ‘don’t touch it!’)

(46) *mere na-ngi-mathputh-nukun=thurru* (Murrinh-Patha)

NEG 2SGS.HANDS(8).FUTIRR-ISGO-interrupt-APPR=2SGS.GO(6).FUTIRR
 ‘Don’t you continually [go(6)=‘keep.on’] interrupt me.’
 (>Implicit threat: ‘or I’ll punish you’) (Nordlinger & Caudal 2012:104)

(47) *mere=nukun thurru* (Murrinh-Patha)

NEG=APPR 2SG.GO(6).FUTIRR (Mansfield 2014:446)
 ‘you better not go!’ (>Implicit warning: ‘or you’ll regret it’)

3.3 *What the literature on the tense-aspect interaction can tell us about the tense-aspect/modality interaction w.r.t. periphrastic vs. synthetic forms*

At this stage, to further make sense of our observations about synthetic vs. periphrastic modal inflections in our sample, it is useful to actually step out, and replace our investigations within a broader Australian and typological picture. The first important fact of note, is that crosslinguistically, periphrastic forms are often (and even most generally) non-compositional from the perspective of the morphology to semantics interface.²² From this, it would naturally follow that synthetic forms derived from such periphrastic forms are even less likely to be compositional w.r.t. the morphology to

²² For further considerations about analogies between the morphology to semantics interface of periphrastic TAM forms and that of polysynthetic ones, see (Caudal 2022a).

semantics interface, as they have undergone further re-analysis. We believe that this generalization makes it reasonable to hypothesize that compositionality is at best an accidental outlier in such morphologisation scenarios.²³

Considering the literature on discontinuous TAM forms in general, including e.g., periphrastic tense-aspect forms, could be helpful to clarifying the matter at stake here. We believe that the literature of discontinuous tense-aspect forms, because it is so much more developed in many respects, can help us grasp why the general assumption that all types of discontinuous TAM inflectional forms (including modal forms) should ideally be analyzed compositionally, is maybe not as wise as it may seem.

To understand this, let us turn to morphologically discontinuous perfects, and tenses deriving from such perfects. This comprises so-called ‘perfectivized’ perfect inflections, such as the French *passé composé* (Caudal & Roussarie 2006; Caudal 2015) or German *Perfekt*, or even the perfect in some varieties of English. Their meaning has expanded towards perfective viewpoint uses, cf. (Squartini & Bertinetto 2000)’s notion of *aoristic drift*. There is an increasingly large body of evidence showing that Romance and Germanic perfects originated in a variety of constructions whose meaning was non-compositional (as it was a matter of lexification/entrenchment) from the onset, and that their subsequent semantic changes involved various reanalysis processes (Öhl 2009), possibly furthering their non-compositional nature (cf. e.g. (Pinkster 1987; de Acosta 2006; Bourova 2007; Haverling 2010a; Haverling 2010b; Öhl 2014; Pieroni 2016), where multiple syntactic and semantic variants of said construction are listed).²⁴ They ended up being morpho-syntactic atoms with a discontinuous realization – ‘minimal signs’ in

²³ Note that even if (a) the initial periphrastic form could be deemed compositional (which, to be fair, seems very unlikely, given that most originate in constructions / collocational structures, which, by definition, have diverged from a normal, compositional use, towards some kind of entrenched, lexicalized meaning) and (b) if its morphologisation as (poly)synthetic morphology preserved said compositionality, there is no guarantee that it will not be whittled away into non-compositionality through subsequent evolutions. Semantic change is a constant in the evolution of tenses; it is very unlikely that in due time, it would not affect its purported ‘compositionality’. A good case in point for this, is the development of perfective readings for perfects: these are obviously difficult to reconcile with the (rather common place) idea that some element in said perfect should be endowed with a resultative meaning.

²⁴ Romance perfects can be argued to have in fact derived from a complex network of constructions, gradually ‘merging’ due to reanalysis into a more or less united *have/be* perfect paradigms, with novel meanings; so, reanalysis combined with semantic change. Much the same can be said of Germanic perfects, of course, cf. e.g. (Fischer 2020). Some perfects, in spite of over two thousand years of evolution, still exhibit striking conservative features; cf. e.g., the persistence of agreement properties of the ‘avoir’ *passé composé* (where agreement with the object is warranted by its appearing before the auxiliary, in line with its deriving from an attributive construction).

the sense of (Blevins 2016). And most importantly, their semantics continuously evolved through time – in terms of e.g. their interaction with various Aktionsart parameters (Alexiadou & McFadden 2006; McFadden 2015; Rebotier 2017) or agentivity (cf. (Carey 1994) w.r.t. subject agentivity marking the real shedding line between Old English resultative constructions, and a nascent perfect gram). The semantic evolution of tenses is even mirrored in their ability to coerce some aspectual types of verbs (Caudal 2020) – where it exhibits numerous signs of being arbitrary in nature, as said changes appear to be ‘collostructional’ (Stefanowitsch & Gries 2003) in nature. None of the above changes can be evidently ascribed to an alleged morphological sub-element of said forms; it should obviously affect the entirety of the analytical tense – and if change is driven by collostructional, then it involves a collocation with particular lexical classes (which makes it even less amenable to a matter of compositionality within the analytical structure itself).

Yet, in spite of these rather overwhelming diachronic observations, there has been a steady (though limited) flow of compositional analyses of perfects over the past decades (cf. e.g. (Grewendorf 1995; Musan 2001) for the German *Perfekt*, (Caudal 2015: 182) for the French *passé composé*, (Klecha 2016) for the English perfect, or most recently, (Wegner 2019; Zhao 2022) for a variety of perfect forms). Some works seem to happily turn a blind eye to the increasing large set of evidence that perfects are probably best analyzed as non-compositional forms, and do not involve smaller meaningful morphological elements. Others assume that reanalysis somehow prompted a decompositional reanalysis, where various sub-elements are endowed with particular meanings. See (Öhl 2009: 294) for a discussion focusing on the *Perfekt*, and (Caudal 2015; Wegner 2019) for diachrony-informed, or even diachronic accounts perfects along such lines. And even if subsequent changes alter the meaning of a well-established analytical tense, one could postulate that the semantic change should be ascribed to a particular formal ingredient in some compositional analysis, as was done in e.g. (Caudal 2015). However, both those moves somehow seem self-serving, in the sense that they look like stipulations, supporting in an aprioristic manner a compositional analysis of analytical tenses; compositionality is regarded as *a priori* desirable for its elegance.²⁵ And when semantic change seems to affect only certain collocations/constructions, i.e., exhibits clear evidence of being arbitrary, assuming a compositional analysis seems clearly unjustified (see e.g. (Rebotier 2017; McFadden 2015)). Or to put it in a nutshell: diachrony very much stands in the way of compositional approaches to analytical tenses.

Much the same can be said of the development of e.g., Romance synthetic futures and conditionals, which derive from Latin constructions having morphologized. Interestingly, in spite of the existence of an obvious

²⁵ Such an aprioristic view is extremely commonly defended among semanticists, especially formal semanticists – ‘sense enumeration’, or ‘homonymy’ has had a bad name in the domain for several decades, see e.g. (Pustejovsky 1995). For a specific illustration of this belief concerning perfects, see (Klein 2000: 362), and for a detailed discussion of how problematic such a view can be, see (Caudal 2018b)

reanalysis step in their evolution (when from being analytical forms, they became synthetic), some works nevertheless claim that they exhibit semantic compositionality. This is for instance what (Iatridou 2000; Camussi-Ni 2006) claim about the French *conditionnel présent* ('present conditional'), at least to some extent; its *imparfait*-like ending should contribute aspectuo-temporal information similar to that of the *imparfait* itself. Thus, constituting an instance of 'fake tense' for Iatridou, as it would need to give rise to present modal meanings in combination with modal verbs (cf. *il devrait_{COND} être malade* meaning 'he should be sick', which is a present epistemic modal). As shown in (Caudal 2018a) though, such an analysis faces insurmountable empirical obstacles, as the ill-named *conditionnel présent* also marks some structures with past modal uses, notably of the 'future-in-the-past' type (49) – including with non-epistemic modal verbs (50), in contrast with (48). Note that here too, semantic change can proceed in a collocation-driven, arbitrary manner, so that assuming a compositional account of change changes seems impossible; see e.g. (Caudal 2017) for further observations along these lines.

(48) *Marie devrait partir.* (French)
 Marie have.to-CONDPR.3SG leave-INF.
 'Marie should go.'

(49) *Jean déclara que Marie tomberait malade.* (French)
 Jean declare-3SG.PS that Marie fall-CONDPR.3SG sick
 'John declared that Marie would become sick.'

(50) *Jean déclara que Marie devrait partir.*
 (French)
 Jean declare-3SG.PS that Marie have.to-CONDPR.3SG leave-INF
 'John declared that Marie would have to go.'

There is, in fact, widespread crosslinguistic evidence for modal inflections to exhibit mixed present/past readings, and for a general evolution cline from past modal readings to present modal readings, generally affecting deontic uses of said modals first. Such semantic discrepancies are very problematic for a compositional conception of the tense-aspect/modality interaction.

For some general observations concerning this cline, and in general the tendency of past modals to drift towards present uses, see (Hogeweg 2009; Patard 2019); this evolution appears to start most generally with deontic/interactional deontic uses of modal, due to 'politeness effects' of priority modals being used with past marking, but with a presently valid relevance. I.e., it is a common byproduct of 'politeness' uses of past priority modals; for a detailed description and account of a 'politeness' use of a priority modal, see (Caudal 2017).²⁶

²⁶ Quite significantly, (Caudal 2018a: 58–59) observes that emphatic 'politeness' uses of the so-called past conditional in French, started emerging at the end of the 18th century; these uses have now become fairly widespread to mark actual polite uses of priority modal verbs and constructions in French, as present conditional have become the expected

While similar diachronic evidence w.r.t. the morphological and semantic evolution of modal inflections is of course not accessible for Australian languages, some of the facts uncovered here could be of import to attempts at reconstructing the evolution of modal inflections, at least for non-Pama-Nyungan languages. Thus, (Osgarby 2018) argues that Ngarnka derived its current modal inflectional paradigms from the morphologisation of modal particles or auxiliary, in a preverbal position. He tentatively suggests that such an evolution cycle could be found in other Mirndi languages, and even be common across non-Pama-Nyungan languages. This obviously makes sense for all languages possessing so-called ‘pronominal portmanteaus’ on some left slot of their verbal morphology, if said portmanteau also plays a part in encoding TAM information – regardless of whether or not said portmanteau must ‘team up’ with a verb-final TAM infix or TAM suffix.

Now if our observations about Iwaidja periphrastic modal forms are correct, these would naturally look like precursors to Osgarby’s morphologisation cycle: more specifically, they would constitute analytical modal inflection prior to modal particles/auxiliaries being ‘fused’ with the initial slot of the verb template. Then it would follow that in such a subsequent stage, regardless of whether or not the tense-aspect / modality interaction was compositional at the periphrastic stage, tense-aspect information would end up being constrained by exponents found in two distinct slots in the verb template. As reanalysis is obviously required to transition from the periphrastic to the (poly-)synthetic stage of the inflection, there is no reason to postulate that a previous compositionality would be preserved. Which, again, given what we know from the semantic diachrony of discontinuous inflections, sounds very unlikely in the first place.

While such a temporal disparity is not obviously the case for any form in our sample (it comprises several instances of temporally underspecified modal forms, cf. the Anindilyakwa *IRR- ~ -∅* paradigm), Mawng – a language closely related to Iwaidja – datapoints strikingly similar to that of the French *conditionnel*, in that it illustrates the very same tortuous, partial evolution from past to present modal meanings. Mawng possesses an irrealis inflection (the so-called ‘irrealis 2’, glossed I2 below) whose various readings do not have the same temporal anchoring. Most strikingly, its deontic readings are all present (51), whereas its semantics is otherwise relatively similar (and seems to be formally cognate with) the Iwaidja past counterfactual – it notably has both avertive (52) and past counterfactual readings (53).

(51) *nuyimung* *anng-arntakpu-ni mata warlk.* (Mawng)
 2SG.CONTR 2SG-chop.down-I2 VE tree
 ‘Now you chop the tree’. (Singer 2006: 113)

(52) *ja* *karrkpin* *ja* *jalakaraj* *ing-errka-nyi.*
 MA big MA fishing.spear 3FE/3MA-spear-I2
 ‘She tried to spear it with a big spear’ (Mawng) (Singer 2006: 63)

inflectional marking of such structures (so that a novel emphatic present modal structure was needed, due to linguistic erosion).

- (53) *Kun-pu-ni* *ma-warlka-nya.* (Mawng)
 1SG/2SG-hit-12 VE-fall-12
 ‘I would have knocked you down’ (if I was a little younger). (Mawng)
 (Singer 2006: 148)

Such a fact is impossible to reconcile with a compositional analysis of the Mawng inflections.²⁷ And it strongly suggests that as a rule of thumb, temporal anchoring should be regarded as a potential matter of *uses* of modals (or modal constructions), rather than necessarily as an inherent, rigid semantic feature of a particular modal inflection. This is why providing a thorough description of TAM systems, including in their distribution with particles, and also investigating their lexical/constructional quirks (in effect, some frozen structures which they happen to mark, and which many scholars nevertheless try to explain on a compositional semantic basis), is essential in order to make certain we are drawing appropriate conclusions as to the tense-aspect/modality interaction in any given language. Our description of Iwaidja modal markers (be they polysynthetic or periphrastic) seems to suggest that they are either rigidly past (or at least foreclosed), present, but that none of them is currently undergoing a temporal shift in their semantics. At the same time, some facts uncovered in our exploration of periphrastic modal inflections in this language rather suggests a pattern of conventionalized TAM agreement. For instance, it rather striking that the future in Iwaidja seems to be unable to combine with modal particles apparently associating with rigid past temporal anchoring. However for want of space (and for want of sufficiently clear data for some combinations of forms), we will leave this issue open to future research.

4. Theorizing the interaction between aspectuo-temporal meanings and modal meanings of modal inflections in our sample (and in other Australian languages)

The more theoretical part of our paper will try and determine how aspectuo-temporal and modal meanings effectively combine to construe the meanings one can ascribe to modal inflections in the languages of our sample, and possibly in other non-Pama-Nyungan / Australian languages.

4.1 *Some (meta-)theoretical preliminaries*

While this paper cannot cover such a wide-ranging and complex issue as the role played by temporal and aspectual parameters in the semantics of modal inflections, we will here offer some tentative insights concerning their

²⁷ Moreover, the Mawng portmanteau prefix contrasts future-marking prefixes with realis+irrealis marking prefixes (which can be either past or present); it can also bear additional present tense marking. A ‘composite mood marking’ account of the Mawng TAM system therefore seems difficult to adopt anyway, as this portmanteau must encode both modal and temporal information

role in the semantics of Australian modal inflections (and in particular those found in non-Pama-Nyungan languages).

As is well known from the theoretical literature (see e.g. (Mizuno & Kaufmann 2022) for a quick overview), two major approaches to the role of temporal parameters w.r.t. counterfactuality have been so far put forth:

- (i) the so-called ‘Past-as-Modal’ approach, which comes in several brands. The most famous version of this approach is undoubtedly the so-called ‘Fake-Past’ whereby past conditions in modals play a *modal* part by ‘excluding’ some proposition from accessible worlds – it conveys in effect some of kind of modal remoteness condition; pioneered by (Iatridou 2000) in the formal literature, it is actually a fairly old idea (an early instantiation of the concept can be found in (Damourette & Pichon 1911)’s ‘toncal’), but has received several fairly precise technical treatments, cf. e.g. (Schulz 2014; Mackay 2019). Other, alternatives of this type include e.g. (Cipria & Roberts 2000) (which take the Spanish *imperfetto* to denote a modal, whose denotation can be trivialized to a temporal expression), or more recently (Karawani, Kauf & Zeijlstra 2019) (which adopt a technically different, but analytically similar approach, whereby tenses essentially makes reference to world-time pairs (and possibly involving the actual world), but not the time of utterance; as a last resort, if a tense is not embedded under any modal context, past tense will get indexed to the actual world w_0 , and will receive a straightforward past interpretation).
- (ii) the so-called ‘Past-as-Past’ approach, whereby past conditions in modals typically signal some actually past world, where the modalized proposition and its relevant possible world of validation might (still) have been accessible; or, under a less ‘realistic’ understanding of pastness, as involving some manner of temporal shift.

(Formal and) theoretical works focusing on the interaction between tense-aspect and modality in conditional-counterfactuals, tend to assume that either type of approach should hold about all flavours of modals.

At this stage, it could be worthwhile observing that a considerable number of theoretical and formal analyses of modality:

- (i) primarily focus on a well-documented European language – even though there is an already considerable and ever-growing body of e.g. formal semantic analyses of modals in endangered/minorized/underdescribed languages based on first hand descriptive work in the field (see e.g. work by L. Matthewson and past and present associated), this is not your mainstream theoretical paper on modality;
- (ii) when works actually focus on language diversity, and take on a comparative or typological perspective (such as in (Verstraete 2005; Verstraete 2006; Van Linden & Verstraete 2008)), they generally do not investigate a substantial part of the grammar of modality in each studied language – or at least, do not investigate various types of modal bases in a systematic way.

As a result, empirical bases of numerous theoretical works remain narrower than they should be, in a double sense.

This is potentially very problematic, as shown in (Mizuno & Kaufmann 2022). It is argued in this work that desiderative modals with an optative-counterfactual meaning (expressing wishes) with past marking in Japanese, require a ‘Past-as-Past’ approach in a way quite different from the manner in which temporal marking seems to interact with e.g. English counterfactuals such as (1)-(2) – this indicative of the fact that much of the discussion about these two approaches could benefit from exposition to a greater empirical coverage of relevant facts. (Mizuno & Kaufmann 2022) suggest that a lack of concern for the diversity of linguistic facts both language-internally, and crosslinguistically, can have a very significant impact on our understanding of the semantics of modality in general, and of the tense-aspect / modality interaction in particular. We couldn’t agree more, of course; our investigations need to be descriptively wide-sweeping both language internally and language externally. The empirical and theoretical coverage (three languages with an in-depth analysis of some facts, combined with wide-ranging typological and even diachronic observations) of the present paper is an attempt at finding some way of striking a compromise solution between both types of coverage, while keeping our investigations manageable within the confines of a single paper. As we will see, this broad coverage will lead us to notably conclude that *temporality* has been given too much prominence in too many works w.r.t. our understanding of foreclosed counterfactual forms, and aspect not enough

4.2 *Aspect: an important, and under-rated parameter in the study of the tense-aspect/modality interaction*

It is striking to note that in the theoretical literature on modality, temporal conditions have received a disproportionate importance in the investigation of foreclosed vs. open counterfactual meanings. It is notably significant that many works descriptively refer to utterances like (1) as ‘double past counterfactuals’; the label is unfortunate, as in effect, it rather combines an aspectual gram – a perfect – with a past tense.

It is worth recalling now that Australian languages do not exhibit such ‘double-past’ marking; indeed, as a consequence, they tend not to have so-called ‘fake past’ marking (i.e., past marking of an otherwise open counterfactual modal meaning; cf. (54), where the possibility of the relevant vehicle is a open possibility at speech time, where the relevant evaluation modal event is anchored in the present)²⁸; the semantic representation of such an utterance arguable offers a present temporal anchoring.

- (54) *“If it [the vehicle] broke down we would probably just have to patch it back together with duct tape.”* (“Richardsons keeping Starbuck on ice – Our Communities”, *Winnipeg Free Press*, 10.06.2011)

²⁸ It must be recalled that we assume modals to be event predicates with stative variables, à la (Ferreira 2014; Homer 2021) – this is the event here mentioned.

So given the (apparently widespread) absence of so-called ‘fake past’ in Australian languages, it seems natural that many descriptive and theoretical works focusing on foreclosed counterfactual meanings in said languages, ascribe a central role to temporality/pastness – for past modals seem to overwhelmingly ‘truly’ past, and to have foreclosed meanings. This is most obvious in (Verstraete 2005; Verstraete 2006; Van Linden & Verstraete 2008), as we will see.

However, outside of the Australianist community, a substantial number of scholars now object to temporality-centered theories of modality (including theories resorting to the concept of ‘fake past’), arguing that aspect too should play an important role in the semantic analysis of modal forms, whether foreclosed or not. See e.g. (Homer 2011; Ferreira 2014; Homer 2021), or to a lesser extent, (Halpert & Karawani 2012).²⁹ In particular, it is widely hypothesized in such works that ‘run-of-the-mill’ modal meanings *require* imperfective aspectual conditions – which is reflected in the crosslinguistic frequency of imperfective forms, or aspectually underspecified forms, marking modal forms, including complex modal constructions such as e.g. conditional or biclausal counterfactuals of various types; cf. e.g. (Boogaart & Trnavac 2011; Ferreira 2014). In contrast to such commonplace modal meanings, *postmodal* readings of modal forms are arguably marked – and are the most revealing readings w.r.t. the importance of aspect in the semantics of modal forms. The most pervasive and well-known type are so-called ‘actuality entailment’ readings (55) (Bhatt 1999; Mari 2016; Homer 2021), and avertive readings of modal verbs (56) – which convey in fact, *inactuality entailments*, (Caudal 2023: 166–167), i.e. entailments that some negative event actually took place (we are here assuming the existence of negative events in our ontology, following (Bernard & Champollion 2018)). In Romance and Germanic, such readings of modals overwhelmingly associate with perfective viewpoint marking – and a perfective viewpoint semantics.

Could related phenomena also cast some doubt on the efficaciousness of temporality-centered accounts of modality in Australian languages? Remarkably, while *actuality* entailments appear to be fairly rare in the grammar of Australian languages (or to be limited to some very specific modals, such as purposives and apprehensives). *inactuality* entailments of many types (especially those associated with avertive meanings) are very common. (Caudal 2023: 169–170) attributes this contrast to the fact that Australian languages do not exhibit the type of perfective viewpoint marking of modal structures found in e.g. Romance (and possibly altogether lack ‘strong’ perfective viewpoints, as found in e.g. Romance languages, and only

²⁹ We are assuming that ‘fake past’ is nothing more than a morphological reflex without any semantic significance in languages exhibiting it, and is entirely due to the normal evolution cycle of past modal forms towards present meanings, cf. e.g. (Patard 2019). For want of space, we will not discuss here the role played by so-called ‘fake aspect’ (see e.g. (Grønn 2013)) in relation to ‘fake past’ in some theories, but it certainly reflects on the realization that aspect does matter in the tense-aspect/modality interaction.

possess tenses with ‘weak’ perfective readings, in the sense of (Martin & Demirdache 2020); cf. (Caudal 2022b)).

(55) *Il a pu partir.* (French)
 He have.PR.3SG be.capable.PP go-INF
 ‘He was able to leave.’ (= he managed to leave OR was allowed to leave OR seized an opportunity and left)

(56) *Il a voulu partir.* (French)
 Hehave.PR.3SG want-PP leave-INF.
 ‘He tried to leave (and failed)’ (lit.: ‘he wanted_{perfective} to leave’)

It is also significant that much like in many other parts of the world, one can reconstruct recurrent patterns of (especially past) irrealis marking formally deriving from past imperfective markers in Australian languages (cf. e.g. (Caudal 2023: 157, note 87)). Murrinh-Patha itself is quite significant of this very pattern, as its morphology appears to bear lingering traces of such an origin. The *-dha* exponent re-entrant in past imperfective, past irrealis and present deontic/directive forms, is obviously connected with imperfectivity morphology being a common denominator to all these forms.

By itself, the general role of imperfective morphology in the development of irrealis forms is hardly surprising, given that this is crosslinguistically common. But it is probably relevant as to why Australian modal inflections lack actuality entailments: as their aspectual components are morphologically ‘frozen’, but commonly reflect on former imperfective, their semantics is more likely to be imperfective. And even more importantly, in Australian languages where modality is mostly inflectionally encoded, one cannot morphologically construe aspectual contrasts between e.g., imperfective modal inflections, and perfective modal inflections – unlike e.g. Romance modal verbs, which can receive an overt past perfective or past imperfective marking. This is an important argument against a true ‘composite mood marking’ approach to modality in Australian languages: aspect as a grammatical category cannot play any part in their modal structures because these are primarily based on inflections, rather than verbs (or at least so-called ‘auxiliaries’ or other lexico-grammatical modal categories with a significant lexical verb-like content) – while *vice versa*, such an approach appears far more applicable to e.g. Romance modal verbs.

Now the reason why Australian languages present so many inactuality entailment readings probably stems from the fact those easily associate with imperfective viewpoint meanings (contrary to actuality entailment readings, which seem to have clear affinities with perfective viewpoint meanings). Indeed, *inactuality* entailments are crosslinguistically common with overt imperfective viewpoint marking. They are even found in e.g. Romance languages – this is notably the case in Romanian, where a *bona fide* semantically avertive construction with imperfective marking can be found (Pahonțu forthcoming). It will become apparent in the remainder of this paper, just how important postmodal meanings (especially inactuality readings of modals) are in our own study of the semantics of modal inflections in Iwaidja, Anindilyakwa and Murrinh-Patha – and that such data

poses significant challenges to temporality-based accounts of modality, including to J.C. Verstraete's accounts.

4.3 *Discussion of Verstraete's (2005, 2006) and Verstraete and van Linden's (2008) temporal account of irrealis interpretations in Australian languages*

Let us now turn to a discussion of (Verstraete 2005; Verstraete 2006; Van Linden & Verstraete 2008)'s semantic and pragmatic theory of the interaction between tense-aspect and modality in Australian languages – for simplicity of reference, we will simply refer to the 'V&V account', as the three relevant references have a lot in common, theoretically. Our critique will tap three particular areas where we believe potential trouble awaits: (i) the manner in which 'negative entailments' are rigidly associated with pastness in Australian modals (we will see that this causes serious issues of empirical adequacy) by the V&V account and (ii) the absence of any function ascribed to aspect in the semantic analysis of Australian past modals in the V&V account. If our above meta-theoretical musings are founded, then aspectual meaning should matter in the semantic modelling of Australian modals, including in our sample.

The V&V account is based on four main empirical generalizations concerning foreclosed counterfactual meanings in Australian language, where those meanings can be encoded *via* four means:

a. Dedicated morphology (but how dedicated is actually somewhat unclear) – this is deemed rare, on the basis of the samples investigated by V&V

b. A past tense marker (perfect or perfective, according to V&V – although it's not entirely clear whether they actually mean what is generally meant by these terms in the mainstream aspectual literature)

c. A purely aspectual marker – which in fact, has a crucially temporal effect, according to V&V (it is taken to be a proxy for a temporal marker)

d. Some combination of a modal element and a past or past-inducing tense marker (perfect or perfective) – this is the most common pattern in V&V's sample; so double marking, but no 'double past' marking for foreclosed counterfactuals in Australian languages.

The interpretative part of the V&V account focuses on pattern (d), highlighting the importance of temporal parameters (again, aspect is very much reduced to its temporal effects). It is crucially based on the idea that counterfactuality originates as an implicature (or entailment, V&V are not quite clear about this)³⁰ derived from the combination of modal and past temporal conditions – aspectual conditions are ignored or reduced to temporal conditions, and so-called perfect or perfective markers are taken to

³⁰ Note that this obviously a question relating to what is known as 'pragmatic intrusion';

(Chierchia 2004)'s concept of locally computed implicatures would be a natural explanation for the difficulty to identify these phenomena as properly semantic, or as pragmatic. See (Lee 2008) a for a detailed discussion.

essentially contribute a pastness condition. Relevant implicatures are generated *qua* 'Horn scales' (Horn 1989) – i.e., as scalar implicatures (Carston 1998). In a nutshell, Horn scale predict that given expressions appearing on an informative scale of strength, Grice's Maxim of Quantity will trigger some kind of implicature (or entailment), such that some weaker expression entails/implicates that some stronger expression does not hold – hence the negative entailment/implicature in (57). As according to V&V, past modal utterances are informationally weaker than their non-modalized, indicative past tense-marked counterparts, they entail/implicate that said past-marked indicative counterpart does not hold true, i.e., this gives rise to the negative entailment/implicature (58).

(57) *some* < *all* THEREFORE *some* → ¬*all*

(58) a. *John should have left* < *John left*. THEREFORE
 b. *John should have left* → ¬*John left*.

But why is pastness so central to the V&V account of counterfactual modals? Because pastness is taken to be a necessary ingredient for negative entailments such as (57). Observing that the present modal utterance (59) does not entail the negative present indicative utterance (60) – contrary to the past modal utterance (61), which entails indicative negative past utterance (62) – (linden & Verstraete 2008: 1879) conclude that such negative entailments/implicatures are only part of the interpretative content of modals with past meaning/anchoring – not of that of modal forms with present meaning/anchoring.

Two problems are already worth noting at this stage: (i) (60) is in fact a *modal* utterance (as it receives a proximative/futurate reading, which arguably constitutes a *bona fide* type of modal meaning; cf. e.g. (Copley 2009)), and (ii) (60) and (62) involve different aspectual parameters. As a result, the connection (59) and (60) do not differ from (61) and (62) on mere temporal grounds, and the conclusion drawn is not warranted and (linden & Verstraete 2008) fails to establish that pastness plays a key role in the pragmatic explanation it puts forth. Intuitively, part of the problem lies in the different semantic roles played by Aktionsart parameters in present vs. past indicative tenses bearing on telic utterances – a difference not found in present vs. past modal utterances. Had V&V used atelic utterances (e.g. *Jack should be sick* / *Jack is sick* vs. *Jack should have been sick* / *Jack was sick*), the problem might have gone unnoticed. We will get back to this question further down in our argumentation, but it already suggests that aspect needs to play a role in our understanding of the semantics of present vs. past modals, and that it obviously plays different roles in modal vs. non-modal forms. But an immediate side effect of this is that there is in fact no way we can construe evidently parallel non-modal vs. modal utterances for all Aktionsart types of verbs – so that the very empirical foundations of the V&V account is already in jeopardy; temporality alone cannot explain everything.

(59) *Jack should come to the party.*

(60) *Jack is not coming to the party.*

(61) *Jack should have come to the party.*

(62) *Jack did not come to the party.*

But let us put this problem aside for the sake of pursuing our critique. To substantiate the idea that pairings of non-modal and modal utterances can form the type of quantity implicatures shown in (58), (Linden & Verstraete 2008: 1877) resorts to the following set of examples in order to demonstrate the existence of a scale of certainty, ranging from (63) (indicative utterance) to the weakly potential (65) (modal utterance conveying a mere epistemic possibility) – the crucial point being that (63) is stronger ('more certain') than either (64) or (65).

(63) *John is coming.* **statement of certainty ; past indicative**

(64) *John must come.* **statement of strong potentiality**
(necessity)

(65) *John may be coming* **statement of weak potentiality (possibility)**

We here find again some of the issues already identified with (59)-(62). First, like (60), (63) (i) stands out by its aspectual marking and (ii) is in fact a modal utterance: regardless of whether it has a progressive reading or a proximative one, (63) indicates that in some possible, ulterior world, John is expected to have reached whatever location is involved in the current deictic centre. In other words, (63), (64) and (65) are all modal utterances, albeit with different modal flavours (and some modal strength differences). The use of an indicative tense marking does not necessarily imply an absence of modal meaning. Therefore, the above data does not warrant at all the validity of the purported 'scalar implicature' assumed in (58) between modal and non-modal utterances: (63)-(65) does not oppose a non-modal utterance with two less informative modal utterances (64)-(65). One could finally observe that it is not very clear that (63) is less certain than (64), if (63) is taken to express that John intends to come.

Furthermore, the very notion of certainty as applied by V&V to both modal and non-modal expressions is debatable. The non-modalized assertion of P in some perfective, past tense does contrast with some past modalized possibility or necessity assertion of P, but in terms of *actuality*, not *certainty*. In other words, asserting P in a perfective tense makes P *actual* and *irrevocable* – this is not an epistemic notion, *pace* the V&V account.

But the most serious challenges faced by the V&V account lie elsewhere: the account seems to make incorrect predictions as soon as we start introducing some empirical complexity. Thus, once we start looking at a broader of modal meanings than V&V did to ground their theory of scalar implicatures stemming from past modals, it becomes obvious that the type of negative entailment/implicature illustrated in (58) does not always hold – far from it. *Should have V-ed* actually involves a rather peculiar type of reproachative/admonitive (Olmen 2018) modal meaning (not a plain past deontic meaning), whose relations to negative entailment are dependent on

the modal flavour at stake. The following sequence of examples is quite revealing of the problem:

- (66) *John had to leave.* ('was under the obligation of leaving, but did not necessarily leave'; past deontic)
- (67) *John had to leave.* ('was compelled to leave'; actuality entailment reading)
- (68) *John could have left.* (foreclosed counterfactual: John did not leave)
- (69) *John was able to leave.* ('actuality entailment' reading: John left)
- (70) *John would have gladly left.* (foreclosed counterfactual: John did not leave)

A first issue is immediately visible in (66): does not evidently entail either *John left* or *John did not leave* – and this contradicts the V&V account. Worse yet: while (68) and (70) entails *John did not leave* (which is line with the V&V account) (67) and (69) entail *John left* – which, if we apply the V&V account to French, results in an under-generation problem (the V&V account only predicts *negative* entailments for modals, not positive ones).

This series of examples is enough to disprove the notion that past modals systematically entail the negation of the corresponding utterance in the past, i.e., the fundamental tenet behind the V&V account, connecting pastness (temporality) with foreclosed counterfactual meanings. The above datapoints suggest that negative vs. positive (or the absence of any entailment of that type) depend on the lexical semantics of particular modals, as well as their interaction with temporal and aspectual conditions (and marking).

It is important to note that so-called 'actuality entailments', cf. (55), or 'inactuality entailments' cf. (56) readings of e.g. French modals clearly illustrate how aspectual meaning can play a key role in such matters. Indeed, if we mark these examples with a past imperfective tense instead of a past perfective one, then the observed actuality/inactuality entailments vanish – (71)-(72) entail neither 'he left' nor 'he did not leave'. Such datapoints clearly suggest that aspectual parameters should not be overlooked, or reduced to temporal 'proxies' (as is the case in the V&V account), in a theory of the interpretation of past modals.

- (71) *Il pouvait partir.* (French)
 He have.PR.3SG be.capable.IPFV go-INF
 'He had the ability/had been given permission to leave.'
- (72) *Il voulait partir.* (French)
 He want-IPFV leave-INF.

'He was experiencing a desire to leave.'³¹

Related issues were mentioned in (McGregor 2009). It was observed in this paper that the V&V account could not properly explain why some Nyulnyulan past modal inflections encoded no uncertainty about some proposition *P* holding in the past. And that on the contrary, such utterances *semantically* encoded that 'not *P*' was the case. As a result, such utterances cannot be informationally 'weaker' than a non-modalized/non-modal past utterance. McGregor illustrates this problem with an avertive-denoting utterance (73). Crucially, (linden & Verstraete 2008: 1879) did cite a similar (Gooniyandi) avertive example in support of their account. This means that they would claim that (73) has a negative interpretation because it is less certain (i.e., informationally 'weaker') than a past indicative, non-modalized assertion corresponding to (74). Such an analysis is evidently misguided; (73) has a negative semantic content, as it is an instance of semantic avertive (Caudal 2023) – (73) is not semantically 'less certain' than (74), but it is contradictory with it. Avertive utterances involving a semantically avertive inflection like in (73) conventionally involve actual, negative past events (albeit possibly in a secondary dimension of meaning, as presuppositions or as conventional implicatures à la Potts (2007)). (73) and (74) utterances are inherently contradictory, without there being any need to invoke a Horn scale. It should be noted that the label 'inactuality entailment' might seem a tad misleading; avertives like (73) semantically encode that some *negative event* actually took place. Following (Bernard & Champollion 2018), we will regard such negative events as ontologically existent, but endowed with a negative polarity. In other words, 'inactuality entailments' are in fact the negatively-oriented counterpart of actuality entailments; they are also an actualistic type of (post)modal statement, albeit one bearing on a negative event.

(73) *miliyarri nga-l-jamba-na kinya juurru ngayu-na*
 (Warrwa)
 long.ago 1MIN.NOM.IRR-step-PSTthis snake I-ERG
 'I nearly stepped on a snake [but I didn't]'
 (McGregor 2009: 158)

(74) I stepped on a snake.

Moreover, and even more problematically, McGregor (2009) notes that under its epistemic-evidential uses, the past 'subjunctive' inflection found in Gooniyandi entails that some proposition *P* actually holds in the past. In contrast, the V&V account incorrectly predicts that (75) should entail 'they did not eat here'. This is a similar problem to the V&V account incorrectly predicting (if applied to French modals) that actuality entailment readings should not exist – but with datapoints in an Australian language.

³¹ While we agree that this translation is sub-optimal, it highlights the fact that (72) reports a truly imperfectly-viewed mental state/desire.

- (75) *Ngab-ja-wirra* *ngamoo-nyali* (Gooniyandi)
 eat-SUBJ-3PL.NOM/PST+A before-REP
 ‘They were apparently eating here not long ago’ (McGregor 2009:
 160)

Interestingly, a similar problem arises with actualistic interpretations of apprehensive modals with a past interpretation. While such postmodal readings seem to be rare, they are attested in at least some languages where apprehensive modals with a doxastic-epistemic reading can be found – note that the apprehensive modal inflection in Yidiny is temporally underspecified; in (76), its interpretation must comprise a past temporal condition, so the V&V analysis should apply – and incorrectly predicts that (76) entails ‘I did not fall’:³²

- (76) *ngayu* *bama* *wawa:l* *wandanḍinggu.* (Yidiny)
 1-SA person-ABS see-PST fall-APPR-ERG
 ‘I saw the person as I was (unfortunately) falling over’. (Dixon 1977:
 352)

Last but not least, the V&V account (linden & Verstraete 2008: 1878) also makes a problematic claim in relation to the impact of negation on the above purported ‘certainty scales’. In particular, it is argued that negation simply preserves those scales, (77)-(80):

- (77) potential $p < p$
 (78) potential $p \rightarrow \neg p$
 (79) potential $\neg p < \neg p$
 (80) potential $\neg p \rightarrow \neg(\neg p)$, i.e. potential $\neg p \rightarrow p$

However, as was shown in (77) about Murrinh-Patha, non-Pama-Nyungan past irrealis inflections (including those found in Iwaidja and Anindilyakwa) often exhibit a striking ambiguity when combined with negation, where the relevant readings are mutually contradictory, cf. (81). This means that negation would not systematically preserve those so-called ‘certainty scales’ (regardless of whether or not they are legitimate in the first place); on the contrary, reading (b) is the equivalent of an actual negative past event, i.e. of

³² Past narrative, actualistic uses of purposives found in numerous Australian languages might constitute another similar class of problematic datapoints for the V&V analysis, but we will leave this as an open question for future research. One might also take into consideration past dispositional modals/habituals – which are generally assumed to constitute a class of modal meanings (see e.g. (Carlson & Pelletier 1995) for a standard modal quantificational analysis, and (Cohen 2012) for a more innovative one). It is unclear how the V&V account would handle such modals.

a non-modalized negative past assertion (which, again, is suggestive that no such ‘certainty scales’ are involved in the interpretation of modal inflections in Australian languages).

- (81) *marda the-na-mut-tha* *palngun.*
 (Murrinh-Patha)
 NEG 2SGS.POKE(19).PSTIRR-3S.M.BEN-give-PIMP female
 a. ‘You didn’t give him that girl.’
 b. ‘You shouldn’t have given him that girl.’ (77)

To conclude our little critique, it appears that the V&V account (i.e., (linden & Verstraete 2008) and its precursors (Verstraete 2005; Verstraete 2006)) is plagued with numerous empirical adequacy problems, and is theoretically flawed in several important respects:

- (i) it is dubious that modalized and non-modalized assertions form any kind of scale upon which quantity implicatures could be built in relation to temporality alone, as past non-modalized utterances are not *certain*, they are *actual* (i.e. pas and irrevocable, which modalized propositions are not); moreover, parallel modal/non-modal utterances cannot always be found without resorting aspectual markers (which can make it impossible to actually find actually acceptable correspondents)
- (ii) it is incorrect to posit that $PAST(MOD(P))$ in general entails $\neg P$; this depends on lexical modal meanings, and how some positive or negative actualistic readings (actuality vs. inactuality entailments) may have conventionalized with certain aspectuo-temporal conditions/markings (and also on contextual parameters, in case some modal is not conventionally biased towards either P or $\neg P$ being implicated); the V&V account is clearly unable to explain the contrast between actuality vs. inactuality entailment patterns, and any form of past modal without any negative entailment/implicatures (cf. e.g. (75)).
- (iii) it is incorrect to assume that negation preserves the connection of modal forms with negative entailments/implicatures (and of course that it preserves ‘scales’ connecting modalized vs. non-modalized statements, as said scales are non-existent anyway), in the light of NEG + past irrealis marking being ambiguous in numerous non-Pama-Nyungan languages;
- (iv) combining modal and temporal parameters is obviously insufficient when trying to account for the semantics of modal forms – aspectual parameters must also come into play (and not merely because they can impact temporal anchoring; imperfective viewpoint meanings have special affinities with modal meanings, which obviously need to be paid attention to).

We believe that point (iv) should be really crucial to a proper semantic theory of the tense-aspect/modality interaction.

4.4 *Theoretical and formal consequences for modelling tense-aspect/modality in languages of our sample*

Now that we have established that aspect does indeed play a role in determining the semantic behavior of Australian past irrealis forms (or foreclosed counterfactual forms, if you will), what could we possibly conclude from this about the semantic makeup of modal inflections in our sample?

Prior to this, we have established that the discontinuous TAM morphology found in our sample could not be analyzed in the compositional terms of ‘composite mood marking’ à la V&V. But does this mean that modal and aspectuo-temporal conditions need to be treated as unanalyzable semantic atoms? We believe that this is not the case. Indeed, if synchronic ‘morphological atomicity’ is warranted for such forms, this does not mean that their semantics should not comprise distinct aspectuo-temporal and modal ingredients. And the fact that the V&V account fails at explaining how and why pastness seems to play an important role in encoding foreclosed counterfactuality, does not mean that past temporal anchoring should not be a necessary semantic ingredient for modal inflections – or at least for some of them.

According to V&V, Australian languages do not exhibit instances of presently-anchored instances of otherwise ‘past’ modal inflections – *contra* e.g. ‘single past’ counterfactuals (2)-(3), or even (arguably) ‘two past’ counterfactuals involving individual-level states (1). We will not venture here far enough in the realm of hypothetical conditional to ascertain whether (1)-(3) can have correspondent in Australian languages.

But there is one important theoretical move we can make, namely that tense-aspect conditions appear to systematically outscope modal conditions in the semantic representation ascribed to the denotation of modal inflections in our sample. This means that a scope hierarchy such as (82) must hold between aspectuo-temporal and modal operators/functions in the semantic representation ascribed to modal inflections (whether synthetic or periphrastic).

(82) Aspectuo-temporal conditions > modal conditions > lexical conditions

How general (82) should be, is an obviously delicate theoretical question: should it apply to all types of modal meanings, i.e. flavors? In particular, could it apply to non-root modal meanings? There is indeed a vast body of literature arguing that epistemic modals should not be subjected to such a scope hierarchy, as they should outscope tense; see e.g. (Hacquard 2006) for references and a detailed review of the classic literature on this topic. While settling such a mightily complex question cannot be achieved within the confines of our paper, and inspired by descriptive and theoretical insights found in works such as (Homer 2013; Rullmann & Matthewson 2018; Homer 2021), we will suggest that (82) should also apply to non-root modals. Our main motivation can be found in the numerous ‘mistaken thoughts/beliefs’ readings associated with a variety of modal forms in our sample (and in Australian languages in general, see e.g. (Caudal 2023; McGregor 2023)). Those meanings obviously correlate with evidential-epistemic flavors. And being

past and actualistic, they must require some manner of past aspectuo-temporal ‘binding’ the modal flavor they derive from.

5. Conclusion

We must now conclude our comparative study of modal inflections in Iwaidja, Anindilyakwa and Murrinh-Patha.

Let us turn first to the negative side of our results: hypotheses and ideas we have refuted. We have established that Verstraete’s concept of ‘composite mood marking’ could not be applied *as is* to these three languages, as they do not exhibit the type of compositionality in the tense-aspect/modality interaction it would require. Of course, one cannot *a priori* exclude the existence of *bona fide* composite mood-marking in non-Pama-Nyungan languages, i.e., languages where real compositionality involving two separate tense-aspect and modality morphemes would take place. But we have suggested that it is rather unlikely, given the highly inflectional encoding of modality in these languages. It could more fruitfully apply to languages with overt, semantically productive tense-aspect marking of modal verbs/auxiliaries such as Romance languages, than to Australian languages. Our detailed review of the various discontinuous paradigms found in the languages of our sample, and of the various semantic reasons why they cannot be regarded as supporting a ‘composite mood marking’ compositional analysis, remains our first and most solid argument against such a view. Even if we leave aside obviously non-compositional paradigms (e.g., if their prefixed/suffixed elements are unique), why certain combinations of prefixes/suffixes (or more to the point, exponents found in the left vs. right positions in the verb template) are not possible is generally not explainable on semantic grounds. Nor can we explain numerous readings associated with certain discontinuous paradigms in a compositional manner. This is an important methodological point to us: synchronically, one cannot make any informed hypotheses about the tense-aspect/modality interaction, if one does not consider a TAM system globally.

In lieu of ‘composite mood marking’, we would like to speculate that discontinuous TAM morphs as well as periphrastic TAM inflections (modal inflections in our data) found in our sample, could be better thought of as a matter of conventionalized pairings of exponents – collocations, if you will; see (Bonami 2015). One could for instance compare them to so-called asymmetric marking on conditional structures (Molencki 2000); they have been analyzed as a matter of a purely formal, conventionalized marking in works insisting upon the fact that they were compositional, while they really are the ‘frozen’ end-product of diachronic processes.³³ While French conditional structures are a perfect test-bench for this type of approach, cf. (Caudal 2018a; Patard 2019), Australian languages also have potential in this

³³ Although one could always claim that reanalysis could introduce compositionality where there was none, initially, but this might well be compositional wishful thinking: reanalysis can be an entirely formal, without any significant semantic change – at least at first.

respect, since they also exhibit features suggestive of the same diachronic processes being at play (such as, for instance, the tendency for certain kinds of past modals to acquire present readings over time; cf. the ‘irrealis 2’ in Mawng, (51)-(53)).

We have also shown that (linden & Verstraete 2008) pragmatic analysis of foreclosed counterfactual meanings in Australian languages was highly problematic in several respects: (i) it is dubious that Horn Scales connecting modal utterances and their non-modal utterances can be invoked to explain why foreclosed counterfactual utterances entail negation of the propositional content they mark and (ii) such an approach cannot account for a variety of phenomena, especially postmodal, actualistic interpretations of modal inflections (dubbed ‘actuality entailments’, and ‘inactuality entailments’ above), and is therefore empirically inadequate. We have suggested that the primary explanation behind this rather radical diagnostic, is that the theory places far too much emphasis on pastness/temporality alone, and connects it to negative entailments in a way that is theoretically and empirically inadequate. It also fails to acknowledge the importance of aspect while investigating the interplay between tense-aspect and modality – a fact now well-known from the study of actualistic readings of modal forms, both as positive ‘actuality entailments’ (Homer 2021) or as negative ‘inactuality entailments’ (Caudal 2023), as in the case of e.g. avertive utterances. We have suggested that the extreme prominence of the latter in Australian languages, has to do with the fact that they can easily emerge from imperfective viewpoints (an idea already defended in Caudal 2023) and that Australian pasts irrealis inflections are rigidly associated with an imperfective viewpoint meaning. *Vice versa*, the latter fact would explain the near absence of positive ‘actuality entailment’ readings of modal inflections in Australia: those would require perfective viewpoint meanings that Australian modal inflections do not really possess.³⁴ Given that Australian languages do not allow for overt, distinct tense-aspect marking of modals (which are essentially flectional in these languages), and do not offer compositional tense-aspect/modality interactions even in their discontinuous TAM inflections, we conclude that even an aspectually-enriched and revised theory of ‘composite mood marking’ (so not the original Verstraetian analysis, but see e.g. (Ferreira 2014; Homer 2021) for possible alternatives) cannot apply to non-Pama-Nyungan Australian languages. But, *vice versa* it would be very-well suited to Romance languages, as they express modality *via* still strongly lexical modal verbs. Their numerous actualistic readings of modal verbs with perfective tense marking seem to be a perfect playground for such a theory³⁵

³⁴ How some rare actuality entailment readings of modal inflections nevertheless emerged in Australian languages, is an independent question we must leave to future research. But it is possibly connected with some special semantic properties of said modals.

³⁵ This being said, actuality and inactuality entailment readings of such verbs may well involve conventional implicatures à la (Potts 2007) (cf. (Caudal 2023: 168)), or presuppositions (Mari 2016), or maybe some more complex semantic configuration, combining entailments with presuppositions (Homer 2021), so it’s unclear how well this would connect with these readings being fully compositional. Some caution is probably

Turning now to the positive results of our investigations, we have uncovered substantial evidence supporting (Osgarby 2018)'s hypothesis that non-Pama-Nyungan combinations of prefixed (or near prefixed) 'pronominal portmanteaux' with TAM suffixes (or other TAM positions on the other end of the verb template), might be reconstructed as deriving from the joint morphologisation of respectively preverbal modal auxiliary/particles/clitics and postverbal modal auxiliary/particles/clitics. Iwaidja was shown to offer very solid evidence in favor of a similar origin for its TAM prefixes, as it currently presents a complex system of preverbal modal particles already forming a periphrastic inflectional modal system, while the Murrinh-Patha *-/nukun* (more or less) verb final affix/clitic, clearly illustrates the postverbal part of Osgarby's hypothesis (i.e., that postverbal particles could also morphologize), cf. (45)-(47).

At the same time, our data demonstrates that quite a few wrinkles (not to say serious revisions) should be added to Osgarby's original hypothesis. In particular, Osgarby did not take into consideration the fact that TAM information – not just *modal* information – could be spread across both ends of the verb; he assumed tense-aspect meanings had to be postverbal. Our description of *wurrkany* modal periphrases suggests that this is a necessary amendment for Iwaidja, even when a preverbal modal particle is morphologized: indeed, *wurrkany* appear to rigidly associated with past modal meanings, and is transparently a past verb form. So diachronically, this means that it probably must have been perceived from the onset as a combination of modal and temporal meanings. We cannot stress enough how important this particular datapoint is, when trying to untangle the morphology to semantics interface behind TAM forms in some non-Pama-Nyungan languages: it very strongly suggests that even from their earliest diachronic stages, at least some languages do not separate aspectuo-temporal and modal conditions on their 'pronominal-TAM' portmanteaus. This places (again!) in a very favorable light the idea that tense-aspect compositionality should not be invoked for such systems: given the chance, they can (and will) 'bundle up' aspectuo-temporal and modal meanings in a single morphological slot, on either end of the verb. Of course, as non-compositionality in the tense-aspect/modality interaction is already visible in the periphrastic, modal particle/auxiliary-based forms such as those identified in e.g. Iwaidja, it seems very unlikely that actual compositionality could surface at later stages, in systems derived from such paradigms – especially if one considers the overall distribution of TAM exponents in the entirety of a TAM system in any given language, rather than a couple of forms.

Still on the positive side, another important idea we have tried to push forward, is that tense-aspect/modality interaction is semantically complex even for morphologically complex forms, due to numerous datapoints demonstrating that temporal and aspectual semantic conditions interacted with modal conditions in the semantics of Iwaidja/Anindilyakwa/Murrinh-Patha modal inflections – the abundance of (mostly negative) actualistic

interpretations of modal inflections found in our sample is our best argument in support of this idea. This is also reflected in the fact that different temporal anchoring can be associated with different modal inflections in Australian languages (languages in our sample exhibit a lot of rigidly past vs. present morphemes) – and that a single modal inflection can have different temporal anchoring (cf. again the Mawng ‘irrealis 2’). We have suggested a relatively straightforward set of scope relations between tense-aspect and modality, whereby tense-aspect systematically outscopes modal operators, even in the case of non-root modal meanings, i.e. epistemic readings.

6. References

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