THE SEMANTICS AND EXPRESSION OF APPREHENSIONAL MODALITY

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MANUSCRIPT *as of* DECEMBER 3, 2023

ABSTRACT   *Apprehensionality* refers to the semantic domain of negative prospective epistemic modality and the formal expressions used to encode it (Vuillermet, 2018). In this article, we break down the *maximal apprehensional situation* into five components: (I) future reference, (II) possibility, (III) negative evaluation, (IV) avertive intent, and (V) a preferred action. In doing so, we propose a framework for comparing synchronic and diachronic aspects of the semantics and expression of apprehensional modality across languages. We discuss formal accounts of three apprehensional morphemes—Francez's (2023) account of Biblical Hebrew *pen*, Dąbkowski and AnderBois's (2023a) of A'ingae *-sa'ne*, and Phillips's (2021) of Australian Kriol *bambai*,—relate their formalisms to the apprehensional situation schema, and evaluate their predictions. We summarize previous findings on the grammaticalization pathways towards and among apprehensional morphemes. We find that apprehensionals grammaticalize from a wide range of sources, including components I–IV of the apprehensional schema. Among the apprehensional functions themselves, both subordination and insubordination are commonly encountered.

1 INTRODUCTION

Classical modal logic focused largely on sentential modal operators like English *may*, *should*, and *must*. Recent decades of work on modality have enriched this picture through the study of variation in modality across languages, at the subsentential level such as in the nominal domain, and through the study of expressions that combine modal meanings with the expression of other categories such as evidentiality and temporality. In the article, we survey one particular such case: the expression of negative prospective epistemic modality, what Vuillermet (2018) and other recent work have called *apprehensional* morphemes.

Under this umbrella, Vuillermet (2018) (building on Lichtenberk, 1995) identifies five distinct uses of apprehensional morphemes: the *apprehensive* (*proper*) (1a),[1] *avertive* (1b) and *in-case* (1c) precautioning uses, *timitive* case/adpositions (1d), and *apprehensional complementizers* (1e) that introduce the complements of attitude predicates encoding negative prospective attitudes, such as *fear*. We discuss these functions in more detail in Section 2. Throughout the rest of the paper, apprehensional morphology is underlined.

(1)   FIVE DIFFERENT APPREHENSIONAL FUNCTIONS

a.   APPREHENSIVE PROPER   Ese Ejja (Takanan; Vuillermet, 2018)
B'iya b'iya b'iya b'iya! Kekwa-ka-chana miya!
bee   bee bee bee   pierce-3A-APPR 2SG.ABS
"Bee, bee, bee, bee! Watch out it might sting you!"

b.   AVERTIVE PRECAUTIONING   Ese Ejja (Takanan; Vuillermet, 2018)
Owaya ekowijji shijja-ka-ani [e-jja-saja-ki   kwajejje.]
3ERG   rifle   clean-3A-PRS AVERT-MID-block-MID AVERT
"He cleans his rifle lest it get blocked."

c.   IN-CASE PRECAUTIONING   A'ingae (Dąbkowski and AnderBois, 2023a)
Vasûi=ngi tsûi [iyu   khûi-sa'ne.]
slowly=1   walk snake lie-APPR
"I walked slowly in case there are snakes."

d.   TIMITIVE   Ese Ejja (Takanan; Vuillermet, 2018)
Iñawewa kwaji~kwaji-ani b'iya=yajjajo.
dog   run~RED-PRS   bee=TIM
"The dog is running for fear of the bees."

e.   *FEAR*-COMPLEMENTIZER   A'ingae (Dąbkowski and AnderBois, 2023b)
[Thesi ña=ma   an-sa'ne] dyuju.
jaguar 1SG=ACC eat=APPR be.afraid
"I fear the jaguar might eat me."

Individual apprehensional morphemes/constructions in individual languages have been shown to pick out different subsets of these uses. For example, Vuillermet (2018) argues that Ese Ejja (Takanan) has three apprehensional constructions: apprehensive *-chana* (1a), avertive

e- ... *-kwajejje* (1b), and timitive *=yajjajo* (1d). In other cases, however, a single morpheme may appear to exhibit polyfunctionality, occurring across several of the uses in (1). For example, Dąbkowski and AnderBois (2023b) show that A'ingae (isolate) *-sa'ne* is not only in-case precautioning, as demonstrated in (1c), but has all of the apprehensional functions in (1) except for the apprehensive proper, in which it is only marginally possible. Angelo and Schultze-Berndt (2016) and Phillips (2021) describe Australian Kriol *bambai* as occurring in uses (1a-1c), but being unattested in (1d-1e).

In this paper, we survey accounts of the semantics of apprehensional morphemes. While the accounts we discuss present different approaches to the semantics of apprehensional modality, it is crucial to note that they are designed for apprehensional morphemes covering a different subset of the uses in (1). In order to render them more directly comparable, then, we consider each account within the framework of what we dub a *maximal apprehensional situation*, as schematized in (2).

(2) MAXIMAL APPREHENSIONAL SITUATION SCHEMA

<u>In the future,</u> <u>X is possible.</u> <u>X would be bad.</u> <u>In order to avoid X,</u> <u>do Y.</u>
   I – future   II – possibility   III – negative evaluation   IV – avertive intent   V – preferred action

While all apprehensional morphemes can be used in a situation like (2)—and arguably, prototypically are—individual proposed apprehensional semantics, then, can differ both in terms of whether a give component in (2) is encoded at all, and in terms of how it is encoded. In this way, we aim to understand both how different accounts approach the semantics of apprehensional modality, but also the ways in which they treat what has been a central question in prior work on apprehensionality: the relationship between (1a-1e). Is there a single meaning unifying some or all of them? Is this a case of a polyfunctionality with set of meanings related in a principled, general way? Are they semantically related only diachronically? How the answers to the above questions relate to the diachronic sources for specific apprehensional forms?

The rest of the paper is structured as follows. Section 2 introduces the five apprehensional constructions in a bit more detail, relating them to the apprehensional situation schema. Section 3 surveys recent formal semantic approaches to apprehensionals. Section 4 summarizes findings on the diachronic pathways towards and among apprehensional morphemes. Section 5 concludes.

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1 Glossing has been adapted from the original publications for consistency and clarity of exposition. The following abbreviations have been used: 1 = first person, 2 = second person, 3 = third person, A = agent, ABL = ablative, ABS = absolutive, ACC = accusative, ALL = allative, APPR = apprehensional or apprehensive proper, ART = article, AUX = auxiliary, AVERT = avertive, CAUS = causative, COP = copula, CS = construct state, CVB = converb, DEF = definite, DEM = demonstrative, DISC = discourse particle, DU = dual, EMPH = emphatic, END = sentence ender, ERG = ergative, F = feminine, FACT = factative, FUT = future, GEN = genitive, HAB = habitual, IMP = imperative, INCL = inclusive, INF = infinitive, INS = instrumental, INT = interrogative, IPFV = imperfective, IRR = irrealis, ITER = iterative, LINK = linker, LOC = locative, M = masculine, MID = middle, MOD = modal, NEG = negative, NOM = nominative, NPF = nominal prefix, NPST = nonpast, OPT = optative, PERS = person article, PFV = perfective, PL = plural, PRS = present, PST = past, RED = reduplicant, REFL = reflexive, SEE = see, SEQ = sequential, SG = singular, SUB = subordinator, TEL = telic, TIM = timitive, TOKEN = token, TOP = topic.

2 APPREHENSIONAL CONSTRUCTIONS

While often overlooked, apprehensional constructions have seen the subject of a number of recent typological works, including Angelo and Schultze-Berndt (2016), Vuillermet (2018), and most notably, an edited volume, Vuillermet et al. (2023), describing a range of apprehensional constructions across a number of unrelated language. One of the major conclusions of this literature is that there are a range of apprehensional functions or uses, with some individual apprehensional morphemes/constructions being limited to specific functions, and others attested across multiple constructions. In the latter case, there is a further question of whether cases of apparent polyfunctionality of this sort are the result of a uniform synchronic semantics or the result of diachronic forces such as grammaticalization. In this section, we briefly describe the five functions identified by Vuillermet (2018).

2.1 *Apprehensive proper*

Perhaps the simplest apprehensional function is what Vuillermet calls the *apprehensive* (*proper*). The apprehensive proper operator occurs in a matrix clause and conveys that the eventuality described by its prejacent might come to pass along with a negative attitude about this. In terms of the maximal apprehensional situation in (2), apprehensives proper regularly communicate components I–III, as illustrated in (3).

(3) ENCODING I–III   Ngarinyman (Pama-Nyungan; Angelo and Schultze-Berndt, 2016)
    Ngaja=ngali   bayalan guliyan   garraga.
    APPR=1DU.INCL bite.PRS dangerous frill-necked.lizard
    "It might bite you and me, the dangerous frill-necked lizard."

One important note distinguishing the apprehensive proper from other apprehensional constructions is that these components are necessarily anchored to the speaker and addressee. It is necessarily the speaker's evaluation that the prospective eventuality described would be bad for the addressee and that it is located in the future relative to the time of the utterance.

As Vuillermet (2018) notes, the suggestion that the addressee avoid this state of affairs and take particular actions to do so appears to not be a necessary component of the apprehensive proper. However, these components are frequently expressed with adjacent independent clauses that Vuillermet argues are related only via their juxtaposition (4), unlike in precautioning uses below.

(4) PREFERRED ACTION JUXTAPOSED   Ese Ejja (Takanan; Vuillermet, 2018)
    Piajja=koma! Shiwi-'io-chana=mi! Jama=owe   a-kwe   b'a'a!
    bad=DISC   slim-TEL-APPR=2ABS this.way=DISC do-IMP SEE
    "But this is unhealthy! Watch out you'll slim down! Look, do it that way!"

2.2 *Timitive case/adposition*

The other monoclausal apprehensional construction is what Vuillermet dubs the *timitive*. Rather than taking a clause/proposition as its argument, the timitive case marker/adposition takes a nominal expression as its argument and returns a clausal modifier with a meaning such as 'for fear of *x*' or 'in order to avoid *x*' (5).

(5) TIMITIVE NOMINAL MARKER   Ese Ejja (Takanan; Vuillermet, 2018)
E-sho'i   d'okwei'ai=yajjajo towaa-'io-naje ena=wasijje.
NPF-child stag=TIM   jump-TEL-PST water=ALL
"The child jumped into the water out of fear of the stag."

The timitive modifier introduces an entity that is associated with a negative prospective eventuality in some way, components I–III of the apprehensive situation schema (2). The action taken to avoid or prepare for this negative eventuality (component V), or which is caused by it, is encoded by the main clause which the timitive phrase modifies.

2.3 *Precautioning clause*

Unlike the apprehensive proper and timitive functions, *precautioning* clauses are necessarily biclausal constructions. In this use, the precautioning morpheme introduces a subordinate clause that modifies the main clause to which it attaches. Precautioning uses are formally distinct from the other apprehensional functions described here, previous literature has often made a further distinction, motivated by the semantics alone, between *avertive* and *in-case* precautioning clauses. In the former (6a), the clause with the apprehensional morpheme introduces describes an eventuality that the action of the main clause action aims to avoid. In the latter (6b), the eventuality of the apprehensional clause is merely one to be prepared for, rather than one that can necessarily be avoided. For example, while the hiding in (6a) can realistically be intended to prevent the seeing event of the main clause, taking umbrellas in (6b) clearly cannot affect whether it rains. Rather, the action is taken so that the subject is prepared in case the rain of the main clause does take place.

(6) PRECAUTIONING FUNCTIONS OF TO'ABA'ITA *ADA*   (Lichtenberk, 1995)

  a. AVERTIVE PRECAUTIONING
    Nau ku   agwa'i buira fau <u>ada</u> wane'eri ka   riki nau.
    1SG 1SG.FACT hide at behind rock APPR man that 3SG.SEQ see 1SG
    "I hid behind a rock lest the man see me."

  b. IN-CASE PRECAUTIONING
    Ngali-a   kaleko 'aa'ako ada fanu 'eri ka   gwagwarila ba-na 'a-fa   rodo.
    take-them clothes warm APPR place that it:SEQ be.cold   LIM-its at-CLASS night
    "Take warm clothes in case it's cold at night."

2.4 *Fear-complementizer*

The fifth and final apprehensional function is introducing complements to verbs with negative prospective meanings such as 'fear,' 'not want,' etc. This use is similar to the precautioning use in that it is necessarily biclausal (albeit in a different structure). On the other hand, it shares with the apprehensive proper the fact that only components I–III of the schema in (2) are communicated. Anecdotally, it seems that juxtaposition of components IV–V is less common in this use than for the apprehensive proper.

(7) *FEAR-COMPLEMENTIZER FUNCTION*   Early Modern English (López-Couso, 2007)
     For therunto I had said to them, that I ferid [*lest the Kinges Highnes wolde as they saide take displeasure inough towarde me for the only refusal of the other.*]

Given the polyfunctionality frequently exhibited by such complementizers, it is often extremely difficult to tell whether such cases are in fact complementizers or may instead be regarded as either apprehensives proper juxtaposed with a negative attitude predication or as precautioning uses. See Dąbkowski and AnderBois (2023b, §4) for a detailed discussion of this issue for A'ingae *-sa'ne*, where it is argued that there are indeed complementizer uses. There are not yet existing formal analyses that give a detailed account of this use and so given this and the complex interactions with the lexical semantics of attitude predicates, we largely set aside this use in the semantic discussion below.

3 FORMAL ACCOUNTS OF APPREHENSIONAL SYNCHRONY

Thus far, we have briefly reviewed the various uses that have been identified in the apprehensional domain cross-linguistically. We turn now to survey several recent proposals for the formal semantics of apprehensional morphemes. One of the points of major cross-linguistic variation is precisely in the degree and kind of polyfunctionality exhibited by apprehensional morphemes. A question to which we return several times below, therefore is to what extent the different proposal below are best regarded as alternative proposals for apprehensional semantics, as opposed to analyses which aim to capture distinct data and may therefore be seem as complementary.

Given that many expressions in this domain are attested in more than one of the uses presented in Section 2 as noted above, this task is not as straightforward as simply comparing analyses within each individual function. We, therefore, discuss these various analyses with reference to the apprehensional situation schema, repeated in (8), examining which components are encoded semantically and how, which components arise pragmatically, and which components are expressed by other adjacent linguistic material. The applicability of a given analysis to the different apprehensional functions in Section 2 can therefore be seen as a consequence—or indeed a correct prediction!—of the analytical choices made by different authors.

(8) MAXIMAL APPREHENSIONAL SITUATION SCHEMA
     <u>In the future,</u> <u>X is possible.</u> <u>X would be bad.</u> <u>In order to avoid X,</u> <u>do Y.</u>
        I – future   II – possibility   III – negative evaluation   IV – avertive intent   V – preferred action

3.1   *Francez (2023) on Biblical Hebrew pen*

The first account we consider is Francez's (2023) account of the Biblical Hebrew apprehensional *pen*. Francez claims that *pen* occurs most commonly alongside a matrix clause describing avertive actions as in (9a). In that sense, its paradigm use, therefore, appears similar to the precautioning use of Section 2.3. Despite this, Francez argues that *pen* nonetheless has apprehensive proper uses like (9b), in which the apprehensional morpheme merely encodes a negative attitude about a prospective event with no explicit exhortation to avert the described state not a specific suggestion of a preferred alternative action.

(9)   APPREHENSIONAL FUNCTIONS OF BIBLICAL HEBREW *PEN*   (Francez, 2023)

    a.   AVERTIVE PRECAUTIONING

      … Kax   et   ištexa   ve-et   šte   bnotexa   ha-mica'ot
      take.IMP ACC wife.CS.2MSG and-ACC two.F.CS daughter.PL.CS.2MSG the-present

      pen   tisape   ba-avon   ha-ir.
      APPR perish.MOD.2MSG in.the-iniquity.CS the-city

      "Take your wife and your two daughters who remain with you, lest you be wiped out in the punishment of the city."

    b.   APPREHENSIVE PROPER

      Pen   yasit   etxem   hizkiyahu leemor YHWH yacilenu …
      APPR incite.MOD.3MSG ACC.MPL Hezekiah say.INF YHWH save.MOD.3MSG.1PL

      "Lest Hezekiah mislead you, saying the LORD will save us."

Given the existence of examples like (9b), Francez proposes the account in (10) where the aspects of (8) found in both uses are semantically encoded, while those found in (9b), but not (9a), arise pragmatically. The semantic components are as follows:

(10)   FRANCEZ'S (2023) SEMANTICS FOR BIBLICAL HEBREW *PEN*
    A clause with the complementizer *pen* expressing a proposition p:

    a.   asserts the possibility of p, and

    b.   conventionally implicates that there is a contextually salient q that is causally dependent on p and bouletically dispreferred.

Consider Francez's (2023) in terms of the apprehensional situation schema (8). Component II (epistemic possibility) is straightforwardly encoded as the at-issue content of *pen*. Component III (negative evaluation) is encoded as not-at-issue content. We can note here, as we see in the analysis of Dąbkowski and AnderBois (2023a) below, that component I (future-orientation) of the apprehensional is derived indirectly. In this case, it is derived from the fact that the negative evaluation must hold of a proposition q which is causally dependent on p and given the nature of causation, this will among other things require p to temporally precede q.

In addition to the semantics of *pen*, Francez (2023) sketches a pragmatic account to capture components IV (avertive intent) and V (preferred action). The preferred alternative action

is optionally expressed by a formally unrelated adjacent clause as in the "take your wife…" clause in (9a). The avertive intent arises pragmatically in cases where the addressee infers an EXPLANATION coherence relation (in the sense of Asher and Lascarides, 2003 and much related work). To simplify slightly, the idea is that the dispreference for *q* is interpreted in context as explaining the preferred action, in this case of the imperative. Similar to Dąbkowski and AnderBois (2023a) below, note that the disconnect between *p* and *q* allows for the in-case and avertive uses to fall out as special cases of this process.

While the accuracy of these predictions for Biblical Hebrew *pen* is unclear at present, it's worth highlighting a few aspects of the account that we will see in a moment constitute important choice points. First, while implicit, as not-at-issue content, it would seem that the bouletic dispreference for *q* must be that of the speaker, rather than some other agent such as the subject. The speaker could, of course, disprefer something because of how it impacts another agent, but the preference expressed is necessarily their own. Second, since the two clauses in precautioning uses like (9a) are merely related by parataxis, the whole multi-clause sequence is predicted to not be embeddable (e. g. within a conditional antecedent such as "if you do x in order to to avoid y, then z"). Third, and finally, while the avertive nature is captured via the EXPLANATION coherence relation, the defeasible nature of coherence relations predicts that other coherence relations ought to be equally possible. For example, a NARRATION relation like "*pen* you might get sunburned, put on aloe" or "*pen* the exam might hurt, treat yourself to ice cream after" ought to be equally acceptable as should many other coherence relations. More detailed investigation of the coherence relations with surrounding context for apprehensive proper examples such as (9b) is needed to assess this prediction in this case.

3.2   *Dąbkowski and AnderBois (2023a) on A'ingae -sa'ne*

The second account we consider is that developed by AnderBois and Dąbkowski (2020) and Dąbkowski and AnderBois (2023a) for the A'ingae apprehensional *-sa'ne*. Their account focuses on three uses of the morpheme: avertive (11a), in-case (11b), and timitive (11c).

(11)   FUNCTIONS OF THE A'INGAE *-SA'NE*

    a. AVERTIVE PRECAUTIONING   (AnderBois and Dąbkowski, 2020)
        Phuraen kan-ñakha [*amphi ja-sane.*]
        touch   try-ITER   fall   go-APPR
        "He kept feeling with his hand so as not to fall down."

    b. IN-CASE PRECAUTIONING   (AnderBois and Dąbkowski, 2020)
        Chaketa=ma=ngi undikhû [*ûnjin tûi-sa'ne.*]
        jacket=ACC=1   don   rain splash-APPR
        "I put on a jacket in case it rains."

    c. TIMITIVE   (AnderBois and Dąbkowski, 2020)
        Anae'ma=ni=ngi phi [*thesi-sa'ne.*]
        hammock=LOC=1 sit jaguar-APPR
        "I'm inside a hammock for fear of a jaguar."

The empirical picture for A'ingae *-sa'ne* differs from Biblical Hebrew *pen* in several respects, most notably in the absence of the apprehensive proper, the use that Francez's (2023) account takes as central. In contrast, Dąbkowski and AnderBois (2023a) take the precautioning uses as central, and propose a quite different analysis with the denotation for *-sa'ne* 'lest' as in (12).

(12) DĄBKOWSKI AND ANDERBOIS'S (2023A) SEMANTICS FOR A'INGAE *-SA'NE* (PRECAUTIONING)
      $[\![\text{-}sa'ne]\!] = \lambda q_{st}.\lambda p_{st}.\lambda w.[p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : r \Rightarrow q \text{ and } \neg r(w')]$
         where r is a contextually inferrable proposition
      PRESUPPOSITION: $\exists i.$ such that RESP(i, p) (i. e. i intentionally brings it about that p)

This denotation builds on work on rationale clauses (see Dąbkowski and AnderBois, 2023a for references) like those introduced by English *in order to*. In other words, the precautioning *-sa'ne* is an operator which takes as input a proposition q and outputs a propositional modifier of a main clause p such that the p-relevant goal worlds of some impetus i (typically the subject of the sentence) are worlds where the inferrable proposition r (which itself entails the stated proposition q). That is to say, the goal worlds the subject has in mind in performing p are ones that avoid some proposition r holding.

For the avertive precautioning example in (11a), the result is that that the action of him feeling with his hands (p) has a modifier that adds the condition that the goal worlds of the impetus responsible for that (the subject "he" in this case) are ones where he does not fall down. In the avertive use here, the contextually inferrable proposition r is identical to the stated proposition q. The feeling around with his hands is plausibly intended to avoid him falling. In contrast, in the in-case use in (11b), the stated proposition q "that it rain" is not plausibly avoided by putting on a jacket. Rather, the proposition to be avoided, r, is some "larger" proposition that entails it, here that it rains and I not be prepared by wearing my jacket and therefore get wet. Despite various differences discussed below, this account is similar to Francez (2023) in that both unify the in-case and avertive uses by treating the stated proposition as a special case of a more general contextually inferrable proposition.[2] AnderBois and Dąbkowski (2020) further extend this concept to capture the timitive use in (11c) with the lexical entry in (13).

(13) DĄBKOWSKI AND ANDERBOIS'S (2023A) SEMANTICS FOR A'INGAE =*SA'NE* (TIMITIVE)
      $[\![\text{=}sa'ne_{\text{timitive}}]\!] = \lambda x_e.\lambda p_{st}.\lambda w.[p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : r \text{ involves } x \text{ and } \neg r(w')]$
         where r is a contextually inferrable proposition
      PRESUPPOSITION: $\exists i.$ such that RESP(i, p) (i. e. i intentionally brings it about that p)

Thinking of this analysis in terms of the schema in (8), the primary aspect encoded directly in this account is component IV (avertive intent). Since the avertive clause here is a clausal

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2 Francez (2023) has a footnote which claims (we believe erroneously) that this is, in fact, a point of major difference between the two approaches. He describes the account of AnderBois and Dąbkowski (2020) as being "therefore analyzed as always relating two propositions that are compositionally supplied." While it is true that Dąbkowski and AnderBois's approach requires some connection between the stated proposition, identity is similarly a special case of more permissive semantics. Whereas Francez (2023) allows for *any* contextually recoverable proposition r, Dąbkowski and AnderBois (2023a) allow for any contextually recoverable proposition r so long as r entails the stated proposition q. Both accounts allow for r to simply be q in the avertive subcase, but also allow for other uses where they diverge, albeit in a somewhat more unconstrained way for Francez.

modifier, component V, the preferred action, is typically obligatory and explicitly encoded as at-issue content by that formally connected clause. Components I (future-orientation) and II (epistemic possibility) are indirectly captured by the nature of the goals themselves. Without going into detail, it is intuitively clear that goals are necessarily about future plans (relative to when the agent has the goal) and necessarily involve uncertainty given that they concern trying to achieve particular outcomes out of a set of possible outcomes. The negative evaluation in this analysis then can be said to arise pragmatically: if an agent *a* has a goal to avoid *r*, then to the extent *a* is rational and knowledgeable, they ought to disprefer *r*.

Contrasting this analysis with Francez (2023), we see a few key differences. While there is a sense in which the two can be thought of as competing accounts, we note again that these differences are motivated to a large extent by the empirical differences in the specific apprehensional morphemes they aim to capture. The first major difference here is that the preference (here, a teleological preference rather than a bouletic one) holds not of the speaker, as in Francez (2023), but rather of whatever individual or force (typically the subject) brought about the main clause state of affairs. A second difference is that the preferred action and avertive intent are obligatorily encoded by a syntactically connected clause. This, therefore, predicts no necessary restriction on embedding the whole complex precautioning unit, and at least without positing ellipsis or some other additional interpretive mechanism, predicts that apprehensive proper uses should not be possible. For A'ingae, Dąbkowski and AnderBois (2023a) show both predictions are upheld, e. g. in (14) for embedding.

(14) COMPLEX UNIT EMBEDDED   A'ingae (Dąbkowski and AnderBois, 2023a)
[[*Iyufa=ma jin-sa'ne*] *tayu   tsa'khû=ma gua'thian-'chu=ni*] *khase gua'thian-ñe*
worm=ACC exist-APPR already water=ACC boil-SUB=LOC   again boil-INF
injienge-mbi.
be.important-NEG
"If the water's already been boiled for germs, there is no reason to boil it again."

3.3 *Phillips (2021) on Australian Kriol bambai*

The third account we discuss is Phillips's (2021) account of Australian Kriol *bambai*. Phillips's (2021) thesis concerns not only the apprehensional uses of *bambai* but its diachrony, and its connection to other non-modal and temporal temporal uses of *bambai*. As such, it contains not only an account of apprehensional *bambai*, but additionally contains related – though at times conflicting – proposals for other diachronic stages and/or other uses. The relationship between these proposals is not always clear to us, but we refer the reader to Phillips (2021) for more detailed discussion. Given our focus here is on the apprehensional uses, we focus primarily on his most comprehensive proposal covering these uses, and touch only briefly on other aspects of the overall proposal.

Empirically, Phillips's (2021) focus is on Australian Kriol *bambai*, a morpheme grammaticalized from archaic English *by and by*. As this history suggests, *bambai* also has non-apprehensional temporal uses. While we set these other uses aside here, we refer the reader to Phillips (2021,

esp. §4) for attempts to unify these uses synchronically and/or diachronically. Similar to Francez's (2023) work on Biblical Hebrew *pen*, Phillips regards the apprehensional uses of *bambai* as instances of the apprehensive proper, as in (15a), with a tendency to co-occur with a paratactic avertive clause, as in (15b).

(15) APPREHENSIONAL FUNCTIONS OF AUSTRALIAN KRIOL *BAMBAI*   (Phillips, 2021)

    a. APPREHENSIVE PROPER   (p. 56)

      Najing, im rait! <u>Bambai</u> ai gaan binijim main wek!
      no 3SG okay APPR 1SG neg.mod finish 1SG work

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

    b. AVERTIVE PRECAUTIONING   (p. 63)

      Ai=rra dringgi kofi <u>bambai</u> mi gurrumuk la desk iya gin.
      1SG=IRR drink coffee APPR 1SG fall.asleep LOC desk here EMPH

      "I'll/ought to have a coffee; otherwise I might pass out right here on the desk."
      (or "… lest I pass out.")

Whereas the other accounts build on accounts of (negative) bouletic and teleological modality, Phillips (2021) builds on work on conditionals, including Phillips and Kotek's (2020) work on English *otherwise*, and proposes the semantics in (16).

(16) PHILLIPS'S (2021, P. 64) SEMANTICS FOR AUSTRALIAN KRIOL *BAMBAI*
    K_i *bambai* $K_j \Longleftrightarrow (K_i) \wedge (\neg K_{i_{sub}} \Diamond K_j)$
    The complex condition K_i *bambai* K_j is satisfiable iff both C_{K_i} and $(\neg K_{i_{sub}} \Diamond K_j)$ are satisfiable, where $K_{i_{sub}}$ is some DRS that is contained within K_i.

In apprehensional uses, the antecedent—the unspoken "if I did" in (15a) or the overt "I will/ought to have coffee" in (15b)—is itself modalized. The sequence with *bambai* on this account, then, first updates the context with this modalized antecedent, K_i. The update of the overt clause containing *bambai*, K_j, is modally subordinated to a modal context created by K_i. Specifically, it is asserted relative to the negation of the unmodalized prejacent to K_i. To take (15b) as our example, the sequence asserts that I ought to drink coffee, but in the worlds where 'I drink coffee' does not hold, it is possible that the speaker passes out. We refer the reader to Phillips (2021) for more technical DRT details, but hope that the informal intuition is clear. One crucial aspect of the analysis to point out is that it relies on the presence of an antecedent proposition which has a particular kind of modality (i.e. one which concerns the subject's intended future actions). Again, while such a requirement could be seen as a bug in analyzing different data in other languages, this is claimed to be a feature here since *bambai* is claimed to have non-apprehensional uses in the absence of such modality.[3]

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3 That said, there is a real worry in the sense that this modalized antecedent in Phillips' view is often implicit, as in (15a). There is therefore a sense in which it still may be preferable to instead build this sort of modality into the meaning of *bambai* in a more direct way, even if that reduces the potential of a unified account with temporal uses. We leave it to future work to explore such possibilities.

We turn now to contextualize this analysis within the schema in (8). First, we see that component II (epistemic modality) is encoded directly as an entailment of (16). Components I (future-orientation) and V (preferred action) are encoded by the antecedent proposition in K_1, with the same caveat as above, that it has the appropriate sort of modality present. Component III, negative evaluation, is encoded indirectly pragmatically given a suitable ($\approx$ teleological) modal in the antecedent. Similar to Dąbkowski and AnderBois (2023a), then, the negative evaluation comes about indirectly from reasoning about the subject's intent to perform actions that avoid particular outcomes.[4] While the negative evaluation (component III) arguably arises via similar reasoning to Dąbkowski and AnderBois (2023a), the avertive intent (component IV) arises quite differently. Whereas this is encoded semantically in Dąbkowski and AnderBois (2023a), here this component also arises pragmatically. In short, the speaker has noted to subject's intent or duty to perform some action and then paratactically indicated that not doing so would have made the negative consequence possible. Phillips (2021) does not spell out in detail the specific coherence mechanism underlying this, but it is clear that this too is a pragmatic reasoning process.

Comparing Phillips's (2021) account with the prior accounts, we see several salient differences. First, whereas Francez (2023) and Dąbkowski and AnderBois (2023a) encoded bouletic and teleological modality respectively, Phillips (2021) does not ascribe any specific modal meaning to *bambai*, to *bambai*, instead allowing it to pick up such a meaning anaphorically. While this may be a virtue for the case at hand given the coexistence of certain non-modal meanings for the same morpheme, it also is unclear at present how implicit antecedents arise. Without such an understanding, the predictive power of the account and specifically, it is not clear what sorts of modality might be salient and how they might interact with the apprehensional morpheme. Finally, while Phillips (2021) discusses data primarily with 1st and 2nd person subjects, given the crucial role of the anaphoric antecedent, there is no prediction that *bambai* will be limited to such uses. As we have already seen, this may be a virtue or not depending on the specific facts of the apprehensional morpheme in question.[5]

4 GRAMMATICALIZATION PATHWAYS

In this section, we consider the apprehensional domain from a diachronic perspective. First, we summarize some of the previous findings on the grammaticalization pathways which lead to the arising of apprehensional morphology. Then, we discuss the attested development among the five different apprehensional functions.

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4 Elsewhere, Phillips (2021, p. 83) proposes that *bambai*, presumably in a later diachronic stage, has developed a negative use condition as part of its semantics:

   (i) PHILLIPS'S (2021) USE CONDITION FOR *BAMBAI*
        $[\![bambai\ q]\!]^u - \{c : c_s$ is negatively disposed to q in $c_W\}$
        bambai q is expressively correct in a context where the speaker c_s is negatively disposed to q in $w*$.

5 Additionally, since DRS's in DRT may be embedded within other operators, there is a clear prediction that the complex condition in (i) can itself be embedded. Whether this prediction is welcome depends on whether a complex apprehensional unit can be embedded, like in A'ingae (14).

4.1 *Origins of apprehensionals*

The maximal apprehensional schema (8) comprises five distinct meaning components: (I) future reference, (II) possibility, (III) negative evaluation, (IV) avertive intent, and (V) a preferred action. Correspondingly, there are many different grammaticalization pathways that give rise to apprehensional morphemes.

Component I of the apprehensional schema is future reference. Correspondingly, expressions of future reference and posteriority are a common source of apprehensional markers. In Korean, the avertive *-lla* comes from the future suffix *-l* and the sentence ender *-la* (17).[6] While *-la* is no longer in common use in Present Day Korean, Rhee and Kuteva (2023) propose that the particle conveyed a sense of exclamation and surprise. The combination of the future *-l* and the exclamative *-la* had the compositional meaning of "*x* will (happen)!" The future exclamative *-lla*, Rhee and Kuteva (2023) suggest, later acquired an overtone of undesirability leading its development into an avertive marker.

(17) FUTURE → AVERTIVE PRECAUTIONING   Korean (Rhee and Kuteva, 2023)
      Pelley tuleo-l-la   changmwun tat-ala.
      insect come.in-FUT-END window   close-IMP
      "Close the window lest insects come inside."

Another temporal source of apprehensional morphemes comprises adverbs and conjunctions which present two situations following one another, such as *later* and *before*. If the posterior situation is taken to be undesirable, the temporal marker may develop apprehensional meaning.[7] This is the trajectory proposed by Angelo and Schultze-Berndt (2016) for the colloquial German *nachher* 'later,' which in its unstressed use has a necessarily negative emotional connotation. I. e., the use in (18) is only felicitous if winning the lottery is undesirable.

(18) POSTERIORITY → APPREHENSIVE PROPER   German (Angelo and Schultze-Berndt, 2016)
      Nachher gewinn-e   ich noch und kann das CL Finale nicht zu Hause schauen.
      later   win-1SG.PRS 1SG DISC and can DEF CL finals NEG at home watch
      "[I think I'd rather not take part in this lottery.] I might win [a trip] and would not be able to watch the CL (Champions League [in football]) finals at home."

Component II of the apprehensional schema is possibility. Apprehensionals may grammaticalize from expressions of possibility by acquiring the additional semantic component of undesirability. Francez (2023) reports that while the Hebrew modal adjective *alul* used to express simple possibility in the early revivalist period, in its modern-day usage, the modal has acquired negative evaluative meaning. This is to say, (19) necessarily conveys that the speaker does not want the addressee to succeed.

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6 The glosses in this section show the historical origin of the respective apprehensionals (underlined). This decomposition is not to suggest that the present-day morphemes are analyzed as morphologically complex.

7 Concomitantly, the anterior situation may be interpreted as the precaution averting the undesirable situation.

(19) POSSIBILITY MODAL → APPREHENSIVE PROPER   Hebrew (Francez, 2023)
      Ata alul lehacliax.
      2SG can succeed.INF

      "You might (God forbid) succeed."

Polar questions raise an issue but do not assert the content of their prejacent. As such, they may be recruited to express possibility. If the possibility is an unwelcome one, they may further acquire apprehensional meaning. This development is demonstrated by the Japanese *fear*-complementization strategy, where the interrogative *=ka* and negative *-na(k)*. The question raises an undesirable possibility. The negation points the speaker's preference for a negative answer (Dobrushina, 2021).

(20) NEGATIVE QUESTION → *FEAR*-COMPLEMENTIZER   Japanse (Dobrushina, 2021)
      Nanika   waru-i   koto=ga   oki-nak-at-ta=ka   sinpai=da.
      something bad-NPST thing=NOM happen-NEG-LINK=INT worried=COP.NPST

      "I am worried that something bad has happened." (literally: "[I] am worried whether something bad did not happen.")

Component III of the apprehensional schema is the negative evaluation of a situation and its concomitant undesirability. As such, apprehensionals may originate from various expressions that convey a negative evaluation or emotional response. In Thulung (Kiranti), the verbs of avertive precautioning clauses (introduced by the subordinator *rwaksaka*) are prefixes with the negative *me-* and suffixes with the optative *-nɯ* (21). The optative *-nɯ* itself traces back to the lexical verb *nɯmu* 'be good' (Lahaussois, 2023).

(21) *BE NOT GOOD* → AVERTIVE PRECAUTIONING   Thulung (Kiranti; Lahaussois, 2023)
      Tsɵttsɵ-mim-ka pi:masi me-bi-mi-nɯ   rwaksaka thʌk-tɯ.
      child-PL-ERG   fruit   NEG-beg-3PL⟩3SG-be.good SUB   hide-3SG⟩3SG.PST

      "So that the children wouldn't beg for the fruit, he hid it."

Apprehensional expressions can also grammaticalize from lexical verbs which encode undesirability directly. The Ese Ejja timitive enclitic *=yajjajo* (22) derives from the *-yajja*, a shortening of the verb *-(y)ajjajja* 'to fear,' and the locative clitic *=jo* (Vuillermet, 2018). Thus, the decomposition of *=yajjajo*, Vuillermet (2018) observes, resembles that of the English timitive expression *for fear of* or the Spanish *por miedo de*.

(22) *FEAR* → TIMITIVE   Ese Ejja (Vuillermet, 2018)
      Iñawewa kwaji~kwaji-ani b'iya=yajja=jo.
      dog   run~RED-PRS   bee=fear=LOC

      "The dog is running for fear of the bees."

Another group of lexical verbs richly attested to have given rise to apprehensional morphemes includes verbs of watchfulness and warning, such as *look*, *take care*, and *beware*. In Dorig

(Oceanic) and other Banks languages, the precautioning subordinator has grammaticalized from the lexical verb *te(g)kor* 'watch out, beware' (23), which itself in turn decomposes to *teg* 'watch' and *kor* 'over' (François, 2023). Note the homophony between the matrix verb and the precautioning complementizer.

(23) *WATCH OUT → PRECAUTIONING*   Dorig (Oceanic; François, 2023)
      Nēk s-tekor   o   sri-n,   tekor   nēk so-dlōm!
      2SG IRR-beware ART bone-3SG watch.out 2SG IRR-swallow
      "Beware the bones, lest you swallow them!"

Component IV of the apprehensional schema is avertive intent. The grammaticalization pathways which build on this component include prohibition and ablation. The first strategy is attested, among others, in Slavic languages. In Russian, for example, apprehensive clauses are expressed as prohibitions, formed by negating an imperative (24). The prohibitive strategy consists of directing the addressee to avert the negative outcome (Wiemer, 2023).

(24) NEGATIVE IMPERATIVE → APPREHENSIVE PROPER   Russian (Slavic; Wiemer, 2023)
      (*Smotr-i,*)   *ne poskol'zn-i-s'!*
      look.IPFV-IMP.SG NEG slip.PFV-IMP.SG-REFL
      "(Be careful,) don't slip!"

The second strategy, found in Upper Tanana Dene (Athabaskan; Lovick, 2023) and Torres-Banks (Oceanic) languages, including Lemerig (25), involves grammaticalization from ablative marking. This pathway relies on a spatial metaphor—the undesirable situation is conceptualized as a place and avoiding it as a movement away from it (François, 2023).

(25) ABLATIVE → AVERTIVE PRECAUTIONING   Lemerig (Oceanic; François, 2023)
      Në k-mimi'ir   rān   e   'en ē   sē   n-pël.
      1SG IRR.1SG-sleep~HAB over.it TOP ABL PERS anyone IRR.3SG-steal
      "I sleep on it so nobody steals it."

We did not find apprehensionals grammaticalized from expressions whose meaning is associated with component V of the schema (the preferred action). This may be because the course of events brought about by the preferred action (Y in the schema) is a different situation from the undesirable potentiality to be avoided (X in the schema). This is to say, expressions functionally close to Y may become grammaticalized in association with Y, but not with X.

Finally, we note the existence of grammatical pathways more distantly related to the apprehensional schema. For example, Polish (Slavic) has a precautioning strategy where an imperative to avoid an outcome is metalinguistically justified (*bo* 'because') with the undesirable consequences of disregarding the directive (26). This strategy presents as dispreferred future (component I), but also draws on the grammar of justification, which falls outside of the apprehensional schema as narrowly defined.

(26) REASON → PRECAUTIONING   Polish (Slavic; Ożóg, 1990, p. 135; Wiemer, 2023)
      Nie rusza-j   t-ego,   <u>bo</u>   się oparz-<u>ysz</u>.
      NEG touch.IPFV-IMP.SG DEM-GEN.SG because REFL burn.PFV-FUT.2SG
      "Don't touch this because [if you do] you'll burn yourself." (i. e. "… lest you burn
      yourself.")

In interim summary, we find that there is a wide variety of sources that can give rise to
apprehensional morphemes in the course of grammaticalization. Common pathways lead
from expressions whose meaning implicates components I-IV of the apprehensional schema.

4.2 *Pathways among apprehensionals*

Finally, we briefly discuss diachronic pathways among apprehensional constructions, i. e.
changes whereby a morpheme expressing one of the functions (1) acquires another function.
As we have seen above, the relationship between apprehensional constructions involves a mix
of synchrony and diachrony. The attested diachronic developments include various cases of
"syntactic tightening" where an independent clause or an adjunct becomes a core argument
of a verb (standard grammaticalization) as well as *insubordination* (Evans, 2007) whereby a
subordinate clause or a grammatical dependent gains a stand-alone use.

The first category includes developments where an independent apprehensional clause
(apprehensive proper) becomes subordinate to another clause. This course has been proposed
for precaution clauses in Thulung (27). Thulung apprehensive clauses express a negative
wish by combining optative and negative morphology (27a). Lahaussois (2023) proposes that
precautioning clauses developed by subordinating the previously stand-alone apprehensive
clauses with the complementizer *rwaksaka* (27b).

(27) APPREHENSIVE PROPER → PRECAUTIONING   Thulung (Kiranti; Lahaussois, 2023)
      a. APPREHENSIVE PROPER
          Bu:dzi-ŋa <u>me-dɯm-nɯ</u> …
          shy-INT   NEG-become.3SG-OPT
          "May it not be shy …"
      b. SUBORDINATED TO AVERTIVE PRECAUTIONING
          Dzu-kka <u>me-si:-nɯ</u>   rwaksaka je   phʌ-beʈ-to.
          cold-INS NEG-die.3SG-OPT SUB   clothes wear-CAUS-1SG⟩3SG
          "So that he does not die of cold, I dressed him."

Apprehensives proper may also develop into the complements of apprehensional verbs such
as *fear*. This path has been proposed by Dobrushina (2021) for Kumyk (Turkic). Similarly to
Thulung, Kumyk's apprehensives are expressed by means of combining a negative and an
optative marker (28a). Clauses subordinate to *qorq-* 'be afraid' shows the same morphology
as matrix-clause apprehensives (28b). Dobrushina (2021) suggests that this pattern arose
through an intermediate stage, where the *fear*-predicate was paratactically juxtaposed with a
wish that the undesirable outcome does not obtain—"*x* is afraid; may *p* not happen!"

(28) APPREHENSIVE PROPER → *FEAR*-COMPLEMENT   Kumyk (Turkic; Dobrushina, 2021)

    a. APPRENSIVE PROPER

      Sen awru-p   qal-<u>ma-</u>ɣaj   edi-ŋ.
      2SG be.ill-CVB remain-NEG-OPT AUX-2SG

      "Beware not to fall ill!"

    b. SUBORDINATED TO *FEAR*-COMPLEMENT

      Ol qorq-a   sen awru-p qal-<u>ma-</u>ɣaj   edi-ŋ   dep.
      3SG be.afraid-PRS 2SG be.ill-CVB remain-NEG-OPT AUX-2SG SUB

      "He is afraid that you will get ill."

Other types of grammaticalization among apprehensional morphemes include the development of apprehensives proper and avertive adjuncts into a *fear*-complement. For examples and discussion, see e. g. Dobrushina (2021) and Wiemer (2023).

The second category includes *insubordination* (Evans, 2007), in which a formerly dependent element gains a stand-alone use. One prominently represented class of apprehensional insubordination is that of precautioning clauses acquiring the apprehensive proper function. This development has been proposed by Evans (2007) for Diyari (Karnic) (29). The dominant function of the Diyari suffix *-yaṭi* is to introduce precautioning clauses (29a). The apprehensive proper (29b) is expressed by a stand-alone formally subordinate clause.

(29) PRECAUTIONING → APPREHENSIVE   Diyari (Karnic; Evans, 2007)

    a. IN-CASE PRECAUTIONING   (Austin, 1981, p. 225)

      Makita paḍaka-∅-mayi, wanku   yundu wala ṇayi-<u>yaṭi.</u>
      gun   take-IMP-EMPH snake.ACC 2SG.ERG soon see-APPR

      "Carry a gun, in case you see a snake."

    b. INSUBORDINATED TO APPREHENSIVE PROPER   (Austin, 1981, p. 229)

      Ṇulu-ka   kiṉṭala-li yinaṉa maṭa-<u>yaṭi.</u>
      3SG.F.ERG-TOKEN dog-ERG 2SG.ACC bite-APPR

      "This dog might bite you." (literally: "Lest this dog bite you.")

Insubordination of other apprehensional dependents is also attested. The canonical function of the Mudburra (Eastern Ngumpin) timitive *-wirri* is to introduce an entity the fear of which motives an action on the part of the subject (30a). Nonetheless, Browne et al. (2023) note that stand-alone insubordinate uses are also encountered (30b). When used by itself, the timitive has the discursive force of an apprehensive proper—it presents an imminent possibility judged negatively by the speaker.

(30) TIMITIVE → APPREHENSIVE   Mudburra (Eastern Ngumpin; Browne et al., 2023)

    a. TIMITIVE

      Yurrub wandi   ngarrambalyangka-<u>wirri.</u>
      hide   fall.IMP police-TIM

      "Hide, for fear of the police!"

b. INSUBORDINATED TO APPREHENSIVE PROPER
    Kardajala-wirri!
    sandhill-people-TIM
    "Careful of the sandhill people!" (literally: "For fear of the sandhill people!")

Attested pathways also include other developments. For example, Daniel and Dobrushina (2023) propose that the Archi (East Caucasian) suffix *-lk:ut* developed from a *fear*-complementizer to a marker of apprehensives proper and precautioning clauses.

In interim summary, we find that apprehensional markers may change or acquire new functions over time. Attested developments go in both directions: There are cases of syntactic tightening, whereby a previously independent use becomes more grammatically dependent, as well as the opposite, with syntactic arguments and adjuncts gaining stand-alone uses as matrix clauses.

5 CONCLUSIONS

In this paper, we have surveyed recent research examining a previously overlooked kind of modality, apprehensional modality. We proposed that apprehensional morphemes typically occur in situations schematized in (31).

(31) MAXIMAL APPREHENSIONAL SITUATION SCHEMA
      <u>In the future,</u> <u>X is possible.</u> <u>X would be bad.</u> <u>In order to avoid X,</u> <u>do Y.</u>
      I – future   II – possibility   III – negative evaluation   IV – avertive intent   V – preferred action

Against this backdrop, we have seen that synchronic analyses of individual apprehensional morphemes vary in whether and how they encode these components. In all of the existing formal analyses we are aware of, some of the aspects arise via pragmatic reasoning, while others are encoded semantically. For those elements which are encoded semantically, analyses differ in how they are encoded (e. g. as at-issue assertions vs. not-at-issue assertions). They also differ in whether they are directly encoded as such or are merely consequences of the specific kind of bouletic, teleological, or other modality present in the semantics. To some extent, this variation is potentially warranted by variation between apprehensional constructions. For example, an apprehensive proper, by definition, involves only I-III. However, the existing synchronic accounts also in some cases make clear predictions that have to our knowledge yet to be tested.

We have found that apprehensional morphemes may grammaticalize from a variety of diachronic sources. Common developments include expressions whose semantics entails or implicates components I–IV of the apprehensional schema. The grammaticalization then consists of acquiring the meaning of the schema's other components, such as futurity, possibility, undesirability, or negative intent. Likewise, a multiplicity of developments is attested among the apprehensional functions themselves. The independent use (apprehensive) may develop into a subordinate one (precautioning, *fear*-complementizer), but the opposite directionality (precautioning, timitive, *fear*-complementizer → apprehensive) is also robustly attested.

While research on apprehensional constructions is in its infancy, we hope to have shown that they present an important case study for understanding the synchronic and diachronic relationships between different kinds of modality and other elements, including negation.

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