

RATIONALE AND PRECAUTIONING CLAUSES: INSIGHTS FROM A'INGAE

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ABSTRACT. We describe and analyze the semantics of *rationale* and *precautioning* clauses (i. e. *in order to*- and *lest*-clauses) through a detailed case study of two operators in A'ingae (or Cofán, iso 639-3: con, an Amazonian isolate): the infinitive *-ye* 'INF' and the apprehensional *-sa'ne* 'APPR.'

We provide a new account of rationale semantics and the first formal account of precautioning semantics. We propose that in structures such as $[p \text{ } \underline{[(in\ order)\ to\ q}]]$ or $[p \text{ } \underline{[q\text{-}ye]}]$, the rationale operator (underlined) encodes modal semantics where the goal worlds of the actor responsible for p achieve q .

In structures such as $[p [\textit{lest } q]]$ or $[p [q\textit{-sa'ne}]]$, the precautioning operator encodes modal semantics where the actor's goal worlds avoid a recoverable situation r which entails q ($r \Rightarrow q$).

We observe and account for three apparent asymmetries within the domain of rationale and precautioning semantics, which we dub *precautioning semantics asymmetry*, *rationale polarity asymmetry*, and *precautioning encoding asymmetry*. We thus elucidate the relation between rationale and precautioning clauses and make substantial predictions with respect to the cross-linguistic inventories of rationale and precautioning operators.

KEYWORDS: modality, rationale, precautioning, precautive, apprehensional, avertive, infinitive, negation, adjunct, purpose, goal, asymmetry, polarity, apprehensive

1 INTRODUCTION

A rationale clause is an adjunct which expresses the intention behind the matrix clause, i.e. the *rationale* of some agent for it, typically—but not necessarily—the matrix subject. In English, rationale clauses are introduced with the infinitive *to* or expressions such as *in order to* and *so as to* (1). Subordinate clauses are given in brackets and the operators which introduce them are underlined.

- (1) RATIONALE
I work [{to, in order to, so as to} have food.]

A negative rationale, i. e. the intention to avoid a particular situation, can be expressed in two ways: via negation of a rationale clause (2a) or via a dedicated *precautioning* morpheme such as *lest* (2b).

- (2) a. NEGATIVE RATIONALE
I work [(in order) for my children to not be hungry.]
 b. PRECAUTIONING AVERTIVE
I work [lest my children be hungry.]

In addition to introducing a negative rationale, where the intention behind the matrix clause is to avert the event described by the subordinate clause (2b), a precautioning operator such as *lest* can also be used to introduce a negative situation over which the agent has no control yet aims to prepare for, such as rain in (3b). We refer to the former use as *precautioning avertive* and to the latter—as *precautioning in-case*.¹ Crucially, however, we observe that a

¹ We recognize that the English operator *lest* is at best dated and not available in all English dialects. We also recognize that the precautioning in-case use of *lest* is available in an even

negated rationale clause lacks this second function (there is no “negative rationale in-case” use), while the dedicated precautioning morpheme allows for both uses. In other words, (3a) only has the pragmatically aberrant reading where putting on a jacket aims at preventing the rain itself, rather than its negative consequence of getting wet.

- (3) a. “NEGATIVE RATIONALE IN-CASE”
 #I put on a jacket [(in order) for it to not rain.]
 b. PRECAUTIONING IN-CASE
 I put on a jacket [lest it rain.]

In this paper, we explore these broader issues through the detailed investigation of rationale and precautioning constructions in A’ingae (or Cofán, iso 639-3: con, an Amazonian isolate). Whereas English has only the archaic *lest*, A’ingae has two grammaticalized negative rationale/precautioning forms: a dedicated apprehensional² *-sa’ne* ‘APPR’ and a periphrastic negative rationale form, *-mb-e kan-ñe* ‘NEG-ADV AUX-INF,’ built in part from the infinitive morpheme *-ye* ‘INF,’ which also introduces positive rationale clauses.

We propose an account of the semantics of rationale and precautioning clauses that not only captures their meanings, but also explains several asymmetries we observe in the operators encoded in this domain. Specifically, in structures such as $[p \text{ } \underline{[(in \text{ order}) \text{ to } q]}]$ or $[p \text{ } [q\text{-}ye]]$, the rationale operator (underlined) encodes modal semantics where the goal worlds of the actor responsible for p (typically the agent) achieve q . Negative rationale clauses, i. e. structures such as $[p \text{ } \underline{[(in \text{ order}) \text{ to not } q]}]$, therefore, straightforwardly encode modal semantics where the goal worlds of the actor achieve $\neg q$ (or alternatively, their goal worlds avoid q).

The avertive function of precautioning morphemes such as the A’ingae *-sa’ne* ‘APPR,’ e. g. (2b), is semantically equivalent to negative rationale clauses. The in-case function, e. g. (3b), has been characterized by previous literature as one where the matrix clause aims at being prepared for the eventuality of the subordinate clause (e. g. Lovick, 2018). In contrast, we propose an

smaller subset thereof. In this introduction, we use the English *lest* primarily for expository purposes. The core of our analysis pertains to *-sa’ne* ‘APPR,’ a morpheme of A’ingae analogous in many ways to *lest*, for which all the relevant readings are robustly available. Thus, our account does not hinge on the judgements reported for (2-3).

² We refer to the A’ingae *-sa’ne* ‘APPR’ as *apprehensional*, as opposed to *precautioning*, because it has other functions which go beyond introducing precautioning clauses, but which fall squarely within the semantic domain of *apprehension* (as identified by Vuillermet, 2018 and others, building on Lichtenberk’s, 1995 work on To’abaita). For more on the other functions of *-sa’ne* ‘APPR’ (i. e. timitive, *fear*-complement, and apprehensive proper), see AnderBois and Dąbkowski (2021) and Dąbkowski and AnderBois (in press).

analysis where the in-case function is also fundamentally avertive, except what is averted is not the subordinate clause itself, but only an undesirable consequence of the subordinate clause.

Thus, we provide a unified precautioning semantics: In structures such as $[p [\textit{lest } q]]$ or $[p [q\textit{-sa'ne}]]$, the precautioning operator encodes modal semantics where goal worlds exclude a contextually salient or recoverable situation r which entails q ($r \Rightarrow q$). In the precautioning avertive use, one strives to avoid q itself ($r \Leftrightarrow q$). This captures the fact the negated rationale clauses are semantically identical to precautioning avertive clauses. In the precautioning in-case use, one strives to be prepared for q so as to avoid r , the undesirable ‘extension’ of q ($r \Rightarrow q$ but $q \not\Rightarrow r$).

Our account naturally captures three asymmetries found among rationale and precautioning adjuncts, making predictions with respect to the cross-linguistic inventories of operators in these semantic domains.

First, we predict that there will be grammaticized forms which have both precautioning functions (*lest*, *-sa'ne* ‘APPR’) as well as forms which only have the avertive function (*in order to not*, *-mb-e kan-ñe* ‘NEG-ADV AUX-INF’), but there will be not operators which only have the in-case function. We dub this prediction *precautioning semantics asymmetry*.

Second, we observe that whereas lexically negative precautioning operators like *lest* and *-sa'ne* ‘APPR’ have two distinct subfunctions (avertive and in-case), lexically positive/affirmative rationale operators like (*in order*) *to* and *-ye* INF have only the narrower function (i. e. there is no positive analog of the precautioning in-case use). We dub this observation *rationale polarity asymmetry*.

Third and last, we predict that morphologically transparent negations of rationale clauses will tend to be avertive only, while the full precautioning meaning (with both avertive and in-case uses) will tend to be encoded by morphologically unanalyzable operators. We dub this prediction *precautioning encoding asymmetry*. A’ingae straightforwardly illustrates each of these predictions, and they receive tentative support from the available typological data more broadly.

The rest of the paper is structured as follows: [Section 2](#) provides background on the A’ingae language and its speakers. [Section 3](#) describes the properties of rationale clauses introduced by the A’ingae infinitive *-ye* ‘INF’ and develops an formal account of rationale semantics. [Section 4](#) describes the properties of precautioning clauses introduced by the A’ingae apprehensional *-sa'ne* ‘APPR’ and develops an account of precautioning semantics. [Section 5](#) elaborates on the three semantic asymmetries captured by our

account and shows that its typological predictions are borne out by cross-linguistic data. [Section 6](#) concludes.

2 BACKGROUND

In this section, we provide background on A'ingae. [Section 2.1](#) introduces the language, its speakers, and summarizes previous literature. [Section 2.2](#) discusses basic morphosyntactic properties of the language. [Section 2.3](#) situates the infinitive *-ye* 'INF' and the apprehensional *-sa'ne* 'APPR' within the context of A'ingae subordinate clauses.

2.1 *A'ingae and its speakers*

A'ingae (or Cofán, iso 639-3: con) is an indigenous language isolate spoken by ca. 1,500 Cofán people in northeast Ecuador and southern Colombia at the interface of the Andes and the Amazon. The language is believed to be an isolate despite prior claims of affiliation with Barbacoan, Chibchan, and Chicham (AnderBois, Emlen, et al., [2019](#) and references therein).

The ancestral territory of the Cofán people spanned the Andean foothills of Ecuador and Colombia down into Amazonia. Since the 1960s, colonization and environmental damage from oil extraction have damaged and reduced the Cofán territory. Their language is endangered in Ecuador and severely endangered in Colombia, although it is still robustly learned by children in most Ecuadorian communities.

Notable works on the language includes a dictionary (Borman, [1976](#)), a bible translation, two written collections of traditionally oral narratives (Blaser and Chica Umenda, [2008](#); Borman and Criollo, [1990](#)), a corpus of approximately ten hours of annotated video (AnderBois and Silva, [2018](#)), a grammar sketch (Fischer and Hengeveld, [in press](#)), a phonetic sketch (Repetti-Ludlow et al., [2019](#)), and analyses of stress and suprasegmental glottalization (Dąbkowski, [2019a,b](#), [2021a,b](#)).

The data used in this paper come from elicitations with speakers from the communities of Zábalo, Dureno, and Sinangoé and a collection of naturalistic stories deposited as AnderBois and Silva ([2018](#)). The latter are cited with a SOAS identifier and a line number. All sources represent the Ecuadorian language variety.

2.2 Morphosyntactic profile

A'ingae is an agglutinating language. In matrix clauses, word order is largely free, whereas finite subordinate clauses are strictly verb-final. Functional categories are expressed with suffixes and enclitics; prefixes and proclitics are virtually absent.

Verbs are richly inflected, including categories such as voice, aspect, associated motion, number, modality, polarity, force, and others (4).³ For further discussion, see Dąbkowski (2019b) or Fischer and Hengeveld (in press).

- (4) *Kufe'jengi'fayambitsû.*
kufe -'je -ngi -'fa -ya -mbi -tsû
 play -IMPV -VEN -PLS -IRR -NEG =3
 “They_{3,PLS} will_{IRR} not_{NEG} come_{VEN} to be_{IMPV} playing.”

A'ingae is dependent-marking. Verbal dependents are marked for case in a nominative-accusative alignment. Case is expressed with clitics. Case clitics follow the noun phrase, within which word order is free (5). The language displays extensive pro-drop, with both subjects and objects omitted if contextually recoverable.

- (5) a. *Rande tsa'uma athe.* b. *Tsa'u randema athe.*
rande tsa'u=ma athe *tsa'u rande=ma athe*
 large house=ACC see house large=ACC see
 “(S/he) saw a large house.” “(S/he) saw a large house.”

There are five sentence-level clitics in A'ingae. They appear in the second position in the sentence and encode matrix subject features: first person =*ngi* ‘1,’ second person =*ki* ‘2,’ and third person =*tsû* ‘3,’ as well as reportative evidentiality =*te* ‘RPRT,’ and polar interrogatives =*ti* ‘INT.’ Second-position clitics are restricted to matrix clauses (6).

³ The following glossing abbreviations have been used: ablative case ‘ABL,’ absolutive case ‘ABS,’ accusative case (2) ‘ACC(2),’ additive focus ‘ADD,’ adjectivizer ‘ADJ,’ adverbializer ‘ADV,’ agent ‘A,’ anaphoric demonstrative ‘ANA,’ andative direction ‘AND,’ apprehensional ‘APPR,’ auxiliary verb ‘AUX,’ benefactive case ‘BEN,’ causative voice ‘CAUS,’ comparative ‘CMP,’ contrastive topic ‘CNTR,’ dative case ‘DAT,’ diminutive aspect ‘DMN,’ different subject ‘DS,’ elative case ‘ELAT,’ exclusive focus ‘EXCL,’ evitative case ‘EVIT,’ first person ‘1,’ frustrative ‘FRST,’ hesitative ‘HES,’ imperative mood (2/3) ‘IMP(2/3),’ imperfective aspect ‘IMPV,’ infinitive ‘INF,’ instrumental case ‘INST,’ irrealis mood ‘IRR,’ iterative aspect ‘ITER,’ locative case ‘LOC,’ manner demonstrative ‘THUS,’ negation ‘NEG,’ new topic ‘NEW,’ nominal subordinator ‘SBRD,’ passive voice ‘PASS,’ pejorative ‘PEJ,’ present tense ‘PRS,’ reduplication ‘RDP,’ same subject ‘SS,’ second person ‘2,’ subject plurality ‘PLS,’ third person ‘3,’ timitive case ‘TIM,’ plural number ‘PL,’ polar interrogative ‘INT,’ prohibitive mood ‘PRHB,’ pronoun singularity ‘SG,’ pronoun plurality ‘PL,’ prospective aspect ‘PRSP,’ purpose clause ‘PURP,’ venitive direction ‘VEN,’ verbal plurality ‘PLV,’ veridical mood ‘VER.’

- (6) *Ke(*ngi/*ki) kunda'chumangi pañambi.*
 [ke(*=ngi/*=ki) kunda-'chu]=ma=ngi paña-mbi
 2SG(*=1/*=2) tell-SBRD=ACC=1 understand-NEG
 "I didn't understand what you said."

2.3 Subordinate clauses

Subordinate clauses include verbal complements or adjuncts. Complement clauses can be introduced by a variety of means, including the nominalizing subordinator *-'chu* 'SBRD' (7a), the manner demonstrative/quotative complementizer *=khen* 'THUS' (7b), the attributive *-sû* 'ATTR' (7c), and the infinitive *-ye* 'INF' (7d).

(7) COMPLEMENT CLAUSES

- a. *Pañaña tise dûshû'ndekhû inajen'chuma.*
pañã-ña [tise dûshû-'ndekhû ina-jen-'chu]=ma
 understand-VER 3SG child-PL cry-IMPV-SBRD=ACC
 "He realized that his children were crying."
 (20170803_dyandyaccu_LC: 72)
- b. *Tsa tsandû injanña tetete fithikhen.*
tsa tsandû injan-ña [tetete fithi=khen]
 ANA husband think-VER Tetete kill=THUS
 "The husband thought that the Tetete killed her."
 (20170804_erision_cuento_FACQ: 30)
- c. *Panza'sû jayi.*
[panza-'sû] jayi
 hunt-ATTR go.PRSP
 "He's off to hunt."
- d. *In'jangi panzaye.*
in'jan=ngi [panza-ye]
 want=1 hunt-INF
 "I want to hunt."

The markers of clausal adjuncts include the new topic *=ta* 'NEW' and the locative *=ni* 'LOC' which introduce conditional antecedents (8a-b), the frustrative *=ma* 'FRST' introducing adversative clauses (8c), and the infinitive *-ye* 'INF' introducing rationale clauses (8d).

(8) ADJUNCT CLAUSES

- a. *Indi'tangi avûjatshiya.*
 [indi=ta]=ngi avûjatshi-ya
 catch=NEW=1 happy-IRR
 "If I catch (a fish), I will be happy."
- b. *Dû'shû junguesû ñambema in'jan'ni afeyangi tisenga.*
 [dû'shû junguesû ña=mbe=ma in'jan=ni] afe-ya=ngi tise=nga
 child what 1SG=BEN=ACC want=LOC give-IRR=1 3SG=DAT
 "If a child wants something of mine, I will give (it) to them."
- c. *Nama an'matsû tuya khipue'sû.*
 [na=ma an=ma]=tsû tuya khipue'sû
 meat=ACC eat=FRST=3 still hungry
 "He ate meat but was still hungry."
- d. *Sema'jengi ankhe'sûma a'mbiane.*
 sema-'jen=ngi [ankhe'sû=ma a'mbian-ne]
 work-IMPV=1 food=ACC have-INF
 "I am working (in order) to have food."⁴

Note that, similar to English infinitives, the A'ingae infinitive *-ye 'INF'* has both argument uses as irrealis or future complement clauses (7d), as well as clausal adjunct uses expressing a rationale (8d).⁵

The apprehensional *-sa'ne 'APPR'* is parallel to this, having argument uses as negative irrealis or future complement clauses (9a), as well as clausal adjunct uses expressing a negative rationale (9b) (see López-Couso, 2007 for similar claims regarding *lest* in earlier stages of English).

(9) a. APPREHENSIONAL COMPLEMENT

Anse'ngengi ñama feñasa'ne.
 anse'nge=ngi [ña=ma feña-sa'ne]
 be ashamed=1 1SG=ACC laugh-APPR

"I am afraid that he might laugh at me."

b. APPREHENSIONAL ADJUNCT

Sema'jengi dû'shûndekhû khiphue'sûsane.
 sema-'jen=ngi [dû'shû-ndekhû khiphue'sû-sane]
 work-IMPV=1 child-PL be hungry-APPR

"I am working lest my children be hungry."

⁴ The infinitive *-ye 'INF'* has the allomorph *-ñe 'INF'* when preceded by a nasal vowel.

⁵ The A'ingae infinitive *-ye 'INF'* does not seem to have other uses identified by Huettner (1989), although we leave it to future work to investigate more fully.

Our focus for the rest of the paper will be the clausal adjunct uses of the infinitive *-ye* ‘INF’ and the apprehensional *-sa’ne* ‘APPR.’ For more on the complement uses of *-sa’ne* ‘APPR,’ see Dąbkowski and AnderBois (*in press*), where we also present tests for distinguishing complement uses from adjunct uses. For an analysis of the DP adjunct use of *-sa’ne* ‘APPR’ (i. e. the timitive function), see AnderBois and Dąbkowski (2021) and a brief mention in Section 4.2.1.⁶

3 RATIONALE CLAUSES

In this section, we discuss *rationale* clauses, which in A’ingae are introduced by the infinitive morpheme *-ye* ‘INF.’ Section 3.1 situates A’ingae rationale clauses within a Huettner’s (1989) taxonomy of English infinitive adjuncts and reviews their various properties. Section 3.2 provides an analysis of rationale semantics. Section 3.3 builds on that analysis to capture negative rationale semantics.

3.1 Properties of rationale clauses

Work on English infinitives has uncovered a wide range of syntactically and semantically distinct adjunct infinitives (e.g. Faraci, 1974).⁷ While Huettner (1989) identifies as many as 7 types of adjunct infinitives in English, the one relevant to our study is the rationale clause (10).⁸

(10) *I gave Scruffy a biscuit [(in order) to keep him quiet.]*

⁶ In our analysis, the difference between the clausal adjunct uses of the apprehensional *-sa’ne* ‘APPR’ (i. e. the precautioning function) and the DP adjunct uses (i. e. the timitive function) is predominantly syntactic. Thus, we propose that the precautioning and the timitive share the same core apprehensional meaning (for more, see Section 4.2.1 and AnderBois and Dąbkowski, 2021).

Our analysis of the precautioning function may be extended to the matrix clausal uses of *-sa’ne* ‘APPR’ (i. e. the apprehensive proper function, not robustly attested in A’ingae) by viewing them as a kind of insubordination (Dąbkowski and AnderBois, *in press*).

The problem of unifying adjunct and complement uses of infinitives is famously tricky; unifying the adjunct and complement uses of *-sa’ne* ‘APPR’ is analogously so.

⁷ The compositional semantics of these as well as their relationship to argument uses of infinitives remains relatively unexplored (though see Portner, 1997).

⁸ The most similar to rationale clauses, such as (10), are purpose clauses (i).

(i) *I bought that dog [to bark at my in-laws.]*

Huettner (1989) distinguishes rationale clauses from purpose clauses based on the following considerations: Rationale clauses show optional subject control, allow for adding *in order* with no change in meaning, and can occur in a left-adjoined position, while purpose clauses show obligatory object control, do not allow for adding *in order*, and cannot occur in a left-adjoined position.

Huettner (1989) identifies a characteristic which sets rationale clauses apart from other infinitive adjuncts: While most infinitival adjuncts have an obligatory subject gap which is obligatorily controlled, rationale clauses have an optional gap, which is optionally controlled.

For example, the subject of the rationale clause in (11) can be overt. This shows that the subject gap is only optional. When the subject of the rationale clause is not overt, it is still distinct from the subject of the matrix clause: It is some unspecified third person, not Mary herself, who kept Mary from talking. This shows that control of the subject gap is also optional.

- (11) *Mary was foully murdered [in order (for them) to keep her from talking.]*
(adapted from Huettner, 1989, p. 126)

A'ingae rationale clauses are introduced by the infinitive *-ye* 'INF.' In (12), the subject of the rationale clause is explicit, which shows that the subject gap is optional in A'ingae as well.

- (12) *Sema'jengi ña dû'shûndekhû an'khesûma am'bian'faye.*
sema-'jen=ngi [ña dû'shû-ndekhû an'khesû=ma am'bian-'fa-ye]
work-IMPV=1 1SG child-PL food=ACC have-PLS-INF
"I am working in order for my children to have food."

Grosz (2014), Landau (2000), A. Williams (2015), A. Williams and J. Green (2017), and E. Williams (1985) observe that a matrix agent is not necessary for a rationale clause to be possible (13a). This observation holds of A'ingae as well (13b).

- (13) a. *The house is white [(in order) to meet the HOA rules.]*
b. *Na'en tsûtunitsû jin tsa'u ingi tsa'khûma iye.*
na'en tsûtu=ni=tsû jin tsa'u [ingi tsa'khû=ma i-ye]
upriver=LOC=3 exist house 1PL water=ACC bring-INF
"The house is upriver in order for us to fetch water."

In (13a), for example, the matrix copula *is* does not assign any θ -role, but it is still understood that some agent who painted the house white exists. In the A'ingae clause (13b), the person responsible for choosing the location for the house in is likewise implicit.

Other properties of A'ingae rationale clauses include free ordering with respect to the matrix clause, contribution to at-issue content, and syntactic incompatibility with negation *-mbi* 'NEG' which, in order to introduce a negative rationale clause, is circumvented via a periphrastic construction.

First, the rationale clause is ordered freely with respect to the matrix clause, which means that it can appear to its left (14a) or right (14b).

- (14) a. *Khuvima fi'thiye tise ja tsampini.*
 [khuvi=ma fi'thi-ye] tise ja tsampi=ni
 tapir=ACC kill-INF 3SG go forest-LOC
 "He went to the forest (in order) to kill a tapir."
 b. *Tise ja tsampini khuvima fi'thiye.*
 tise ja tsampi=ni [khuvi=ma fi'thi-ye]
 3SG go forest-LOC tapir=ACC kill-INF
 "He went to the forest (in order) to kill a tapir."

Second, the content of the rationale clause contributes to the main point of the sentence, or is *at-issue* in the sense of Simons et al. (2010) and related work. This is seen in that the rationale can be directly dissented to (15).

- (15) A: *Tisetatsû tsa'khûma guathian'jen iyufama fi'thiye.*
 tise=ta=tsû tsa'khû=ma guathian-'jen [iyufa=ma fi'thi-ye]
 3SG=NEW=3 water=ACC boil-IMPV WORM=ACC kill-INF
 "He is boiling water (in order) to kill germs."
 B: *Me'in, guathian'jentsû kûnapechama mandyiye.*
 me'in guathian-'jen=tsû [kûnapecha=ma mandyi-ye]
 no boil-IMPV=3 chicha=ACC squeeze-INF
 "No, he is boiling it for chicha."

Tonhauser (2012) further observes that at-issue content can be embedded. A'ingae rationale *ye*-clauses pass Tonhauser's (2012) diagnostic, (16).

- (16) *Iyufama fi'thiye tayu tsa'khûma gua'thian'chuni khase*
 [[iyufa=ma fi'thi-ye] tayu tsa'khû=ma gua'thian-'chu=ni] khase
 worm=ACC kill-INF already water=ACC boil-SBRD=LOC again
gua'thiañe injiengembi.
gua'thian-ñe injienge-mbi
 boil-INF be important-NEG
 "If the water's already been boiled (in order) to kill germs, there is no reason to boil it again."

Finally, the infinitive *-ye* 'INF' and negation *-mbi* 'NEG' are syntactically incompatible (17).

- (17) **Sema'jengi vanambiye.*
 *sema-'jen=ngi [vana-mbi-ye]
 work-IMPV=1 suffer-NEG-INF
 intended: "I'm working (in order) to not suffer."

To express negative rationale semantics, the incompatibility of *-ye* ‘INF’ and *-mbi* ‘NEG’ is circumvented via the periphrastic construction *-mb-e kan-ñe* ‘NEG-ADV AUX-INF,’ which adverbializes the negated verb with *-e* ‘ADV’ and introduces it as an argument of the dummy auxiliary *kan* ‘AUX’ (18).⁹

- (18) *Putaeñ’gumangi am’bian thesi ñama ambe kañe.*
putaeñ’gu=ma=ngi am’bian [thesi ña=ma an-mb-e kan-ñe]
 rifle=ACC=1 have jaguar 1=ACC eat-NEG-ADV AUX-INF
 “I have a rifle so that a jaguar does not eat me.”

3.2 Analysis of rationale semantics

In this section, we develop a semantics for rationale clauses in five steps, capturing the meaning of rationale operators such as the English (*in order*) *to* and A’ingae *-ye* ‘INF.’

STEP 1. As a jumping-off point for our semantics of rationale clauses, we adapt Nissenbaum’s (2005) proposal (19).

- (19) $\llbracket (in\ order)\ to\ have\ food_{adjunct} \rrbracket^w = \lambda e. \forall w' \text{ compatible}$
 with the goals relevant to e in $w : \text{PRO}$ has food in w'
 (adapted from Nissenbaum, 2005)

Nissenbaum (2005) formalizes the intuition that rationale clauses are event modifiers whose content expresses a goal of the event the rationale clause modifies.

STEP 2. We then make the rationale semantics compositional following Grosz’s (2014) reformulation of Nissenbaum’s (2005) proposal (20).

- (20) $\llbracket \text{MOD}_{\text{rationale clause}} \rrbracket^w = \lambda q. \lambda e. \forall w' \text{ compatible}$
 with the goals relevant to e in $w : q(w')$
 (adapted from Grosz, 2014)

Informally, Grosz (2014) analyzes rationale clauses as possessing a covert modal operator which combines with a proposition and yields an event modifier such that the proposition expresses goals relevant to the event.

STEP 3. Rather than event modifiers, we treat rationale clauses as propositional modifiers. Syntactically, this is motivated by Huettner’s (1989) claim that rationale clauses are TP adjuncts rather than VP adjuncts. Semantically,

⁹ As a lexical verb, *kan* means ‘look.’

it is motivated by Dretske's (1972), Grano's (2017), and A. Williams and J. Green's (2017) observations that rationale clauses are crucially intensional. We incorporate those insights by changing the semantics above so that rationale clauses are propositional modifiers, rather than event modifiers.

STEP 4. We recall that a matrix agent is not syntactically necessary for a rationale clause to be possible (13).

- (13) a. *The house is white [(in order) to meet the HOA rules.]*
 b. *Na'en tsûtunitsû jin tsa'u ingi tsa'khûma iye.*
na'en tsûtu=ni=tsû jin tsa'u [ingi tsa'khû=ma i-ye]
 upriver=LOC-3 exist house 1PL water=ACC bring-INF
 "The house is upriver in order for us to fetch water."

To accommodate this insight, we incorporate the rationale clause subject via Grano's (2017) revised version of Farkas's (1988) RESP-relation (contra Whelpton, 2002) (21).

- (21) $\text{RESP}(a, p) \approx a$ intentionally brings it about that p

The RESP-relation holds between an individual and a state of affairs which the individual intentionally brings about. The RESP-relation thus formalizes the insight that the notion of intentionally bringing about a state of affairs is distinct from the thematic role of agent. For further motivation and discussion, see Farkas (1988).

STEP 5. Finally, we bring together the insights of Steps 1-4 and propose that the existence of an impetus bearing the RESP-relation to the state of affairs expressed by the matrix clause is a presupposition of the rationale clause itself rather than a part of the matrix clause denotation. For example, the semantics of the matrix clause in (13a) does not entail the existence of an individual responsible for the house being white.¹⁰ Thus, we arrive at the semantics given in (22).

- (22) $\llbracket (\text{in order}) \text{ to} \rrbracket = \lambda q_{st}. \lambda p_{st}. \lambda w. [p(w)$
 $\text{and } \forall w' \in \text{GOAL}_{i,p}(w) : q(w')]$
 presupposition: $\exists i.$ such that $\text{RESP}(i, p)$

¹⁰ In conjunction with world knowledge, *the house is white* will most commonly be understood as a consequence of someone painting it so. However, the house might be white because someone painted it beige and the color faded out, or because it is covered in volcanic ash. Thus, the existence of an agent painting the house white cannot be a part of the semantic denotation of *the house is white* any more than the existence of an agent painting the grass green is a part of the semantic denotation of *the grass is green*.

Our proposal amounts to identifying the rationale operator, such as the English (*in order*) *to*, with a function whose input is a proposition q and output a propositional modifier of p such that the modifier's input proposition p is brought about with the intent of achieve the p -relative goals of the impetus i responsible for the matrix clause (notated $\text{GOAL}_{i,p}$).

The impetus i responsible for the matrix clause is usually the agent/subject of the clause. The identity between the impetus i and the agent of the matrix clause, however, is not required in order to allow for cases such as (13). We assume that the impetus is anything that can determine a teleological structure, i. e. anything that can have or generate goals. Typically, the impetus will be agentive human, but not necessarily so (see below for cases lacking an explicit or implicit agent).

The p -relative goals of of the impetus i (notated $\text{GOAL}_{i,p}$) are these are the goals that i has in mind when bringing about the proposition p . This formulation captures the observation that while an individual might have many different goals, not all of their goals are relevant at a certain moment in bringing about the situation p .

While we have used English as the object language so far, the semantics is equally applicable to A'ingae adjunct infinitives, as seen in (23), yielding a top-level meaning as in (24).

- (23) *Sema'jengi ankhe'sûma am'biañe.*
sema-'jen=ngi [ankhe'sû=ma am'bian-ñe]
 work-IMPV=1 food=ACC have-INF
 "I am working (in order) to have food."
- (24) $\llbracket (23) \rrbracket = \lambda w$. the speaker is working in w and
 $\forall w' [w' \in \text{GOAL}_{i,p}(w) : \text{the speaker has food in } w']$
 where p = the speaker is working
 presupposition: $\exists i$. such that $\text{RESP}(i,$
 λw . the speaker is working in $w)$

Informally then, the semantics of (23) says that the speaker is working and that their goal worlds for which they are working are ones in which they have food.

Finally, we consider an empirical complication. There are cases of rationale clauses seemingly lacking an explicit or implicit agent (see E. Williams, 1974 for a discussion). They occur in English (25a) as well as A'ingae (25b).

- (25) a. *Fruits have seeds [(in order) to reproduce.]*

- b. *Teta'chundekhûtsû am'bian'fa chunma tsa'ye shu'yuye.*
teta'chu=ndekhû=tsû am'bian-'fa chun=ma [tsa='ye shu'yu-ye]
 fruit=PL=3 have=PLS seed=ACC ANA=ELAT sprout-INF
 “Fruits have seeds (in order) to reproduce.”

Previous proposals by Grano (2017), Grosz (2014), and E. Williams (1974) observe that evolution here is goal-oriented in a way similar to human goals and that natural languages seem to treat the two on par. We tentatively adopt their view, while conceding that it is ultimately worth considering whether cases such as (25) necessitate a formalism for agentless goal structures.^{11, 12}

3.3 Analysis of negative rationale semantics

In this section, we extend our analysis to negative rationale clauses. In English, negative rationale clauses arise in a fully compositional manner from a combination of a rationale operator, such as *(in order) to*, and negation *not*, i. e. *(in order) to not*.

To express negative rationale semantics in A'ingae, the periphrastic construction *-mb-e kan-ñe* ‘NEG-ADV AUX-INF’ is used. This is presumably because as

- 11 Manzini (1983) observes that unaccusative matrix verbs are not compatible with rationale clauses (iia), while corresponding passives, which are semantically similar, are (iib).

- (ii) a. #*The boat sank [(in order) to collect the insurance money.]*
 b. *The boat was sunk [(in order) to collect the insurance money.]*

To explain (ii), Roeper (1987) invokes argument structural differences. *Sank* is an unaccusative verb, and therefore does not have an agent at any level of representation, whereas *was sunk* is a passivized transitive verb, with a slot for an agent at the relevant level of syntax. However, Roeper’s (1987) syntactic approach undergenerates with respect to (13) and (25), which do not have agents at any level of syntactic structure.

Instead, following E. Williams (1985), we speculate that the unavailability of (iia) is due to pragmatic competition between pairs of causative/inchoative alternants. Observe that the implicature of the unaccusative *sink*’s agentlessness can be ameliorated given a rich enough context, consequently improving its compatibility with a rationale adjunct (iii).

- (iii) A: *They orchestrated every detail of this scheme so masterfully. Every step was perfectly executed. But one piece still doesn’t fit the puzzle: Why did they need to have the ship sink?*
 B: ?*The ship sank for them to collect the insurance money.*
 A: *Ingenious!*

- 12 Recent work by A. Williams (2015) and A. Williams and J. Green (2017) suggests an alternative analysis, where the adjunct clause gives a teleological explanation of the matrix clause directly, without a recourse to an individual impetus (see also Dretske, 1972 for related discussion). Under this construal, the intentions, purposes, or desires of individuals are understood as just one way that teleological explanations may be materially instantiated. While such an approach is potentially quite promising, we set it aside here as it seems to raise a number of thorny teleological issues beyond the scope of this paper.

noted above, the infinitive *-ye* ‘INF’ (which serves as the rationale operator) is morphologically incompatible with negation *-mbi* ‘NEG.’ We make the simplifying assumption here that *-e* ‘ADV’ and *kan* ‘AUX’ are semantically empty, inserted for syntactic reasons. Despite these complications, it is nevertheless clear the A’ingae negative rationale operator retains a high degree of transparency, with exponents of negation (*-mbi* ‘NEG’) and rationale semantics (*-ye* ‘INF’) both unambiguously present.

In both English and A’ingae, the negative rationale clauses are simply rationale clauses combined with negation. We then provide semantics minimally different from (22), where it is $\neg q$, rather than q , that holds in the goal worlds of the actor responsible for the matrix clause (26).

$$(26) \quad \llbracket -mbe \text{ kañe } \text{“in order not to”} \rrbracket = \\ \lambda q_{st} . \lambda p_{st} . \lambda w . [p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : \neg q(w')] \\ \text{presupposition: } \exists i . \text{ such that } \text{RESP}(i, p)$$

Applying our negative rationale semantics of (26) to (18), repeated below, yields a top-level denotation given in (27).

$$(18) \quad \text{Putaeñ'gumangi am'bian thesi ñama ambe kañe.} \\ \text{putaeñ'gu=ma=ngi am'bian [thesi ña=ma an-mb-e kan-ñe]} \\ \text{rifle=ACC=1 have jaguar 1=ACC eat-NEG-ADV AUX-INF} \\ \text{“I have a rifle so that a jaguar does not eat me.”}$$

$$(27) \quad \llbracket (18) \rrbracket = \lambda w . \text{ the speaker has a rifle in } w \text{ and} \\ \forall w' [w' \in \text{GOAL}_{i,p}(w) : \text{ a jaguar does not eat the speaker in } w'] \\ \text{where } p = \text{ the speaker has a rifle} \\ \text{presupposition: } \exists i . \text{ such that } \text{RESP}(i, \\ \lambda w . \text{ the speaker has a rifle in } w)$$

In prose, the formula above says that the speaker has a rifle and that in the goals of the actor i responsible for the having the rifle (here again, the speaker), a jaguar does not eat the speaker.

4 PRECAUTIONING CLAUSES

In this section, we discuss *precautioning* clauses, which in A’ingae are introduced by the apprehensional *-sa'ne* ‘APPR.’ Section 4.1 describes A’ingae precautioning clauses and reviews their various properties. Section 4.2 extends our analysis of negative rationale semantics to precautioning clauses.

4.1 Properties of precautioning clauses

The most common function of the A'ingae apprehensional *-sa'ne* 'APPR' is the precautioning function. Within the precautioning function, Lichtenberk (1995) further distinguishes two subfunctions (or uses): *avertive* and *in-case*. The avertive use arises when the precautioning clause introduces an undesirable situation which is to be averted by the matrix clause. The in-case use arises when the precautioning clause expresses a situation whose undesirable consequence is to be avoided.

In English, the somewhat archaic *lest* can have both the avertive and the in-case use (28), but a negative rationale clause introduced with e. g. *to not* can only express the former (29).

- (28) a. I took a rifle [lest a jaguar kill me.]
 b. I took a rifle [lest I see a jaguar.]
- (29) a. I took a rifle [for a jaguar to not kill me.]
 b. #I took a rifle [for me to not see a jaguar.]

In A'ingae, both avertive and in-case clauses can be introduced with the apprehensional *-sa'ne* 'APPR.' Section 4.1.1 compares precautioning clauses with rationale clauses. Section 4.1.2 discusses the properties of precautioning avertive uses, and Section 4.1.3—of precautioning in-cases uses.

4.1.1 Precautioning vs. rationale clauses

Precautioning clauses share many similarities with rationale clauses: Both are TP-level adjuncts and express the intention behind the matrix clause, except that rationale clauses introduce an eventually to be achieved, while precautioning clauses—one to be avoided. In the rest of this section, we focus on the syntactic similarities between the precautioning and rationale clauses. In Section 4.2, we will propose an account of precautioning semantics, which builds on our account for negative rationale clauses.

Like rationale clauses, precautioning clauses have an optional and optionally controlled subject gap. In (30), the subject of the precautioning clause differs from the subject of the matrix clause, whether overt or not.

- (30) *Tsandietsû fithiye (na'sûndekhû) iñajampaña'fasa'ne.*
 tsandie=tsû fithi-ye [(na'sû-ndekhû) iñajampaña-'fa-sa'ne]
 man=3 kill-PASS authority-PL ask questions-PLS-APPR
 "A man was murdered lest (the authorities) ask him questions."

Word order-wise, the precautioning *sa'ne*-clause can appear before (31a) or after (31b) the matrix clause.

- (31) a. *Ña chama iyikha'yesa'nengi shu'khaen.*
 [ña chan=ma iyikha'ye-sa'ne]=ngi shu'khaen
 1SG mother=ACC annoy-APPR=1 cook
 "I cooked so that my mother does not get mad."
 b. *Ka'shingi apishu'thuma chan ñama iyû'ûsa'ne.*
 ka'shi=ngi apishu'thu=ma [chan ña=ma iyû'û-sa'ne]
 wash=1 dish=ACC mother 1SG=ACC scold-APPR
 "I washed the dishes so that my mother does not scold me."

The content of the precautioning *-sa'ne*-clauses is at-issue, demonstrated by the fact that they can be directly dissented to (32) and embedded (33).

- (32) A: *Tisetatsû tsa'khûma guathian'jen iyufa jinsa'ne.*
 tise=ta=tsû tsa'khû=ma guathian-'jen [iyufa jin-sa'ne]
 3SG=NEW=3 water=ACC boil-IMPV worm be-APPR
 "He is boiling water in case there are germs."
 B: *Me'in, guathian'jentsû kûnapechama mandyiye.*
 me'in guathian-'jen=tsû [kûnapecha=ma mandyi-ye]
 no boil-IMPV=3 chicha=ACC squeeze-INF
 "No, he is boiling it for chicha."
 (33) *Iyufa jinsane tayu tsa'khûma gua'thian'chuni khase*
 [[iyufa jin-sane] tayu tsa'khû=ma gua'thian-'chu=ni] khase
 worm be-APPR already water=ACC boil-SBRD=LOC again
gua'thiañe injiengembi.
gua'thian-ñe injienge-mbi
 boil-INF be important-NEG
 "If the water's already been boiled for germs, there is no reason to boil it again."

Lastly, unlike the infinitive *-ye 'INF'*, the apprehensional *-sa'ne 'APPR'* is compatible with negation *-mbi 'NEG'* (34).

- (34) *Japa simbanga ja khuviima panzambisa'ne.*
 ja-pa simba-nga-ja [khuvi=ma panza-mbi-sa'ne]
 go-ss fish-AND-IMP tapir-ACC hunt-NEG-APPR
 "Go fish in case (he) does not hunt tapir."

4.1.2 *Precautioning avertive use*

In the precautioning avertive use, *-sa'ne* 'APPR' introduces a subordinate clause describing a negative potential outcome to be avoided (35).

- (35) a. *Ka'shingi apishu'thuma chan ñama iyû'ûsa'ne.*
ka'shi=ngi apishu'thu=ma [chan ña=ma iyû'û-sa'ne]
 wash=1 dishes=ACC mother 1SG=ACC scold-APPR
 "I washed the dishes so that my mother does not scold me."
- b. *Upûingi cha'ndi'sûsa'ne.*
upûi=ngi [cha'ndi'sû-sa'ne]
 cover up=1 be cold-APPR
 "I covered myself so that I do not get cold."
- c. *Kuenzaja yajema kû'i ûnjin tûisa'ne.*
kuenza=ja yaje=ma kû'i [ûnjin tûi-sa'ne]
 old=CNTR ayahuasca=ACC drink rain splash=APPR
 "The elder drank ayahuasca for rain to not come."

In (35a), the speaker washes the dishes to avoid a scolding. In (35b), the speaker covers himself up to avoid getting cold. In (35c), a ritual action is performed to avert rain. The avertive readings are available with agentive (35a), non-agentive (35b), and weather verbs (35c).

The undesirability associated with the precautioning avertive *-sa'ne*-clauses is part of their semantics, as opposed to just being an implicature.¹³ The apprehensional *-sa'ne* 'APPR' can appear with verbs of negative (36a), neutral (36b), or positive emotional connotation (36c), although the situation of the avertive clause is always presented as undesirable in the eyes of the subject.

- (36) a. *Ña chama iyikha'yesa'nengi shu'khaen.*
[ña chan=ma iyikha'ye-sa'ne]=ngi shu'khaen
 1SG mother=ACC annoy-APPR=1 cook
 "I cooked so that my mother does not get mad."
- b. *Jûnde ja tise faengae jisa'ne.*
jûnde ja [tise faengae ji-sa'ne]
 soon go 3SG together come-APPR
 "I hurried up to leave so that he does not come with us."

¹³ Thus, our account differs from Phillips's (2021), who proposes a use-conditional account of undesirability in largely matrix-clausal (apprehensive proper) uses, where the judgement of undesirability is that of the speaker, not the subject. In A'ingae, the precautioning meaning is at-issue, which we show in Section 4.1.1.

- c. *Pûshesûtsû tsandie aya'fama phikhu feñasa'ne.*
pûshesû=tsû tsandie aya'fa=ma phikhu [feña-sa'ne]
 woman=3 man mouth=ACC cover laugh-APPR
 “She covered his mouth so that he does not laugh.”

4.1.3 Precautioning in-case use

In the precautioning in-case use, *-sa'ne* ‘APPR’ introduces a subordinate clause which expresses a situation for which to be prepared or whose undesirable consequence is to be avoided (37). While often discussed in previous literature in these terms, we develop below the intuition these in-case uses too can be considered as avertive in an extended sense. Setting aside the semantics for the moment, we note that in-case uses of *-sa'ne* ‘APPR’ are formally identical to the avertive uses.

- (37) a. *Putæn'guma am'bian tetetendekhû ji'fasa'ne.*
putæn'gu=ma am'bian [tetete-ndekhû ji-'fa-sa'ne]
 rifle=ACC have Tetete-PL COME-PLS-APPR
 “I got my rifle ready in case the Tetete come.”
- b. *Vasûingi tsûi iyu khûisa'ne.*
vasûi=ngi tsûi [iyu khûi-sa'ne]
 slowly=1 walk snake lie-APPR
 “I walked slowly in case there are snakes.”
- c. *Chaketamangi undikhû ûnjin tûisa'ne.*
chaketa=ma=ngi undikhû [ûnjin tûi-sa'ne]
 jacket=ACC=1 don rain splash-APPR
 “I put on a jacket in case it rains.”

In the in-case uses, however, it is an undesirable consequence of the *sa'ne*-clause that is to be avoided—not the situation described itself. For example, getting one’s rifle ready will not prevent the Tetete from coming, but might avert the negative consequence of being unprepared for their potential attack (37a). Walking slowly will not make snakes disappear, but it might help avoid stepping on one (37b). Putting on a jacket will not stop the rain, but it will prevent one from getting wet (37c). The precautioning in-case readings are available with agentive (37a), non-agentive (37b), and weather verbs (37c).

The precautioning in-case clauses may, like avertives, appear with verbs of negative (38a), neutral (38b), or positive (38c) emotional connotation.

- (38) a. *Seje'pamangi tsun'jen ña dû'shû iyunga tseyesa'ne.*
seje'pa=ma=ngi tsun-'jen [ña dû'shû iyu=nga tsei-ye-sa'ne]
 medicine=ACC=1 do-IMPV 1SG child snake=DAT bite-PASS-APPR
 "I'm preparing medicine in case my son gets bitten by a snake."
- b. *Jayimbingi fiestanga tsetse'pa jinsa'ne.*
jayi-mbi=ngi fiesta=nga [tsetse'pa jin-sa'ne]
 GO.PRSP-NEG=1 party=DAT alcohol be-APPR
 "I'm not going to the party in case there is alcohol."
- c. *Tsa'khûmangi guathian'jen ña yaya khuvi ma isa'ne.*
tsa'khû=ma=ngi guathian-'jen [ña yaya khuvi=ma i-sa'ne]
 water=ACC=1 boil-IMPV 1SG father tapir=ACC bring-APPR
 "I am boiling water in case my father brings a tapir."

When the situation of the precautioning clause is unambiguously positive, only the in-case readings, in which a larger situation is deemed undesirable, are pragmatically viable. In (38c), for example, the speaker's father bringing home a tapir is clearly desirable in a hunter-gatherer society, but having a tapir home without any water ready to boil it is to be avoided.

Despite the similarities to the avertive use, typological literature (following Lichtenberk, 1995) typically regards the precautioning in-case use as distinct from the precautioning avertive use.¹⁴ One argument given is the existence of forms like the periphrastic *-mb-e kan-ñe* 'NEG-ADV AUX-INF' in A'ingae, which only allows for the avertive use (39). Here, we opt instead for a unified semantics of both precautioning uses for *-sa'ne* 'APPR.' In Section 5, we consider extensively the relationship between the two in A'ingae and cross-linguistically.

- (39) a. *Putael'gumangi am'bian thesi ñama ambe kañe.*
putael'gu=ma=ngi am'bian [thesi ña=ma an-mb-e kan-ñe]
 rifle=ACC=1 have jaguar 1=ACC eat-NEG-ADV AUX-INF
 "I have a rifle so that a jaguar does not eat me."
- b. #*Putael'gumangi am'bian thesima kachi mbe kañe.*
 #*putael'gu=ma=ngi am'bian [thesi=ma kachi-mb-e kan-ñe]*
 rifle=ACC=1 have jaguar=ACC meet-NEG-ADV AUX-INF
 intended: "I have a rifle in case I encounter a jaguar."
 actual: "I have a rifle so that I do not encounter a jaguar."

Having a rifle might prevent being eaten by a jaguar, so *-mb-e kan-ñe* 'NEG-ADV AUX-INF' can be felicitously used in (39a). A rifle will not, however, make

¹⁴ Although Lichtenberk (1995) considers unifying the semantics of the avertive and the in-case uses, he ultimately rejects that idea in favor of a polysemy analysis.

meeting a jaguar any less likely. Thus, (39b) has only the pragmatically aberrant reading.

4.2 Analysis of precautioning semantics

In this section we extend the semantics for negative rationale clauses in Section 3.3 to capture precautioning clauses. We begin by observing that the avertive use of precautioning clauses has the same exact meaning as negative rationale clauses. Thus, let us suppose—for now—that *-sa'ne* 'APPR' has the same meaning as *-mb-e kan-ñe* 'NEG-ADV AUX-INF.' Below, we take the negative rationale semantics as our starting point and restate the formula of (26) in (40), preliminarily identifying the *-sa'ne* 'APPR' with *-mb-e kan-ñe* 'NEG-ADV AUX-INF.' We will soon revise this, providing one meaning for *-sa'ne* 'APPR's' avertive and in-case uses.

$$(40) \quad \llbracket -mbe\ ka\tilde{n}e \text{ "in order not to"} \rrbracket = \llbracket -sa'ne \text{ (preliminary)} \rrbracket = \\ \lambda q_{st}.\lambda p_{st}.\lambda w.[p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : \neg q(w')] \\ \text{presupposition: } \exists i. \text{ such that } \text{RESP}(i, p)$$

Informally, the avertive *-sa'ne* 'APPR' takes a proposition q as its input and outputs a propositional modifier such that the relevant goal worlds of the impetus i (typically the matrix subject) are ones where q does not hold. Applying this semantics to (41), we arrive at the meaning given in (42).

$$(41) \quad \text{Sema'jengi } d\hat{u}'sh\hat{u}ndekh\hat{u} \text{ khiphue's}\hat{u}sa'ne. \\ \text{sema-'jen=ngi } [d\hat{u}'sh\hat{u}ndekh\hat{u} \text{ khiphue's}\hat{u}\text{-}sa'ne] \\ \text{work-IMPV=1 child-PL be hungry-APPR} \\ \text{"I am working lest my children be hungry."}$$

$$(42) \quad \begin{aligned} \text{a. } \llbracket \text{sema-'jen=ngi} \rrbracket &= \lambda w. \text{ the speaker is working in } w \\ \text{b. } \llbracket d\hat{u}'sh\hat{u}ndekh\hat{u} \text{ khiphue's}\hat{u} \rrbracket &= \lambda w. \text{ the children go hungry in } w \\ \text{c. } \llbracket d\hat{u}'sh\hat{u}ndekh\hat{u} \text{ khiphue's}\hat{u}\text{-}sa'ne \rrbracket &= \lambda p_{st}.\lambda w.[p(w) \text{ and} \\ &\quad \forall w' \in \text{GOAL}_{i,p}(w) : \text{the children do not go hungry in } w'] \\ &\text{presupposition: } \exists i. \text{ such that } \text{RESP}(i, p) \\ \text{d. } \llbracket (41) \rrbracket &= \lambda w. \text{ the speaker is working in } w \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : \\ &\quad \text{the speaker's children do not go hungry in } w' \\ &\text{where } p = \text{the speaker is working} \\ &\text{presupposition: } \exists i. \text{ such that } \text{RESP}(i, \\ &\quad \lambda w. \text{ the speaker is working in } w) \end{aligned}$$

The matrix clause in (42a) says that the speaker is working. The argument of *-sa'ne* in (42b) says that the children go hungry. The subordinate *-sa'ne*-clause in (42c) is a propositional modifier which takes in a matrix clause

and says that it is the goal of the impetus responsible for the matrix clause's proposition that the children do not go hungry. Finally, (42d) says that the speaker is working and the goal of the impetus responsible for the speaker working is that their children are not hungry.

In other words, the situation described by the avertive *-sa'ne*-clause does not obtain in the worlds where the presupposed impetus's *p*-relevant goals are met. As is usually the case, the RESP-presupposition is met by the agent of the matrix clause, i. e. the speaker since the subject is first person.

In our account, the semantics for precautioning avertive *sa'ne*-clauses differs from the semantics for rationale *ye*-clauses only in polarity. This predicts that, just like rationale clauses, the avertive clauses should allow implicit agents (43) and should be able appear with agentless situation if forces of nature can be construed as agents (44). Both predictions are borne out.

- (43) *Tsa'utsû sefatshi na'en pikhusa'ne.*
tsa'u=tsû sefatshi [na'en pikhu-sa'ne]
 house=3 raised river cover-APPR
 "The house is raised lest the river flood it."
- (44) *Kini'jen tsû sejepapa angiyesa'ne.*
kini'jen tsû sejepapa [angiye-sa'ne]
 plant 3 poisonous eat.PASS-APPR
 "The plant is poisonous lest it get eaten (by animals)."

So far, we have proposed an apprehensional semantics based on the semantics of rationale clauses. This semantics is suitable for precautioning avertive uses, but does not work for in-case uses. Consider (38c) again.

- (38c) *Tsa'khûmangi guathian'jen ña yaya khuvima isa'ne.*
tsa'khû=ma=ngi guathian-'jen [ña yaya khuvi=ma i-sa'ne]
 water=ACC=1 boil-IMPV 1SG father tapir=ACC bring-APPR
 "I am boiling water in case my father brings a tapir."

Here, the subject's goal worlds are not limited to those in which the subject's father fails to bring home a tapir. Indeed, the father bringing home a tapir is desirable situation without any negative emotional valence. Nevertheless, there is intuitively another "larger" situation that the subject wants to avoid. For (38c), it is the situation of being unprepared to cook the tapir when father brings one home.

To account for in-case uses like (38c), we revise the semantics of (40) as follows, giving a unified account of the avertive and in-case uses (45).

- (45) $\llbracket \text{-sa'ne "lest"} \rrbracket = \lambda q_{st}. \lambda p_{st}. \lambda w. [p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : r \Rightarrow q \text{ and } \neg r(w')]$
 where r is a contextually inferrable proposition
 presupposition: $\exists i.$ such that $\text{RESP}(i, p)$

Across both uses, the precautioning *-sa'ne* 'APPR' is an operator which takes as input a proposition q and outputs a propositional modifier of p such that i 's p -relevant goal worlds are ones where the inferrable proposition r —which entails the stated proposition q —does not hold.

Under this unified semantics of precautioning uses, avertive and in-case uses fall out as its special cases. When the state of affair to be avoided is identical to the one described, the precautioning avertive use emerges (46a). When the state of affairs to be avoided is “included,” but not identical with, the stated one, the precautioning in-case use emerges (46b).

- (46) a. avertive uses of *-sa'ne* 'APPR': $r \Leftrightarrow q$
 b. in-case uses of *-sa'ne* 'APPR': $r \Rightarrow q$ but $q \not\Rightarrow r$

Whether the precautioning *-sa'ne* 'APPR' receives the avertive or the in-case interpretation depends on a number of pragmatic factors, including considerations such as whether q is plausibly under i 's control (e. g. rain is not controllable by most potential i other than shamans), whether q is itself likely to be regarded negatively by i (i. e. i is generally unlikely to avoid a positive state of affairs), and what outcomes would engaging in p plausibly be intended to avert (e. g. what tapir-related outcomes boiling water could be intended to avert).

While the semantics itself leaves r quite underspecified, these various pragmatic factors serve to constrain substantially the potential values for r in a given context. Thus, sentences where the matrix clause and the precautioning clause cannot be intelligibly related are infelicitous. As pointed out by an anonymous reviewer, this includes cases where the precautioning clause is trivially true (47).

- (47) #*Upathû tsû ciruelama tsa'khû tshipatshisa'ne.*
 #*upathû tsû ciruela=ma [tsa'khû tshipatshi-sa'ne]*
 pick 3 plum=ACC water wet-APPR
 “He picked the plums so that water is not wet.”

4.2.1 Alternative analyses

This section considers two alternative analyses to (45). The first alternative involves replacing the contextual r with a conjunction of q and $\neg p$. The

second alternative involves existential quantification over the contextual r . Ultimately, both alternatives are considered and rejected.

THE q -AND-NOT- p ANALYSIS. The first alternative analysis¹⁵ involves replacing the contextual r with a conjunction of q and $\neg p$ (48). Since we argue that our proposal is preferable to the alternative in (48), we mark the proposed alternative with the asterisk *.

$$(48) \quad * \llbracket \text{sa'ne "lest"} \rrbracket = \lambda q_{st}. \lambda p_{st}. \lambda w. [p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : \neg(q \wedge \neg p)(w')] \\ \text{presupposition: } \exists i. \text{ such that } \text{RESP}(i, p) \quad (\text{REJECTED ALTERNATIVE})$$

When the denotation in (48) is applied to (38c), the resulting proposition is that the speaker is boiling water in order to avoid a situation where their father brings a tapir and the speaker is not boiling water. This differs from our denotation in (45), which yields the proposition that the speaker is boiling water in order to avoid a larger situation where the speaker's father brings a tapir, but does not explicitly state what that situation is.

We choose to formalize the in-case semantics with a contextual r (45) rather than $q \wedge \neg p$ (48) for three reasons. First, formalizing the in-case semantics with a contextual r captures the intuition that oftentimes performing the action described by p may be one of many ways to achieve i 's goal. This is to say, if the impetus i had not brought it about that p , they would have done something else to avoid the undesirable outcome. In the case of (38c), if the speaker had not been boiling water to boil the tapir meat, they might have chosen to preserve the meat in some other way, such as starting a fire to smoke it.

Second, the recourse to a contextually inferrable situation r is independently needed to account for the *timitive* uses of the the A'ingae sa'ne 'APPR.' In its timitive function, sa'ne 'APPR' functions as an adposition or a case marker introducing an entity which is feared or to be avoided. Although a detailed discussion of the timitive is beyond the scope of this paper (see AnderBois and Dąbkowski, 2021 for further discussion), we observe that the timitive use requires recovering a salient situation which involves the timitive-marked entity. In (49), the speaker is sitting in a hammock in order to avoid a contextually recoverable situation that involves a jaguar (i. e. the situation of being eaten by said jaguar).

¹⁵ Thanks to Pauline Jacobson, Lucas Champollion, and others for bringing this alternative to our attention and thanks to an anonymous reviewer for a detailed discussion thereof.

- (49) *Anae'manangi phi thesisa'ne.*
anae'ma=ni=ngi phi [thesi=sa'ne]
 hammock=LOC=1 sit jaguar=APPR
 "I'm in a hammock for fear of a jaguar."

Modelling precautioning semantics with a contextually recoverable situation r allows for a straightforward adaptation of the current analysis to the timitive uses (50). Here, the timitive semantics differs from the precautioning semantics only in that r involves entity x , instead of entailing proposition q .

- (50) $\llbracket \text{sa'ne "for fear of"} \rrbracket = \lambda x_e. \lambda p_{st}. \lambda w. [p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : r \text{ involves } x \text{ in } w' \text{ and } \neg r(w')]$
 where r is a contextually inferrable proposition
 presupposition: $\exists i.$ such that $\text{RESP}(i, p)$

Under our analysis in (45), the difference between precautioning and timitive uses is essentially syntactic—the former function pertains to entire clauses, while the latter to noun phrases, but the semantics of the two are almost identical. If one were to model the precautioning semantics with a conjunction of q and $\neg p$, however, the similarity between the two uses would not be captured.

Third, in quantified sentences, the avoided situation r can covary with the impetus i . In (51a), the situation r avoided by Alfredo is drinking too much when he is with his brother. In (51b), the situation r avoided by Beto is seeing his brother get drunk. Thus, the situations avoided by Alfredo and Beto are different. Even so, (51c) can be felicitously uttered when the contexts of (51a) and (51b) hold.

- (51) a. CONTEXT: Alfredo drinks too much when he is with his brother.
Alfredo tsû ja khun'dyûnga tisûyi kûi'khesû jinsa'ne.
Alfredo tsû ja khun'dyû=nga tisû=yi [kûi'khesû jin-sa'ne]
 Alfredo 3 go celebration=DAT REFL=EXCL beverage exist-APPR
 "Alfredo went to the party alone in case there was alcohol."
- b. CONTEXT: Beto's brother is an alcoholic, so Beto does not want to go to the party with him because he's afraid that he'd get drunk.
Beto tsû ja khun'dyûnga tisûyi kûi'khesû jinsa'ne.
Beto tsû ja khun'dyû=nga tisû=yi [kûi'khesû jin-sa'ne]
 Beto 3 go celebration=DAT REFL=EXCL beverage exist-APPR
 "Beto went to the party alone in case there was alcohol."

c. CONTEXT as in (51a) and (51b)

{Tise'pa, Puiyikhu} tsû ja'fa khun'dyûnga tisû'payi
 {tise'pa, puiyikhu} tsû ja'fa khun'dyû=nga tisû'pa=yi
 3PL everyone 3 GO-PLS celebration=DAT REFL.PL=EXCL
 kûi'khesû jinsa'ne.
 [kûi'khesû jin-sa'ne]
 beverage exist-APPR

"{They, Everyone} went to the party alone in case there was alcohol."

The felicity of (51c) is expected under our account (45), where the avoided situation r can vary with the impetus i . On the other hand, the proposal in (48) predicts that the avoided situation is that of there being alcohol at the party and it not being the case that both Alfredo and Beto go alone. This is incorrect since the motivation of neither agent has to do with the other person. Rather, their motivations are independent and specific to the agent.

THE EXISTENTIALLY-QUANTIFIED- r ANALYSIS. A reviewer also suggests another alternative, where the situation r is not contextually determined, but rather existentially quantified (52). Since we argue that our proposal is preferable to the alternative in (52), we mark the proposed alternative with the asterisk *.

$$(52) * \llbracket \text{sa'ne "lest"} \rrbracket = \lambda q_{st} . \lambda p_{st} . \lambda w . [p(w) \text{ and } \exists r \forall w' \in \text{GOAL}_{i,p}(w) : r \Rightarrow q \text{ and } \neg r(w')] \\ \text{presupposition: } \exists i. \text{ such that } \text{RESP}(i, p) \quad (\text{REJECTED ALTERNATIVE})$$

Assuming that the existential quantifier has a low scope, as in (52), the two analyses of (45) and (52) are similar in many respects. Both analyses (i) allow for the negative situation to go unstated, (ii) predict low scope if embedded or under negation, (iii) capture the intuition that p may be one of many ways to achieve i 's goals, (iv) capture the similarity between precautioning and timitive uses, and (v) allow for r to covary with i .

The two analyses differ in that (45) requires that r be definite and contextually recoverable, whereas (52) requires only that some undesirable r exist. Thus, (52) predicts that the semantics of a *sa'ne*-clause is independent of context. This prediction appears to be incorrect; a *sa'ne*-clause may be infelicitous given prior context. Thus, (51a) and (51b)—where the context supports the agents' reasons for going to the party alone—are felicitous, whereas (53)—where the context does not support the agent's reason for going to the party alone—is infelicitous.

- (53) CONTEXT: Claudia is religious and she does not want to see people getting drunk.

#Claudia tsû ja khun'dyûnga tisûyi kûi'khesû jinsa'ne.

#Claudia tsû ja khun'dyûnga tisûyi [kûi'khesû jin-sa'ne]

Claudia 3 go celebration=DAT REFL=EXCL beverage exist-APPR

"Claudia went to the party alone in case there was alcohol."

In sum, the alternative analyses fail to capture central properties of *sa'ne*-clauses. The *p*-and-not-*q* analysis (48) does not allow for *r* to covary with *i*, does not capture the intuition that *p* may be one of many ways to achieve *i*'s goals, and does not capture the similarity between precautioning and timitive uses. The existentially-quantified-*r* analysis (52) comes closer, but does not capture the apparent context-sensitivity of *sa'ne*-clauses.

4.3 Interim summary

In Section 3, we developed formal semantics for rationale clauses, encoded by (*in order*) *to* in English and *-ye* 'INF' in A'ingae, negative rationale clauses, encoded by (*in order*) *to not* and *-mb-e kan-ñe* 'NEG-ADV AUX-INF.' In this section, we extended our analysis to precautioning clauses, encoded by, respectively, *lest* and *-sa'ne* 'APPR.' The three formulas are restated in (54).

- (54) a. $\llbracket \text{-ye "in order to"} \rrbracket = \lambda q_{st} . \lambda p_{st} . \lambda w . [p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : q(w')]$
presupposition: $\exists i$. such that $\text{RESP}(i, p)$
- b. $\llbracket \text{-mbe kañe "in order to not"} \rrbracket =$
 $\lambda q_{st} . \lambda p_{st} . \lambda w . [p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : \neg q(w')]$
presupposition: $\exists i$. such that $\text{RESP}(i, p)$
- c. $\llbracket \text{-sa'ne "lest"} \rrbracket = \lambda q_{st} . \lambda p_{st} . \lambda w . [p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : r \Rightarrow q \text{ and } \neg r(w')]$
where *r* is a contextually inferrable proposition
presupposition: $\exists i$. such that $\text{RESP}(i, p)$

We proposed a unified semantic account of the avertive and in-case precautioning uses of the A'ingae *-sa'ne* 'APPR.' Whereas previous literature had (informally) considered these as two separate meanings, here they fall out as special cases of a single precautioning semantics. In addition to avoiding the need for a covert ambiguity, we show in Section 5 that this approach helps explain several apparent cross-linguistic asymmetries in the encoding of rationale and precautioning clauses.

5 TYPOLOGICAL IMPLICATIONS

In this section, we explore three asymmetries our account predicts for operators within the domain of rationale and precautioning semantics.

[Section 5.1](#) explores the precautioning semantics asymmetry, which states that if a precautioning operator has the precautioning in-case function, then it also has the precautioning avertive function.

[Section 5.2](#) explores the rationale polarity asymmetry, which states that the negative rationale of a precautioning clause may be contextually supplied, but the positive rationale of a rationale clause is always overtly expressed.

[Section 5.3](#) explores the precautioning encoding asymmetry, which states that negative rationale operators tend to be morphologically transparent negations of rationale operators, while dedicated precautioning operators tend to be morphologically unanalyzable. Cross-linguistic data support the predicted asymmetries.

5.1 *Precautioning semantics asymmetry*

Both the avertive and in-case uses introduce agent-oriented clausal modifiers. Thus, Vuillermet (2018) and the emergent typological consensus group them together formally under the label *precautioning*. Moreover, Lichtenberk (1995) and most of the subsequent literature regard the avertive use and the in-case use as distinct. This is to say, operators which have both functions are regarded as polysemous. As such, no predictions are made with respect to relative availability of avertive and in-case uses for any given operator.¹⁶

Our unified semantics, on the other hand, reveals an inherent asymmetry between the avertive and the in-case uses. The precautioning avertive use has the same semantics as negative rationale clauses, encoding the aversion of their argument situation q . Below, (54b) is restated as (55).

- (55) AVERTIVE/NEGATIVE RATIONALE SEMANTICS

$$\llbracket \text{AVERT} \rrbracket = \lambda q_{st} . \lambda p_{st} . \lambda w . [p(w)$$

$$\text{and } \forall w' \in \text{GOAL}_{i,p}(w) : \neg q(w')]$$

presupposition: $\exists i$. such that $\text{RESP}(i, p)$

¹⁶ Although Lichtenberk (1995) makes the crucial observations that “[i]f the apprehension-causing situation cannot be averted by the precautionary situation, only the in-case meaning is possible” and that “[i]f the apprehension-causing situation can be averted, both meanings may be possible” (p. 299), his account does not capture the precautioning semantics asymmetry.

Precautioning clauses cast a wider net than negative rationale clauses, allowing also for in-cases uses where what is averted is an unstated, contextually recoverable, undesirable situation r which entails q . This was captured in (54c), restated as (56).

- (56) PRECAUTIONING SEMANTICS
 $\llbracket \text{PREC} \rrbracket = \lambda q_{st}. \lambda p_{st}. \lambda w. [p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : r \Rightarrow q \text{ and } \neg r(w')]$
 where r is a contextually inferrable proposition
 presupposition: $\exists i.$ such that $\text{RESP}(i, p)$

Observe that, if undesirable, the proposition encoded by a precautioning clause itself is *trivially* inferrable. If q is the undesirable proposition to be avoided, then $r \Leftrightarrow q$ and (56) collapses to (55). Thus, an operator such as (56) effectively has both precautioning functions: avertive and in-case.

Now, consider a hypothetical operator restricted to the in-case function. This operator would denote the precautioning semantics while excluding the avertive semantics. This denotation is given in (57). Since we will argue that no natural language operator is associated with the semantics of (57), we mark it with the asterisk $*$.

- (57) IN-CASE SEMANTICS
 $*\llbracket \text{IN-CASE} \rrbracket = \lambda q_{st}. \lambda p_{st}. \lambda w. [p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : r \Rightarrow q \text{ and } r \neq q \text{ and } \neg r(w')]$
 where r is a contextually inferrable proposition
 presupposition: $\exists i.$ such that $\text{RESP}(i, p)$

In the avertive function, the avoided situation is q . In the precautioning function, the avoided situation is r which entails q . In the hypothesized in-case function, the avoided situation is r which entails q , but crucially not q itself. Thus, we submit, the hypothetical in-case operator picks out a set of propositions that do not form a “natural class,” making it difficult to learn. This is schematized in Figure 1, where grey represents the avoided situation in each of the three functions.

Therefore, we predict that we should find dedicated avertive operators without in-case uses (55) and operators with both avertive and in-case uses (56), but dedicated in-case operators without avertive uses should be non-existent (or at least much rarer). We dub this prediction *precautioning semantics asymmetry* (58).

- (58) PRECAUTIONING SEMANTICS ASYMMETRY
 If a precautioning operator has the in-case function, then it also has the avertive function.

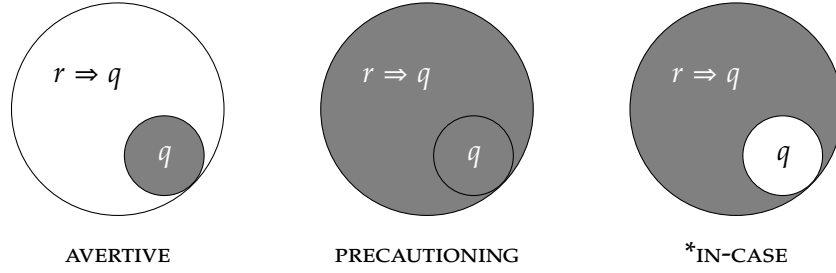


Figure 1: Schematic semantics of the precautioning, avertive, and dedicated in-case functions. The avoided situation is in grey.

From what is known of the typology of precautioning operators to date, the prediction of precautioning semantics asymmetry is borne out. The A'ingae *-sa'ne* 'APPR,' for example, has both the avertive and in-case uses. The periphrastic *-mb-e kan-ñe* 'NEG-ADV AUX-INF' can be used to express avertive meanings but does not have the in-case function, as illustrated in (59).

- (59) a. PRECAUTIONING (AVERTIVE OR IN-CASE): *-sa'ne* 'APPR'
Jûnde ja tise faengae jisa'ne.
jûnde ja [tise faengae ji-sa'ne]
 soon go 3SG together come-APPR
 "I hurried up to leave {so it is not the case that, in case} he comes with us."
- b. DEDICATED AVERTIVE: *-mb-e kan-ñe* 'NEG-ADV AUX-INF'
Putæn'gumangi am'bian thesi ñama ambe kañe.
putæn'gu=ma=ngi am'bian [thesi ña=ma an-mb-e kan-ñe]
 rifle=ACC=1 have jaguar 1GS=ACC eat-NEG-ADV AUX-INF
 "I have a rifle so that a jaguar does not eat me."
- c. DEDICATED IN-CASE: N/A
 *cross-linguistically unattested to date

This situation is paralleled exactly by To'abaita, whose apprehensional *ada* 'APPR' has avertive and in-case functions, while *fasi* 'PURP' in combination with negation, e.g. *a'i* 'NEG.VB,' can only be used in the avertive fashion (Lichtenberk, 1995). Likewise, the English *lest* occurs in both avertive and in-case contexts, while a plethora of English negative purpose constructions (*in order to not*, *so as not to*, *so that not*) are avertive only.

A potential counterexample to our generalization is the English operator *in case*. However, we observe that the English *in case* is not necessarily negative and has more conditional semantics.¹⁷ For example, (60) is felicitous even

¹⁷ We are unaware of literature on the semantics of the English *in case* to point to for a more extensive analysis.

if winning the lottery is not construed as potentially having an undesirable outcome. Likewise, (61a) does not imply that Sam dislikes strawberries or that strawberries are to be avoided. In this, (61a) contrasts with the A'ingae version with *-sa'ne* 'APPR' (61b) which is infelicitous if Sam has no dislike of creamless strawberries.

- (60) *I will be happy [in case I win the lottery.]*
- (61) CONTEXT: Sam likes strawberries but prefers them with cream.
- a. *Sam bought cream [in case there are strawberries.]*
- b. #*Fresa jin'sane tsû Sam chava cremama.*
 #[fresa jin-sa'ne] tsû Sam chava crema=ma
 strawberry exist-APPR 3 Sam buy cream=ACC
 "Sam bought cream in case there are strawberries."
 implies: Sam does not like strawberries without cream.

Thus, the English *in case* differs from a true precautioning operator such as the A'ingae *-sa'ne* 'APPR' and does not constitute counterevidence to the precautioning semantics asymmetry.

Table 1 summarizes preliminary data in support of the precautioning semantics asymmetry hypothesis. For the cross-linguistic data, see Appendix.

LANGUAGE	OPERATOR	AVERTIVE	IN-CASE
English	<i>lest</i>	✓	✓
A'ingae	<i>-sa'ne</i>	✓	✓
To'abaita (70)	<i>ada</i>	✓	✓
Marrithiyel (71)	<i>-fang</i>	✓	✓
Diyari (72)	<i>yathi</i>	✓	✓
Warrgamay (73)	<i>-ma/-lma</i>	✓	✓?
English	<i>(in order) to not</i>	✓	✗
A'ingae	<i>-mbe kañe</i>	✓	✗
To'abaita (74)	<i>fasi a'i</i>	✓	✗
Ese Ejja (75)	<i>e- kwajejje</i>	✓	✗
[predicted absent]	N/A	✗	✓

Table 1: Operators by precautioning functions cross-linguistically.

Thus, we accounted for negative rationale clauses and provided a unified semantics of the formally identical precautioning avertive and in-case uses.

In doing so, we predicted an asymmetry in their encoding.¹⁸ Preliminary cross-linguistic data corroborate our prediction.

5.2 Rationale polarity asymmetry

Another asymmetry relates to rationale and precautioning clauses. As we have just seen, A'ingae and other languages have two different types of grammaticalized clauses encoding the avoidance of an undesirable situation: negative rationale clauses (e. g. *-mb-e kan-ñe* 'NEG-ADV AUX-INF' or *in order to not*), allowing for avertive uses, and precautioning clauses (e. g. *-sa'ne* 'APPR' or *lest*), allowing for both avertive and in-case uses. In our account, these differ in whether they take as their argument the stated proposition q or an inferred proposition r (which entails q).

In contrast, for positive rationale clauses, only the former type exists. In other words, no positive analog to the negative precautioning clauses is attested. Our account explains this on the grounds of an inherent learning bias and a logical asymmetry between averting a state of affairs and bringing about a state of affairs.

Recall our formulations of avertive/negative rationale and precautioning semantics. An avertive/negative rationale clause says that in the goal worlds of the impetus i , the stated proposition q is false (55).

- (55) AVERTIVE/NEGATIVE RATIONALE SEMANTICS
 $\llbracket \text{AVERT} \rrbracket = \lambda q_{st} . \lambda p_{st} . \lambda w . [p(w)$
 $\text{and } \forall w' \in \text{GOAL}_{i,p}(w) : \neg q(w')]$
 presupposition: $\exists i$. such that $\text{RESP}(i, p)$

A precautioning clause says that in the goal worlds of the impetus i , a contextually inferable proposition r is false, where r entails q (56). Note that i 's goals might be accomplished even if q itself remains true (i. e. the q event itself occurs). If q is not evaded, the precautioning in-case reading emerges. If q is evaded, the precautioning avertive reading emerges.

¹⁸ Another adjunct function of the A'ingae *-sa'ne* 'APPR,' which is beyond the scope of this paper, is its *timitive* use. The *timitive* is an adposition or a case marker introducing an entity which is feared or to be avoided. In AnderBois and Dąbkowski (2021), we make a typological prediction relating the relative availability of the avertive, in-case, and *timitive* uses for any given morpheme, completing the picture presented here. We dub this prediction *timitive asymmetry* (iv).

(iv) TIMITIVE ASYMMETRY
 If an operator has the precautioning avertive and *timitive* functions, then it also has the precautioning in-case function.

- (56) PRECAUTIONING SEMANTICS
 $\llbracket \text{PREC} \rrbracket = \lambda q_{st}. \lambda p_{st}. \lambda w. [p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : r \Rightarrow q \text{ and } \neg r(w')]$
 where r is a contextually inferrable proposition
 presupposition: $\exists i.$ such that $\text{RESP}(i, p)$

Observe that the precautioning semantics shows a certain peculiarity absent from the negative rationale semantics. The syntax of a negative rationale operator is such that it attaches to a clause which denotes a proposition q . Its semantics also straightforwardly refers to q .

Now, as for a precautioning operator, its syntax is such that it attaches to a clause which denotes a proposition q . Its semantics, however, refer to a *different* unstated proposition r which needs to be inferred.

We observe that the precautioning semantics is in this way somewhat less natural—the learner need not ordinarily infer the existence of an unstated proposition or set and operate on it in order to compute the meaning of a sentence. Thus, we propose that in the absence of input requiring that the language learner posit the more complex precautioning semantics, they will always posit the simpler avertive/negative rationale semantics.

Consider an input sentence such as (62), where an actor has control over the undesirable situation q , where q = being hungry. Here, the negative operator *lest* is hypothetically compatible with both the avertive and precautioning semantics. Under the avertive interpretation, the actor avoids the stated situation q of being hungry. Under the precautioning interpretation, the actor avoids an inferrable proposition r , which entails being hungry (e. g. being hungry and miserable because of it \Rightarrow being hungry).

- (62) *I work [lest I go hungry.]*

Importantly, positing the simpler avertive semantics for (62) is enough for the language learner to arrive at an intelligible meaning. Therefore, we propose that if the learner only receives input sentences where an actor has control over the undesirable situation q , they will never have to posit the more complex precautioning semantics, so they will always associate a negative operator such as *lest* with the simpler avertive semantics.

We propose that the more complex precautioning semantics is learned only when the input is inconsistent with the simpler avertive semantics, as in (63). Here, the learner cannot identify the stated proposition q (where q = it raining) with the situation that an agent tries to avert, because one does not generally have control over the rain (and most certainly not by putting on a jacket). Thus, to arrive at an intelligible reading, the learner must posit the

existence of a larger situation r which entails q and which is to be averted (e. g. it raining and the speaker getting wet \Rightarrow it raining).

(63) *I put on a jacket [lest it rain.]*

Note that once an operator such as *lest* is associated with the more complex precautioning semantics, it can also function averatively in the special case when $r = q$. Thus, our account proposes one unified meaning for precautioning operators, dispensing with a need for ambiguity.

Turning to our rationale clauses semantics from (54a), we restate it as (64). A rationale clause says that in i 's goal worlds, q is true. Note that rationale semantics is similar to averative semantics in that it makes no reference to a salient situation r .

(64) RATIONALE SEMANTICS
 $\llbracket \text{RAT} \rrbracket = \lambda q_{st} . \lambda p_{st} . \lambda w . [p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : q(w')]$
 presupposition: $\exists i$. such that $\text{RESP}(i, p)$

However, consider an attempt at assimilating the denotation for rationale semantics to the denotation for precautioning semantics by adding a reference to a salient situation r (65). This variant of rationale clause semantics (let's call it "rationale-with- r ") says that in the goal worlds of the impetus i , a salient proposition r which entails q is true. Since we will ultimately propose that that no natural language operator is associated with the semantics of (65), we mark it with the asterisk *.

(65) "RATIONALE-WITH- r " SEMANTICS
 $*\llbracket \text{RAT}' \rrbracket = \lambda q_{st} . \lambda p_{st} . \lambda w . [p(w) \text{ and } \forall w' \in \text{GOAL}_{i,p}(w) : r \Rightarrow q \text{ and } r(w')]$
 where r is a contextually inferrable proposition
 presupposition: $\exists i$. such that $\text{RESP}(i, p)$

The hypothetical rationale-with- r semantics (65) differs from precautioning semantics (56) only in polarity: rationale-with- r clauses say that in i 's goal worlds r is true, while precautioning clauses say that r is false. Yet, while there are precautioning morphemes, we propose that the meaning of (65) is not assigned to any natural language operator.

The absence of rationale-with- r operators stems from an interaction of logical principles and learning biases. As we already showed, some sentences with negative operators such as *lest* require the learner to posit a contextually inferrable situation r , since the stated situation q cannot be avoided. Below, (63) is elaborated as (66).

- (66) *I put on a jacket [lest it rain.]*
 q = it is raining
 r = it is raining and the speaker gets wet
 $\neg r \wedge q$ = it is raining but the speaker does not get wet

In (66), an actor is striving to avoid getting wet in the rain (r) which entails rain happening (q). Their success in averting r , i. e. bringing about $\neg r$, does not require bringing about $\neg q$. In fact, $\neg r$ and q are compatible in the understood meaning of avoiding getting wet, but not averting rain.

When it comes to positive operators, such as (*in order*) *to*, however, bringing about a larger situation r always entails bringing about q because $r \Rightarrow q$. In (67), for example, the speaker aims at going to a party. One might posit a larger situation r that entails it, e. g. being clean and going to a party, but bringing about any such larger situation r will necessarily result in bringing about q . In other words, when $r \Rightarrow q$, it is impossible for r to be true without q being true.

- (67) *I showered [(in order) to go to the party.]*
 q = the speaker goes to the party
 r = the speaker is clean and they go to the party
 r and $\neg q = \perp$

This is to say, there is a logical asymmetry between the negative case of averting a state of affairs and the positive case of bringing about a state of affairs: If r entails q , it is possible to avert r without averting q ($(r \Rightarrow q \wedge \neg r \wedge q) \neq \perp$). It is not possible, however, to bring about r without bringing about q ($(r \Rightarrow q \wedge r \wedge \neg q) \Rightarrow \perp$).

The meaning of a sentence such as (67) is compatible with rationale semantics (64) as well as rationale-with- r semantics (65). Thus, in principle, a language learner may associate a positive rationale operator such as (*in order*) *to* with either meaning. However, since q always holds when r holds, the learner will never have evidence that *requires* positing the more marked rationale-with- r semantics. We propose that since rationale semantics is the dispreferred hypothesis, the learner will always associate rationale operators with the regular rationale semantics.

These findings are summarized in Table 2, where the three different rationale/precautioning meanings are classified by polarity and necessity to posit a contextually supplied situation r . The non-existent case of a positive rationale operator which requires of the learner to posit r is marked with an asterisk *.

POLARITY	NEEDS <i>r</i> ?	LEARNED SEMANTICS
negative	no	avertive/negative rationale
negative	yes	precautioning
positive	no	rationale
*positive	yes	[predicted absent]

Table 2: Rationale and precautioning meanings by polarity and need for *r*.

Thus, we arrive at an asymmetry whereby rationale clauses have the polar opposite meaning of precautioning avertive clauses but, contra (65), there is no “in-case” variant of rationale semantics. We dub this prediction *rationale polarity asymmetry* (68).

(68) RATIONALE POLARITY ASYMMETRY

The negative rationale of a precautioning clause may be contextually supplied, but the positive rationale of a rationale clause is always overtly expressed.

In sum, in precautioning clauses *q* may but need not be the averted situation, giving rise to avertive and in-case variants, respectively. In rationale clauses, however, *q* is always the goal, yielding no positive rationale counterpart the precautioning in-case semantics. Thus, the distinction which gives rise to negative rationale and precautioning operators is collapsed in case of rationale operators. Given this collapse, we propose that language learners acquire the simpler rationale semantics (64) over the more complex rationale-with-*r* semantics (65)

5.3 Precautioning encoding asymmetry

Finally, we observe an asymmetry in the encoding of precautioning semantics. While precautioning operators tend to be morphologically simplex, e. g. English *lest* or A’ingae *-sa’ne* ‘APPR,’ dedicated avertive operators are often transparently encoded as negations of rationale operators, e. g. English (*in order*) *to not* or A’ingae *-mb-e kan-ñe* ‘NEG-ADV AUX-INF.’ We explain this tendency on grounds of language acquisition, proposing a learning bias which leverages the rationale polarity asymmetry.

In our discussion of the rationale polarity asymmetry, we proposed that precautioning semantics differs from rationale semantics in the following way: When it comes to precautioning semantics, sensitivity to a salient or contextually recoverable proposition *r* has the effect of allowing for distinct

in-case readings. When it comes to rationale semantics, however, sensitivity to r does not have a comparable effect. Thus, we propose that while a language learner could in principle posit the more complex rationale-with- r semantics of (65), they will have very little evidence to do so. Instead, they will associate rationale clauses with the simpler rationale semantics of (64), where the goal q is overtly stated and no appeal to a contextually recoverable r has to be made.

Recall that avertive/negative rationale clauses (55) differ from positive rationale clauses (64) only in polarity: the former encode the goal of q being false, while the latter—of q being true. Thus, precautioning avertive/negative rationale meanings can be straightforwardly expounded by composing negation with a rationale operator.

Precautioning clauses, on the other hand, which also allow for in-case readings sensitive to a contextually recoverable proposition r (45), cannot be related by language learners to any positive clause type. Thus, precautioning meanings cannot be expounded via a straightforward composition of independently available operators.

Thus, we predict that clauses with purely avertive/negative rationale semantics will tend to be encoded transparently, as negations of rationale clauses, while precautioning clauses which allow for both avertive and in-case uses will tend to be encoded by morphologically unanalyzable exponents. We dub this prediction *precautioning encoding asymmetry* (69).

(69) PRECAUTIONING ENCODING ASYMMETRY

Negative rationale operators tend to be morphologically transparent negations of rationale operators, while precautioning operators tend to be morphologically unanalyzable.

Our prediction receives preliminary support from typological data. In English, all clauses with purely avertive semantics are introduced by transparent negations of rationale clauses, including (*in order*) *to not*, *so as not to*, *so that not*, etc. This contrasts with the morphologically simple *lest* which introduces precautioning clauses of both avertive and in-case varieties.¹⁹

¹⁹ Given that the avertive function is a special case of the precautioning function, our proposal predicts cyclic change: Avertive morphemes should over time generalize to precautioning morphemes, acquiring the in-case use. Then, a new dedicated avertive would be recruited. (For an overview of diachronic semantics, see Deo, 2015.)

While an exploration of this diachronic hypothesis is beyond the scope of this paper, we observe that the English *lest* might have had that trajectory. The English *lest* is a contracted form of the Middle English *les te* ‘less that,’ with *les* encoding negation and *te*—rationale semantics. We predict that *lest* originated as an avertive particle and generalized to a precautioning one, at the same time losing its semantic transparency. We are not aware of a historical study which would confirm or disconfirm our prediction.

In A'ingae, purely avertive clauses are introduced by *-mb-e kan-ñe* 'NEG-ADV AUX-INF,' composed of the infinitive *-ye* 'INF,' which encodes rationale semantics, and *-mbi* 'NEG,' which introduces negation. Due to the syntactic incompatibility of *-ye* 'INF' and *-mbi* 'NEG,' periphrasis is employed whereby the negated clause is first adverbialized with *-e* 'ADV' and then introduced by the dummy auxiliary verb *kan* 'AUX.' Still, *-mb-e kan-ñe* 'NEG-ADV AUX-INF' retains a high degree of morphological and semantical transparency. This contrasts with the morphologically simple *-sa'ne* 'APPR,' which allows for both avertive and in-case readings.

To'abaita uses *fasi* 'PURP' to introduce rationale clauses. Avertive clauses are introduced by combining *fasi* 'PURP' with sentential negation expressed in a variety of ways, including *a'i* 'NEG.VB.' This way of forming avertive clauses contrasts with the morphologically simple *ada* 'APPR' which allows for both avertive and in-case semantics (Lichtenberk, 1995).

Ese Ejja uses a complex form to introduce avertive 'AVERT' semantics: a prefix *e-* that goes before the verb and a separate periphrastic form *kwajejje* or *kwanijje* that goes after the verb (Vuillermet, 2018).²⁰ While we leave detailed analysis of Ese Ejja to future work, the avertive form *e- kwejejje* 'AVERT' plausibly has separate rationale and negative components in line with our proposal. Crucially, the prefix *e-* also shows up in positive purpose clauses. We propose, therefore, that the Ese Ejja avertive *e- kwajejje* 'AVERT' should be analyzed as containing a rationale component encoded by *e-* and a special grammaticalized negative component encoded by *kwajejje*.²¹ Thus, Ese Ejja resembles A'ingae in that although avertive clauses are mapped to a unique morphological exponent, they can still be analyzed as built out of a positive rationale clause.

The data are summarized in Tables 1 and 3. Both precautioning and dedicated avertive/negative rationale operators are given in Table 1. The latter are repeated in Table 3, with exponents of rationale semantics marked with a straight underline and exponents of negation—with a wavy underline.

20 Vuillermet (2018) suggests that *kwajejje* and *kwanijje* come from tensed copular forms *kwaje* 'be.FUT' and *kwani* 'be.PRS,' respectively, and the periphrastic clitic *-jje* (canonically expressing movement "though," "across," or "along" the marked referent) or the temporal subordinate marker *-(a)jje*. The form might have grammaticalized as negation from a temporal use, by analogy with English "before," which allows for its complement to not be realized (v).

(v) Put away your phone before the teacher catches you.

21 Although *kwajejje* and *kwanijje* as negation occur only in avertive clauses, construction-specific negation is not out of character for Ese Ejja, which has at least four other morphologically unrelated ways of negating: *-ajja* 'never,' *-jjima* 'not yet,' *pojyama* 'it is not (the case that),' and *chamá* 'none' (Vuillermet, 2012).

LANGUAGE	OPERATOR	RATIONALE	NEGATION
English	<u>(in order)</u> <u>not to</u>	(in order) to	not
A'ingae	<u>-mb-e</u> <u>kan-ñe</u>	-ye	-mbi
To'abaita (74)	<u>fasi</u> <u>a'i</u>	fasi	a'i
Ese Ejja (75)	<u>e-</u> <u>kwajejje</u>	e-	kwajejje

Table 3: Dedicated avertives as negated rationale operators cross-linguistically.

Thus far, there are no known cases of dedicated avertive operators that are monomorphemic like the precautioning *-sa'ne* 'APPR' in A'ingae or *ada* 'APPR' in To'abaita. Even the most grammaticalized forms like the Ese Ejja avertive *e- kwejejje* 'AVERT' can be morphologically decomposed, with one part tied to each component. While we do not propose that monomorphemic avertive operators are strictly impossible, their typological absence strongly supports the prediction of precautioning encoding asymmetry.

To recap, we propose that in the course of language acquisition, a language learner will tend to associate rationale clauses with the simpler rationale semantics of (64), rather than the more complex rationale-with-*r* semantics of (65). Since negating a rationale clause yields avertive semantics compositionally, we explain a non-arbitrary grammaticalization trajectory: Avertive semantics tend to be expounded transparently, while precautioning semantics tend to be expounded by morphologically unanalyzable operators.

6 CONCLUSION

In this paper, we developed a formal account of rationale and precautioning clauses. We proposed that a rationale clause, introduced by an operator such as English *(in order) to* or A'ingae *-ye* 'INF', says that a proposition *q* holds in the goal worlds of the actor *i* responsible for the matrix clause *p*.

We identified the semantics of negative rationale clauses (*in order to not*, *-mb-e kan-ñe* 'NEG-ADV AUX-INF') with the avertive uses of precautioning clauses (*lest*, *-sa'ne* 'APPR'). Building on our novel account of rationale semantics, we proposed that a negative rationale/avertive clause states that $\neg q$ holds in *i*'s goal worlds.

While previously regarded as introducing parallel meanings, we proposed an analysis in which in-case uses of a precautioning operator are also fundamentally avertive, but in those cases, a contextually inferred proposition *r* which entails *q* is averted. In other words, a precautioning clause states that $r \Rightarrow q$ and $\neg r$ holds in *i*'s goal worlds.

Our formal account uncovered three asymmetries in the semantic domain of rationale and precautioning operators, thus making substantive typological predictions. These predictions are summarized in Table 4. The positive goal worlds q column abbreviates rationale uses. The positive goal worlds r column abbreviates the hypothetically possible yet unattested rationale-with- r uses. The negative goal worlds columns $\neg q$ and $\neg r$ abbreviate, respectively, avertive and in-case uses.

SEMANTICS		OPERATOR	GOAL WORLDS	
POSITIVE GOAL:			q	r
(I)	[predicted absent]	N/A	✓	✓
(II)	rationale	(<i>in order</i>) <i>to, -ye</i>	✓	✗
(III)	[predicted absent]	N/A	✗	✓
NEGATIVE GOAL:			$\neg q$	$\neg r$
(IV)	precautioning	<i>lest, -sa'ne</i>	✓	✓
(V)	negative rationale	(<i>in order</i>) <i>to not, -mbe kañe</i>	✓	✗
(VI)	[predicted absent]	N/A	✗	✓

Table 4: Rationale and precautioning asymmetries summarized.

Precautioning semantics asymmetry captured the lack of operators with in-cases uses only (VI). Rationale polarity asymmetry explained the absence of rationale operators with “in-case” readings (I, III). Finally, precautioning encoding asymmetry accounted for why dedicated avertives (V) tend to be encoded as transparent negations of rationale operators (II) while precautioning operators (IV) are morphologically unanalyzable.

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A APPENDIX

Below, we give cross-linguistic data in support of the predicted typological asymmetries, referred to in [Tables 1 and 3](#). Glossing abbreviations have been adapted from the original publications.

- (70) a. PRECAUTIONING AVERTIVE To'abaita (Lichtenberk, 1995, p. 12)
Nau ku agwa 'i buira fau ada wane 'eri ka riki nau.
nau ku agwa 'i buira fau [ada wane 'eri ka riki nau]
 I I hid at behind rock APPR man that he see me
 "I hid behind a rock so that the man might not see me."
- b. PRECAUTIONING IN-CASE To'abaita (Lichtenberk, 1995, p. 14)
Wane kai too i laala kai lio ma'asia maelimae ada ka
wane kai too i laala kai lio ma'asi-a maelimae [ada ka
 man he stay at inside he look wait for-him enemy APPR he
lae mai.
lae mai]
 go hither
 "The man would stay inside and look out for the enemy in case he came and did something."
- (71) a. PRECAUTIONING AVERTIVE Marrithiyel (I. Green, 1989, p. 235)
Anjipukfiyi gidithutfang.
anji-puk-fiyi-Ø [gidi-thut-fang]
 2SS.R.NJ-place on-head-IMP 3SS.R.heat-dry-APPR
 "Put the top on (the pen), lest it dry out."

- b. PRECAUTIONING IN-CASE Marrithiyel (I. Green, 1989, p. 359)
Ambi warriwut gan nitji aguwan
ambi warri-wut-Ø gan nitji [a-guwan
 NEG.2SS TR.go-walk-IMP here night CA-snake
ginjsjifang.
ginjsji-fang]
 3SS.R.be hanging-APPR
 “Don’t walk about here at night, for fear of the snakes hanging down (from the trees).”
- (72) a. PRECAUTIONING AVERTIVE Diyari (Austin, 1981, p. 586)
Ngamamayi, yura puriyathi.
ngama-mayi [yura puri-yathi]
 sit.IMP-EMPH 2PL.NOM fall-APPR
 “Sit down or you’ll fall.”
- b. PRECAUTIONING IN-CASE Diyari (Austin, 1981, p. 587)
Makita pardaka-mayi, wanku yundru walya nhayiyathi.
makita pardaka-mayi [wanku yundru walya nhayi-yathi]
 gun.ACC take.IMP-EMPH snake.ACC 2SG.ERG soon see-APPR
 “Carry a gun in case you see a snake.”
- (73) PRECAUTIONING Warrgamay (Dixon, 1981, p. 125)
Midanga dumbaga yugandu bardilma.
midanga dumbaga [yugandu bardilma]
 house-LOC enter-IMP rain-ERG wet-IRR
 “Come into the house, lest the rain wet you!”
- (74) DEDICATED AVERTIVE To’abaita (Lichtenberk, 1995, p. 300)
Nau ku agwa ’i buira fau fasia wane ’eri ’e a’i si riki
nau ku agwa ’i buira fau [fasi-a wane ’eri ’e a’i si riki
 I I hide at behind rock PURP-it man that it NEG.VB he.NEG see
nau.
nau]
 me
 “I hid behind a rock so that the man might not see me.”
- (75) DEDICATED AVERTIVE Ese Ejja (Vuillermét, 2018, p. 3)
Owaya ekowijji shijjakaani ejjasajaki kwajeje.
owaya ekowijji shijja-ka-ani [e-jja-saja-ki kwajeje]
 3ERG rifle clean-3A-PRS AVERT-MID-block-MID AVERT
 “He cleans his rifle lest it get blocked.”