Variable-Force Variable-Flavor Attitude Verb in Koryak[*]

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Outline

Overview

Koryak has an attitude verb that has many readings (flavors), some of which are listed in (1), and the verb displays weak as well as strong quantificational force (cf. *think*, *allow for the possibility*).

(1) meʎʎo   ∅-k-iv-ə-ŋ-∅,   (əno) ∅-ku-muq-et-ə-ŋ-∅
     Melljo.ABS.SG 2/3.S/A.IND-PRS-*ivək*-E-PRS-3.S.IND that 2/3.S/A.IND-PRS-rain-VB-E-PRS-3.S.IND
     'Melljo {says, thinks, allows for the possibility, hopes, fears, *knows, *imagines} that it's raining.'

> We analyze the Koryak verb *ivək* as a doxastic-assertive attitude verb: its domain of quantification is underspecified for the distinction between the doxastic and the assertive readings (modeled with a free variable). Its quantificational force arises from a restriction on an underlying universal quantifier (cf. Rullmann et al. 2008). We show that the bouletic flavor is not fully encoded in the denotation of the verb (or in the matrix clause), but it arises from covert and overt material in the embedded clause. While this has been proposed for the Navajo *nízin* (Bogal-Allbritten 2016), our innovation is to show that bouletic meanings can be split at LF into a matrix-clause doxastic quantifier and an embedded-clause preference item.

We also argue against the following cross-linguistic generalization:

> Nauze's generalization:
>
> (2) Modal elements […] either vary on the [flavor] axis and thus are polyfunctional in the original sense of expressing different types of modality or they vary on the [force] axis and can express possibility and necessity, but they cannot vary on both axes. (Nauze 2008, p. 222)

We put forth *ivək* as a counterexample. We use data from the doxastic flavor to show that *ivək* displays variability in quantificational force. We take the underspecification between the doxastic and the assertive flavor to speak to the polyfunctionality of the flavor of *ivək*.[1]

1 Elicitation Methodology

- **Koryak** is a highly endangered Chukotko-Kamchatkan language with ∼600 speakers spoken in northern Kamchatka in the Russian Far East.[2]

- Unless otherwise indicated, our data was obtained using a technique we call a **matching task**[3]:

    > We provide a context (typically in Russian) and then a Koryak and a Russian sentence. The speakers are first asked to provide a contextual felicity judgment on the former, and then are asked whether it can express the same 'thought' (Rus. *mysl'*) as the latter in the given context.[4]

    Previous work with our Koryak consultants showed that they are prone to ignoring salient features of the context when giving judgments, and in many cases just give syntactic well-formedness judgments on sentences. Asking the speaker to explain how they understood the Koryak sentence is also not sufficient because the speakers import features of Koryak into Russian, producing infelicitous Russian sentences.

    – Speakers use 'think/say if only' (Rus. *dumajet/govorit, xotja by*) to translate sentences involving wishes, even though this is not the locution for expressing wishes in Russian. By contrast, when asked to translate 'wish' (Rus. *želat'*) into Koryak, the speakers had no trouble using *ivək*.

    – Certain epistemic modals would appear in (claimed to be acceptable) locutions such as 'probably p and probably not p' or 'p but probably not p' (eg. 'It is raining, but it is probably not raining.'), which is reminiscent of the L2 translation issues with variable force reported in Rullmann et al. (2008, fn. 32) .

- Importantly, matching tasks allowed us to also obtain **infelicity judgments**. They also made it easier to get non-default readings of *ivək*; to illustrate:

    > A speaker was provided with (3), where the context and the target sentences were all in Koryak. The speaker at first rejected it, expressing confusion as to how Hewngyto could think two incompatible things. When the speaker was explicitly asked whether *ivək* could mean *dopuskat'* ('allow for the possibility') in this discourse, the speaker readily confirmed this and changed her judgment about the coherence of the discourse. We observed similar effects when the

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[1]As mentioned above, the bouletic flavor, by contrast, originates from the embedded clause and might therefore not be considered as a strong enough argument for the polyfunctionality of flavor of *ivək*.

[2]Our transcription uses the IPA, except that we use *č* for the voiceless alveolo-palatal affricate. Our glossing schema follows the Leipzig Glossing Rules, except for: AP - antipassive, CF - counterfactual, CS - causative, E - epenthetic vowel, IRR - irrealis, RLS - realis, VB - verbalizer.

[3]Masha Polinsky (p.c.) and Seth Cable (p.c.) have correctly pointed out that this technique is not entirely new, as both report having used it in their own fieldwork. However, matching tasks have never to our knowledge been discussed *per se* in the literature on semantic fieldwork methodology, which tends to focus on contextual acceptability judgments and guided spontaneous production tasks like storyboards. Importantly, we found that neither of these techniques worked with our consultants, which, to our knowledge, has also never been reported in this literature. Our contribution in the methodological domain is therefore to show that matching tasks are a way of doing fieldwork in semantics when more widely-used techniques fail.

[4]We don't use the word 'meaning' (Rus. *značenije*) in the elicitation, as this tends to trigger word-for-word translations. Instead, we ask if the sentences can can express the same 'thought' (Rus. *mysl'*), which our speakers seem to understand better.

speakers had been previously exposed to *dopuskat'* during the elicitation session. In the absence of previous exposure or a matching task, the judgments across speakers on the weak doxastic meaning were not stable enough to warrant further inquiry, for example to test whether a piece of information can bias the weak meaning of *ivək*.

(3) Hewngyto is walking down the street. Melljo sees him and asks: `Menno ɣənin ŋevətqet? Metke kotavareŋjaŋəŋ jajak?' (Where is your wife? Is she making jam at home?) He replies:

qoo.   t-ə-k-iv-ə-ŋ-∅   əno ∅-ko-ta-vareŋja-ŋ-ə-ŋ-∅
dunno 1SG.S/A-E-PRS-*ivək*-E-PRS-1SG.S that 2/3.S/A.IND-PRS-make-jam-make-E-PRS-3.S.IND
jaja-k
house-LOC
'I don't know. I allow for the possibility that she's making jam at home.'

He continues walking. Qechghylqot sees him and asks: `Menno ɣənin ŋevətqet? Metke keluŋ umkək?' (Where is your wife? Is she picking berries in the forest?) Hewngyto replies:

qoo.   t-ə-k-iv-ə-ŋ-∅   əno ∅-k-elu-ŋ-∅
dunno 1SG.S/A-E-PRS-*ivək*-E-PRS-1SG.S that 2/3.S/A.IND-PRS-pick.berries-E-PRS-3.S.IND
umk-ə-k.
forest-E-LOC
'I don't know. I allow for the possibility that she's in the forest picking berries.'

2 Force with Attitude Verbs

"In the Hintikkan tradition, attitude verbs are treated uniformly as universal quantifiers over possible worlds, where the sole difference between various attitudes is in the accessibility relation that determines the set of worlds they quantify over." (Anand and Hacquard 2009)

2.1 Previous work on existential attitudes

• Anand and Hacquard (2013) proposed an existential force over the doxastic state for Romance attitude verbs expressing **doubt**, **hope**, and **fear**.[5]

• Močnik (2019a,b,c) discussed the Slovenian **existential belief verb** *dopuščati* ('**allow for the possibility**'), which conveys merely that the embedded clause is consistent with the attitude holder's beliefs – there is no preference with respect to the embedded clause (cf. *hope*) or negative bias (cf. *doubt*).[6]

(4) a. Othello dopušča, da   Desdemona ljubi Cassija.
        Othello allows   that Desdemona loves Cassio
        'Othello allows for the possibility that Desdemona loves Cassio.'

    b. Dopuščam da   je vaša laž posledica   neznanja in   ne zlonamernosti
        I.allow   that is your lie consequence ignorance and not malevolence
        'I allow for the possibility that your lie follows from ignorance and not malevolence.'
        (http://www.delo.si/novice/slovenija/repe-zombiji-bodo-ukradeno-drzavo-priborili-nazaj.html)
                                                                                    (Močnik 2019a)

(5) Dopušča, da   dežuje, in   dopušča, da ne dežuje.
     he.allows that rains   and he.allows that not rains
     'He allows for the possibility that it's raining and he allows for the possibility that it's not raining.'
     (Močnik 2019a, adapted from)

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[5]See also Heim (1992) for *doubt* as *not believe*.
[6]This verb also has a deontic use:

(i) Oče   (nam)   dopušča, da   se   igramo zunaj.
     father (to.us) allows   that refl we.play outside
     'Our father lets us play outside.'

2.2   Koryak variable-force belief

- Variable force predicates have recently been noticed in the modal domain – Rullmann et al. 2008, Davis et al. 2009 et seq. **To our knowledge, we discuss the first documented variable-force attitude verb:** *ivək*.

- We will focus on showing its variability in the doxastic flavor. Our analysis eventually predicts that its assertive flavor should come in two forces as well. Our best guess for an existential version of 'say' is '**suggest**', as in (6).

(6) Context: Two people went out hunting and haven't come back. Hewngyto said that it's possible that they got lost, but he also said that it's possible that they hadn't.

    Ɂewŋəto   ∅-iv-i   əno   taɣəjɲiŋ-ə-lɁ-ə-t
    Hewngyto.ABS.SG   2/3.S/A.IND-*ivək*-AOR   that   hunt-E-S/O.PTCP-E-ABS.DU
    ∅-təmŋew-ɣəɁe.   ənno   Ɂopta ∅-iv-i   əno   əčč-i
    2/3.S/A.IND-get.lost-3DU.S.PST 3SG.ABS also   2/3.S/A.IND-*ivək*-AOR that 3NSG-ABS.DU
    jatan ∅-ko-pel-aɲ-ŋ-e
    only   2/3.S/A.IND-PRS-remain-VB-PRS-3DU
    'Hewngyto suggested that the hunters had gotten lost. He also suggested that they are just late.'

2.2.1   Data

- *Ivək* is most commonly used with the strong interpretation.

(7) A little boy was almost eaten by a bear – lightning came down from the sky and scared the bear, so the little boy managed to escape. When Qechghylqot, who is Christian, hears this story, he smiles. You ask him why he is smiling. He says:

    t-ə-k-iv-ə-ŋ-∅   əno   aŋaŋ   n-ə-mel-qin   ɁujemtewilɁ-ə-n.
    1SG.S/A-E-PRS-*ivək*-E-PRS-1SG.S that   God.ABS.SG ADJ-E-good-ADJ.SG person-E-ABS.SG
    ŋeveq   qəjəm   n-ə-Ɂ-ə-tva-n,   qəjəm   qaj-ə-kmiŋ-ə-n
    if   NEG.IRR 2/3.S/A.CF-E-CF-E-be-2/3.S/O.CF NEG.IRR DIM-E-child-E-ABS.SG
    n-ə-Ɂ-ə-ɲ-ɲəmajt-an-nen.
    2/3.S/A.CF-E-CF-E-CS-be.saved-VB-3SG.A > 3.O
    'I think that God is a good person. If he weren't, he wouldn't have saved the child.'

(8) t-ə-k-ew-ŋəvo-ŋ-∅,   `meki   ∅-ko-n-waɲav-aw-ŋ-ə-nen
    1SG.S/A-E-PRS-*ivək*-HAB-PRS-1SG.S who.ABS.SG 2/3.S/A.IND-PRS-CS-word-VB-PRS-E-3SG.A > 3.O
    qonpəŋ',   i   vilu-t   t-ə-ku-nike-ŋ-ne-t,   tit
    always   and   ear-ABS.DU   1SG.S/A-E-PRS-whatchamacallit-PRS-3.O-3DU so.that
    m-ə-valom-ə-n,   jənnə   ∅-ko-tv-ə-ŋ-nen.
    1SG.S/A.IMP-E-hear-E-3SG.O what.ABS.SG 2/3.S/A.IND-PRS-say-PRS-E-3SG.A > 3.O
    'I **thought**, "Who is he always talking to?" and [pricked up] my ears so that I might hear what he was saying.' (Golovanĭova and Mal'ceva 2015, 18)

(9) məč-čalɣəl-la-∅   teʎəčča-jtəŋ,   məjew   ečɁej-ə-k   teɁi
    1NSG.S/A-move-PL-1NSG.S/O Tilichiki-ALL because Achayvayam-E-LOC few
    ∅-nəɁal-la-j   učiteʎ-u   škola-k.   t-ə-k-iv-ə-ŋ-∅:
    2/3.S/A.IND-become-PL-AOR teacher-ABS.PL school-LOC 1SG.S/A-E-PRS-*ivək*-PRS-1SG.S
    'tit   metɁa-ŋ   n-ə-pʎətku-ne-w   ɣəm-nin   kəmiŋ-u,   ləɣu
    so.that   beautiful-ADV 3.S/A.IMP-E-finish-3.S/O.IMP-3PL 1SG-POSS son-3PL better
    məɲ-ɲalɣəl-la-∅   miŋkəje.'
    1NSG.IMP.S/A-move-PL-1NSG.S/O whither
    'We moved to Tilichiki because in Achayvayam there came to be few teachers in the school. I **thought**: "So that my sons are educated well (lit. finish [school] beautifully), it would be better for us to move somewhere."' (Golovanĭova and Mal'ceva 2015, 47)

• Weak force is also available:

(10) Hewngyto says: ujŋe liɣi elŋəke metke kupiŋatəŋ ('I don't know whether it's snowing').
      Ɂewŋəto   ∅-k-iv-ə-ŋ-∅   əno   ujŋe   a-piŋ-at-ka
      Hewngyto.ABS.SG   2/3.S/A.IND-PRS-*ivək*-E-PRS-3.S.IND   that   NEG.RLS   NEG-snow-VB-NEG
      ∅-k-it-ə-ŋ-∅.   Ɂewŋəto   Ɂopta   ∅-k-iv-ə-ŋ-∅
      2/3.S/A.IND-PRS-be-PRS-3.S.IND Hewngyto.ABS.SG also   2/3.S/A.IND-PRS-*ivək*-E-PRS-3.S.IND
      əno   ∅-ku-piŋ-at-ə-ŋ-∅.
      that 2/3.S/A.IND-PRS-snow-VB-PRS-3.S.IND
      'Hewngyto **allows for the possibility** that it's not snowing. Hewngyto also **allows for the possibility** that it's snowing.'

• *Ivək* is in this respect crucially different from *ləmalavək* 'believe', which does not have a weak reading:

(11) a.#Ɂewŋəto   ∅-ko-lmal-av-ə-ŋ-∅   əno
          Hewngyto.ABS.SG   2/3.S/A.IND-PRS-believe-VB-E-PRS-3.S.IND   that
          ∅-ku-muq-et-ə-ŋ-∅,   Ɂam Ɂopta ∅-ko-lmal-av-ə-ŋ-∅
          2/3.S/A.IND-PRS-rain-VB-E-PRS-3.S.IND but also   2/3.S/A.IND-PRS-believe-VB-E-PRS-3.S.IND
          əno ujŋe   e-muq-et-ke.
          that NEG.RLS NEG-rain-VB-NEG
          'Hewngyto **allows for the possibility** that it is raining but also **allows for the possibility** that it is not raining.' (intended)
      b. Ɂewŋəto   ∅-k-iv-ə-ŋ-∅   əno ∅-ku-muq-et-ə-ŋ-∅,
          Hewngyto.ABS.SG 2/3.S/A.IND-PRS-*ivək*-PRS-3.S.IND   that 2/3.S/A.IND-PRS-rain-VB-E-PRS-3.S.IND
          Ɂam Ɂopta ∅-k-iv-ə-ŋ-∅   əno ujŋe   e-muq-et-ke.
          but also   2/3.S/A.IND-PRS-*ivək*-PRS-3.S.IND   that NEG.RLS NEG-rain-VB-NEG
          'Hewngyto **allows for the possibility** that it is raining but also **allows for the possibility** that it is not raining.'

Downward-entailing contexts:

• Both readings seem available (below we report a strong force in an antecedent of a conditional and what looks like weak force in the restrictor of a universal quantifier).[7]

(12) Kaljahang is talking on the phone with Tyngangawyt, who is supposed to fly to Petropavlovsk-Kamchatsky today from Tilichiki. Njobanga and I can tell that they are talking about heavy rains, but we don't know what exactly is going on. I ask Njobanga *jeqin kivəŋ təŋaŋawət?* 'What is Tyngangawyt saying?' Njobanga says:
      quu,   Ɂam   ŋeveq   təŋaŋawət   ∅-k-iv-ə-ŋ-∅,   əno
      dunno   but   if   Tyngangawyt.ABS.SG   2/3.S/A.IND-PRS-*ivək*-PRS-3.S.IND   that
      ∅-ku-mejŋ-ə-muq-et-ə-ŋ-∅   teʎʎəča-k,   amu   ečɣi   qəjəm
      2/3.S/A.IND-PRS-big-E-rain-VB-PRS-3.S.IND Tilichiki-LOC   might today NEG.IRR
      n-ə-jet-ə-n   petropavlovska-jtəŋ.
      3.S/A.IMP-E-come-E-3.S/O.IMP Petropavlovsk.Kamchatsky-ALL
      'I don't know, but if Tyngangawyt **is saying** that it is raining heavily in Tilichiki, then probably she will not come to Petropavlovsk-Kamchatsky today.'

(13) We're walking down the street and there are many people with raincoats. Melljo says:
      əməŋ   ɁujemtewilɁ-u   meki-w   ∅-ew-la-j   əno
      all   person-ABS.PL   who-ABS.PL   2/3.S/A.IND-*ivək*-PL-AOR   that
      ∅-je-muq-et-iki-∅   ne-jet-ə-n-∅   muqe-ičɁ-ə-n
      2/3.S/A.IND-FUT-rain-VB-IPFV-3.S.IND   INV-bring-E-3.O-SG   rain-clothes-E-ABS.SG
      'Everybody who said that it will rain brought a raincoat.' [volunteered]
      'Everybody who **allowed for the possibility** that it will rain brought a raincoat.' [matching task]

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[7]Side note: one of the locutions for 'tell the truth' in Koryak in 'correctly *ivək*', which is also found in downward-entailing contexts in texts, e.g. 'But now you should not run away [from the dogs], if you told the truth [about them not hunting you]' (Vdovin and Jajletkan 1949, p.90).

- Under negation, *ivək* seems to be able to express universal force, as in (14b). However, the same reading could in principle be derived with neg-raising over an existential quantification.

(14) Two balls are in a box: one white, one black. I pull out one and do not show it to you.

    a. t-ə-k-iv-ə-ŋ-∅   əno   əɲɲin   qapəl   n-ilɣ-ə-qin   to
       1SG.S/A-E-PRS-*ivək*-E-PRS-1SG.S that that.ABS.SG ball.ABS.SG ADJ-white-E-ADJ.SG and
       t-ə-k-iv-ə-ŋ-∅   əno   ənno   luqi-n
       1SG.S/A-E-PRS-*ivək*-E-PRS-1SG.S that 3SG.ABS black-ADJ.SG
       'I allow that the ball is white and I allow that it is black.'

    b. ujŋe   ∅-iw-ke   t-ə-k-it-ə-ŋ-∅   əno   əɲɲin   qapəl
       NEG.RLS NEG-*ivək*-NEG 1SG.S/A-E-PRS-be-E-PRS-1SG.S that that.ABS.SG ball.ABS.SG
       n-ilɣ-ə-qin   to   ujŋe   ∅-iw-ke   t-ə-k-it-ə-ŋ-∅   əno
       ADJ-white-E-ADJ.SG and NEG.RLS NEG-*ivək*-NEG 1SG.S/A-E-PRS-be-E-PRS-1SG.S that
       ənno   luqi-n
       3SG.ABS black-ADJ.SG
       'I **don't think** that the ball is white and I **don't think** that it is black.' (speaker comment: same thought as (14a)[8])

2.2.2   Analysis of the variable-force of *ivək*

- We will implement Rullmann et al.'s (2008) idea: the modal item is a universal quantifier with a "modal choice function" domain restriction.

(15) "modal choice function" (2008, pp. 337–338)   (subset selection function)

    a. $f_{(st)st}$ is a function s.t. for any non-empty set of worlds W: f(W)$\subseteq$ W and f(W)$\neq \emptyset$

    b. $[\![\text{modal}]\!]^{c,w}$ is only defined if c provides a modal base B.
       $[\![\text{modal}]\!]^{c,w} = \lambda f_{(st)st} \lambda p_{st}. \forall w'[w' \in f(B(w)) \rightarrow p(w')]$

   In addition to a contextual resolution, Rullmann et al. also need the mechanism of existential closure over the selection function. Their existential closure applies at LF over *f*.

- Recall that we mostly had to use matching tasks. So, we have not been able to reliably test for the alleged context-sensitivity of the selection function mechanism. In particular, we have not been able to test the felicity of *ivək* in a situation where a piece of evidence is salient + *ivək* has the weak reading. Pending further evidence, we reflect this by restricting C below to two options: either f does no work (f is the identity function) or it is *some* restriction on the domain ($\sim$ Rullmann et al.'s existential closure). Thus, in comparison to Rullmann et al. (2008), we lack the option of resolving C to a context-induced cover over these functions.

(16) Denotation of *ivək* (to be amended for flavour)[a]
    $[\![ivək]\!]^{c,g,w} = \lambda C \lambda p \lambda x :$
    $C = \{f \,|\, f(\mathcal{B}_w^x) = \mathcal{B}_w^x\} \quad \lor \quad C = \{f \,|\, f(\mathcal{B}_w^x) \subseteq \mathcal{B}_w^x \land f(\mathcal{B}_w^x) \neq \emptyset\}$.
    $\exists f \in C \,\forall w' \in f(\mathcal{B}_w^x) \,[p(w') = 1]$

    where $\mathcal{B}_w^x$ is the set of worlds compatible with x's beliefs at w,
    C is a cover that limits the choice of $f_{(st)st}$ (so that f is either the identity function or some subset selection function on $\mathcal{B}_w^x$)

    We'll abbreviate $\mathcal{C}_{id}$ for the first way of resolving the cover and $\mathcal{C}_{all}$ for the second.

    [a]This alternative implementation is based on a suggestion by Roger Schwarzschild.

Working out some examples:

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[8]A speaker noted that (14b) also expresses "another thought" that is infelicitous in this context: namely, the one where the ball is half white and half black. This reading can be obtained if the resulting interpretation has two wide-scope necessity forces ($\Box$*black* $\land$ $\Box$*white*).

(17) $[\![(11b)]\!]^{c,g,w} = 1$ iff $\exists f \in g(C)[\forall w' \in f(\mathcal{B}_w^h)[r(w') = 1]] \wedge \exists f \in g(C)[\forall w' \in f(\mathcal{B}_w^h)[r(w')] = 0]$

Resolution to $\mathcal{C}_{id}$ (contradictory): $\forall w' \in \mathcal{B}_w^h[r(w') = 1]$ $\wedge$ $\forall w' \in \mathcal{B}_w^h[r(w') = 0]$
Resolution to $\mathcal{C}_{all}$ (felicitous): $\exists f \in \mathcal{C}_{all} \, \forall w' \in f(\mathcal{B}_w^h)[r(w') = 1] \wedge \exists f \in \mathcal{C}_{all} \, \forall w' \in f(\mathcal{B}_w^h)[r(w') = 0]$

$\exists f \in g(C) \, \forall w' \in f(\mathbb{B})[p(w') = 1] \wedge \exists f \in g(C) \, \forall w' \in f(\mathbb{B})[p(w') = 0]$
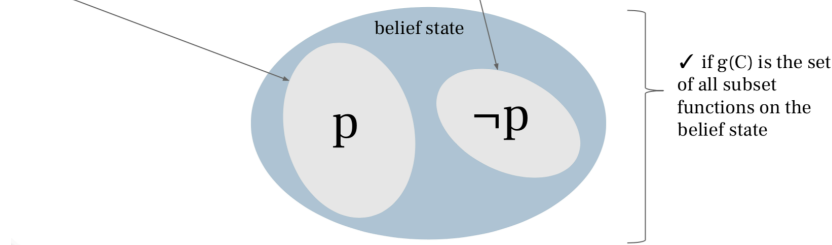
Figure 1: (11b): $iv\partial k(p) \wedge iv\partial k(\neg p)$

(18) $[\![(14b)]\!]^{c,g,w} = 1$ iff $\neg \exists f \in g(C)[\forall w' \in f(\mathcal{B}_w^h)[b(w') = 1]]$ and $\neg \exists f \in g(C)[\forall w' \in f(\mathcal{B}_w^h)[b(w') = 0]]$

Resolution to $\mathcal{C}_{id}$ (felicitous): $\exists w' \in \mathcal{B}_w^h[b(w') = 0]$ $\wedge$ $\exists w' \in \mathcal{B}_w^h[b(w') = 1]$
Resolution to $\mathcal{C}_{all}$ (contradictory): $\forall f \in \mathcal{C}_{all}[\exists w' \in f(\mathcal{B}_w^h)[b(w') = 0]] \wedge \forall f \in \mathcal{C}_{all}[\exists w' \in f(\mathcal{B}_w^h)[b(w') = 1]]$

$\forall f \in g(C) \, \exists w' \in f(\mathbb{B})[p(w') = 0] \wedge \forall f \in g(C) \, \exists w' \in f(\mathbb{B})[p(w') = 1]$
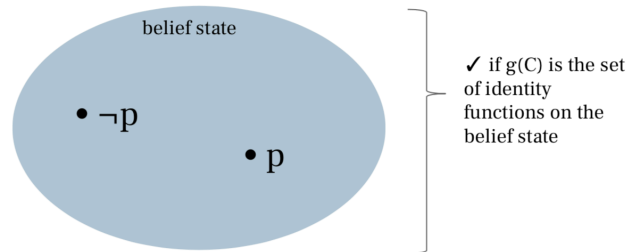

Figure 2: (14b): $\neg iv\partial k(p) \wedge \neg iv\partial k(\neg p)$

3   Flavours of attitude verbs and where they come from

• In this talk we address three flavors (readings) of *ivək*: doxastic ('think', 'allow for the possibility'), assertive ('say', 'suggest'), and bouletic ('hope', 'fear', 'wish'). (The Appendix contains examples of some others.)

• The upshot is that while the assertive and the doxastic flavors are tied to the denotation of *ivək*, a separate component (located in the embedded clause) is responsible for giving rise to the bouletic reading.

• This illustrates two ways in which attitudinal flavor surfaces at LF. We offer some cross-linguistic thoughts on this at the end of this section.

3.1   Navajo and the contribution of the embedded clause (Bogal-Allbritten 2016)

• The Navajo **nízin** has **doxastic** and **bouletic** readings: 'think', 'want/wish', and 'hope' (Bogal-Allbritten 2015, 2016). Unlike *ivək*, it does not seem to have variability in force, having only necessity readings (Elizabeth Bogal-Allbritten, p.c. January 2019).

- Bogal-Allbritten argues that *nízin* is itself not specified for flavour, and that **material in the embedded clause determines the flavor**.

  – The flavours of *nízin* (can) have overt correlates, but these correlates appear in the embedded clause. The presence of *sha'shin* results in a doxastic flavour, as in (19a), while *laanaa* is used for the bouletic one, as in (19b).

    (19) a. Hastiin [nahodoołtį́įł sha'shin] nízin.
              man   3S.rain.FUT   MODAL   3S.ATT
              'The man thinks it will probably rain.' (2015, ex. 15a)

          b. Alice [nahodoołtį́įł (laanaa)] nízin.
              Alice 3S.rain.FUT   DESIRE   3S.ATT
              'Alice wants, wishes it to rain.' (2015, ex. 24)

  – Further evidence comes from the fact that two clauses conjoined under *nízin* can have different flavours: in (20), the first clause has a doxastic interpretation, whereas the second has a bouletic one.

    (20) Context: Alice thinks that Bill moved to Flagstaff. She wants to go visit him some time, but does not have any definite plans to do so and knows it is very likely it will not happen.
          Alice [Bill Kinłánígóó 'ííná]   'ákondi   [bich'į̇ deesháál] nízin
          Alice Bill   Flagstaff.to 3S.move.PERF but.even.so   3O.to   1S.go.FUT 3S.ATT
          'Alice thinks Bill moved [to Flagstaff], but even so she wants to go see him.' (2015, ex. 13)

- She proposes that *nízin* is only a predicate of mental attitude situations, in (21a), and that the embedded elements have meanings as in (21b). Notice also that the possible-worlds quantification is contributed by the embedded clause, à la Kratzer (2006), with *laanaa* or the covert DES (short for desires).

    (21) a. $[\![\textit{nízin}]\!] = \lambda s \lambda w.\text{mental–attitude}(s)(w)$ (2015, pp. 5–7)

          b. $[\![\textit{laanaa}/\emptyset_{des}]\!] = \lambda p \lambda s \lambda w. \forall w' \in \text{DES}(s)(w)[p(w')]$

          c. $[\![(19b)]\!] =$
              $\exists s[\text{mental-attitude}(s)(w_0) \wedge \text{experiencer(Alice)}(s)(w_0) \wedge \forall w' \in \text{DES}(s)(w_0)[\text{rain}(w')]]$

3.2 Flavors of *ivək* and the role of the embedded clause

3.2.1 The assertive and the doxastic flavors of *ivək*

- *Ivək* is commonly used as an assertive verb meaning 'say' or 'tell' (in fact, if you ask a speaker what *ivək* means, the answer will nearly always be 'say').

    (22) jeq-ə-kjit   ənp-ə-qlavol-a   ∅-iw-nin   ŋavəčŋ-o,   əno
          what-E-NARR   old-E-man-ERG   2/3.S/A.IND-*ivək*-3SG.A>3.O   woman-ABS.PL   that
          ∅-ku-leʔu-ŋ-nin   jatan ənnen kəmiŋ-ə-n?
          2/3.S/A.IND-PRS-see-PRS-3SG.A>3.O   only   one   boy-E-ABS.SG
          'Why did the old man tell the women that he saw only one boy?' (Vdovin and Jajletkan 1949)

    (23) - tumɣ-ə-tuj-u,   ɣəm-nan t-ə-n-toŋv-av-ə-n   oječv-at-ɣəjŋ-ə-n
            friend-E-2NSG-ABS.PL   1SG-ERG 1SG.S/A-E-CS-be.created-VB-E-3SG.O play-VB-NMLZ-E-ABS.SG
          - ∅-iv-i   kavaw
            2/3.S/A.IND-*ivək*-AOR Kavaw.ABS.SG
          - miŋkəje it-ə-lʔ-ə-n?   - na-pŋəlo-n   ənno   qaj-ə-kmiŋ-ə-jək-∅
            how   be-E-S/O.PTCP-E-ABS.SG   INV-ask-3SG.O 3SG.ABS   DIM-E-child-E-OBL.NSG-ERG
          '"Friends, I've created a game," **said** Kavaw. "What kind?" the children asked him.' (Vdovin and Jajletkan 1949)

- Both the assertive and doxastic readings are found in **nominalizations**, suggesting that they don't require the presence of an embedded clause.

(24) ek-wəjŋ-ə-n
      ivək-NMLZ-E-ABS.SG
      '**utterance**, **thought**, something allowed'

- We find that a single *ivək* cannot embedded two clauses and have a doxastic interpretation over one conjunct and an assertive interpretation over the other one. This test was proposed by Bogal-Allbritten (2016) as a way of distinguishing whether the flavor comes from the embedded clause or not.

(25) A principal enters the classroom of a teacher whose students are doing poorly in class and asks him how the students are doing. The teacher doesn't want to disappoint the principal, so he says 'The students are doing well'.
      #inenɣəjulevəč?-ə-n   ∅-**iv**-i   əno   ə-nine-w   jejɣučewŋəl?-u
      teacher-E-ABS.SG   2/3.S/A.IND-*ivək*-AOR   that   3SG-POSS-3PL   student-ABS.PL
      met?a-ŋ   ∅-ko-ja-jɣočawŋ-ə-la-ŋ-∅   ?am   əno   qekwa-ŋ
      beautiful-ADV   2/3.S/A.IND-PRS-study-E-PL-PRS-3.S.IND   but   that   bad-ADV
      ∅-ko-jajɣočawŋ-ə-la-ŋ-∅
      2/3.S/A.IND-PRS-study-E-PL-PRS-3.S.IND
      'The teacher **said** that his students are studying well but **thought** that they were studying badly.'
      (intended)

- The distinction between the doxastic 'think' and the assertive 'say' can be specified with **adverbials** ('secretly', 'to oneself' vs. 'openly', 'with words'), and in some cases has to be, as in (26). This resembles the configurations where adverbials like *according to the law* are used to specify the flavour of English modals like *must*.

(26) A teacher is always complaining to his wife about how bad his students are. One day, the principal asks him about his students, and he tells him that they are great.
      a. inenɣəjulevəč?-ə-n ∅-**iv**-i   əno ə-nine-w   jejɣučewŋəl?-u met?a-ŋ
          teacher-E-ABS.SG   2/3.S/A.IND-*ivək*-AOR that 3SG-POSS-3PL student-ABS.PL beautiful-ADV
          ∅-ko-jajɣočawŋ-ə-la-ŋ-∅   ?am   #(činin) ∅-**iv**-i   əno
          2/3.S/A.IND-PRS-study-E-PL-PRS-3.S.IND   but   self   2/3.S/A.IND-*ivək*-AOR   that
          əčč-u   qekwa-ŋ ∅-ko-jajɣočawŋ-ə-la-ŋ-∅
          3NSG-ABS.PL bad-ADV 2/3.S/A.IND-PRS-study-E-PL-PRS-3.S.IND
          'The teacher **said** that his students studied well but **thought** to himself that they studied badly.'
      b. inenɣəjulevəč?-ə-n ∅-**iv**-i   əno ə-nine-w   jejɣučewŋəl?-u qekwa-ŋ
          teacher-E-ABS.SG   2/3.S/A.IND-*ivək*-AOR that 3SG-POSS-3PL student-ABS.PL bad-ADV
          ∅-ko-jajɣočawŋ-ə-la-ŋ-∅   ?am   #(?oja-ŋ) ∅-**iv**-i   əno
          2/3.S/A.IND-PRS-study-E-PL-PRS-3.S.IND   but   open-ADV   2/3.S/A.IND-*ivək*-AOR   that
          əčč-u   met?a-ŋ   ∅-ko-jajɣočawŋ-ə-la-ŋ-∅
          3NSG-ABS.PL beautiful-ADV 2/3.S/A.IND-PRS-study-E-PL-PRS-3.S.IND
          'The teacher **thought** that his students studied badly but openly **said** that they studied well.'

3.2.2   The bouletic flavour of *ivək*

- The bouletic flavor of *ivək* is realized by morphologically distinct embedded clauses: the indicative mood, as in (27), allows for the 'hope' and 'fear' readings, while the counterfactual mood, as in (28), is needed for wishes.[9]

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[9]Some speakers prefer to add the particle *iwke* 'if only' to an embedded counterfactual clause giving rise to the 'wish' meaning, though it is not required.

(27) meʎʎo   ∅-k-iv-ə-ŋ-∅,   (əno) ∅-ku-muq-et-ə-ŋ-∅
      Melljo.ABS.SG 2/3.S/A.IND-PRS-*ivək*-E-PRS-3.S.IND that   2/3.S/A.IND-PRS-rain-VB-E-PRS-3.S.IND
      'Melljo {says, thinks, allows for the possibility, hopes, fears, …, *knows, *imagines,*wishes} that
      it's raining.'

(28) meʎʎo   ∅-k-iv-ə-ŋ-∅,   (iwke) n-ə-ʔ-ə-muq-et-ə-n
      Melljo.ABS.SG 2/3.S/A.IND-PRS-*ivək*-E-PRS-3.S.IND if.only 2/3.S/A.CF-E-CF-E-rain-VB-E-2/3.S/O.CF
      'Melljo wishes it would rain.'

- The bouletic flavour is *not* found in the *-ɣəjŋ* nominalizations, which only have the assertive and doxastic
  readings. Other verbs may be nominalized to produce some of these bouletic readings, for example,
  ɣajmatək 'to wish/desire/love' or *wejulʔetək* 'to fear' for the nouns 'desire' and 'fear', respectively.[10]

(29) ek-wəjŋ-ə-n
      ivək-NMLZ-E-ABS.SG
      'utterance, thought, something allowed, *hope, *fear, *wish'

(30) a. ɣajm-at-ɣəjŋ-ə-n
          wish-VB-NMLZ-E-ABS.SG
          'wish/desire'

      b. wajolʔ-at-ɣəjŋ-ə-n
          fear-VB-NMLZ-E-ABS.SG
          'fear'

- Recall the test from (25), where we embedded two clauses under a single attitude verb, attempting to
  assign them two distinct flavors. This did not work for the combination of the doxastic and the assertive
  flavor. However, like in Navajo, Bogal-Allbritten's test works for the combination of the doxastic and the
  bouletic flavor. Notice that quantificational force seems to not play a role since 'hope' can be in this way
  coordinate with both 'think' as well as with 'allow for the possibility'.

(31) a. We're talking about our mutual friend Tatiana, who lives in Novosibirsk.
          t-ə-k-iv-ə-ŋ-∅   [əno   tatjana   ∅-ko-tva-ŋ-∅
          1SG.S/A-E-PRS-*ivək*-E-PRS that   Tatiana.ABS.SG   2/3.S/A.IND-PRS-be-PRS-3.S.IND
          novosibirsk-ə-k]   to   [əno ečɣi ∅-ku-kəčviʎʔ-et-ə-ŋ-∅]
          Novosibirsk-E-LOC   and that today 2/3.S/A.IND-PRS-be.happy-VB-E-PRS-3.S.IND
          'I **think** that Tatiana is in Novosibirsk and I **hope** that she is happy today.'

      b. Hewngyto and Qechghylqot are competing in a race, and I want Hewngyto to win.
          t-ə-k-iv-ə-ŋ-∅   [əno ʔewŋəto   ∅-j-ena-lv-at-ə-ŋ-∅]
          1SG.S/A-E-PRS-*ivək*-E-PRS-1SG.S that Hewngyto.ABS.SG 2/3.S/A.IND-FUT-AP-defeat-VB-FUT-3.S.IND
          ʔam [əno ewənčam   qečɣəlqot   ∅-j-ena-lv-at-ə-ŋ-∅]
          but that nonetheless Qechghylqot.ABS.SG 2/3.S/A.IND-FUT-AP-defeat-VB-FUT-3.S.IND
          'I **hope** that Hewngyto will win, but I **allow for the possibiliy** that nonetheless Qechghylqot
          will win.'

(32) ʔewŋəto   ∅-k-iv-ə-ŋ-∅   [əno meʎʎo   mitʔa-jin]   to
      Hewngyto.ABS.SG 2/3.S/A.IND-PRS-*ivək*-PRS-3.S.IND that Melljo.ABS.SG beautiful-ADJ.SG and
      [iwke   n-ə-ʔ-ə-ŋawtəŋ-ə-n   ən-ə-k]
      if.only 2/3.S/A.CF-E-CF-E-marry-VB-E-2/3.S/O.CF 3SG-E-LOC
      'Hewngyto **thinks** that Melljo is beautiful and **wishes** he would marry her.'

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[10] Interestingly, speakers of the northern dialect of Chawchuven Koryak, which lacks a verb expressing 'hope' other than *ivək*, know
of no way to express the noun 'hope' in the language.

- Since the two clauses are embedded under only one verb[11], the fact that the conjuncts differ as to whether they are interpreted as the complement of a doxastic predicate or a bouletic one shows that this distinction must come from the embedded clause.

- We propose that the doxastic flavor comes from the verb *ivək* itself, and that the bouletic meaning arises by combining the matrix doxastic quantifier with material in the embedded clause. For 'wish' we will simply encode it into the semantics of the counterfactual mood, while for 'hope' we will attribute it to a covert item.[12]

- The group attitude holder test from Bogal-Allbritten (2016) shows a lack of a **hope/fear distinction**: as shown in (33), when the subject of *ivək* is non-singular, the attitude holders may differ in their preference towards the embedded clause. However, the reading seems to require a preference, as *ivək* cannot be used to express indifference (34). A more careful examination is needed here.

(33) Hewngyto and Vanja are in a race. Qotaw and I have bet money on the winner: I bet money on Hewngyto, and Qotaw bet on Vanja.

muj-i	qotaw	mət-k-**iv**-ə-ŋ-∅		[amu	ʔewŋəto
1NSG-ABS.DU	Qotaw.ABS.SG	1NSG.S/A-PRS-*ivək*-E-PRS-1NSG.S/O		might	Hewngyto.ABS.SG
∅-j-ena-lv-at-ə-ŋ-∅			ʔije-k]		
2/3.S/A.IND-FUT-AP-defeat-VB-FUT-3.S.IND			race-LOC		

'I hope and Qotaw fears that Hewngyto will win the race.'
(literally, Qotaw and I *ivək* that Hewngyto will win the race)

(34) #ɣəmmo t-ə-k-iv-ə-ŋ   metke je-muq-et-ə-ŋ   metke qəjəm
1SG.ABS 1SG.S/A-E-PRS-say-E-PRS POL.Q FUT-rain-VB-E-FUT POL.Q NEG.IRR
intended: 'I don't care whether or not it will rain.'

- We have not yet found a fear-version of wish: 'I *ivək* that I was sad' would presuppose that I am happy and assert that being sad is dispreferable.

3.2.3 Analysis of the flavors

- **Assertive/doxastic** flavor: These two flavors seem to be coming from the verb *ivək* itself, rather than some material in the embedded clause. One way to model this is as **underspecification**: a free variable at LF.

(35) Denotation of *ivək* (final):
$$[\![ivək]\!]^{c,g,w} = \lambda i \lambda C \lambda p \lambda x :$$
$$\left(i(x)(w) = \mathcal{B}_w^x \vee i(x)(w) = \mathcal{S}_w^x\right) \quad \wedge$$
$$\left(C = \{f \mid f(i(x)(w)) = i(x)(w)\} \vee C = \{f \mid f(i(x)(w)) \subseteq i(x)(w) \wedge f(i(x)(w)) \neq \emptyset\}\right).$$
$$\exists f \in C[\forall w' \in f(i(x)(w))[p(w') = 1]]$$

We encode the quantificational force in the attitude verb. There is independent evidence that the variability in force is restricted only to some attitude verbs in Koryak – recall that *ləmalavək* 'believe' does not have a weak force, cf. (11a). If one was to encode the quantificational force in the embedded clause, as in Bogal-Allbritten (2016) or Kratzer (2006), one would need to work with a selection mechanism or something equivalent.

- **Bouletic** flavor: Since there is evidence that the bouletic flavor is determined by material in the embedded clause, we will take an off-the-shelf meaning for the English verbs like *wish* and extract form them the doxastic component. The doxastic component will be contributed to by the doxastic interpretation of *ivək*, while material in the embedded clause will make up for the rest.

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[11]Or under distinct verbs that are semantically identical, allowing one of them to be gapped.

[12]A more precise analysis would build the meaning of 'wish' from the counterfactual mood and 'want', see Iatridou (2000). Since *ivək* does not mean 'want', we will not encode a connection between the 'hope' reading and the 'wish' reading, but will provide two separate lexical entries.

- Following Yalcin (2007), we enrich the point of evaluation to contain, in addition to the world of evaluation, an information state of evaluation. We depart from Yalcin (2007) by replacing the information state as a set of worlds in the parameter with the triple that produces such an information state.

(36)   a. $[\![\cdot]\!]^{g,\langle w,\langle a,v,I\rangle\rangle}$, where w is the world of evaluation and $\langle a,v,I\rangle$ is the information state of evaluation (a is the information state holder, v is the world from which the state is generated and $\mathcal{I}$ (of type *esst*) is the way in which the state is generated)

       b. $\langle a,v,I\rangle$ intuitively corresponds to the set of worlds $\mathcal{I}_v^a$

       c.   Example: $\langle j,w,\mathcal{B}\rangle$ instead of $\mathcal{B}_j^w$ (John's beliefs at w)

- Following Yalcin (2007), attitude verbs shift the information state parameter to the set of worlds they quantify over. Thus, a clause embedded under *ivək* is not interpreted with respect to the matrix information state (more precisely, $\langle a,v,\mathcal{I}\rangle$ below) but with respect to the attitude holder's beliefs/sayings in the world of evaluation (more precisely, $\langle x,w,\lambda y\lambda w''.f(i(y)(w''))\rangle$ below).

(37) $[\![ivək]\!]^{c,g,\langle w,\langle a,v,\mathcal{I}\rangle\rangle}(i)(C)(p)(x)$
     is defined only if
           $i(x)(w) = \mathcal{B}_w^x$ or $i(x)(w) = \mathcal{S}_w^x$ and
           $C = \{f \mid f(i(x)(w)) = i(x)(w)\}$ or $C = \{f \mid f(i(x)(w)) \subseteq i(x)(w) \wedge f(i(x)(w)) \neq \emptyset\}$
     and, if defined, is true iff
     $\exists f \in C \, \forall w' \in f(i(x)(w)) \; \big[p\big(\langle w',\langle x,w,\lambda y\lambda w''.f(i(y)(w''))\rangle\rangle\big) = 1\big]$

- **Wishing**: English *wish* denotation broken down into *ivək* (in the matrix clause), defined in (37), and the CF mood (in the embedded clause), defined below. As mentioned above, there might be reasons to decompose this CF entry further, to assign the counterfactual mood a more fine-grained role in combination with the covert item that appears with 'hope/fear'.[13]

$$\text{If defined, } [\![wish]\!]^{g,c}(\geq,p,x,w)=1 \text{ iff } \forall w' \in \mathcal{B}_w^x : \text{SIM}(w',rev_p(\mathcal{B}_w^x)\cap p) >_w^x w' \qquad \text{(Crnič}$$
2011, p. 75) (based on Heim 1992, p. 204)

issue: belief-state contingent

the goal is to abstract this out

$$\text{If defined, } [\![CF]\!]^{c,g,\langle w',\langle a,v,\mathcal{I}\rangle\rangle}(p) = 1 \text{ iff } \text{SIM}(w',rev_p(\mathcal{I}_v^a)\cap p) >_v^a w'$$

Two example derivations (with Englishized Koryak in the object language):

(38)   If defined,
     $[\![John\ [[ivək\ m]\ C]\ [that\ CF\ it's\ raining]]\!]^{c,g,w,\langle a,v,\mathcal{I}\rangle} = 1$ iff
     $[\![ivək]\!]^{c,g,w,\langle a,v,\mathcal{I}\rangle}\big(g(m)\big)\big(g(C)\big)\big([\![that\ CF\ it's\ raining]\!]_{\mathfrak{C}}^{c,g}\big)(j) = 1$ iff
     $\exists f \in g(C) \, \forall w' \in f\big(g(m)(j)(w)\big) : [\![that\ CF\ it's\ raining]\!]_{\mathfrak{C}}^{c,g}(w',\langle j,w,\lambda x\lambda v.f((g(m)(x)(v)))\rangle) = 1$ iff
     $\exists f \in g(C) \, \forall w' \in f\big(g(m)(j)(w)\big) : [\![that\ CF\ it's\ raining]\!]^{c,g,\langle w',\langle j,w,\lambda x\lambda v.g(C)((g(m)(x)(v)))\rangle\rangle} = 1$ iff
     $\exists f \in g(C) \, \forall w' \in f\big(g(m)(j)(w)\big) : \text{SIM}\big(w',rev_\varphi(f(g(m)(j)(w)))\cap\varphi\big) >_w^j w'$ (where φ abbreviates $\lambda w.$ it's raining at w)

     Suppose that $g(C)$ is $\mathcal{C}_{id}$ and $g(m)$ is $\mathcal{B}$, then this amounts to:
     $\forall w' \in \mathcal{B}(j)(w) : \text{SIM}\big(w',rev_\varphi(\mathcal{B}(j)(w))\big)\cap\varphi\big) >_w^j w'$

---

[13]We have not tested whether *ləmalavək* 'believe' can give rise to wishes when combined with the counterfactual mood. However, matrix clauses with the particle *iwke* and counterfactual mood express speaker-oriented wishes:

(i)   iwke   n-ə-ʔ-ečɣəʎʔ-at-ə-n   ajɣəve
     if.only   2/3.S/A.CF-E-CF-bright-VB-E-2/3.S/O.CF   yesterday
     'If only it had been sunny yesterday!'

(39) If defined,
$[\![$John $[[iv\partial k\ m]\ C]$ [Melljo is pretty and CF John marry Melljo]$]\!]^{c,g,w,\langle a,v,\mathcal{I}\rangle} = 1$ iff
$\exists f \in g(C)\ \forall w' \in f(g(m)(j)(w)) : [\![$M is pretty and CF J marry M$]\!]^{c,g,\langle w',\langle j,w,\lambda x \lambda v.g(C)((g(m)(x)(v))\rangle\rangle} = 1$ iff
$\exists f \in g(C)\ \forall w' \in f(g(m)(j)(w)):$ M is pretty at w' and $[\![$CF J marry M$]\!]^{c,g,\langle w',\langle j,w,\lambda x \lambda v.g(C)((g(m)(x)(v))\rangle\rangle} =$
1 iff $\exists f \in g(C)\ \forall w' \in f(g(m)(j)(w)):$ Melljo is pretty at w' and $\mathrm{SIM}(w', rev_\varphi(f(g(m)(j)(w)))\cap\varphi) >^j_w w'$
(where φ is λw. John marries Melljo at w)

Note: When we see one overt *ivək*, there could be a gapped *ivək*. This would mean two instances of *ivək* at LF with $g(C)$ and $g(m)$ needing to receive identical interpretations. Notice that $g(C)$ could be $\mathcal{C}_{all}$, which would allow for variable force.

- **Hoping/Fearing**: The decomposition proceeds in a similar way. Since there is no overt morphological reflex in the embedded clause, we need to postulate a covert component. Thus, the English *hope* denotation, in (40), decomposes into a matrix-clause *ivək* and a covert item DES in the embedded clause, defined in (41). Since preliminary data in (33) suggests that *ivək* does not distinguish between the two interpretations (hoping and fearing), we preliminarily encoded the two as a disjunction in (33).

  (40) If defined, $[\![$hope$]\!]^{g,c}(\geq,p,x,w) = 1$ iff $\forall w' \in \mathcal{B}^x_w : \mathrm{SIM}(w', \mathcal{B}^x_w \cap p) >^x_w \mathrm{SIM}(w', \mathcal{B}^x_w\backslash p)$ (Crnič 2011, p. 76); (roughly, for any belief world w': x prefers p at w')

  (41) a covert preference item in the Koryak embedded clause:
        If defined, $[\![$DES$]\!]^{c,g,\langle w',\langle a,v,\mathcal{I}\rangle\rangle}(p) = 1$ iff
        $[\mathrm{SIM}(w', \mathcal{I}^a_v \cap p) >^a_v \mathrm{SIM}(w', \mathcal{I}^a_v\backslash p)] \vee [\mathrm{SIM}(w', \mathcal{I}^a_v\backslash p) >^a_v \mathrm{SIM}(w', \mathcal{I}^a_v \cap p)]]$
        (roughly, *a* prefers *p* at w' or *a* disprefers *p* at w', where *a*'s preference is set at *v*)

- **Mixed feelings?** Further investigation is also needed to see whether *ivək* has a 'mixed-feelings' reading. This reading would be one where in some some doxastic worlds *p* is preferred and in others ¬*p* is preferred. If this reading turns out to not be available, one could place a homogeneity condition (as a definedness condition) on the preference ($>$) relation.

3.3 How common is variable flavor with attitudes? What are the cross-linguistic strategies for encoding attitudinal flavor?

- Other languages seem to use the same lexical material to express the distinction between *think* and *say*.

  – Biblical Hebrew *ʔ-m-r* typically means 'say' (as it does in the modern language), but it also has a variety of other meanings, including 'think' (often, though not obligatorily, in the context of the PP *in X's heart*), 'promise','intend', and possibly 'hope.'[14]

  (42) a. 'think'
        way-yōmer   ʕēśāw   bᵊ-libb-ō   yi-qrᵊb-ū   yᵊmē ʔēbel   ʔāb-ī
        and-said.3.M.SG Esau   in-heart-his 3-approach-M.PL days mourning father-my
        'Esau thought to himself (lit. 'said in his heart'): the days of mourning my father approach.' (Gen 27.41)

        b. 'promise'
        ʔāmar-tī   li-šmōr   dᵊbārē-kā
        promise.PFV-1.SG to-keep.INF words-your
        'I promised to keep your words' (Ps 119.57)

        c. 'intend'
        hᵃ-lᵊ-horg-ēnī   attā šōmēr?
        Q-to-kill.INF-me   you   intend.PTCP.M.SG
        'Do you intend to kill me?' (Exod 2.14)

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[14]Thanks to Matthew Hewett for providing us with these data.

      d. 'hope'(?)
         way-yōmer   lˤ-biqʔ-ām   ʔēl-āyw
         and-hoped/intended.3.M.SG to-cut.off.INF-them for-him
         'He hoped/intended to annex them (lit. cut them off) for himself.' (2 Chr 32.1)

– formal/archaic Slovenian *meniti* ('think', 'say'):

  (43) a. Menim, da   dežuje.
             I.think   that   it's.raining
             'I think it's raining.'

         b. lahko greste, meni zaničljivo,   toda prej   plačajte
             can   you.go says contemptibly but   before pay
             'You can go, he said contemptibly, but pay first.' (example from SSKJ)

– The English *be like*, while only quotative, also seems to be either doxastic or assertive: the person who holds the attitude can, but does not have to, have expressed it out loud.

  (44) a. John$_j$ was like, he$_{i/*j}$ is tall

        b. *Who was John like Mary saw _?

  (45) I was like, that's a bad idea.
        'I thought that it was a bad idea.'
        'I said that it was a bad idea.'

• What are the cross-linguistic strategies for encoding flavor with attitudes?

– **lexical encoding**: English *wish, say, think, order,…*

– **underspecification/ambiguity**: Koryak doxastic-assertive *ivək*, Slovenian doxastic-deontic *dopuščati*, Slovenian doxastic-assertive *meniti,…*
    · in some cases specifiable with **adverbials**: 'openly'/'with words' (assertive flavour) vs. 'secretly'/'to self' (doxastic flavour) for the Koryak *ivək*, 'in my heart' for the doxastic reading of the Biblical Hebrew *ʔ-m-r*

– **separate lexical encoding**:
    · bouletic flavor in the **embedded clause** with the Navajo *nízin* and the Koryak *ivək* (see Appendix for the directive flavor of *ivək* with an embedded imperative)
    · "reflexive" **clitics**: Slovenian *meniti* ('think') vs. *meniti se* ('talk about'), *spraševati se* ('wonder') vs. *spraševati* ('be asking')

4 Nauze's generalization and outlook

• How do modals and attitudes differ in force and flavor?

Comparison by force:

	fixed force	variable force
universal base	*must*	*k'a* (St'át'imcets)
existential base	*may*	*oq'a* (Nez Perce)

Figure 3: Typology of force variation in the modal domain (some examples)

	fixed force	variable force
universal base	*know, believe,…*	*ivək* (Koryak)
existential base	*dopuščati* (Slovenian)	?

Figure 4: Typology of force variation in the attitudinal domain (some examples)

Comparison by flavor:

fixed flavor	variable flavor
k'a (St'át'imcets)	*must*

Figure 5: Typology of flavor variation in the modal domain (some examples)

fixed flavor	variable flavor
know	*ivək* (Koryak)

Figure 6: Typology of flavor variation in the attitudinal domain (some examples)

- Recall Nauze's generalization:

(46) Modal elements […] either vary on the [flavor] axis and thus are polyfunctional in the original sense of expressing different types of modality or they vary on the [force] axis and can express possibility and necessity, but they cannot vary on both axes. (Nauze 2008, p. 222)

As recently shown by Bochnak (2015b,a), this generalization does not hold for modals. As we show here, it does also not hold for attitude verbs. More empirical work is needed to fill up the table in Figure 8.

Comparison by both:

	fixed flavour	variable flavour
universal	*mesthi* (Javanese)	*must*
existential	*might*	*may*
universal + weakening	*k'a* (St'át'imcets)	*-eʔ* (Washo)
existential + strengthening	*oq'a* (Nez Perce)	?

Figure 7: Typology of force-flavour combinations in the modal domain (some examples)

	fixed flavour	variable flavour
strictly universal	*know, believe,* …	*ʔ-m-r* (Biblical Hebrew)?
strictly existential	?	*dopuščati* (Slovenian)
universal + weakening	?	*ivək* (Koryak)
existential + strengthening	?	?

Figure 8: Typology of force-flavour combinations in the attitudinal domain (some examples)

Our contributions:

- methodological: solution for doing semantic fieldwork when contextual felicity judgments fail

- empirical: variable-force attitude verb, variable-force-variable-flavour attitude verb

- theoretical: a new way of composing the bouletic meaning at LF (a doxastic quantifier + a preference component) [our account differs in this respect from Bogal-Allbritten (2016)]

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Appendix: Various further empirical points

• *ivək* is not factive, by contrast to *liɣi ləŋək* 'know'

(47) Hewngyto silently leaves his room with a rain jacket. I know that it is not raining and that it won't. I say:

  a. ujŋe   e-muq-et-ke   ∅-k-it-ə-ŋ-∅,   ʔam ʔewŋəto
      NEG.RLS   NEG-rain-VB-NEG   2/3.S/A.IND-PRS-be-E-PRS-3.S.IND   but   Hewngyto.ABS.SG
      ∅-k-iv-ə-ŋ-∅,   əno ∅-ku-muq-et-ə-ŋ-∅
      2/3.S/A.IND-PRS-*ivək*-E-PRS-3.S.IND   that 2/3.S/A.IND-PRS-rain-VB-E-PRS-3.S.IND
      'It is not raining but Hewngyto **thinks** that it's raining.'

  b.#ujŋe   e-muq-et-ke   ∅-k-it-ə-ŋ-∅,   ʔam
      NEG.RLS   NEG-rain-VB-NEG   2/3.S/A.IND-PRS-be-E-PRS-3.S.IND   but
      ʔewŋəto-na-k   liɣi   ∅-ku-lŋ-ə-ŋ-nin,   əno
      Hewngyto-OBL.SG-ERG   know?   2/3.S/A.IND-PRS-consider-E-PRS-3SG.A>3.O   that

  ∅-ku-muq-et-ə-ŋ-∅
  2/3.S/A.IND-PRS-rain-VB-E-PRS-3.S.IND
  'It is not raining but Hewngyto knows that it is raining.'

- adverbials like *amu* ('might'; it is also used to form *wh*-indefinites) facilitate the weaker reading:[15]

(48) γəmmo t-ə-k-iv-ə-ŋ-∅,   amu ∅-je-muqe-juʔ-ə-ŋ-∅
   1SG.ABS 1SG.S/A-E-PRS-*ivək*-E-PRS-1SG.S might 2/3.S/A.IND-FUT-rain-INCH-E-FUT-3.S.IND
   'I **allow for the possibility** that it will rain.' [translation to Koryak task]

Amu also preferably appears with 'hope' and 'fear':

(49) ʔewŋəto   ∅-k-iv-ə-ŋ-∅,   əno   (amu)
   Hewngyto.ABS.SG 2/3.S/A.IND-PRS-*ivək*-PRS-3.S.IND   that might
   qoja-wjep-ə-lʔ-o   vəʔajok ∅-ja-pkej-ʎa-ŋ-∅
   reindeer-herd-E-S/O.PTCP-ABS.PL soon   2/3.S/A.IND-FUT-arrive-PL-FUT-3.S.IND
   ənək-nəmnəm-etəŋ
   3SG.POSS-village-ALL
   'Hewngyto **hopes** that the reindeer herders will soon arrive to his village.'

(50) ŋeveq ʔewŋəto   n-ə-ʔ-iv-ə-n,   amu
   if   Hewngyto.ABS.SG 2/3.S/A.CF-E-CF-*ivək*-E-2/3.S/O.CF might
   ∅-j-ena-lv-at-ə-ŋ-∅   ʔije-k,   ənnenu
   2/3.S/A.IND-FUT-AP-defeat-VB-E-PRS-3.O.IND race-LOC constantly
   n-aʔ-ə-čoččəm-av-eke
   2/3.S/A.CF-CF-E-prepare-VB-IPFV
   'If Hewngyto **hoped** to win the race, he would be constantly training.'

- not disjunctive ('think or say') truth-conditions[16]

(51) Context: The school principal goes into the classroom of a teacher whose students are doing poorly
   in class, and asks the teacher how the students are doing. The teacher doesn't want to disappoint
   him, so he says, 'The students are doing well'.
   inenγəjulevəčʔ-ə-n ujŋe   ∅-iw-ke   ∅-itt-i,   əno ə-nine-w
   teacher-E-ABS.SG   NEG.RLS NEG-say-NEG 2/3.S/A.IND-be-AOR that 3SG-POSS-3PL
   jejγučewŋəlʔ-u qekwa-ŋ   ko-jajγočawŋ-ə-la-ŋ,   ʔam ŋanko
   student-ABS.PL   bad-ADV 2/3.S/A.IND-PRS-study-E-PL-PRS-3.S.IND but then
   ∅-ləmal-av-e,   əno qekwa-ŋ ∅-ko-jajγočawŋ-ə-la-ŋ-∅.
   2/3.S/A.IND-believe-VB-AOR that bad-ADV 2/3.S/A.IND-PRS-study-E-PL-PRS-3.S.IND
   'The teacher did not **say** that his students studied badly, but he believed then that they studied
   badly.'

- adverb *wəjinvan* 'fortunately' is only acceptable with the 'hope' reading

(52) a. t-ə-k-iv-ə-ŋ-∅   wəjinvan mitiw t-ə-je-pʎətku-ŋ-ə-n
     1SG.S/A-E-PRS-*ivək*-E-PRS-1SG.S fortunately tomorrow 1SG.S/A-E-FUT-finish-FUT-E-3SG.O
     wuččin   vet-γəjŋ-ə-n
     this.ABS.SG work-NMLZ-E-ABS.SG
     'I **hope** that I will finish this work tomorrow'

---

[15]Speakers have occasionally insisted on using *amu*, though no generalization as to when it is obligatory is forthcoming. We suspect that the weaker reading is simply harder to access, and that adverbs like *amu* facilitate it. This may be related to Rullmann et al. (2008)'s observation that St'át'imcets *sxek* ('maybe') is frequently used in clauses with variable-force modals when the possibility reading is intended.

[16]If *ivək* asserted a disjunction ('The teacher thought or said that the students studied badly'), negating *ivək* would rule out both thinking and saying, which would be inconsistent with the continuation that the teacher believed that the students studied badly (thanks to Roger Schwarzschild for the suggestion).

b. t-ə-k-iv-ə-ŋ-∅   (#wəjinvan)   mitiw   qəjəm
    1SG.S/A-E-PRS-*ivək*-E-PRS-1SG.S   (fortunately)   tomorrow   NEG.IRR
    m-ə-pʎətku-n   wuččin   vet-ɣəjŋ-ə-n
    1SG.S/A.IMP-E-finish-3SG.O   this.ABS.SG   work-NMLZ-E-ABS.SG
    'I **fear** that I will not finish this work tomorrow'

- some other flavours of *ivək*

(53) t-ik-wi   {jən-nəm-at-ə-k   /   q-ə-n-nəm-at-ɣ-ə-n}   təll-ə-təl
      1SG.S/A-ivək-2SG.O   CS-close-VB-E-INF   2.S/A.IMP-E-CS-close-VB-2A.IMP-E-3SG.O   door-E-ABS.SG
      'I **told** you to close the door.' [translation from Russian to Koryak]

(54) ɣəm-nan   t-iw-ne-w   tumɣ-u   qət-ə-k   ŋanen-awje-ja-jtəŋ
      1SG-ERG   1SG.S/A-*ivək*-3.O-3PL friend-ABS.PL   go-E-INF   that-eat-house-ALL
      'I told the friends to go to that restaurant.' [Koryak to Russian translation]
      'I {**advised/recommended/proposed/suggested**} (to) the friends to go to that restaurant.'
      [matching]

(55) ɣəm-nan   t-iv-ə-n   ʔewŋəto   əno   qəjom   m-ə-tulʔ-et-ə-n
      1SG-ERG   1SG.S/A-say-E-3SG.O   Hewngyto.ABS.SG   that   NEG.IRR 1SG.S/A.IMP-E-steal-VB-E-3SG.O
      ə-nin   milɣ-ə-ʔəj
      3SG-POSS   fire-E-bow.ABS.SG
      'I **promised** Hewngyto that I would not steal his gun.'

(56) ujŋe   iw-ke   ∅-itt-i,   əŋŋəʔan   ∅-j-it-ə-ŋ-∅
      NEG.RLS   *ivək*-NEG   2/3.S/A.IND-be-AOR   thus   2/3.S/A.IND-FUT-be-E-3.S.IND
      'I did not **expect** that that would happen.'