Accounting for Some (Allegedly) Unusual Attitude Verbs*

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1 Forces of 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)

1.1 Hoping, fearing, doubting? (Anand and Hacquard 2013)

- Examining Romance attitude verbs, Anand and Hacquard (2013) propose an existential force over the doxastic state for some of them.

1 a weaker semantics for doubt, but it’s not just a “plain” existential doxastic verb:

a. Anand and Hacquard (2013, p. 36):

\[ [\text{a doubt}_C \text{ that } \phi]^{c, w, S', \theta} \text{ is defined iff} \]
\[ \phi \text{-verifiers in } S' \neq \emptyset \land \phi \text{-falsifiers in } S' \neq \emptyset. \]

\[ \text{If defined } =1 \text{ iff} \]
\[ \exists w' \in S': \{ [\phi]^{c, w', S', \theta} = 1 \} \land \]
\[ p \text{-falsifiers } \geq_{\text{PRoBa}, w} p \text{-verifiers} \]

where \( S' = DOX_{a, w} \) and \( \phi \)-verifiers in \( S' = \lambda S'' \subseteq S' \land \forall S'' \subseteq S' : \{ \exists w' \in S'' : [\phi]^{c, w', S'', \theta} = 1 \} = pow(S' \cap p) \)

\phi \text{-falsifiers in } S' = \neg \phi \text{-verifiers in } S'

b. Heim (1992, p. 190):

That (25) doesn’t make sense is predicted if we assume that doubt means (or at least implies) something like not believe. After the first conjunct in (25), we then

c. cf. NPI licensing: I doubt that they have ever been to Paris.

2 differing views on hope verbs:


\[ [\text{a hope}_C \text{ that } p]^{c, w, S', \theta} \text{ is defined iff} \]
\[ p \text{-verifiers in } S' \neq \emptyset \land p \text{-falsifiers in } S' \neq \emptyset. \]

\[ \text{If defined } =1 \text{ iff} \]
\[ \exists w' \in S': \{ [p]^{c, w', S', \theta} = 1 \} \land \]
\[ p \text{-falsifiers } \geq_{\text{Des}, w} p \text{-verifiers} \]

where \( S' = DOX_{a, w} \) and \( p \)-verifiers in \( S' = \lambda S'' \subseteq S' \land \forall S'' \subseteq S' : \{ \exists w' \in S'' : [p]^{c, w', S'', \theta} = 1 \} = pow(S' \cap p) \)

\[ p \text{-falsifiers in } S' = \neg p \text{-verifiers in } S' = pow(S' \cap \neg p) \]

b. If defined, \[ [\text{hope}_C^{\text{des}}]^{c, c, p, x, w} = 1 \text{ iff } \forall w' \in B_{w}^c : \text{SIM}(w', B_{w}^c \cap p) >_{w}^{x} \text{SIM}(w', B_{w}^c \setminus p) \]

Crnič (2011, p. 76)

What about a very simple verb, like \( \exists w \in DOX[p(w) = 1]? \)

1.2 Slovenian existential belief (Močnik 2019a, b, c)

- Slovenian has a verb that conveys that the embedded clause is consistent with the attitude holder’s beliefs. Intuitively, there is no preference component (cf. hope) or negative bias (cf. doubt).

3 a. Othello dopušča, da Desdemona ljubi Cassija.

Othello allows that Desdemona loves Cassio

‘Othello allows for the possibility that Desdemona loves Cassio.’

b. Dopusušcam da je vaša laž posledica neznanja in ne zlonamernosti

I allow for the possibility that your lie follows from ignorance and not malevolence.’

c. (seveda dopuščam da obstajajo določene izjeme. ampak jih še nisem of course I.allow that exist certain exceptions but them yet not AUX srečala)
met
'(of course I allow for the possibility that there are certain exceptions. but I haven’t yet come across them)'(web²)
d. To je seveda le moje mnenje, nikakor ga ne vsiljujem, tudi dopuščam, da this is of course only my opinion in no way it not I impose also I allow that se motim.
REFL I.err
'This is of course only my opinion, I definitely do not impose it, I even allow for the possibility that I’m wrong.' (web³)

- The verb can take an optional noun možnost ('possibility').

(4) Tusk dopušča možnost, da brexita ne bo. D NP CP
Tusk allows possibility that brexit not will be
‘Tusk allows for the possibility that there will be no Brexit.’ (web⁴)

- It takes declarative CPs:

(5) a. *Dopuščam, če gre dež.
I.allow if goes rain
b. *Dopuščam, kdo je prišel.
I.allow who is come

- It has a weak force:

(6) a. Dopuščam, da dežuje, in dopuščam, da ne dežuje. Dₚ Dₜ₋ₚ
I.allow that rains and I.allow that not rains
‘I allow for the possibility that it’s raining and I allow for the possibility that it’s not raining.’
I.think that rains and I.think that not rains
‘I think that it’s raining and I think that it’s not raining.’
• It can be strengthened into a belief claim:

(7) In a debate with Flat-Earthers, a scientist is asked:

\[
\text{Ali dopuščate, da je Zemlja okrogla?}
\]
\[
\text{Q you.allow that is Earth round}
\]

‘Do you allow for the possibility that the Earth is round?’

The scientist replies:

\[
\text{Seveda dopuščam, da je -- trdno verjamem, da je!}
\]
\[
\text{of course I.allow that is firmly I.believe that is}
\]

‘Of course I allow that it is – I firmly believe that it is!’

• There can be false dopuščati states:

(8) Dežuje, ampak Janez ne dopušča, da dežuje.

\[
\text{It's raining but John not allows that rains}
\]

‘It’s raining but John doesn’t allow for the possibility that it’s raining.’

• I have been interested in its behaviour with respect to embedded epistemic modals.\(^5\)

• There is also a permission dopuščati (polysemy?):

(9) Oče (nam) dopušča, da se igramo zunaj.

\[
\text{Our father lets us play outside}
\]

‘Our father lets us play outside.’

1.3 Koryak variable-force belief

• Variable force predicates are known from the modal domain (Rullmann et al. 2008, Davis et al. 2009 et seq.)

• We present what is, to our knowledge, the first documented variable-force attitude: Koryak ivək.\(^6\)

• ivək can take either an indicative (10) or a counterfactual (11) complement, which trigger different readings; in this section we’ll only focus on the doxastic reading

(10) meʎʎo ∅-k-iv-ə-ŋ-, (ano) ∅-ku-muq-et-ə-ŋ-∅


‘Melljo {says, thinks, allows for the possibility, hopes, fears, …, *knows, *imagines,*wishes} that it’s raining.’

\(^5\)Consider, for example:

(i) You wake up and you’re too lazy to open your eyes. But you can nevertheless tell that it’s bright. What should you make of that? You might say to yourself:


\[
\text{I.think that might/must be sunny}
\]

‘I think it might/must be sunny.’

b. Dopuščam, da utegne/*mora biti sončno.

\[
\text{I.allow that might/mora be sunny}
\]

‘I allow for the possibility that it might/must be sunny.’

c. Mislim/*Dopuščam, da ne more biti deževno.

\[
\text{I.think/I.allow that not can be rainy}
\]

‘I think /’I allow for the possibility that it can’t be rainy.’

\(^6\)Koryak is a highly endangered Chukotko-Kamchatkan language with ~600 speakers spoken in northern Kamchatka in the Russian Far East. Our transcription uses the IPA, except that we use ŋ 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
(11) meʎʎo \( \odot \cdot k \cdot i \cdot v \cdot a \cdot n \cdot \emptyset \), (iwke) n-əʔ-ə-muq-et-ə-n
‘Melljo wishes it would rain.’

• Upshot: the quantificational force varies due to a restriction on an underlying universal quantifier (in the spirit of Rullmann et al. 2008).

**Detour: Elicitation Methodology**

• We employ an elicitation technique that we call a “matching task”. Unless otherwise indicated, the examples provided in this paper were obtained in this manner.
  
  – 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 the two sentences can have the same meaning in the given context.\(^7\)

• Why not just do contextual felicity judgments, as is standard (Matthewson 2004 et. seq.)?

• 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 wellformedness 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 like (11), even though this is not the location 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).

• Conclusion: best technique was to use a matching task, where the context was aided by the Russian sentence.

• Preference for a strong interpretation

(12) t-ə-k-ew-ŋəvo-ŋ-, `meki \( \odot \cdot k \cdot o \cdot n \cdot wənəvətən \cdot n\)-nen
qonpaŋ’, i vila-t t-a-ku-nike-ŋ-ne-t, tit
always and ear-ABS.DU 1SG.S/A-E-PRS-whatchamacallit-PRS-3.O-3DU so.that
m-o-valom-ə-n, jonna \( \odot \cdot k-o-tənən \).
‘I thought, “Who is he always talking to?” and [pricked up] my ears so that I might hear what he was saying.’ (Golovaniova and Mal’ceva 2015, 18)

(13) məč-čalɣəl-la-\( \emptyset \) teʃəčə-jtəŋ, majew ečʔej-ə-k teʔi
1NSG.S/A-move-PL-1NSG.S/O Tiličiki-ALL because Achavayam-E-LOC few
ə-naʔal-la-j učiteʎ-u škola-k. t-ə-k-iv-ən-\( \emptyset \):

\(^7\)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 express the same ‘thought’ (Rus. mys’), which our speakers seem to understand better.
Hewngyto says: "I don't know whether it's snowing'. "

\[ \text{ʔewŋəto} \]

Hewngyto is walking down the street. Melljo sees him and asks: "Menno γανιν γναταγι? Metke kotavarenjaŋajajak?" (Where is your wife? Is she making jam at home?) He replies:

\[ \text{ʔewŋəto} \]

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\[ \text{ʔewŋəto} \]

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\[ \text{ʔewŋəto} \]
(17) 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 kivan təŋəŋawət? ‘What is Tyngangawyt saying?’ Njobanga says:

```
quu, ʔam əneq təŋəŋawət ə-k-ə-nə-ə, əno
tə-k-ə-meŋ-ə-muq-et-ə-nə-ə əno
teʔaŋa-ə-k, amu eŋi qaəm
tilichiki-LOC might today NEG.IRR
n-ə-jət-ə-n petropavlovsk-jaŋa.
```

‘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.’

(18) We’re walking down the street and there are many people with raincoats. Melljo says:

```
aməŋ ʔeʃemtwiʔ-u meki-w əno
tila person-ABS.PL who-ABS.PL əno
all 2/3.S/A.IND-ivək-PL-AOR that
ə-je-muq-ət-ik-ə əno əɲɲin
n-ej-ə-nə-ə muq-e-ʔə-n
tə-k-ə-muq-et-i-ik əno əɲɲin
ne-ʃeləča-k, ečɣi qaəm
rain-clothes-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]

• Under negation, ivək seems to be able to express universal force, as in (19b). However, the same reading could in principle be derived with neg-raising over an existential quantification.

(19) 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-nə-ə əno əɲɲin qapəl n-əlɣ-ə-qin to
1SG.S/A-E-PRS-ivək-E-PRS-1SG.S that that.ABS.SG ball.ABS.SG
e-ʃeləča-k, ečɣi qaəm
ADJ-white-E-ADJ.SG
n-ə-lɣ-ə-qin to
2/3.S/A.IND-ivək-PRS-1SG.S that 3SG.ABS black-ADJ.SG
‘I allow that the ball is white and I allow that it is black.’
b. 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-ə-lɣ-ə-qin to əɲɲin qapəl NEG.RLS NEG-ivək-NEG 1SG.S/A-E-PRS-1SG.S that that.ABS.SG ball.ABS.SG
ne-ʃeləča-k, ečɣi qaəm
ADJ-white-E-ADJ.SG
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 (19a)⁹)

1.3.1 How can we account for this?

• We will borrow the proposal from Rullmann et al. (2008):

(20) “modal choice function” (2008, pp. 337–338) (subset selection function)

```
a. f_{st,W} is a function s.t. for any non-empty set of worlds W: f(W)⊆ W and f(W)̸= ∅
b. [modal] ⋄c.w is only defined if c provides a modal base B.

[modal] ⋄c.w = λf_{st,W} . λp_{st,b}. ∀w′ ∈ f(B(w)) → p(w′)
```

• Thus, ivək will be an underlyingly universal quantifier with a domain restriction.

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⁹A speaker noted that (19b) 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 (⋄black ∧ ◊white).

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4. Under negation, ivək seems to be able to express universal force, as in (19b). However, the same reading could in principle be derived with neg-raising over an existential quantification.

7. Thus, ivək will be an underlyingly universal quantifier with a domain restriction.
• 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.

• In addition to a contextual resolution, Rullmann et al. also need the option of existential closure over the selection function.

(21) Denotation of ivək (to be amended for flavour)\textsuperscript{10}
\[
\text{\textsc{ivək}}: \lambda x . C \land p \lambda x : \\
C = \{ f \mid f(B^w_x) = B^w_x \} \quad \lor \quad C = \{ f \mid f(B^w_x) \subseteq B^w_x \land f(B^w_x) \neq \emptyset \} . \\
\exists f \in C \forall w' \in f(B^w_x) [p(w') = 1]
\]
where $B^w_x$ is the set of worlds compatible with $x$’s beliefs at $w$,
$C$ is a cover that limits the choice of $f_{(st)}$ (so that $f$ is either the identity function or some subset selection function on $B^w_x$)

We’ll abbreviate $C_{id}$ for the first way of resolving the cover and $C_{all}$ for the second.

(22) $\llbracket 16b \rrbracket^{C_{\text{id}}, w} = 1$ iff $\exists f \in g(C) (\forall w' \in f(B^w_x)[r(w') = 1]) \land \exists f \in g(C) (\forall w' \in f(B^w_x)[r(w') = 0])$

Resolution to $C_{id}$ (contradictory):
$\forall w' \in B^w_x [r(w') = 1] \land \forall w' \in B^w_x [r(w') = 0]$

Resolution to $C_{all}$ (felicitous):
$\exists f \in C_{all} (\forall w' \in f(B^w_x)[r(w') = 1]) \land \exists f \in C_{all} (\forall w' \in f(B^w_x)[r(w') = 0])$

Figure 1: (16b): \textsc{ivək}(p) \land \textsc{ivək}(\neg p)

(23) $\llbracket 19b \rrbracket^{C_{\text{id}}, w} = 1$ iff $\neg \exists f \in g(C) (\forall w' \in f(B^w_x)[b(w') = 1])$ and $\neg \exists f \in g(C) (\forall w' \in f(B^w_x)[b(w') = 0])$

Resolution to $C_{id}$ (felicitous):
$\exists w' \in B^w_x [b(w') = 0] \land \exists w' \in B^w_x [b(w') = 1]$

Resolution to $C_{all}$ (contradictory):
$\forall f \in C_{all} (\exists w' \in f(B^w_x)[b(w') = 0]) \land \forall f \in C_{all} (\exists w' \in f(B^w_x)[b(w') = 1])$

Figure 2: (19b): \textsc{ivək}(\neg p) \land \neg \textsc{ivək}(p)

\textsuperscript{10}This alternative implementation is based on a suggestion by Roger Schwarzschild.
2 Flavours of attitude verbs and where they come from

- We want to make two points:
  - variable flavour can “come from” a separate item at LF (the bouletic flavour in Navajo and with \( \text{\textipa{ivək}} \), but this is not always the case (the assertive flavour of \( \text{\textipa{ivək}} \))
  - more cross-linguistic research is needed into flavour variation among attitude verbs – how (un)common is it?

2.1 Navajo and the role of the embedded clause (Bogal-Allbritten 2016)

- Another recently-discussed example of a verb with both doxastic and bouletic interpretations is the Navajo \( \text{nízin} \), which can be interpreted as ‘think’, ‘want/wish’, and ‘hope’ (Bogal-Allbritten 2015, 2016).

- Bogal-Allbritten argues that \( \text{nízin} \) is itself not specified for flavour, and that it is material in the embedded clause that determines the reading of this verb.

- Evidence from this comes from the fact that the various flavours of \( \text{nízin} \) (can) have overt correlates, but these correlates appear in the embedded clause.

- The presence of \( \text{sha’šin} \) results in a doxastic flavour, as in (24a), while \( \text{laanaa} \) is used for the bouletic one, as in (24b).

(24) a. Hastiin [nahoodooltíí \( \text{sha’šin} \) \( \text{nízin} \).
  man 3S.rain.FUT MODAL 3S.ATT
  ‘The man thinks it will probably rain.’ (2015, ex. 15a)

b. Alice [nahoodooltíí (\( \text{laanaa} \)) \( \text{nízin} \).
  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 \( \text{nízin} \) can have different flavours: in (25), the first clause has a doxastic interpretation, whereas the second has a bouletic one.

(25) 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 \( \text{Kinlánígo} \) ‘ííná] [bich’í] ‘akondi [deesháá] \( \text{nízin} \).
  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.’ (Bogal-Allbritten 2015, ex. 13)

- She proposes that \( \text{nízin} \) is only a predicate of mental attitude situations, in (26a), and that the embedded elements have meanings as in (26b).

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

b. \([\text{laanaa} / \emptyset \emptyset] = \lambda p \lambda s \lambda w. \forall w' \in \text{DES}(s)(w)[p(w')]\]

c. \([\text{24b}] = \exists s [\text{mental–attitude}(s)(w_0) \land \text{experiencer}(\text{Alice})(s)(w_0) \land \forall w' \in \text{DES}(s)(w_0)[\text{rain}(w')]]\]

- Crucially, for Bogal-Allbritten, the possible-worlds quantification lies in the embedded clause (DES abbreviates the doxastic + preference semantics).

\[11\] Unlike \( \text{ivək} \), it does not seem to have variability in force, having only necessity readings (Elizabeth Bogal-Allbritten, p.c. January 2019).
2.2  Koryak and the different role of the embedded clause (Močnik and Abramovitz 2019)

• In addition to the doxastic flavour, ivək also has some other flavours: assertive (§2.2.1), bouletic (§2.2.2), and others (see Appendix).

• Upshot: the bouletic flavour comes from the embedded clause (cf. Navajo nizin), but the assertive flavour does not

2.2.1  Assertive flavour

• Ivək is commonly used as an assertive verb meaning ‘say/tell’ (in fact, if you ask a speaker what ivək means, the answer will nearly always be ‘say’)

• From texts:


• Both the assertive and doxastic readings are found in nominalizations, suggesting that they don’t require the presence of an embedded clause

(29) ek-wajn-ə-n
ivək-NMLZ-E-ABS.SG
‘utterance, thought, something allowed’

• If we apply Bogal-Allbritten’s conjunction test, we find that a single ivək cannot have a doxastic interpretation for one conjunct and an assertive interpretation for the other.

(30) 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’.

‘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 similarly specified with adverbials (‘secretly’, ‘to oneself’ vs. ‘openly’, ‘with words’), and in some cases has to be, as in the example below. (Cf. according to the law, which can be used to specify the flavour of English modals like ‘must’.)
2.2.2 Bouletic flavour

- The bouletic flavour, unlike the doxastic one, is not found in the nominalization of \textit{ivək}

\begin{enumerate}
  \item a. ek-waj-gn-a

  \begin{verbatim}
  ivək-NMLZ-E-ABS.SG
  \end{verbatim}

  ‘utterance, thought, something allowed, *hope, *fear, *wish’
  \item b. jajm-at-waj-gn-a

  want-VB-NMLZ-E-ABS.SG

  ‘wish/desire’
\end{enumerate}

- We performed the embedded conjunction test from Bogal-Allbritten (2016). Here is how the doxastic-bouletic conjunction differs from the doxastic-assertive one, where we could not get different flavours:

\begin{enumerate}
  \item a. We’re talking about our mutual friend Tatiana, who lives in Novosibirsk.

  \begin{verbatim}
  t-ə-k-iv-gn-ə-ð [ano tatjana \ø-ko-tva-ñ-ə]
  \end{verbatim}


  Novosibirsk-ə-k] to [ano ečyi \ø-ku-kačviaʔ-ə-ñ-ə]


  ‘I think that Tatjiana is in Novosibirsk and I hope that she is happy today.’
  \item b. Hewngyto and Qechghylqot are competing in a race, and I want Hewngyto to win.
\end{enumerate}

\footnote{Recall that this was done in a matching task; we have not tested this yet with the adverbials ‘openly’/‘with words’.
2.2.3 Denotation of \( \text{ivak} \) (final):

\[
\begin{align*}
\text{[ivak]}_{\mathcal{G}, w} & = \lambda \mathcal{I} \mathcal{L} \mathcal{C} \mathcal{P} \lambda x : \\
& (i(x)(w) = E_w^x(i(x)) \lor i(x)(w) = S_w^x) \land \\
& (C = \{ f \mid f(i(x)(w)) = i(x)(w) \} \lor C = \{ f \mid f(i(x)(w)) \subseteq i(x)(w) \land f(i(x)(w)) \neq \emptyset \}) . \\
& \exists f \in C \forall w' \in f(i(x)(w)) [p(w') = 1] 
\end{align*}
\]

• The bouletic flavour we can model with a preference component in the embedded clause

(38) a. \( \text{[ivak]}_{\mathcal{G}, \langle a, v, I \rangle} \), where \( w \) is the world of evaluation and \( \langle a, v, I \rangle \) is the information state (see Yalcin 2007) of evaluation (\( a \) is the information state holder, \( v \) is the world from which the state is generated and \( I \) of type ess) is the way in which the state is generated

b. \( \langle a, v, I \rangle \) corresponds to \( I_w^a \)

c. Example: \( \langle j, w, E \rangle \), which corresponds to \( E_w^j \) (John’s beliefs at \( w \))

(39) Denotation of \( \text{ivak} \) (initial):

\[
\begin{align*}
\text{[ivak]}_{\mathcal{G}, \langle a, v, I \rangle} \ (i)(C)(p)(x) \\
is \text{defined only if} \\
& i(x)(w) = E_w^x \text{ or } i(x)(w) = S_w^x \text{ and} \\
& C = \{ f \mid f(i(x)(w)) = i(x)(w) \} \text{ or } C = \{ f \mid f(i(x)(w)) \subseteq i(x)(w) \land f(i(x)(w)) \neq \emptyset \} \\
& \text{and, if defined, is true iff} \\
& \exists f \in C \forall w' \in f(i(x)(w)) \ [p(w', \langle x, w, \lambda y \lambda w'' f(i(y)(w''))) = 1] 
\end{align*}
\]
Ideally, the counterfactual mood might in fact build on this covert item, cf. Iatridou (2000).

---

**Contributions of Močnik and Abramovitz (2019)**

- methodological: solution for doing semantic fieldwork when contextual felicity judgments fail
- empirical: variable-force attitude verb, variable-force-variable-flavours 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-Allbriten (2016)]

---

*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 C_{df} which would allow for variable force.*

*Ideally, the counterfactual mood might in fact build on this covert item, cf. Iatridou (2000).*
2.3 How common is variable flavour? An example from Biblical Hebrew and maybe English.

- In Biblical Hebrew, the verb ʔ-m-r typically means 'say' (as it does in the modern language), but 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.'

(44) a. ‘think’

way-yōmer ʔēśāw b³-libb-ō yi-qr“b-ū y⁴mē ʔēbel ʔāb-i
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.’

b. ‘promise’

ʔāmar-tī promise.PFV-1.SG to-keep.INF words-your
‘I promised to keep your words’ (Ps 119.57)

c. ‘intend’

h⁴-l⁷-horg-ēnī attā šōmēr?
Q-to-kill.INF-me you intend.PTCP.M.SG
‘Do you intend to kill me?’ (Exod 2.14)

d. ‘hope’ (?)

way-yōmer ʔāq-biʔ-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)

- The English expression be like 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.

(45) I was like, that’s a bad idea.

Caveat: be like is obligatorily quotative:

(46) a. Johnj was like, he/i/s is tall

b. *Who was John like Mary saw _?

- formal/archaic Slovenian meniti (‘think’, ‘say’)?

(47) 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)

2.4 How do we express attitudinal flavour in natural language? Some preliminary thoughts.

- lexically encoded: wish, say, think, order,…

- separate material in the embedded clause (not flavour variation per se):

  Navajo nizin to obtain the bouletic flavour,

  Koryak ʔavak to obtain the bouletic flavour (see Appendix for the directive flavour with an embedded imperative)

---

15Thanks to Matthew Hewett for providing us with these data.
• (optional) adverbial specification:
  Koryak ivək: ‘openly’/‘with words’ (assertive flavour) vs. ‘secretly’/‘to self’ (doxastic flavour)
  Biblical Hebrew: ‘in my heart’ (doxastic flavour)

• “reflexive” clitics:
  Slovenian meniti (‘think’) vs. meniti se (‘talk about’), spraševati se (‘wonder’) vs. spraševati (‘be asking’)
  [marks a transition between the doxastic-assertive domains – private vs. public?]

3 Mixing force and flavour: attitudes vs. modals

Comparison of force:

<table>
<thead>
<tr>
<th></th>
<th>fixed force</th>
<th>variable force</th>
</tr>
</thead>
<tbody>
<tr>
<td>universal base</td>
<td>must</td>
<td>k’a (St’át’imcets)</td>
</tr>
<tr>
<td>existential base</td>
<td>may</td>
<td>oq’a (Nez Perce)</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>fixed force</th>
<th>variable force</th>
</tr>
</thead>
<tbody>
<tr>
<td>universal base</td>
<td>know, believe,…</td>
<td>ivək (Koryak)</td>
</tr>
<tr>
<td>existential base</td>
<td>dopuščati (Slovenian)</td>
<td>?</td>
</tr>
</tbody>
</table>

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

Comparison of flavour:

<table>
<thead>
<tr>
<th></th>
<th>fixed flavour</th>
<th>variable flavour</th>
</tr>
</thead>
<tbody>
<tr>
<td>k’a (St’át’imcets)</td>
<td>must</td>
<td></td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>fixed flavour</th>
<th>variable flavour</th>
</tr>
</thead>
<tbody>
<tr>
<td>know</td>
<td>ivək (Koryak)</td>
<td></td>
</tr>
</tbody>
</table>

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

Mixing force and flavour, against Nauze (2008):16

<table>
<thead>
<tr>
<th></th>
<th>fixed flavour</th>
<th>variable flavour</th>
</tr>
</thead>
<tbody>
<tr>
<td>universal</td>
<td>mesthi (Javanese)</td>
<td>must</td>
</tr>
<tr>
<td>existential</td>
<td>might</td>
<td>may</td>
</tr>
<tr>
<td>universal + weakening</td>
<td>k’a (St’át’imcets)</td>
<td>-eʔ (Washo)</td>
</tr>
<tr>
<td>existential + strengthening</td>
<td>oq’a (Nez Perce)</td>
<td>?</td>
</tr>
</tbody>
</table>

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

<table>
<thead>
<tr>
<th></th>
<th>fixed flavour</th>
<th>variable flavour</th>
</tr>
</thead>
<tbody>
<tr>
<td>strictly universal</td>
<td>know, believe,…</td>
<td>-m-r (Biblical Hebrew)?</td>
</tr>
<tr>
<td>strictly existential</td>
<td>?</td>
<td>dopuščati (Slovenian)</td>
</tr>
<tr>
<td>universal + weakening</td>
<td>?</td>
<td>ivək (Koryak)</td>
</tr>
<tr>
<td>existential + strengthening</td>
<td>?</td>
<td>?</td>
</tr>
</tbody>
</table>

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

---

16“Modal elements [...] either vary on the [flavour] 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.” (p. 222)
References


Appendix: Various further empirical points

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

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

a. ʔewŋəto
   Hewngyto.ABS.SG
   that
   but Hewngyto.ABS.SG
   ∅-k-iv-a-ŋ-∅,
   1sg.s/a-prs
   ?am
   ʔam
   neg.rls
   e-muq-ke
   neg
   -it-a-ŋ-∅,
   1sg.s/a-prs
   NEG.RLS
   liɣi
   know?
   ∅-k-iv-ə-ŋ-∅,
   2/3.s/a.ind
   3.s.ind
   e
   -prs
   -be-
   e
   -prs
   -3.s.ind
   'It is not raining but Hewngyto *thinks* that it’s raining.'

b. #ʔewŋəto
   Hewngyto.ABS.SG
   but
   ʔewŋəto-na-k
   Hewngyto.OBL.SG-ERG
   abs.sg
   -k-iv-ə-ŋ-∅,
   2/3.s/a.ind
   3.s.ind
   ∅-k-muq-et-a-ŋ-∅,
   2/3.s/a.ind
   -prs
   -be-
   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:

(49) ɣəmmo
   1sg.abs
   t-ə-k-iv-ə-ŋ-∅,
   1sg.s/a-prs
   neg.rls
   e-muq-et-ke
   neg
   -it-a-ŋ-∅,
   1sg.s/a-prs
   liɣi
   know?
   ∅-je-muqe-juʔ-ə-ŋ-∅
   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’:

(50) ?ewŋəto
   Hewngyto.ABS.SG
   that
   ∅-k-iv-a-ŋ-∅,
   1sg.s/a-prs
   ano
   ∅-je-muque-juʔ-ə-ŋ-∅
   2/3.s/a.ind
   fut
   -rain-
   inch
   -e
   -fut
   -3.s.ind
   vaʔajok
   soon
   ∅-ja-pkej-ƛa-ŋ-∅
   reindeer-herd-E/S.O.PLCP-ABS.PL
   3sg.poss-village-all
   ʔənək-nəmnəm-etəŋ
   3sg.poss-village
   'Hewngyto hopes that the reindeer herders will soon arrive to his village.'

(51) ηeνeq
   ʔewŋəto
   Hewngyto.ABS.SG
   2/3.s/A.IND-PRS-ivək-PRS-3.O.CF
   amu
   n-ə?-iv-a-n,
   ∅-j-ena-lv-at-a-ŋ-∅
   annenu
   loc-LOC
   ?iye-k,
   race-loc
   2/3.s/A.CF-CONF-prepare-VB-IPFV
   ∅-gaʔ-əi-gəm-av-əke
   2/3.s/A.CF-CONF-PREPARE-VB-IPFV
   'If Hewngyto hoped to win the race, he would be constantly training.'

• not disjunctive (‘think or say’) truth-conditions

(52) 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’.

---

17Speakers 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’at’imcets sxek (‘maybe’) is frequently used in clauses with variable-force modals when the possibility reading is intended.

18If *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).
'The teacher did not say that his students studied badly, but he believed then that they studied badly.'

- adverb *wojinvan* ‘fortunately’ is only acceptable with the ‘hope’ reading

(53)  a. t-ə-k-iv-ə-ŋ wojinvan mitiw t-ə-je-pəŋətuŋŋə-ə-ŋ
1SG.S/A-E-PRS-ivək-E-PRS-1SG.S fortunately tomorrow 1SG.S/A-E-FUT-finish-FUT-E-3SG.O
wuččin vet-γəjŋə-ə-ŋ
this.ABS.SG work-NMLZ-E-ABS.SG
'I hope that I will finish this work tomorrow'

b. t-ə-k-iv-ə-ŋ (#wojinvan) mitiw qəjəm
1SG.S/A-E-PRS-ivək-E-PRS-1SG.S (fortunately) tomorrow NEG.IRR
m-ə-pəŋətuŋŋə-ə-ŋ wuččin vet-γəjŋə-ə-ŋ
1SG.S/A.IMP-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*

(54)  t-ik-wi (jən-nam-at-ə-k / q-ə-n-nəm-at-γ-ə-ŋ) tall-ə-tal
'I told you to close the door.’ [translation from Russian to Koryak]

(55)  ɣəm-nan t-ə-ŋ-w tumγ-u qət-ə-k ɣanen-awje-ja-təŋ
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]

(56)  ɣəm-nan t-ə-ŋ-n ʔewŋəto ano qajom m-ə-tulʔ-et-ə-ŋ
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 mily-ə-ʔaj
3SG-POSS fire-E-bow.ABS.SG
'I promised Hewngyto that I would not steal his gun.’

(57)  uŋje iw-ke ə-itt-i, əŋŋəʔan ə-j-ə-ŋ-∅
'I did not expect that that would happen.’