The semantics of *ky* particle in Tundra Nenets

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Data and puzzles

INTRO: Matrix *ky*-marked clauses have two readings:

(i) possibility modal statements; (ii) polar questions

(1) Vanja to.na.ky?
Vanja came.PART.ky
'Did Vanja come?'

(2) Vanja to.na.ky.
Vanja came.PART.ky
'Vanja may be/possibly came'.

When embedded, they give rise to puzzles:

PUZZLE 1: ***know ky** vs. **✓not know ky**

(3) *Anja tjenjeva,Vanja to.na.ky. [***know ky**]
Anja knows Vanja came.PART.ky
Int.: 'Anja knows whether Vanja came.'

Comments from speakers: 'You said she knows. But *ky* means she is in doubt. This is a contradiction'.

Speaker ignorance does not improve (3).

Similar facts obtain for other factive verbs.

However:

(4) Anja ni tjenjeva, Vanja to.na.ky. **[✓not know ky]**
Anja NEG know, Vanja came.PART.ky
'Anja doesn't know whether Vanja came.'

PUZZLE 2: **think ky** >> only the possibility reading

(5) Man' yibyidorŋadm^{q}, Vanja to.va.ky.
I think Vanja came.PastPART.ky
'I think that Vanja possibly came.'

PUZZLE 3: **ky**-clauses under factives >> only questions

(6) **a**. Xibjaxart^{q} jexjera, Vanja tonaky. **b**. Man' ibedorŋam^{q}, pyda nivy tu.
Nobody not.knows V. cameKY. I think he NEG came
'Nobody knows whether Vanja came. I think he didn't come.'

If (6)a presupposed that V. possibly came, (6)b would have been infelicitous.

No general ban on embedding possibility modals under *know.*

PUZZLE 4: ***✓must know ky***

(7) A. tjenjeva.bta tara V. tjukoxona ile.na.ky.
A. know.X must V. here lives.PART.ky
'Anja must know / maybe knows whether Vanja lives here.'

Proposal

EXPLAINING PUZZLE 1

Ky: - a question op. mapping $p_{<s,t>}$ to {p, ¬p}
- sensitive to a perspective parameter <$P_{individual}$, P_{world} >
- presupposes that p is possible for $P_{individual}$, in P_{world}

(8) $[\![ky]\!]^{w''',<\mathbf{Psp.},\mathbf{Pw}>} = \lambda p_{<s,t>}$**:** $\underline{\exists w'[\mathbf{w}R^{\mathbf{Sp}}w' \& p(w')]}$. $\lambda q_{<s,t>}$ **.** q=p ∨ q=¬p

This derives (1) as a question:

(9) $[\![(1)]\!]^{w''',<\mathbf{Sp.},\mathbf{w}>}$ is **def. only if** $\exists w'[\mathbf{w}R^{\mathbf{Sp}}w' \&$ V. came in w']
= $\lambda q_{<s,t>}$ **.** q=Vania came ∨ q=Vania didn't come

Factives obligatorily shift the perspective parameter of their prejacent to the attitude holder and evaluation world:

(10) $[\![\text{know } \varphi]\!]^{w,<Psp.,Pw>} = \lambda x$**:** $\underline{\lambda w'.[\![\varphi]\!]^{w',<\mathbf{Px},\mathbf{Pw}>}(w)}$. $\forall w''[wR^{x}w'' \rightarrow \lambda w'.[\![\varphi]\!]^{w',<\mathbf{Px},\mathbf{Pw}>}(w'')]$

With a strong answerhood operator, ANS, sentence (2)

- presupposes: A.'s evidence is compatible with the possibility that V. came
- asserts: A. believes in the true answer to "Did V. come?"

(11) $[\![$A know Ans ky V came$]\!]^{w,<Psp.,Pw>}$ **def. only if** $\exists w'[wR^{A}w' \&$ V came w'], and
= T iff $\forall w'[wR^{A}w' \rightarrow \lambda w''.$V came in w''(w')=$\lambda w'''.$V came in w'''(w)]

This is consistent only if A. knows that V. came and is thus ruled out by Maximize Presupposition in favor of (12):

(12) Ania knows (that) Vania came.

In (4), *not know KY*, MP is not triggered:

(13) $[\![$¬ A know Ans ky V came$]\!]^{w,<\mathbf{Psp.},\mathbf{Pw}>}$ **def. only if** $\exists w'[wR^{A}w' \&$ V came w'], and
=T iff $\neg\forall w'[wR^{A}w' \rightarrow \lambda w''.$V came in w''(w')=$\lambda w'''.$V came in w'''(w)]

EXPLAINING PUZZLE 2.

The possibility reading of *ky* arises via:

- Existential closure (∃) over sets of propositions
- B-operator turning a presupposition into assertive content (Beaver & Krahmer 2001):

(14) $[\![\exists]\!]^{w} = \lambda P_{<<st>t>}.\ \exists p[p \in P \& p(w)=1]$ (15) $[\![B]\!]^{w} = \lambda p$ .1 if p(w)=1, 0 if not

Predicting the possibility reading for (2):

(16) $[\![$B ∃ Ky Vanja came$]\!]^{w,} =$ T iff $\exists p[p \in \{\lambda w'.$V came in w'; $\lambda w'.$ ¬V came in w'} & p(w)=1] & $\exists w'[wR^{Sp}w' \&$ V came w']

For (5), we propose that

- *B ∃ Ky Vanja came* is under *think;*
- *think* shifts the perspective to the *origo* and dox. alt:

(17) $[\![\text{think } \varphi]\!]^{w} = \lambda x\ .\ \forall<y,w''>[wR^{x}w'' \rightarrow \lambda w'.[\![\varphi]\!]^{w',<\mathbf{Py},\mathbf{Pw''}>}(w'')]$

Predicting an embedded modal interpretation for (5):

(18) $[\![(5)]\!]^{w}$ = T iff $\forall<y,w''>[wR^{Sp}w'' \rightarrow \exists w'[w''R^{y}w' \&$ V came w']

Proposal (continued)

EXPLAINING PUZZLE 3

Predictions for *know + B ∃ Ky Vanja came:*

(19) [Anja knows [B ∃ Ky Vanja came]]

(20) $[\![(19)]\!]^{w,<Psp,Pw>}$ **defined only if** $\exists w'[wR^{A}w' \&$ V. came in w'] & $\exists p[p \in \{\lambda w.$V came in w; $\lambda w'.$ ¬V came in w'} & p(w)=1]
= T iff $\forall w''[wR^{A}w'' \rightarrow \exists w'[wR^{A}w' \&$ V came in w'] & $\exists p[p \in \{\lambda w.$V came in w; $\lambda w'.$ ¬V came in w'} & p(w)=1]

The presupposition entails the assertion: the structure is ruled out.

B-operator cannot be applied at matrix level to give the interpretation in (22):

(21) *[B [Anja knows [B ∃ Ky Vanja came]]]

(22) Anja's evidence is compatible with the possibility that Vanja came.

The reading in (22) will arise with all factives and should thus be ruled out by pragmatics (cf. Buccola and Spector's 2016 Pragmatic Economy Constraint).

EXPLAINING PUZZLE 4

Intuition: in (7), it is the speaker and not Anja whose evidence is compatible with the possibility that Vania came.

Goal: make *ky* in (7) dependent on the speaker-parameter.

Strategy: allow modal operators above *know* to introduce the speaker as the perspective-parameter in addition to the attitude holder (adapting Bäuerle's 1983 and Percus's 2020 Index Storage Approach).

Implementation:
-a modal operator overwrites the default perspective parameter of its prejacent
- non-default perspective parameters are stacked
- an accompanying covert Op^{n} allows *ky* to get access to any parameter in the stack of perspective parameters (μ)

(23) $[\![Op^{n}\ X]\!]^{w,\mu} = [\![Op^{n}\ X]\!]^{w,n(\mu)}$ where n(μ) stands for the nth number of μ

Prediction for (7), *Anja must know whether Vanja came*:

(24) *LF*: [NEC [Anja knows [ANS [[Op^{2} Ky] Vanja came]]]]

(25) $[\![\text{NEC know } \varphi]\!]^{w,<Psp,Pw>}$ =1 iff
necessarily w': $[\![\text{know } \varphi]\!]^{\mathbf{w'},\mathbf{[<Psp,Pw>]}}$ iff
necessarily w': Anja knows w'': $[\![\varphi]\!]^{\mathbf{w''},\mathbf{[<PAnja,Pw>,\ <Psp,Pw>]}}$

(25) $[\![(24)]\!]^{w,<Psp.,Pw>,g}$ = 1 **defined only if** $\exists w'[\mathbf{w}R^{\mathbf{Sp}}w' \&$ V. came in w'], and
= T iff $\forall w''[wR^{sp}w'' \rightarrow \forall w'''[w''R^{Anja}w''' \rightarrow$
$\lambda w''''[[$ ANS [OP^{2} ky] V came]] $]\!]^{w'''',\mathbf{[<Pa,Pw">,<Ps,Pw>]}}$ (w''')]

With Op^{1} instead of Op^{2} in the LF, we get a stronger reading *in addition to* the weaker one predicted with Op^{2}. Its presence is thus empirically difficult to identify.

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