Argument structure of *thinking*: a view from Buryat

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The puzzle

Buryat (Mongolic) has an attitude verb *hanaxa* whose meaning seems to be determined by the complement it selects for.

- when it combines with CPs, it is translated as ‘think’;
- when it combines with nominalizations, it is translated as ‘remember, recall’.
The puzzle

(1) a. dugar [CP mi:sgəj zagaha ədj-ə: gəʒə] han-a:  
Dugar.NOM cat.NOM fish eat-PST COMP think-PST  
‘Dugat thought that the cat ate the fish.’

(2) a. dugar [NMN mi:sgəj-n zagaha ədj-ə:j-i:jə] han-a:  
Dugar.NOM cat-GEN fish eat-PART-ACC think-PST  
‘Dugat remembered ("thought of") the cat's eating the fish.’

What is the intuition behind translating the verb in (1a) and (2a) differently?
The puzzle

- (1a) does not presuppose that the cat ate the fish, hence the continuation in (1b) is felicitous.

(1) a. dugar [CP mi:sgəj zagaha ədj-ə: gəʒə] han-a:
   Dugar.NOM cat.NOM fish eat-PST COMP think-PST
   ‘Dugat thought that the cat ate the fish.’

b. …xarin mi:sgəj zagaha ədj-ə:-güj
   but cat.NOM fish eat-PST-NEG
   ‘…but the cat didn’t eat the fish.’
The puzzle

- (2a) presupposes that the cat ate the fish, hence the continuation in (2b) is infelicitous.

(2) a. dugar [\text{NOM}] mi:sg\text{-n} zagaha \text{-gen} \text{-eat-PART-ACC} \text{think-PST}

Dugar.NOM cat-GEN fish eat-PART-ACC think-PST

‘Dugat remembered ("thought of") the cat's eating the fish.’

b. \#…xarin mi:sg\text{-j} zagaha \text{-eat-PST-NEG}

but cat.NOM fish eat-PST-NEG

‘…but the cat didn’t eat the fish.’

NMN \rightarrow \text{factive use}
The question:

What exactly is the difference between the meanings of the verb in (1) and (2) and why does it arise?
Roadmap

Setting up the framework
- Decomposing attitudes: approach proposed by Kratzer (2006, 2016)
- Modification of Kratzer’s proposal

The proposal
- Solution to the puzzle in a nutshell
- Deriving \textit{hanaxa} + CP
- Deriving \textit{hanaxa} + nominalization

Looking at some predictions
- Additional evidence from nouns that do not combine with CPs
- Additional evidence from accusative subjects of CPs
What’s not on the roadmap (but does exist)

- Evidence that the observed inference is indeed a presupposition.
- (Not conclusive but) some evidence suggesting that a homophony hypothesis is unlikely.
- Evidence that the presupposition cannot “come” from the nominal status of the nominalization or definiteness.
- Facts from morphology and syntactic distribution that go well together with the proposed analysis.

Ask me later if interested!
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Decomposing Attitudes

(3) The Hintikkan approach

a. \([[\text{believe}]]^w = \lambda p_{st}. \lambda x_e. \forall w' [w' \in \text{Dox}_{x,w} \rightarrow p(w')],\)
   (where \(\text{Dox}_{x,w} := \text{the set of worlds compatible with } x\text{'s beliefs in } w\))

b. \([[\text{that the cat ate the fish}]]^w = \exists e [\text{eat(the fish)}(e) \& \text{Agent}(e) = \text{the cat} \& e \text{ is in } w]]\)

✓ quantification over worlds is encoded in the verb’s meaning
✓ CP denotes a proposition
Decomposing Attitudes

(4) The decompositional approach (Kratzer 2006, 2016)

a. \([\text{[believe]}]^w = \lambda y_e. \lambda s. \text{believe}(y)(s) \& s \text{ is in } w.\]

b. \([\text{[that the cat ate the fish]}]^w = \lambda y_e. \forall w' [\text{compatible}(y)(w') \rightarrow \\
\exists e [\text{eat}(\text{the fish})(e) \& \text{Agent}(e) = \text{the cat} \& e \text{ is in } w']]\]

What is \(y\)?

- It is a “content argument” – a thing like belief, rumor.
- My understanding: \(y\) refers to product of the mental attitude, *not* to the object (= what is being thought about) of the mental attitude (Moltmann 2003).
Decomposing Attitudes

(4) The decompositional approach (Kratzer 2006, 2016)

a. \([[\text{believe}]^w = \lambda y_e. \lambda s. \text{believe}(y)(s) \& s \text{ is in } w.\]

b. \([[\text{that the cat ate the fish}]^w = \lambda y_e. \forall w'[\text{compatible}(y)(w') \rightarrow \exists e [\text{eat}(\text{the fish})(e) \& \text{Agent}(e) = \text{the cat} \& e \text{ is in } w']]\]

✓ quantification over worlds is encoded in the meaning of CP
✓ CP denotes a property (of individuals)
Decomposing Attitudes

(4) The decompositional approach (Kratzer 2006, 2016)

a. \([\text{believe}]^w = \lambda y. \lambda s. \text{believe}(y)(s) \& s \text{ is in } w.\)

b. \([\text{that the cat ate the fish}]^w = \lambda y. \forall w'[\text{compatible}(y)(w') \Rightarrow \exists e [\text{eat}(\text{the fish})(e) \& \text{Agent}(e) = \text{the cat} \& e \text{ is in } w']]\]

✓ quantification over worlds is encoded in the meaning of CP
✓ CP denotes a property (of individuals)

How exactly do (4a) and (4b) combine?
Decomposing Attitudes

Kratzer proposes that the verb and the CP combine via Restrict (Chung & Ladusaw 2004):

\[(5) \lambda y_e. \lambda s. \text{believe}(y)(s) \& s \text{ is in } w \bigoplus \lambda y_e. \forall w'[\text{compatible}(y)(w') \rightarrow \exists e [\text{eat}(\text{the fish})(e) \& \text{Agent}(e) = \text{the cat} \& e \text{ is in } w']] = \lambda y_e. \lambda s. \text{believe}(y)(s) \& s \text{ is in } w \& \forall w'[\text{compatible}(y)(w') \rightarrow \exists e [\text{eat}(\text{the fish})(e) \& \text{Agent}(e) = \text{the cat} \& e \text{ is in } w']] \]
Decomposing Attitudes

The attitude holder is combined via Event Identification:

\[(6) \lambda y_e. \lambda s. \text{believe}(y)(s) \land \text{Exp}(s)=\text{Badma} \land s \text{ is in } w \land \\
\forall w'[\text{compatible}(y)(w') \Rightarrow \exists e [\text{eat}(\text{the fish})(e) \land \text{Agent}(e) = \text{the cat} \land e \text{ is in } w']]\]
Decomposing Attitudes

- The last step – existential closure “closes off” the content argument and the eventuality argument:

\[(7) \; [[\text{Badma thinks that the cat ate the fish}]]^{w,g} = 1 \iff \]

\[\exists y_e \exists s \left[ \text{believe}(y)(s) \land \text{Exp}(s)=\text{Badma} \land s \text{ is in } w \land \forall w' \left[ \text{compatible}(y)(w') \Rightarrow \exists e \left[ \text{eat}(\text{the fish})(e) \land \text{Agent}(e) = \text{the cat} \land e \text{ is in } w' \right] \right] \right] \]
Motivation for Decomposing Attitudes

- CPs can force a speech report interpretation with unergative verbs.
  
  (8) *She groaned that she would have to start all over.*

- CPs can sometimes appear with nouns where they don’t fill argument positions:

  (9) *The rumour that Harry Potter had boarded the train had spread like wildfire.*
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Modification of Kratzer’s proposal

(10) \([[\text{believe}]]^{w,g} = \lambda y_e. \lambda s. \text{believe}(y)(s) \land s \text{ is in } w.\]

✓ quantification over worlds is encoded in the meaning of CP
✓ CP denotes a property

✓ CP restricts \(y\), which is the part to be changed
  - the internal argument of the attitude verb
  - denotes the content argument (= product of thought, ex. belief)
Modification of Kratzer’s proposal

(11) \[ [[\text{believe}]]^w,g = \lambda y_e. \lambda s. \text{believe}(y)(s) \& s \text{ is in } w. \]

- quantification over worlds is encoded in the meaning of CP
- CP denotes a property

- **CP restricts** \( s \), the eventuality argument
- **\( y \)** is not the content argument (like belief), but it is an internal argument that denotes the object of thought (= what is being thought about)
Modification of Kratzer’s proposal

(12) \[[\text{Badma thinks that the cat ate the fish}]\]^w,g = 1 \text{ iff }

\[
\exists y_e. \exists s \left[ \text{believe}(y)(s) \& \text{Exp}(s) = \text{Badma} \& s \text{ is in } w \& \right.
\forall w' \left[ w' \in \text{Content}(s) \rightarrow \exists e \left[ \text{eat}(\text{the fish})(e) \& \text{Agent}(e) = \text{the cat} \& e \text{ is in } w' \right] \right] \]

There exists an individual y and a state s such that s is the state of believing about y, the experiencer of s is Badma, s is in w, and in all worlds compatible with the propositional content available from s, the cat eats the fish in those worlds.
## Summary of different proposals

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<td>yes</td>
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<td>content argument = product of the mental attitude (ex. belief)</td>
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Solution in a nutshell

Sub_m CP  hanaxa $\rightarrow$ ‘think’
Sub_m NMN hanaxa $\rightarrow$ ‘remember’

(13) $[\text{hanaxa}]^{w,g} = \lambda x_e. \lambda e_v : \text{LB}(\tau_w(x)) < \text{LB}(\tau_w(e))$. think(x)(e) & e is in w.

- *hanaxa* has a uniform meaning across all uses;
- it comes with a presupposition that the object of the thinking event exists prior to the thinking event;
- CP is combined by restricting the *e* argument, while NMN is combined by saturating the *x* argument.
Solution in a nutshell

\[
\begin{array}{ccc}
\text{Sub}_m & \text{CP} & \text{hanaxa} \rightarrow \text{‘think’} \\
\text{Sub}_m & \text{NMN} & \text{hanaxa} \rightarrow \text{‘remember’}
\end{array}
\]

(13) \([\text{hanaxa}]^{w,g} = \lambda x_e \cdot \lambda e_v : \text{LB}(\tau_w(x)) < \text{LB}(\tau_w(e))). \text{think}(x)(e) \& e \text{ is in } w. \]

\( (x = \text{object of thinking, } e = \text{thinking event}) \)

- the presupposition is about the object \(x\)
  \(\rightarrow\) in sentences with CPs \(x\) is not expressed by any overt material (it is existentially quantified over), so we can’t “sense” the presupposition
  \(\rightarrow\) In sentences with NMN, \(x = \text{the/a event described by NMN;}
  \text{thinking of an event that is presupposed to have started existing} \approx \text{remember} \)
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Deriving \textit{hanaxa} + CP

**Ingredients:**

(14) $[[\text{hanaxa}]]^{w,g} = \lambda x_e \cdot \lambda e_v : \text{LB}(\tau_w(x)) < \text{LB}(\tau_w(e))). \text{think}(x)(e) \& e \text{ is in } w.$

(15) $[[\text{gɘʒɘ}]]^{w,g} = \lambda p_{st} \cdot \lambda e_v : \exists k \text{ in } D_{st} \\text{[Content}(e)=k]. \forall w' \ [w' \in \text{Content}(e) \rightarrow p(w')=1].$

(16) $[[\text{TP Badma broke the cart}]]^{w,g} = \exists e_3 \\text{[break(the cart)}(e_3) \& \text{Agent}(e_3) = \text{Badma} \& e_3 \text{ is in } w']].$
Combining C and TP (FA):

\[(17) \([\text{that Badma broke the cart}]^{w,g} = \lambda e_v. \exists k \text{ in } D_{st} [\text{Content}(e)=k]. \forall w' [w' \in \text{Content}(e) \rightarrow \exists e_3 [\text{break(the cart)}(e_3) \& \text{Agent}(e_3) = \text{Badma} \& e_3 \text{ is in } w']].\]
Combining CP and V (Restrict):

(18) \([\mathrm{CP} \ V]^{w,g} = \)

\([\text{that Badma broke the cart hanaxa}]^{w,g} = \)

\(\lambda x_e. \lambda e_v : \mathrm{LB}(\tau_w(x)) < \mathrm{LB}(\tau_w(e))). \text{think}(x)(e) & e \)

is in w & \(\forall w' [w' \in \text{Content}(e) \Rightarrow \exists e_3[\text{break}(the cart)(e_3) & \text{Agent}(e_3) = \text{Badma} & e_3 \text{ is in } w']].\)
Introducing the experiencer
(Event Identification):

(19) \[[\text{Sajana CP V}]\]^{w,g} = \[[\text{that Badma broke the cart hanaxa}]\]^{w,g} =

\[\lambda x_e.\lambda e : \text{LB}(\tau_w(x)) < \text{LB}(\tau_w(e)).\ \text{think}(x)(e) \& \text{Exp}(e) = \text{Sajana} \& e \text{ is in } w \& \forall w' [w' \in \text{Content}(e) \rightarrow \exists e_3 [\text{break(the cart)}(e_3) \& \text{Agent}(e_3) = \text{Badma} \& e_3 \text{ is in } w']].\]
Existential Closure “closes off” \( e \) and \( x \) variables

(20) \([[\text{Sajana thought that Badma broke the cart}]])^{w,g} = 1 \text{ iff } \exists x \exists e: LB(\tau_w(x)) < LB(\tau_w(e)). \text{think}(x)(e) \& e \text{ is in } w \& \text{Experiencer}(e) = \text{Sajana} \& \forall w' [w' \in \text{Content}(e) \rightarrow \exists e_3 [\text{break}(\text{the cart})(e_3) \& \text{Agent}(e_3) = \text{Badma} \& e_3 \text{ is in } w'].}
Deriving *hanaxa + CP*

(20) \([[\text{Sajana thought that Badma broke the cart}]^{w,g} = 1 \text{ iff} \]

\[ \exists x \exists e: \text{LB}(\tau_w(x)) < \text{LB}(\tau_w(e)). \text{think}(x)(e) \& e \text{ is in } w \& \text{Experiencer}(e) = \text{Sajana} \& \forall w' [w' \in \text{Content}(e) \Rightarrow \exists e_3 [\text{break-the-cart}(e_3) \& \text{Agent}(e_3) = \text{Badma} \& e_3 \text{ is in } w']]. \]

- the presupposition exists, but it’s not about the event of breaking of the cart, and nothing in the linguistic material corresponds to it.
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Nominalizations combine with the verb by Function Application.
I assume that NMNs in Buryat come with null determiners and illustrate the derivation with an indefinite nominalization (NMN with an indefinite generalized quantifier).
(23) \[[Sajana thought of Badma’s breaking the cart]\]^w.g =

\[\exists e_3 \exists e_v : LB(\tau_w(e_3)) < LB(\tau_w(e))\]
\[\text{[break(the cart)(e_3) \& Agent(e_3) = Badma \& e_3 is in w \& think(e_3)(e) \& e is in w \& Experiencer(e) = Sajana].}\]

- the ‘remember’ meaning arises due to the presupposition that the object of thought (= the event described by the NMN) exists prior to thinking.
Deriving *hanaxa* + NMN

(23) \([\text{[Sajana thought of Badma’s breaking the cart]}]^{w,g} = \)

\[\exists e_3\exists e_v : \text{LB}(\tau_w(e_3)) < \text{LB}(\tau_w(e)) \ [\text{break(the cart)}(e_3) \& \text{Agent}(e_3) = \text{Badma} \& e_3 \text{ is in } w \& \text{think}(e_3)(e) \& e \text{ is in } w \& \text{Exp}(e) = \text{Sajana}].\]

Things to note:

- According to this proposal, NMN denotes a property of events (there is no quantification over worlds at all!).
- Also, there is no connection between the denotation of NMN and beliefs of the experiencer argument: nothing is said about how an event of breaking the cart is represented in Sajana’s mind.
NMN denotes a property of events

- De dicto readings are not possible. Arguments of nominalization have to exist in the actual world.

- The nominalization can be an argument of predicates like ‘is sad' or ‘happened in the yard', which are predicates that can apply to events, but not propositions.

- The nominalization cannot be an argument of predicates that clearly select for propositional arguments: be false, suspect, argue, doubt, deny, take into account, be mistaken.

- The nominalization cannot describe a false memory.
NMN denotes a property of events

(24) a. səsəg xan garu:di ʃubu:n-ai
Seseg.NOM honor. Garudi bird-GEN
oi soːguːr niːd-əʃ-iːjə han-a:
woods through fly-PART-ACC think-PST
‘Seseg remembered bird Garudi’s flying
through the woods’

b. #…xarin xan garu:di ʃubu:n
but honor. Garudi bird.NOM
gazar dəːɾ ügiː gəzə mədə-nə-b
earth on NEG COMP know-PRS-1SG
Intended: ‘…but there is no bird Garudi on Earth’
NMN denotes a property of events

(25) a. sajana  badm-i:n  tərgə  əmdəl-ə:ʃ-i:jə  han-a:
Sajana.NOM  Badma.GEN  cart  break-PART-ACC  think-PST
‘Sajana remembered Badma’s breaking the cart.’

b. …ənə  uʃar  gaza:  bol-o:
this  event  outside  become-PST
‘This happened outside.’

(26)  badm-i:n  tərgə  əmdəl-ə:ʃə-n’  gomdoltoi
Badma-GEN  cart  break-PART-3  sad
‘Badma’s breaking the cart is sad.’
NMN denotes a property of events

(27) *sajana səsəg-əi xada də:ɾə
    Sajana.NOM Seseg-GEN mountain on

gar-aːʃ-iːʃə arsalda-na / taːmagla-na
go.up-PART-ACC argue-PRS / suspect-PRS

Intended:
Sajana argues / suspects that Seseg climbed onto the mountain.

- “Arguing an event” / “suspecting an event” – makes no sense.
NMN does not express the beliefs of the attitude holder

(28) badma darim-i:n dən türö:r
Badma.NOM Darima-GEN too.much fast
maʃin-a:r jab-a:j-i:jə hana-na,
car-INSTR go-PART-ACC think-PRS

xarin badma (darima) dən türö:r
but Badma (Darima) too.much fast
maʃin-a:r jab-a: gəʒə hana-na-guj
car-INSTR go-PSTCOMP think-PRS-NEG

‘Badma remembers Darima’s driving very quickly, but he doesn’t think that she was driving very quickly.’
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Looking at some predictions

(29) \([\text{hanaxa}]^{w,g} = \lambda x_e. \lambda e_v : \text{LB}(\tau_w(x)) < \text{LB}(\tau_w(e))). \text{think}(x)(e) \& e \text{ is in } w.\)

- The formulation in (29) predicts that it should be possible to both attach a CP (by modifying the eventuality argument) and an overt object at the same time: nothing in the system prevents this from happening.

Is this option attested?
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Additional evidence from nouns that do not combine with CPs

- In Buryat, some nouns can combine with CPs: *rumor, claim*.

- Other nouns cannot combine with CPs. For example, *uʃar ‘event’* cannot combine with CPs when it occupies the subject position:

  (30) *badma tərgə əmdəl-ə: gə-ʒə uʃar gomdoltoj
  Badma.NOM cart break-PST say-CONV event sad
  Intended: ‘The event of Badma’s breaking the cart is sad.’

- (Removing CP in (30) makes it grammatical: *An event is sad*).
Additional evidence from nouns that do not combine with CPs

- Suprisingly, while (30) is bad, (31) is good:

(31) sajana badma tərgə əmdəl-ə: gə-ʒə
    Sajana.NOM Badma.NOM cart break-PST say-CONV
    uʃar-iːjə han-a:
    event-ACC think-PST
    ‘Sajana remembered /thought of the event that Badma broke the cart.’

- Hypothesis: (31) is grammatical because both the CP (by restricting e) and the noun (by saturating x) combine with the verb in this case.
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Additional evidence from $\text{SUB}_{\text{ACC}}$ of CPs

- Buryat has covert hyperraising (30):
  subjects of CPs can receive ACC from the matrix verb.

(30) sajana badm-i:jə tərgə əmdəl-ə: ə-gə-ʒə han-a:
  Sajana.NOM Badma-ACC cart break-PST say-CONV think-PST
  ‘Sajana thought that Badma broke the cart.’

- Hypothesis:
  hyperraising is another instance of saturating the object (x) and restricting
  the event argument (e) at the same time.
Additional evidence from $\text{SUB}_{\text{ACC}}$ of CPs

(30) sajana $\text{badm-}:jə$ tərgə əmdəl-ə: gə-ʒə ən-a:
                   Sajana.NOM   Badma-ACC cart   break-PST say-CONV think-PST
‘Sajana thought that Badma broke the cart.’

- Why think of this as raising?
  - binding, NPI licensing (Bondarenko 2017);
  - obey islands (CSC), $de\ re$ readings only.

- Why is it covert?
  The material of the embedded clause (adverbs, PPs) can precede the accusative subject.
Additional evidence from SUB$^{Acc}$ of CPs

(31) a. sɘsɘg xan garu:di fubu:n
Seseg.NOM honor. Garudi bird.NOM
oi so:gu:r ni:d-ə: gɘʒɘ han-a:
woods through fly-PST COMP think-PST
‘Seseg thought that bird Garudi flew through the woods’

b. OK…xarin xan garu:di fubu:n
but honor. Garudi bird.NOM
gazar də:ɬ ügi: gɘʒɘ mɘdɘ-nə-b
earth on NEG COMP know-PRS-1SG
‘…but there is no bird Garudi on Earth’
Additional evidence from SUB$_{ACC}$ of CPs

(32) a. səsəg xan garu:di subu:-jə
Seseg.NOM honor. Garudi bird-ACC
oi soːɡuːr niːd-ə: gəəə han-a:
woods through fly-PST COMP think-PST
‘Seseg thought of bird Garudi that it flew through the woods’

b. #…xarin xan garu:di subuːn
but honor. Garudi bird.NOM
ɡəəə gəəə məəə-ŋə-b
earth on NEG COMP know-PRS-1SG
Intended:‘…but there is no bird Garudi on Earth’
I propose that the index of the subject (13 in the LF) is separated from it by the insertion of the matrix verb.

The CP after the lambda abstraction becomes of the same type as the verb: a function from individuals to events to truth-values, $<e<vt>>$. 

Additional evidence from $\text{SUB}_{\text{ACC}}$ of CPs
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(33) $[[\text{hanaxa}]]^{w,g} = \lambda x_e. \lambda e_{2v} : \text{LB}(\tau_w(x)) < \text{LB}(\tau_w(e_2))$. think($x$(e_2)) & $e_2$ is in $w$.

(34) $[[\text{that 13 t}_{13} 8 t_8 broke the cart}]]^{w,g} = $

$\lambda y_e. \lambda e_{1v} : \exists k \in D_{st} \ [\text{Content}(e_1)=k]. \ \forall w' \ [w' \in \text{Content}(e_1) \Rightarrow \exists e_3[\text{break(the cart)}(e_3) & \text{Agent}(e_3) = y & e_3 \text{ is in } w']]$. 
Additional evidence from $\text{SUB}_{\text{ACC}}$ of CPs

(33) $[[\text{hanaxa}]]^{w,g} = \lambda x_e. \lambda e_{2v} : \text{LB}(\tau_w(x)) < \text{LB}(\tau_w(e_2))$. \text{think}(x)(e_2) & e_2 \text{ is in } w.$

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- I propose that the verb and the CP combine by a rule that identifies two individual arguments and two events arguments respectively:
  - $x = y = z$;
  - $e_2 = e_1 = e_4$. 
Additional evidence from $\text{SUB}_{\text{ACC}}$ of CPs

- This results in (35):

(35) $[[\text{CP} + \text{hanaxa}]]^{w,g} =$

$\lambda z. \lambda e_4 : \text{LB}(\tau_w(z)) < \text{LB}(\tau_w(e_4))$.

think($z(e_4)$) & $e_4$ is in $w$ &

$\forall w' [w' \in \text{Content}(e_4) \Rightarrow \exists e_3[\text{break(the cart)}(e_3) & \text{Agent}(e_3) = z & e_3 \text{ is in } w']]$. 
Additional evidence from SUB\textsubscript{ACC} of CPs

- After this $z$ is saturated by **Badma**: 

\[(36) \; [[\text{Badma CP + hanaxa}]]^{w,g} = \]

$$\lambda e_4 v : \text{LB}(\tau_w(\text{Badma})) < \text{LB}(\tau_w(e_4))).$$

think(Badma)(e_4) & e_4 is in w & 
\forall w' [w' \in \text{Content}(e_4) \rightarrow \exists e_3[\text{break(the cart)}(e_3) & \text{Agent}(e_3) = \text{Badma} & e_3 \text{is in w}']].$$
Additional evidence from \( \text{SUB}_{\text{ACC}} \) of CPs

- At last, existential closure “closes off” the event argument:

\[
\exists e_4^v : \text{LB}(\tau_w(\text{Badma})) < \text{LB}(\tau_w(e_4))).
\]

\[
\text{think}(\text{Badma})(e_4) \land \text{Exp}(e_4)=\text{Sajana} \land e_4 \text{ is in } w \land \forall w' [w' \in \text{Content}(e_4) \Rightarrow \exists e_3 [\text{break(the cart)}(e_3) \land \text{Agent}(e_3) = \text{Badma} \land e_3 \text{ is in } w']] \]
Typology of CPs and hyperraising: speculations

- **What we know from typology:**
  Languages have different complementizers
  I  based on nominal elements
     (English: demonstrative *that*, Russian: wh-word *čto* ‘what’)
  II based on verbal forms
     (Turkic, Mongolic: say + adverbial morphology)

- **What we know from syntax:**
  Languages differ in whether they allow hyperraising or not.

Based on the *very-very-very few* languages I know: I-languages do not hyperraise, II-languages do.
What if the main difference is the kind of property CPs denote?

- **Complementizers:**
  
  I  based on nominal elements  
  (English, Russian)

  II  based on verbal forms  
  (Turkic, Mongolic)

- **CPs:**

  properties of individuals

  properties of events
What if the main difference is the kind of property CPs denote?

<table>
<thead>
<tr>
<th>Complementizers:</th>
<th>CPs:</th>
<th>What CPs restrict:</th>
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</thead>
<tbody>
<tr>
<td>I  based on nominal elements (English, Russian)</td>
<td>properties of individuals</td>
<td>the internal argument</td>
</tr>
<tr>
<td>II based on verbal forms (Turkic, Mongolic)</td>
<td>properties of events</td>
<td>the eventuality argument</td>
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</table>

- If this is true, then Kratzer’s approach and mine are two different typological possibilities.
What if the main difference is the kind of property CPs denote?

- If this is true, then Kratzer’s approach and mine are two different typological possibilities.

Type I (COMP based on nominal elements)

(38) \([\text{believe}]^w_g = \lambda y_e. \lambda s. \text{believe}(y)(s) \land s \text{ is in } w\).

- \(y = \) content argument;
- CPs are properties of individuals;
- CPs restrict the internal argument \(y\);
- no hyperraising: there is no argument that is the object of belief.
What if the main difference is the kind of property CPs denote?

- If this is true, then Kratzer’s approach and mine are two different typological possibilities.

**Type II (COMP based on verbal forms)**

(39) \([[\text{believe}]^{w,g} = \lambda y_e. \lambda s. \text{believe}(y)(s) \& s \text{ is in } w.\]

- \(y = \text{object of belief};\)
- CPs are properties of events;
- CPs restrict the thinking event;
- hyperraising possible: DPs can raise into the object of belief position (y).
Other open issues

- My approach as it is predicts for Buryat-type languages that prolepsis should also always be a possibility: this is just saturating the object argument by merging a DP by External Merge (and not by Internal Merge as in hyperraising). Is this true?

- It seems that ACC arguments of prolepsis / hyperraising have to correspond to a gap in the embedded CP. Nothing in my set up accounts for that, if this is indeed true.

- More broadly: what should be the connection between the object of thinking and the CP and what is its nature?
Other open issues

- General question for the enterprise:
  If CPs restrict arguments, then what prevents several CPs from combining with the verb at the same time?

- I believe:
  That an attitude-event can have only one proposition as its Content.

  *If true, what is the nature of this restriction?*
Other open issues

- Consider (40):

(40) bi badma tamxi tata-dag gü gǝʒǝ hana-na-b
   1SG.NOM Badma.NOM tobacco smoke-HAB Q COMP think-PRS-1SG
   ‘I am recalling whether Badma smokes.’

- (40) means that the speaker is recalling the (known) answer to the question.
- Here a CP is embedded. Why do we get ‘remember’ meaning?
- Very vague hypothesis: here the CP restricts the object argument which is interpreted as “answer” (CP restricts “answer” by naming the question which it is an answer to).
Conclusions

- Think / remember puzzle in Buryat can be solved with a single meaning of the verb *hanaxa* ‘think’ by
  (i) assuming that the verb has a presupposition that the object of thinking exists prior to the thinking event;
  (ii) employing a version of the decompositional approach to attitudes.
- Interesting typological questions emerge with respect to complementizers in different languages and hyperraising.

Selected references: