

Asking and Knowing in Uyghur: Syntactic Distinctions between Extensional and Intensional Attitudes

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Background

Uyghur (Turkic) is a wh-in-situ language with three complementation strategies each headed by a distinct particle: *dep*, *liq* and *ish*.

This presentation will be on the semantic and syntactic distinctions between the three based on novel data collected with a consultant in Cambridge MA.

I find that there are restrictions in the syntactic size of interrogative complements under extensional verbs and suggest that this is due to a three-layered syntacto-semantic structure which distinguishes propositions, extensional attitudes, and intensional attitudes.

Intensional vs Extensional (Part I)

Extensional predicates embed complements whose meaning is index-dependent: the meaning of the complement depends on the world of evaluation for the matrix verb.

Intensional predicates embed complements whose meaning is index-independent: the world in which the verb is evaluated has no bearing on the meaning of the internal clause (Karttunen 1977; Groenendijk and Stokhof 1982).

Intensional vs Extensional (Part II)

- (1) Know is an extensional verb.
- a. Sean knows whether Liam rides a motorcycle
Liam rides a motorcycle
⇒ Sean knows that Liam rides a motorcycle
 - b. Sean knows whether Liam rides a motorcycle
Liam doesn't ride a motorcycle
⇒ Sean knows that Liam doesn't ride a motorcycle
- (2) Guess is an intensional verb.
- a. Sean guessed whether Liam rides a motorcycle
Liam rides a motorcycle
⇏ Sean guessed that Liam rides a motorcycle
 - b. Sean guessed whether Liam rides a motorcycle
Liam doesn't ride a motorcycle
⇏ Sean guessed that Liam doesn't ride a motorcycle

Uyghur Complementation *ish*

ish-nominalizations, *ish* is attached directly to a bare embedded verb. Subject of embedded clause not necessarily coreferent with matrix controller. Subject of embedded clause gets genitive case, verb gets possessor agreement and case.

- (3) Reyhan Tursun-ning tort-ni yé-yish-i-ni xala-y-du.
Reyhan Tursun-GEN cake-ACC eat-ISH-POSS.3-ACC wish-NPST-3
'Reyhan wants Tursun to eat the cake'

Clauses headed by *ish* tend to be embedded under emotive and modal predicates (hope, expect, decide), although they may be used under attitude and speech predicates (know, think, say) with a given modal flavor (4).

- (4) Reyhan Tursun-ning tort-ni yé-yish-i-ni bil-i-du.
Reyhan Tursun-GEN cake-ACC eat-ISH-POSS.3-ACC know-NPST-3
'Reyhan knows Tursun will/would/is to eat the cake.'

Uyghur Complementation *liq*

liq attaches to the verb+aspect, tend to be embedded under attitude verbs (know, think, believe), without an accompanying modal flavor, as in (5).

- (5) Reyhan Tursun-ning tort-ni yé-gen-lik-i-ni bil-i-du.
Reyhan Tursun-GEN cake-ACC eat-PFV-LIQ-POSS.3-ACC know-NPST-3
'Reyhan knows that Tursun ate the cake.'

It is also possible to embed *liq*-nominalizations under emotive and modal predicates, but only when the imperfective aspect is used.

- (6) a. Reyhan Tursun-ning tort-ni yé-ydighan-lik-i-ni
Reyhan Tursun-GEN cake-ACC eat-IPFV-LIQ-POSS.3-ACC
xala-y-du.
wish-NPST-3
'Reyhan wants Tursun to eat the cake.'
- b. *Reyhan Tursun-ning tort-ni yé-gen-lik-i-ni
Reyhan Tursun-GEN cake-ACC eat-PFV-LIQ-POSS.3-ACC
xala-y-du.
wish-NPST-3

Uyghur Complementation *dep*

dep embeds a finite clause — with tense, aspect, and agreement marking. These are used often with speech and attitude verbs (say, know, think, believe), and, unlike the other forms of complementation seen so far, allow indexical shift (7).

- (7) a. Reyhan tort-ni yé-d-im dep étirap qil-d-i.
Reyhan cake-ACC eat-PST-1SG DEP admit do-PST-3SG
'Reyhan admitted that she ate the cake.'
- b. Tursun tünügün men kim-ni kör-d-üm dep
Tursun yesterday 1SG.NOM who-ACC see-PST-1SG DEP
oyla-y-du?
think-NPST-3
'Who does Tursun think he saw yesterday?'

The use of *dep* complementation is banned under emotive verbs, even when the nonpast tense is used.

- (8) *Reyhan Tursun tort-ni yé-y-du dep xala-y-du.
Reyhan Tursun cake-ACC eat-NPST-3 DEP wish-NPST-3
Intended: 'Reyhan wants Tursun to eat the cake.'

Embedding Interrogatives under Intensional Predicates

Intensional predicates can embed interrogatives under any of the three embedding strategies. Note the modal flavor in (9c).

- (9)
- a. Reyhan kim tort-ni yé-d-i dep sori-d-i.
Reyhan who cake-ACC eat-PST-3 DEP ask-PST-3
'Reyhan asked who ate the cake.'
 - b. Reyhan kim-ning tort-ni yé-gen-lik-i-ni sori-d-i.
Reyhan who-GEN cake-ACC eat-PFV-LIQ-POSS.3-ACC ask-PST-3
'Reyhan asked who ate the cake.'
 - c. Reyhan kim-ning tort-ni yé-yish-i-ni sori-d-i
Reyhan who-GEN cake-ACC eat-ISH-POSS.3-ACC ask-PST-3
'Reyhan asked who could/would eat the cake.'

Embedding Interrogatives under Extensional Predicates

Extensional predicates cannot embed interrogatives under *dep*.

- (10)
- a. *Reyhan kim tort-ni yé-d-i dep bil-i-du
Reyhan who cake-ACC eat-PST-3 DEP know-NPST-3
Intended: 'Reyhan knows who ate the cake.'
 - b. Reyhan kim-ning tort-ni yé-gen-lik-i-ni
Reyhan who-GEN cake-ACC eat-PFV-LIQ-POSS.3-ACC
bil-i-du
know-NPST-3
'Reyhan knows who ate the cake.'
 - c. Reyhan kim-ning tort-ni yé-yish-i-ni bil-i-du
Reyhan who-GEN cake-ACC eat-ISH-POSS.3-ACC know-NPST-3
'Reyhan knows who will eat the cake.'

Embedding Interrogatives under Extensional Predicates with Modals

Embedding under *dep* becomes fine when the extensional predicate itself is embedded under a modal.

- (11) a. Reyhan kim tort-ni yé-d-i dep bil-gü-si
Reyhan who cake-ACC eat-PST-3 DEP know-DES-POSS.3
kel-d-i.
want-PST-3
'Reyhan wondered/wanted to know who ate the cake.'
- b. Reyhan kim-ning tort-ni yé-gen-lik-i-ni
Reyhan who-GEN cake-ACC eat-PFV-LIQ-POSS.3-ACC
bil-gü-si kel-d-i.
know-DES-POSS.3 want-PST-3
'Reyhan wondered/wanted to know who ate the cake.'
- c. Reyhan kim-ning tort-ni yé-yish-i-ni
Reyhan who-GEN cake-ACC eat-ISH-POSS.3-ACC
bil-gü-si kel-d-i.
know-DES-POSS.3 want-PST-3
'Reyhan wondered/wanted to know who would / was to the cake.'

The Facts and the Suggestion

- (12) Interrogatives complements cannot be embedded under *dep* unless:
- The embedding complement is intensional, or
 - There is some modal predicate which embeds embedding complement.

Following Karttunen (1977) and Groenendijk and Stokhof (1982): extensional and intensional predicates take ontologically distinct complements. Proposal: *dep* can embed intensional attitudes but not extensional attitudes.

Intensional complements abstract over indices. Extensional attitude = a , then an intensional complement = $\langle s, a \rangle$. *dep* takes a complement of type $\langle s, a \rangle$, which prevents extensional complements.

- (13)
- Extensional Complements, variable E , type a , where a is undecided.
 - Intensional Complements, variable I , type $\langle s, a \rangle$
 - $\llbracket dep \rrbracket = \lambda I_{\langle s, a \rangle} . [\dots]$

A Problem: Quantifying over Indices is Common

Typical analysis of attitude verbs quantifies over indices.

- (14)
- a. $\llbracket C_{\text{know}} \phi \rrbracket = \lambda x. \forall w [\text{COMP}(x, w) \rightarrow \phi(w)]$
 - b. $\llbracket \text{know} \rrbracket = \lambda x \lambda e. \text{know}(e) \wedge \text{THEME}(e, x)$
 - c. $\llbracket \text{know } C_{\text{know}} \phi \rrbracket = \lambda e. \exists x [\text{know}(e) \wedge \text{THEME}(e, x) \wedge \forall w [\text{COMP}(x, w) \rightarrow \phi(w)]]$

Under this analysis, 'know' is index independent. While world-quantification may work for modal verbs and for intensional attitude complements, it is insufficient for extensional attitude complements. Suggestion: 'know' quantifies over mental models.

- (15) DEFINITION OF A MENTAL MODEL

A mental model m is a semantic object of type $\langle s, \langle \langle s, t \rangle, t \rangle \rangle$, which takes a world w and a proposition p and returns a truth value of 1 iff the model m associates p as being true of w .

Models Allow Index Dependence

'Hope' takes a proposition: quantifies over worlds.

- (16) $\llbracket \text{hope that } \phi \rrbracket = \lambda w. \exists x [\text{hope}(w, x) \wedge \forall w' [\text{COMP-W}(x, w') \rightarrow \phi(w')]]$
Given a world w , there exists an entity x such that x is hoped in w , and for all worlds w' , if w' is compatible with the attitude content of x , then ϕ is true of w' .

'Know' takes an extensional attitude: quantifies over models.

- (17) $\llbracket \text{know that } \phi \rrbracket = \lambda w. \exists x [\text{know}(w, x) \wedge \forall m [\text{COMP-M}(x, m) \rightarrow m(w, \phi)]]$
Given a world w , there exists an entity x such that x is known in w , and for all models m , if m is compatible with the attitude content of x , then m associates ϕ as true of w .

Deriving Index Dependence (Part I)

- (18) $\llbracket \text{Ayaka dances (in } w_5) \rrbracket_{\text{Ext. Att.}} = \lambda m.m(w_5, \lambda w.\text{Ayaka-dances}(w))$
A set of models m such that m evaluates 'Ayaka dances' as being true of w_5

- (19)
- Extensional Attitude
 $\lambda m.m(w_5, \lambda w'.\text{Ayaka-dances}(w'))$
- World
 w_5

$\lambda w \lambda m.m(w, \lambda w'.\text{Ayaka-dances}(w'))$
- Modeling Operator
 $\lambda p \lambda w \lambda m.m(w, p)$

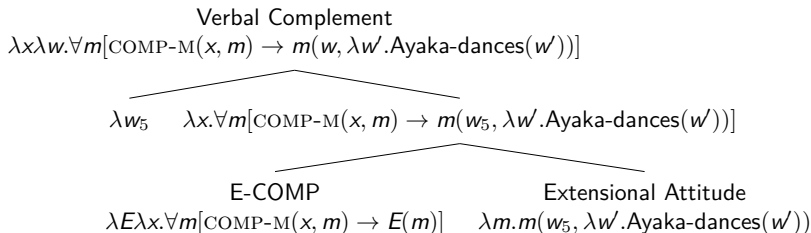
Ayaka dances
 $\lambda w.\text{Ayaka-dances}(w)$

Deriving Index Dependence (Part II)

(20) DEFINITION OF AN EXTENSIONAL ATTITUDE TAKING
COMPLEMENTIZER (E-COMP)

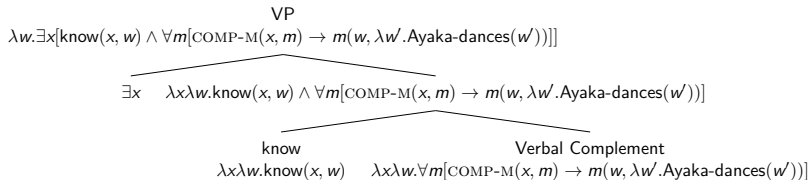
$$\llbracket \text{E-COMP} \rrbracket = \lambda E \lambda x. \forall m [\text{COMP-M}(x, m) \rightarrow E(m)]$$

(21)



Deriving Index Dependence (Part III)

(22)



Two Flavors of Modeling Operators (Part I)

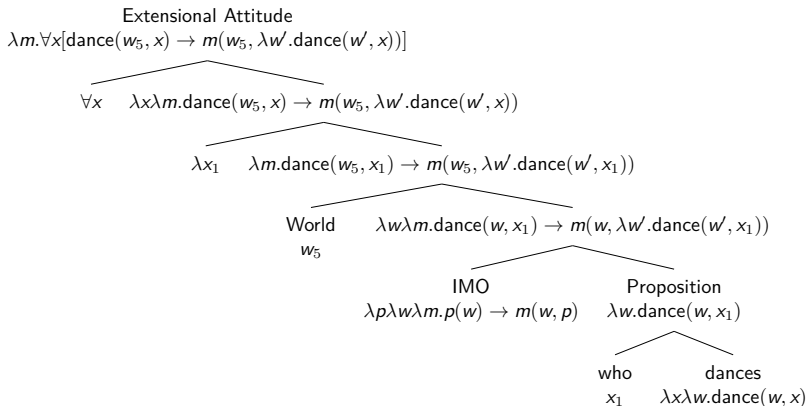
Two flavors of Modeler: a Non-Interrogative Modeling Operator (NIMO) and an Interrogative Modeling Operator (IMO)

- (23)
- a. DEFINITION OF NIMO:
$$\llbracket \text{NIMO} \rrbracket = \lambda p \lambda m \lambda w. m(w, p)$$
 - b. DEFINITION OF IMO:
$$\llbracket \text{IMO} \rrbracket = \lambda p \lambda m \lambda w. p(w) \rightarrow m(w, p)$$

For the sets of propositions that come with a question content, IMO only picks out the propositions true of the modelled world for modelling.

Two Flavors of Modeling Operators (Part II)

(24)



Two Flavors of Modeling Operators (Part III)

- (25) Desired definition: $\llbracket \text{Sean knows who dances} \rrbracket =$
 $\lambda w. \exists x [\text{know}(x, w) \wedge \forall m \forall y [\text{COMP-M}(x, m) \wedge \text{dance}(w, y) \rightarrow$
 $m(w, \lambda w'. \text{dance}(w', y))]]$

Given a world w , there exists an entity x such that Sean knows x in w and for all models m and all entities y , if m is compatible with the attitude x and ' y dances' is true of w , then m models the proposition ' y dances' as true of w .

- (26) Our Ontology So Far:

- Propositional complements (under 'want' like verbs): propositions $\langle s, t \rangle$, closed through quantification over worlds.
- Extensional attitude complements (under 'know' like verbs): model predicates $\langle \langle s, \langle \langle s, t \rangle, t \rangle \rangle, t \rangle = a$, closed through quantification over models.
- Intensional attitude complements: Following intensional attitude = $\langle s, a \rangle$, model predicate concepts: $\langle s, \langle \langle s, \langle \langle s, t \rangle, t \rangle \rangle, t \rangle \rangle$

REQUEST and Model Centers

Intensional attitudes form from the addition of a REQUEST operator: this new world is not the world that the proposition is evaluated with respect to, but rather the world which the model holds to be the world in which the model exists (what the model identifies as the actual world).

- (27)
- a. $\text{HOLD}(m, w)$ is true iff a model m identifies w as the world in which the model exists (the logophoric center of the model)
 - b. $\llbracket \text{REQUEST} \rrbracket = \lambda E \lambda w \lambda m. \text{HOLD}(m, w) \wedge E(m)$
 - c. $\llbracket dep \rrbracket = \lambda I \lambda x \lambda w. \forall m [\text{COMP-M}(x, m) \rightarrow I(w, m)]$

I define *dep* as taking intensional attitudes: thus it must attach after the introduction of this world argument.

Deriving Ungrammaticality under Extensional Attitudes

Problem: even before abstraction of the world variable, there is a world variable available! Too many worlds!

$$(28) \quad \llbracket dep \text{ Sean sings} \rrbracket = \\ \lambda x \lambda w. \forall m [\text{HOLD}(x, w) \wedge \text{COMP-M}(x, m) \rightarrow m(w_5, \lambda w'. \text{sing}(w', \text{Sean}))]$$

The result is that when the verb combines with the *dep* headed complement, RESTRICT applies to this open world variable, rather than the world which the model evaluates.

$$(29) \quad \llbracket \text{Reyhan knows } dep \text{ who ate the cake} \rrbracket = \\ \lambda w. \exists x [\text{know}(w, x, \text{Reyhan}) \wedge \forall m \forall y [\text{HOLD}(x, w) \wedge \text{COMP-M}(x, m) \wedge \\ \text{cake-eat}(w_5, y) \rightarrow m(w_5, \lambda w'. \text{cake-eat}(w', y))]]]$$

The issue with (29) is that the world variable w_5 has no place to open. Without a proper referent for w_5 , the sentence is ungrammatical, as desired.

- (10a) *Reyhan kim tort-ni yé-d-i dep bil-i-du
Reyhan who cake-ACC eat-PST-3 DEP know-NPST-3
Intended: 'Reyhan knows who ate the cake.'

Deriving Ungrammaticality under Extensional Attitudes with Modals

A modal verb provides additional world closure. w_5 does not undergo abstraction until after world closure of the model's 'centered' world.

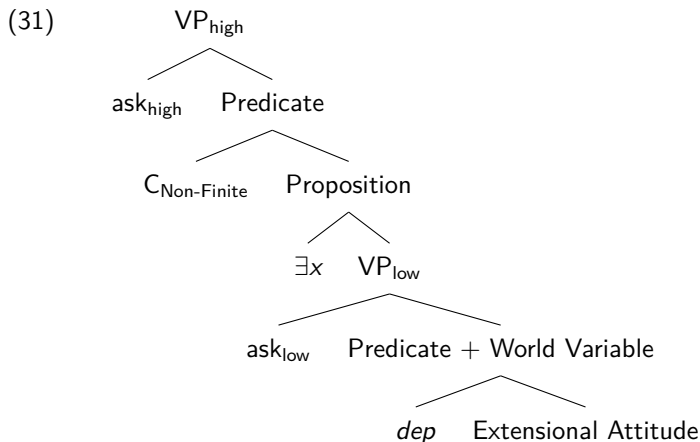
$$(30) \quad \llbracket \text{Reyhan wants to know } dep \text{ who ate the cake} \rrbracket = \\ \lambda w''. \exists z [\text{want}(w'', z, \text{Reyhan}) \wedge \forall w [\text{COMP-W}(w, z) \rightarrow \\ \exists x [\text{know}(w, x, \text{Reyhan}) \wedge \forall m \forall y [\text{HOLD}(x, w) \wedge \text{COMP-M}(x, m) \wedge \\ \text{cake-eat}(w', y) \rightarrow m(w'', \lambda w'. \text{cake-eat}(w', y))]]]]]$$

The 'centered' world is the world that is wanted; the world which the proposition is evaluated is the matrix world. This can be paraphrased as 'Reyhan, in world w wants a world w' where she knows who ate the cake' in world w .

(11a) Reyhan kim tort-ni yé-d-i dep bil-gü-si kel-d-i.
Reyhan who cake-ACC eat-PST-3 DEP know-DES-POSS.3 want-PST-3
'Reyhan wondered/wanted to know who ate the cake.'

Hidden Complex Predicates

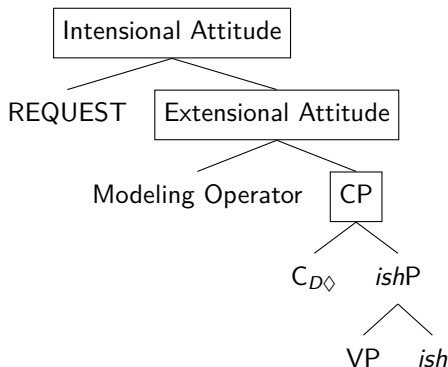
I argue that intensional verbs are complex predicates which license quantification over both worlds and models. Verb exists in two places: one in a lower, manner quantifying position (like 'know') and one in a higher world quantifying position (like 'want').



Deriving Optionality: *ish*

- (32)
- a. When a complement embedder attaches, additional 'empty' material may be added.
 - b. *dep* is only overt in finite contexts.
 - c. *ish* cuts off below CP, and so the additional C head that is added is non-finite wh (a la Bhatt (2006))
 - d. *ish* can thus embed proposition, extensional attitudes, and intensional attitudes; all with modal flavor.

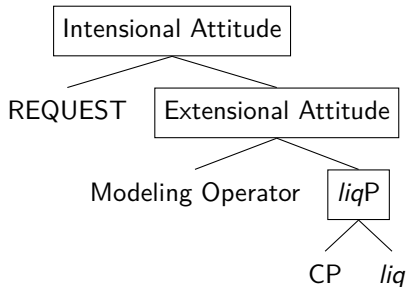
(33)



Deriving Optionality: *liq*

liq cuts off just above CP, it can embed propositions, extensional attitudes, and intensional attitudes; modality comes from imperfective.

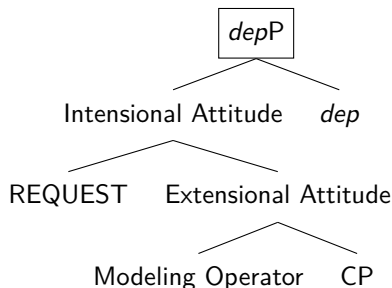
(34)



Deriving Optionality: *dep*

dep attaches to Intensional Attitudes only; no room for propositional or extensional meaning.

(35)



Exception: what about non-interrogative clauses under *dep*?

Conclusion

The intensional-extensional distinction has an observable effect on the grammaticality of Uyghur sentences.

We can derive index-dependence from the presence of quantification over non-world variables, namely models.

A syntacto-semantic difference can be made between three kinds of attitudes (propositions, extensional, and intensional attitudes), each with different expectations for the interpretation and syntax of interrogatives.

Thank You!

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