Uegaki, Wataru and Yasutada Sudo. 2019. “The *Hope-Wh Puzzle.” Natural Language Semantics 27: 323-356.

1.Introduction.

1.2. Preferential predicates and types of embeddings

Preferential predicates:
desideratives (e.g. *hope, wish, want, fear, be surprised, be happy*)
directives (e.g. *demand, advise, encourage*).

Non-veridical preferential predicates:
hope, *wish*, *expect*, *want*, *be eager*, *aspire*, *fear*, *desire*, *prefer*

Veridical preferential predicates:
be surprised, *be annoyed*, *be glad*, *be happy*, *like*, *love*, *hate*
(Anand and Hacquard 2013; Bolinger 1968; Heim 1992; Villalta 2008; Rubinstein 2012; Harner 2016)

All of these predicates are compatible with declarative complements.

(1) Ben hopes/wishes that Becky is invited to the party.
(2) Chris expects/fears that Cathy is invited to the party.
(3) Dorothy is surprised/annoyed/glad/happy that Daniel will give a presentation.

The ones that are **veridical/factive** with declarative complements can **embed questions** (they are responsive).

(4) Andy is surprised (at/by) which students are invited to the party.
(5) Ben is happy/glad ?(about) which students are invited to the party.
(6) Chris liked/hated which students were invited to the party.

The **non-veridical** ones are anti-rogative, and **incompatible with interrogative complements**.

(7) *Ben hopes/wishes which students will be invited to the party.
(8) *Chris expects/fears how many students will be invited to the party.

(?potential counterexamples: nervous, worried?)

Can it be a free relative? No! (Huddleston and Pullum 2002: 398).

The test: the compatibility with *wh-else* (Ross 1967: 38), which also cannot be interpreted as a free relative.

(9) Andy is surprised (at/by) who else is invited to the party.
(10) Ben is glad/happy ?(about) who else is invited to the party.
(11) Chris liked/hated who else was invited to the party.

Hypothesis: All non-veridical *preferential* predicates are anti-rogative.

1.2. Focus sensitivity

Villalta 2008; Rubinstein 2012; Romero 2015; Harner 2016

(12) Context: Natasha does not like to teach logic and prefers to teach syntax. She is not allowed to teach both. This year, it is likely that she needs to teach logic, and if so, she prefers to do so in the morning, as she prefers to do all her teaching in the morning.

a. Natasha **hopes** that she'll teach logic in the MORning. **true**
b. Natasha **hopes** that she'll teach LOgic in the morning. **false**

(13) Context: Lisa knew that syntax was going to be taught. She expected syntax to be taught by John, since he is the best syntactician around. Also, she expected syntax to be taught on Mondays, since that is the rule.

a. It **surprised** Lisa that John taught syntax on TUESdays. **true**
b. It **surprised** Lisa that JOHN taught syntax on Tuesdays. **false**

These predicates exhibit ***truth-conditional*** effects of focus, not just ***pragmatic*** effects of focus, which all predicates exhibit one way or another.

(14) Context: Natasha is required to teach logic, but she's free to choose when to teach it. However, if she teaches anything in the morning, it needs to be logic. In the end, she decides to teach logic in the morning and syntax in the afternoon.

a. Natasha decided that she'll teach logic in the MORning. **true**
b. Natasha decided that she'll teach LOgic in the morning. **infelicitous**

2. The proposal

The core idea of the paper: non-veridical preferential predicates with interrogative clauses give rise to trivial meaning while veridical preferential predicates do not, regardless of the complement clause type.

All embedded clauses denote sets of propositions

(15) $[\![\text{whether Alice jumped}]\!] = \{ \lambda w.\ \text{jump}_W(a), \lambda w.\ \neg\text{jump}_W(a) \}$
(16) $[\![\text{who jumped}]\!]=\{\lambda w.\text{jump}_W(x) \mid x \in D\} \cup \{\lambda w.\neg\exists x[\text{jump}_W(x)]\}$

A declarative complementizer converts a proposition into a singleton set containing the proposition.

(17) $[\![$that Alice jumped $]\!] = \{ \lambda w.\ jump_W(a) \}$

All attitude verbs are looking for a question:

(18) $[\![$be certain$]\!] = \lambda Q_{<st,t>}..\lambda x.\lambda w.\ \exists p \in Q[certain_W(x, p)]$

(19) $[\![$know$]\!] = \lambda Q_{<st,t>}..\lambda x.\lambda w{:}\ \exists p{\in}Q[p(w)].\exists p{\in}Q[p(w){\wedge}\ know_W(x, p)]$

(20) $[\![$believe$]\!] = \lambda Q_{<st,t>}.\lambda x.\lambda w.\ \exists p \in Q[believe_W(x, p)]$

Veridical preferential predicates

Building on Romero (2015) (to be modified).

(21) $[\![$Be happy$C]\!]^{W} = \boldsymbol{\lambda p\langle s,t\rangle}.\lambda x.\lambda w{:}\ p(w) \wedge believe_W(x,p) \wedge p{\in}C.$
$Pref_W(x, p) > \theta(C)$

(22) $Pref_W(x, p)$:= the maximum degree to which x prefers p at w

(23) $\theta(C)$:= the standard threshold given the comparison class C

x is happy that p

presupposes:

that p is true

that x believes that p

that p is a member of the focus alternatives C

asserts:

that the degree to which x prefers p at w is greater than the threshold given C.

The last presupposition—that $p \in C$—is an instance of a presupposition existing in degree constructions in general, namely that the comparison class includes the comparison term.

Degree semantics?

(24) Chris is happier that Alice jumped than Bill is.

(25) Chris liked/hated that Alice jumped more than Bill did.

(26) *Chris thought that Alice jumped more than Bill did.

We need to do three things:

(i) find a place for focus

(ii) make possible for a predicate to compose with a question in principle

(iii) account for the distinction between the veridical ones and non-veridical ones in their ability to compose with a question

The denotation in (27) does (i) and (ii):

(27) $[\![$be happy$_C]\!]^{o} = \lambda Q_{<st,t>}.\lambda x.\lambda w{:}\ \exists p{\in}Q[p(w){\wedge}believe_W(x, p) \wedge p \in C].$
$\exists p'' {\in} Q[p''(w) \wedge believe_W(x, p'') \wedge p'' \in C \wedge\ Pref_w(x,p'') > \theta(C)]$

Beck (2006): *wh*-items to be necessarily focused.

(28) $Q := [\![\text{who jumped}]\!]^{o} = [\![\text{who}_F \text{ jumped}]\!]^{f}$

(29) $[\![\alpha\sim C]\!]^{o}$ is defined only if $C \subseteq [\![\alpha]\!]^{f}$; if defined, $[\![\alpha\sim C]\!]^{o} = [\![\alpha]\!]^{o}$

(30) $C \subseteq [\![\text{who jumped}]\!]^{f} = Q$

(31) LF: John is happy$_C$ (about) [[who$_F$ jumped]~C]

(32) $[\![(31)]\!]^{o}=$
$\lambda w: \exists p\in Q[p(w) \wedge \text{believe}_w(j, p) \wedge p \in C].$
$\exists p'' \in Q[p''(w) \wedge \text{believe}_w(j, p'') \wedge p'' \in C \wedge \text{Pref}_w(j,p'') > \theta(C)]$

'John is happy who jumped':
presupposes: that there is a true answer of Q which John believes,
asserts: that a true answer of Q which John believes is such that he prefers it to a greater extent than the standard threshold given the alternatives in *C* , which in turn is a subset of Q.

(33) LF: John is happy$_C$ **that [[Alice$_F$ jumped**]~C]

(34) $[\![(33)]\!]^{o}= \lambda w: \exists p\in Q[p(w) \wedge \text{believe}_w(j, p) \wedge p \in C].$
$\exists p'' \in Q[p''(w) \wedge \text{believe}_w(j, p'') \wedge p'' \in C \wedge \text{Pref}_w(j,p'') > \theta(C)]$

(35) $[\![(33)]\!]^{o}= \lambda w: A(w) \wedge \text{believe}_w(j, A) \wedge A \in C].$
$A(w) \wedge \text{believe}_w(j, A) \wedge A \in C \wedge \text{Pref}_w(j,A) > \theta(C)]$

Non-veridical preferential predicates

(36) $[\![\text{hope}_C]\!]^{o} = \lambda Q_{<st,t>}. \lambda x . \lambda w: \exists p\in Q [p \in C] .$
$\exists p'' \in Q [p'' \in C \wedge \text{Pref}_W(x, p'') > \theta(C)]$

(37) $[\![\text{John hopes}_C \text{ that [[}\textbf{Alice}_F \textbf{ jumped}]\sim C]]\!]^{o}= \lambda w: A \in C. \text{Pref}_w(j,A) > \theta(C)$

The meaning predicted for a sentence with an interrogative complement turns out to be systematically trivial, **assuming an additional presupposition triggered by the preferential predicate**, which is the boxed portion of the presupposition—Threshold Significance.

(38) $[\![\text{John is hopes}_C \text{ (about) [who}_F \text{ jumped]}\sim C]\!]^{o}=$
$\lambda w: \exists p\in Q[p \in C] \wedge \boxed{\exists d\in\{\text{Pref}_W(j,q) | q\in C\}[d>\theta(C)].} \exists p''\in Q[p \in C \wedge \text{Pref}_w(j,p'') > \theta(C)]$

Threshold Significance requires that there be an element in the comparison class whose degree along the relevant scale is higher than the threshold returned by θ .

The explanation for the anti-rogativity of non-veridical preferential predicates like *hope*:

- Given Threshold Significance , (38) turns out to be necessarily true whenever it is defined. This is so since whenever Threshold Significance holds, there is always a proposition in $C \subseteq Q$ which John prefers more than the threshold given *C*

- *Hope* with a declarative complement is *not* logically trivial, regardless of Threshold Significance. This is so because whether the assertion of (37) is true depends on whether or not John prefers the particular proposition mentioned in the declarative complement (i.e., that Alice jumped), and Threshold Significance does not guarantee that he does.

The explanation for compatibility of the veridical preferential predicates like *happy* with questions:

- They do not induce logical triviality regardless of the complement clause type, due to the veridical restriction on existential quantification.
- The assertion of *be happy* with an interrogative complement is non-trivial (regardless of Threshold Significance) since its truth is contingent on whether John prefers a *true* answer.
- The presupposition only requires that there is some answer that John prefers
- The assertion requires that he prefers a true answer.

(39) LF: John is happy_C who_F jumped]~C

(40) $[\![(39)]\!]^o =$

λw: $\exists p \in Q[p(w) \wedge \text{believe}_w(j, p) \wedge p \in C \wedge \underline{\exists d \in \{\text{Pref}_w(j,q) | q \in C\}[d > \theta(C)]}$.

$\exists p'' \in Q[p''(w) \wedge \text{believe}_w(j, p'') \wedge p'' \in C \wedge \text{Pref}_w(j,p'') > \theta(C)]$

Motivation for the Threshold Significance:
this is a general property of gradable expressions whose interpretations depend on a threshold, including the positive form of gradable adjectives like *tall* and preferential predicates like *hope*.

Empirical support the Threshold Significance:
(Context: There is no particular student John wants to sing. John knows which student will sing.)

(41) #John {isn't happy about/doesn't like} which student will sing.

Potential counterexample:

be indifferent (about) is compatible with a situation as described in (41).

(42) John is indifferent about which student will sing.

hope and *be happy* involve comparison of *propositions* *be indifferent* involves comparison of *questions*. *be indifferent* is marginal at best with declarative complements

Context: There is no particular student John wants to sing. John knows which student will sing.

(43) ??John is indifferent that Alice will sing.
(44) John is indifferent about whether Alice will sing.
(45) John is indifferent about who will sing.

- *be indifferent* involves comparison of questions, the focus value relevant for sentences like (44) is a set of questions, rather than a set of propositions;
- Threshold Significance in the case of (44) would require that there is a question that John is indifferent about to an extent higher than the threshold.
- This is compatible with the situation described in the context.

3. Exhaustivity of embedded questions

Mention some readings are possible (George's (2013))

(46) Pat was happy about which students sang, but she wasn't happy about which student didn't sing.

Strong exhaustivity is also available (Klinedinst and Rothschild 2011; Theiler 2014; Cremers and Chemla 2017).

Context: Four students run a race: Bob, Ted, Alice, and Sue. Emily expects Bob, Ted, and Alice to run it in under six minutes. Only Bob runs it in under six minutes.
(47) Emily is surprised who ran the race in under six minutes (since she expected more people to).

No evidence for an intermediately exhaustive reading.

(48) Pat is happy about which students sang.
#"For all students who sang, Pat is happy that they sang; for all students who didn't sing, Pat didn't prefer that they sing."

Modelling strong exhaustivity via higher order questions:

(49) $\{ \lambda w. G(\lambda x.\ \text{sang}_W(x)) \mid G \in \{Q\text{: Q is a generalized quantifier}\} \}$
'Which GQ is such that $G(\lambda x.\text{sang}_W(x))$ is true?'

- This denotation includes '(strongly-)exhaustified' answers such as 'Only Ann sang'.

- Strong exhaustivity can be accounted for, preserving the existential semantics for embedding predicates.

- The last sentence in (47) is judged true since, in the given context, there is a generalized quantifier G such that $\lambda w.G(\lambda x.x$ ran the race in under six minutes in w) is surprising to Emily

- This mechanism only accounts for the *optional* strong exhaustivity of embedded questions

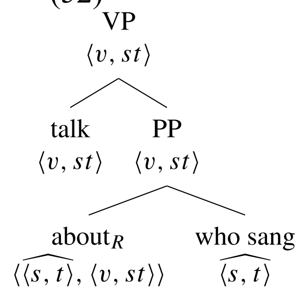
4. About

Rawlins' (2013)

(50) $[\![\text{about}R]\!] = \lambda Q_{<st,t>}..\lambda e_V.\lambda w: e \in Dom(Con_W).\neg \text{Orthogonal}(Q, Con_W(e))$

(51) $\text{Orthogonal}(Q1, Q2) \Leftrightarrow \forall p \in Q1 \cup \{W - Q1\} \forall p' \in Q2 \cup \{W - Q2\}[p \cap p' \neq \emptyset]$

(52)



(53) $[\![\text{talk about } R \text{ who sang}]\!]$
$= \lambda e_V.\lambda w : e \in Dom(Con_W).\ \text{Talking}_W(e) \wedge \neg\text{Orthogonal}(\text{ who sang }, Con_W (e))$

This does not work for preferential predicates:

Context: Emily is a good old friend of Max. Max is happy whenever Emily is happy, and he is happy whenever he is with her. Their mutual friend Paul is going to throw a singles party. Being single, Max is invited to the party. Emily isn't invited since she recently started dating someone from her yoga class. Max is happy that Emily is no longer single, but he is also sad that Emily won't be at the party.

(54) Max is happy about who was invited.

- *about*-PP complement of *be happy* does not merely provide a content that is non-orthogonal to the content of happiness, but rather the content of happiness itself.
- There has to be semantically vacuous *about*$\emptyset$