A compositional semantics for *wh-ever* free relatives

Aron Hirsch, MIT — *aronh@mit.edu*

Massachusetts Institute of Technology

Sinn und Bedeutung 20
Universität Tübingen
September 9-12, 2015

1. The puzzles

- *Wh-ever* FRs can appear both in **argument position** (1a) and as **free adjuncts** (1b) (= unconditionals, free adjunct free relatives).

  (1) a. John ate **whatever Mary cooked.**
  b. **Whatever Mary cooked**, John had fun.

Question: what is the analysis of *wh-ever* FRs in argument position and how does it relate to the analysis of unconditionals?

- A general approach to argument FRs (Jacobson 1995):

  (2) ***Argument FRs are definite descriptions***
  [[wh(-ever) Mary cooked]] = ιx [Mary cooked x in w]

- But, this does not fully capture the properties of *wh-ever* FRs:

A. *Wh-ever* FRs must convey ignorance (3a) or indifference (3b).
(Dayal 1997, von Fintel 2000, Iatridou & Varlakosta 1996, Tredinnick 2005, Lauer 2009, Condoravdi 2015, *i.a.*)

(3) a. Whatever Arlo is cooking has a lot of garlic. (von Fintel 2000)
b. I simply voted for whoever was at the top of the ballot.

Note: the empirical focus here is restricted to ignorance; future work will extend the proposal to indifference.

B. *Wh-ever* FRs have properties in common with questions.
(Richardson 1995, Gawron 2001, cf. Rawlins 2010)

(4) ***Wh* morphology**
a. **What** did John eat?
b. *John ate the food **what** Mary cooked.
c. John ate **what**ever Mary cooked.

(5) ***Ever***
a. What**ever** did John eat?
b. *John ate the food which**ever** Mary cooked.
c. John ate what**ever** Mary cooked.

(6) ***The hell***
a. What **the hell** did John eat?
b. *John ate the food which **the hell** Mary cooked.
c. John ate whatever **the hell** Mary cooked.

(7) ***Else***
a. What **else** did John eat?
b. *John ate the food which **else** Mary cooked.
c. John ate whatever **else** Mary cooked.

- Von Fintel (2000) maintains argument *wh-ever* FRs as definites and accounts for ignorance by introducing a **presupposition**, re-formulating an earlier proposal in Dayal (1997).

(8) a. whatever(w)(F)(p) presupposes (b), asserts (c)
b. ∃w'∃w' ∈ F(w): ιx [P(w')(x)] ≠ ιx [P(w'')(x)]
c. ιx [P(w)(x)]

Goal for today: (A) to derive ignorance in argument *wh-ever* FRs without construction-specific stipulation and **(B)** to understand why argument *wh-ever* FRs show question-like properties.

Strategy: to build on insights from the literature on unconditionals.

- **Main claim:** the analysis of (1) has three components: a **question**, a **covert modal**, *and* a **definite description**.

Acknowledgments: I am grateful to Kenyon Branan, Ömer Demirok, Kai von Fintel, Danny Fox, Martin Hackl, Irene Heim, Sabine Iatridou, Daniel Margulis, David Pesetsky, and Roger Schwarzschild. All errors are, of course, my own. I receive partial financial support from a doctoral fellowship from the Social Sciences and Humanities Research Council of Canada.

2. Analysis: from unconditionals to argument *wh-ever* FRs

Point of departure: unconditionals

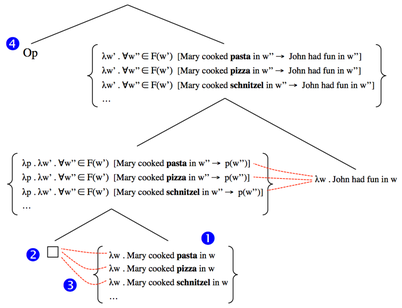
Unconditionals share properties with argument FRs, including: episodic unconditionals like (1b) convey ignorance; unconditionals have the question properties in (4)-(7).

Yet, they have been analyzed in very different ways. Key analysis: **Rawlins (2008, 2013)**.

- Rawlins analyzes (1b) as a conjunction of conditionals of the form:

  (9) If Mary cooked x, John had fun.

- The *wh-ever* XP is an interrogative CP denoting a set of propositions, which pointwise restricts a covert modal to yield a set of *modalized* propositions (conditionals after Lewis 1975, Kratzer e.g. 1977, Heim 1982). (1b) denotes the generalized conjunction of these propositions.



❶ ***Wh-ever* CP is a Hamblin (1973) question**
[[whatever Mary cooked]]
= λp_{st} . ∃x [p = λw . Mary cooked x in w]

❷ **Necessity modal**
$[[\Box]]^c = \lambda p . \lambda q . \lambda w . \forall w' \in F_c(w) [p(w') \rightarrow q(w')]$

❸ **Pointwise Functional Application** (e.g. Kratzer & Shimoyama 2002)
Propositions in the Hamblin set pointwise restrict modal.

❹ **Op: in effect, generalized conjunction**
$[[Op]] = \lambda P_{<st,t>} . \lambda w . \forall p [P(p) \rightarrow p(w)]$

This analysis achieves for unconditionals our desiderata for argument *wh-ever* FRs:

- A: Ignorance can be derived if the modal is *epistemic* (minimally adapting Rawlins' discussion of "relational indifference"); the derivation of ignorance is sketched:

  1. The universal quantifier built into the modal in ❷ must quantify over a non-empty domain:
  (10) $F_c(w) \cap p \neq \emptyset$ (p restrictor, w evaluation world) *(non-triviality presupposition)*
  2. Assume the modal in ❷ has an epistemic modal base:
  (11) $F_c(w)$ = {w' : w' is compatible with the speaker's beliefs in w}
  3. Because every proposition in the Hamblin set pointwise restricts the modal, it follows that every proposition in the Hamblin set must be epistemically possible — ignorance!

- B: Question-like properties are unsurprising, since the analysis contains a question.

Towards extending the analysis to argument *wh-ever* FRs: unconditionals with a pronoun

(12) Whatever Mary cooked, John ate **it**. *(interpreted similarly to (1a))*

- An E-type analysis of *it* (13) combined with a Rawlins LF (14) captures the interpretation of (12) as a conjunction of conditionals of the form in (15).

(13) [[it]] = ιx [Mary cooked x in w] *(E-type)*
(14) [[□ whatever Mary cooked] John ate ιx [Mary cooked x in w]] *(Rawlins LF)*
(15) If Mary cooked y, John ate the maximal x such that Mary cooked x.

_Wh_-ever FRs in argument position

The unification hypothesis
LF for argument *wh-ever* FRs like (1a) = LF for unconditionals like (12).

The basic compositional challenge

- If *wh-ever* constituents denote sets of propositions, how do they appear in argument position, and when they do, how is there a definite description equivalent to E-type *it* in (13)?

Step 1: a change to the analysis of questions

- Jacobson (1995), Caponigro (2004), George (2011): an interrogative CP itself denotes a predicate — not a set of propositions.

  (16) *LF for 'what Mary cooked':* [$_{CP}$ what λ1 Mary cooked t_1]

  (17) a. [[what]] = λx . λw . x is inanimate (in w)
  b. [[what Mary cooked]] = λx . λw . x is inanimate (in w) & Mary cooked x in w
  ≈ λx . λw . Mary cooked x in w

- A covert Q morpheme converts to a Hamblin denotation (after George 2011)

  (18) a. $[[Q]] = \lambda f_{est} . \lambda p . \exists x [p = f(x)]$
  b. [[Q]]([[what Mary cooked]]) = λp . ∃x [p = λw . Mary cooked x in w]

- Corresponding updates to the LF for the unconditional in (12):

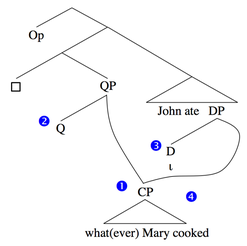
  1. The sister of the modal is a QP containing an interrogative CP, not a bare interrogative CP.
  (19) [[□ [$_{QP}$ ever Q what Mary cooked] John ate ιx [Mary cooked x in w]]
  2. Assumption: *ever* (as well as *the hell*, *else*) operate on QP.

Step 2: questions and definite descriptions have a common core (cf. Jacobson 1995)

(20) *Both involve a predicate + operator (Q/the).*
a. What did Mary cook? [[Q]](λx . Mary cooked x in w)
b. the (thing) Mary cooked. [[the]](λx . Mary cooked x in w)

Step 3: in argument *wh-ever* FRs, the predicate denoted by the interrogative CP forms the core of *both* a question (QP) *and* a definite description (DP).

- Model with multi-dominance (in the spirit of Johnson 2010, Johnson & Fox 2015 on QR)



❶ **Interrogative CP is multiply dominated.**

❷ **Q converts to Hamblin denotation; restricts modal**
[[QP]] = λp . ∃x [p = λw . Mary cooked x in w]

❸ **Covert ι converts to definite description**
[[DP]] = ιx [Mary cooked x in w]

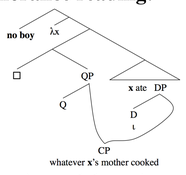
❹ **PF assumption:** interrogative CP spelled out in argument position; *ever* affixes to *wh* and get spelled out with the CP.

(Could also model with movement; see my SuB abstract for details.)

3. Consequence #1: deviance of variable binding

Subject quantifiers cannot bind a variable in an object *wh-ever* FR on an ignorance reading.

(21) a. No boy ate whatever Mary cooked.
b. No boy_1 ate whatever his_1 mother cooked. (?* with ignorance)



The proposal accounts for (21b):

- *Epistemic Containment Principle* (von Fintel & Iatridou 2003; ECP): a quantifier cannot bind its trace across an epistemic modal.
- The ECP is violated in (21b): on an ignorance reading, (21b) contains an epistemic modal; *no boy* moves over the modal to bind *his* (structure above; also a violation of weak crossover 'WCO').
- Epistemic conditionals show a parallel ECP effect:

  (22) *No boy_1 is home if his_1 light is off. (after von Fintel & Iatridou 2002)

(21b) remains a puzzle if modality is in a presupposition of *wh-ever*, as in (8): the *wh-ever* XP is a plain object definite, and *no boy* binds *his* without moving over the *wh-ever* XP (no ECP/WCO *).

4. Consequence #2: impossibility of multiple *wh*

Despite unification, there is still a key difference between unconditionals and argument FRs:

- The interrogative CP itself is only the argument of Q in an unconditional, and is the argument of *both* Q and ι in an argument *wh-ever* FR.

- **Correct consequence:** multiple *wh* is possible with unconditionals (23a), but not possible with argument *wh-ever* FRs (23b) (Izvorski 2000, Gawron 2001, Grosu 2003, Rawlins 2008/2013, *i.a.*)

  (23) a. (?)Whoever said what to whom, we've got to put this behind us. (CGEL via Rawlins)
  b. *John talked to whoever said what to whom.

- Q can be defined to take any n-place predicate and existentially bind all open arguments (needed for multiple *wh*-questions; George 2011); ι requires a 1-place predicate.

  (24) [[who said what to whom]] = λx . λy . λz . x said y to z *(**3**-place predicate)*