Free choice and exhaustification: an account of subtrigging effects

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Overview

1. Examples:

(1) a. #Any woman fell.
b. Any woman may fall.
c. Any woman who tried to jump fell. (SUBTRIGGING)

2. Goal: explain distribution and meaning of *any* in (1).
3. Key components of the analysis:
   - *Any* is an indefinite (*contra* Dayal)
   - Indefinites induce sets of propositional alternatives (Aloni, K&S)
   - *Any* triggers hidden structure (Menéndez-Benito):

   (2) [$\forall$]... **Exh** (... any ...)

   - Facts in (1) explained by interactions between [$\forall$], **Exh** and the modal operator (in (1b)) and the post-nominal modifier (in (1c)).

Structure of the talk

1. Background:
    - 'Hamblin' semantics for indeterminate pronouns (K&S 2002);
    - Menéndez-Benito (2005) on *any* in modal statements.
2. Proposal: subtrigging and modal effects via exhaustification.
    - Exhaustification (Zeevat 1994);
    - Type-shift rules : $\textsc{shift}_e$ & $\textsc{shift}_{\langle s,t\rangle}$;
    - A first application: free relatives and wh-interrogatives (Jacobson 1995);
    - Main application: subtrigging and modal effects of FC *any*.

‘Hamblin’ semantics for indeterminate pronouns

MOTIVATION

- Explain variety of indefinite pronouns. E.g. *any*, *a*, *some*, ...

HOW

- Indefinites ‘introduce’ sets of propositional alternatives.
- These are bound by propositional operators: [∃], [∀], [Neg].
- Different indefinites associate with different operators.

EXAMPLES

(3) a. [∃] (someone fell)
b. [∀] (anyone fell)
c. [Neg] (nessuno cadde)

d.

d_1 fell	d_2 fell	d_3 fell	...

A closer look

- In a Hamblin semantics, all expressions denote sets.
- Mostly singleton sets of traditional denotations. E.g.

(4) $[\![\textit{ fell }]\!]_{w,g} = \{\lambda x \lambda w'.\text{FELL}(x)(w')\}$

- Indefinites map to multi-membered sets of alternatives. E.g.

(5) $[\![\textit{someone/anyone/who}]\!]_{w,g} = \{x \mid \text{HUMAN}(x)(w)\}$

- Via pointwise functional application, these alternatives expand into propositional sets:

(6) $[\![\textit{fell}]\!]_{w,g}([\![\textit{someone/anyone/who}]\!]_{w,g}) = \{$that d_1 fell, that d_2 fell, that d_3 fell,...$\}$

- Until they reach one of the propositional operators. E.g.

(7) $[\forall]([\![\textit{fell}]\!]_{w,g}([\![\textit{anyone}]\!]_{w,g})) = \{$that everyone fell$\}$

Any: naif account

- $[\forall]$ quantifies over propositional alternatives.

(8) a. $[\forall]$(anyone fell)

d_1 fell	d_2 fell	d_3 fell	...

b. $[\forall]$(anyone may fall)

$\Diamond$ d_1 fall	$\Diamond$ d_2 fall	$\Diamond$ d_3 fall	...

c. $[\forall]$(anyone who tried to jump fell)

d_1 fell	d_2 fell

- Merits: captures universal meaning of (c);
- Problems: doesn't explain (a) & dubious truth-conditions for (b):

  E.g. suppose only two options: (i) nobody falls; (ii) everybody falls. Then (b) would be true against intuitions [Menéndez-Benito 2005].

Any: Menéndez-Benito account

- **Excl** transforms Hamblin alternatives into sets of mutually exclusive propositions.

(9) a. $[\forall](\textbf{Excl}(\text{anyone fell}))$

only d_1 fell	only d_2 fell	...

b. $[\forall](\Diamond(\textbf{Excl}(\text{anyone fall})))$

$\Diamond$ only d_1 fall	$\Diamond$ only d_2 fall	...

c. $[\forall](\textbf{Excl}(\text{anyone who tried to jump fell}))$

only d_1 fell	only d_2 fell

- Merits: captures (a) (out because inconsistent) and (b) (consistent and unrestricted liberty of choice);
- Problems: doesn't extend to (c) (out because inconsistent).

Synopsis

- DESIDERATA:
  - M-B's predictions for the unsubtrigged and modal cases (a) and (b) [via **Excl**];
  - Naif account's predictions for the subtrigged case (c) [no **Excl**].
- Question: why **Excl** does not seem to play a role when a post-nominal modifier is present?
- My answer will assume, rather than **Excl**, a much more general and independently motivated notion **Exh** of exhaustification.

Exhaustification

- At work in the semantics of a large variety of constructions, a.o. free relatives, wh-interrogatives, correlatives, degree relatives (Grosu & Landman)
- Not surprising if at work in FC constructions, which in many languages employ wh-morphology (Giannakidou & Cheng)
- Exhaustive values: minimal/maximal elements wrt some order (e.g. Zeevat 1994)

(10) a. What J can spend is less than what J can live on.
b. The max amount of money that J can spend is less than the min amount of money that J can live on.

(11) a. John helped who fell.
b. John helped the (max collection of) people that fell.

The **Exh** operator

- **Exh** takes a domain D and a property P and returns the property of exhaustively satisfying P wrt D:

(12) a. $\mathbf{Exh}[D, P]$ type: $\langle e, \langle s, t\rangle\rangle$
b. $\{\lambda x \lambda w[x \text{ exhaustively satisfies } P \text{ wrt } D \text{ in } w]\}$

- E.g. using Zeevat 1994:

(13) x exhaustively satisfies P wrt D iff x is in D, $P(x)$ is true, and for all y in D if $P(y)$ is true then $P(x)$ entails $P(y)$.

- x and y range over domains of plural individuals (e.g. Link 1983).

Two type-shift rules for properties

1. SHIFT$_e$: $\langle e, \langle s, t\rangle\rangle \rightarrow e$ (from properties to **entities**)

(14) Partee iota rule:

a. $P \rightarrow \iota x[P(x)(w)]$

b. $\{P\} \rightarrow \{d\}$ if d is the unique P in w, undefined otherwise

2. SHIFT$_{\langle s,t\rangle}$: $\langle e, \langle s, t\rangle\rangle \rightarrow \langle s, t\rangle$ (from properties to **propositions**)

(15) Hamblin question formation rule:

a. $P \rightarrow \hat{p}\ [\exists x[P(x) = p]]$

b. $\{P\} \rightarrow \{d_1$ is P, d_2 is P, d_3 is P, ...$\}$

Type shifting exhaustive values

When applied to **exh**[D,P]

(i) SHIFT$_e$ (always defined) yields maximal plural entities:

(16) a. SHIFT$_e$($\mathbf{exh}[D, P]$)
b. {the sum of entities from D satisfying P in w}

(ii) SHIFT$_{\langle s,t \rangle}$ yields sets of mutually exclusive propositions:

(17) a. SHIFT$_{\langle s,t \rangle}$($\mathbf{exh}[D, P]$)
b. {only d_1 is P, only d_2 is P, only d_1 & d_2 are P, ... }

First application: Free relatives and wh-interrogatives

- Free relatives and wh-interrogatives are born with the same meaning:

(18) a. who fell — type: $\langle e, \langle s, t\rangle\rangle$
b. **exh**[who, fell]
c. $\{\lambda x \lambda w[x$ is the sum of people falling in $w\}$

- But typeshift differently (cf. Cooper, Jacobson):

(19) a. John helped [$_{DP}$ who fell] — type: e
b. $\textsc{shift}_e$(**exh**[who, fell])
c. {the sum of people falling in w}

(20) a. John knows [$_Q$ who fell] — type: $\langle s, t\rangle$
b. $\textsc{shift}_{\langle s,t\rangle}$(**exh**[who, fell])
c. {only d_1 fell, only d_2 fell, only d_1 & d_2 fell, ... }

A closer look at interrogatives

- Questions and propositions have the same type in a Hamblin semantics, namely $\langle s, t\rangle$. Questions typically denote multi-membered sets.
- Difference between question/proposition embedding verbs explained in terms of propositional quantifiers:

(21) a. John knows who fell/that Mary fell.
b. $\text{Bel}_j[\text{true}](A)$

(22) a. John believes that Mary fell/#who fell.
b. $\text{Bel}_j[\exists](A)$

(23) a. John wonders who fell/# that Mary fell.
b. $[\forall]\neg\ \text{Bel}_j(A)$

A closer look at free relatives

- We assume a further operation $\downarrow$ which transforms singletons of plural sets into sets of atomic alternatives:

(24) a. $[\![\alpha]\!]_{w,g} = \{\{a, b\}\}$ a singleton set of plural entities
b. $[\![\downarrow \alpha]\!]_{w,g} = \{a, b\}$ a set of atomic alternatives

- $\downarrow$ needed to account for universal/distributive meanings of free relatives (and degree relatives) (cf. Grosu and Landman):

(25) We will veto three-quarters of whatever proposals you make.
a. Of the proposals: three-quarters won't make it. (definite)
b. For each proposal: three-quarters of it will be vetoed. (universal)

(26) I took with me every book there was on the table.

Subtrigging and modal effects: core idea

- FC items like wh-words trigger the application of **Exh**.
- UNSUBTRIGGED CASES:

(27) a. $[_{IP}$ Any woman fell$]$
b. $[_{IP}$ Any woman may fall$]$

  - Exhaustification must apply at the IP level;
  - SHIFT$_{\langle s,t\rangle}$ generates sets of mutually exclusive propositional alternatives.

- SUBTRIGGED CASES:

(28) $[_{DP}$ Any woman who tried to jump$]$ fell.

  - Exhaustification can apply at the DP level;
  - SHIFT$_e$ and $\downarrow$ apply and generate sets of individuals.

- Post-nominal modifier crucial for (28) because it supplies the 2nd argument essential for the application of **Exh** inside the DP.

Any: final proposal

(29) a. $[\forall](\textsc{shift}_{(s,t)}(\mathbf{Exh}[\text{anyone, fell}]))$

only d_1 fell	only d_2 fell	...

b. $[\forall](\Diamond(\textsc{shift}_{(s,t)}(\mathbf{Exh}[\text{anyone, fall}])))$

$\Diamond$ only d_1 fall	$\Diamond$ only d_2 fall	...

c. $[\forall](\downarrow\textsc{shift}_e(\mathbf{Exh}[\text{anyone, who tried to jump}])\text{ fell})$

d_1 fell	d_2 fell

- MERITS: captures (a) (out because inconsistent), (b) (consistent and unrestricted freedom of choice) and (c) (consistent and universal meaning).
- PROBLEMS: ...

Problems, problems, problems

- THEORETICAL: Where do [∀] and **Exh** come from?
- EMPIRICAL: Not every type of postnominal modifier yields (good) subtriggers. Infinitival relatives don't.

(30) a. A friend to talk to is a blessing.
b. #Any friend to talk to is a blessing.
c. Any friend who you can talk to is such a blessing.

- ...

THE END