Categorial – Propositional set – Partition

Take-home message

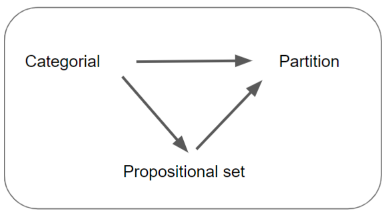
(1) $[\![\text{which girl smiled}]\!]^{w_0}$
$= \lambda x \lambda w : \mathsf{hmn}_{w_0}(x).\mathsf{smiled}_w(x)$ (categorial)
$= \lambda p \exists x \in \mathsf{hmn}_{w_0} : p = \lambda w.\mathsf{smiled}_w(x)$ (p-set)
$= \lambda w \lambda w'.\{x \mid \mathsf{simled}_w(x)\} = \{x \mid \mathsf{smiled}_{w'}(x)\}$ (partition)

The three kinds of denotations can be ordered by informativeness

Categorial > Propositional set > Partition

$A > B$: any information that is derivable from meaning B is also derivable from meaning A, but not the other direction.

Mapping one approach to another



Categorial → Propositional set

(2) $\pi(R) = \lambda p \exists \vec{x}.p = R(\vec{x})$

Propositional set → Partition

(3) $\delta(Q) = \lambda w \lambda w' \{p \in Q \mid p(w) = 1\} = \{p \in Q \mid p(w') = 1\}$

Categprial → Partition

(4) $\rho(R) = \lambda w \lambda w'.\{\vec{x} \mid R(\vec{x})(w) = 1\} = \{\vec{x} \mid R(\vec{x})(w') = 1\}$ or
$\rho = \delta \circ \pi$

Propositional set, Partition ↛ Categorial: Short answers cannot be retrieved from the former two approaches.

Partition ↛ Propositional set: Mention-some questions cannot be derived from the former.

(5) $[\![\text{where can I buy coffee}]\!](w_0)$
$= \lambda w'.\{\text{I can buy coffee at } x \text{ in } w_0 \mid x \in \mathsf{cafe}_{w_0}\} =$
$\{\text{I can buy coffee at } x \text{ in } w' \mid x \in \mathsf{cafe}_{w'}\}$

Mention-some questions

(6) a. Where can I buy coffee? — Peets' coffee.
b. Who is in your committee, for example? — Anna.

(7) Jenny knows where you can buy coffee.
⇝ There is a coffee house x and John knows you can buy coffee at x.

Different answerhood operators

Beck & Rullmann (1999)

(8) $\mathbf{Ans}^{\exists}_{w_0}(Q) = \exists p \in Q : p(w_0)$

Over-generation: Any question would be ambiguous between a mention-all and mention-some reading.

Covert distributivity and scope

Fox (2013), see also Xiang (2022)

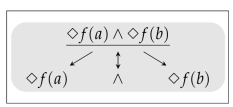
(9) a. Where$_1$ can $[t_1\text{-}\mathbb{D}]_2$ I buy coffee t_2
b. $\{\Diamond(\forall y \leq_{\text{atom}} x.\mathsf{buy\text{-}coffee}(y)) \mid x \in {}^*\mathsf{place}\}$

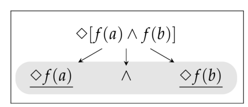
(10) a. Where$_1$ $[t_1\text{-}\mathbb{D}]_2$ can I buy coffee t_2
b. $\{\forall y \leq_{\text{atom}} x. \Diamond (\mathsf{buy\text{-}coffee}(y)) \mid x \in {}^*\mathsf{place}\}$

Modifying Dayal's answerhood operator:

(11) $\mathbf{Ans}^{Fox}_{w_0}(Q) = \{p \in Q \mid p(w_0) \wedge \forall q \in Q : q(w_0) \rightarrow q \not\subset p\}$

(12) a. $\mathbf{Ans}^{Fox}_{w_0}$(9-b) Mention-some
b. $\mathbf{Ans}^{Fox}_{w_0}$(10-b) Mention-all





[Note: a and b are two places; f stands for buy-coffee]

Pragmatic view

Groenendijk & Stokhof (1984); van Rooij & Schulz (2004)
Mention-some answers are partial answers that are sufficient for the conversational goal behind the question.

(13) Where can I buy coffee?
a. Goal: find a coffee house Mention-some
b. Goal: investigate the local market Mention-all

Weak vs. strong exhaustivity

Different question-embedding predicates license different kinds of exhaustive readings. (Heim 1994; Uegaki 2015)

Strong exhaustivity
Suppose that Anna and Becky smiled, but Cindy didn't.

(14) Jenny knows who smiled.
⇝ John believes A and B smiled and C didn't.

Weak exhaustivity
Among Anna, Becky, and Cindy, Jenny expected that everyone would come. In fact, Anna and Becky came but Cindy didn't.

(15) It surprised Jenny who came. False
⇝ It surprised Jenny that Anna and Becky came.

(16) It surprised Jenny who didn't come. True
⇝ It surprised Jenny that Cindy didn't come.

Based on propositional sets, we can define **two kinds of answerhood operators** to capture the two types of exhaustivity.

(17) $\mathbf{Ans}^{W}_{w_0}(Q) = \iota p.p(w_0) \wedge \forall q \in Q : q(w_0) \rightarrow p \subseteq q$

(18) $\mathbf{Ans}^{S}_{w_0}(Q) = \lambda w.\mathbf{Ans}^{W}_{w_0}(Q) = \mathbf{Ans}^{W}_{w'}(Q)$

A flexible approach

- The question meaning defined in the categorial approach is taken as the base.
- The propositional set and the partition are generated when needed.

Revisiting *wh*-coordination

(19) Peter knows who came and who brought what.
a. $\lambda w.\mathsf{know}_w(\pi(\lambda x \lambda w.\mathsf{came}_w(x)) \sqcap \pi(\lambda x \lambda y \lambda w.\mathsf{brought}_w(x)(y)))(\mathrm{p})$
b. $\lambda w.\mathsf{know}_w(\rho(\lambda x \lambda w.\mathsf{came}_w(x)) \wedge \rho(\lambda x \lambda y \lambda w.\mathsf{brought}_w(x)(y)))(\mathrm{p})$

Prediction: *Wh*-coordination should not admit short answers.

(20) A: What dish did you eat and what wine did you drink?
B: ?Beans, (and) wine.