Varieties of specification and underspecification: A view from semantics

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The technique of underspecification I

- Presupposed: in semantics, specification involves a narrowing-in of an interpretational range.
- In computational linguistics and much work in formal semantics, underspecification is simply a technique which allows us to represent semantic information in an (ideally) compact format.
- Motivation: if one cannot decide on an interpretation in context, this technique allows one to proceed processing without making uninformed decisions.
- Underspecified representations must be logically transparent and allow for deductions and the inclusion of truth conditions.
The technique of underspecification II

- The most prominent examples involve scope ambiguities
- Applicable to any kind of lexical ambiguity (apart from vagueness)
- No opposition between underspecification and ambiguity

Interpretation of German homonymous Bank (‘bank’, ‘bench’)

\[
\text{Bank} \sim \text{financial institute}(x) \lor \text{seating accommodation}(x)
\]

(1) a. \textit{Wir haben den ganzen Abend auf der Bank gesessen.}
   ‘We spent the whole evening on the bench.’

b. \textit{Die Bank wurde gestern ausgeraubt.}
   ‘The bank was robbed yesterday.’
The technique of underspecification III

Referential arguments of *Absperrung* (event, object, state)

\[
\begin{align*}
\alpha = e \lor \alpha = s \lor \alpha = y \\
& \quad e \text{ CAUSE } s \\
& \quad s: \text{ HAVE}(y,z) \\
& \quad \text{FUNCTION\_AS\_BARRIER}(y) \\
& \quad \text{AGENT}(e) = x
\end{align*}
\]

(2) a. **event**: *Die Absperrung des Gebiets wurde von Demonstranten behindert.*

‘The cordonning-off (of the area) was hampered by protesters.’

b. **state**: *Die Absperrung des Gebiets wird noch aufrecht erhalten.*

‘The cordonning-off of the area is still sustained.’

c. **object**: *Die Absperrung wird morgen abgebaut.*

‘The barrier will be dismantled tomorrow.’
Underspecification reflecting psychological reality

- In linguistics (and in linguistic semantics in particular) a view is prominent where what is (represented as) underspecified should also have a common mental basis.
- Remark: processing assumptions motivate the CL approach, too.
- From this perspective, it makes no sense to treat cases of homonymy as underspecified, since the two interpretations of *Bank* have nothing in common (from a synchronic point of view).
- No reasonable, common inferences available in the case of *Bank*.
- For e.g. the state interpretation of *Absperrung*, this could be different, though: it necessarily involves (i.e. presupposes) an event of blocking.
- Underspecification (shared semantic core) vs. ambiguity/homonymy (no shared features).
- Where do we draw the line with respect to psychological reality?
- Monosemy as a methodological principle (Charles Ruhl).
Alternative: uninformed specification and revision

- We do indeed make uninformed decisions based on preferences. Revision must occur whenever the following context contradicts what has been assumed.

(3) a. *Auf dem Marktplatz wurde alle fünf Minuten ein Mann angerempelt.*
   ‘Every five minutes a man was bumped into at the market.’
   b. *Das hat ihn sehr gestört.*
   ‘That annoyed him immensely.’

- In (3a), the $\forall \exists$ reading is strongly preferred: every five minutes some, but not necessarily the same man was bumped into.

- If (3a) is followed by (3b), this ordering has to be reversed into $\exists \forall$: a certain man was bumped into every five minutes.

- Prediction: Revision strategy should be more costly in terms of processing than underspecification.
Disambiguation I

If underspecification involves disjunction or conjunction, disambiguation may be viewed as a process of disjunct or conjunct reduction.

DRS for three-way ambiguous Absperrung (simplified)

\[
\begin{array}{|c|}
\hline
\chi = e \lor \chi = s \lor \chi = y \\
\hline
\end{array}
\]

e CAUSE s
s: HAVE(y,z)
FUNCTION_AS_BARRIER(y)

(4) a. abbauen ‘dismantle’: \(\chi = e \lor \chi = s \lor \chi = y\)
b. aufrecht erhalten ‘sustain’: \(\chi = e \lor \chi = s \lor \chi = y\)
c. behindern ‘hamper’: \(\chi = e \lor \chi = s \lor \chi = y\)
Coercion I

   b. *Kann mir jemand bitte mit dem Rechner helfen?*
       ‘Could someone please help me with the computer?’

- Coercion is triggered by type conflict/category mismatch
  - Criterion for identifying cases of coercion
  - Depending on (lexical) type specifications, there will be conflicting views on when coercion is necessary, (5a) vs. (5b)

- To resolve the conflict, additional material must be introduced, no direct type changes or overwriting, as shown by (6):

(6) Yesterday, I began a book by Ror Wolf. It has 150 pages.

- Type preservation, embedding in covert material
- Motivated by linguistic and non-linguistic knowledge
Coercion II

Decomposing coercion

1 Threat: type conflict
   \( F_{\langle \alpha, \beta \rangle} (p_\gamma) \)
   
   "book" does not describe event

2 Saviour/Repair
   
   (i) embedding of argument: \( F_{\langle \alpha, \beta \rangle} (H_{\gamma, \alpha} (p_\gamma)) \)
      
      "book" as argument of an event predicate
   (ii) embedding of functor: \( J_{\langle \langle \alpha, \beta \rangle, \langle \gamma, \beta \rangle \rangle} (F_{\langle \alpha, \beta \rangle} (p_\gamma)) \)
      
      "begin" as predicate of entities?

3 Specification
   
   What are the more specific characteristics of the intervening functor?
   
   a "book" is (e.g.) read or written, "book by Ror Wolf" is read
Coercion III

- Alternatively, dotted types?

(7)  
   a. $F_{\alpha,\beta}(p_{\alpha,\gamma})$
   b. $G_{\gamma,\beta}(p_{\alpha,\gamma})$

- No need to assume coercion, because there is no type conflict.
- Still underspecified event predication in the case of *begin*, though.
Selective vs. additive specification

Disambiguation

“selective” specification
conjunct/disjunct reduction: $\alpha \lor \beta$

Coercion

“additive” specification
introduction of new material: $P(a) \rightarrow P(H(a))$

(8) a. *Meine Freundin hat eigenhändig die Absperrung abgebaut.*
   ‘My girlfriend dismantled the barrier on her own.’
  b. *I have just begun a new book.*
  c. *Kann mir jemand (von euch Ganoven) mit der Bank Ecke Proskauer/Rigaer helfen?*
   ‘Could anyone help me with the (i) bank/(ii) bench on the corner of Proskauer and Rigaer street?’
Is disambiguation/specification “reversible”?

(9)  
\begin{align*}
a. \text{abbauen ‘dismantle’: } & \alpha = e \lor \alpha = s \lor \alpha = y \\
b. \text{aufrecht erhalten ‘sustain’: } & \alpha = e \lor \alpha = s \lor \alpha = y \\
c. \text{behindern ‘hamper’: } & \alpha = e \lor \alpha = s \lor \alpha = y \\
\end{align*}

Based on data involving anaphora resolution, we claim that a naive deletion view of disambiguation is not adequate, since it makes false predictions for these data.
Die Absperrung des Rathauses wurde vorgestern von Demonstranten behindert. Wegen anhaltender Unruhen wird sie auch heute aufrecht erhalten.

‘The cordoning-off of the town hall was disturbed by protesters the day before yesterday. Due to continuing unrest, it [the state of being cordoned off] is sustained today as well.’

- predicate *behindern* ‘hamper’ restricts the ambiguity of *Die Absperrung des Rathauses* and fixes an event reading
- The matrix predicate in the second sentence, *aufrecht erhalten* ‘sustain’, only allows the referential argument of *sie* to be a state
- Problem: If the fixation of the event reading involves the irreversible deletion of other possible referential arguments, there should be no appropriate discourse referent for *sie* to pick up, contrary to intuitions.
We investigate two alternative approaches to dealing with this challenge:

- **thinning**: disambiguation should be allowed to be local, no real disjunct deletion
  problem: overgeneration?
- **reambiguation**: non-monotonicity of interpretation:
  disambiguation is reversible
  problem: how do we know which representations may be restored?

**General discussion**

- Differences between (i) intraphrasal, intrasentential (B1, B3, B4, D1, current phase) and (ii) intersentential contexts?
- Direction of process of specification? If it is reversible, is it cyclic or unidirectional?