Similarity Demonstratives

The German demonstrative 'so'

- **ad-adjectival**
  So groß ist Anna. 'Anna is this tall.'

- **ad-nominal**
  So ein Auto hat Anna. 'Anna has a car like this.'

- **ad-verbal**
  So hat Anna das Fahrrad repariert. 'Anna fixed the bike like this.'

The puzzle

(i) what does the demonstrative *so* refer to?

(ii) how is it possible that a demonstrative acts as a modifier?

The solution

(i) The referent of the demonstrative *so* is the individual pointed to.

(ii) The relation between the referent and the interpretation is similarity.

\[ [\text{So ein Auto hat Anna.}] = \exists x. \text{car}(x) \land \text{sim}(x, \text{ref}, F) \land \text{owns}(\text{Anna}, x) \]

where:

- sim: similarity relation
- ref: the car the speaker points to
- x: the discourse referent of the NP
- F: a set of features of comparison (color, ...)

How to spell out similarity?

Measure function

(Kennedy 1999)

- \( f: U \rightarrow \text{degrees} \)
  - e.g. height (Anna) = 180 cm

Generalized measure function

(Gust, Umbach 2010)

- \( F: U \rightarrow \text{points in multi-dimensional spaces} \)
  - e.g. \( F(\text{Anna's car}) = \{\text{color: blue}, \text{equipment: radio}, \text{weight: 900 kg}\} \)

Referential semantics + attribute spaces

Ways of implementing similarity

- Feature contrast (Tversky 77)
  - compare common/distinct weighted features

- Conceptual spaces (Gärdenfors 2000)
  - quantitative similarity measure based on geometrical distance

- Attribute spaces (Gust, Umbach 2010)
  - qualitative similarity measure based on undiscernibility w.r.t. properties defined on dimensions

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**Similarity in Cognitive Science**

Goodman 1972

"Similarity, ever ready to solve philosophical problems and overcome obstacles, is a pretender, an impostor, a quack." (p. 437)

Quine 1969

"Similarity is fundamental for learning, knowledge and thought, for only our sense of similarity allows us to order things into kinds [...]." (p. 114)

Tversky 1977

"Similarity [...] serves as an organizing principle by which individuals classify objects, form concepts, and make generalizations." (p. 327)

**Characteristics of similarity**

Asymmetry

(a) North Korea is similar to Red China.

(b) Red China is similar to North Korea.

Similarity in (a) is rated higher than in (b)

[Tversky 77, but see also Gleitman et al. 96]

Informativeness

Quaggas are similar to zebras.

\( \Rightarrow \) Quaggas have four legs

(Medin & Goldstone 95)

Anomaly

?? Robins are similar to birds.

?? Robins are similar to questions.

(Medin & Goldstone 95)

Note that anomaly corresponds to the constraints on coordination – semantic difference and the existence of a superordinate concept – proposed in Lang (1984)

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**Multi-dimensional attribute spaces**

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