A Contextual Analysis of Concrete and Abstract Words

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Motivation

Problem Setting
- the characteristics of concrete and abstract words play a key role in the debate about meaning representation in the human mind
- concrete words are grounded in the sensory-motor system, while the meaning of abstract words is derived from the activation of concrete words related to them [1]
- Distributional Hypothesis [2]: similar linguistic contexts tend to imply similar word meanings

Thus, we used
- a distributional semantic approach to perform a quantitative investigation of the contexts of concrete and abstract words in order to determine distinct contextual cues

Our Main Hypotheses

1) concrete and abstract words mainly co-occur with concrete words
2) concrete words occur in a limited set of distinct contexts while abstract words appear in a broader range of different contexts
3) concrete words are easier to predict than abstract words, due to the greater contextual variability of abstract words

Example Sentences

a. The football player kicked the football that lay on the ground.
b. She was scared of telling the truth.
c. The manager was grateful for the tactful behaviour of his employee towards his assistants.

Results

Hypothesis 1: Co-occurrence

- Figure 1: Context of Abstract Nouns
- Figure 2: Context of Concrete Nouns

Hypothesis 2: Semantic Variation of Context

- Figure 3: Non-Zero Context Dimensions
- Figure 4: Mean Pairwise Cosine Sim.

Hypothesis 3: Contextual Entropy

- Figure 5: Entropy of Nouns

Data

Corpus
- ENCOW16AX (sentence-shuffled) [3]
Ratings
- Concreteness Ratings [4]

Conclusion

Our studies show consistent differences in the contexts of concrete and abstract words:
- concrete words primarily co-occur with other concrete words
- the contexts of concrete words can be predicted with greater certainty than the contexts of abstract words
- abstract words mainly co-occur with other abstract words

For abstract words, we yield patterns that challenge the grounding theory of cognition and therefore require further investigation.

References