

# Introduction to Vector Space Semantics

Yoad Winter and Joost Zwarts

13-17 August, ESSLLI 2001, Helsinki

## Course Plan

1. The semantics of prepositions - some preliminaries
2. Background on generalized quantifier theory
3. Ontology and compositionality in VSS
4. Lexical denotations of prepositions
5. Denotational constraints
6. Modification constructions
7. Further extensions of VSS: Place vectors and axis vectors, temporal vectors, kinship terms, vectors in the domain of adjectives

## References

- Barwise, J. and Cooper, R. (1981). Generalized quantifiers and natural language. *Linguistics and Philosophy*, 4:159–219.
- Bennett, D. C. (1975). *Spatial and Temporal Uses of English Prepositions: an essay in stratificational semantics*. Longman, London.
- Crangle, C. and Suppes, P. (1989). Geometrical semantics for spatial prepositions. *Midwest Studies in Philosophy*, 14:399–422.
- Cresswell, M. (1978). Prepositions and points of view. *Linguistics and Philosophy*, 2:1–41.
- Crow, J. S. M. (1989). *Towards a Semantics for English Spatial Expressions*. PhD thesis, University of Texas at Austin.
- Faller, M. (1997). Geometric description functions in a vector space semantics for locative PPs. Unpublished ms., Stanford University.
- Faller, M. (2000). Dimensional adjectives and measure phrases in vector space semantics. In Faller, M., Kaufmann, S., and Pauly, M., editors, *Formalizing the Dynamics of Information*. CSLI Publications, Stanford.

- Gärdenfors, P. (1994). Frameworks for properties: possible worlds vs. conceptual spaces. *Sémiotiques*, 6:99–120.
- Helmantel, M. (1998). Simplex adpositions and vector theory. *The Linguistic Review*, 15:361–388.
- Herskovits, A. (1986). *Language and Spatial Cognition: an interdisciplinary study of the prepositions in English*. Cambridge University Press, Cambridge.
- Jackendoff, R. (1983). *Semantics and Cognition*. MIT Press, Cambridge, Massachusetts.
- Jackendoff, R. and Landau, B. (1991). Spatial language and spatial cognition. In Napoli, D. J. and Kegl, J. A., editors, *Bridges between Psychology and Linguistics*. Lawrence Erlbaum Associates, Hillsdale, NJ.
- Keenan, E. (1996). The semantics of determiners. In Lappin, S., editor, *The Handbook of Contemporary Semantic Theory*. Blackwell.
- Keenan, E. and Westerståhl, D. (1996). Generalized quantifiers in linguistics and logic. In van Benthem, J. and ter Meulen, A., editors, *Handbook of Logic and Language*. Elsevier, Amsterdam.
- Kelley, J. L. (1961). *General Topology*. Van Nostrand, Princeton, New Jersey.
- Lakoff, G. (1987). *Women, Fire, and Dangerous Things: what categories reveal about the mind*. Chicago University Press, Chicago.
- Landau, B. and Jackendoff, R. (1993). ‘What’ and ‘where’ in spatial language and spatial cognition. *Behavioral and Brain Sciences*, 16:217–265.
- Lang, S. (1977). *Linear Algebra*. Addison-Wesley, Reading, Massachusetts, second edition.
- Nam, S. (1995). *The Semantics of Locative Prepositional Phrases in English*. PhD thesis, University of California Los Angeles.
- O’Keefe, J. (1996). The spatial prepositions in English, vector grammar, and the cognitive map theory. In Bloom, P., Peterson, M. A., Nadel, L., and Garrett, M. F., editors, *Language and Space*. MIT Press, Cambridge, Massachusetts.
- Vandeloise, C. (1991). *Spatial Prepositions*. Chicago University Press, Chicago.
- Winter, Y. (2001). Measure phrase modification in Vector Space Semantics. In *Proceedings of WCCFL 20*. To appear.
- Wunderlich, D. (1991). How do prepositional phrases fit into compositional syntax and semantics. *Linguistics*, 29:591–621.
- Wunderlich, D. (1993). On German *um*: semantic and conceptual aspects. *Linguistics*, 31:111–133.
- Zwarts, J. (1997). Vectors as relative positions: a compositional semantics of modified PPs. *Journal of Semantics*, 14:57–86.
- Zwarts, J. (2001). Vectors across spatial domains: from place to size, orientation, shape and parts (1). Unpublished ms., SIL/BTL, Kenya.
- Zwarts, J. and Winter, Y. (2000). Vector space semantics: a model-theoretic analysis of locative prepositions. *Journal of Logic, Language and Information*, 9:169–211.