

## **Traditional semantic maps and multidimensional scaling as methods for typological study: the case of epistemic and inferential functions**

### **Category: oral**

In recent years, semantic maps have become a popular and a frequently used method in typological studies. General issues concerning the traditional kind of semantic maps can be found, for example, in Haspelmath (2003). Multidimensional scaling (MDS) as a possible alternative to the traditional semantic map model is discussed, for example, by Cysouw (2007) and Croft & Poole (2008). In addition to these approaches, some other semantic-map like approaches have been used in typological research (cf. Majid 2008). There are thus several ways to make semantic maps. Despite the differences between them, they all attempt to analyze and display cross-linguistic variability and simultaneously capture the regularity underlying this variability. The purpose of this paper is to consider some general questions of using traditional semantic maps and multidimensional scaling as tools for typological research. The discussion is mostly based on my large-scale typological study of epistemic modality and inferentiality (130 languages), based on the survey of descriptive grammars and other descriptive material. Moreover, I will also refer to other studies in which the semantic map methodology has been used.

I will especially focus on the question of the differences and similarities between traditional semantic map and MDS representations. Several typologists have dealt with this question, but I will present some new principles and possibilities that could be useful for future typological studies. In my study, 33 functions and 6 subdomains are distinguished as comparative concepts in the domains of epistemic modality and inferentiality. The notion of comparative concept is used in the sense proposed by Haspelmath (2008): it is a concept that is created by the linguist for the specific purposes of comparison. Epistemic functions are based on the values of the semantic parameter 'the degree of the speaker's certainty', and inferential functions, representing a more general domain of evidentiality, need at least a value of the parameter 'the source of information' for their characterization. Often, however, inferential functions combine values from both of the parameters. Either of these values is interpreted as predominant. For example, the English *should* can indicate both 'probability' (predominant) and 'inference from reasoning' as one of its functions. In previous classical semantic maps proposed, the comparative concepts are usually interpreted as wholes, and they are arranged in such a way that all multifunctional forms occupy a contiguous region on the semantic map. In the presentation, it will be argued that if the parameters used to describe the concepts are already firmly based on empirical study before drawing the map, they could be hypothesized as dimensions of the map. Then, the semantic map method is used in the further interpretation of the dimensions and in the arrangement of the concepts. This principle is illustrated by means of the map for epistemic and inferential functions. As the point of departure, the parameter 'the degree of the speaker's certainty' is interpreted as a vertical dimension and the parameter 'the source of information' as a horizontal dimension. The semantic map method suggests that it is not possible to arrange all the inferential functions along the horizontal dimension, while it is possible to place all the epistemic functions along the vertical dimension. It will also be argued that all the epistemic and inferential functions, or other functions described by means of semantic parameters, can be presented on a single map, if different kinds of connecting lines between the functions and different kinds of boundaries for language-specific forms are used to indicate predominant values. The map of this type is a useful tool for presenting semantic closeness between functions by means of nodes and connecting lines and discovering implicational universals.

In the presentation, PERMAP, a publicly available computer program, is used to construct an MDS representation. The PERMAP display can be interpreted like a Euclidean space, in which the distances between the functions are indicative of their semantic similarity. In contrast to the traditional map, this kind of map represents the frequencies of the types of multifunctionality. In the MDS representation of epistemic and inferential functions, the relevant dimensions are not postulated in advance, but they are revealed by the MDS analysis. The three-dimensional configuration clearly reveals the dimensions discussed above. In addition, it provides information that is not easy to discover on the traditional semantic map. It will be proposed that the patterning is even more evident, if the relevant connecting lines are added. The lines as well as boundaries are added by means of Microsoft Paint program. The issue of mental reality of this kind of structure is also briefly discussed.

Both the traditional semantic map and the MDS configuration discussed assume the existence of decompositional meanings as well as unitary meanings. The theory of two levels of meaning has also been important in typological studies of semantic categories, in which elicitation tools are used (e.g. Levinson & Wilkins 2006). This kind of theoretical assumption seems to be necessary in semantic typology.

## References:

- Croft, William & Keith T. Poole 2008. Inferring universals from grammatical variation: multidimensional scaling for typological analysis. *Theoretical Linguistics* 34.1-37.
- Cysouw, Michael 2007. Building semantic maps: the case of person marking. In: Matti Miestamo & Bernhard Wälchli (eds.) *New Challenges in Typology*, 225-248. Berlin: Mouton de Gruyter,.
- Haspelmath, Martin 2003. The Geometry of Grammatical Meaning: Semantic Maps and Cross- Linguistic Comparison. In Michael Tomasello (ed.), *The New Psychology of Language*, Volume 2:217-242. Mahwah, N.J. and London: Erlbaum.
- Haspelmath, Martin 2008. Why is Language Typology Possible? Paper given at the conference Cognitive and Functional Perspectives on Dynamic Tendencies in Languages, Tartu, May-June 2008. [available at <http://www.fl.ut.ee/ktttdk/ecla/plenary>]
- Levinson, Stephen C. & David Wilkins 2006. Patterns in the data: towards a semantic typology of spatial description. In Stephen C. Levinson & David Wilkins (eds.) *Grammars of Space*, 512-552. Cambridge: CUP.
- Majid, Asifa 2008. Conceptual maps using multivariate statistics: Building bridges between typological linguistics and psychology. *Theoretical Linguistics*, 34, 59-66.