

# Semantic Convergence in Bilinguals

Eef Ameel (eef.ameel@psy.kuleuven.be) and Gert Storms (gert.storms@psy.kuleuven.be)  
University of Leuven, Belgium

Barbara Malt (barbara.malt@lehigh.edu)  
Lehigh University, Bethlehem, PA, USA

**Keywords:** convergence; bilingualism; categorization.

## Abstract

Recent evidence suggests that bilinguals' lexical mappings for their two languages converge on a common naming pattern. The present paper investigates how semantic convergence affects the category centers and the category boundaries in the two languages of a bilingual. For common household objects, we found that the prototypes for corresponding categories in a bilingual's two languages were more similar than corresponding monolingual prototypes. Bilingual category boundaries were less complex than monolingual boundaries. The findings can be explained by the diminished language input for bilinguals as compared to monolinguals.

## Introduction

A general assumption in bilingual research is that the two language systems in a bilingual's mind inevitably interact (Grosjean, 1982). In this research domain, the notion of convergence is prominent. Convergence can be defined as the enhancement of inherent structural similarities found between two linguistic systems (Bullock & Toribio, 2004). Different aspects of a bilingual's linguistic systems can undergo convergence: the phonological system, the morpho-syntactic system, the semantic system. In the present paper, we further investigate semantic convergence, as found by Ameel, Storms, Malt, and Sloman, (2005) in the names for two sets of household objects, bottles and dishes. More specifically, we ask how convergence affects the category centers and the category boundaries in the two languages of a bilingual. A possible reason for semantic convergence to come about in bilinguals is that, compared to monolinguals, bilinguals get only half the input in each language (Gollan, 2005). Depending on what bilinguals do with the pattern of input provided by the bilingual experience, category centers and boundaries can be affected in different ways.

## Convergence in Category Centers

Study 1 and 2 were designed to find out how the diminished input for bilinguals affects bilingual category prototypes. The central question was whether the diminished language input is sufficient to allow separate native-like prototypes to be established or not. The first study used raw typicality ratings for categories of the bottles and dishes set, collected from Dutch- and French-speaking monolinguals and Dutch-French bilinguals. We found higher correlations between Dutch and French typicality ratings of bilinguals for corresponding categories than between typicality ratings of

Dutch-speaking and French-speaking monolinguals. When representing the semantic categories in an  $M$ -dimensional geometrical space derived from sorting data for the two stimulus sets (Study 2), we found that the prototypes of corresponding categories in the two languages of bilinguals were situated closer to each other than the monolingual prototypes. The results of both studies suggest that the prototypes of corresponding categories for bilinguals are more similar to each other than the corresponding category prototypes for monolinguals. The diminished language input in bilinguals does not seem to be sufficient to establish native-like prototypes.

## Convergence in Category Boundaries

Study 3 and 4 investigated how the diminished input for bilinguals affects bilingual category boundaries, and more specifically, the complexity level of bilingual categories. The diminished input for bilinguals could either cause more complex categories by incorporating boundary exemplars of each language in both languages, or simpler categories by dropping boundary exemplars. In Study 3, category complexity was quantified by the number of dimensions needed to arrive at linearly separable categories. Bilinguals needed fewer dimensions to separate their categories out than monolinguals. To examine more directly whether bilinguals drop boundary exemplars, Study 4 compared the number of outliers (i.e., objects that were more similar to the prototype of a category different from their own category) for bilinguals and monolinguals. Fewer outliers were observed for bilinguals than for monolinguals. These results indicate that the category boundaries for bilinguals are less complex than the category boundaries for monolinguals.

## References

- Ameel, E., Storms, G., Malt, B. C., & Sloman, S. A. (2005). How bilinguals solve the naming problem. *Journal of Memory and Language*, 53, 60-80.
- Bullock, B. E., & Toribio, A. J. (2004). Introduction: Convergence as an emergent property in bilingual speech. *Bilingualism: Language and Cognition*, 7(2), 91-93.
- Gollan, T. H., Montoya, R. I., Fennema-Notestine, C., & Morris, S.K. (2005). Picture-naming and classification in monolinguals and Spanish-English bilinguals. *Memory and Cognition*, 33, 1220-1234.
- Grosjean, F. (1982). *Life with two languages: An introduction to bilingualism*. Cambridge, Mass: Harvard University Press.