

‘Seeing and thinking for speaking’ across languages: spatial encoding and attention allocation in agrammatic aphasia

Efstathia Soroli

Structures Formelles du Langage Lab, CNRS & University of Paris 8, France

<https://doi.org/10.36505/ExLing-2012/05/0028/000234>

Abstract

Current typological research has shown that languages encode space in strikingly different ways, onto divergent lexical and syntactic structures. Such typological properties seem to strongly guide speakers’ ‘speaking’ and ‘thinking’ in typical and atypical (pathological) contexts. Such asymmetries in the distribution of the lexical and grammatical elements are also particularly interesting for the study of agrammatic speakers who show dissociations between those two elements when speaking. The present research investigates whether language-specific factors influence how speakers of typologically different languages with and without agrammatism encode motion events verbally (speaking), as well as how they allocate their visual attention (seeing) when constructing their spatial representations (thinking).

Key words: spatial language, eye movements, agrammatism

Introduction

Recent typological and crosslinguistic research has begun to examine the implications of linguistic diversity for human cognition (Evans & Levinson 2009) in normal as well as in pathological states (Soroli 2011). More specifically, in the domain of space, languages are found to encode lexical and syntactic structures in strikingly different ways (*satellite-framed* vs. *verb-framed* languages) (Talmy 2000). With respect to the expression of motion, languages are classified into: those expressing *Manner* (the subjective component of motion) in verb roots and *Path* (the objective component of motion) in satellites (e.g., English), see example (1); and those lexicalizing *Path* in the verb leaving *Manner* implicit or peripheral (e.g., French), in example (2).

- (1) *The mouse climbs up the table*
Manner Path (S-framed pattern)
- (2) *La souris **monte** sur le pied de la table [en courant]*
Path **Manner**
Lit. ‘The mouse ascends on the table leg [by running]’.
(V-framed pattern)

Such striking cross-linguistic differences, apart from their typological interest (Slobin 1996), are significant for the study of the relationship

between language and cognition (Hickmann et al. 2009), contribute to the debate opposing universalist approaches — according to which spatial cognition is based on universal, perceptual and cognitive processes that are independent from language-specific properties; and relativity approaches — according to which language-specific factors may affect how speakers construct spatial representations beyond language use (Soroli & Hickmann 2010). Such linguistic variation is also of great interest for the investigation of the lexical vs. syntactic strategies of aphasic speakers during verbal encoding (Nespoulous 1999). In this context, and despite a few cross-linguistic studies of aphasia (Menn & Obler 1990), little is still known about universal vs. language-specific aspects of aphasia in language use and beyond (Soroli et al. in press).

The present study aims to determine the role of typological (language-related/typological) vs. language-independent (universal/ syndrome-related) factors for language encoding processes, in accounting for similarities and differences in the verbalization, and visual attention patterns of speakers with and without agrammatism.

Method

In order to measure the relative role of language-independent and language-specific factors we coupled the analysis of verbal data with an eye-tracking paradigm. More specifically, we compared how several groups of speakers: English and French controls (N=40); English and French speakers with agrammatism (N=2), describe motion events presented visually (video-clips) in a Production and how they allocate their visual attention.

The Production task consisted in watching a series of short target video-clips showing motion events performed in different *Manners* (i.e. walking, jumping, crawling) and along a variety of *Paths* (up/down, across/along, into/out of). Participants were asked to describe at the end of each clip what had happened.

The analysis examined the type of information expressed (*Manner/Path*), the linguistic means used (verbs/other devices), and the eye fixations to specific Areas of interest in the clips corresponding to the main motion components (cf. *Path* (P) and *Manner* areas (P+/-M)), as illustrated in Figure 1.



Figure 1. Example of an ‘into’ motion event divided in different Areas of interest (Source (S), Goal (G), Path (P), and Manner (P+/-M))

Results

The results from the production task confirmed the main *V-* vs. *S-framed* typological differences in the patterns of French and English control speakers: main focus on *Path*-component typically lexicalized in French; systematic lexicalization of *Manner* together with *Path* in the verbal network in English. With respect to speakers with aphasia, the French speaker either expressed no semantic information in his utterances or when selected one, he preferred to express *Path* in the verb and no other information in the periphery. In parallel, in English the participant mainly produced utterances expressing only one component (in contrast to the typical compact *Manner+Path* pattern) and encode either *Manner* or *Path* in the verb, and either only *Path* or no semantic information in peripheral devices.

The data from the production eye-tracking paradigm showed that, depending on the language group and irrespective pathology, spatial components were not only encoded differently, but also filtered visually in different ways. French *Path*-fixations were more frequent than those performed by the English viewers on the same Areas, whereas, with respect to the time spent fixating these areas, participants’ fixations to the specific *Path* and *Manner* areas did not depend on the language factor.

Discussion and conclusion

We examined speakers’ verbal and non-verbal responses in a task that required speakers to construct representations of motion events and then encode them verbally. Overall, the results showed important differences in the linguistic verbalizations (speaking), but also in the representations

beyond language use (thinking), as revealed by the non-verbal measures (seeing). More specifically, findings showed language-specific variation in the encoding patterns across all participants, but only a partial language effect on the attention allocation data. More specifically, a significant language effect was found in the encoding patterns used in discourse, and in the numbers of eye-fixations during the exploration of the visual scenes, but only a partial language effect for the duration of the eye fixations in the same Areas of interest. Speakers with agrammatism developed parallel language- and syndrome-related strategies showing a rather double pattern of compensation.

These findings support a moderate relativistic/typological view and indicate the need for additional research directions before definitive conclusions can be reached. It is clear that the use of multiple methodologies, and the account for multiple factors are essential in order to deeply investigate how language relate to thought and what is the relative impact of language- and syndrome-related factors for the cognitive processes involved in aphasia.

References

- Evans, N. & Levinson, S. C. 2009. The myth of language universals: Language diversity and its importance for cognitive science. *Behavioral and Brain Sciences*, 32(5), 429-492.
- Hickmann, M., Taranne, P. & Bonnet, Ph. 2009. Motion in first language acquisition: manner and path in French and in English. *Journal of Child Language*, 36(4), 705-741.
- Menn, L. & Obler L.K. 1990. Cross-Language data and theories of agrammatism. In L. Menn & L.K. Obler, (Eds.), *Agrammatic Aphasia. A cross language narrative sourcebook*, 1369-1388. Amsterdam: John Benjamins.
- Nespoulous J-L. 1999. Universal vs language-specific constraints in agrammatic aphasia. In C. Fuchs & S. Robert (Eds.) *Language diversity and cognitive representation*, 195-207. Amsterdam: John Benjamins.
- Slobin, D. I. 1996. From "thought and language" to "thinking to speaking". In J. J. Gumperz & S. C. Levinson (Eds.), *Rethinking linguistic relativity*, 70-96. Cambridge: Cambridge University Press.
- Soroli, E. (2011). *Language and Spatial Cognition in French and in English: crosslinguistic perspectives in aphasia*. Ph.D dissertation, University of Paris 8, France.
- Soroli, E. & Hickmann, M. (2010). Language and spatial representations in French and in English : evidence from eye-movements. In G. Marotta, A. Lenci, L. Meini & F. Rovai (eds.), *Space in Language*, 581-597. Pisa : Editrice Testi Scientifici.
- Soroli, E., Sahraoui, H. & Sacchetti, C. (in press). Linguistic encoding in English and French: typological constraints on second language acquisition and agrammatic aphasia, *LIA journal*.
- Talmy, L. (2000). *Toward a cognitive semantics*. Cambridge, MA: MIT Press.