1. Background
Linguistic diversity

Although human spatial cognition is thought to be universal, languages present striking differences in how they organize and encode spatial information, leading to debates [1;2] about the relationship between language and cognition. 

Talmy [3] proposes a typological distinction between satellite-framed vs. verb-framed languages (e.g. Germanic vs. Romance languages). Satellite-framed languages lexicalize the Manner (M) of motion in the verb and Path in adverbial phrases within a single clause structure. In contrast, verb-framed languages lexicalize P in the verb root, leaving M implicit or in the periphery of the sentence:

- Satellite-framed → M + P: He is running up, down, across, into, away...
- Verb-framed → P + (M): Il monte, traverse, part... on courant (‘He ascends, crosses, leaves... running’)

Some languages are harder to classify into these two categories, such as serial-verbal or equipollent languages (e.g. Chinese, cf.[2]) and languages such as Greek that present a parallel system of conflation in which both verb- and satellite-framed structures seem to be available in equal frequent contexts [3;4;5].

The present study explores the implications of several co-existing systems in the same language:

1. V-framed system → P (M): lexicalizes only P in the verb leaving M implicit or in the periphery: Ferco renatur (‘He leaves running’).

2. S-framed basic system → M + P: lexicalizes M in non-bare verbs often followed by additional spatial adverbials and locative or directional elements similar to English satellites: Freoch parami, Anthi. [‘He runs up, down...’] H he runs up, down... [to the hill].

3. S-framed prefixed system → P + M: lexicalizes both M and P in the verb (P in prefix & M in verb root) and either expresses M in peripheral participles or leaves M implicit: Atheno trechontas = [An[thesis]-veren]-[Vroot]-[Vgerund]-[Vadverb]-[Vadverb], Lit. ‘up-walking running’.

Aims

The present paper examines the typological status of Greek and tests its implications for speakers’ representational choices of motion events. Most language effects previously reported are based on language use [1;6;7], while non-verbal performance shows either no language effect or effects that are less clear [8;9;10].

We investigated how typologically different languages (French, English, Greek) perform in non-verbal tasks coupled with eye-tracking, as compared to non-verbal tasks:

- non-verbal categorization task (categorizing events in the absence of any relevant linguistic information)
- verbal categorization task (categorizing events when targets were sentences presenting Path and Manner)
- a production task (describing events).

Hypotheses tested

- null hypothesis: no major language effects should occur in any task;
- strong relative hypothesis: language effects should occur in all tasks;
- weak hypothesis: language should affect production, but not non-verbal responses;
- moderate hypothesis: language should affect production, as well as non-verbal responses but only when linguistic information must be processed (production, categorization).

2. Method

Participants

Monolingual adult native speakers of French (14), English (14) and Greek (40), all right-handed.

Material

Visual and auditory stimuli implying voluntary motion events with varied Paths (P) and Manners (M):

- Paths: up, down, into, out of, across
- Manners without instruments: run, jump, crawl, walk
- Manners with instruments: bicycle, scooter, rollers

Tasks

- Production (coupled with eye-tracking): Visual stimuli were presented in a pseudo-randomized order (Fig.1). Participants were asked to describe what had happened.
- Non-Verbal Categorization: Participants first saw a short target video showing a motion event performed in a certain Manner and along a certain Path. The target video was followed by two variants of the target that differed from it with respect either to Path or to Manner (Fig.2). Participants were asked to choose the variant they thought was like the target and to press a key as fast as they could to indicate their choice.
  - Verbal Categorization: identical to the non-verbal categorization task, except that the target video was replaced by a sentence presented auditorily at the same time as the two video variants. There were two conditions in which sentences were either S-Basic or S-Prefixed (cf. ex. 2 and 3 above).

3. Results

Production: English speakers used compact structures systematically encoding Manner in verbs and Path in other devices. French speakers expressed Path in the verb and provided lexical information about Manner in either loci and/or did not use any other devices in the verbal network (Fig.3). The Greek data were coded twice with a coding that viewed Greek either as a V-system or as an S-system. French speakers expressed Path in the verb and provided less information about Manner in other devices. French speakers expressed Path in the verb and provided less information about Manner in other devices. French speakers expressed Path in the verb and provided less information about Manner in other devices.

Non-Verbal Categorization: Manner choices: Greek ˃ English ˃ French

Participants showed a preference for Path over Manner in French, no significant preference for Manner or Path over English, and a clear preference for Manner in Greek.

Verbal Categorization: Manner choices: English ˃ Greek ˃ French

This task involved more Manner choices in all groups as compared to non-verbal categorization. However, English speakers showed a significant preference for Manner over Path and they chose Manner significantly more often than French speakers, who preferred Path as they did during non-verbal categorization. Greek participants showed a preference for Manner in both conditions (Fig.6).

Eye-movements: Cartoons showed a difference in how speakers of different languages allocated attention to different Areas of Interest (AoI): English and French showed that speakers paid as much attention to Path and to Manner in English, but focused their attention more on Path in French (Fig.7).

4. Conclusion

Typological properties of languages invite speakers to express motion events in very different ways. They can also generate different categorical choices even in non-linguistic tasks and have implications for attention allocation. These data partly support our hypothesis, which predicted language effects not only in verbal tasks but also in visual and non-verbal language use. The evidence concerning Greek also suggests a complex typological pattern that is far from being clearly V-framed as previously claimed and that shares some properties with S-framed systems. Analyses in progress examine Greek speakers’ eye movements, speakers’ performance in other language groups, as well as aphasic patients across languages, providing new crosslinguistic perspectives on the relationship between language and cognition.

References

[6] Efstathia SOROLI & Maya HICKMANN Laboratoire Structures Formelles du Langage, CNRS & Université Paris 8, France contact:


Crosslinguistic spatial cognition: exploring visuospatial thinking and speaking