How language affects perceptually-based categorization in L1 and L2: the case of placements events

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INTRODUCTION

Language and perception are two essential cognitive systems, but until recently the interaction between them has been examined only occasionally. A fundamental tool in the search for linguistic determinants of semantic structuring in human perception is the method of cross-linguistic comparison. Several of studies have shown that languages differ strikingly in their semantic organization of a number of domains, including that of spatial relations, and more specific that of placement events ('She puts an apple in the bowl').We therefore ask the following research question: does cross-linguistic variation in the codification of placement events has implications for (A) speakers' non-linguistic cognition and (B) for adult second language acquisition, and if so, under what conditions? In order to find an answer to this question, we will run a number of experiments with two types of populations (1) native speakers of Dutch, Spanish, English and German; and (2) adult second language learners of Dutch with Spanish, English and German backgrounds.

OBJECTIVES

The overall aim of the present project, as seen in the light of the LanPercept Marie Curie Initial Training Network, is to develop a better understanding of the basic mechanisms of language-perception interactions in healthy populations, with a focus on the influence of language on non-linguistic cognition (memory) and in adult second language learners.

PARTICIPANTS

Native speakers and L2 learners of:

- **DUTCH**: a language that codes the distinction between vertically or horizontally placed objects
- **SPANISH**: a language that does NOT code the distinction between vertically or horizontally placed objects
- **ENGLISH**: a language with low-frequency cognates (*stand, lay*) that mark the distinction
- **GERMAN**: a language that, like Dutch, codes the distinction between vertically or horizontally placed objects

MATERIALS & METHODS 1

EXPERIMENTAL TASK 1

Similarity judgment task with picture priming procedure (as in Coventry et al., 2010, based on Feist and Gentner, 2007)

Research question
Does the manipulation of language during the encoding of a visual image primes the false recognition of visual features that correspond with the linguistic features encoded previously?
Hypothesis
We expect that Dutch L1 speakers, with their language distinction between vertical (*zetten*) and horizontal (*leggen*), are more sensitive to changes in these spatial relations than Spanish L1 speakers, who have a single verb (*poner*) for both.

Procedure
1) Participants are asked whether a sentence containing a placement verb presented with a picture matches that picture or not (prime trials)
2) A second picture is presented (without an accompanying sentence) that either displays the same or different (gradually manipulated) horizontal / vertical position of the placed object than the first (prime) picture. Participants are asked to indicate whether the pictures are the same or different.

If it appears from this task that the manipulation of language indeed primes the false recognition of visual features that correspond with the linguistic features encoded previously for native speakers, we will continue experimenting with this task with the following second language population (a) L1 Spanish learners of L2 Dutch and (b) L1 Dutch learners of Spanish, at B2/C1 profiency CEF level. Possibly we will test L2 learners at lower profieciency levels as well.

FMRI STUDY

A second step would then be to investigate whether there are differences in brain activation between NSs of Dutch and Spanish, and between those and L2 learners of these languages. In Dutch, the language provides a more specific cue to anticipated motion than Spanish as it codes the final position of the placed object. In view of this difference, a relevant question to be asked is: are there different brain activation patterns in speakers of the two languages? and if they are, what is the situation like with L2 learners when they see pictures and hear descriptions in the two languages? In the experimental set-up the informants would lie in a scanner and watch still pictures where anticipated motion is shown (one can only see the beginning of the movement) and hear sentences in the relevant language.

MATERIALS & METHODS 2

If it appears from the similarity judgment task with picture priming procedure that no differences between native speakers of Spanish and Dutch are found, there is no reason to further experiment with L2 learners. There are then three options to further study our central theme. It is most likely that we will first try one of the first two following options, but if we find no significant results between the performance of NSs of different languages (mainly, Dutch and Spanish), we will turn to the third and last option.

Option 1: Similarity judgment task with forced choice (as in Malt, Sloman & Gennari, 2002)

Option 2: Recognition task with priming procedure (as in Stanfield & Zwaan, 2001).

Option 3: Verbal description task (as in Gullberg, 2009; Cadierno et al., in prep.)
A final option if all the above mentioned tasks don't work out as expected (i.e., if no significant differences are found between NSs of different languages) is to develop a linguistic task. Previous research has shown that linguistic tasks based on oral descriptions of video clips, generate interesting data to analyze. The task can be based on the videos already developed for the first experiment, or videos that have already been employed at the Max Planck Institute in Njimegen. Videos will depict support and/or containment types of relation between the Figure and the Ground. This may also concern non-canonical types of relation, eg., a lamp lying on its side. The set-up for the videos will be done following Gullberg (2009) to allow for future analysis of gestures; it will consist of a dyadic director-matcher game where the learner watches each video clip on a laptop screen and then describes it from memory to an interlocutor who cannot see the video clip and has to draw the setup of the objects. Eye-tracking could optionally be incorporated in the task design. We would experiment with this task with native speakers as well as L2 learners.

RESULTS & IMPLICATIONS

In general, results from this project will contribute to develop a better understanding of the basic mechanisms of the influence of language on non-linguistic cognition (memory) and in adult second language learners. The possible impact that cross-linguistic differences in the expression of placement events may have on speakers' non-linguistic cognition has received very little attention in the literature. To our knowledge there has only been one study to explicitly address the relationship between linguistic difference and non-linguistic performance in the area of placement (Bosse & Papafragou, 2010). The current project will also examine this issue by means of research methodologies that have not yet been used in the field.

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