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DO DIFFERENT DEMONSTRATIVE SYSTEMS INFLUENCE DISTANCE CATEGORIZATION IN GEOGRAPHICAL SPACE? CROSS-LINGUISTIC COMPARISON: POLISH AND SPANISH

The purpose of this paper is to verify whether the difference in distance categorization in Polish and Spanish would cause divers space conceptualizations by the speakers of these languages. The experiment was based on the assumption that different numbers of demonstratives in each language would cause different distance estimations by Polish and Spanish speakers. The experiment was conducted in laboratory conditions with the use of a computer. It consisted in fulfilling tasks regarding distance categorization in geographical space. Photos of landscapes were used for distance estimations. The tasks were introduced with the use of a program prepared especially for this experiment. Polish and Spanish students participated in the experiment. The hypotheses on different scopes of meaning, as well as the influence of the addressee on the use of Spanish demonstratives, were not confirmed. However, the main pronoun effect was obtained. The results confirm the validity of the method used but do not confirm the linguistic relativity hypothesis.
Key words: linguistic relativity, frames of reference, demonstratives, distance

Introduction

Languages differ in how they describe space. Does this difference entail differences in thinking about space? Does language influence how people think, memorize and reason about spatial relations? Differences between languages can be used to explore possible differences in cognitive representations of the relation between language and thought (e.g. Bloom, Peterson, Nadel & Garret, 1996; Levinson, 2003). This paper reports on cross-linguistic research conducted in Polish and Spanish.

Linguistic relativity

Does the structure of the language affect the conceptualization of the world by the speaker? According to the Whorfian hypothesis, language shapes the way

we perceive the world that surrounds us (Whorf, 1956/1982). This claim is supported inter alia by analysis of the ways space is encoded in different languages from different cultures. In Hopi language time is one of space dimensions. As a consequence, there is no separate term that would correspond with time as a distinct dimension. That is why time conceptualization by Hopi speakers is different from the users of SAE (Standard Average European) (Munnich et al., 2001). If we extend this opinion to the domain of space, differences in spatial language may affect non-linguistic conceptualization of space.

An experiment carried out by Boroditsky (2001) comparing concepts of time by English and Mandarin speakers, confirms this notion. In English, time is talked about as if it were horizontal and in Mandarin as if it were vertical (e.g. words like *up* and *down* are applied in relation to both space and time).

In the present study participants were asked to answer time-related true/false questions (e.g. "March comes before April") after being shown the prime – either horizontal or vertical arrays of objects. Subjects' first language influenced priming effects. Mandarin speakers were faster in making time judgments when they were primed with the vertical array of objects whereas English speakers were faster after a horizontal prime.

Frames of reference

Diverse frames of reference that exist in different cultures influence space categorization (Levinson, 2003). Languages differ regarding the applied frames of reference systems that are used to describe the location of objects in space. There are three distinct frames of reference: intrinsic, absolute and relative. In some languages only one of these is used, others may use a combination of two or all three. A relative frame of reference is an egocentric one; location of one object towards another is defined from the point of view of the speaker. Intrinsic and absolute frames of reference are allocentric systems. The intrinsic describes the location of the object towards another one, whereas in the absolute frame of reference location of the object is defined in reference to geographical space (Levinson et al., 2001).

English and other European language speakers use a relative frame of reference to describe spatial relations between objects placed in the table-top space, whereas they will use an absolute frame of reference for geographical space descriptions. Guugu Yimithirr speakers use an absolute frame of reference irrespective of the space they refer to (Majid et al., 2004; Levinson, 2003), even to describe the location of a small object on their own body. They would say, e.g., "There is an army ant on your southern leg" (Levinson, 2003).

Space notion acquisition

If we assume that adults representing different cultures perceive the world in different ways, it is worth considering whether it is innate. It is worth focusing on space notion acquisition by children.

A recent study has revealed that at the age of 6-7 months children start to make spatial distinctions. At 9-10 months they can make distinctions between most spatial relations in nonverbal, preferential-looking tasks. Between 9 and 11 months children begin to understand the relation of containment (e.g. small object in box), and by 17-19 they also understand the relation of support (e.g. apple on a plate) as well as the relation of tight contact (e.g. tape in a tape-recorder pocket). As we see, children become sensitive to spatial concepts very early. But only some of these relations will be important for them, depending on the language they speak (McDonough et al., 2003).

A cross-linguistic comparison study carried out on Korean and English children by Bowerman and Choi (1991) revealed that children in both groups begin to properly use spatial terms before the age of two. An earlier had study revealed that English children concentrated on making a distinction between the support relation expressed with the pronoun *on* and containment when the pronoun *in* is used. Tight/loose contact criterion, expressed with *kkita* (tight) and *nehta* (loose) is more important for Korean children. In both groups children made distinctions in the presented situations according to the criterion given in their language. The criterion used in other languages have no significance for them (Choi et al., 1999).

Types of demonstrative systems among languages

Spatial demonstratives exist in all languages, but demonstrative systems differ across languages. An analysis of 80 languages conducted by Diessel (Diessel, 1999) revealed that the most common system is one where there is a distinction between two zones of space, one of which referred to as proximal (e.g. this, here) and the other as distal (e.g. that, there). This distinction is very similar to the perceptual distinction between near and far. However, many languages divide space into three or more sectors. In the majority of these systems demonstratives refer to the dimension of proximity and distance not only in space but also in time perception.

Several groups of languages use three terms to describe distance. In all these systems the first term relates to proximity, with the speaker as the reference point. The systems differ in the way the medial and distal terms are used.

In the three-term person-oriented system, the second term marks proximity as well but with the addressee as the reference point. The third term is the distal demonstrative which reflects the distance from both speaker and addressee. One example of the languages with this kind of system is Japanese where *kono* means "close to the speaker", *sono* "close to the addressee" and *ano* "distal to both". It is worth mentioning that this system distinguishes between two zones: proximal and distal, with an additional term that allows the speaker to make precise whether the object is placed closer to him or to the addressee.

There are two other types of three-term systems which are distance-oriented, with the speaker as the deictic centre. In one of them, there are distal and proximal demonstratives and the third term, that describes space intermediate between those

two, is called medial demonstrative. According to Diessel this system exists in Spanish: *este* means "proximal to the speaker", *ese* "medial to speaker" and *aquél* "distal to speaker. The corresponding adverbs are *aquí*, *ahí* and *allí*.

Another type of distance-related system is one where there are one proximal and two distal demonstratives that divide space into "remote" and "very remote", which can even mean "invisible". This system exists in Yidin, language spoken by Pama-Nyungan, Australia.

There are also languages in which distance is described with four or more demonstratives. The language with the most developed demonstrative system is Malagasy that distinguishes seven different terms for varying degrees of remoteness.

Alternative explanation of demonstrative systems

Nimura and Hayashi (Nimura & Hayashi, 1996) present an alternative explanation of the use of spatial demonstratives. In their study, they stress the fact that many linguists, e.g. Lakoff, Halliday & Hasan and Lyons, claim that in English the proximity to the speaker expressed with demonstratives *this/that* can have psychological and emotional overtones. An alternative model was also presented by Strauss (2001). Not only does she reject the traditional proximal/distal distinction but also adds another demonstrative *it* which is the semantic and functional opposition to its counterparts *this* and *that*. Strauss presents a more dynamic system based on interactions between the speaker and the object spoken about. *This* reflects here high concentration on the object, *that* medium and *it* low. Strauss noticed as well that the use of a specific demonstrative depends on two factors: 1) the amount of information that the speaker presumes the addressee to have in reference to the object, and 2) how important the object is for the speaker.

In the case of Japanese an alternative system is presented by Kuroda and Horiguchi (Nimura & Hayashi, 1996). They both claim that the selection of *ko, so* and *a* depends on the psychological proximity and engagement of the speaker to the object referred to.

Chatterjee (2001) shows that the use of expressions to describe the location of an object like *this* and *that* depends on the knowledge of those who take part in the conversation as well as on the context in which the demonstratives are used.

Spatial systems in Polish and Spanish

The Polish demonstrative system divides space into two egocentrically grounded regions, using demonstratives *tutaj* (here) and *tam* (there). This system encodes a distinction between two zones of space: proximal (*tutaj*) and distal (*tam*) with the speaker as reference point (Bartosz, 1998). In Spanish, the same space is divided into three regions with the demonstratives *aquí, ahí* and *allí*. In this three-term distance oriented system, the first (*aquí*) and third (*allí*) are called proximal and distal demonstratives, and the second (*ahí*) is called medial demonstrative since it is used

to refer to objects that are at a distance intermediate between proximal and distal (Kemmerer, 1999). However, according to other sources, the Spanish demonstrative system is a person-oriented one. The first term is a proximal demonstrative with the speaker as reference point, the second is also a proximal demonstrative but with the addressee as reference point, and the third term is a distal demonstrative with both speaker and addressee as reference points (Cybulska-Janczewa & Perlin, 1999).

Experiment

The purpose of this study is to examine whether differences in demonstrative systems in Polish and Spanish influence the way their users reason about space and spatial relations. The study was based on the assumption that the different number of demonstratives in Polish and Spanish would lead to different distance categorizations made by their users.

1. Estimations of distance characteristic for Polish pronouns should reveal less extreme average ratings (as the distance continuum is divided into two subcategories). Estimation of distance in Spanish for the two utmost pronouns (*aquí* and *allí*) should be more extreme (than in Polish) – due to the presence of the third pronoun (*ahí*) in this language.
2. The meaning scopes of Polish pronouns should be broader (as there are two pronouns) than those in Spanish (three pronouns).

Another question was whether the appearance of an addressee would have any influence on the application of demonstratives among Spanish speakers (as some theories suggest).

Method

These questions were taken up in three experiments (two in Spanish: one with the two utmost pronouns only, and one with all three pronouns; one in Polish) conducted in laboratory conditions. A new method of indirect estimation of distance in geographical space was developed for the study. Subjects estimated the distance in space landscape photos on the computer screen. Each photo was accompanied by a short story (slightly different for each trial) in which the pronouns were introduced. The subjects' task was to show on the screen (using a mouse) the outcome of the story (where a certain object could be located). They were to estimate the distance of the object (not visible on the photo up to the moment of its placement by the subject) from the person present in the picture. The procedure was identical across all three experiments. They differed only in language and/or number of pronouns used.

Participants

Participants in the study were native speakers of Polish (29 subjects: 19 females and 10 males) and Spanish (experiment 1.: 24 subjects: 18 females and 6 males; experiment 2.: 24 subjects: 14 females, 10 males) . They were students of

the Warsaw University and Warsaw University of Technology and of the Basque Country University in Bilbao.

Design and materials

To present geographical space, pictures of different landscapes were used in the study. Photos of the people were also employed to present *speakers* and *addressees* as well as pictures of dogs that represented the objects to be placed by participants in geographical space. The language material consisted in schematic stories describing the situation of the person who was walking the dog. In the experiment the background picture, the instruction together with persons related to it, and the object to be placed (*a dog)* were randomized in all trials in order to avoid the hidden effect of influence of the picture or the instruction.

The pictures used in the study showed diverse landscapes but they were chosen so that in all of them the perspective was clearly visible. In all pictures the perspective was accentuated with a road. Six different pictures were used in the study.

Half of the figures that appeared in the pictures were women and half were men. That concerned both *speaker* and *addressee* pictures. There were six different *speaker* and *addressee* figures.

The figure of *the speaker* was placed at the bottom in the centre of the picture and was always turned backwards so that the participants perceived the whole situation from the speaker's point of view. To find out whether Spanish speakers would really place the dog on the screen guided by the proximity criterion, another figure always appeared at the same distance from the speaker. It was placed randomly on the curve, to the left as well as to the right of the speaker. To make the experiment as realistic as possible, the size of the figure was reduced with the perspective. This figure was always turned towards the speaker. On the back of the speaker there was a sign with the name of the person (the same name that appeared in the instruction), so that the participants could be sure which figure is the speaker and which the addressee. The names differed in the Polish and Spanish variants of the experiment.

To introduce the spatial demonstrative in the instruction, short, schematic stories were used. They all described somebody who went for a walk with a dog. Demonstratives appeared in the instructions to indicate where the dog was.

Instructions were simple and as similar in both languages as possible. This guaranteed that both Polish and Spanish speakers find the same task. All the instructions were drawn up according to one scheme and they differed in details so that the task was not too tiresome for participants.

The examples of instructions in Polish and Spanish are as follow:

1. *Marta poszła na spacer. Zabrała ze sobą psa. Po chwili pies znikł. Nagle Marta go zobaczyła i powiedziała: "O, pies jest tutaj!". Pokaż, gdzie – Twoim zdaniem – może znajdować się pies.*

Figure 1. The introductory task completed (*Now you go to the experiment proper. When you are ready press "Forward"*)

(Marta went for a walk. She took the dog with her. After a while the dog disappeared. Suddenly Marta saw him and said: "Oh, the dog is here!". Show where in your opinion the dog could be).

2. *Ana y Francisco fueron a dar una vuelta. Se llevaron al perro consigo. Al cabo de un rato el perro se escapó. Francisco se alejó para buscarlo. En ese momento Ana vio al perro y dijo: '!Anda! !El perro está allí!' Indica dónde crees que está el perro.*

(Ana and Francisco went for a walk. They took the dog with them. After a moment the dog ran away. Francisco went to look for him. At that moment Ana saw the dog and cried: "Oh, the dog is there!". Show where in your opinion the dog could be).

Procedure

The experiment consisted of three parts. They were all conducted with the use of a computer. To move from one part to the next the subjects first needed to fulfill the task and then to press the *Forward* button. In the first part the participants were asked to give some basic personal data: age, specialization and gender.

The second part of the experiment was the introductory task the purpose of which was to get participants accustomed to the program.

The third part was the experiment itself. The number of trials for each subject was 36, which resulted from the number of demonstratives in Spanish (3), the

Figure 2. Completed task of the experiment (*Marta says: "The dog is here"*)

number of variants (1 person/2 persons) and the number of background pictures (6). To equalize the number of trials in all three groups the variant with one person that appeared in the picture was repeated. It was decided to repeat this particular variant due to the fact that the difference resulting from the appearance of the addressee was not expected to appear.

Results

The data were analyzed in three different ways:
1. Within-language analyses. Separate ANOVAs for each language were con-ducted. The gender effect was controlled in the analyses even though it was not expected to appear. In Polish: gender (2) and pronoun (2) were the inde-pendent variables. The main effect of the pronoun appeared ($F(1,27) = 24.76$; $p < 0.00001$) that shows there is a significant difference between the pronouns *tutaj* and *tam* in Polish.

   In Spanish, the independent variables were gender (2) and pronoun (2) in one analysis, and gender (2) and pronoun (3) in the other analysis. There was also a significant pronoun effect ($F(2,44) = 29.19$, $p < 0.00001$) that indicates the variable use of the pronouns *aquí, ahí* and *allí* in Spanish.

   In no cases were there effects of gender but, as there were significant main effects of pronouns, the new method used in the study was revealed to be sensitive for distance estimation.

Table 1. F-test statistic and its significance

		F	p
Proximal	Situation with 1 person	1.11	0.400
	Situation with 2 persons	1.13	0.383
Distal	Situation with 1 person	1.07	0.428
	Situation with 2 persons	3.90	0.000

2. Cross-linguistic analysis. ANOVA (language (2) x gender (2) x pronoun (2)) showed again no effect of gender. There was found to be a main effect of the pronoun $(F(1,50) = 56.87; p < 0.00001)$ but no effect of language $(F(1,50) = 1.40; p = 0.2425)$. Thus hypothesis 1 (cross-linguistic differences) was not confirmed in the study.
3. Comparison of distance ranges for corresponding pronouns in Polish and Spanish. F-test for variance revealed no significant difference in variance between Polish and Spanish, which was incongruent with hypothesis 2.

Discussion

The results obtained in this study do not confirm the hypothesis about different meaning scopes of pronouns in Polish and Spanish. In both languages subjects showed similar distance approximations for pronouns used in the study.

All the analyses confirmed the existence of pronoun main effect. The results confirm the validity of the method used (although the sensitivity of the method can still be improved) but they do not support the linguistic relativity hypothesis which was the theoretical background for this study (Whorf, 1956/1982).

People use pronouns everyday to place objects in space. They never think why or how to use them. In all cases they use some inner, intuitive criterion for the use of a particular pronoun. What is this criterion? It would be hard for an average speaker to define it because language acquisition is a process we are not aware of. That is why if we asked native speakers of different languages to give a definition of the use of pronouns, it is most probable that they would answer using these pronouns. They would not mention nor specify parameters of exact distance. That is why it is worth considering testing the influence of language on space categorization restoring to "unconscious knowledge" of native speakers of two different languages without verbal instruction that would include pronouns.

Conclusion

The experiment described in this report was based on the Whorfian hypothesis. According to this theory, the difference in distance description in Polish and

Spanish should result in a difference in distance categorization by Polish and Spanish speakers. The results obtained in the study do not confirm this. Even though there is a cross-linguistic difference in space description, Polish and Spanish users estimated the distance in a similar way in the conducted experiment. The results obtained can rather be referred to the linguistic universalism theory. On the other hand, they may indicate that the sensitivity of the method should be increased or that the method should be changed.

Based on this study it can be affirmed that the availability of language means does not have influence on world conceptualization, but only on the way it is described. No influence of language-related means of distance estimation on differences in its estimation by Polish and Spanish speakers was revealed.

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