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Investigating meaning construal in the language of the blind: a cognitive linguistic perspective

This paper describes and discusses issues pertaining to investigating meaning construal in the language of the blind. It introduces key problems in this largely unexplored area and proposes possible avenues of research by outlining four studies conducted over a period of eight years. The central arguments are built around the fundamental cognitive linguistic premise that language is an experiential phenomenon intimately related to general cognitive processes. The author focuses on the role of salience (or attention) and demonstrates how it is coded in the language of the blind. The main part of the paper starts with the outline of two exploratory studies the aim of which was to identify possible differences in salience and situatedness. The author discusses the contribution of the two studies and proceeds by describing a more focused study whose hypotheses were motivated by some of the questions raised in the previous two studies. The primary research question was related to the idea of the primacy of space in the blinds' mental imagery and meaning construal. Finally, the author proposes a model integrating key language internal and language external factors affecting the process of meaning construal in this extraordinary population, and finishes by describing the fourth study whose primary aim was to double–test the research instrument used to investigate spatial (topological) elements in the language of the blind.

1. Introduction

Investigating linguistic meaning is difficult. It is difficult due its subjective and dynamic nature. Its intimate relation to thought makes it susceptible to various language internal and language external factors. However, if we accept its somewhat unstable and playful character, and, at the same time, remain open–minded about whatever might determine its demanding nature, we are likely to obtain extraordinary insights into both language and thought.

Basic domains like TIME, SPACE, MATERIAL, FORCE, COLOR, HARDNESS, LOUDNESS, etc. are rooted in directly embodied human experience and they represent

the base for semantic characterization of concepts (Langacker, 1987). Embodiment assumes both tendencies and limitations which act as a connection between perception and conceptualization, and which are evident on various levels – from the neural to the cultural level (see Rohrer, 2007, Ziemke et al., 2007). Furthermore, embodiment has a twofold effect on the way in which we experience the world: it filters out anything that is necessarily outside the range of our sense perception (Dretske, 1995: 331), but it also influences our meaningful perception (Dretske, 1995: 331) – our conception of a thing is necessarily connected to our perception and the ways in which we use it (cf. e.g. Lakoff and Johnson, 1999, Zwaan, 2003). Finally, embodiment should be seen as a factor which extends from the body, encompasses the more–or–less immediate (physical, cultural and social) environment, and eventually merges with a widely set cultural background, which has a clear influence on our (embodied) experience (cf. e.g. Sinha and López, 2000). From this perspective, it is clear that the blind's extraordinary experience of the world and unique reliance on other sensory modalities are bound to determine specific aspects of their domains of knowledge.

If language is an experiential phenomenon, and meaning construal depends on a variety of cognitive processes that communicate with our experience, how does the process of constructing meaning differ in those individuals whose experience is extraordinary? And more specifically, is the language of the blind different from the language of the sighted, and how can we investigate possible differences? In order to answer these broad questions, we report on four studies conducted over the course of eight years, which involved blind and sighted subjects. Two initial studies were exploratory in nature whereas subsequent two employed specific research instruments and focused on a considerably more measurable phenomenon. Before we proceed to describing and discussing the results of the above mentioned studies, let us consider the scholarly framework within which linguistic meaning in the blind has been investigated so far.

2. The history of meaning in the language of the blind

There have been a number of studies dealing with the language of the blind. They deal with highly important issues of language development and language use, often, however, coming to conclusions that may seem less than satisfactory to a cognitive linguist. Thus, nativist studies expectedly claim that the lack of vision will not significantly affect the process of language acquisition (see e.g. Chomsky, 1980, Landau and Gleitman, 1985). Conversely, empiricists attempt to prove that deficient sensory experience of the blind is bound to have a negative effect on their cognitive development and language acquisition (see e.g. Andersen et al., 1993, Dunlea and Andersen, 1992, Fraiberg, 1977, Preisler, 1997, Urwin, 1984). More recent approaches show that neither of these is completely true: although concept formation is delayed in blind children, the initial disadvantages are lost after the age of 10 (Pérez–Pereira

and Conti–Ramsden, 1999). Moreover, the congenitally blind exhibit enhanced speech comprehension, which may be related to enhanced perceptual processing skills (Röder et al., 2003, Röder and Rösler, 2004: 731).

However, linguistic meaning construal in the blind is a largely unexplored area. The central issue pertaining to the semantics of their language has been the concept of verbalism – the term coined by Cutsforth, who defined the phenomenon as the use of words "not verified by concrete experience" (1951: 48). His aim was to investigate non–sensory based language, that is, definitions for words based on experience that is not accessible to the congenitally blind. He used a word–association test with 39 totally blind individuals, 26 congenitally and 13 adventitiously blind (aged 8–21). They were asked to respond to the word with a quality of the object designated by the word. The list Cutsforth used in his test was composed of words whose underlying concepts had various degrees of sensory availability – some of the words used were: *moon, sky, violet, night, gold, ink, lamp,* etc. As one might expect, a large number of responses were words denoting visual qualities. More specifically, 48.2 per cent of the responses obtained from the congenitally blind were of visual qualities, and 65.7 per cent of the responses given by the adventitiously blind were also visual in nature. Thus, they used words such as "red", "green", "darkness", etc. Cutsforth concluded the following:

> A predisposition toward the unwarranted use of meaningless visual terminology demonstrates a strong tendency toward unreality in which valid relationships are utterly disregarded. The inevitable result is that nothing but incoherent and loose thinking is possible. Intellectually the child is organized without reference either to himself or to his own experiential world. The seeing world with its visual concepts becomes a flimsy gossamer web out of which his intellectual character must be woven (1951: 69).

The first serious criticism of the concept of verbalism and Cutsforth's negative value judgment came from Dokecki (1966). He insists that, apart from the obvious relationship of words to things, there is also the important relationship of words to words (1966: 526). In other words, he stresses that the meaning of words is not derived exclusively from sensory experience but also through language itself.

Direcly and indirectly Cutsforth's work inspired a number of studies: Nolan (1966), Harley (1963), Demott (1972), and Von Tetzchner and Martinsen (1980). However, the results of these studies did not really support Cutsforth's findings. Nolan (1966) attempted to replicate Cutsforth's study and used identical stimulus words. He used two groups of blind subjects, one under controlled association and the other under free association conditions. The results showed that both groups gave a significantly lower number of visual responses than Cutsforth's group. Harley's (1963) aim was to investigate the relationship between verbalism and the age, intelligence, experience, and psychosocial adjustment of blind children. The participants were given three

tests: 1) word definition, 2) identification through tactile exploration, and 3) a personal adjustment test. The participants (40 congenitally blind children ages 6–14 with IQ range from 65 to 132) were asked to say whether they had contact with the object that the word referred to. All the answers where the participants identified the objects poorly but defined them correctly were counted as "verbalism for objects". On the other hand, the score for "visually oriented verbalism" was the number of verbalisms about visual perception or colors that the participants used in the word–definition test. The results suggested that only verbalism for objects correlated in a significantly negative way with age, with IQ, and with the level of personal adjustment. No significant correlations were found in the case of visually oriented verbalism. Demott (1972) basically replicated Harley's experiment. The sample consisted of 41 participants who were totally blind, 41 who were legally[1] blind, and 61 participants who were sighted. The participants were aged 6–19. The results showed that there were no significant differences between the language used by the three groups. Von Tetzchner and Martinsen (1980) also conducted a very similar study to the one conducted by Harley. They had a sample of 8 children aged 8–13 who were blind and a control group of 8 sighted children who performed an object–recognition task while blindfolded. Both groups used verbalisms and the only statistically significant result was a significant negative correlation between the number of correctly defined words and verbalism.

An interesting methodological shift from word–association, word–definition, and object–identification tests, which were used in the above mentioned studies, was a study by McGinnis (1981), who tested the oral and gestural communication in six blind and six sighted children (aged 3.5 to 5). The children were matched according to age, language, and IQ. The author audiotaped conversations that were held with each child individually. Visual terms were classified as follows: (1) color words, (2) verbs with a visual reference ('see', 'look', 'stare', etc.), and (3) verbs with a visual reference but used metaphorically to mean 'understand', 'imagine', etc. The results showed statistically significant differences in the sighted children's use of verbalisms – they used more visual terms than their blind peers, but only in the first two categories. The author explained the results by suggesting that visual terms obviously had little value for them.

The most recent study on verbalism was conducted by Rosel, Caballer, Jara, and Oliver (2005). The participants were children who had been totally blind from birth. As stressed by the authors, by studying children who were totally blind from birth it was possible to avoid "individual differences with respect to experiences with perception, knowledge, and the denomination of colours with respect to the terms *see* and *look"* (2005: 417). Furthermore, the authors used a systematic sampling method that was based on the child's age, gender, and vision status. A sample of 126 children was used – 62 blind

1 Legal blindness occurs when a person has central visual acuity (vision that allows a person to see straight ahead of them) of 20/200 (6/60) or less in his or her better eye with correction. With 20/200 visual acuity, a person can see at 20 feet (6.1m), what a person with 20/20 vision sees at 200 feet (61m).

boys and girls and 64 sighted boys and girls, all aged 7–14. Each child was interviewed individually and asked to tell two stories and then choose and describe a character from one of the stories (Rosel et. al., 2005). The children were given key words that were to serve as the basis for the story. They were also given guidelines for a thorough description of the chosen character (what the character looked like, how the character thought, the way the character behaved, etc.). The variables observed were the following: gender, vision; age; total verbalism in the story. The authors took into consideration a number of important factors, including the variation in the length of the stories. Having analyzed the data by using the EQS software for structural equation models, the authors obtained the results that point to the conclusion that "a child's degree of sight has no significant effect on the frequency with which the child uses verbalisms" (2005: 422). The variable that had a significant positive effect on the verbalism, in both sighted and blind children, was age – children tend to use more visual terms as they get older. As pointed out by the authors, the results seem to contradict those obtained by Harley (1963), but the instruments in the two studies were considerably different – Harley used a word–definition test, whereas Rosel and colleagues used spontaneous narrative (Rosel et al., 2005: 422). Concluding their discussion on verbalism, the authors suggest that the fact that both blind and sighted children tend to use verbalism in a similar way is "a positive sign of children who are blind to adapt to the general linguistic behavior of the community they live in" (2005: 422). They conclude their argument by stressing that individuals who are blind "do not have their own particular language that is shaped by their own experience; rather, their language does not differ (in form and the vocabulary they use) from that used by sighted children" (2005: 423).

This objectivist conclusion originates from the view that words/constructions have clear–cut, clearly defined and relatively stable meanings (cf. Geld and Šimunić, 2009: 411), which is fundamentally opposite to what has been claimed and substantiated by cognitive linguists. The aim of this paper is to challenge the above–cited conclusion by hypothesizing that each individual experience of the blind is indeed reflected in language. In other words, contrary to the initially negative findings and judgments pertaining to the alleged meaninglessness of particular elements in the language of the blind, and subsequent attempts to dispute these judgments and claim that their language does not differ from the language used by the sighted, our attempt is to demonstrate that the extraordinary experience of the blind is bound to be coded in their language. Furthermore, our aim is to propose a research paradigm that will allow us to address a variety of linguistic phenomena instead of limiting our focus on a set of vocabulary items that are believed to code various degrees of visual information. Both lexicon and grammar are conceptual tools and the only way to tackle the nature of the language of the blind is to investigate how lexicon interacts with grammar and how meanings change in order to contribute to the specific conceptual content in the language of the blind.

If we wished to discuss language from the perspective of its role as a communication system with clear–cut referential functions in which language

corresponds to what one might call the objective reality, then we could easily agree with the conclusion that blind individuals do not have their own particular language that is shaped by their own experience and claim that the blinds' experience is unlikely to interfere with their language and its ultimate communicative purpose. However, we wish to look into our language as a motivated conceptual system that communicates with other cognitive processes interacting with a variety of experiences, so we need to go a step further and ask ourselves: what is it that makes the blinds' language different?

Or, more specifically, what kind of knowledge enters and builds their cognitive domains forming the foundation for a somewhat unique semantic characterization of concepts? For example, a group of results from the first study we are going to describe in this paper suggest that, under specific circumstances and facing a particular task, the blind tend to avoid describing elements pertaining to distances, far–away objects and scenes requiring a bird's eye perspective. Rather, their language reflects "in the scene" perspective and attention to details within "their arms' reach" that seem to be largely irrelevant to the sighted. In other words, the meaning conveyed by the blind is indeed different, and the difference is due to their extraordinary experience of the world and specific selectivity in attending to those aspects of their environment that are easily attainable via sensory modalities other than sight.

In 1985 Landau and Gleitman published their influential work on the relationship between language and experience from the perspective of language development in a congenitally blind girl called Kelli. They observed her uses of the verbs *look* and *see* from a very young age. When she was 36 months old they started an intensive study whose purpose was to investigate her comprehension of the two verbs. The data collected for Kelli were compared with the data obtained for four sighted but blindfolded children who were asked the same questions. The results related to the verb *look* showed that for Kelli the verb meant 'contact with the hands' whereas for the sighted children it meant 'turn one's nose toward'. What is more, when asked to "look up", "look down", "look behind", etc. she moved her hands, not her eyes and head. Likewise, when she was instructed to look at an object, Kelli explored the object manually, running her hands over its surfaces. It was clear that for Kelli looking at something meant exploring and apprehending. Conversely, touching was not an exploratory process, it simply meant 'contact'. As opposed to the blind girl, the sighted blindfolded children simply oriented their eyes towards the object. From the cognitive linguistic perspective, these results also suggest that the meaning constructed is based on specific mental imagery whose nature is dependent on and determined by a constant interaction between general cognitive processes, language, and experience.

Our attention is selective. What our mind selects as salient in our environment, our input, and, ultimately, our meaning construal, depends on a number of language external and internal factors. As previously suggested (Geld and Maldonado, 2011, Geld and Letica Krevelj, 2011, and Geld and Čutić, 2014), the process of linguistic meaning construal should always be viewed as a dynamic process in which one activates various domains of knowledge. As

is often the case, discoveries about the extraordinary shed new light on the ordinary, and our understanding about the everyday comes from taking a step away from what is perceived as such. Thus, a great deal about the structure of various world languages has come into foreground by examining these languages when used by non–native speakers. Likewise, interdisciplinary efforts to examine language development and meaning construal in the blind are likely to elucidate various aspects of the relationship between language and thought, and the nature of language as an experiential phenomenon in general. In the sections that follow we shall describe a specific course of investigation that has proved a viable path that one can take to investigate the language of the blind. The course starts with the investigation of meaning construal in Croatian as L1 and general research questions in two exploratory studies that offered rather tentative, but eye–opening answers. Then the course shifts into examining a specific linguistic phenomenon in a group of Croatian users of English as L2, and it ends with a study involving native users of English.

3. Cognitive linguistic investigation into the language of the blind

3.1 Salience and situatedness in Croatian as L1

In 2005 and early 2006, Geld, Starčević, and Stanojević conducted a series of interviews with legally blind Croats followed by two exploratory studies (Geld and Starčević, 2006, and Geld and Stanojević, 2006). They hypothesized that (1) due to the blind's haptic experience of the world and reliance on other sensory modalities, their language will code a shift in scalar adjustment from shematicity to specificity; and (2) that due to their haptic experience of the world and variability in the effective use of residual vision, their language will code an "in the scene" position of the conceptualizer. The joint sample of the two studies consisted of two subsamples: 18 legally blind adults and 19 sighted adults. There were 8 congenitally blind (4 functionally blind, i.e. with the reduction of vision to 5%; 3 totally blind; 1 sensitive to light and some colors), 2 adventitiously blind with the reduction of vision to 10%, 5 adventitiously blind with the reduction of vision to 5%, and 3 born with a serious visual impairment and blinded in their early twenties. The sighted group consisted of 19 adults with normal vision.

The research task was inspired by the Vividness of Visual Imagery Questionnaire (VVIQ; Marks, 1973), which falls into the category of subjective tasks based on introspective reports (see Mammarella et al., 2006). The questionnaire used in this research consisted of three out of four questions originally developed for the VVIQ. The VVIQ had been designed to measure the subjective vividness of imagery with sighted individuals – the subjects had been asked to rate how vivid their image was on the scale from 1 to 5. In this way, despite the subjective nature of measures, the researchers had a quantitative element they could count and compare. However, our primary aim was not to determine how vivid particular images are but investigate the subjectivity of linguistic

construal based on specific aspects of mental imagery. In other words, we were interested in the elements that build the pictures our subjects see with their minds' eye as well as processes that can be identified as aspects of their construal(s).[2] The subjects were asked to do the following three tasks:

A) Think of a relative or friend. Describe the image that comes to your mind.
B) Think of the rising sun. Describe the image that comes to your mind.
C) Think of a countryside scene which involves trees, mountains and a lake. Describe the image that comes to your mind.

The subjects had 10–15 minutes to do each task. There were 5–minute breaks between the tasks. The order of the tasks was randomized for each participant. The tasks were presented in whichever form was most comfortable to the subjects (Braille, enlarged print, regular print). The subjects were asked to produce a short written description using whichever form of writing was most comfortable to them. After completing the three tasks, they were briefed about the aim of the study.

Before they filled in the questionnaire, demographic data was collected about the subjects as well as data about the their state of vision loss, the age at which they lost their vision (if applicable), and the effectiveness of use of their residual vision (if applicable).

In task A, which required the image and description of a relative or a friend, we were particularly interested in the levels of specificity, hypothesizing that the blind group would be more specific in their descriptions. We divided each description into units dealing with a single aspect of the described person, such as their build (e.g. "he is of athletic build"[3]), hair (e.g. "she has long hair"), face ("he has a round face"), clothes ("she usually wears jeans"), etc. In this way we obtained a total of 210 units for the blind group and 160 units for the sighted group. In order to assign each unit to the schematic, basic or specific level, we had three raters independently rate all of the units. The raters were instructed to rate which of the three levels each unit belonged to, according to the following criteria: the description of the whole body as a single unit was defined as the schematic level (e.g. the description of a person's build, height, weight), the body parts which normally stand out (e.g. the hands, face, hair) as the basic level, and detailed descriptions of body parts and clothes (e.g. jewelry, beard, nose size, etc.) as the specific level. The raters were not linguists, nor were they given any other background on the research. The agreement between the three raters was very high ($ICC = .906$), and we took the median value of the three raters as the final value.

2 The VVIQ is considered a valid and reliable instrument for measuring vividness of visual imagery. The questions that were used in this research were selected on the basis of their potential to evoke images based on a variety of perceptual input, including those images that cannot be experienced in their totality, such as the mountains in the distance (see task C).

3 The questionnaire was in Croatian, and all our subjects were native speakers of Croatian. The quotations in the paper are idiomatic translations of their Croatian responses.

In task B, we were interested in the level of detail about the sun itself. Specifically, we looked for any language that mentioned the color of the sun, the light it emits, the shape of the sun, sun's rays and movement (distinguishing between the mention of vertical movement (e.g. *dizanje* 'sunrise') and non–vertical movement (e.g. *izlazak sunca* lit. 'the coming out of the sun'; 'sunrise')). Our basic assumption was that the descriptions of light and color would be prevalent in the sighted group, while shape and movement would be prevalent in the blind group. We asked the same three raters to search for any language pointing to a given element in each of the descriptions, assigning yes/no. For instance, in a description such as "I think of the sun forcing its way through the clouds, and the clouds breaking up, making room for the sun" "yes" would be scored for non–vertical movement. The agreement between the three raters was very high (*ICC* = .954), and we took the median value of the three raters as the final value.

In task C, which required the image and description of a countryside scene, we investigated scalar adjustment and the vantage point and hypothesized that a) the blind would tend to be "in the scene" and b) descriptions of what they see with their mind's eye would involve a variety of details that are not customarily expected in an image of what we might describe as a wide–scope landscape. We assumed that the answers to this particular task would be especially complex because the landscape contained three potential focal points (trees, mountains and a lake) with a variable degree of immediacy in the blinds' interaction with the environment.

The results of task A seemed to show a tendency of the blind group to focus on the schematic and basic level in describing a person, whereas the sighted group focused on the basic and specific level. More specifically, the subjects in the blind group tended to describe a person on a schematic level, i.e. the person's build and height, as in "he is 180 cm tall, built like me", and "she is somewhat shorter than me". This accounts for one quarter of all descriptions in the blind group and roughly eight percent of the descriptions in the sighted group. Subjects in both groups exhibited the same type of focus on the basic level, i.e. on a person's "prominent" features, such as face and hair (e.g. "she has long hair", "he wears glasses"). However, they seemed to differ in the specific level – whereas 42.4% of description units from the subjects in the blind group focus on particular details of the person's appearance (e.g. jewelry), this is done in over fifty percent of descriptions in the sighted group (see Table 1).

level of specificity	blind group	sighted group
schematic level (i.e. the whole body – build, height)	25.7%	8.8%
basic level (e.g. face, hair)	31.9%	39.0%
specific level (e.g. details of clothes)	42.4%	52.2%
Total	100%	100%

Table 1. Results of the first task: levels of specificity

The results of the first task suggested the salience of different levels of specificity depending on different sensory inputs. This is why our hypothesis about the specific level of description being more salient in the blind group did not seem to be confirmed. When we interact with other people, we usually stand several feet away from them. No matter what the sensory input, we focus on the prominent features of what we (culturally and biologically) consider the most informative part of their body – the head.[4] The usual "interaction distance" allows the sighted group to notice further detail through the visual channel, which is (because of social restrictions of touching other people) not normally available to the blind group. It is precisely the "interaction distance" that limits the sighted and does not allow them to perceive the whole body – from head to toe – because it necessitates a move in the vantage point, further away from the culturally encoded interaction distance. In contrast, this type of judgment is available to the blind group. This is in accordance with the results of the study by Arditi et al. (1988), who investigated haptic imagery in the congenitally blind by applying Kosslyn's (1978) procedure of investigating visual images of objects at different distances. They found out that, unlike the sighted, blind subjects showed no tendency to imagine larger objects as being further away and smaller objects as being closer to them. When asked to imagine that they were moving toward the object until it overflowed their mental field of view, they reported it never overflowed.

In task B we looked at the details concerning the type of light the sun emits, its color, shape and movement. All four elements appeared in descriptions from both groups. Sun's light was mentioned by both groups as a crucial element in the description, with twice as many subjects from the sighted group mentioning the blinding quality of the sun in comparison to the blind group. The color of the sun appeared in slightly more than half descriptions in the blind group (58%) and in roughly two thirds of descriptions in the sighted group (68%). Qualitatively, a difference appears in the selection of colors between the two groups. Whereas the subjects in the blind group only mentioned basic colors in their descriptions (orange, red, yellow and the blue of the sky), the sighted group mentioned a wider range of colors, including various hues such as reddish, bright yellow, bright orange, yellowish orange, light blue, light yellow and golden.

The movement of the sun during sunrise seemed to be culturally significant and over half of all subjects mentioned it in various ways. Nevertheless, there was a difference regarding the direction of the movement – whereas the sighted group tended to describe it in terms of vertical movement, the blind usually described it without reference to the vertical axis. Thus, most subjects from the sighted group who gave detail about the movement of the sun described it as *dizanje* 'rising', as opposed to using the conventional noun *izlazak*

4 Note, however, that the congenitally blind primarily use a person's voice to recognize them, and are indeed better at recognizing people by voice than the sighted (Röder and Neville, 2003: 254–255). In our study, three congenitally blind subjects who were totally blind did in fact mention voice as the primary feature they recognize their friend by.

(lit. 'coming out'[5]). In contrast, the subjects from the blind group described it as "forcing its way through", "appearing", "surfacing", and "being blown up like a ball". The detailed results are presented in Table 2. The blind group mentioned non–vertical movement more frequently than the sighted group.

sun's movement	blind group	sighted group
vertical	12%	37%
other	65%	5%

Table 2. Sun's movement

The shape of the sun was an important aspect of sunrise mentioned by both groups. For instance, they described the sun as "a semi–circle, a sphere", "a circle", "a ball", "an orange" etc. This was done by 29% of the subjects from the blind group and some 21% of subjects from the sighted group. We also observed a grammatical difference between the two groups – while all of the subjects from the blind group described the sun's shape using a predicative construction (e.g. "The sun is an orange"), half of the subjects from the sighted group who mentioned its shape described it predicatively and half attributively (e.g. "the round sun"). Finally, the blind specified the sun's rays and their effect (e.g. in "the sun's rays are forcing their way through the clouds", "a warm sun's ray is tickling me"). One characterization of the sun's rays is particularly apt: "[it is] a small warm finger – the tip of the finger – touching my cheeks … becoming warmer … and changing into a palm", because it reflects a conceptualization of the sun's ray as an extension from the sun that may reach an individual, which seems to be behind most descriptions. The sun's rays were mentioned by 40% of the subjects from the blind group, and only one participant from the sighted group.

The results of task B again seem to quite clearly illustrate the perceptual and cultural character of our knowledge of the world. When it comes to providing detail, subjects from both groups recognized the cultural importance of the four investigated qualities: the type of light the sun emits, its color, shape and movement, but they seemed to profile their relative importance based on their perceptual knowledge. Thus, the sighted group tended to profile visual information, including various hues, the blinding quality of the light and sunrise as the climbing of the sun. In contrast, the blind focused on the movement of the sun during sunrise and provided details about the sun's shape. The difference in the quality of the movement (vertical movement for the sighted and non–vertical movement for the blind) may be a result of the conventional language material used. Both groups tended to frame their descriptions of sunrise by focusing on its significant culturally shared symbolic conceptualizations or by describing conventionalized imagery associated with sunrise. The subjects from the blind group usually

5 In Croatian the verb *izaći* 'come out, exit' and the noun *izlazak* 'coming out, exiting', which do not profile vertical movement, are conventionally used to refer to sunrise.

described sunrise as a symbolic event, emphasizing its culturally significant qualities, such as the beginning of a new day and other similar features ("Sunrise means something new … a new day, new opportunities", "Day is triumphing over night", "it is romantic"). Roughly half of the subjects from the blind group mentioned the symbolic aspect of sunrise, whereas only one participant from the sighted group did so. As opposed to this, the subjects from the sighted group were more inclined to frame their description of sunrise by giving conventionalized rich imagery connected with it (e.g. adding elements such as the sea, a beach). Although the blind group did use this framing (in roughly two fifths of the cases), it is clearly predominant in the sighted group (roughly four fifths of the subjects). In order to describe a rather illusive and schematic event such as sunrise, we draw on our conventional knowledge of the world, enabling us to establish common ground with our collocutor. The sighted group seemed to profile conventional visual imagery from the common conceptual base, whereas the blind group profiled symbolic elements.

In task C the researchers expected a tendency towards an "in the scene" view of the blind, with more details, which are not to be expected of the sighted when three schematic level focal points (trees, mountains and a lake) are given. This hypothesis is in keeping with the ability of the blind to keep the detail as well as the wide–scope picture in view at all times. However, given the complex scene and the variety in the descriptions, as well as the differences among the subjects and a relatively small number of them, it was impossible to "objectify" the material using any kind of quantitative analysis. Rather, what was obtained in task C was a gradient chain of images that vary individually, presumably in relation to the nature of the subjects' impairment. Therefore, the answers were grouped according to the quality of the subjects' vision as well as their subjective evaluation of how effectively they use their residual vision. Thus, the data was categorized into the following groups: (1) the group of 8 congenitally blind subjects (CBG), (2) the group of 5 adventitiously blind who rated their residual vision as low (ABG1); (3) the group of 5 adventitiously blind who rated their residual vision as high or very high (ABG2), and (4) the sighted group (SG).

The congenitally blind group (CBG)

Five out of the eight congenitally blind subjects gave rather short and straightforward descriptions that contained details one might expect to find in a dictionary. For example, the trees were described as "standing trunks" that have "branches which move upwards and extend away from the trunk", as "trunks of various sizes and height with smooth or rough textures" or "something upright and strong that is firmly rooted in the ground and can support one's body and provide shade". Furthermore, the elements in nature were characterized in terms of their resemblance to household objects and human bodies: "branches are like hands sticking out of bodies"; "some trunks are vibrant and alive with branches and leaves that sing in the wind and others are

wrinkled and rough and injured"; the lake in the picture "is like a basin filled with water and its bottom is covered with stones", "the edges of the beach are grassy and feel like stepping on an old woolly carpet". Finally, the mountains were either not mentioned or mentioned simply as something in the distance.

Two of the eight subjects described elements that suggest their direct and personal involvement in the scene (one person feels the wind moving the branches while she is playing with her dog in the middle of the forest, while the other says that he is standing on the pebbly shore of the lake and feels the roundedness and smoothness of the pebbles under his feet (as opposed to ordinary stones he is used to)). Again, for the two subjects, the mountains were something detached and in the distance. One subject said she could not imagine/describe the picture.

The adventitiously blind who rated the effectiveness of their residual vision as low (ABG1)

This group of subjects (45, 5; 35, 20; 21, 12; 21, 7; 56, 23)[6] gave considerably longer descriptions. Four of them described the quality of the lake in terms of its brightness and/or shiny surface. For example, they said that "the lake mirrors the surrounding shapes", "the surface of the lake is shining in the sun", "the sunlight is reflected in the lake and colors it", and "the lake glitters". The same four mentioned shadows or colors with reference to the sun and its light: "the sun is high and the trees cast shadows", "it is dusk and the orange is reflected in the lake", "the light changes the color of some trees". Especially interesting was the fact that four out of five subjects in this group directly or indirectly insisted that the mountains were somewhere far, whereas the forest and the lake were something that surrounded them in a more immediate way. The mountains are "far, big and blue in the distance", they are "somehow detached and different from the forest and the lake", they are "far and there is nothing much to say about them", and "the forest and the lake are one thing and the mountains are another". Only one description in this group did not contain any reference to the mountains. First it focused on the lake, mentioned its "greenish color" and "the surface that glitters in the sun" as well as "the sound of frogs and birds nearby". Then it elaborated on the size and shades of the trees in the forest: "the closest trees all seem the same color while those further away seem the same size but different shades". The immediacy of the lake and the forest was also evident through an interplay of various auditory, olfactory and tactile elements: "I dip my feet in the lake", "we can feel the smell of soil and water in the air", "I can hear the forest – the birds singing and the sound of a creek coming from the mountains", "my feet rustling through the leaves", "the trees are a frame around me, hugging me", and "I am on a small dusty lane entering the forest". The elements indicating the immediacy of the lake and the forest were also an indication of an "in the scene" perspective.

6 The first number refers to the subjects' age and the second to the age when they lost their sight.

The adventitiously blind who rated the effectiveness of their use of residual vision as high or very high (ABG2).

This group consisted of five adventitiously blind subjects (46, 22; 38, 17; 66, 40; 55, 45; 33, 11). Four of them had been losing their sight progressively and at the time of our research they had been legally blind for ten or more years. Interestingly, this group was the least informative in terms of the nature of the subjects' contributions. All descriptions were rather short. Three descriptions were very experiential, but they did not entirely correspond to the task of imagining the scene. They gave details such as the following: "mountains and a lake – it is a place for relaxation where I can breathe deeply"; "I like this kind of scenery much more than the seaside where it's too hot and crowded"; "it is like the place where I have my cottage, silent, no traffic, only birds and deer visit, trying to get some food or something"; "oh yes, a cozy little mountain cottage in the snow…like the one we stay in when we go hiking". On the other hand, there were two descriptions that seemed completely different in nature. They contained a (stereo)typical postcard–like landscape with snowcapped mountains in the background and a greenish/bluish lake surrounded by a forest in the foreground. However, they were both accompanied by somewhat ironic comments characterizing the elements that were described as either "learned" or "idealized" rather than "real" and "natural".

The sighted group (SG)

The sighted group (SG) were somewhat less imaginative. It was obvious that the specified elements steered them to constructing a (stereo)typical postcard–like landscape, as already described for two subjects in ABG2. More than half of the subjects from this group gave a description containing snowcapped mountains in the background and a lake surrounded by a forest in the foreground. Some answers contained the exact location of particular elements, for example: "high mountains are in the background; in the front part of the scene, on the left side, there is a small forest"; "there is a lake a bit to the right; the lake is clearly seen in the foreground"; "the mountains in the background are partly covered with snow and partly just grey and bare", etc. Two subjects mentioned the trees or the mountains being reflected in the lake while three describe the colors of the lake, the valley, or the mountains.

Three out of the nineteen subjects gave very short answers stating that they did not have a clear image or that their image was fragmented.

Finally, six out of the nineteen descriptions seemed to be more experiential and more subjective. In some of them, the describer was "in the picture" and used the first person singular or plural to locate herself and the people around her: "I am sitting on the grass"; "we can see the mountain peaks way up high"; "I am taking a walk with somebody I love"; "I am dipping my feet in the lake". In the remaining descriptions, the involvement is indicated less directly – the describers mentioned the wind, the warmth of the sun, the freshness and coldness of the air, the birds singing, the frogs making noise, but there was no explicit first person involvement.

The qualitative analysis of the position of the conceptualizer with reference to the subjects' vision may be systematized by means of a gradient chain of conceptualizer positions: from a specific, zoomed–in position primarily evident in CBG to a zoomed–out position evident in SG.

At one end of the chain there are "zoomed in" descriptions of individual elements that make up the scene. These are descriptions provided by the congenitally blind who tend to focus on two elements that seem to be more readily experienced and explored by touch – the trees and the lake (and not the mountains). These two elements are characterized in terms of their resemblance to household objects and parts of human bodies, i.e. concepts that are relatively easily available to the congenitally blind. Thus, the most salient aspects of their construal are those elements they are generally more likely to experience directly: those that are, both literally and metaphorically, within their arms' reach.

The middle of the chain contains several groups of images indicating what we have called an "in the scene" perspective. Firstly, in ABG1, the immediacy of the two focal points is evident through various auditory, olfactory and tactile elements as well as personal involvement, which is linguistically coded by the first person singular or plural, as in "I dip my feet in the lake", "we can feel the smell of earth and water in the air", or "I can hear the forest – the birds singing and the sound of a creek coming from the mountains", etc. A very similar construal is found in two congenitally blind subjects (CBG) – one person feels the wind moving the branches while she is playing with her dog in the middle of the forest, while the other says that he is standing on the pebbly shore of the lake and feels the roundedness and smoothness of the pebbles under his feet. Finally, three out of nineteen members of the SG also explicitly locate themselves in the picture, e.g. "I am sitting on the grass" or "we can see the mountain peaks way up high".

Next on the gradient chain are descriptions that seem experiential but do not contain direct reference to any first person involvement. They simply provide elements that somewhat latently suggest the "in the scene" perspective. In other words, situatedness is coded by a variety of sense–related vocabulary such as *warmth, freshness, coldness, singing*, etc. The last group of images in the middle of the chain was provided by three subjects from ABG2. These images are experiential in nature, but somewhat different from what has been described so far, because they do not entirely correspond to the task of imagining the given scene. We might say that they focus on the atmosphere of the place and the feelings it produces in the observer. In addition to that, they do not seem to refer to idealized or imaginary places, but contain details about specific places that our subjects have actually visited and enjoyed.

The other end of the chain is composed of stereo(typical) images that resemble those we find on postcards or the TV. They all have a gestalt nature, with some variation and elaboration of detail (ABG1) or very little variation (ABG2 and SG). The variation in ABG1 refers to elaborating on the brightness of the lake and providing details such as colors and shadows and their location in different elements of the scene. This is exactly what might be expected in a group whose members belong to a population extra sensitive to

light. Furthermore, mountains are marginalized and depicted as distant and detached. There might be a number of reasons for that, such as e.g. the fact that mountains themselves are not the most comfortable place to spend time in, at least in the sense of climbing them and experiencing directly, or the fact that their very size and shape make them distant and unreachable. The remaining images with very little internal variation are completely "zoomed out", ready–made gestalts (ABG2 and SG).

In sum, the gradient chain[7] (see Figure 1) contains non–discrete categories, where elements vary in salience depending on the perspective from which the scene is observed/imagined. Perspective and situatedness do not refer solely to a physical point from which something is viewed, but imply specific shifts in the vantage point characterized by sophisticated adjustments the blind make in their contact with the world (as suggested by Geld and Šimunić (2009)[8]). The vantage point changes with every sense–related shift of attention, resulting in unique mental imagery and meaning construal. Such a view is in keeping with the fact that the blind are a very heterogeneous population (e.g. there are differences in the degree, onset and duration of blindness), but rather than creating methodological problems (Röder and Neville, 2003: 255–256) it presents opportunities for the cognitive linguistic methodology.

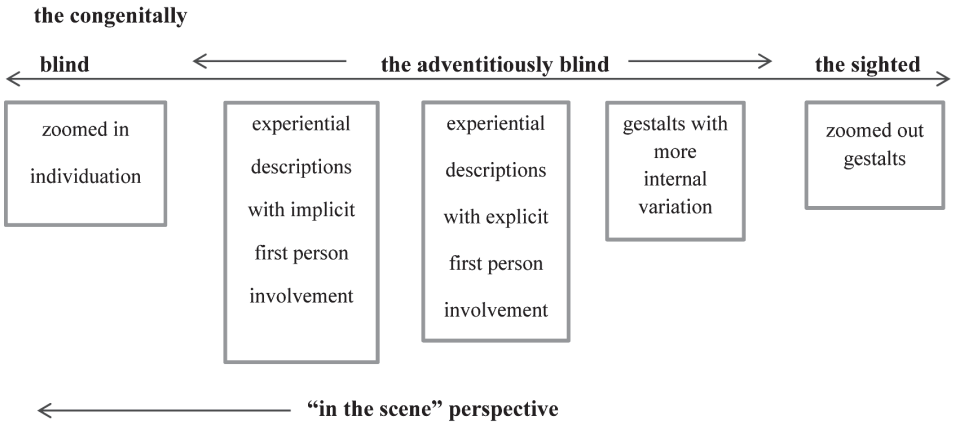

Figure 1. Gradient chain in imagery/construal

7 In this paper we have not specifically dealt with the role of imagery in memory and self-perception. Studies by Libby and associates (Libby and Eibach, 2002, Libby et al., 2005, Libby et al., 2007) suggest that perspective plays an important role in self-concept and personal change among the sighted. Given our present results, it would be interesting to see to what extent and in what way this is also true of the blind.

8 As proposed by Geld and Šimunić (2009: 425), "it is easy to imagine a blind person moving forward after having used her touch to check for obstacles, or moving backward having smelled the fire, or being more easily attracted to the smell of nature blooming on a spring day, or being faster in detecting the first drops of rain." This specific reliance on a variety of sensory input compensating for the lack of vision results in rather unique shifts of perspective, that is, subtle shifts in space and time that are bound to be coded in the blind's mental imagery and, consequently, linguistic meaning construal.

The two initial hypotheses – the shift in schematicity and the "in the scene" position of the conceptualizer – were confirmed to some extent. The shift from schematicity to specificity in the blind was not confirmed in task A (due to social restrictions of touching other people), but was confirmed in all aspects of task B. Task C confirmed that there is a difference in the position of the conceptualizer, which proved to be more "in the scene" for the congenitally blind group and much less so for the sighted subjects, showing, at the same time, that it is possible to postulate the existence of a gradient chain varying with regard to the perspective taken. In all three tasks various cultural elements also played an important role. Overall, such results show that the two proposed hypotheses were too specific in terms of the tasks at hand and the heterogeneity of the subjects.

Generally speaking, the results of all three tasks suggest that the perceptual and cultural availability and salience of a particular element are likely to influence its construal. Thus, in task A, the availability and salience of the basic level for the blind and the specific level for the sighted explain the results we obtained better than the proposed hypothesis of a shift to specificity. In task B, similar information is culturally available, and significant differences are found only where perceptual barriers appear (looking directly into the sun or seeing the sun's movement). Perceptual differences in task C largely correspond to the availability of a particular perspective, leading to the gradient chain proposed in the analysis.

Moreover, perceptual experience of the subjects influenced the answers as well, which was especially evident in task C, making it very difficult to make any generalizations about the nature of the imagery described. However, the analyses have revealed some interesting tendencies that might be interpreted as links between mental imagery (and hence linguistic meaning) and the extraordinary perceptual characteristics of our subjects. For example, the congenitally blind tend to select individual elements of the scene and focus on what they have explored haptically and experienced directly. On the other hand, the adventitiously blind are a tremendously heterogeneous group and their imagery reflects reliance on whatever residual vision they seem to have and/or use effectively as well as their multi–sensual experience that substitutes for accurate and detailed visual input.

Overall, this suggests that the hypotheses proposed were too specific for the tasks and the subjects at hand. Nevertheless, this does not mean that it is impossible to compare the imagery of the blind and the sighted in terms of how salience, situatedness and other cognitive processes are coded in language. It only confirms that communication between language and other cognitive processes should be viewed and measured as a highly subjective process in which discrete differences are uncommon and tend to be found at the end points of the continuum. It is also reasonable to conclude that whatever might be found as different and unique is certainly not an exclusive and stable characteristic of a particular group or individual.

This is precisely where the methodological apparatus of cognitive linguistics comes in with its significant advantages. Firstly, a detailed analysis

of particular linguistic expressions allows exploring individual tendencies in a bottom–up way. This is in line with the usage–based view of language espoused in cognitive linguistics (cf. e.g. Langacker, 1987, Barlow and Kemmer, 2000), which allows language to be seen as a dynamic process of construal, where individual events are on a par with generalizations. Such an approach is instrumental in informing general views, making it perfect for exploratory studies of the sort presented here. Secondly, the cognitive enterprise provides a global perspective which is cognitively real and broad enough to easily fit in with a variety of approaches from a variety of disciplines. It includes both embodiment and culture which gives it the breadth necessary for a range of issues, and allows keeping in mind the big picture without ignoring specific results (or sweeping them under the proverbial rug). Finally, the non–objectivist tendencies in the cognitive endeavor (cf. e.g. Lakoff and Johnson, 1999) make it a perfect candidate to study issues which may seem controversial if tackled with preconceptions.

The strength of the above described exploratory studies lies in the fact that they raised the investigators' awareness of the complexity and depth of the subject in question. Furthermore, it became clear that research methodology needs to include different instruments – those that would elicit data which are somewhat more reliable, focused and comparable. Obviously, the weakness of the studies was the nature of the data obtained. It was almost impossible to conduct reliable statistical analysis so the data were described and analyzed mostly qualitatively. However, these studies paved the way for a study that would focus on a single phenomenon that is more easily measured. Furthermore, it directed the researchers into recruiting a sample of blind and sighted research subjects that would be highly comparable and homogeneous in terms of age, education, language proficiency, etc. Finally, the results obtained in task C prompted the researchers to single out space as one of the key elements in the blinds' mental imagery. The results suggested that the immediacy of particular elements on one hand, and the unavailability of distant elements on the other hand are likely to make spatial relations quite central in the images constructed by the blind people's minds. This is how we came to the idea to focus on English particle–verb constructions. The study is described in the section that follows.

3.2 Salience of space in English as L2

The study was conducted by Geld and Čutić (2014). The instrument used was previously validated in several studies concerned with strategic meaning construal, that is meaning construal in L2 (Geld, 2009, 2011, Geld and Maldonado, 2011). All of the studies in question had been concerned with the issue of topological vs. lexical semantic determination in composite wholes. Therefore, the instrument used seemed like a highly reliable tool for obtaining measurable results pertaining to the role of space in the process of meaning construction in the blind. More specifically, the aim of the study was to investigate whether blind users of English employ similar cognitive strategies in the process of meaning construction of particle verbs (PVs) to those described for the sighted users of English.

What makes PVs exceptionally interesting as a linguistic instrument for investigating meaning construal in the blind is the fact that they are composed of two elements, one of which is topological, that is, it codes space. As suggested by Geld and Čutić (2014: 13), from Langacker's framework of "Space Grammar" (1982, 1987) to contributions by Lindner (1981), Brugman (1981), Herskovits (1982), Talmy (1983, 2000a, 2000b), Langacker and Casad (1985), Lakoff (1987), Johnson (1987), Vandeloise (1991, 2003), Bowerman (1996), Bowerman and Choi (2003), Tenbrink (2007), and many others, space has been recognized as one of the most fundamental aspect of our experience as well as its structuring force. But, the blind experience certain limitations in their exploration of space because they lack visual input. On the other hand, as stressed by Geld and Čutić (2014: 17–18), the specific nature of haptic exploration of space, which is characterized by fine granularity and unique physical immediacy, is bound to result in the blinds' extraordinary experience of the world. What is more, blind individuals require extensive storage of information about their environment because "they cannot rely on their vision to understand the spatial organization of their environment and visually update online the spatial coordinates of objects outside their reach" (Fortin et al., 2008: 2995). Therefore, it was reasonable to assume that linguistic meaning construal of the blind might show certain bias towards topological elements in composite wholes.

Geld and Čutić had three basic hypotheses: 1) there will be differences in the strategic construal of PVs between blind users of English and sighted users of English; 2) there will be differences in the strategic construal of PVs in the group of congenitally blind users of English in comparison to both adventitiously blind and sighted users of English; 3) there will be no differences between the three groups of subjects in terms of which semantic determination prevails in PVs in relation to the nature of the verb (light vs. heavy)[9]: topological determination will prevail with PVs containing light verbs, and conversely, lexical determination will prevail with PVs containing heavy verbs.

The sample of 75 users of English as L2 included two subsamples: 30 visually impaired learners of English in the 3rd and 4th grades (secondary vocational school for the blind), and 45 sighted learners of English in the 3rd and 4th grades (secondary vocational school for the sighted). Classes that participated in the research were chosen randomly. The blind subjects in the study were further divided into the following two groups: 9 congenitally blind and 21 adventitiously blind. The instrument used was the same as the one used in several previous studies (Geld, 2009, Geld, 2011, Geld and Maldonado, 2011), slightly modified in form for the needs of this particular study. Thus, the instrument had already been validated. It was a questionnaire that contained 12 particle verbs. The questionnaire included PVs with both heavy (e.g. *pull*) and light (e.g. *take*) lexical parts. Each PV was attributed one particular meaning

9 The opposition is based on a well-documented linguistic description of a specific group of verbs whose basicness makes them particularly good material for idiomatic and grammaticalized usages. They have been called basic, light, delexical, high-frequency, easy, simple, semantically vague, schematic, etc., and they have been studied by a considerable number of authors. Such verbs are, e.g., *take* or *get*. Heavy verbs, on the other hand, are semantically more concrete – like, e.g., *draw* or *write*.

without additional context(s). The subjects were asked to make sense of the meanings attributed to the 12 particle verbs. For example, they were asked to make sense of the following: *take out* = 'kill' or *pull out* = 'stop being involved'. The answers were coded with the following three codes[10]: top – for the answers where topology overrides lexical determination, lx – for the answers where lexical determination overrides the meaning of the particle, and cmp – for those answers where both parts of the PV construction are mentioned and explained. For example, the following answers were coded as topological: "take out means kill because a killed person is displaced, out of this world", "pull out is stop being involved because somebody who is out of the place cannot influence the situation anymore".

The results of χ^2 test showed a statistically significant difference between blind and sighted subjects in the frequency of topological determination, with the blind providing a higher number of topological explanations ($\chi^2 = 15.42$ $df=7$; $p<.05$). Furthermore, the results also showed a statistically significant difference in compositionality[11] ($\chi^2 = 7.67$ $df=3$; $p=.05$) with the blind subjects giving more compositional explanations than the sighted. See Figure 2.

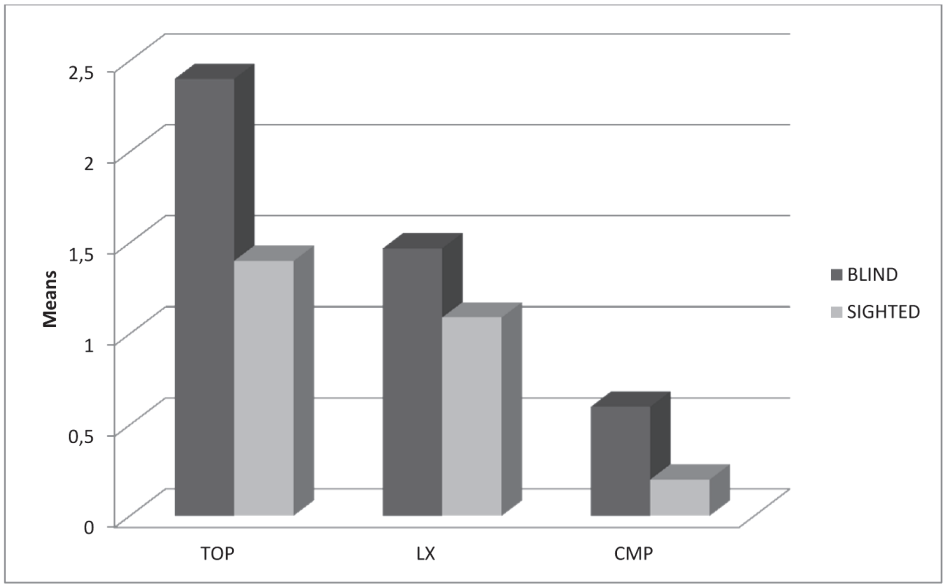

Figure 2. Differencess in the frequency of determination: the blind vs. the sighted (adapted from Geld and Čutić, 2014: 23)

10 There were actually seven different codes, such as a code for misinterpretation or simple paraphrase, but these are not mentioned because they were not relevant for the discussion in question.

11 It is important to stress that the term compositionality is not used in its traditional sense whereby A+B=C, that is the components have clear and stable contributions in the resulting structure. The term is used to label those answers where it is either acknowledged (and described) or clearly implied that both components have cognitively motivated contributions in the composite wholes.

As stressed by the authors, spatial competence involves many different abilities such as the recognition of the shapes of objects, knowing where the body is in relation to other objects, where the parts of the body are in relation to one another, etc. Thus, a reasonable assumption might have been that blind users of English would tend to avoid attending to the topological part of PV constructions. However, the results suggested that they tend to do quite the opposite. Not only did they show remarkable understanding of spatial relations, they also demonstrated excellent analytical skills. Geld and Čutić (2014: 22) concluded that the latter might be related to the fact that they are actually quite prone to analyzing language – they use language as a substitute for visual input whereby language becomes a very important tool for obtaining information, as suggested by Pérez–Pereira & Conti–Ramsden (1999: 35–36).

As for the differences between the adventitiously blind, the congenitally blind, and the sighted, the results showed that a significant difference found for topological determination (χ^2 =28.07; *df*=14; p<.01). The difference in topological determination was found only between the sighted and the congenitally blind (p<.05), whereas differences in other comparisons (sighted vs. adventitiously blind and adventitiously vs. congenitally blind) showed no statistical significance. Sighted subjects (M=1.4; SD=1.41) gave significantly fewer topological explanations than the congenitally blind subjects (M=3; SD=2.12). See Figure 3.

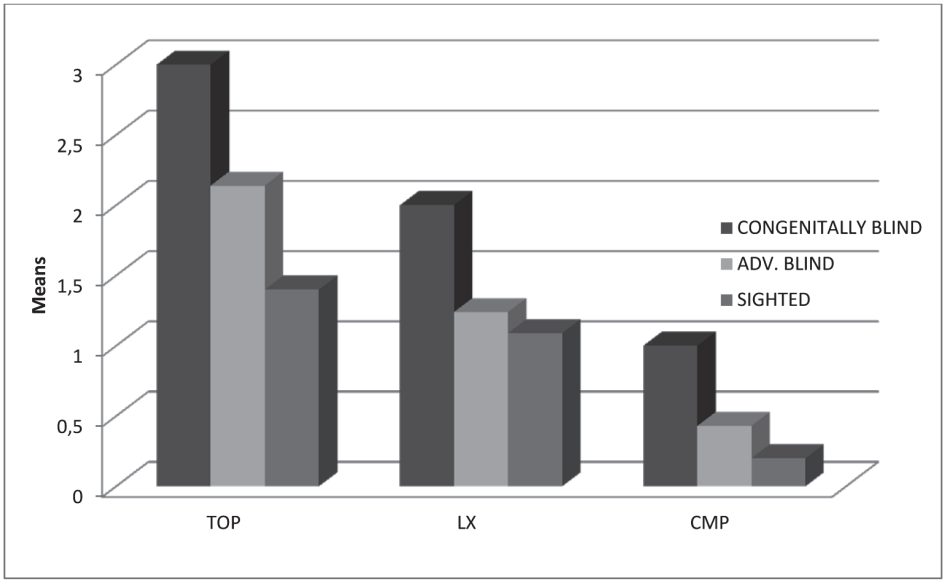

Figure 3. Differences in the frequency of determination: the congenitally blind vs. the adventitiously blind vs. the sighted (adapted from Geld and Čutić, 2014: 22)

The authors stress that this analysis is in accordance with the findings described by Geld and Stanojević (2006), and continue:

> …even though the process of meaning construal should be viewed as a non–discrete continuum due to highly individual differences in both the blind and the sighted, it is the difference between the congenitally blind on one end and the sighted on the other that offers the most tangible evidence that our sensory experience is coded in the language we speak. In this particular case, it is the congenitally blind subjects' conception of spatial relations and their specific sensitivity to the importance of these relations that sets them apart from the sighted (Geld and Čutić, 2014: 23).

The same pattern of results was obtained for compositionality – the only significant difference occurred between the sighted and the congenitally blind ($p<.01$). Sighted subjects ($M=.2$; $SD=.51$) gave significantly fewer compositional explanations than the congenitally blind subjects ($M=1$; $SD=1.12$). Thus, as already proposed, it is reasonable to assume that the blind tend to be more analytical when faced with complex language constructions and meaning construal.

Finally, the results showed that topological determination prevailed in the group of light verbs ($t=6.59$; $df=74$; $p<.01$). On the other hand, in the group of heavy verbs lexical determination prevailed ($t=5.68$; $df=74$; $p<.01$). The results of an independent samples T–test showed that compositionality was more frequent in the case of heavy verbs in the whole research sample ($t=2.59$; $df=74$; $p<.05$). See Figure 4.

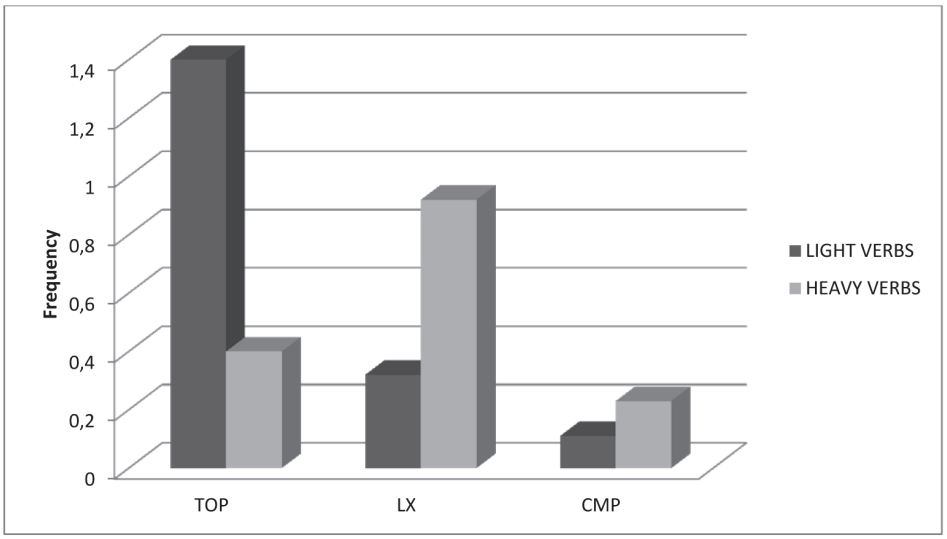

Figure 4. Differences in the frequency of determination: light vs. heavy verbs (adapted from Geld and Čutić, 2014: 25)

Geld and Čutić conclude that the findings confirm those pertaining to the sighted users of English (Geld, 2009, 2011, Geld and Letica Krevelj, 2011). In

other words, the results show that the semantic weight of both components plays a significant role in the process of meaning construction in L2. This takes us back to the issue of dynamicity of meaning and the factors affecting meaning construal. Let us consider the following model:

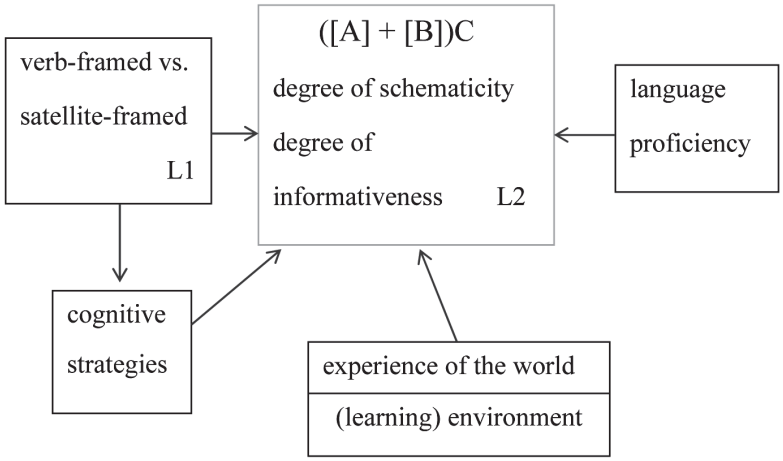

Figure 5. Factors affecting the strategic construal of particles in PV constructions (based on Geld and Letica Krevelj, 2011: 164)

The model represents a composite whole, in this case a PV construction, and the factors affecting its construal. As stressed by Langacker (2000: 94), the composite structure (C) should not be taken as merely the union of [A] and [B], nor [A] and [B] as unmodified in (C). As mentioned above, both components play a significant role in the process of meaning construction. Two aspects of the components are singled out as important: a) degree of schematicity, and b) degree of informativeness. Naturally, the process is also affected by language internal factors related to the users' L1. English is a satellite–framed language. Croatian also shows a tendency towards satellites in the form of prefixes. As claimed by Geld (2009) and Geld and Maldonado (2011), the fact that Slavic languages tend to express the core schema by the satellite facilitates the speakers' recognition of compositionality and the role of particles in English PV constructions.[12] Logically, language typology and the type of con-

12 Croatian is certainly not a (proto)typical satellite–framed language. It actually exhibits both lexical and satellital strategy in expressing the core schema (see Geld, 2009 and Geld and Maldonado, 2011). Typologically, there are two basic language groups in terms of how the conceptual structure is mapped onto syntactic structure: a) verb framed languages, and b) satellite framed languages (Talmy, 2000a: 221). Broadly speaking, the basic difference lies in whether the core schema is expressed by the main verb or by the satellite. The satellite can be either a bound affix or a free word. Thus, its category includes a variety of grammatical forms: English verb particles, German separable and inseparable verb prefixes, Russian verb prefixes, Chinese verb complements, etc. Verb–framed languages map the core schema into the verb and the verb is called a framing verb. Satellite–framed languages map the core schema onto the satellite (*ibid*.: 222).

structions found in L1 affect the nature and choice of cognitive strategies in L2, as shown on the left side of the model. Furthermore, all this is dependent on what we might very broadly call experience of the world, or, less broadly, the learning environment. This is where embodiment and immediate interaction with the world come into play, and this is where we situate the factors pertaining to the extraordinary experience of the blind – their haptic exploration of the world, the nature of their mental representation of space and spatial memory, and, hence, specific reliance on the topological elements in the process of linguistic meaning construal. Finally, we should not forget the issue of language proficiency. As already established, language proficiency affects various aspects of meaning construal, including the construal of components in composite wholes (Geld, 2009, 2011, Geld and Letica Krevelj, 2011). On the other hand, it is reasonable to assume that the blinds' enhanced speech comprehension, which is believed to be related to enhanced perceptual processing skills (Röder et al., 2003, Röder and Rösler, 2004: 731), has a positive effect on their listening skills in L2, and, ultimately, on various other processes involved in language development and language learning, such as cognitive learning strategies. Finally, the issue of language proficiency is also related to the fact that language itself is an important source of information for the blind – both linguistic and metalinguistic information as well as general information about the world are obtained via language. As proposed earlier, this may largely affect the processes involved in constructing linguistic meaning. With all this in mind we wish to propose a new model (see Figure 6). The model represents a somewhat generalized version of the previously proposed model. However, it emphasizes the importance of a broadly–conceived nature of input consisting of the following: a) linguistic input, b) metalinguistic input, and c) contextual and sensory input. The linguistic input is characterized by the users' analysis of its distributional characteristics. This process leads to the emergence of structural regularities, as proposed by constructivists who share a usage–based perspective on language. In other words, linguistic units are seen as being abstracted from usage–events. These units range from specific to schematic – from concrete lexical items to schematic grammatical rules. Coupled with metalinguistic information, the analysis of this input forms a firm foundation for the emergence of those aspects of meaning that are not available via sensory input. This is very much in accordance with the proposal made by Landau and Gleitman (1985) for the acquisition of L1. They analyzed the spatial contexts of occurrence of the above mentioned perceptual verbs and found that these contexts alone could not explain how Kelli learned the meaning of verbs. They concluded that the verbs in question occurred in specific syntactic frames that offer invaluable information about their meanings (1985: 119).

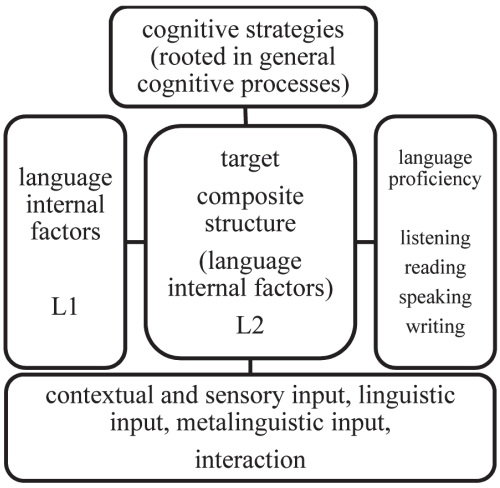

Figure 6. Factors affecting strategic meaning construal in the blind

From the cognitive linguistic perspective, this is a very significant conclusion. Both lexicon and grammar are meaningful and form a continuum. Thus, the conceptual structure coded by grammar, and used to describe particular aspects of a particular context, is bound to be informative about the nature of lexicon as well.

At this point we need to re–emphasize the view that meaning is subjective and dynamic, and that it is equated with mental imagery[13] (cf. e.g. Lakoff, 1987, Langacker, 1987, Talmy, 2000a, 2000b) and attempt to answer the question stated at the beginning of this paper: is the language of the blind different from the language of the sighted, and how can we investigate possible differences? We believe that, in terms of its communicative potential, the language of the blind is as informative as the language of the sighted. Just like the sighted, they acquire language and construct linguistic meaning by a lifelong analysis of various aspects of input. Naturally, the salience of particular aspects of that input varies, but we propose that this variation is certainly not a cognitive phenomenon found exclusively in the blind population. The fact that some people can run very fast, or endure extremely low temperatures, or sky dive for fun, or have very high voices is something that affects their perception of the world, and hence the language they use. What we propose is a research paradigm that allows us to focus on processes that can be identified as aspects of meaning construal in order to find evidence that their extraordinary interaction with the world is bound to be reflected in the language they use. The triad consisting of experience and sensory input, general cognitive processes that act upon the experience and communicate with language, and the language itself is the basis for considering various aspects of mental ima-

13 We see the psychological notion of imagery as equivalent to the cognitive linguistic notion of imagery (i.e. construal; for a similar point see Tabakowska, 1993: 21–32).

gery and, hence, linguistic meaning construal. This was our starting point in the first studies that examined two fundamental processes – salience and situatedness, and this is what led us to narrow our focus on the salience of spatial elements in the construal of particular language constructions in L2. Naturally, our final step was to return to the investigation of L1 with the attempt to confirm that the salience of space is not an aspect of construal salient only in the language of blind L2 users. In other words, if space truly plays an important role in mental imagery and meaning construal in the blind, this is likely to show in the users of English as L1. The study examining this particular assumption is presented in the section that follows.

3.3 Salience of space in English as L1

As already proposed, the aim of this study was to confirm the importance of spatial elements in the process of meaning construal in English as L1. In order to obtain comparable results we used the same instrument and subjects with personal and educational profiles as similar as possible to those we had established for the group of Croatian users of English (see previous section). Thus, we recruited 20 speakers of English as L1 in a specialized educational institution in the US[14]. The sample consisted of 13 congenitally blind and 7 adventitiously blind students[15]. The youngest subject was 14 and the oldest 18 years old (M=15.55). The central research question was whether there would be any significant differences in the salience of topological elements in the native speakers' construal of PV constructions. Naturally, we were also interested in the frequency of lexical determination and compositionality[16]. The subjects were given a list of the 12 particle verbs and asked to make sense of their meanings. As expected, the first reaction of our subjects was the state of total confusion. Native speakers tend to take their language for granted and they are not likely to spend time analyzing the constructions they are using. In addition, learning foreign languages is not one of the priorities in the American educational system. Thus, language learning strategies are likely to be less active in American high school students than in their Croatian peers. In other words, general cognitive processes that are activated in the form of strategies learners use while analyzing the language (at various levels of consciousness) probably need more time to get activated. However, after the initial

14 The study conducted was part of the author's Fulbright project carried out with the support of the Cognitive Science Department at Case Western Reserve University, Cleveland, Ohio. I am ever so thankful to Professor Mark Turner for his invaluable professional and personal support at various stages of the project. I am also thankful to Austin Bennett for his unselfishness and disposition to help. The subjects in the study were students attending the Ohio State School for the Blind in Columbus. My sincerest gratitude goes to each of them personally as well as their English teacher, who made sure that hours and days of our joint effort went smoothly and joyfully, and their school principal whose approval and genuine interest in the project made it all possible.

15 Blindness is frequently coupled with a variety of other disorders. The investigators in the studies cited and described in this paper made sure that the subjects selected for their studies did not have any additional disorders.

16 See footnote 3.

stage of being somewhat at a loss, the subjects began to feel less apprehensive about their task and they were ready to answer the questions they were asked. Their answers were analyzed, coded and statistically processed. The codes used were the following: top – for the answers where topology overrides lexical determination, lex – for the answers where lexical determination overrides the meaning of the particle, and comp – for those answers where both parts of the PV construction are mentioned and explained.

First we wished to see whether reliance on topology would be their primary strategy in constructing meaning, and then we proceeded to compare the answers obtained with those obtained in the study with the Croatian users of English.

A repeated measures ANOVA test was conducted and the results showed that there is a statistically significant difference between the means of the three types of answers: topological determination, lexical determination and compositionality ($F(1.43) = 3.79$; $p=.049$; $\eta^2=.166$). The significant difference is due to the difference between the answers implying topology and those implying lexical determination ($p<.05$) (see Figure 7). More specifically, the answers implying topological determination, i.e. the salience of spatial elements, were found to be significantly more frequent than those implying lexical determination. The occurrence of answers implying cognitively motivated compositionality did not differ significantly from neither of the above mentioned answers. These results point to the fact that topological elements are likely to play an important role in meaning construction in blind users of English as L1.

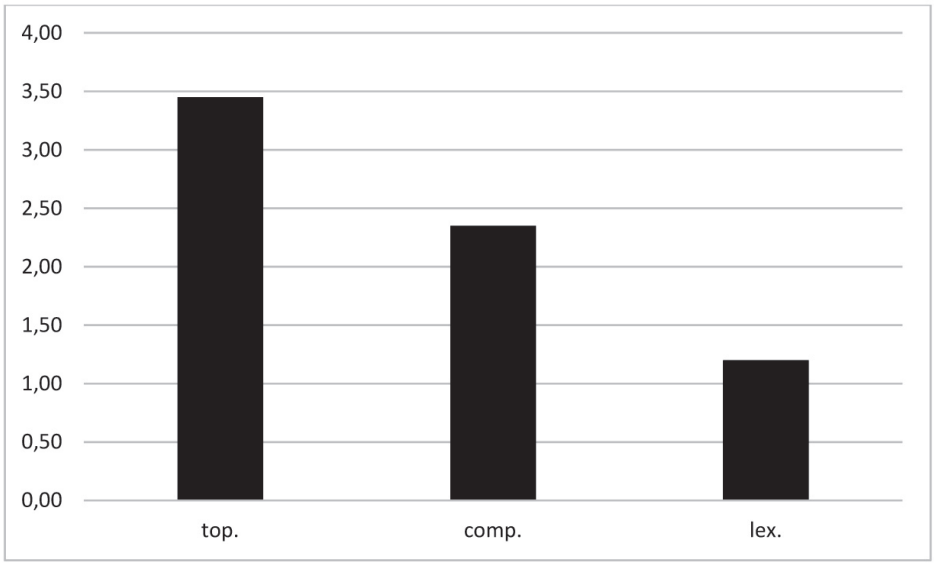

Figure 7. Semantic determination of PVs in blind users of English as L1

Our next step was to find out if there are any significant differences between the native speakers' answers from this study and the answers obtained by their non–native counterparts, i.e. Croatian users of English from the study described in the previous section. In order to establish possible differences we conducted a repeated measures ANOVA test with a between–subjects effect of L1.

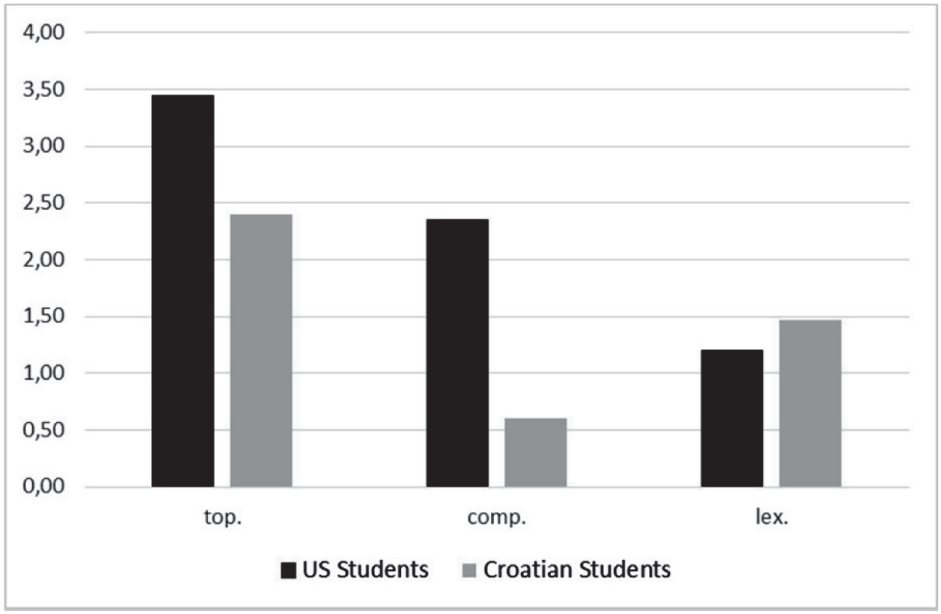

Figure 8. Differences in the frequency of semantic determination: Americans vs. Croats

There is a statistically significant difference in the whole sample between the means of the three types on answers analyzed: topological determination, lexical determination, and compositionality ($F(1.69) = 11.03$; $p=.000$; $\eta^2=.187$). The difference is due to a higher number of answers implying topology ($M=2.82$) in comparison to the answers implying lexical determination ($M=1.36$) and compositionality ($M=1.30$) ($p<.05$). The interaction effect pertaining to the types of determination and L1 is significant ($F(1.69) = 3.73$; $p=.035$; $\eta^2=.072$). However, contrary to the main effect showing that topological answers outnumber both lexical and compositional answers, the results related to the differences between the Croats and the Americans demonstrate the following: there is no statistically significant difference in the number of topological answers ($t(29.31) = 1.65$; $p=.110$), and there is no statistically significant difference in the number of lexical answers ($t(48) = –.75$; $p=.456$). The only significant difference is between the answers implying compositionality ($t(48) = 2.42$; $p=.025$) – the Americans tend to give more such answers. See Figure 8.

The fact that there are no significant differences in the salience of topological elements in the process of meaning construal between blind American users of English as L1 and their Croatian counterparts suggests that spatial elements might truly play an important role in mental imagery and thus linguistic meaning construal in the blind. In other words, the findings of this study suggest that the tendency to attend to topological elements in PV constructions is not a strategy found exclusively in the process of meaning construal typical for L2 users of English. As for the significant difference in the number of occurrences of compositional determination in native users of English, it is reasonable to assume that attending to both components in the composite wholes represents a kind of default strategy for native users of English. More specifically, when facing the task of analyzing the meaning of complex structures such as PVs in their own language, native speakers may find it commonsensical to assign meaning to both components.

Conclusion

As suggested at the beginning of this paper, linguistic meaning is dynamic and subjective. However, accepting its changing and susceptible nature is the first step towards a meaningful investigation of language and thought. Accordingly, rather than offering final and incontestable results, the aim of this work was to raise new questions and prompt further research on the relationship between language and thought, as well as the nature of their dependence on human interaction with the environment. Furthermore, the studies outlined in this work may serve as a starting point for developing new methodologies that may elucidate the role of a variety of factors affecting the process of meaning construal.

The findings of the studies and the model proposed suggest that our knowledge of language, be it first or second, is both deeply rooted in our experience as well as tremendously informative about our conception of the world. The exploratory studies confirmed the complexity of the blinds' mental imagery and showed that both salience and situatedness are legitimate starting points for investigating the language of the blind. The two studies that followed explored the salience of topological elements in English particle–verb constructions and confirmed the starting assumption that spatial elements are likely to play a significant role in the blinds' mental imagery and meaning construal. Finally, the author proposes a model integrating a variety of language internal and external factors that need to be considered in a meaningful investigation of meaning. It emphasizes the importance of a broadly–conceived nature of input: linguistic, metalinguistic, contextual, and sensory. The linguistic input is characterized by the users' analysis of its distributional characteristics. Coupled with metalinguistic information, the analysis of this input forms a firm foundation for the emergence of those aspects of meaning that are not available via sensory input. Finally, being subjective and dynamic, and equated with mental imagery, the linguistic meaning constructed by the blind

is certainly different from the meaning constructed by the sighted. However, it is important to bear in mind that the differences we are likely to establish should not be interpreted as deficiencies. Rather, they should be treated as a meaningful product that may serve as an important insight into the intricacies of our mind.

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Istraživanje konstruiranja značenja u jeziku slijepih: kognitivnolingvistička perspektiva

Rad se bavi istraživanjem konstruiranja značenja u jeziku slijepih. Raspravlja se o ključnim pitanjima u ovom prilično neistračenom području i predlažu istraživačke smjernice na temelju opisa četiriju studija koje je autorica sa suradnicima provela u razdoblju od 2006. do 2013. godine. Središnja se rasprava temelji na osnovnoj kognitivnolingvističkoj pretpostavci da je jezik iskustvena pojavnost koja je nerazdvojiva od općih kognitivnih procesa. Autorica se bavi ulogom istaknutosti odnosno pažnje i nastoji pokazati kako je navedeni proces kodiran u jeziku. Glavni dio rada započinje opisom studija kojima je cilj bio utvrditi moguće razlike u kodiranju pažnje u jeziku slijepih. Raspravlja se o rezultatima i doprinosu navedenih studija za formuliranje novih, preciznijih hipoteza za studiju čiji opis također slijedi u radu. Temeljno istraživačko pitanje nove studije vezano je uz istaknutost prostornih elemenata u jeziku slijepih. Nakon rasprave o dobivenim rezultatima koji potvrđuju važnost navedenih elemenata, autorica predlaže model koji integrira unutarjezične i izvanjezične čimbenike za koje vjeruje da utječu na konstruiranje značenja kod slijepe populacije. Rad završava opisom četvrte studije kojoj je cilj bio revalidirati instrument upotrijebljen u prijašnjim studijama te potvrditi prethodne rezultate vezane uz prostorne (topološke) jezične elemente. Cilj je postignut i opisan u radu.

Ključne riječi: slijepi, kognitivna lingvistika, konstruiranje značenja, istaknutost, prostor, topologija

Key words: the blind, cognitive linguistics, meaning construal, salience, space, topology