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# Topologically biased construal in offline processing: the case of *up* and *down* in the language of the blind

The aim of this paper is to investigate the role of the particles *up* and *down* in the strategic meaning construal of particle verbs (PVs) in blind and sighted users of English as L2. The paper is situated within the cognitive linguistic framework. Based on the results of a speaker–judgment study with 20 blind and 20 sighted users of English, we show that PVs with *down* are more informative to all the participants, and that blind users rely on the particles (particularly the particle *up*) more than sighted users. We claim that the difference in informativeness is related to the experiential status of *up* and *down*. *Down* is more informative because it is at human scale, which limits its metaphorization potential. *Up* is more open–ended, making it more schematic and allowing greater departure from its original topology. Blind users rely on the particles more because they are more inclined to analyzing linguistic cues, since they often serve as additional experiential input. Moreover, the blind rely more on egocentric topology, which produces similar results for *down*, and different for *up*.

## 1. Introduction

Users of English as a second language use strategic construal (Geld 2009) to make sense of complex constructions such as particle verbs (PVs), where constructional meaning may go over and above the meaning of the constituent parts (e.g. Langacker 1987). For instance, when making sense of *go down* 'be sent to prison' a participant in our study reports that it makes sense because the person going down is "moving, descending towards the bottom, because prison is the bottom". This shows that the participant in question is aware of motivation – i.e. reliance on the meaning of constituent parts to understand the whole (because he mentions both movement and the particle *down*), as well as of "additional meaning" that goes over and above the constituent parts,

as seen in his explanation that prison is down (which is, incidentally, based on the axiology of the UP–DOWN schema).

Studies investigating the role of particles in the strategic construal of English PVs by Croatian and Spanish L2 users of English suggest that topological determination, i.e. reliance on the particle in explicating the meaning, is prevalent with PVs containing light, schematic verbs, as in *take in* 'make a piece of clothing narrower or tighter' or *put in* 'officially make a claim for something' (Geld 2011). Moreover, topological determination is significantly more frequent in the meanings constructed by users of English whose L1 is a satellite–framed language[1] or shows such tendencies (Geld 2011; Geld and Letica Krevelj 2011; Geld and Maldonado 2011). In other words, previous studies have provided considerable evidence that the strategic construal of composite wholes such as PVs depends on a number of language internal factors (including metalinguistic awareness).

However, qualitative analyses within the same studies have shown that meaning construal also depends on language external factors, such as cognitive strategies in processing idiomatic language and various aspects of experience. Focusing on experiential differences, topology is of particular importance because it is based on embodied and situated schemas. This allows users of language to use their topological knowledge to different degrees of abstraction. For instance, they may construe the meaning of *put out* 'to injure your back, shoulder or hip' as concrete and topological if their experience or knowledge of the injury is "richer" (a bone getting *out* of its place), whereas they may resort to more abstract strategies (*out* referring to outside the normal state) if this is not the case (Geld and Maldonado 2011: 104).

What additionally complicates the picture is that not all PVs are created equal as far as topology is concerned. As mentioned above, previous studies have shown that in PVs with light, more schematic verbs, topology will be more important than with heavy, more specific verbs.[2] However, regardless of the schematicity of the verb, in the *in–out* pair of particles, the first member of the pair was found to be less informative (Geld 2009: 144; Geld and Mal-

1 Satellite–framed languages, as defined by Talmy (2000b: 221–223), are languages where the core conceptual schema is largely captured by a satellite (an affix or a free word that is "in a sister relation to the verb root" (Talmy 2000b: 222), such as verb particles, prefixes, etc.). For instance, to use Talmy's (Talmy 2000b: 223) example, in a sentence such as *The bottle floated out*, the core schema – the path in this instance – is expressed by the satellite *out*. As opposed to that, in verb–framed languages, the core schema is normally expressed by the verb, as in Spanish *La botella salió flotando* 'The bottle exited floating', where the path is expressed by the verb *salir* 'to exit'. Note that this division should be seen as a tendency. English is a satellite–framed language, and Croatian, although generally satellite–framed, also exhibits some verb–framed characteristics (Geld 2009: 15).

2 We take a rather broad definition of light and heavy verbs, whereby we define light verbs as verbs which tend to be highly schematic in meaning, high–frequency, and particularly open to grammaticalized and idiomatic uses. We contrast this with heavy verbs, which have a more transparent and specific meaning (cf. Geld 2009: 15, and literature cited therein). The distinction is by no means absolute; what is crucial for the claims made here is that out of the verbs treated, some are recognized as more schematic, i.e. light, whereas others are recognized as more specific, i.e. heavy.

donado 2011) for L2 users of English. This was evident from the number and types of strategic construal established for the particles in question.

Therefore, one possible avenue of research as to the role of topology is to look into possible differences in the construal of PVs in a population with a somewhat extraordinary experience of the world – the blind. The blind experience certain limitations in their exploration of space because they lack visual input. However, as stressed by Geld and Čutić (2014: 17–18), the specific nature of their 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, which cannot go unnoticed in language. 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). Thus, it is reasonable to assume that linguistic meaning construal of the blind might show a certain bias towards topological elements in composite wholes. Moreover, given that the blind exhibit enhanced speech comprehension (Röder et al. 2003; Röder and Rösler 2004: 731) and are more prone to being analytical when it comes to language (Geld and Čutić 2014), their insight should be helpful in resolving the informativeness–of–the–particle issue.

The aim of this paper is to investigate the role of the particles *up* and *down* in the strategic meaning construal in blind and sighted users of English. More specifically, we will study to what extent blind and sighted users of English as a second language whose mother tongue is Croatian rely on particles in offline processing of English PVs. We will show that PVs with *down* are more informative to all the participants, and that there will be clearly more topological determination for blind users as opposed to sighted users regardless of the particle. Based on our results, we claim that the informativeness of the particle is related to its experiential status in relation to topology: the more informative particle will be the one with less potential for varied metaphorization. Moreover, we claim that a bias towards topology (more clearly visible in the blind) will be the experiential factor driving easier analysis of the PVs.

## 2. Theoretical background

In this section we discuss two sets of issues: the role of space in construal and strategic construal in particular relation to PVs, and the significance of space in the language of the blind.

### *2.1. Situatedness, space and strategic construal*

The factors that enable us to model our knowledge of the language and its relation to experience are commonly referred to as conceptual motivation or grounding (Lakoff and Johnson 1999), grounded cognition (Barsalou 2008) and situatedness (cf. e.g. Frank 2008). With some differences between the different authors, in essence this construct refers to the fact that certain

types of conceptual structures can be understood directly based on our situated experience, and they, in turn, serve as the basis for the understanding of other, more complex, structures. One of such basic domains is the domain of space which is evident in language in a variety of ways and has been of central importance for linguists for decades (see e.g. Fillmore 1968; Brugman 1981; Langacker 1982; Talmy 1982; Talmy 1983; Vandeloise 1984; Langacker 1987; Choi and Bowerman 1991; Vandeloise 1991; Vandeloise 1994; Talmy 2000a; Talmy 2000b; Hickmann and Robert 2006; Tenbrink 2007). One of the most commonly discussed spatially–based phenomena in cognitive linguistics are prepositions (e.g. Brugman 1981; Lindner 1981; Boers 1996; Tabakowska 2003) and spatial particles (Lindner 1981; Talmy 2000a; Cappelle 2002). Thus, a particle such as *in* makes sense because it is grounded in our everyday experience of containment and containers, as shown in many studies (Herskovits 1982; Hallan 2001; Tomasello 1987). When using our situated experience, we can schematize it (Talmy 2000a: 47–68), focusing on only those aspects that are significant at a given moment, and thus creating analog patterns referred to as image schemas (Johnson 1987). For instance, the particle *down* refers to our basic situated experience, which is based on our position in space (think of climbing trees or hills, or going down canyons) as well as our basic orientation (humans are vertically oriented, with the head clearly being up, and our feet down; we are not made for upside–down functioning, and we feel physical consequences of it, such as a feeling of pressure in our head; cf. Boers (1996: 78–96) for some additional examples). This asymmetry gives rise to the UP–DOWN image schema (Johnson 1987).

The spatial domain may be extended in a variety of ways to obtain non–spatial meanings, which are still grounded in our basic experience. This is what happens with a variety of metaphorical and metonymic extensions. For example, when we cannot ourselves maintain the default vertical orientation – i.e. when we are *down* – this may reflect that we are unwell, and hence cannot control our own movements ourselves. Similarly, being on upper ground or above someone (e.g. when fighting with them) gives you more control over them. This, and a number of other situated connections with space (for some examples see Boers 1996: 78–96), enables the UP–DOWN image schema to be metaphorically extended to the GOOD IS UP and BAD IS DOWN, as well as CONTROL IS UP and LACK OF CONTROL IS DOWN metaphors (Lakoff and Johnson 2003). This (along with some other knowledge) motivates the meaning of PVs *go down* 'be sent to prison' (here, *down* reflects something bad, but is also connected to social hierarchies) or *put down* 'criticize somebody and make them feel stupid' (BAD IS DOWN, plus intellectual control and superiority over someone).

Using motivation in second language learning may be a way to reduce the apparent arbitrariness of the system of the second language (Taylor 2008: 57). Thus, we can use the shared aspects of our situated experience in explaining to L2 users how language works. Moreover, L2 users should in principle be able to use their basic experience – such as their experience of space – to understand foreign language structures. In other words, they can construe lan-

guage using their cognitive strategies, i.e. they can rely on strategic construal (Geld 2009; Geld and Letica Krevelj 2011; Geld and Maldonado 2011).

The model of strategic construal as proposed by Geld (2014: 51) stresses the importance of a broadly–conceived nature of input – it comprises the following triad: a) experience and sensory input, b) general cognitive processes that act upon the experience and communicate with language, and c) the language itself. Language is an experiential phenomenon and it is intimately related to other cognitive processes, such as, e.g. attention, comparison, perspective, and gestalt (see Croft and Wood 2000; Croft and Cruse 2004). In broader terms, the emergence of complex language representations results from "simple learning mechanisms operating in and across human systems of perception, motor action and cognition while exposed to language data in communicatively rich human social environment" (Ellis 2003: 63).[3] Furthermore, meaning construal is dynamic and subjective (cf. Langacker 1987; Langacker 1991; Langacker 2000 and elsewhere), and construal operations (such as metonymy, metaphor, fictive motion, categorization, deixis, etc.) are viewed as instances of abovementioned general cognitive processes as aspects of conceptual structure. Finally, strategic meaning construal (cognitive learning strategies activated in the process of L2 meaning construction) inevitably depends on whatever precedes. Being entangled with L1 and experiential knowledge of the world, L2 both relies on and mirrors various cognitive processes that constitute conceptual structure in L1. Second language learners are somewhat burdened (MacWhinney 2001; MacWhinney 2006) with prior linguistic knowledge as well as experience. How they make sense of a new language system is shaped by their interaction with the environment as well as linguistic knowledge.

In sum, L2 learners' knowledge and experience may serve as a constraint as well as affordance[4] in the process of L2 development, processing and meaning construal. If we narrow down the factor of language to a specific construction, the meaning of the construction may go over and above the meaning of its constituent parts (Langacker 1987). The model in Figure 2 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 should [A] and [B] be taken as unmodified in (C), and both components play a significant role in the process of meaning construction. Two aspects of the components of the composite structure are singled out as important: a) their degree of schematicity, and b) their degree of informativeness. As already mentioned above, the degree of schematicity refers to light and heavy verbs, whereas the degree of informativeness refers to the degree to which users of English as L2 rely

3 This view is shared by various constructivists, for example connectionists (Plunkett 1998; Christiansen and Chater 1999; Christiansen and Chater 2001), functional linguists (Bates and MacWhinney 1982), emergentists (Elman et al. 1996), cognitive linguists (Lakoff 1987; Langacker 1987; Croft and Cruse 2004), child language researchers (Tomasello 1992; Tomasello 1995) and many others.

4 See e.g. Singleton and Aronin (2007), Aronin and Singleton (2010) and Dewaele (2010) for studies of affordances in the context of multilingualism.

on the particle in strategic construal. Irrespective of their inclination to view language either as an arbitrary or as a cognitively motivated system, all learners process language by attending to both meaning and form. Their attention is constant but it varies quantitatively and qualitatively. This line of thought is in accordance with theoretical constructs such as Langacker's analysability (Langacker 1987; Langacker 2000) as well as L2 studies on the nature of implicit vs. explicit knowledge, and their relation to consciousness (Hulstijn 1989; Schmidt 1990; Schmidt 1994a; Schmidt 1994b; Schmidt 2001; Doughty 2001). As suggested by Schmidt (1990), the explicit/implicit contrast represents a continuum and there is no learning without noticing. Learners both consciously and unconsciously attend to various aspects of language and pass judgements that result in constant restructuring of their knowledge. Thus, if we wish to investigate the process of strategic meaning construal, it seems legitimate to do so by shifting our learners' attention to form and asking questions about meaning. It is reasonable to assume that their strategic reasoning will involve subtle judgements about how informative and specific (vs. schematic) certain linguistic units are and what seems to be their semantic contribution.

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. Logically, language typology and the type of constructions found in L1 affect the nature and choice of cognitive strategies in L2, as shown on the left side of the model. Furthermore, language proficiency affects various aspects of meaning construal, including the construal of components in composite wholes (Geld 2009; Geld 2011; Geld and Letica Krevelj 2011). Finally, all this is dependent on what we broadly call experience of the world, or, less broadly, the learning environment, which includes embodiment as well as immediate interaction with the world.

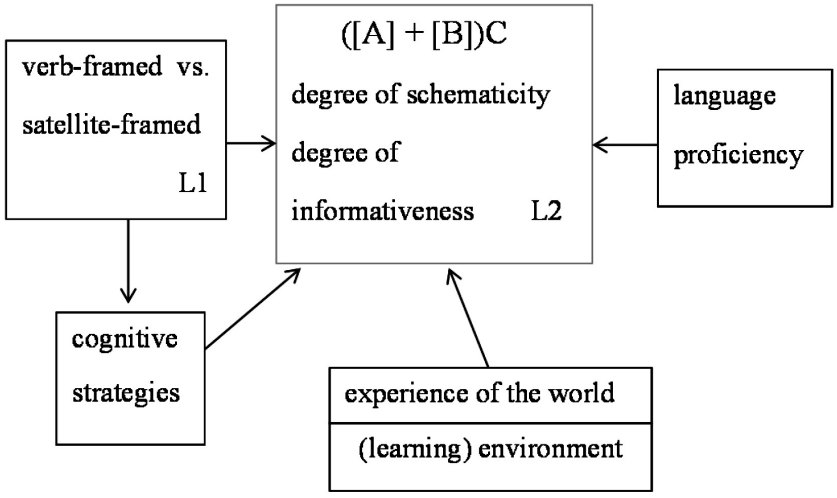


*Figure 1. Factors affecting the strategic construal of particles in PV constructions (based on Geld and Letica Krevelj 2011: 164)*

### *2.2. The blind and their haptic exploration of the world*

The last part of the model – experience of the world – 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, their specific reliance on the topological elements in the process of linguistic meaning construal (see Geld 2014).

The blind individuals' reliance on space, that is topological components in their meaning construal of PVs, may seem counterintuitive. They lack what we might consider an omnipotent sense in terms of its empowering nature – the sense that enables human beings to grasp their immediate and less immediate environment and move around freely, the sense that allows for phenomena such as joint attention, fine–grained aspects of perspective, or remarkable speed in creating and understanding gestalts.

However, what makes the blind individuals' experience unique and what sets them apart from the sighted is their constant engagement in making sense of their environment. In investigating the blind children's concept on how people see, Bigelow (1988) observed two congenitally blind brothers who were asked to show various objects (portable, nonportable, sound–producing, non–sound–producing, etc.) to each other and sighted individuals they know well. The distance was approximately 12 feet away. In the case of portable objects, both children walked to their brother and allowed them to feel the objects. Even with sound–producing objects, they were satisfied only after the brother had felt the object. When communicating with sighted individuals, both children walked to them and positioned themselves within 5 feet of the person. Sometimes the person was encouraged to feel the object and sometimes they simply held it and sounded to them. With nonportable objects, the two children had different strategies that were believed to depend on their age and cognitive maturity. For example, the younger child sometimes said that the person could not see the object unless he/she approached him, sometimes he patted the object and said "look", etc. The older child consistently responded that the sighted person could not actually see the object unless he/she came closer. These and similar results from other studies illustrate the complexities pertaining to specific points on a developmental continuum of perspective taking skills.

Blind children, especially totally blind children, show difficulties with the so–called Euclidean tasks (Bigelow 1996). Contrary to sighted and visually impaired children, they make a lot of route mistakes – they show difficulties in distinguishing between the travel distances to familiar locations and the straight–line distances to the same locations. Bigelow stresses that such errors suggest that blind children's spatial knowledge is based on their travel between places rather than on an understanding of relative positions of these locations. In more general terms, their knowledge is based on a more immediate interaction with objects, specific landmarks and locations they encounter while moving around both familiar and unfamiliar surroundings, often dubbed egocentric organization (Thinus–Blanc and Gaunet 1997)

Physical contact has been reported as a dominant strategy in locating objects from a very young age. Blind infants' understanding of space is initially body–centered (Fraiberg 1977). For example, even after sound begins to direct blind infants' reaches, if the direction of the sound does not overlap with the location of prior tactile contact, a blind infant will always reach towards the area where he/she lost physical contact with the object rather than toward the sound. In addition to difficulties in searching for objects, the blind children's early development is also marked by challenges in perceiving what others are attending to, both in terms of physical contact as well as emotional reactions. They need to make an extra effort in detecting the spatial relations among self, other, and objects as well as the focus of others' attention (Bigelow 2003; Bigelow 2005). Hence, development of joint attention is delayed as well as certain emotional reactions.

Overall, blind individuals make a great deal of effort and some sort of cognitive maneuvering in order to accomplish various space–related tasks that the sighted master with ease, developing a variety of compensatory mechanisms, or a supramodal brain organization (Cattaneo et al. 2008: 1353–1356). The compensatory mechanisms also relate to their enhanced metalinguistic awareness as a way to achieve information about external reality (Geld and Čutić 2014). Hence, what we wish to suggest is that it is this cognitive maneuvering that is responsible for space taking a priority seat in their mental set–up. In other words, their constant interaction and engagement in understanding and storing spatial relations makes this cognitive domain salient for the blind. This is in line with brain studies investigating differences in hippocampal volume that may reflect adaptive responses to sensory deprivation as well as increased functional demands on memory systems (Chebat et al. 2007; Leporé et al. 2009; Fortin et al. 2008). For example, in their study on navigational skills during route learning, Fortin et al. (2008: 3003) showed that blind individuals are better at learning complex paths within a maze compared to blindfolded sighted subjects. It is important to add that the superior abilities of the blind became more evident as task difficulty increased, which is, according to the authors, probably more representative of real life situations. In other words, we claim that it is precisely because of the fact that space may present a challenge to the blind as well as the fact that they obtain a multitude of information about the world through language, that the blind tend to focus on spatial elements in language.

In brief, in this paper we focus on the interaction between the experience of the world and the informativeness of the particles *up* and *down* in the strategic construal of PVs. Given the situatedness of our knowledge of the particle in the experience of space, we explore to what extent differences in spatial experience influence strategic construal and the informativeness of the topological element. To investigate these differences, we focus on the spatial experience of blind individuals.

## 3. Methods

To explore the informativeness of the particles and topological determination in strategic construal, we used a questionnaire which consisted of 12 PVs. The PVs combine a heavy or light lexical verb with the particle *up* or *down* to make a highly idiomatic meaning, such as *take out* 'kill' or *cut up* 'suddenly drive in front of another vehicle in a dangerous way'. The participants were asked to make sense of the meanings of the PVs (which were provided to them) by relating the PV construction with its meaning. More specifically, they were asked to note for each PV what it is in the construction that produces the meaning given for the expression in question.

This questionnaire is a reduced version of the instrument containing 45 meanings of 20 PVs, which was constructed and validated as part of another study (Geld 2009). All the meanings of the 20 PVs (96 in total) were collected from three learners' phrasal verbs dictionaries (Spears 1996; McIntosh 2006; *Cambridge Phrasal Verbs Dictionary* 2006), and rated for figurativeness by 2 linguists, 5 native speakers and 40 proficient learners of English. Only those meanings that were rated as highly figurative were included in the larger study. In the reduced version used here, we included only those 12 PVs (6 combining a heavy lexical part and *up*/*down* and 6 combining a light lexical part and *up*/*down*) that were rated the highest.[5] This resulted in the following list of PVs used in the study:

a) Heavy lexical part + *up*/*down*
   *break up* – 'end a relationship'
   *break down* – 'stop working'
   *cut up* – 'suddenly drive in front of another vehicle in a dangerous way'
   *cut down* – 'kill somebody'
   *pull up* – 'stop while driving, especially for a short period of time'
   *pull down* – 'destroy a building'
b) Light lexical part + *up*/*down*
   *go up* – 'be destroyed by fire of explosion'
   *go down* – 'be sent to prison'
   *put up* – 'resist strongly or fight hard'
   *put down* – 'criticize somebody and make them feel stupid'
   *take up* – 'fill an amount of space or time'
   *take down* – 'write something'

The participants were blind (N=20) and sighted (N=20) users of English as L2 with similar social backgrounds and educational profiles. Their age range was 16–19, and they had no additional disorders. The blind group consisted of 4 congenitally blind, 12 early blind (onset of blindness before the age of 8), and 4 participants blinded between the ages of 11 and 16.[6] Both groups were

5 We reduced the questionnaire to reduce the time needed to complete it, which was one of the factors mentioned as problematic in the previous studies.

6 Despite the differences in the onset of blindness, we did not look into possible differences between the congenitally blind and early blind on one side, and the late blind on the other. However, it is reasonable to assume that participants blinded later in life might activate meaning construal strategies closer to those activated by their sighted peers.

recruited from vocational secondary schools where English is taught as the so–called first foreign language. Permission for the study was obtained from the school, and each of the participants gave informed consent. All the participants were given a short introduction describing the purpose of the study. Basic demographic data was also collected. Due to obstacles in collecting responses and analyzing the answers written in Braille, the blind participants were interviewed individually. They were given a list of PVs in Braille, and their interviews were individually recorded in an informal classroom atmosphere and later transcribed. Each interview took approximately 20 minutes. The sighted participants filled the questionnaire in writing, during their regular English lessons, and it took them approximately 20 minutes to fill in the questionnaire. All the participants were asked to use either English or Croatian in their answers, to allow them to express themselves as freely as possible.[7]

Students' descriptions were coded by two raters in accordance with the procedure developed by Geld (2009), according to whether they primarily consisted of topological determination (most weight given to the particle), lexical determination (most weight given to the verb), compositional determination (equal importance given to both parts), paraphrase (no explanation of how meaning is produced, but just a paraphrase of the meaning) or no answer (where the student did not provide an answer or said that s/he did not know). Examples (1) – (12) are an illustration of the major categories, with the PVs, their meanings and participants' answers. The parts of the answers in bold (in the first three categories) signal the key elements that guided the raters towards their decision. Note that the answers that were originally in Croatian have been translated into English for the purpose of this paper, keeping the significance and the wording of the original.

Topological determination:

(1) *put up* 'resist strongly or fight hard' – "it is like **up** meaning that your body is straight and firm with **your head up there**"
(2) *break down* 'stop working' – "when something stops working it is **down** – dead **on the ground**"
(3) *pull down* 'destroy' – "what you have destroyed is **down**, on **the lowest level**, close to the ground"

7 We decided to sacrifice formal correspondence of the medium for the study in order to conduct it in conditions that the students find natural. Our sighted participants are used to group written tasks. In contrast, blind and visually impaired students' classes tend to be very small (5–7 students) and students are used to an individualized approach in in–class work. In order to maintain these conditions in the course of our study, and thus avoid constraints and anxiety that might have been caused by group testing conditions, we opted for individual interviews with the blind participants that took approximately the same time as questionnaire completion in the sighted participants. There is evidence that suggests that the blind process verbal stimuli differently than the sighted (Röder, Rösler, and Neville 2000), and that reading Braille (Sadato 2005) involves different processes than reading visual characters. Thus, formal correspondence cannot be maintained already at the level of providing the stimulus for the study.

Lexical determination:

(4) *take up* 'fill an amount of space or time' – "it means that something **takes time** from you, like somebody **took it** and you don't have it anymore"
(5) *cut up* 'suddenly drive in front of another vehicle in a dangerous way'– "**cut** is when you **take a knife** or something else and **cut**, and in the same way you can **cut** somebody's way, like metaphorically"
(6) *break down* 'stop working' – "the thing stops if you take it and **break it**, it **cannot function** anymore because **you broke** a part of it"

Compositionality:

(7) *go up* 'be destroyed by fire of explosion' – "**go** is like **motion**, and **up** means that the explosion **goes up** and everywhere"
(8) *pull down* 'destroy' – "when you wish to destroy a building, for example, you **pull it with some force** and then it ends up **down on the ground,** and it is destroyed"
(9) *take down* 'write something' – "this is like when you **take your notes** or something that you are thinking about and you **put it down** on the paper or you **write it down** on your keyboard **below your fingers**"

Paraphrase

(10) *take up* 'fill an amount of space or time' – "when someone fills up, takes away or takes up your time"
(11) *go down* 'be sent to prison' – "when the police arrests us"
(12) *cut up* 'suddenly drive in front of another vehicle in a dangerous way' –"to me this means when someone suddenly cuts in front of someone else"

## 4. Results

### *4.1. Informativeness of the particle*

For all the verbs in the sample, the participants predominantly used paraphrase, lexical and topological determination (in 79% of the cases), with the remaining descriptions referring to compositional meaning or "don't know" answers (see Figure 2 for details). Descriptions which solely or partially depended on the particle (i.e. topological and compositional determination) accounted for some 35% of the entire sample.

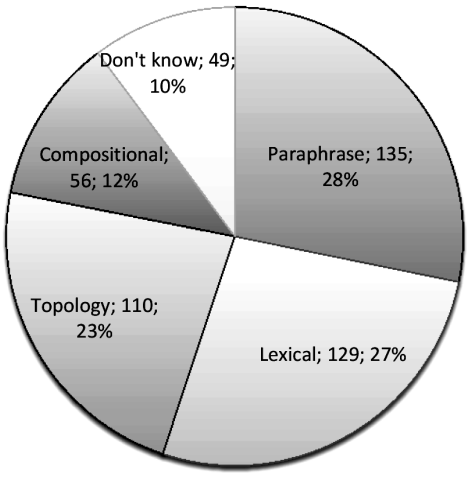


*Figure 2. Types of answers in the entire sample*

The distribution of the type of answers in PVs with *up* and *down* is presented in Table 1.

*Table 1. Observed and expected counts of types of answers in PVs with* up *and* down

| | | Paraphrase | Lexical | Topology | Compositional | I don't know | Row Totals |
|---|---|---|---|---|---|---|---|
| PVs with *up* | observed (expected) [contribution to $\chi 2$] | 77 (67.64) [1.29] | 75 (64.63) [1.66] | 38 (55.11) [5.31] | 17 (28.06) [4.36] | 33 (24.55) [2.91] | 240 |
| PVs with *down* | observed (expected) [contribution to $\chi 2$] | 58 (67.36) [1.30] | 54 (64.3) [1.67] | 72 (54.89) [5.34] | 39 (27.94) [4.38] | 16 (24.45) [2.92] | 239 |
| Column Totals | | 135 | 129 | 110 | 56 | 49 | 479 |

There is a statistically significant difference between PVs with *up* and *down* according to the types of explanation processes used ($\chi 2=31.1406$; $df=4$; $p<0.00001$). The contribution to $\chi 2$ statistic shows that the greatest discrepancy between expected and observed counts appears in topological and compositional answers, which contributed the most to the overall $\chi 2$. Thus,

in PVs with *up* the observed count of topological and compositional answers was lower than expected, whereas it was higher than expected in PVs with *down*. The opposite is true, albeit to a lesser extent, in paraphrase and lexical answers: in PVs with *up* the observed counts are higher than expected, and in PVs with *down* they are lower than expected. The "I don't know" answers are higher than expected in PVs with *up*, and lower than expected in PVs with *down*. Overall, this suggests that the respondents did not find the particle *up* particularly informative, because they focused on the lexical part of the PV or resorted to paraphrase (rather than giving topology–based or compositional responses). As opposed to that, the respondents found it easier to focus on the particle in PVs with *down*, as shown by higher than expected number of answers based on topology and compositionality. The higher–than–expected count of "I don't know" answers in PVs with *up* corroborates their overall difficulty for the respondents.

In order to understand what exactly was more or less informative about the participants' view of the PVs, we took a more detailed look at the participants' compositional and topological explanations of the PVs in the sample. Each of the twelve PVs had at least one topological or compositional explanation by at least one participant (see Table 2).

*Table 2. Topological and compositional determination for the PVs in the sample*

| | PVs | blind | sighted | total |
|---|---|---|---|---|
| PVs with *up* | **go up** 'be destroyed by fire of explosion' | 16 | 9 | **25** |
| | **put up** 'resist strongly or fight hard' | 15 | 5 | **20** |
| | **take up** 'fill an amount of space or time' | 2 | 2 | **4** |
| | **cut up** 'suddenly drive in front of another vehicle in a dangerous way' | 3 | 0 | **3** |
| | **pull up** 'stop while driving, especially for a short period of time' | 1 | 1 | **2** |
| | **break up** 'end a relationship' | 0 | 1 | **1** |
| PVs with *down* | **go down** 'be sent to prison' | 18 | 13 | **31** |
| | **put down** 'criticize somebody and make them feel stupid' | 17 | 12 | **29** |
| | **pull down** 'destroy a building' | 16 | 9 | **25** |
| | **take down** 'write something' | 10 | 2 | **12** |
| | **cut down** 'kill somebody' | 5 | 3 | **8** |
| | **break down** 'stop working' | 2 | 3 | **5** |
| | **Total** | **105** | **60** | **165** |

The results show that two PVs with *up*, *go up* and *put up* were explained by making some reference to the particle by at least half of the participants, whereas the same can be said of three PVs with *down*: *go down*, *put down* and *pull down*. The most frequent verbs explained using compositional and topological explanations may be a result of several factors. One of them is whether the lexical element itself is heavy or light, whereby PVs with light verbs are more likely to be explained topologically or compositionally (cf. Geld 2009). This is the case with the PVs *go up*, *go down*, *put up* and *put down* in our case. Other reasons may include the frequency of the PV, as well as what we might provisionally call transparency of the PV. Unlike Cappelle, Shtyrov, and Pulvermüller (2010), we do not treat metaphorical PVs as opaque, but we take a more dynamic, learner/decoder–oriented view, where the degree of transparency of a figurative expression depends not only on the expression itself but also the characteristics of the learner (cf. Littlemore and Low 2006: 70–85 for a detailed discussion)

Let us now turn to a qualitative analysis of the PVs in question. The most frequently topologically explained verb was *go up* 'be destroyed by fire of explosion', where the participants explain that *up* in the PV makes sense because of the upward movement of things that explode, where some participants reference the stereotypical image of things flying up in explosions as seen in films.

The second most frequent topologically or compositionally explained verb was *put up* 'resist strongly or fight hard'. Participants relate *up* to a person's body posture, standing erect and/or raising one's hands and fists to fight with someone. Some mention that attacking someone with your fist is an upward movement (presumably going for the head), and some mention that the stronger person is positioned higher in relation to the weaker person. Finally, some participants mention one's voice, which is higher (presumably in loudness and pitch)[8] when you fight with someone.

The participants produced only several (four or fewer) explanations for the remaining PVs with *up*. When describing *take up* 'fill an amount of space or time' they mention that more of an activity may be up, that it may fill your time (presumably seen as a container), and that if you plan something it is in your head, which is the upper part of your body. One participant explicitly mentioned that future time (presumably the time that you will have filled the time/space) is seen as up. For *cut up* 'suddenly drive in front of another vehicle in a dangerous way', participants say that *up* means being in front of another car, which probably stems from a reorientation of the horizontal movement as vertical movement. The same reorientation is evident in one of the answers for *pull up* 'stop while driving, especially for a short period of time', where the side of the road is conceptualized as being up by one partici-

8 This explanation was found in the blind group and it might be also related to the direction of the voice. The blind determine various aspects of their environment, especially precise locations, heights, etc. by detecting the source and direction of the sound (a human form of echolocation). There are blind individuals who even use a special technique of clicks and echoes to navigate their surroundings very successfully.

pant. Another participant said that the PV makes sense because the parking brake is *up* when one is stopped. Finally, the PV *break up* 'end a relationship' is explained by a single participant, who mentions that the particles *up* and *down* are usually connected to "radical ways" of dealing with things, which may perhaps be interpreted as explaining the aspectual character of the particle (*up* referring to termination).

The most frequently topologically and/or compositionally explained PV with *down* was *go down* 'be sent to prison'. Most explanations center on *down* making sense because jail is a bad place, which is, therefore, *down*. Participants mention that being sent to prison is like a low point in one's life, a place where you are underneath others, where you sink to the bottom. Some mention that in the hierarchy of society, prison is the lowest point. There are a handful of more clearly physical explanations, which focus on a criminal falling down or being tackled to the ground by the police.

The second most frequent verb with a topological and/or compositional explanation was *put down* 'criticize somebody and make them feel stupid'. The most common way of making sense of *down* was to claim that it causes the other person to be positioned beneath your level, on the ground. In this way they are prevented from feeling lofty and elevated, and their self–esteem is lowered. Another set of explanations focuses on the other person's feelings, and says that after being criticized they feel as if they were on the ground, depressed. The metaphorical connection between down and bad are clearly stated in all of the explanations.

Although the meaning of *pull down* 'destroy a building' seems relatively physical, less than half of participants gave a topological or a compositional explanation of it. Most focused on a building being pulled down to the ground by a piece of machinery, or on giving an image of something smaller (but still tall) being pulled by one's hand, explaining that when you grip something by its top and pull on it, it will fall down. Others mention that when a building is destroyed it will be down, it no longer stands upright like a normal building.

As for *take down* 'write something', most participants reference the fact that the paper you write on (some also mention a computer keyboard) is *down* in relation to you or that it is under your hand (i.e. down); others say that your hand and the paper are both down. Two participants take the image further, explaining that something which is up (in your head, in the air) is transferred onto paper, which is down.

*Cut down* 'kill somebody' is generally connected with a person falling on the ground when they are killed, or someone being tackled down to achieve control over them and then cutting them to kill them. Two participants say that falling down is something bad, showing a more metaphorical strategy.

Finally, *down* in *break down* 'stop working' is generally connected with something bad, no longer functioning. One participant seems to have a relatively physical image of something being on the ground, whereas some others give more abstract explanations, saying that the work that something does is low down or completely non–existent, i.e. on a lower level than expected.

Overall, the qualitative results confirm the quantitative results, and show that the participants find *down* more informative than *up*: not only was the number of answers higher, but also their variety. The question that remains is whether this was consistently so for blind as opposed to sighted users.

### *4.2. The role of topology in blind and sighted users*

Table 2 above showed some raw numbers signaling the difference between blind and sighted users of English in relation to the combined number of topological and compositional answers. In order to check whether there is a significant difference in the types of explanations used by the participants, we summed the number of answers for each particular type for each individual and ran the Mann–Whitney test. The results (see Table 3) show that there is a significant difference ($p<0.001$) between the answers for topological determination and paraphrase, with the blind participants giving significantly more topological answers, and significantly fewer paraphrases. The number of lexically determined answers is also significant ($p=0.033$), whereas there is no difference between the number of compositionally determined answers and the number of "don't know" answers.

*Table 3. Differences between the number of answers for all PVs*

| | Visual impairment | N | Mean Rank | Sum of Ranks | Mann Whitney U | p |
|---|---|---|---|---|---|---|
| Number of topology answers | blind | 20 | 26.50 | 530.00 | 80.000 | 0.001 |
| | sighted | 20 | 14.50 | 290.00 | | |
| | Total | 40 | | | | |
| Number of lexical answers | blind | 20 | 24.35 | 487.00 | 123.000 | 0.033 |
| | sighted | 20 | 16.65 | 333.00 | | |
| | Total | 40 | | | | |
| Number of compositional answers | blind | 20 | 22.85 | 457.00 | 153.000 | 0.187 |
| | sighted | 20 | 18.15 | 363.00 | | |
| | Total | 40 | | | | |
| Number of paraphrase answers | blind | 20 | 12.40 | 248.00 | 38.000 | 0.000 |
| | sighted | 20 | 28.60 | 572.00 | | |
| | Total | 40 | | | | |
| Number of "don't know" answers | blind | 20 | 23.33 | 466.50 | 143.500 | 0.108 |
| | sighted | 20 | 17.68 | 353.50 | | |
| | Total | 40 | | | | |

Focusing in on topology, blind participants consistently provide more topological determination answers with PVs with *up* as well as PVs with *down* (see Table 4). The difference is statistically significant for PVs with *up* (p=0.002) and *down* (p=0.021).

*Table 4. Difference in topological determination in PVs with up and down*

| | Visual impairment | N | Mean Rank | Sum of Ranks | Mann Whitney U | p |
|---|---|---|---|---|---|---|
| Number of topology answers with *up* verbs | blind | 20 | 27.75 | 515.00 | 95.000 | 0.002 |
| | sighted | 20 | 15.25 | 305.00 | | |
| | Total | 40 | | | | |
| Number of topology answers with *down* verbs | blind | 20 | 24.65 | 493.00 | 117.000 | 0.021 |
| | sighted | 20 | 16.35 | 327.00 | | |
| | Total | 40 | | | | |

Overall, these results confirm the initial hypothesis that blind users use topological determination more than sighted users. The hypothesis that blind users will use more topology consistently regardless of the particle was also confirmed.

## 5. Discussion

### *5.1. Transparency and informativeness*

In this section we put forward the idea that *down* was found more informative than *up* due to a difference in their experiential status, basing the discussion on our results and on additional evidence from a preliminary corpus study.

Participants found some of the PVs used in the study to be more transparent in combination with *down* than with *up*. For instance, in *pull down* 'destroy a building', the resulting state is fairly physical: the building is no longer erect, i.e. it is down, which is indeed what many participants recognized. As opposed to that, with *pull up* 'stop while driving, especially for a short period of time' there is no easy or obvious way to connect pulling (in its transitive physical sense) with *up* and with the meaning of stopping a car. The same is true of *break up* 'end a relationship', *cut up* 'suddenly drive in front of another vehicle in a dangerous way' and *take up* 'fill an amount of space or time', neither of which seems to be conducive to an analysis based on the meaning of *up*. In contrast, up–down orientation may be evoked in a meaningful way in most of the PVs with *down*, either in terms of physical orientation (cf. the participants' descriptions for *cut down*, *pull down*, *take down*), or in a more figurative way (*break down*, *put down*). The question that remains is: to what

extent is this a characteristic of only those PVs used in the study, and would this be true for all PVs with *up*/*down*, making *down* more informative than *up*? A "simple" way of checking this would be to do a study where speaker judgments concerning transparency and opaqueness of a PV with *up* and *down* would be elicited using more or less explicit methods, which is currently under way. In the meantime, however, we provide data on a pilot corpus study, based on which we put forward a discussion of several issues in favor of the latter, more far–reaching view.

A preliminary corpus study in the 13 billion enTenTen corpus (www.sketchengine.co.uk; cf. Kilgarriff et al. 2014) suggests that there is an asymmetry in the frequency of PVs with *up* and with *down*, both in terms of tokens and types.[9] We extracted a random 1000–token sample of a lexical verb followed by either the particle *up* or *down*. In terms of tokens, PVs with *up* accounted for 83% (827 examples) of the sample, whereas PVs with *down* accounted for 17% (173 examples). We also looked for how many different verbs (i.e. types) each particle combines with to make a PV. There were a total of 222 unique verb types which occurred with either *up* or *down*. Out of this, *up* combines with 152 unique verb types (which do not occur with *down*), which accounts for 68% of the total number of types. *Down* combines with 35 unique verbs (which do not occur with *up*), accounting for 16% of types. The remaining 16% of unique types refer to verbs shared by *up* and *down*. Finally, nearly 70% of all verb tokens combined with *down* also appeared with *up* (i.e. they were not unique to *down*), whereas only 24% of verb tokens combined with *up* were also shared with *down* (i.e. not unique to *up*).

This suggests that, given that *down* mostly combines with verbs which will also appear in PVs with *up*, informativeness may be seen as an epiphenomenon, and depends on the verb as part of the PV. However, the difference in tokens suggests that the overall variety of senses for *down* may be smaller. This may indicate that the semantic network of *down* is simply not as diverse as that of *up*; i.e. that *up* and *down* are in an asymmetrical relationship.[10] Such a view is in accordance with what we know about the nature of dimensional antonyms (cf. e.g. Croft and Cruse 2004; Vogel 2004), such as *deep–shallow*, where the supra term (*deep*) is generally more frequent than the sub term, and allows more diverse metaphorization. As opposed to that the sub term (*shallow*) is less frequent, and tends to be metaphorized to a limited extent. It has been put forward that this difference in metaphorization may be due to their experiential status (Stanojević 2015). The term *deep* is conducive to a wide range of metaphorical extensions because our experience of being

9 A token is any instance of a particular word form, whereas a type is any unique word form. Thus, in a sentence such as *There is a cat on the mat*, there are 7 tokens and 6 types (because the determiner *a* appears twice).

10 Using a corpus study to triangulate speaker usage data is a well–established technique in cognitive linguistics. Note that our conclusions presuppose that textual frequency reflects conceptual factors to some extent and may be related to familiarity, but not the claim that prototypical senses are more frequent, which has been shown to be incorrect (cf.e.g. Fulgosi and Tudman Vuković 2001). Also note, however, that we have not used a learner corpus, which would perhaps be more suitable for triangulating purposes.

inside deep containers is multifaceted (we cannot see in deep containers, our voice sound different from deep containers, etc.). Moreover, the scale is such that it is open–ended on one side (i.e. depth does not have a maximum extension), whereas something that is completely shallow is simply nonexistent.

The same argument can be adduced for *up* and *down*. If we consider a canonical anthropocentric perspective (e.g. humans walking) we will consider *up* anything that is higher than our head, and *down* anything that is by our feet (depending on the reference point we take; cf. e.g. Tribushinina 2008; Tribushinina 2011). Note that the scale is open–ended on one side because of our typical anthropocentric experience: what we experience as down tends to be limited to the ground we walk on (or we can reach), and what is up tends to be much more open, often only limited by our technology or imagination (think of the heavens, stars and reaching Mars, etc.). In terms of Turner (2014), what is up may exceed human scale and may need to be reduced to it. For instance, standing in an open expanse, things that are just inches away higher than we can extend our arm as well as things thousands of kilometers away may conceptualized as *up*. As opposed to that, *down* tends to be at human scale. If we think of a person standing in an open expanse, we will think of *down* as next to our feet, and we will be able to reach it very easily. All other possible experience of down seems to be non–canonical and/or requires some additional effort; e.g. canyons are not the canonical surface of the earth, pits need to be dug, and jumping down (e.g. with a parachute or from a tree) requires that we first go up. This conceptual conclusion fits in with the corpus asymmetry (most PVs with *up* are unique, whereas most PVs with *down* are not) and the results of the speaker judgment study (*down* gets more topological explanations). It suggests that regardless of the sample, *down* may indeed be more informative, being more limited, and experientially more clearly related to its topological meaning. Hence, its metaphorization will be more limited as well. In contrast, *up* is more schematic and farther away from its original topology. This conclusion is also in line with studies which showed that, in the *in*/*out* pair of particles, *out* was more informative in a sample of sighted participants (Geld and Maldonado 2011) and blind participants (Geld and Čutić 2014).

### *5.2. The role of topology and informativeness in blind and sighted L2 users*

The questions we address in this section refer to modeling the reasons why topology figures as more important in the strategic construal of the blind, and the extent to which the notion of informativeness of the particle influences this construal. We argue for a view where several factors work hand in hand: proneness to language analysis, proficiency and the experiential status of the particle.

The results show significant differences between the blind and sighted participants with regard to paraphrase and topology. This is an indication of increased metalinguistic awareness of blind learners of English. Paraphrase, which was used significantly less frequently by blind participants, is not explanatory in terms of how the meaning of the entire PV comes about, but

rather a way of restating the meaning. In terms of the task, this may be identified as an avoidance strategy. As opposed to that, topological determination, where the blind outperformed the sighted group, requires metalinguistic awareness of the meaning of the particle, as well as analysis which will make sense of its meaning in relation to the meaning of the entire PV. Additional support to this is given by the fact that blind participants, when compared to the sighted, also focus somewhat more on the lexical part of the PV construction. In other words, the blind are more prone to analyzing language, which is in line with the results found by Geld and Čutić (2014) for PVs with *in* and *out*. The reason behind this is probably the overall importance of language in the experience of the blind. Language may be used as a tool to compensate for lack of visual input because it may convey information about external reality (cf. Geld and Čutić 2014 for a discussion).

One seemingly surprising factor is that there is no statistically significant difference in compositional determination: with a higher level of metalinguistic awareness, one would expect more compositional determination in the blind. Thus, Geld and Čutić (2014: 22) find that blind participants give more compositional answers for PVs with *in* and *out*, and their results approach significance. This suggests that there may be differences between pairs of particles – *in*/*out* vs. *up*/*down*. Moreover, the results for PVs with *in* and *out* for sighted participants show that compositionality tends to significantly correlate with proficiency in most cases (Geld 2009: 104). If higher metalinguistic awareness of the blind is taken at face value, this would additionally suggest that compositionality requires a particular level of proficiency rather than metalinguistic awareness solely. In other words, understanding what we might refer to as "constructionality" (i.e. providing motivation for all parts of the construction) may be a complex task that is reserved for higher levels of linguistic knowledge.

The role of topology is certainly different between blind and sighted participants for both particles. Still, we suggest a qualitative distinction between *up* and *down* based on their conceptual background. It has been found in previous studies with linguistic (Geld 2014) and non–linguistic cues (for a review cf. Cattaneo et al. 2008: 1349) that egocentric organization is of importance to the blind. For instance, in spatial manipulation tasks, egocentric coding strategies are more important to the blind because of the reduced availability of distal landmarks (Thinus–Blanc and Gaunet 1997: 26). Moreover, the blind differ in their manipulation of mental imagery: they do not tend to imagine larger objects as being further away, and smaller objects as being closer to them, nor do they experience "overflowing" of their mental field of view when they moved closer to an object (Arditi, Holtzman, and Kosslyn 1988; Vanlierde and Wanet–Defalque 2005). This would suggest that the particle *up* may be at human scale for blind participants, i.e. that the reduction to egocentric topology is a default strategy for them. This may be why they find it easier (and/or more meaningful) to refer to spatial senses of *up* even for what we might linguistically consider abstract senses: they are more prone to finding extensions from an egocentric position. As opposed to that, *down* is at human scale for

both groups of participants to begin with, and extensions from the egocentric position tend to be the norm.

## 6. Conclusion

The aim of this paper was to investigate the role of topological determination in strategic meaning construal in blind and sighted users of English. Specifically, we focused on PVs with *up* and *down*, and showed that PVs with *down* are more informative to both groups of participants. Furthermore, the blind relied on the particle more than the sighted.

We claim that the difference in the informativeness between *up* and *down* is related to their experiential status, comparing it to the asymmetry found in dimensional antonyms. We argue that the particle *down* was found to be more informative because it is at human scale, which limits its metaphorization potential. In contrast, *up* was found to be more open–ended, sometimes requiring reduction to human scale, making its network potentially more schematic in some of its senses, which means that it potentially goes farther away from its original topology.

The status of topology was found to be different for blind and sighted participants, with blind participants paying more attention to topological cues. We connected this with the overall higher proneness of the blind participants to analyzing linguistic cues, because they often serve as additional experiential input. However, in strategic construal, language analysis seems to be limited by proficiency, which explains why the proneness for metalinguistic analysis in the blind did not produce significant differences in compositionality.

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## *Topološko strateško konstruiranje značenja: frazni glagoli s up i down u jeziku slijepih*

Cilj je ovoga rada istražiti ulogu *up* 'gore' i *down* 'dolje' u strateškome konstruiranju fraznih glagola kod slijepih i videćih govornika engleskoga kao drugoga jezika. Rad se oslanja na teorijske postavke kognitivne lingvistike u kojoj su jezik i naše svakodnevno iskustvo neodvojivo povezani. U istraživanju je sudjelovalo 20 slijepih i 20 videćih govornika engleskoga kao drugoga jezika kojima je materinski jezik hrvatski. Ispitanici su rješavali upitnik u kojemu su trebali odrediti na koji način sastavnice zajedno pridonose značenju fraznoga glagola (primjerice, jedan ispitanik kaže da glagol *go down* 'biti poslan u zatvor' ima smisla jer se *down* 'dolje' odnosi na dno društva). Rezultati pokazuju da je *down* 'dolje' informativniji svim ispitanicima. Nadalje, slijepi ispitanici značenje objašnjavaju više se oslanjajući na sastavnice *up* i *down*, osobito na *up* 'gore', a manje na glagol kao sastavnicu konstrukcije. Dva su temeljna zaključka rada: prvo, smatramo da je *down* 'dolje' općenito informativniji jer je bliži tzv. »ljudskoj mjeri« (Turner 2014), što ograničava koliko ga je moguće metaforizirati, dok je *up* 'gore' shematičniji pa ima i veći metaforički potencijal, te drugo, da slijepi ispitanici u procesu konstruiranja značenja daju prioritet prostornim sastavnicama (u ovome slučaju *up* i *down*) jer su skloniji analiziranju jezika. Navedena sklonost analizi proizlazi velikim dijelom iz činjenice da im jezik služi kao dodatan način stvaranja iskustvenih veza i značajan izvor informacija o svijetu. Ipak, razlika između videćih i slijepih ispitanika nije značajna za *down*, što tumačimo kao rezultat veće uloge iskustva vlastite smještenosti u prostoru.

**Keywords**: the blind, the sighted, particle verbs, strategic construal of meaning, English as a second language

**Ključne riječi**: slijepi govornici, videći govornici, frazni glagoli, strateško konstruiranje značenja, engleski kao drugi jezik