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I. PROBLEMOS IR SPRENDIMAI / PROBLEMY I ICH ROZWIĄZANIA

Dušan Stamenković
University of Niš
Ćirila i Metodija 2, 18000 Niš, Serbia
Tel. +381 63 7151019
E-mail: dusan.stamenkovic@filfak.ni.ac.rs
Research interests: cognitive linguistics, cognitive semantics, semiotics, visual languages, semantics of literature

Austin Bennett
Case Western Reserve University
10900 Euclid Avenue, Cleveland, Ohio 44106-7068, USA
E-mail: austin.bennett@case.edu
Research interests: cognitive linguistics, cognitive semiotics, cognition and culture, stories, cognitive science of identity

Mihailo Antović
University of Niš
Ćirila i Metodija 2, 18000 Niš, Serbia
E-mail: mihailo.antovic@filfak.ni.ac.rs
Research interests: cognitive linguistics, cognitive science of music, cognitive science of religion

THE ROLES OF VISION, SPACE, AND THE BODY IN INTERPRETING UNFAMILIAR SERBIAN AND ENGLISH IDIOMATIC EXPRESSIONS

The present paper investigates whether lexicalized visuo-spatial configurations and/or an explicit reference to a human body part can facilitate the interpretation of unknown idioms by comparing the levels of correct interpretation of unknown English and Serbian idiomatic expressions. Two groups of respondents, American and Serbian engineering students, had the task to interpret literally translated idiomatic expressions from a target language they were not familiar with (Serbian or English). The idioms were divided into three groups: (1) visuo-spatial bodily idioms, (2) bodily idioms only, and (3) non-bodily idioms. The goal was to test whether references to visuo-spatial information and/or parts of the body would help respondents interpret the expressions correctly. Our results, compiled from both groups of respondents, suggest that there are significant differences for the three scores, with the combined visuo-spatial and bodily components taking the lead, the bodily component only coming second, and the non-bodily idioms falling strikingly far behind. This could provide support to the well-known assumptions of cognitive linguistics that visuo-spatial configurations and embodiment play a major role in the construction of abstract concepts.

KEY WORDS: vision, space, embodiment, idioms, conceptualization.

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1. Introduction

1.1. The rationale and aims of the study

The main assumption behind the study presented in this paper is that success in interpreting specific groups of unknown idioms might reveal some underlying mechanisms behind conceptualization. Two groups of respondents, one from the United States and the other from Serbia, were presented with literally translated idiomatic expressions from a target language they were not familiar with (Serbian and English respectively), and had the task to interpret them, i.e., paraphrase what they believed to be their "hidden" meanings. If participants showed a higher level of understanding of those idioms which appeared to employ visuo-spatial and/or bodily experience, this would mean that visuo-spatial configurations or embodiment might indeed be relevant to intuitive concept formation, as claimed by some authors in cognitive linguistics.

The research questions were the following: (1) would American respondents better intuit the meanings of those idiomatic expressions which contained a "visuo-spatial and bodily," "bodily only," or "non-bodily" lexical component when asked to interpret literally translated Serbian idioms, (2) would Serbian respondents better intuit the meanings of those idiomatic expressions which contained a "visuo-spatial and bodily," "bodily only," or "non-bodily" lexical component when asked to interpret literally translated English idioms, and (3) could these findings be used to provide further support for the thesis that vision, space, and embodiment are important in the course of concept construction.

Therefore, the main goal of the present research is to provide additional empirical support for the studies that stress the importance of vision, spatial relations, and embodiment in the process of conceptualization. To that purpose, the paper will quantify the respondents' correct interpretations in order to investigate whether lexicalized visuo-spatial configurations and/or an explicit reference to a human body part can facilitate the interpretation of unknown idioms.

1.2. Theoretical background: concepts, vision, space, and body

Conceptualization and categorization belong to the oldest and most important questions of the philosophy of mind and cognitive science. The problem of categorization seems to be central to both objectivist and experiential views. In fact, we may isolate at least three groups of approaches to categories: atomistic, probabilistic, and exemplar (Smith and Medin 1981; Medin and Rips 2005). The atomistic approach largely corresponds to the objectivist view, in which things belong to the same category whenever they have certain properties in common; categories are thus verifiable and at least partly correspondent with the real world. The probabilistic approach is based on binary features, which can be either present or absent within a concept: the configurations of these features determine whether a concept can be classified within a particular category or not. Properties within these two approaches are called "necessary and sufficient conditions" for defining a category, and categories based on them are usually clearly bounded and their members have equal status (Taylor 1989: 23–24). In the exemplar approach (the dominant approach to categorization in the experiential view), the best representatives of a category serve as role models in the process of cate-

gorization. This third approach has become commonly known as *Prototype Theory* (Rosch 1973, 1975a, 1975b; Lakoff 1987). Such a methodological choice has in many ways motivated the development of the field of cognitive linguistics (Rosch 1975; Lakoff and Johnson 1981; Lakoff 1987; Johnson 1987; Mandler 1992; Fauconnier and Turner 2002; inter alia). Most of these authors accept that some innate capacities of the infant cognitive system make conceptualization possible, but at the same time they reject the strong nativist position (e.g., Chomsky 1988) according to which there is a universal grammar and perhaps also a universal grammar of concepts (Jackendoff 1990) responsible for mechanisms that lead to the conceptualization of abstractions. They usually insist that early physical perception results in inferences that become stored in long-term memory as simplified schemas, which are then naturally used as prompts to create more and more complex concepts in the adult mind. These are now known as "image schemas" (Johnson 1987, 2005; Hampe 2005), and represent a well-established construct of cognitive linguistics. Image schemas are considered to be pre-conceptual in origin, derived from interaction with the environment, inherently meaningful, and form the basis of word senses (Evans 2010: 43–45).

The function of the bodily and, in particular, visuo-spatial experience in the emergence of image schemas, and thus conceptualization, seems to be very important (Arnheim 1969: 13–37; Edwards and Goodwin 1985; Mandler 2006: 41–51, 66–78). What cognitive linguists sometimes disagree about, however, is whether there is any principal perceptual modality responsible for the construction of concepts. Some claim that visual cognition is essential (Arnheim 1969; Sweetser 1991), whereas others believe that concepts are built via spatial relations (Jackendoff 1987; Mandler 2006, 2008a, 2008b; Landau, Spelke & Gleitman 1984; Munnich, Landau & Dosher 2001; Landau and Hoffman 2005). Yet there are others who propose that conceptualization is the result of embodiment (Gibbs 2006, 2008) and, more recently, those who have developed an encompassing notion of multimodal conceptualization (Forceville and Urios-Aparisi 2009; Kress 2010; Forceville 2011). It is reasonably difficult to unscramble these interconnected conceptions.

The visual system is of crucial importance in our interaction with the world (Marr 1982), and has been best studied among all cognitive capacities (Pinker 1997)—perhaps this is the cause of the preconception that it has an important role in categorization in general. The spatial apparatus is at least moderately dependent on visual stimuli, and is connected to bodily balance and orientation. Both constructs are fundamentally related to the general notion of embodiment that cognitive linguistics has used since its very beginnings (nowadays called *Embodied Mind Theory,* as in Lakoff and Johnson 1999). In spite of the interrelated nature of the three constructs, authors do disagree in assigning one of them relative primacy over the other two.

The study presented in this paper was inspired by the exchange of positions among Jean Mandler, Frank Keil, and Raymond Gibbs, which took place in *Philosophical Psychology* in 2008. In the paper entitled "On the Birth and Growth of Concepts," which triggered the debate, Mandler describes what the earliest concepts are like and provides a theory of the spatial primitives from which they are formed. Starting from the fact that infants tend to respond

to spatial information and are particularly attracted to moving objects—a propensity influenced by the way the visual system develops—Mandler (2008a: 210–213) claims that they create perceptual schemas of objects. The implicit formation of such schemas in practice corresponds to the implicit learning of similarities, which requires no attention or awareness. She suggests that attentional processes are needed to form the first concepts by means of "finding patterns in perceptual data" and redescribing them through "the conceptual primitives that are the vocabulary of the mechanism" (Mandler 2008a: 212), called *Perceptual Meaning Analysis* (PMA). The importance of spatial relations in Mandler's view seems to be best exemplified by the assertion that this reformatting mechanism works for blind children as well: "they get spatial information from haptic and auditory input" (Mandler 2008a: 212), though it is not as detailed as the kind of information we get from vision. This means that blind children "lag behind in their acquisition of object and event knowledge" (Mandler 2008b: 272). Mandler supports this with empirical data from Landau and Gleitman (1985), adding that "it is only after language develops that they [blind children] catch up" (Mandler 2008b: 272). The fact that PMA is able to operate partly independently of vision is most likely the reason why Mandler views the terms "visual" and "spatial" separately. Chilton (2010: 499–514) stresses the significance of the visual factor by confirming that both simple and complex scenarios in the process of conceptualization might have their origins in visual input.

Keil (2008: 241–244) admits that a spatial cognitive capacity may form an important basis for later cognitive growth. On the other hand, due to all the complexity that comes out of the process of conceptualization, for him it seems unlikely that the spatial cognitive faculty can be "the sole or even [a] primary explanation for either the impressive conceptual capacities of infants or the ways in which concepts develop" (Keil 2008: 241).

Another position is that of Gibbs (2008: 231–239), who focuses on integral bodily experience, rather than stressing just one component of embodiment. Whereas he believes that mechanisms clustered around PMA might be of assistance in forming conceptual representations, he claims that Mandler offers no clarification of the formation of symbolic representations or other high-order kinds of concepts, which seem to be "stripped of their embodied roots" (Gibbs 2008: 231). Gibbs insists that throughout childhood and the rest of our lives, bodily experience plays a crucial role in conceptual development, with abstract concepts created "on demand," given the moment and the task. At the same time, these constructs remain connected to the original embodied experiences by means of image schematic configurations.

It is still relatively difficult to test these claims experimentally, especially in studies, such as ours, not involving infants as respondents. However, adult participants may also be useful in the process of illuminating at least certain aspects of the problem. Our study focuses on the understanding of unfamiliar idioms, literally translated from English and Serbian, by native speakers of Serbian and English, respectively. The argument is that these expressions have meanings not familiar to our respondents and are not transparent, in the sense that the sums of their parts do not provide logical clues to the intended meanings of the expressions. Accordingly, if these peculiar idiomatic

expressions are better interpreted when they contain visual and/or bodily references, this might provide some support to one or both of the theses of the authors quoted above. The validity of such a procedure can be supported by Bergen, Polley & Wheeler's (2010) summary of behavioral, neural, and computational evidence that suggests that "language users [regardless of their age] recruit cognitive systems dedicated to spatial cognition when processing language with spatial content" (pp. 79–92).

1.3. Idioms in cognitive linguistics

Idioms are defined as phrases that have transferred or figurative meanings, whose common use helps their interpretation and acceptance in the linguistic community. Idiomatic expressions can be motivated by some of their constituents, but their meaning is most frequently separated from the literal meaning or definition of the constituent words (Katz 1973: 358; Linden 1992: 223). Having in mind various aspects of idiomaticity, Nunberg, Sag & Wasow (1994: 491–497) use the term idiomatic phrases to denote those idioms which do not distribute their meaning among their constituents. These phrases include the famous examples of *to saw logs/wood, to shoot the breeze,* and *to kick the bucket*. These authors distinguish such idioms from what they label *idiomatically combining expressions,* which represent those constructions whose meaning is conventional and yet distributed among their parts (e.g., *to pull strings, to take care of*, and *to take advantage of*). A similar division was proposed by Makkai (1972), who dubbed idioms interpretable by standard rules for interpreting sentences *encoding idioms,* whereas those which correlate with idiomatic phrases were named *decoding idioms.* With regard to this classification, we may claim that the majority of the idioms interpreted in this study belong to what these authors labeled as idiomatic phrases.

We may well assume that idioms can serve as good representatives of "abstract" concepts, as they frequently have a meaning which is not transparent, but is extended and polysemic. This is what makes them a good instrument in the study of metaphorical meaning. Other reasons why they seem to be suitable for a study of transferred meaning include the facts that: (1) their opacity often completely overshadows the meanings of their constituent parts, so that wild guesses in the process of interpretation are frequently wrong unless influenced by strong intuition, and (2) in most instances, they do not match cross-linguistically (e.g., the Serbian equivalent of *He sees red* is *It is getting dark before his eyes*). The problem of idioms seems to have acted as one of the starting mechanisms in cognitive linguistics. Croft and Cruse (2004: 225) claim that it would "not [be] an exaggeration to say that construction grammar grew out of a concern to find a place for idiomatic expressions in the speaker's knowledge of a grammar of their language." They define idioms as "grammatical units larger than a word which are idiosyncratic in some respect" (Croft and Cruse 2004: 230). Conventionality is stressed as the main feature of idioms, as, in some of them, it is too difficult to trace metaphorical content (Croft and Cruse 2004: 232). Once idioms are literally translated to a foreign language—and when a matching expression is non-existent in that language—we can assume that the feature

of compositionality can be completely lost. What is left is unusual, but frequently metaphorical, content that may well be suitable for comprehension tests.

1.4. Experimental background

The paper is a continuation of a study conducted in 2010 (Antović and Stamenković 2012). That study also tried to evaluate various approaches to conceptualization by testing how Serbian respondents interpreted literally translated English idioms. In the process, we presented 60 undergraduate Serbian students who had no formal training in English and 30 Serbian students proficient in English with literally translated English idiomatic expressions, then asked them to guess their meanings. The goal was to investigate whether the expressions would be properly interpreted, whether there would be differences in the degree of correct interpretation between the groups of idioms offered, and whether there would be similarities in the distribution of answers between the two groups of students. The idioms had no direct equivalents in Serbian and were classified into three groups: (1) visuo-spatial bodily idioms; (2) bodily idioms only; (3) non-bodily idioms. Results suggested that there was a clear difference between the understanding of the three groups of idioms, for two strata, and the entire sample (i.e., regardless of the level of participants' English language proficiency). The visuo-spatial bodily idioms were intuitively understood best, the bodily idioms followed, and the idioms with neither of the two components came last. Within each stratum, internal, relative differences between the three groups of idioms for each of the two populations remained. The study results served as a small indication that, independently of one's knowledge of English, a clear reference to a body part facilitated the process of interpreting unknown expressions. Furthermore, the presence of a visual configuration provided additional assistance in the course of revealing the transferred meaning.

The new study takes into consideration the results of the previous one and includes a "mirror" research procedure, which tested a group of American students' understanding of three groups of Serbian idioms. If the American sample showed the same or similar tendencies as compared with the Serbian population, this would led strong support to the thesis that embodiment and visuo-spatial configurations are important in the comprehension of abstract concepts.

2. Study design

2.1. Idiom classification and instrument selection

There were three groups of idioms that we presented to our respondents. Each of them tested their understanding of one idiomatic type. These groups are:

Group 1: Visuo-spatial bodily idioms (those which contained lexical units referring to both visuo-spatial perception and bodily experience). Idioms were assigned to this group for the following reasons: (a) all of them clearly refer to a human body part; (b) in each of them we encounter lexicalized movement, transition, positioning, or a directional change of state, all related to a certain spatial configuration of objects. It can be assumed that such spatial configurations most likely require vision in order to be perceived and, in turn, understood literally or figuratively. This group of idioms may

be exemplified by the English-specific *to be head over heels, to put one's foot in one's mouth*, or *to follow one's nose*, and the Serbian *to pull one's tongue*, *to fill one's ears,* and *to carry one's head in a bag* (lit. trans.).

Group 2: Bodily idioms (those for whose understanding bodily experience alone may be sufficient). The main difference between this and the first type of idioms is that in these idioms we do not find any kind of movement, transition, positioning, or a visible change of state or configuration. All of them evidently refer to a human body part, which might imply that at least some form of bodily experience is required in the process of their interpretation. Examples of this group include, in English, *to have a sweet tooth, to have a brass neck*, and *to get cold feet*, and in Serbian, t*o have golden hands, to be a hard bone*, and *to think with someone else's brain* (lit. trans.).

Group 3: Non-bodily idioms (those for which neither visuo-spatial perception nor bodily experience are necessary). The third group included a random selection of idioms that did not belong to either of the former two groups; in the idioms belonging to this group, visuo-spatial configurations were never coupled with human body parts. When a body part was mentioned, it did not refer to a human being in any manner, and when there was a visuo-spatial configuration described in the idiom, there was no body part mentioned. The group included idioms of very diverse content. Examples which represent this group may be, in English, *to be a sugar daddy, a straw in the wind*, or *to be in one's cups*, and in Serbian, *to go through a sifter and a sieve, to get as bloated as a frog*, and *to lie on the ore* (lit. trans.).

The three groups of English idioms were selected from *Cambridge International Dictionary of Idioms* (1998), *Oxford Dictionary of Idioms* (1999), and *Serbian–English Dictionary of Idioms* (1995). The three groups of Serbian idioms were selected from *Rečnik srpskohrvatskoga književnog jezika* (*The Dictionary of the Serbo-Croatian Literary Language*, 1967) and *Serbian–English Dictionary of Idioms* (1995). For both source languages (directions), all (a) visuo-spatial bodily idioms and (b) bodily idioms were taken from the mentioned dictionaries, and each idiom was assigned a number; the remaining (c) non-bodily idioms were also numbered. Twenty representatives of each group of idioms were randomly selected. Prior to that, all English idioms with direct formal and semantic correspondents in Serbian, and all Serbian idioms with direct formal and semantic correspondents in English, were eliminated from the draw. This procedure resulted in twenty random idioms from each of six groups of interest, three groups for each language. The selected idioms were then used in neutral contexts in order to produce sixty sentences which comprised the two questionnaires, one for American and one for Serbian respondents. Examples of such neutral sentences include: *She got her feet wet. She laughed her head off. She fell into the fire. His back itches.* The sentences from the source language (Serbian or English) were literally translated into the target language (English or Serbian). With the help of native speakers, we performed back translation tests to make sure that the translations were indeed literal and non-transparent in their respective target language.

It was naturally difficult to find a sufficient number of idioms in each of the three groups that could be controlled for a number of possible factors (e.g., idiom length, type of grammatical structure, degree of metaphoricity, etc.). In order to still be able to compare the understanding of the three groups and get methodologically viable results, we employed four criteria: (1) the selection of the idioms was random in each of the groups (eliminating experimenter bias); (2) they were used in as neutral sentences/contexts as possible (ensuring that what was interpreted was the idiom, not other parts of the sentence); (3) idioms with equivalents in the respondents' native language were eliminated from the draw (preventing transfer from source to target language); (4) we performed the task in two directions (from Serbian to English and from English to Serbian, with different random idioms and participants), in order to obtain comparable results. While still not providing causal links or strong correlations, we trust that this kind of design may suggest interesting tendencies, to be tested in further research.

2.2. Procedure and participants

In both directions, the study was based on a four-page questionnaire composed of sixty neutral sentences containing sixty idioms ordered randomly. Their order was rendered by the sequence generator at http://www.random.org/sequences/. Respondents were allowed one hour to complete the questionnaires, which included the task of interpreting the meanings of the given sentences, i.e., by paraphrasing them. They were explicitly instructed to read each sentence, try to guess its metaphorical meaning, and then describe it in one sentence using an empty field on the right side. The first two sentences were given as examples of what the respondents should do (e.g., *It's a turn of the screw = It's an action which makes a bad situation worse*).

Two groups of participants were included in the study:

(1) The first group comprised sixty randomly selected second-year students of mechanical engineering from the University of Niš, Serbia. This group involved students with no or very little formal training in English (their English curricula up to the moment they were tested had included no more than 5% of the idioms employed in the study). These students were asked to interpret sixty English idioms (literally translated into Serbian).

(2) The second group included sixty randomly selected second-year students of engineering from Case Western Reserve University, USA. This group involved students with no knowledge of the Serbian language. These students were asked to interpret sixty Serbian idioms (literally translated into English).

3. Results and Discussion

3.1. Data coding and classification

The answers gathered from the questionnaire were classified into five groups against the criteria of correctness, precision, and the presence of metaphor.

Value 4: This value implied that the interpretation of the literally translated idiom was completely correct. Examples could be the interpretation of *to let your hair down* as *to relax and enjoy yourself*, or understanding the Serbian idiom (lit.)

to lose one's heart as *to feel nervous or frightened about something*.

Value 3: This value meant that the understanding of the idiom was only partially correct, i.e., that it included a recognition of idiomaticity and at least the broad semantic field related to the actual meaning of the idiom. An example of value 3 can be found in interpreting the idiom *to have a head start* as *to be better than everyone else*. Whereas this interpretation implies some sort of advantage, it does not specify the kind of advantage and this is why we can consider it only partially correct. Another example could be claiming that *to have a sweet tooth* means *to be prone to eating loads of food*. If we consider the fact that *sweets* represent a hyponym of the term *food*, then we may conclude that the only component missing in the process of interpretation of this idiom is the type of food, and that is why this interpretation may be regarded as partially correct.

Value 2: The answers coded into value 2 involved those showing the comprehension that there was a metaphor, but with the idiom misinterpreted. For instance, understanding *to have one's ear* as *to be cautious* or *to laugh one's head off* as *being crazy* indicate some possible associative background, and cannot be considered literal. At the same time, they cannot be considered to be correct answers in the sense used for the first two values.

Value 1: Classifying an interpretation into value 1 meant that it was literal, i.e., it showed no understanding of the metaphor. An illustrative example of this group is interpreting *to put your foot in your mouth* as *being very elastic*. Another example could be understanding *to be the meat in the sandwich* as *to be very tasty*.

Value 0: This value meant that there was no answer provided in the field next to the idiom.

3.2. Data analysis

Each subject's responses were assigned one of the five mentioned values (0–4) and separated into three scales. The first scale tested the understanding of visuo-spatial bodily idioms, the second, bodily idioms, and the third, non-bodily idioms. For each of our subjects, we calculated the score for the three respective scales using two types criteria of different intensities: (1) the first and stricter criterion involved summing up the number of totally correct responses (value 4 only), whereas (2) the second, less strict criterion counted the total number of completely correct and partially correct responses (value 3 and value 4 answers summed up). As there was a total of 20 idioms for each of the scales in both directions of our study, we got scores ranging from 0 to 20 per respondent, for each of our 60 American and 60 Serbian students. In the analysis, these scores were used as the principal indicator of how successfully our participants interpreted each of the three idiom groups.

For the three scales, reliability analysis has shown that the use of these items provides consistent results, as supported by the following figures: *Scale 1*, involving visuo-spatial bodily idioms, had Cronbach's Alpha = 0.894 for American respondents and 0.903 for Serbian respondents; *Scale 2*, involving bodily idioms, had Cronbach's Alpha = 0.815 for American respondents and 0.880 for Serbian respondents; *Scale 3*, involving non-bodily idioms, had Cronbach's Alpha =

0.833 for American respondents and 0.896 for Serbian respondents. After the reliability of the scales was confirmed, we conducted an analysis to check for differences in the understanding of the three groups of idioms in each group, and also differences between the performance of the two groups of respondents.

Most importantly, based on the answers we collected from all of our respondents (60 American and 60 Serbian), the results strongly suggest that the application of either the stricter or the less strict criterion leads to similar results: visuo-spatial bodily idioms are understood best, and are followed by bodily and non-bodily idioms.

Table 1. *The number of completely correct interpretations of the three groups of idioms (entire sample, N=120).*

Idiom group	*N*	***Mean***	*Min*	*Max*	*Std. Deviation*
Visuo-spatial bodily	120	**6.5667**	0	17	4.04540
Bodily	120	**3.7333**	0	14	2.86894
Non-bodily	120	**1.5083**	0	12	1.86519

The figures show results for the entire sample tested, the total of 120 respondents. On average, if the stricter criterion was applied, out of the total twenty idioms, the subjects properly interpreted 1.5083 non-bodily idioms, 3.7333 bodily idioms, and 6.5667 visuo-spatial bodily idioms.

When the less strict criterion was considered (correct and partially corrects answers, values 3 and 4), the average number of correct interpretations increased: 3.6583 for non-bodily idioms, 8.3 for bodily idioms, and 11.3833 for visuo-spatial bodily idioms. The tendency, however, remains the same.

Table 2. *The number of completely and partially correct interpretations of the three groups of idioms (entire sample, N=120).*

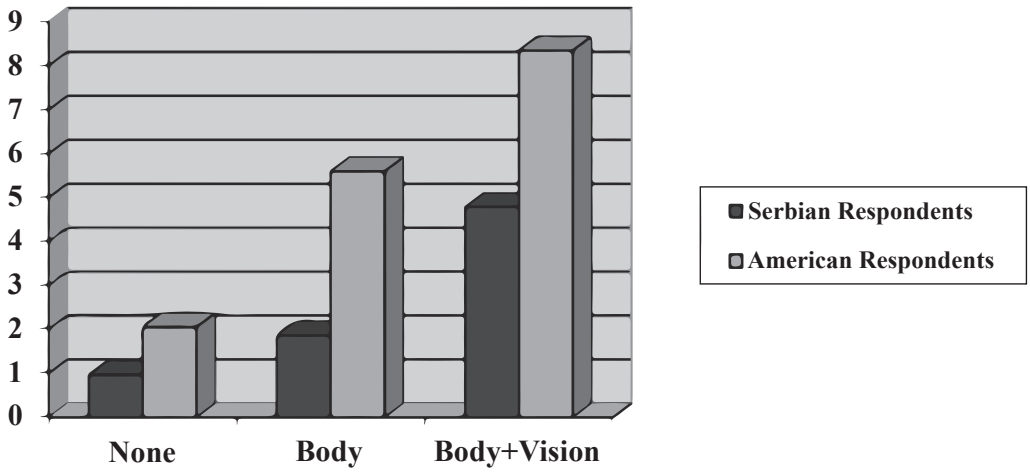
Idiom group	*N*	***Mean***	*Min*	*Max*	*Std. Deviation*
Visuo-spatial bodily	120	**11.3833**	0	20	5.27748
Bodily	120	**8.3000**	0	19	4.67507
Non-bodily	120	**3.6583**	0	15	3.11542

Second, when comparing the performance of the American students with that of the Serbian students, we can see that, in absolute figures, the American students performed considerably better at interpreting literally translated Serbian idioms. The Serbian group of students gave 4.7833 completely correct responses to the visuo-spatial bodily idioms, whereas the American students gave 8.35 out of 20 completely correct responses. As for the bodily idioms, the numbers of completely correct responses for Serbian and American respondents were 1.8667 and 5.6, respectively. The scores for the group of non-bodily idioms were 0.9667 for the Serbian, and 2.05 for the American respondents. The criterion employed in the comparison illustrated in Table 3 was the stricter one.

Table 3. *The average number of completely correct interpretations per idiom group and respondent group.*

Idiom Group	***Respondent group/Source language***	
	Serbian	***American/English***
Visuo-spatial bodily	**4.7833** (Std. dev. 3.7330)	**8.3500** (Std. dev. 3.5502)
Bodily	**1.8667** (Std. dev. 1.9438)	**5.6000** (Std. dev. 2.3949)
Non-bodily	**0.9667** (Std. dev. 1.2483)	**2.0500** (Std. dev. 2.2050)

Graph 1. *Average correct answers, by nationality. Criterion: strict (Value 4).*

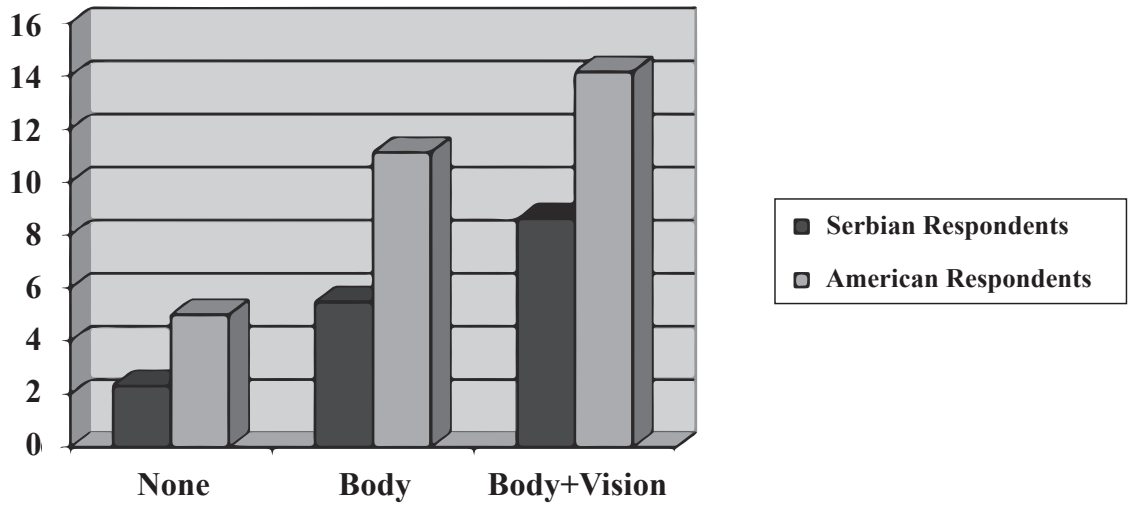


The less strict criterion showed similar tendencies: the Serbian students we tested gave 2.3167 out of 20 successful responses to non-bodily idioms, whereas the American students had 5.0 correct responses. For bodily idioms, the Serbian students had 5.4833 successful interpretations, as compared to 11.1167 correct or partially correct answers given by the American students. Finally, the responses to visuo-spatial bodily idioms were at least partially correct in 8.6167 out 20 Serbian responses, and in 14.15 American ones.

Table 4. *The average number of completely and partially correctly interpreted idioms per idiom group and respondent group.*

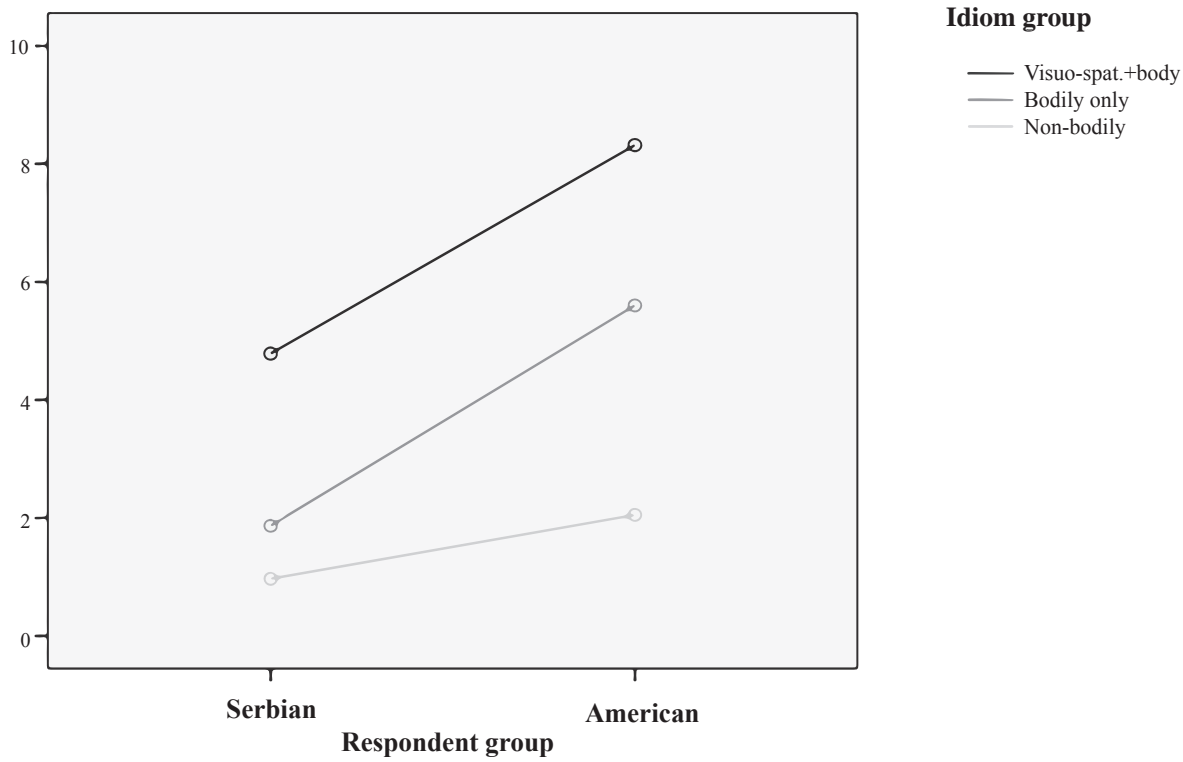
Idiom Group	***Respondent group/Source language***	
	Serbian	***American/English***
Visuo-spatial bodily	**8.6167** (Std. dev. 4.6399)	**14.1500** (Std. dev. 4.3679)
Bodily	**5.4833** (Std. dev. 3.4811)	**11.1167** (Std. dev. 4.0257)
Non-bodily	**2.3167** (Std. dev. 2.0460)	**5.0000** (Std. dev. 3.4247)

Graph 2. *Average correct answers, by nationality. Criterion: less strict (Values 3 and 4).*



On the other hand, within each stratum, internal, relative differences between the three groups of idioms remained, which can be seen when the positions of the three dots on the left and on the right side of the following graph are compared. The two almost parallel lines reflecting the understanding of visuo-spatial bodily and bodily idioms show that relative differences between these two groups of idioms remained almost intact:

Graph 3. *Estimated marginal means. Criterion: strict.*



The nonparametric and robust Friedman test and the repeated measure ANOVA test were applied in order to check if the internal differences for the three idiom groups within the population were significant and not a result of accidental variations related to the choice of sample. The Friedman test examined the differences in the process of interpretation among visuo-spatial bodily, bodily, and non-bodily idioms. It confirmed that significant differences exist and that the ordering of the three groups of idioms, based on how well their meanings were interpreted, seems to be the same in both samples. The differences were at the level of 0.0001, which means there is a high degree of probability that the results may be generalized and applied to whole populations.

The repeated measure ANOVA test has shown that the between-subject effect ($F=185$ and 466, $P<0.0001$), the within-subject effect ($F=223$ and 530, $P<0.0001$), and the interaction effect confirm that the results can be applied to both populations and that the statistical differences between the scores of the two groups of respondents are significant.

4. Conclusions

The results of the two tests suggest that there are statistically significant differences for the three scores, with the visuo-spatial and bodily types taking the lead when coupled, bodily idioms coming second, and non-bodily idioms falling behind strikingly, especially in case of our American respondents. This may serve to indicate that a clear reference to a body part facilitates the process of interpreting unknown expressions. Moreover, the presence of a visuo-spatial configuration provides additional assistance in the course of deciphering the transferred meaning. As a more general outcome of these results, we could hypothesize that embodiment, and especially visuo-spatial orientation, seem to serve as stable aiding factors in the course of meaning construction. The main conclusion of the study is that there is a statistically significant difference in the degree of understanding of unfamiliar visuo-spatial bodily, bodily, and non-bodily idioms. The fact that the American group of respondents had a higher overall score might be attributed to the fact that the American students, who received compensation for performing the task of filling in the questionnaire, may have been more highly motivated. Other reasons might include cultural differences in regard to the students' responsibility in the process of performing professional tasks, even when participating in experimental procedures. American students seem to be much better in this respect, at least in regards to this study—our American respondents left no blank spaces, gave longer responses, and their responses contained more metaphorical content, all of which may be due to their investing a higher degree of effort in the task.

5. Implications

The fact that visuo-spatial bodily idioms are understood better than the other two groups at least partly supports Jean Mandler's and other related ideas stressing the importance of spatial configurations in conceptualization. On the other hand, the conclusion that references to body parts are included in both the first and the second gro-

ups of idioms (which are understood much better than the non-bodily group) seems to support the position of Raymond W. Gibbs and those who favor his notions in regard to the relevance of embodiment to the process of abstract thinking. Further research might also include a fourth group of idioms, "visuo-spatial non-bodily," which could be contrasted with the first group of idioms used in this paper and which might further test the importance of bodily references in the process of interpreting unfamiliar expressions. The procedure may likely be applied to other languages as well, potentially leading to more universal claims than were possible in this and the previous study.

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APPENDIX
Idiom lists

Direction A: English → Serbian

(a) Visuo-spatial bodily idioms:

English idiom	*Serbian literal translation*
1She is head over heels.	*Ona je glavom iznad peta.*
2It is out of my hands.	*To je van mojih ruku.*
3She has cried her eyes out.	*Isplakala je sopstvene oči.*
4He follows his nose.	*On prati svoj nos.*
5She forces his hand.	*Ona tera njegovu ruku.*
6He has a finger in every pie.	*On ima prst u svakoj piti.*
7He has a hand in it.	*On ima ruku u tome.*
8You have your back to the wall.	*Imaš leđa uza zid.*
9She keeps them at arm's length.	*Ona ih drži na razdaljini ispružene ruke.*
10He keeps his head down.	*On drži svoju glavu dole.*
11She has laughed her head off.	*Odsmejala je sopstvenu glavu.*
12He let his hair down.	*Raspustio je kosu.*
13It is on everyone's lips.	*To je na svačijim usnama.*
14He has put his back into it.	*Uneo je leđa u to.*
15He has put his foot in his mouth.	*Stavio je stopalo u usta.*
16Her blood is up.	*Njena krv je gore.*
17Her heart is in her mouth.	*Srce joj je u ustima.*
18She has set tongues wagging.	*Razmahala je jezike.*
19He has tried his hand at it.	*Isprobao je ruku na tome.*
20He said it with tongue in cheek.	*Rekao je to sa jezikom u obrazu.*

(b) Bodily idioms:

English idiom	*Serbian literal translation*
21She had a change of heart.	*Imala je promenu srca.*
22They have bad blood.	*Imaju lošu krv.*
23He is easy on the ear.	*On je lak na uhu.*
24It is hot on his heels.	*Vruće je na njegovim petama.*
25She cooled his heels.	*Ohladila mu je pete.*
26He did it by the skin of his teeth.	*Uradio je to kožom svojih zuba.*

27He got a thick ear.	*Dobio je debelo uvo.*
28She got cold feet.	*Dobila je hladna stopala.*
29She got her feet wet.	*Nakvasila je stopala.*
30We gave them their head.	*Dali smo im njihovu glavu.*
31He has a brass neck.	*On ima limeni vrat.*
32She had a head start.	*Imala je početak od jedne glave.*
33She has a sweet tooth.	*Ona ima sladak zub.*
34She has feet of clay.	*Ona ima glinena stopala.*
35You have my ear.	*Imaš moje uvo.*
36He knows it by heart.	*On zna to srcem.*
37He lended her an ear.	*Pozajmio joj je uvo.*
38I have lost heart.	*Izgubio sam srce.*
39He made no bones about it.	*Nije pravio kosti oko toga.*
40He is wet behind the ears.	*On je mokar iza ušiju.*

(c) Non-bodily idioms:

English idiom	***Serbian literal translation***
41It is a blind alley.	*To je slepi prolaz.*
42He is a couch potato.	*On je krompir sa kauča.*
43It is a dog and pony show.	*To je predstava sa psom i ponijem.*
44It is a happy hunting ground.	*To je veselo lovište.*
45It is a straw in the wind. *T*	*o je slamka na vetru.*
46He is a sugar daddy.	*On je šećerni tata.*
47It is a turn of the screw.	*To je obrt šrafa.*
48It is an old chestnut.	*To je stari kesten.*
49He did it at the drop of a hat.	*Uradio je to na pad šešira.*
50You are in your cups.	*Ti si u svojim peharima.*
51He is on the rack.	*On je na spravi za mučenje.*
52He is the meat in the sandwich.	*On je meso u sendviču.*
53He beats the bushes.	*On udara po žbunju.*
54It is a double speak.	*To je dupli govor.*
55He fell off the wagon.	*Pao je sa kola.*
56She put it to bed.	*Smestila je to u krevet.*
57It is the long and the short of it.	*To je dugo i kratko od toga.*
58She threw good money after bad.	*Bacila je dobar novac nakon lošeg.*
59She is in the pudding club.	*Ona je u klubu pudinga.*
60He is off his rocker.	*On je van svoje stolice za ljuljanje.*

Direction B: Serbian → English

(a) Visuo-spatial bodily idioms:

Serbian idiom	***English literal translation***
1To mi bode oči.	*That's stinging my eyes.*
2Ona me vuče za jezik.	*She's pulling my tongue.*
3On me vuče za nos.	*He's pulling my nose.*
4On me gleda krivim okom.	*He looks at me with a twisted eye.*

5Ona drži jezik za zubima.	*She keeps her tongue behind her teeth.*
6Ona živi na visokoj nozi.	*She lives on a high leg.*
7On njom ispire usta.	*He washes the mouth with her.*
8To stoji na staklenim nogama.	*It's standing on glass legs.*
9Sada sam u tvojoj koži.	*I am now in your skin.*
10On nosi glavu u torbi.	*He's carrying his head in a bag.*
11Smračilo mu se pred očima.	*It has gotten dark before his eyes.*
12Potkratila mu je jezik.	*She has shortened his tongue.*
13Pocrveneo je do ušiju.	*He has gotten red up to his ears.*
14Ona mu puni uši.	*She is filling his ears.*
15Skočio je sam sebi u usta.	*He has jumped into his own mouth.*
16Slomilo se na njegovim leđima.	*It broke against his back.*
17 Stavio bih ruku u vatru za njega.	*I would put my hand in a flame for him.*
18On mi stoji nad glavom.	*He is standing above my head.*
19Uzeo me je na zub.	*He took me on a tooth.*
20Ustala je na levu nogu.	*She got up on her left leg.*

(b) Bodily idioms:

Serbian idiom	***English literal translation***
21On je šaka jada.	*He's a handful of sorrow.*
22Boli me uvo za to.	*My ear hurts for that.*
23Imaju zle jezike.	*They have evil tongues.*
24Znam ga u prste.	*I know him into the fingers.*
25Ona ima zlatne ruke.	*She has golden hands.*
26On ima jaka leđa.	*He has a strong back..*
27On ima obraz kao đon.	*His cheek is like a sole.*
28Ona misli tuđim mozgom.	*She thinks with someone else's brain.*
29Počela je da peva od malih nogu.	*She started singing from little legs.*
30Platio je to svojom kožom.	*He paid it with his skin.*
31Svrbe ga leđa.	*His back itches.*
32Svrbi je jezik.	*Her tongue itches.*
33Tvrd je na ušima.	*He's hard on the ears.*
34Tvrdoglav je.	*He has a hard head.*
35S njim sam na krv i nož.	*I'm on blood and knife with him.*
36Dobra je na jeziku.	*She's good on the tongue.*
37Ostala je duga nosa.	*She has been left long-nosed.*
38Bila je to tvrda kost za nju.	*It was a hard bone for her.*
39Istupio je zube na njoj.	*His teeth have become dull on her.*
40Ona se šali svojom glavom.	*She's joking with her head.*

(c) Non-bodily idioms:

Serbian idiom	***English literal translation***
41Pola toga je bacio u vodu.	*He threw half of it into the water.*
42Taj vic ima bradu.	*It's a bearded joke.*
43Izvukla ga je iz blata.	*She pulled him out of the mud.*
44Ide kao po loju.	*It is going as on tallow.*

45Oni su kao rogovi u vreći.	*They are like horns in a sack.*
46Legao je na rudu.	*He has lain on the ore.*
47To je mačji kašalj.	*It's a cat's cough.*
48Nakrivio je šešir.	*He has bent his hat.*
49On je slepi putnik.	*He is a blind passenger.*
50Otišlo je na doboš.	*It went on the drum.*
51Pala je u vatru.	*She fell into the fire.*
52Ona pronosi glas.	*She's carrying the voice through.*
53Prošao je kroz sito i rešeto.	*He went through a sifter and a sieve.*
54Puca mi prsluk.	*My vest bursts.*
55Nadula se kao žaba.	*She got as bloated as a frog.*
56Skinuo je paučinu.	*He has removed the cobweb.*
57Sunce je zubato.	*The sun is toothed.*
58On tera mak na konac.	*He's driving a poppy seed onto a thread.*
59On traži hleb preko pogače.	*He's asking for a bagel after eating a bread.*
60Cvetaju joj ruže.	*Roses are blooming for her.*

Dušan Stamenković
Uniwersytetu w Niszu, Serbia
Zainteresowania naukowe: językoznawstwo kognitywne, semantyka kognitywna, semiotyka, języki wizualne, semiotyka literatury

Austin Bennett
Case Western Reserve University, USA
Zainteresowania naukowe: językoznawstwo kognitywne, semiotyka kognitywna, poznanie a kultura, opowiadania, kognitywna nauka o tożsamości

Mihailo Antović
Uniwersytetu w Niszu, Serbia
Zainteresowania naukowe: językoznawstwo kognitywne, kognitywistyka muzyki, kognitywistyka religii

ROLA OBRAZU, CIAŁA I PRZESTRZENI W INTERPRETACJI NIEZNANYCH WYRAŻEŃ IDIOMATYCZNYCH W JĘZYKACH ANGIELSKIM I SERBSKIM

Streszczenie
Celem opracowania było zbadanie, czy zleksykalizowane zestawienia wizualno-przestrzenne i/lub wyraźne odniesienia do części ciała człowieka mogą ułatwić interpretację nieznanych idiomów poprzez porównanie poziomów poprawnej interpretacji nieznanych wyrażeń idiomatycznych w językach angielskim i serbskim. Badaniem objęto

Dušan Stamenković
Nišo universitetas, Serbija
Moksliniai interesai: kognityvinė lingvistika, kognityvinė semantika, semiotika, vizualinės kalbos, literatūros semantika

Austin Bennett
Case Western Reserve universitetas, JAV
Moksliniai interesai: kognityvinė lingvistika, kognityvinė semiotika, pažinimas ir kultūra, pasakojimai, kognityvinis tapatumo mokslas

Michailo Antović
Nišo universitetas, Serbija
Moksliniai interesai: kognityvinė lingvistika, muzikos kognityvistika, religijos kognityvistika

VIZIJOS, ERDVĖS IR KŪNO VAIDMUO INTERPRETUOJANT NEŽINOMUS ANGLŲ IR SERBŲ KALBŲ IDIOMATINIUS POSAKIUS

Santrauka
Šiame darbe tiriama, ar leksikalizuotos vizualinės-erdvinės konfigūracijos ir / ar aiški nuoroda į žmogaus kūno dalis gali palengvinti nežinomų idiomų interpretavimą, lyginant teisingus nežinomų anglų ir serbų kalbų idiomatinių išsireiškimų interpretavimo lygius. Dvi respondentų grupės, Amerikos ir Serbijos inžinerijos studentai, gavo užduotį išverstus į vertimo kalbą idiomatinius išsireiškimus, kurių reikšmės anksčiau jie nežinojo (serbų ar anglų kalbose), interpretuoti pažodžiui.

dwie grupy respondentów: amerykańskich i serbskich studentów inżynierii, którzy mieli za zadanie zinterpretować dosłownie przetłumaczone na język docelowy wyrażenia idiomatyczne, których znaczeń wcześniej nie znali (w językach serbskim lub angielskim). Idiomy zostały podzielone na trzy grupy: 1) idiomy wizualno-przestrzenne dotyczące części ciała, 2) idiomy dotyczące wyłącznie części ciała oraz 3) idiomy nie związane z częściami ciała. Celem badania było ustalenie, czy odniesienia do informacji wizualno-przestrzennej i/lub nazw części ciała pomagają respondentom poprawnie zinterpretować wyrażenia. Uzyskane wyniki pozwalają stwierdzić, że respondenci z obu grup najlepiej rozpoznali idiomy wizualno-przestrzenne dotyczące części ciała, na drugim miejscu znalazły się idiomy dotyczące wyłącznie części ciała, najgorzej zaś poradzono sobie z idiomami nie związanymi z częściami ciała. Byłoby to potwierdzeniem dobrze znanych założeń językoznawstwa kognitywnego, że zasadniczą rolę w konstruowaniu abstrakcyjnych konceptów odgrywają zestawienia wizualno-przestrzenne i ucieleśnienie.

SŁOWA KLUCZOWE: obraz, przestrzeń, ucieleśnienie, idiomy, konceptualizacja.

Idiomos buvo suskirstytos į tris grupes: (1) vizualinės-erdvinės kūno idiomos, (2) tik kūno idiomos ir (3) ne kūno idiomos. Tyrimo tikslas buvo patikrinti, ar nuorodos į vizualinę-erdvinę ir / arba kūno dalių informaciją galėtų padėti respondentams teisingai interpretuoti žodinę išraišką. Iš abiejų respondentų grupių buvo gauti tokie rezultatai: pirmaujančią poziciją užėmė vizualinės-erdvinės kūno idiomos, antrą – kūno komponentai, mažiausiai atpažintos ne kūno dalių idiomos. Šių rezultatų interpretacija galėtų sustiprinti gerai žinomas kognityvinės lingvistikos prielaidas, kad konstruojant abstrakčius konceptus vizualinės-erdvinės konfigūracijos ir įkūnijimas yra labai reikšmingi.

REIKŠMINIAI ŽODŽIAI: vizija, erdvė, įkūnijimas, idiomos, konceptualizavimas.

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