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Conceptualizing reasoning, problem-solving, and decision-making in Serbian and English

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Abstract

The paper presents a part of the study that sought to investigate the domain of MIND. Due to space limitations, the present study focuses on the following mental processes: reasoning, problem-solving, and decision-making. We rely on the Conceptual Metaphor Theory (Lakoff/Johnson, 2003 [1980]) in our analysis of the linguistic expressions that point to different representations of the selected mental processes. We analyze two corpora, one containing English news texts and the other containing Serbian news texts, to see if there is any correspondence between the way speakers of these two languages reason and speak about each process. The results indicate that there is a high degree of overlap between the two languages in respect of the most basic mappings and source domains that structure the given processes, while the differences are predominantly observed at the level of individual linguistic expressions. (*примљено: 22. марта 2022; прихваћено: 24. маја 2022*)

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1. Introduction

Mental and psychic processes, as well as their structural and functional cognitive components, which are commonly understood as *mind*, have been researched across cognitive sciences (Klikovac, 2004: 7; Lakoff, 2009: 14; VandenBos, 2015: 654). The existing research (see Johnson, 2017: 39) tends to classify mental processes by their degree of complexity. Accordingly, the *lower cognitive functions* include perceptual, motor, and affective functions. These serve as the basis of more complex modes of thought, known as the *higher cognitive functions* (Matsumoto, 2009: 234; VandenBos, 2015: 495; Johnson, 2017: 39), which are traditionally seen as the *narrow* definition of the term *mind* (VandenBos, 2015: 654).

The *Second-generation (Embodied) Cognitive Science* of the 1980s (Lakoff/Johnson, 1999) provided the framework for analyzing cognitive functions in a different light, stressing primarily their embodied nature. In the field of cognitive linguistics, the *Conceptual Metaphor Theory* (Lakoff/Johnson, 2003 [1980]) emerged as one of the most effective ways of studying abstract concepts from the embodied perspective. The theory holds that the understanding of these concepts depends on the cross-domain mapping of entities, patterns, and relationships from physical and clearly delineated concepts (*source domains*) to the abstract ones (*target domains*) (Lakoff/Johnson, 1999: 334; Lakoff/Johnson, 2003: 118–119).

The views regarding the range and prominence of higher cognitive functions varies considerably between metaphor researchers. To date, the focus in both English and Serbian has largely been either on a specific function, or a selection of few functions (see Roediger, 1980; Sweetser, 1990; Jäkel, 1995; Lakoff/Johnson, 1999; Klikovac, 2004; Carlson, 2012). After contrasting a number of studies and consulting the literature pertaining to the domain in question (see Lakoff et al., 1991; Blackburn, 1996; Rot, 2004; Lacey, 2005; Matsumoto, 2009; VandenBos, 2015), our search produced the following list of mental processes: perceiving, learning, understanding, knowing, reasoning/judging, problem-solving, decision-making, believing, thinking, memorizing, and imagining. In the present research, we devote our attention to reasoning, problem-solving, and decision-making, which are regarded as the more active functions of the mind.

The development in the study of the previously mentioned mental processes (reasoning, problem-solving, judgment, and decision-making), as well as a category identified as “metacognition”, has been traced by Carlson (2012: 25). Although the author does not discuss their conceptualization, his paper does provide an insight into the transition towards more empirically based research that took place over the decades. The cognitive metaphor research on the selected processes, however, tends to contrast the domain of REASON with the domain of EMOTION as one of the common “dualisms” in the treatment of the MIND (Koivisto-Alanko/Tissari, 2006; Rakić, 2014). Such studies have managed to prove that, while the two domains show certain similarity regarding the source domains used (primarily CONTAINER, BODY, and FORCE/CONTROL), marked differences could be observed in respect of the FORCE/CONTROL continuum (Mischler, 2013: 72–73). Jäkel (1995), on the other hand, delved

into judging and problem-solving while describing the complex cognitive model MENTAL ACTIVITY IS MANIPULATION. He maintained that this folk theoretical model was a highly productive way of construing “the world within” (Jäkel, 1995: 197). The conceptualization of these processes in Serbian has largely been unanalyzed thus far. Apart from the REASONING IS TRAVELING and DECISION-MAKING IS REACHING THE DESTINATION conceptual metaphors observed by Klikovac (2004), much of the structure of these domains in Serbian remains unknown.

Due to their partial treatment in the existing literature, the subsequent discussion centers on *diversification* (Goatly, 2007: 12), or the identification of the source domains from which the knowledge structures are mapped onto the selected mental processes. We also turn to the contrastive analysis of our results to test the *universality* hypothesis, that is, to check whether the same metaphors appear in these two languages.

2. Corpus and methodology

The literature devoted to this topic (the *mind*), ranging from research papers to dictionaries of psychology and philosophy, enabled us to make a preliminary list of the necessary mind-related lexemes for our data collection. They were largely selected based on the definitions of the key terms regarding cognition. Yet, in keeping with this paper’s topic, we list solely those relevant to our present purpose. Namely, the examples taken from Serbian (*Politika*, *Blic*, *Vreme*, and *Novi magazin*) and English (*The Financial Times*, *Fortune*, and *The Guardian*) newspapers were searched for: a) the lexeme E: *mind*, S: *um*; b) the metonymically related lexemes E: *head*, S: *glava* and E: *brain*, S: *mozak*; c) adjectives E: *mental*, S: *mentalni* and E: *cognitive*, S: *kognitivni*; d) lexemes that denote content believed to reside in someone’s head: E: *assumption*, *conception*, *decision*, *fact*, *hypothesis*, *idea*, *judgment*, *opinion*, *problem*, *solution*, *theory*, *thought*; S: *činjenica*, *hipoteza*, *ideja*, *misao*, *mišljenje*, *odlučka*, *pojam*, *predstava*, *pretpostavka*, *rešenje*, *sud*, *teorija*, *verovanje*; and finally e) lexemes that mark these mental processes: E: *calculate*, *consider*, *judge*, *judging*, *evaluate*, *reason*, *reasoning*, S: *proceniti*, *rasuđivanje*, *rasuditi*, *razmotriti*, *suđenje* for the reasoning process, E: *decide*, *decision-making*, S: *doneti odluku*, *odlučivanje*, and *zaključiti* for the decision-making process, E: *problem-solving*, *solve*, S: *rešavanje problema* and *rešiti* for the problem-solving process. Our English and Serbian data contained sentences in which the lexical units conveyed metaphorical meaning. This was determined in accordance with the *Metaphor Identification Procedure*¹ (MIP) (Pragglejaz, 2007: 3), according to which the identification of metaphorical utterances rests on the following steps: a) reading the entire text-discourse; b) determining the lexical units the text is comprised of; c) determining the *contextual meaning* for each lexical unit (i.e. how it relates to the entity, attribute, or relation in the situation that

1 It should be noted that this metaphor identification procedure has another variant, *The Metaphor Identification Procedure Vrije Universiteit*, or MIPVU (Steen et al., 2010). Yet, for our present purpose, the MIP proved to be a sufficiently reliable method of judging the degree of metaphoricity. Therefore, we chose to apply this procedure. For more details on MIPVU and its application to Serbian, see Bogetić et al., 2019).

the text evokes); d) determining the more concrete, precise meaning, which is related to bodily action (*basic contemporary meaning*); e) contrasting the contextual and basic meaning; f) marking the lexical unit as metaphorical if the contextual meaning contrasts with the basic meaning, but can be understood in comparison with it. Such is the case in: “I don’t see how *to move from* that assumption to this conclusion” (Johnson, 2017: 160), where the basic meaning of the italicized expression denotes the change of position by moving to a different place, while the contextual meaning has to do with reasoning, the act of drawing a conclusion from an assumption. Since we understand PURPOSEFUL (MENTAL) ACTIVITIES AS MOTION IN SPACE, the contrast between the two meanings gives rise to the REASONING IS MOVING conceptual metaphor.

3. Results and discussion

The discussion is organized so that it treats each mental process in a separate subsection. We begin with the reasoning process, since it is central to diverse human abilities (some of which are the subject of this paper) that range from conducting inquiry, solving problems, evaluating, criticizing, and deliberating about actions to understanding ourselves, other people, and the surrounding world (Lakoff/Johnson, 1999: 14). We identify the *linguistic metaphors*, or the *metaphorical linguistic expressions*, present in each sentence, specify the domain of experience from which the linguistic expression is used, and formulate the underlying conceptual metaphors. The conceptual metaphors are written in small capitals, and the metaphorical linguistic expressions are italicized. The next segment gives an overview of our results.

4. The domain of REASONING

Before we turn to our analysis of the concept, it would be worthwhile to address its relation to the process of judging. Although they are most commonly viewed in synonymous terms, there has been some mention of the differences between the two. From the philosophical perspective, the term *judging* could be confined either to the act of judging – traditionally favored by idealists and pragmatists, or the content of the act of judging – the popular view among formal logicians (Lacey, 2005: 173). What is believed to constitute this process is the formation of a novel notion, as well as the fact that, unlike reasoning, it is not so heavily based on logic (Rot, 2004: 200–201). Rather, it is characterized by: a) varying relations or combinations, and b) the degree of certainty that the judgment is accurate. Although *judgment* is generally seen as the outcome of the judging process, it has been observed that we make judgments both during the process, as well as when we are merely stating that a certain relation exists (Rot, 2004: 203). According to Carlson (2012: 26), the earlier research on reasoning is characterized by great reliance on formal logic. For this reason, the widely held views on the process are often attributed to the philosophical logicians that ruled the American Philosophy of the times (Lakoff, 2009: 244). The defining feature of *reasoning* proves to be its

great reliance on certain principles, because of which it is understood as the act of passing from premises to conclusion (Lacey, 2005: 185; Lakoff/Johnson, 1999: 457). Such a notion was confirmed by Jäkel (1995: 222). His analysis showed that the JOURNEY metaphor, which is central to any purposeful action (the PURPOSEFUL ACTIVITIES ARE JOURNEYS conceptual metaphor), emphasizes the linear nature of logical reasoning. As a result, the optimal path to a conclusion is conceptualized as a straight line.

Still, any attempt to delimit judging as a mental process proves to be anything but simple. The complexity arises from its close relationship with other functions of the mind, some of which have been thought to be an equivalent of judging (such as belief), while others, like decision-making, use judgments as premises (Carlson, 2012: 28). The OED defines the term *judging*² as the act of forming an opinion about an entity or an event based on the information available, while stating that *reasoning*³ stands for the act of forming a judgment about a situation by considering the facts (with an indication that it must be done in a logical way). From the formal definitions, the two processes seem to overlap considerably in meaning. Therefore, we have decided to treat judging as a part of the reasoning process.

The step-by-step, or procedural quality that is attributed to reasoning was linguistically expressed in our corpora in the following ways:

E:

1. But to wonder how neurons create these illusions, as he notes, is to *begin* from the assumption that they are illusions.
2. Construct the argument by identifying the premises *leading to* that conclusion.
3. But the kind of reasoning needed to *reach* logical or mathematical conclusions is different in kind from the implicit knowledge we draw on for most of our lives.
4. Moreover, all good reasoning expresses and *proceeds* from prior commitments and beliefs and relies, at every *step along the way*, on believing – however cautiously and critically – the testimony of others engaged in this and similar collaborative enterprises.
5. For many people, including myself, it is hard to *avoid* the conclusion that the president's decision to remove Director Comey was related to this investigation.
6. It's very easy to *jump* to the wrong conclusions about scores without the proper training.

S:

7. „Mi *polazimo* od različitih premisa šta nam je u interesu, ali mi moramo da razgovaramo sa njima“, rekla je Brnabić.

2 https://www.oxfordlearnersdictionaries.com/definition/english/judge_2?q=judging 11.05.2022.

3 <https://www.oxfordlearnersdictionaries.com/definition/english/reasoning?q=reasoning> 11.05.2022.

8. Srpska strana uglavnom *polazi*, ne od juče, od pretpostavke da će proći bolje ukoliko ili uopšte ne pregovara ili ne prihvata ponuđena rešenja.
9. *Polazna tačka* u sagledavanju tema u vezi sa transplatacijom [...].
10. Kroz seriju veoma složenih *koraka*, uključujući preciznu digitalizaciju, kao i pomoć mašinskog učenja i statističke analize, holandski tim je zaključio da su zapravo dva pisca odgovorna za Veliki svitak Isaije.
11. I većina vlasnika pasa, nakon što budu svedoci ove nesvesne aktivnosti, *dođu* do logičnog zaključka da pas sanja.

Both English and Serbian speakers, therefore, understand this process via the Source-Path-Goal schema, on the basis of which LOGICAL REASONING takes the form of a PURPOSEFUL MOVEMENT ALONG A PATH. Consequently, the linguistic expressions used in the conceptual mappings largely indicate movement in a particular direction (*begin from; proceeds from; leading to; reach; jump to; polazi; dođu do*). The location from which one starts the departure corresponds to premises, the destination to conclusion, and all the reasoning between them corresponds to a road. It thus follows that the domain of REASONING utilizes the JOURNEY domain, just as any other purposeful activity does. In other words, the underlying metaphor REASONING IS MOVING encompasses the following mappings: premise is the starting point, conclusion is the destination, reasoning is following the path, and reaching the conclusion is reaching the destination.

Not only do premises serve as the starting point of the journey, but they are also linked to conclusions in a specific way. The two prove to be, in fact, causally related. This fact could account for the examples:

E:

12. Similarly, the laws of logic are there, and work to *lead* us to correct conclusions, whether we like them or not.
13. Given that we are equipped with the capacity to sympathise with others, nothing can prevent the circle of sympathy from expanding from the family and tribe to embrace all of humankind, particularly as reason *goads* us into realising that there can be nothing uniquely deserving about ourselves or any of the groups to which we belong.
14. Kant, that quintessential figure of Enlightenment, argues that we don't need God or religion to tell us what is good: we can discover the moral law and our own freedom simultaneously – not in biology or some divine text but in ourselves, by *dint* of reason.

S:

15. Sve to *navodi* na zaključak da u mozgu postoji središte koje usmerava ponašanje vezano za porive – glad, polni nagon i nasilje – koje se u toku sna na izvestan način isprazni.

The linguistic metaphors (*lead to; goads; dint; navodi*) evoke the understanding of a forced motion. Whether by a certain law, or their own reason, one is prompted to think in a certain way. In fact, this representation is based on the universal metaphor CAUSATION IS FORCE, given that general causation is normally understood via verbs denoting forced movement (Lakoff/Johnson, 2003: 250). In light of this fact, logic (12) or reason (13–14) are seen as a driving force. Therefore, we could argue that it is reason/logic that enables the movement from premise to a conclusion, it is the enabling cause of the reasoning process (REASON IS THE FORCE THAT MOVES THE MIND conceptual metaphor).

Projecting the ENTITY status onto mental phenomena subsequently affects the conceptualizations that arise. As seen from the examples provided below (16–24), that status could be attributed to REASON itself, in which case it could fall under a specific category of ENTITIES, i.e. the LIVING BEING domain. The citations that exemplify this case are as follows:

E:

16. A mandarin style, a reserved manner, a dislike of political passion – these are quiet, unflashy attributes but, as Tóibín persuasively suggests, they are to be treasured as bulwarks against the sleep of reason and the monsters it *spawns*.
17. Reason, he concludes, is like a government press secretary, there to *defend* your decisions to others.
18. Can we *trust* our reason?

S:

19. Ipak, mogućnost da razum *ovlada* svetom [...].
20. Francuski filozof Paskal je pisao da “srce ima razloge koje razum ne može da *shvati*”. Tako jaka emocija *savladava* rasuđivanje i volju.
21. Danas žalimo *odlazak* voljenog prijatelja Zdravog Razuma koji je bio sa nama mnoge godine. Niko ne zna tačno koliko je bio *star* s obzirom da je njegova *krštenica* davno zagubljena u birokratskoj crvenoj traci – piše u čitulji. Zdrav razum je *izgubio želju za životom* od kako je crkva postala biznis a kriminalci počeli da dobijaju bolji tretman od svojih žrtava.
22. Rubno područje do kog razum *govori* da se sme ići u ulaganju je – platenik.
23. On je kao vrlo mlad *shvatio* da je crtež zapravo fundament, nešto što je starije i od pisane reči, da je to jedna dubinska *rasprava* između srca i razuma [...].
24. Kada su ljudi telesno zdravi, oni imaju *poverenja* da će njihovo telo dobro funkcionisati. Isto tako, kada su mentalno zdravi, imaju *poverenja* u svoje mentalne procese kao što su opažanje, pamćenje, rasuđivanje i zaključivanje.

Here, the subdomains of the general LIVING BEING domain were specified in our data as either HUMAN (17–24), or ANIMAL (16). The citations belonging to the first group (the HUMAN domain) represent a special case of ontological metaphors

– personification, given that they all relate to qualities (e.g. being trustworthy, knowledgeable, or respected) and activities (such as defending a position, overcoming an adversary, comprehending, arguing, or speaking) typical of humans. The expression *spawns* in 16 indicates that the ENTITY is in fact an animal, most likely a fish or an amphibian, because the verb generally denotes the act of producing and depositing eggs.

The use of the same domain (ENTITY) in examples 25–28 makes it possible to concretize the entities that get utilized in the process by understanding them as objects. It is the *facts*, *information*, and *explanations* that are ascribed the OBJECT property, hence they could be perceived as *workable* (25), and the process itself is structured by the REASONING IS THE MANIPULATION OF OBJECTS conceptual metaphor.

E:

25. Facts, it seems to me, are *workable units*, useful in a given frame or context.
 26. Or we will slowly *piece together* a theory (or theories) out of a series of separate but satisfactory explanations.

S:

27. Ukratko rečeno, to je brzina kojom, kako se procenjuje, ljudski mozak može da *obrađuje* podatke.
 28. *Uzmimo* primer Kosova.

Our examples are in line with the folk theoretical model “mental activity is manipulation”, according to which conceptualization of mental processes depends on physical manipulation of solid objects – a conceptual metaphor that has been studied in English by Jäkel (1995: 197, 219–220). Citation 26, for instance, supports this claim. Reasoning is concretized as the act of *piecing* explanations *together* into a coherent whole (*a theory*) which evokes an image of a puzzle.

The act of object manipulation is likewise observable in utterances 29 and 30, where SOUND REASONING correlates with the POSSESSION OF THE OBJECT (srb. *mozak*, engl. *brain*), whereas a FLAW IN REASONING corresponds to THE LOSS OF THE OBJECT, thus revealing the underlying conceptual metaphors SOUND REASONING IS THE POSSESSION OF AN OBJECT and FALLACIOUS REASONING IS THE LOSS OF THE POSSESSED OBJECT.

E:

29. Has the market *lost* its mind?

S:

30. Svakako ne želimo da kažemo da se u trudnoći *gubi* mozak i ne verujemo da je to slučaj.

Example 29 could also present a case of *conceptual metonymy*. In that case, rather than ascribing human abilities (i.e. having the capacity to perform the cognitive function of reasoning) to nonhuman entities, we use one entity to refer to

another which is related to it. By using the expression “the market”, we are referring to the people who buy and sell goods. That way, it is possible to question their line of reasoning.

Finally, our corpora generated different instantiations of the reasoning function relative to the sense modality that gets utilized in the process. Consider these examples:

E:

31. Her ranting *obscures* her reasoning.
32. Archaeologists have *taken a hard, long look at* this idea and dismissed it on the basis of insufficient evidence.
33. Check to *see* if the argument relies on ambiguity.

S:

34. I kolika je njena vrednost u novoj realnosti *gledajući kroz prizmu* zaštite životne sredine i upravljanja otpadom?
35. Ako *sagledamo* stvarnu cenu kilovata koja se isporučuje potrošačima, shvatićemo da ona u suštini i nije velika.

We understand sentences like 31–35 in terms of the REASONING IS SEEING metaphor. From the domain of SIGHT, we draw the knowledge that clearly visible objects are the most easily comprehensible ones, and that the blocked objects are hard, or impossible to see, and subsequently comprehend. Consequently, having an unobstructed view of the object aids the comprehension process. Paired with the REASONING domain, the INABILITY TO THINK LOGICALLY corresponds to the INABILITY TO SEE clearly (31). In addition, the differences in reasoning are attributed and correspond to the *prism* one is looking through (34). The metaphorical linguistic expressions *hard, long look* and *sagledamo* indicate that the process is understood via a more specific metaphor REASONING IS TAKING A CLOSER LOOK AT THE OBJECT.

On the other hand, the soundness of one’s reasoning could also be judged based on the tactile experiences that allow us to take the temperature of the surrounding entities. It relies on the ANGER IS HEAT metaphor:

36. Brže-bolje se stvaraju grupe sa vođom na čelu, kog svi slede, i niko pritom ne razmišlja da *hladne* glave ispita ceo slučaj.

Here, the source (HEAT) emerges from the target (ANGER) through a metonymic process (i.e. anger produces body heat) (Kövecses, 2010: 185). Since higher body temperature correlates with anger, which is a hostile feeling⁴, it comes as no surprise that low body temperature is considered desirable in the reasoning process, as the expression *cool-headed* in 36 shows⁵.

4 The same could be observed in the expression *hot-headed* that denotes rash, impetuous, and volatile behavior (OED).

5 “The presence of REASON and CONTROL correlate with cold and dry qualities of black bile and a ‘calculating’

The citations from our corpora predominantly stress the capacity for logical inference, which is highlighted by the REASONING IS MOVING and REASON IS THE FORCE THAT MOVES THE MIND metaphors; therefore, they are instances of goal-directed reasoning. Attributing the ENTITY property, as the examples show, results in specifications of the kind: MENTAL PHENOMENA ARE OBJECTS and REASON IS A LIVING BEING (HUMAN or ANIMAL). The third category of examples that center on sense modalities confirm the hypotheses that are central to the *Embodied Realism* – that abstract reasoning builds on the cognitive mechanisms that allow us to perceive, and that reasoning is emotionally engaged (Lakoff/Johnson, 1999: 14–15, 26).

5. The domain of PROBLEM-SOLVING

The purposive quality of cognitive processes, such as REASONING and JUDGING, is represented by the MOVING metaphor. By this line of reasoning, one of the mappings that is central to the understanding of the PROBLEM-SOLVING domain would be established by the correlation between the object that obstructs the physical movement and that which obstructs a certain mental process. In other words, problems tend to be assigned the ENTITY quality, and, in the PROBLEM-SOLVING IS MOVING metaphor scenario, that entity is perceived as an OBSTACLE:

E:

37. Whatever the reason, the aim is to *remove* that dissonance and adjust your beliefs so that, hopefully, next time you're in that situation, you won't have any sort of mental conflict.

S:

38. Ne očekujem konkretnu reakciju, ali sam siguran da segregacije vakcinisanih i nevakcinisanih učenika neće biti, jer je to izazvalo oštro negodovanje opšte javnosti i to bi bio *nepremostiv* problem.

The examples confirm that the process is highly dependent on the structural metaphor PROBLEM IS AN ENTITY, and metaphorical mappings: thinking is moving, problems are obstacles on the road, and problem-solving is removing the obstacles on the road. Thinking, in its polymorphic sense, could also be impeded by a mental “obstacle” one does not anticipate. The solution to a problem may not always be in one's path, such a conceptual mapping is reflected in the two languages as follows:

E:

39. The minus: the solver does not claim to have *found* a solution, he doesn't want the reward, and he certainly doesn't want to talk to the media.

40. Nor that, were we to *stumble on* a solution to the Hard Problem, on some distant shore where neuroscience meets philosophy, we would even recognise that we'd *found* it.

mindset (i.e. the SPLEEN METAPHOR), and absence of REASON and CONTROL corresponds with the hot and wet qualities of blood and an ‘impulsive’ mindset (i.e. the BLOOD METAPHOR).” (Mischler, 2013: 146)

S:

41. Tako da pisci, često analitičari ili stručnjaci upućeni u stvar pođu od toga šta je za strane u sporu važno, pa onda *traže* rešenje koje bi bilo s tim u skladu.
42. Iz rečenog proističe da su veoma retke planete na kojima su se razvila složena stvorenja kadra da se zapitaju šta se dešava sa evolucijom i da na to *potraže* odgovor.
43. Ovi proizvodi zahtevaju jako malo intervencija i zbog toga su idealni za svaki biznis koji je u *potrazi* za rešenjem koje omogućava A3 štampu na održiv način [...].

The linguistic metaphors in our data highlight the searching aspect of the movement (e.g. *found* in 39; *traže* in 41; *u potrazi* in 43). Namely, they stress the fact that the solution may not be obvious, since one can, quite by chance, *stumble on* it (40). Such a way of construing the PROBLEM-SOLVING domain is reflected in the formal definition of the term that defines it as “the act of finding ways of dealing with a problem or difficulty” (OED). Similar view is held by psychologists (Rot, 2014: 208) who claim that problem-solving occurs when one is aware of their goal, but unaware of the “road” (that is, an approach) they should take to reach that goal⁶.

There are, however, other ways to represent this process. Ascribing the ENTITY quality to a problem allows us to specify the ENTITY domain as an ADVERSARY and stress its severity and the urgency to tackle it (44). Ultimately, the ENTITY domain could be associated with any other concept (i.e. *course content* or *dice*) which is utilized in the problem-solving activity. This is linguistically expressed in the sentences (45–46) belonging to our Serbian set as *povezuju* (engl. *connecting*) or *slapaju* (engl. *assembling* the pieces together).

E:

44. The problem here is the same sort of problem we are *confronted* with when attempting to think about the scale of Bezos’s wealth, or indeed Bezos himself: the mind struggles to gain purchase.

S:

45. Postoji još jedna opcija, da pitanja budu takva da student može da koristi svu dostupnu literaturu, ali da bi odgovorio na pitanje, on mora da *poveže* čitavo gradivo.
46. Čitanje pomaže u rešavanju problema, *sklapanju* kockica znanja u celinu kako bi bolje upravljali svakodnevnim životom, razumevanje procesa, ali i tumačenju i odgovaranju na emocije drugih ljudi.

The general PROBLEM IS AN ENTITY conceptual metaphor thus gives rise to several specific conceptual metaphors that aid the understanding of this process: PROBLEM-

6 One defining factor in the problem-solving process is the notion of *directedness*. For a detailed account of this phenomenon, see Rot (2014).

SOLVING IS CONFRONTING AN ADVERSARY (44) and PROBLEM-SOLVING IS CONNECTING ENTITIES (45–46), which is related to the PROBLEM-SOLVING IS ASSEMBLING metaphor.

6. The domain of DECISION-MAKING

The decision-making process shows the same pattern of reasoning that characterized the previous two processes, primarily regarding the utilization of the Source-Path-Goal Schema. The key distinguishing quality, however, proves to be the prominence it gives to the schema's final segment – goal. This resultative aspect is based on the conceptual mappings: decision-making is moving, decision is the destination, making a decision is arriving at a destination, and reconsidering the decision is going over the path again. This is reflected in the corpora as follows:

E:

47. Decision-making is a central aspect of your personal and professional life, but decisions can be difficult to *arrive at* in the presence of multiple objectives, or differences of opinion with others.
48. Our criminal justice system relies on juries to evaluate facts – that's why we have 12 people doing it – and to *come* to very difficult decisions about very specific factual incidents.
49. Algorithms, especially those based on deep learning techniques, can be so opaque that it is practically impossible to explain how they *reach* decisions.
50. Yet there's no reason to assume that our brains will be adequate vessels for the *voyage* towards that answer.

S:

51. Kako se navodi u saopštenju Policijske akademije, mera je poništena zbog bitne povrede odredba postupka, koji se sada *vraća* na ponovno odlučivanje.

Although the decision-maker can have an active role in the process, whereby they determine its movement and direction, it is likewise possible to conceive of a DECISION as an autonomous entity that moves along a path and then comes to a halt, as in: S: "U izveštaju lista se navodi da je ta odluka *naišla* na nerazumevanje savetnika Merkelove".

When reasoning about the motivation behind the process, DECISION-MAKING tends to be associated with experiences of FORCE, via the general CAUSATION IS FORCE metaphor, that accounts for the decision-making outcome. It underlines the fact that decisions are made on account of some power which enables the transition from the initial, to ongoing, and then final state, in other words, the act of deciding:

E:

52. Learn what really *drives* your decisions and how you can be more strategic about your decision-making, even during times of uncertainty [...].
53. The fact that Trump's decisions are being *driven* so transparently by his petty domestic political problems suggests that the world shouldn't look to Washington to provide responsible leadership any time soon.

The utilization of the ENTITY domain, as previously indicated, allows the speakers to ascribe a particular quality to the mental phenomena. The same holds in the case of our concept DECISION. In our English data, the stress was on its importance, which was a result of the interaction of the DECISION IS AN ENTITY metaphor and the IMPORTANCE IS A PHYSICAL PROPERTY (precisely, SIZE) metaphor (citations 54 and 55).

E:

54. For O'Donaghue, it's always the *smallest* decisions she has the hardest time making.
55. "It is possible for anxiety to be experienced around many different issues, of which a fear of choosing the wrong option in regards to *big* life decisions may be one," she says.

The PHYSICAL PROPERTY domain was also present in 56. Yet, in the given example the properties such as SIZE and WHOLENESS are joined to describe the progression of the process, not its significance. When, however, the focus is on the complexity of the act of deciding (as is the case in 57), English speakers seem to understand it in terms of the COMPLEXITY of the physical objects.

E:

56. Such *granular* decision-making went on and on, until eventually he gave up in exhaustion.
57. Indecision when the decision is *simple*, or the options all acceptable, is the defining characteristic of "fear of better options" – or Fobo – a social phenomenon coined by Patrick McGinnis.

In the Serbian set of examples, the ENTITY domain was used to structure this target domain in several different ways. Firstly, understanding a DECISION as an ENTITY, precisely an OBJECT, offers the possibility to reason about the decision-making process as an act of bringing the object to a certain location, which is why it was primarily expressed in Serbian via the verb *doneti* in 58, (engl. *bring*), or the noun *donosioci* (engl. *bringers*) in 59:

S:

58. U tom pismu ovaj prosvetni sindikat kritikuje nadležne zbog "neodgovorne politike, neetičkog postupanja prema učenicima, nastavnicima i njihovim porodicama time što nije *doneta* nijedna valjana odluka o prilagođavanju nastave i obima znanja u okolnostima pandemije, niti o unapređenju tehničke podrške atipičnoj nastavi".
59. [...] niko nije identifikovao ugrožene površine i *donosioci* odluka ne mogu da planiraju odgovarajuće antierozione mere.

Example 60 indicates that the target domain in question could be assigned the containment properties. As a result, the containment aspect highlights the

impression of feeling trapped as a result of a decision. In this case, it is the DECISION itself that is conceived of as a CONTAINER:

S:

60. Bili smo *robovi* novopečenih gazda i *zatočnici* tuđih odluka.

The DECISION IS AN ENTITY conceptual metaphor often blends with the SUPPORTING IS STANDING BEHIND conceptual metaphor, as in: S: “Napominje da je on odbio ponižavajuće predloge, ali da je *iza* njegove odluke stao Savet”. The preposition *behind* triggers our knowledge structures about arguments, on account of which we correlate the act of supporting one’s decision with the act of standing behind them⁷.

7. Conclusion

On account of our analysis of the three higher cognitive functions, several conclusions could be drawn regarding the way conceptual metaphors influence the way we understand reasoning, problem-solving, and decision-making. Since the same source domains (the fundamental ones being JOURNEY, FORCE, OBJECT MANIPULATION, CONTAINER, SIGHT, and ENTITY (both OBJECT and LIVING BEING)), were identified in both English and Serbian data, we could argue that all three processes tend to be structured in a similar way. The high degree of overlap was likewise observable in the cross-domain mappings, whereas the differences were largely reflected in the metaphorical linguistic expressions.

In fact, the perceived similarities between the two languages probably result from the fact that the majority of specific conceptual metaphors are prototypical instances of more basic mappings – a remark made by Grady (1997) (Deignan, 2005: 174). This is especially evident in the case of the MOVING metaphor, which was observed in all three cognitive processes, since they all follow the formula X IS MOVING (REASONING IS MOVING; PROBLEM-SOLVING IS MOVING; DECISION-MAKING IS MOVING). We know from our daily experiences that achieving a purpose entails motion directed to a certain place (see Gibbs, 1994; Klikovac, 2004; Lakoff, 2009; Kövecses, 2010; Johnson, 2017). Such reasoning, as much research and our analysis show, is projected onto the mind. This could explain why the JOURNEY domain is central to nearly all mental processes, including those to which the present study aims. The differences between the three functions in this respect are reflected in the aspect which is highlighted. For instance, REASONING seems to focus on the SEQUENCE OF STEPS, PROBLEM-SOLVING centers on the notion of an OBSTRUCTED MOVEMENT, whereas DECISION-MAKING focuses on the DESTINATION, i.e. the final segment of the journey.

Another generalization concerns the ENTITY domain. As our research shows, when specified as a LIVING BEING, the focus tends to be on the physical properties or qualities that the entity possesses. When specified as an OBJECT, however, the entities

⁷ This conceptual metaphor has been observed in Serbian by Klikovac (2004: 156).

used in these functions enable the cognizer to perform these actions. Namely, *facts*, *information*, *premises*, and other mind-related entities are used in the processes. In the case of PROBLEM-SOLVING, PROBLEMS are perceived as ENTITIES that should be removed, or connected in order to find a proper solution, whereas DECISION-MAKING draws heavily on the movement and physical properties of decisions.

We have by no means exhausted all the possibilities regarding the understanding of the selected processes. Their in-depth analysis, as well as the world view promoted by the MIND metaphors, will be more fully performed in our larger study. Yet, the results help identify the direction future work could take in the attempt to explicate one of the most abstract concepts, that is, MIND.

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Тамара Н. Јаневска

Сажетак

МЕТАФОРИЧКА КОНЦЕПТУАЛИЗАЦИЈА РАСУЋИВАЊА, РЕШАВАЊА ПРОБЛЕМСКИХ СИТУАЦИЈА И ОДЛУЧИВАЊА КОД ГОВОРНИКА СРПСКОГ И ЕНГЛЕСКОГ ЈЕЗИКА

Рад представља део истраживања чији је циљ био испитати поимање апстрактног домена ума. Услед ограничености обима рада, пажња је усмерена на испитивање следећих менталних процеса: расућивања, решавања проблемских ситуација и одлучивања. Како би се испитао начин на који говорници енглеског и српског језика поимају напоменуте аспекте когниције, истраживање се спроводи у теоријском оквиру појмовне метафоре (Lakoff/Johnson, 2003). Испитују се и пореде различите језичке реализације појмовних метафора како би се утврдио спектар изворних домена путем којих се дати апстрактни, циљни домени структуришу. Контрастивном анализом настојимо утврдити сличности и разлике између два језика која су предмет истраживања ради провере хипотезе о универзалности метафоре. Резултати истраживања упућују на висок степен сличности у погледу мапирања и скупа изворних домена. Као посебно продуктивни домени истичу се кретање, сила, садржатељ, ентитет, вид и манипулација предметима, док се међу најчешћим сликовним схемама издвајају схема путање и схема манипулације.

Кључне речи:

когниција, виши когнитивни процеси, теорија појмовне метафоре, расућивање, решавање проблемских ситуација, одлучивање, енглески језик, српски језик