

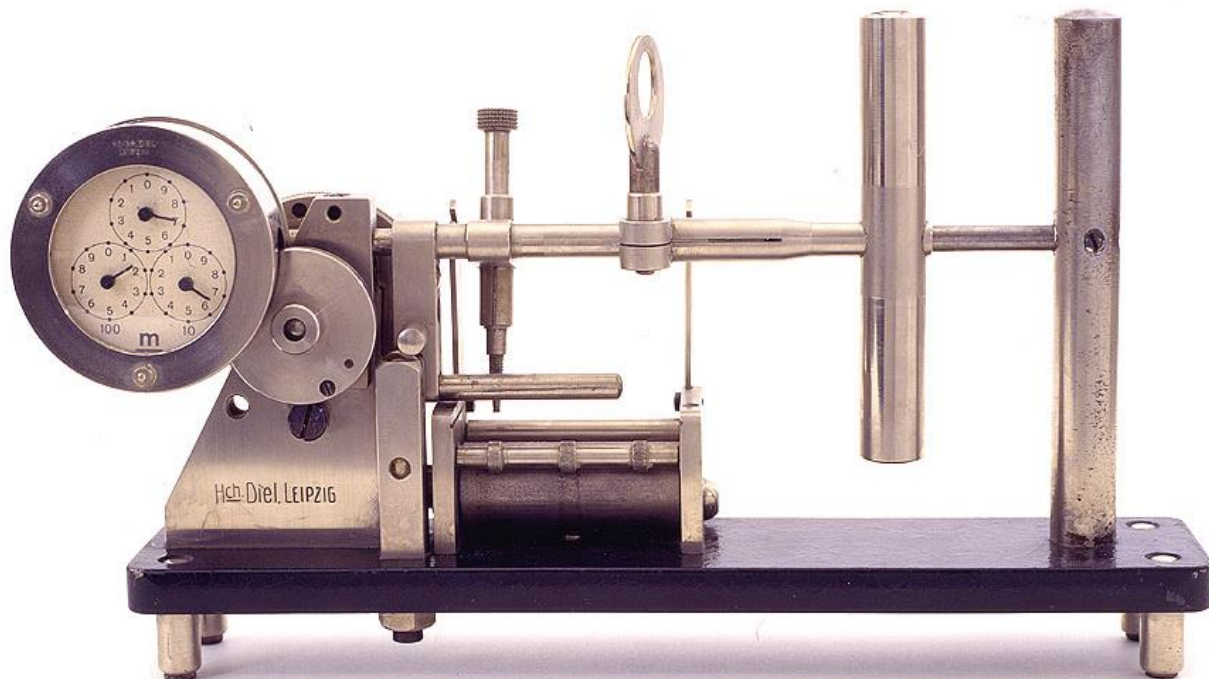
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EMPIRICAL STUDIES IN PSYCHOLOGY

MARCH 29TH – 31ST, 2019

FACULTY OF PHILOSOPHY, UNIVERSITY OF BELGRADE



INSTITUTE OF PSYCHOLOGY
LABORATORY FOR EXPERIMENTAL PSYCHOLOGY
FACULTY OF PHILOSOPHY, UNIVERSITY OF BELGRADE

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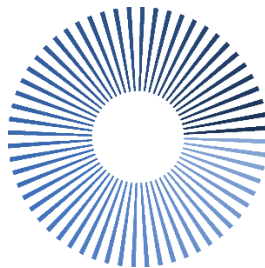
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FACULTY OF PHILOSOPHY, UNIVERSITY OF
BELGRADE

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Belgrade, 2019

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COGNITIVE PSYCHOLOGY

Testing Argumentative Theory of Reasoning: Is Group Smarter than its Smartest Member?

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Abstract

Recent developments in deliberative and epistemic theories of democracy state the assumption that democracy is a smart decision making process. According to the cognitive model of Argumentative theory of reasoning (ATR), complex cognition has evolutionary function which is a social one, rather than individual, or, more precisely, a polemic function. The reason for futile individual reasoning is the existence of numerous cognitive errors - which individuals exhibit in the wide range of tasks. Group decision making then serves to compensate limitations of individual higher cognitive processes. This research is one of the pilot studies of the project which aims to empirically test the assumption of the model that groups have better performance than its best member. This was done by merging heuristics and biases approach with the ATR. Two studies were conducted. In the first one, participants' individual (N = 153) belief bias was measured and they were assigned into discussion groups. The design was counterbalanced. The same design was employed in the second study (N = 94), except that the focal point of this study was not logical reasoning, rather judgment and decision making, by outcome bias, hindsight bias, and anchoring effect. Here we present partial results, which are the findings of the qualitative analysis of the type of the group discussions and regularities observed. Two clusters of group discussions were observed, so called "cascade" and "deliberative", and the second type yielded more correct answers. Finding is in accordance with the notions of the ATR, albeit it is fairly insufficient to make stable inferences.

Keywords: argumentative theory of reasoning; cognitive biases; decision making; deliberation; democracy

Introduction

Describing and predicting the dynamics between the decision-making process and the cognitive benefits of deliberative decision-making are tackled in some models, albeit not narrowly. Epistemic theories of democracy imply that if democratic decision-making should be fully justified, there must also be "some kind of" intelligence "that we perceive in terms of its outcomes" (Landemore, 2013). Findings suggest that "cognitive diversity" is a key element for the emergence of the phenomenon of collective intelligence" (Hong & Page, 2004, 2008; Page, 2007, 2008). Cognitive diversity implies different mental tool sets that people use when solving problems or predicting future possibilities (Landemore, 2013). According to these findings, groups made of individuals with diverse approaches to problem constantly achieved better results than groups made of the best individuals, under the certain conditions (Page,

2008). However, that research was actually a computer simulation. The explanation offered implies that the best individuals are likely to have similar perspectives and heuristics, and are thus likely to "get stuck" in the same places, within the same approach that can't produce workable solution. The randomly selected individuals will not, because they bring a variety of ways of thinking. In the case of democratic decision-making, this would mean that the inclusion of a larger number of people ensures greater cognitive diversity, which increases the likelihood of reaching a correct agreement.

The assumption that a larger group will have greater cognitive diversity is simply more plausible than the assumption that it will be the case when the group is smaller. Results from the deliberative forums show that deliberation can reveal inconsistent, false and tacit assumptions and that it leads the discussion and its participants to "correct" decisions (Luskin & Fishkin, 2002). Although there are positive outcomes and influence of the deliberative forums, primarily regarding participants more informed opinion, a certain problem was noted in the implementation of the forum and the psychological mechanism that leads to a better decisions is not fully explained within the framework of the cognitive paradigm. The presumably synergistic effect of cognition and deliberation remains an open question.

The greatest inducement for initial consideration of this problem comes only recently, through Argumentative theory of reasoning (Mercier & Landemore, 2012; Mercier & Sperber, 2017). According to this model, reasoning (i.e. complex cognition) has no exclusive individual function, but a social, or, more precisely, a polemic function. As a fundamental human function, communication evolved through the evolutionary process in such a way as to enable people with the mechanism of "empirical vigilance". It is the ability to register and eliminate potentially threatening information, which is actualized in the process of argumentation or polemics. This assumption leads to the conclusion that cognition not only is not damaged by social processes and social needs, but that all cognitive illusions, that we are systematically prone to, come precisely from the use of our own reason in isolation, i.e. outside the group.

Within today's domineering approaches to the study of JDM, the existence of numerous *systematic* errors, predictable for most members of the human species are well confirmed. These phenomena are called cognitive illusions or biases, and are rooted in heuristic algorithm

(Kahneman, Slovic & Tversky, 1979; Tversky & Kahneman, 1974; Kahneman, 2011).

According to the ATR, group decision-making helps to overcome the limitation of individual decision-making, judgement and reasoning. This model suggests that during public deliberations, when diverse opinions are considered, group judgment outperforms individual. Consequently, in the group of cognitively diverse people, the shortcomings and mistakes of individual reasoning are corrected at the collective level. The constructive hypothesis of this theory is that if the evolutionary function of reasoning is evolutive, reasoning will lead to better results and outcomes of the group than individually.

The aim of this research was to test a conservative version of the hypothesis: The outcome of the cognitive effort of the group will lead to a better outcome than the cognitive effort of its smartest individual. The goal of the research will be accomplished by implementing three multiphase complementary experiments that together form a single study, starting from basic higher cognitive processes to more complex ones. The aim was to obtain data about deliberation and group decision making in for of information about occurrence of deliberation, and to test the procedure.

Method

Sample

Two studies were conducted. In both studies, participants were students of Faculty of Philosophy, in the first one $N = 153$ (65% female, average age 20), and in the second one $N = 94$ (68% female), as a part of their courses. In the accordance with the aim of the studies, participants and higher on cognitive tasks were excluded.

Materials

32 dual response syllogistic reasoning tasks, 10 items for other biases, cognitive reflection test (CRT, Frederick, 2005), test of general knowledge.

Design and Procedure

In the both studies, participants' individual susceptibility to different cognitive biases were assessed, as well as the CRT score, and score on test of general knowledge. After the exclusion of the highest scoring participants (above the scoring of 85%), subjects were assigned into discussion groups, which consisted out of 3-5 members, all different in level of the individual performance. The design was counterbalanced; half of the participants were first doing tasks individually, and the second first in the groups, and vice-versa. The number of correct responses was recorded for all the biases (anchoring effect, belief, hindsight, outcome bias). Presence of deliberation was observed and analyzed.

Results

Here we present partial results, which are the findings of the qualitative analysis of the type of the group discussions and regularities observed. Two clusters of group discussions were

observed, we dubbed them as the "cascade" (40%) and the "deliberative" (60%). The second type yielded more correct or close to correct answers, almost 70% of all answers were correct. Namely, solutions to the cognitive biases tasks in the "deliberative" groups, in which discussion occurred, were more in accordance with the normatively rational answers. In cascade groups, two types of problem solving were observed: when one person ("leader") gives an answer (usually erroneous), others would 1) agree without deliberation, or 2) stay silent. No difference between members of the different type of groups in CRT score was registered, nor in the scores of cognitive biases and general knowledge ($ps > .05$).

Discussion

Finding is in accordance with the notions of the ATR, albeit it is fairly insufficient to make stable inferences, most of all because of the sample type and sample size. Student sample is not the most diverse one in terms of cognitive functioning, and number of groups was rather small to make quantitative analysis with small group as the unit. However, the procedure itself is adequate for further testing in the main study, with paying special attention to the role of the experimenter and the motivation of participants.

This reasoning within group, according to the ATR, relies on the ability of citizens as a group to, under the right conditions, outperforms alternative decision-making choices that would be exercised by an individual or a few chosen. Cognitive mechanism that underlays this presumed phenomena is yet to be described in details, but one explanation could be that the diversity of the individual heuristics triggers associations which in turn form a common cognitive space or "heuristic network".

Acknowledgements

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The Effect of Grapheme Size on Processing of Latin and Cyrillic Words

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Abstract

The graphemes are designed to transmit the appropriate information by combining a limited number of terminations as well as straight and curved lines. It was found that visual degradation of words written in lower case letters has a different effect in two alphabet systems. The question is whether such effects will be obtained on upper case letters. Two factors were varied-alphabet (Cyrillic and Latin) and visual availability of information (visible whole word, visible upper part of the word and visible lower part of the word). A significant difference was found between the experimental situations in the RT ($F(5) = 360.2, p < .001$). The results show that processing of Cyrillic words and Latin words with visual accessible upper half of the letter are slower when they are written in capital letters. But, whole Latin words and Latin words which are visible to the bottom half, are processed faster if they are written in capital letters.

Keywords: Latin, Cyrillic, word processing, grapheme size, visual degradation

Introduction

Each alphabet is a set of characters that contain common and specific features which allow a distinction between them. Identification of individual grapheme is necessary for visual recognition of the word. Some authors point out that the grapheme are basic perceptive and functional reading units (Havelka & Frankish, 2010). In Serbian, there is bialphabetism, the phenomenon that one word can be written in two alphabets - Cyrillic and Latin. The specificity of this phenomenon is reflected in the fact that each letter in both alphabets has its phonemic interpretation which does not change (Vejnović & Jovanović, 2012). One group of researchers has focused its attention on identifying structural differences between the two alphabets, suggesting that the isolated letters are specific enough to lead to differences in the processing of Cyrillic and Latin words. In the early 1935s, Ramiro and Zoran Bujas examined the perception of isolated letters in the conditions of a short exposure and found the average readability of both types of letters (Koković-Novosel, 2011). Rohaček (1973) examined the readability of words written in small letters and found better results for the words written in the Latin alphabet. The author assumed that this was due to the large number of upper and lower extensions. In an attempt to study the effect of grapheme characteristics on the word processing speed, Borojević, Dimitrijević and Stančić (2018) carried out an experiment in which they manipulated the visibility of the word. The visual degradation of the words written in lowercase had a different

effect in the Latin and Cyrillic alphabet. In Cyrillic words processing is slower, while in Latin words processing is slower only in the case of degradation of the lower part of the letters. The question is whether such effects will be obtained when the words are written in uppercase. Namely, various studies have shown that processing is different if letters of different sizes are used as stimulus (Smith, Lott, & Cronnel, 1969; Arditi & Cho, 2007). Tinker (1963) was the first who find that the text consists only of capital letters is much more difficult to read than the text in the lower case. So, the aim of this study is to examine the effect of grapheme size on processing Latin and Cyrillic words.

Method

Sample

Sixty-eight undergraduate students participated in this experiment. In the sample were included participants that have met the following criteria:

- Cyrillic was the first learned language;
- They had less than 30% of errors
- They do not have preferred alphabet in reading and writing

All subjects had normal or corrected to normal vision.

Design and Procedure

Two factors were varied: *alphabet* (Cyrillic and Latin) and *visual degradation of word* (degraded in upper part, degraded in lower part, undegraded). By combining varied factors, six experimental conditions were obtained. Stimuli used in this experiment were 60 nouns (masculine, nominative, singular, six character length) and 60 pseudowords of the same length. All stimuli were written in uppercase with Arial font 48.

The lexical decision task was used in experiment. Two dependent variables were measured, the reaction time and the number of errors. Participants were tested individually and received a 120 experimental trials with additional 6 practical trials. Each trial is started with presentation of fixation point for 500ms. After that, a series of letters appeared on the screen. Participants were instructed to press one of two buttons on the keyboard to indicate whether these letters are word or pseudoword. The stimuli (words and pseudowords) were displayed on the screen until the answer was given, with maximum time 3000ms. Experimental session lasted approximately 15-20 minutes per participant.

Results

A significant difference was found between the experimental situations in the reaction time (RT) for word ($F(5) = 360.2$, $p < .001$), whereby the Scheffe post hoc analysis of the average RT was grouped into four groups: (1) (804ms), (2) whole Cyrillic (942ms); (3) visible upper (1521.8ms) and lower part (1553.2ms) of Latin words, and (4) visible lower (1827.8ms) and upper part (1948.8ms) of Cyrillic words. Significant effect was obtained in pseudowords ($F(4) = 586.4$, $p < .001$), but the differences in average RT are not significant among all experimental situations.

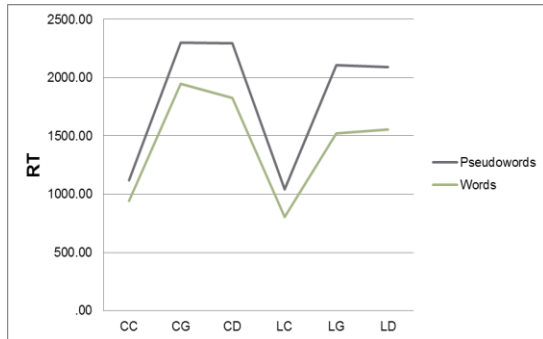


Figure 1. Response latency depending on the *alphabet, lexicality and type of visual word degradation*. Note: *cc* - visible whole Cyrillic words, *cd* - visible upper part of Cyrillic words, *cg* - visible lower part of Cyrillic word; *lc* - visible whole Latin words, *ld* - visible upper part of Latin words.

When the results are compared with the results obtained on the same stimulus in the lower case (Borojević, Dimitrijević, Stančić, 2018), some differences can be noticed (Figure 2). A comparison was not possible for the experimental situation for Latin words in which the lower part was invisible, because in a case of small letters (Borojević, Dimitrijević, & Stančić, 2018) participants have achieved a low accuracy, so this experimental situation in that study was excluded from the analysis. Other comparisons show that reaction time is longer for Cyrillic words (both, degraded and undegraded) when they are written in uppercase.

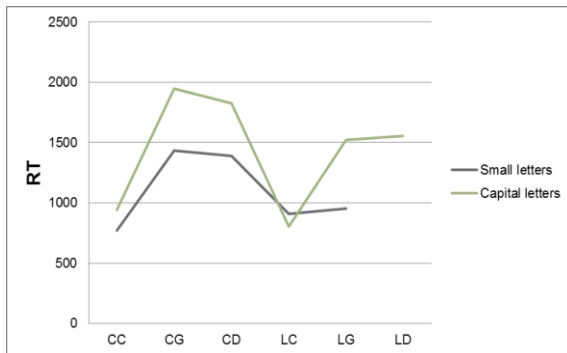


Figure 2: Differences in response latency for word written in small and capital letters among experimental situations

Also, the processing time is longer for Latin words that have degraded the lower part. On the other hand, whole Latin

words are processed slower when they are in lowercase. It could also be concluded for the Latin words that were degraded to the lower part.

Discussion and conclusion

This research is based on the assumption that the difference in processing of two letters Serbian language is based on the structural differences that is, the specific characteristics of individual grapheme. Earlier research (Borojević, Dimitrijević, & Stančić, 2018) has shown that there is an effect of grapheme characteristics on the processing speed of Latin and Cyrillic words, the authors emphasized that the different number of line terminations in the upper or lower part of the letters contributes to different visual complexity, and therefore the differences in recognition. Latin letters also have specific extensions in the upper part that make them different from the Cyrillic letters. When the same experimental manipulation with visual degradation of words is applied to stimulus written in capital letters, somewhat different results are obtained. In Cyrillic words, the response time is longer which implies that processing is more demanding. This is in line with previous research that showed that capital letters are the same height, and they do not contain ascenders and descenders (except the letters Lj and Nj), which would allow a quick distinction (Ardity & Cho, 2007). Ascender is the part of lower-case letter that is taller than the letter. Conversely, descender is the part that is lower than the letter. Slower processing is also observed in Latin words where the lower part is removed. However, the results obtained with the Latin word which has been degraded in the upper part, as well as for the whole word, are inconsistent with previous findings. In attempting to explain such data, we can rely on the researches of the importance of different visual characteristics in the discrimination of letters in different languages. The most important characteristics that are sufficiently perceptively saturated to facilitate the processing of letters and words that create are: vertices (Lanthier, Risko, Stolz, & Besner, 2009), disconnected component (Winkel, 2009) and number of strokes (Tamaoka & Kiyama, 2013). It is possible that the two alphabets of the Serbian language differ in the dominance of the special visual features that are key to recognizing letters and words. It should be systematically checked through experiments in which frequency and frequency should be controlled.

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Inferences of Vertical Projectile Velocity and Acceleration: Task Characteristics Consideration

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Abstract

Human intuitive knowledge about physics mechanics is inherently flawed and characterized by various misconceptions. The primary aim of this study was to examine whether these misconceptions, in particular about velocity and acceleration of vertical projectile, are sensitive to task presentation format. Sample consisted of 250 undergraduate students (76.7% female), whose task was to infer the point of maximum velocity and acceleration characteristics of a ball thrown vertically upwards. Task format was varied in four conditions between-subjects design (stick-drawing vs. textual, with three different positions of stick-figure hand, at 45, 90 or 135 degrees from the body). Results indicated that inferences about maximal velocity point and acceleration characteristics are not influenced neither by stick-figure hand positions, nor by the change in task format, i.e. stick-drawing compared to textual task. Overall results indicate that our misconceptions regarding velocity and acceleration of vertical projectile are not sensitive to task presentation format.

Keywords: intuitive mechanics, vertical projectile motion, task characteristics

Introduction

Intuitive knowledge of mechanics is knowledge of speed, acceleration, causes of movement, etc., acquired through experience. This knowledge is often found to be erroneous, and one of the earliest attempts to explain these errors, particularly in inferences regarding motion, was impetus theory developed by McCloskey (Caramazza, McCloskey, & Green, 1981; McCloskey, 1983). According to impetus theory, our inferences are based on the incorrect belief that, at the beginning of its movement, the object gains impetus, i.e. the internal force that influences object's movement. On the other hand, instead supporting the claim that we possess one general, "naïve" theory of impetus, some authors (see Cooke & Breedin, 1994) claim that during the process of inference about the movement many different information are

taken into account (see also White, 1983). Also, they emphasize the crucial importance of the contextual factors, such as, for example, the type of motion, the characteristics of the objects in interaction, and the way in which the task is formulated. Some authors do not deny the significance of contextual factors, but they also do not reject the possibility of naïve theory of impetus (DiSessa, Gillespie, & Esterly, 2004; Kaiser, Jonides, & Alexander, 1986; Ranney, 1994), because it is (although different from person to person, under the influence of the context and inconsistent), largely based on non-experiential, systematic and time-stable information (Ranney, 1994).

The aim of this study was to examine whether these misconceptions, in particular about the velocity and acceleration of vertical projectile, are sensitive to task presentation format.

Method

Design

Maximum velocity task format is varied in four conditions between-subjects design: stick-drawing tasks vs. textual task. Stick-drawing tasks have three different positions of stick-figure hand: 45, 90 or 135 degrees from the body. The task that did not contain the drawing had six answers: "Between the middle and furthest part of the trajectory", "In the middle part of the trajectory", "Between the initial and middle part of the trajectory", "At the initial part of the trajectory, immediately after the point of throw-out", "At the initial part of the trajectory - at the point of throw-out", "At the furthest part of the trajectory, immediately before the point of stopping". The sequence of those answers had two variants.

On the other side of the paper, there was a question related to the acceleration of the ball, where the respondents should have chosen one of the six offered answers: (a) "The ball is initially decelerating, and then accelerating.", (b) "The ball is initially moving at constant velocity and then decelerating.", (c) "The ball is initially accelerating, and then decelerating.", (d) "The ball is continuously decelerating.", (e) "The ball is initially moving at constant velocity and then accelerating."

and (f) “The ball is continuously accelerating.“, The sequence of these answers had two variants, as well.

Participants and procedure

The sample consisted of 250 undergraduate students at the University of Banja Luka (76.7% female), with group sizes from 61 to 63 participants. The average age of respondents was 21 years ($SD = 1.97$).

The respondents first evaluated the position in which the ball thrown vertically upwards moves at the maximum speed and then responded to the question regarding changes in the speed of the ball along its path.

Results

Results, based on Fisher’s exact test, indicated there was no difference between stick-figure hand position conditions when it comes to the inference about the point of maximal velocity ($p = .884$, $\phi_c = .117$; Figure 1) and for acceleration inferences ($p = .656$, $\phi_c = .151$; Table 1).

The difference was not observed neither when stick-figure and textual format were compared regarding inference about maximum velocity point ($p = .217$, $\phi_c = .168$; figure 1), nor for inferred acceleration characteristics ($p = .051$, $\phi_c = .204$; Table 1).



Figure 1: The inferred maximal velocity point of vertical throw in: (a) text condition, (b) 45° angle drawing, (c) 90° angle drawing, and (d) 135° angle drawing.

Table 1: Inferred acceleration characteristics of the vertical throw

The ball is...	initially decelerating, and then accelerating. (%)	initially moving at constant velocity and then decelerating. (%)	initially accelerating, and then decelerating. (%)	continuously decelerating. (%)	initially moving at constant velocity and then accelerating. (%)	continuously accelerating. (%)
45°	6.3	19.0	49.2	7.9	3.2	14.3
90°	0.0	14.5	51.6	14.5	4.8	14.5
135°	1.6	21.0	45.2	16.1	4.8	11.3
Text	3.2	8.1	54.8	24.2	4.8	4.8

Discussion and Conclusions

Results from the stick-drawing situations are in line with previous findings (Damjanić & Dimitrijević, 2016) (Damjanić & Dimitrijević, 2016), where solely stick-drawing condition with 90 degrees position of the hand relative to body was used. Correct answer (the ball reaches maximum velocity immediately when thrown-out of the hand) was given by 17% of respondents. Respondents who answered incorrectly, estimated on average that the maximum velocity point is in the middle of the ball path. The question about the acceleration of the ball thrown upward was correctly answered by 13% of the respondents. Most frequent answer was that the ball first accelerates and then decelerates (70% of the cases; Damjanić & Dimitrijević, 2016). Although in present research percentages are somewhat smaller (52%), we can conclude that the results in these two studies are similar to a large extent.

Considering different hand positions, according to the impetus theory (McCloskey, 1983), position of the thrower’s hand should have influenced maximum velocity point inferences, considering that in situations with 45° and 90° hand positions, the hand can exert additional force on the ball by moving further upwards, while further upward movement is not possible in 135° situation. Contrary to these predictions, the overall results of this study indicate that our misconceptions regarding the velocity and acceleration of vertical projectile are not sensitive of stick-figure presentation format.

Although some authors point out the significance of contextual factors, for example, the manner in which the task is presented, in this case there are no recorded differences between written and visual assignments. However, marginally increased accuracy in the text condition requires further investigation.

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Sensory Load and Word Recognition

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Abstract

The hallmark of the Perceptual Symbol Systems model is the hypothesized perceptual simulation that is at the core of conceptual representation. The simulation can be boosted if the attention is directed towards a given modality, or prevented if the input information occupies attentional resources within the given modality. Here, we make use of this effect to demonstrate that perceptual simulation occurs not only when explicitly addressing particular sensory feature (as previously demonstrated), but also in word recognition. We hypothesized that working memory load in the given modality would cancel-out the simulation boosting effect that occurs when the presentation modality and the modality of perceptual experience with objects denoted by the given word are the same. Indeed, our results revealed that the simulation boosting effect that had been observed in the control condition was cancelled out under cognitive load condition by the selective interference. In the light of Perceptual Symbol Systems, this is interpreted as a consequence of the preventing of perceptual simulation, thus pointing to the role of perceptual simulation in the process of word recognition.

Keywords: dual tasks; embodied cognition; lexical decision task; semantic memory; working memory

Introduction

According to the Perceptual Symbol Systems model (Barsalou, 1999) the semantic representation of the word is grounded in the perceptual experience with an object that is denoted by that word and is recorded in the neural states that underlie the process of perception. In order to understand the meaning of the word, i.e. in order to activate the semantic representation, one must re-enact the very pattern of neural activation that had been present during the experience with the object denoted by the given word. In other words, the process of semantic activation is coupled with the process of the simulation of the specific perceptual experience.

Previous research has shown that the process of simulation can be both boosted and prevented (Connell & Lynott, 2012). The boosting of simulation occurs if the perceptual stimulation is applied in such a way that it directs attention to the given modality without occupying the resources within that modality, thus leading to easier simulation and facilitated processing. For example, responding to perceptual stimulus (e.g. visual) leads to subsequent shorter property verification time in the same perceptual modality (e.g. *broccoli is green*; van Dantzig, Pecher, Zeelenberg, & Barsalou, 2008). Similarly, tactile stimulation of the hands leads to faster naming of the relevant object (e.g. *which is bigger: wallet or key*; Connell, Lynott, & Dreyer, 2012). In addition to the

boosting, the simulation can also be prevented. This happens if perceptual stimulation from the input occupies attention within the modality thus leaving insufficient resources for the process of simulation and leading to interference. For example, attending to auditory illusion which depicts motion leads to slower sensibility judgements of the sentences that describe the same motion (Kaschak, Zwaan, Aveyard, & Yaxley, 2006). Similarly, holding perceptual stimuli in memory (e.g. visual shapes) leads to slower property verification in the same modality (e.g. *lemon can be yellow*; Vermeulen, Corneille, & Niedenthal, 2008).

In the current research, in order to demonstrate that perceptual simulation is present in word recognition, we aim to join the boosting and the preventing of the simulation in a single study. We start by reasoning that if directing of attention boosts the simulation, and occupying of attention prevents it, than occupying of attention should cancel out the boosting effect in a situation where both are present simultaneously. We will take as the starting point the boosting effect that was observed by Živanović and Filipović Đurđević (2011). In that study, two categories of words were selected: nouns that denote objects that can only be experienced visually (e.g. *rainbow*) and nouns that denote objects that can only be experienced auditorily (e.g. *melody*). Both groups of words were presented in both visual and auditory lexical decision task, i.e. through visual and auditory sensory modality. The results revealed that visual lexical decision latencies were shorter for words denoting visual objects, whereas auditory lexical decision latencies were shorter for words denoting auditory objects. In other words, the boosting of simulation within a perceptual modality was observed if the stimuli were presented in that modality. Visual word presentation directed the attention to visual modality thus helping the simulation of words denoting objects that can be experienced visually. Along the same line, auditory word presentation directed the attention to auditory modality thus boosting the simulation of words denoting objects that can be experienced auditorily. Importantly, in neither case the attentional resources were not occupied, only directed towards a modality. In the current research, we attempted to cancel out this boosting effect by preventing simulation. This was to be achieved by occupying attentional resources within a modality, and we attempted to do so by introducing Working Memory (WM) load within the given modality. We taxed Phonological Loop (PhL) by asking participants to perform lexical decision while performing Serial Digit Recall, and Visuospatial Sketchpad (VSSP) by

simultaneous lexical decision and memorizing of visual objects. We predicted that VSSP load will cancel out the advantage of words denoting visual objects only in visual lexical decision task, whereas PhL load will cancel out the advantage of words denoting auditory objects only in auditory lexical decision task.

Method

We conducted a dual task experiment. The primary task was lexical decision task, whereas the second task was designed to tax either PhL or VSSP.

Participants

A total of 111 participants took part in the experiment for the fulfillment of partial course credits. They were randomly assigned to one experimental condition ($N1 = 21$; $N2 = 18$; $N3 = 18$; $N4 = 18$; $N5 = 18$; $N6 = 17$). All were native speakers of Serbian with normal, or corrected-to-normal vision, who signed informed consent form prior to participating. The study was approved by Ethical Committee of the Department of Psychology, at Faculty of Philosophy, at University of Novi Sad.

Materials and design

We adopted the two groups of Serbian nouns from Filipović Đurđević and Živanović (2011). One group consisted of nouns denoting objects that could only be perceptually experienced in visual modality ($N = 20$), whereas the other group denoted objects that could only be perceptually experienced in auditory modality ($N = 20$). The two groups were matched for word length, orthographic neighborhood, uniqueness point, lemma frequency, and word familiarity (subjective frequency). The forty critical stimuli, along with fillers ($N = 20$) and pseudo-words ($N = 60$) were presented to four groups of participants. Half of the participants were presented with ALD and half of them were presented with VLD. Simultaneously with performing lexical decision, participants were engaged in the second task which incurred additional WM load. Within each presentation modality, half of the participants were performing serial digit recall which was taxing their Phonological Loop (PhL), whereas half of the participants were memorizing visual matrices which taxed their Visuospatial Sketchpad (VSSP). Additionally, the data collected from two groups of participants that were engaged either in VLD or ALD without additional WM load were taken from Filipović Đurđević and Živanović (2011) to serve as the control condition.

The targeted design was 2x3x2 factorial design. We manipulated the presentation modality between participants (VLD, ALD), the modality of WM load between participants (PhL load, VSSP load, no load), and the modality of the experience with an object between stimuli (visual, auditory).

Procedure

The dual-task procedure of Lexical Decision Task coupled with WM load was adopted from Preković et al., (2016).

Stimuli were presented in blocks which were preceded by presentation of the material to be maintained in WM during the LD task and recalled at the end of each block.

Results

Linear mixed effects regression model fitted to log transformed processing latencies revealed significant three-way interaction of the presentation modality, modality of WM load and modality of the experience with an object (Table 1 and Figure 1).

Although PhL load incurred the highest processing cost (as expected given the verbal nature of the primary task), this effect was the same across word types and across the presentation modalities. As compared to the no-load (control) condition, VSSP load was also detrimental for processing in general. However, VSSP load was more detrimental for processing words which denoted visual objects, but only when presented in VLD. In other words, VSSP load was more detrimental for processing visually presented words denoting objects that can be experienced visually (e.g. *rainbow*) than to visually presented words denoting objects that can be experienced auditorily (e.g. *melody*).

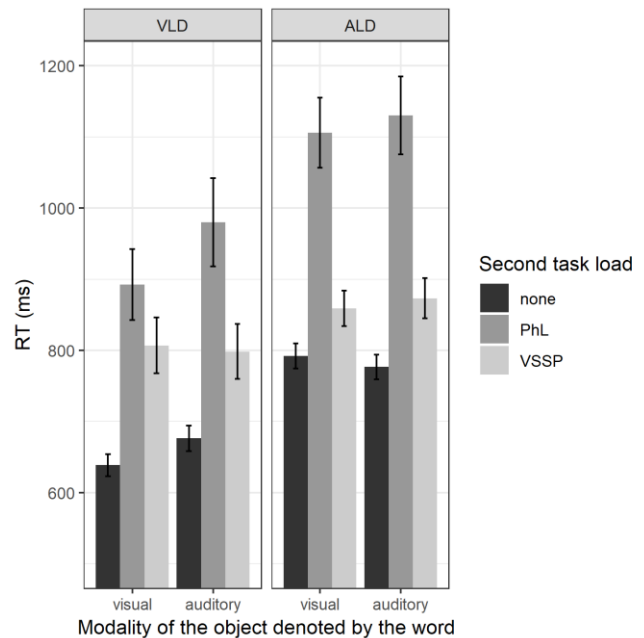


Figure 1: Average reaction time per condition. The left hand side plots data from Visual Lexical Decision task (VLD) and the right hand side plots the data from Auditory Lexical Decision task (ALD). Shades of gray depict the type of processing load: control condition (no load - none), Phonological Loop load (PhL), and Visuospatial Sketchpad (VSSP). Perceptual modality of the objects denoted by the words in question is presented on x axes. Vertical bars denote 95% confidence intervals.

Table 1: Coefficients from the mixed-effects regression model fitted to (log transformed) processing latencies.

Random Effects				
	Variance	Std.Dev.		
Participant (Intercept)	.018	.134		
By-participant slope for the order of trial presentation	.002	.040		
Word (Intercept)	.007	.086		
Residual	.216			
Fixed Effects				
	Estimate	Std. Error	t value	Pr(> t)
Intercept (Perceptual modality: visual; Presentation modality: VLD; Second task load: none)	6.44	.04	165.26	<.001
Order of trial presentation	.01	.01	1.33	.187
Perceptual modality: auditory	.06	.03	1.97	.054
Presentation modality: ALD	.22	.05	4.78	<.001
Second task load: PhL	.23	.05	4.74	<.001
Second task load: VSSP	.18	.05	3.80	<.001
Perceptual modality: auditory, Presentation modality: ALD	-.08	.02	-3.53	<.001
Perceptual modality: auditory, Second task: PhL	-.01	.03	-.34	.735
Perceptual modality: auditory, Second task: VSSP	-.07	.03	-2.68	.007
Presentation modality: ALD, Second task: PhL	.05	.07	.69	.494
Presentation modality: ALD, Second task: VSSP	-.12	.07	-1.80	.074
Perceptual modality: auditory, Presentation modality: ALD, Second task: PhL	-.01	.04	-.25	.806
Perceptual modality: auditory, Presentation modality: ALD, Second task: VSSP	.09	.03	2.55	.011

Discussion

We have observed that cognitive load could cancel out the simulation boosting effect if presented within the same modality. Such cancelling-out effect is rooted in the preventing of simulation that occurs as a consequence of such load occupying attentional resources (Connell & Lynott, 2012). By doing so, we have demonstrated that perceptual simulation is present in word recognition, as postulated by Perceptual Symbols model (Barsalou, 1999).

However, the predicted effect was observed only in visual domain. Therefore, future research should focus on replicating the effect in a higher-powered study and on manipulating cognitive load in a way that would allow for relating a change in cognitive load with a change in processing latencies.

Acknowledgments

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Is there an effect of syntactic complexity on the order of acquisition of *se*-verbs in Serbian?

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Abstract

The present study was designed to test the order in which different kinds of *se*-verbs are acquired in Serbian as the first language. True reflexive, true reciprocal, and anti-causative verbs were tested. None of the tested types is syntactically simple, because they do not involve a canonical linking of semantic roles and syntactic functions. However, it was expected that anti-causative verbs would be acquired after true reflexive and reciprocal verbs, because they are syntactically more complex. A total of twenty-seven subjects belonging to three age groups (3, 4 and 5 year old-nine participants each) took part in the pilot research. The data collection technique was a structured interview with a verb elicitation task. The children were asked to name the activities presented in the pictures. The independent variable was verb type with three levels (true reflexive, true reciprocal and anti-causative verbs). The dependent variable was verb production (coded as target or non-target). The results have indicated that anti-causative verbs are the most difficult for children to produce, as expected, which adds to the body of research that shows that the production of certain verb types causes more difficulty. More participants should be included in the research in the future in order to obtain more reliable results.

Keywords: first language acquisition; *se*-verbs; syntactic complexity

Introduction

In traditional Serbian grammars, the clitic *se* is taken as a sign of reflexivity, even though it appears in a multitude of syntactic conditions. The most widely accepted classification of Serbian reflexive verbs is the one into true reflexive, quasi reflexive and reciprocal reflexive verbs (Stanojević & Popović, 2002). True reflexive verbs denote activities which the agent of the verb performs on himself/herself. In this case, the clitic *se* is interpreted as the accusative case of the reflexive pronoun *sebe* 'self' (e.g. *kupati se* 'wash oneself'). On the other hand, quasi reflexive verbs denote activities or states in which the clitic *se* cannot be interpreted as the accusative case of the pronoun *sebe* 'self' (e.g. *igrati se* 'play'). Reciprocal reflexive verbs mark activities in which the agents perform activities on each other (e.g. *ljubiti se* 'kiss each other').

As Samardžić (2006) points out, such a classification is not based on a unique criterion. While the meaning and function of the clitic *se* are taken as indicators of true reflexive verbs, its function is not defined with quasi reflexive verbs, and it is only stated how it cannot be interpreted. With reciprocal verbs, the clitic *se* is not mentioned at all. However, there have been many attempts to prove that the clitic *se* is not an object clitic (Marelj, 2004; Reinhart & Siloni, 2003; Samardžić, 2006). Reinhart and Siloni (2003) show how the

clitic *se* appears in constructions in which the syntactic valence of the verb is reduced. The clitic *se* is a morphological component of the verb which reduces the accusative case. When it appears, the internal theta-role of the verb cannot be assigned to its canonical position and thus it remains unassigned until the external argument is merged. When the external argument is merged, bundling takes place, i.e. two theta-roles are assigned to the same argument. That is how Reinhart and Siloni (2003) explain the possibility of the subject of reflexive verbs bearing two theta roles at the same time (those of Agent and Patient). Moreover, whereas traditional classifications of *se*-verbs in Serbian do not provide any account of anti-causative verbs (e.g. *otvoriti se* 'open'), which also appear with the clitic *se*, this type is also included in their theory. Reinhart and Siloni (2005: 416) define decausativization (turning a transitive into an anti-causative verb) as the "reduction of an external [+c] role". The external argument is removed before the remaining argument is merged internally. At the final step of the derivation, after the internal argument is merged, it moves to a higher position, to become the subject.

Nativist studies have shown that the production of certain syntactically complex verb types causes more difficulty (Babyonyshev et al. 2001; Borer & Wexler, 1987; Brooks & Tomasello, 1999; Ilić, 2015; Snyder and Hyams, 2008). On the other hand, some psycholinguistic studies have shown that frequency plays an important role in the acquisition of verbs (Anđelković, 2012; Lieven, 2008; Tomasello, 1992). The aim of the present study was to test the production of true reflexive, true reciprocal and anti-causative verbs at different stages of language acquisition. The initial hypothesis was that true reflexive verbs would be acquired before reciprocal and anti-causative verbs, because they are syntactically less complex. This prediction proved true in previous research on the acquisition of *se*-verbs in Croatian as L2 (second language) (Pavlinušić & Kelić, 2001). Pavlinušić and Kelić (2001) concluded that linguistic structures which mark prototypical semantic concepts are acquired first.

Method

Sample

A total of twenty-seven subjects belonging to three age groups (nine participants each) took part in the pilot research. The age range in group 1 was 33-41 months ($N = 9$, $M = 36.33$, $SD = 2.55$), the age range in group 2 was 45-57 months ($N = 9$, $M = 50.89$, $SD = 5.35$), and it was 60-67 months in group 3 ($N = 9$, $M = 63.78$, $SD = 2.33$). None of the children selected had any language impairment or learning disability.

Design and Procedure

The independent variable was verb type with three levels (true reflexive, true reciprocal and anti-causative verbs). The dependent variable was verb production (coded as target or non-target). The data were analyzed with the Mixed Effects Logistic Regression (GLMER), for each of the three age categories. The data collection technique was a structured interview with a verb elicitation task. Three verb types were tested in the experiment:

1. true reflexive: *oblačiti se* ‘dress oneself’, *umivati se* ‘wash one’s face’, *brijati se* ‘shave oneself’, *kupati se* ‘wash oneself’, *češljati se* ‘comb one’s hair’, *šminkati se* ‘put on make-up’;
2. reciprocal: *grliti se* ‘hug each other’, *ljubiti se* ‘kiss each other’, *tući se* ‘fight against each other’, *juriti se* ‘chase each other’, *gađati se* ‘throw something at each other’, *gledati se* ‘look at each other’;
3. anti-causative verbs: *otvoriti se* ‘open’, *zatvoriti se* ‘close’, *upaliti se* ‘turn on’, *ugasiti se* ‘go out’, *pokvariti se* ‘break’, *spojiti se* ‘merge’.

The children were asked to name the activities presented in the pictures. Each stimulus contained two pictures. The examiner would tell the children what is presented in the first picture and elicit the answer for the second picture (Figure 1).

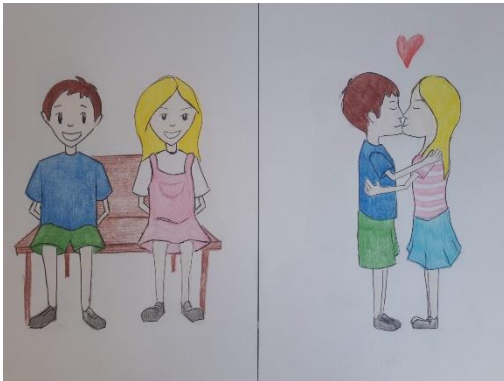


Figure 1: Stimulus for *ljubiti se* ‘kiss’

Results

The results of the first GLMER analysis (age 3) suggest that true reflexive verbs were produced with greater success than anti-causative verbs ($\beta = -1.64$; $z = -2.58$; $\text{Pr}(>|z|) = .00$), as well as reciprocal in comparison with anti-causative verbs ($\beta = -1.31$; $z = -2.06$; $\text{Pr}(>|z|) = .03$) (Table 1). Furthermore, the second GLMER model (age 4) suggests that real reflexive verbs were produced more frequently than anti-causatives ($\beta = -3.27$; $z = -2.06$; $\text{Pr}(>|z|) = .03$) (Table 2), and the last GLMER analysis (age 5) supports the results of the first GLMER analysis ($\beta = -1.99$; $z = -2.37$; $\text{Pr}(>|z|) = .01$ and $\beta = -1.79$; $z = -2.20$; $\text{Pr}(>|z|) = .02$) (Table 3).

Table 1: The results of the Mixed Effects Logistic Regression on data of three year old children.

Fixed effects	Estimate	z	Pr(> z)
(Intercept)	.32	.52	.59
Trial order	.01	.49	.61
Verb length	-1.05	-2.29	.02
Lemma frequency	.30	1.12	.26
NV: Real reflexive verbs	-1.64	-2.58	.00
NV: Reciprocal verbs	-1.31	-2.06	.03

Table 2: The results of the Mixed Effects Logistic Regression on data of four year old children.

Fixed effects	Estimate	z	Pr(> z)
(Intercept)	.95	.38	.69
Trial order	-.03	-1.03	.30
Verb length	-2.13	-1.64	.10
Lemma frequency	.80	1.15	.24
NV: Real reflexive verbs	-3.27	-2.03	.03
NV: Reciprocal verbs	-1.95	-1.16	.24

Table 3: The results of the Mixed Effects Logistic Regression on data of five year old children.

Fixed effects	Estimate	z	Pr(> z)
(Intercept)	.80	.70	.48
Trial order	.03	1.19	.23
Verb length	-2.06	-3.33	.00
Lemma frequency	.58	2.01	.04
NV: Real reflexive verbs	-1.99	-2.37	.01
NV: Reciprocal verbs	-1.79	-2.20	.02

Discussion

The participants did not have difficulty producing true reflexive verbs even at the earliest age. The results have indicated that anti-causative verbs are the most difficult for children to produce, as it was expected. This speaks in favour of the nativist hypothesis regarding the effect of syntactic complexity on the order of acquisition of verbs. Verb length and lemma frequency were not statistically significant.

Regarding the limitations of the research, the frequencies of the target verbs in child language could not be explored in detail, because there are only eight available transcripts of Serbian-speaking children in the CHILDES database, which is a small number if one is to look into specific verb types, as was the case in this study. For that reason, the frequency of the verbs was taken from Serbian Web Corpus (SrWaC). Another drawback was a small number of participants, which is why the results obtained should be taken with caution. It is expected that the results of a larger-scale transversal study will confirm this tendency.

Acknowledgments

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How Reliable are Prefrontal tDCS Effects – Zero-effects on the Keep-track Task?

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Abstract

Recent neuroimaging studies showed that in addition to the dorsolateral prefrontal cortex (dlPFC), the posterior parietal cortex (PPC) plays a significant role in higher cognitive processes such as executive functions. In this study we aimed to explore the neural underpinnings of executive function of updating by exploring the effects of transcranial direct current stimulation (tDCS) over dlPFC and PPC. Nineteen healthy right-handed participants took part in a cross-over sham-controlled experiment. All participants underwent three tDCS conditions (active tDCS over the left dlPFC; active tDCS over the left PPC; and sham) in counterbalanced order. Following tDCS participants completed the keep-track task, with parallel forms being used in different test-sessions. As a control measure, we used a choice reaction time task. Results showed no significant effects of tDCS regardless of the localization of stimulation. Our results are in contrast with results of other studies exploring prefrontal tDCS effects on updating and do not allow for deriving conclusions about the role of the left PPC in the ability to update information in working memory.

Keywords: updating; executive functions; transcranial direct current stimulation (tDCS); dorsolateral prefrontal cortex (dlPFC); posterior parietal cortex (PPC);

Introduction

Updating is defined as the ability to efficiently monitor incoming information and keep the relevant ones in mind by replacing older, no longer relevant with newer, more relevant information (Miyake et al., 2000; Morris & Jones, 1990; Purić, 2013). Not only by its definition, but also by its main operationalizations, such as n-back, keep-track, letter memory task. etc., this construct is similar to working memory (WM) (Miyake & Friedman, 2012; St Clair-Thompson & Gathercole, 2006; Wilhelm, Hildebrandt, & Oberauer, 2013).

Neural basis of updating/WM

For many years, the functional activity of the dorsolateral prefrontal cortex (dlPFC) was considered to be the main hub for higher cognitive processes, especially executive functions (Ardila, 2018; Fuster, 2017; Levine, 2017). However, recent neuroimaging studies suggest that higher cognitive abilities depend on the activity of wider fronto-parietal functional network (Jung & Haier, 2007).

Neuromodulation of Updating/WM

Neuromodulatory techniques enable exploration of causal relationships between the activity of certain brain regions and cognitive functions. One of the widely used is transcranial direct current stimulation (tDCS)—a noninvasive technique that modulates excitability of targeted brain areas by use of weak electrical current (Filmer, Dux, & Mattingley, 2014; Nitsche & Paulus, 2011).

The majority of tDCS studies of updating are mainly focused on anodal stimulation of the left dlPFC (Berryhill, Peterson, Jones, & Stephens, 2014; Dedoncker, Brunoni, Baeken, & Vanderhasselt, 2016). Even though most studies report facilitating effects of single-session tDCS over dlPFC (Dedoncker, et al., 2016), a certain number of studies show zero-effect (Andrews, Hoy, Enticott, Daskalakis, & Fitzgerald, 2011; M. Bogdanov & Schwabe, 2016; Hill, Rogasch, Fitzgerald, & Hoy, 2017, 2018; Mylius et al., 2012; Nilsson, Lebedev, & Lovden, 2015). However, regardless of their outcomes, all studies face some of methodological drawbacks and/or conceptual issues such as: treating a change in reaction times (RT) on the n-back task as a measure of updating, small sample sizes, cephalic positioning of reference electrode etc.

Aims and Hypotheses

In this study we aimed to conceptually replicate the obtained prefrontal anodal tDCS effects on a different updating measure, i.e. the keep-track task which does not have the RT component, as well as to explore the effects of tDCS over PPC on updating so as to validate neuroimaging findings and derive possible causal relationship between the two. Finally, given the RT effects in previous studies, we wanted to assay the specificity of tDCS effects on updating. In line with these aims, we formulated the following hypotheses:

H1: Stimulation over the left dlPFC will lead to increase in performance on the keep-track task.

H2: Stimulation over the left PPC will lead to increase in performance on the keep-track task.

H3: tDCS over dlPFC or PPC will not affect the performance on the choice reaction time task.

Method

Design

This experiment was counterbalanced, randomized, sham-controlled, and employed cross-over factorial design. The within subject factor STIMULATION had two active (dIPFC and PPC) and one sham condition. We used accuracy on the keep-track and a choice RT task as the updating and the control measure, respectively.

Participants

Sample size was determined *a priori* by power analysis for repeated measures with a three-level factor and parameters $\eta^2 = .15$, $\alpha = .05$, $1-\beta = .95$. Based on the results we recruited 21 right-handed participants (age: $M = 24.90$, $SD = 2.49$; 11 female).

tDCS

Three electrodes (5x5 cm) embedded in saline-soaked sponges were placed on participant's scalp: two anodes (over F3 and P3 –International 10–20 EEG system), and the return over the right cheek (Figure 1).

Active tDCS protocol included administering constant 1.5mA current for 20min with 30s fade-in/fade-out ramp using STIMISOLA device (BIOPAC Systems, Inc, USA). In the first and the last minute of the sham protocol a 30s fade-in was immediately followed by the fade-out ramp.

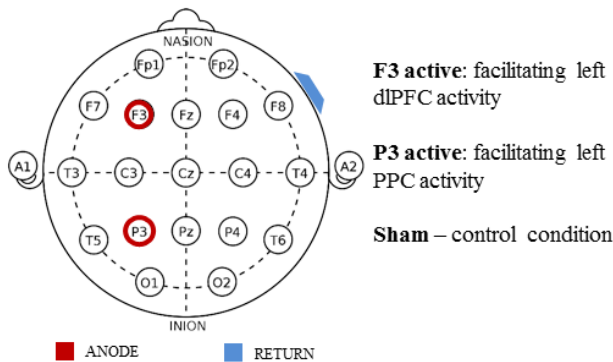


Figure 1: Electrode positioning

Tasks

In the keep-track task subjects monitor the list of successively presented 15 words. Each word in the list belongs to one of six semantic categories, but only representatives of the categories written in the bottom of the screen (*target categories*) should be paid attention to and recalled at the end of list presentation. There were total of nine lists. Number of target categories varied from three to five between lists. Accuracy was calculated as number of correctly recalled words (0-36).

In the choice RT task subjects gave consecutive responses to successive light up of four fields showed on the monitor by keypress. Each field had the corresponding key. Accuracy is measured as the average of RTs (time between light up and the keypress) for correct responses.

Parallel forms of both tasks were counterbalanced across sessions. The keep-track was administered right after and choice RT during the tDCS (Figure 2).

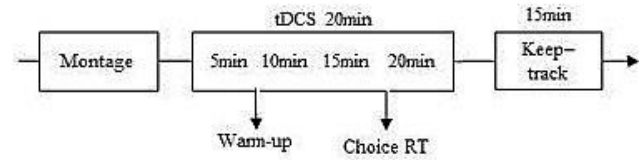


Figure 2: Session timeline

Results

Statistical analyses were performed on the sample of 19 participants (two outliers), average age: $M = 24.89$ ($SD = 2.60$), 10 female. A post hoc power analysis with registered mean correlation between updating measures ($r = .549$) resulted in observed power $1-\beta = .987$ adequate for performing planned analysis.

tDCS effects on Updating

A repeated measures ANOVA with factor STIMULATION (F3/P3/sham) showed that scores on the keep-track task do not depend of presence or localization of stimulation ($F(2, 36) = .499$, $p = .611$) (Table 1).

Table 1: Descriptive statistics

		<i>M</i>	<i>SD</i>
Keep-track	F3	28.00	2.31
	P3	27.26	4.12
	Sham	27.24	2.39
Choice RT	F3	395.26	59.63
	P3	385.28	34.73
	Sham	376.34	36.34

To exclude potential confounds such as TRAINING, GENDER and TASK FORMS, we performed additional analyses. A repeated measures ANOVA with factor TRAINING (first/ second/third session) showed marginal differences ($F(2, 36) = 3.081$, $p = .058$, $\eta^2 = .146$) in participant's scores between the first and the third session (Post hoc with Bonferroni correction: $p = .055$), while analyses for other two factors yielded insignificant results (mixed ANOVA: $F_{\text{GENDER}}(1, 17) = .035$, $p = .854$; $F_{\text{STIMULATION}}(2, 36) = .462$, $p = .643$; $F_{\text{GENDER} \times \text{STIM}}(2, 34) = .112$, $p = .894$; repeated ANOVA: $F_{\text{TASK FORMS}}(2, 36) = 1.557$, $p = .225$).

Effects of tDCS remained insignificant even when factor TRAINING was kept constant, as shown by a repeated measures ANOVA with factor STIMULATION on keep-track scores centered by session number ($F(2, 36) = .921$, $p = .407$).

tDCS effects on control measure

A repeated measures ANOVA with factor STIMULATION showed that subject's scores on the choice RT task are not modulated by tDCS ($F(1.281, 23.059) = 1.519, p = .233$) (Table 1).

Discussion

This study shows that updating processes measured by the keep-track task are not modulated by tDCS regardless of its localization. These outcomes are in contrast with findings of positive prefrontal tDCS effects. However, most of these studies were based on the n-back paradigm (Berryhill & Jones, 2012; Fregni et al., 2005; Keiser et al., 2011) which leaves room for possibility that differences in outcomes originate from differences in task specific processes. On the other hand, our findings support those with zero effects (Andrews et al., 2011; Mario Bogdanov & Schwabe, 2016; Mylius et al., 2012; Nilsson et al., 2015) but all of these studies differ significantly in methodology and have setbacks that may call their validity into question. Furthermore, zero-effects on PPC do not allow assuming causality between PPC activity and processes engaged by the keep-track task.

Although our third hypothesis was confirmed, the pattern of results does not allow for conclusions about the specificity of tDCS effects but rather about the absence of random implausible effects.

Even though our results may call the reliability of prefrontal tDCS effects into question and do not allow for deriving conclusions about the role of the left PPC in the ability to update information they stress the importance of conducting more methodologically consistent research in order to validate either positive or zero-effects.

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Relevance of Experimental Philosophy to the Replication Crisis: Empirical Findings and Further Tests

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Abstract

A recent comprehensive study has shown that the results of empirical research in ‘experimental philosophy’ (X-phi), a research area that uses methods of psychology and cognitive science to test intuitions concerning philosophical notions and intuitions, have a substantially high reproducibility rate. Forty tests in experimental philosophy had a 70% reproducibility success (compared to 35% for the Reproducibility Project in psychology). We suggest that a general focus on the methodological concerns in the field of philosophy of psychology may lead researchers (typically trained in both philosophy and psychology) to be particularly meticulous in implementing empirical methods in their studies. Thus, we propose to test whether the results of studies performed by psychologists who specialize in methodological questions have significantly high reproducibility rates. We also suggest that since philosophy focuses on conceptual issues, there is a lack of pressure to produce empirical studies with the same frequency expected in psychology laboratories. This may contribute to high reproducibility of the results, as experimental philosophers may be spending significantly more time and resources on each segment of their studies. To test this hypothesis, we propose to compare the time researchers spend on their empirical studies in experimental philosophy and psychology.

Keywords: Replication crisis; experimental philosophy; methodology; null result

Experimental philosophy

The sub-field of philosophy labeled “Experimental philosophy” (X-Phi) indent. Typically, it has been advanced by teams of philosophers and psychologists, or philosophers who are typically trained in psychology as well. Broadly speaking, the goal of such research teams is to test differences in intuitions on traditional key philosophical concepts across different groups and cultures.

Thus for instance, central issues in epistemology are probed, especially definition of knowledge, the subjects are tested on the basic philosophical questions concerning language such as the nature of reference of proper names (Is it in one’s head or is it an object to which the proposition refers?), the central ethical concepts such as responsibility, etc. To give one brief example, one central case of X-Phi testing concerns the so-called moral compatibilism, the view that one’s free will and physically deterministic world are compatible. It is a prominent philosophical standpoint in response to the puzzle of genuinely free agents in the world that is determined by physical laws, which seems to imply that agents cannot be responsible for their actions as such actions are inevitably result of physical laws determining such actions for which acting agents cannot be responsible. In the experiments various scenarios describing a

deterministic universe are presented and the subjects are asked whether a person in the scenario was free to act, and accordingly morally responsible. For instance, is a bank robber in a deterministic physical world morally responsible for her action? (Nahmias et al. 2006) Also, for instance, the deterministic physical universe assumption is illustrated in some tests as a supercomputer capable of predicting all future human behavior based on a complete description of the universe plus the laws of nature. Surprisingly, most participants gave compatibilist answers across various scenarios.

Another set of experiments concerns a much debated case of the so-called trolley problem. (Cushman et al. 2006; Wiegmann et al. 2012) The moral intuitions of the subjects are tested by asking them whether they would reroute the trolley heading for four people tied on the track to a single person on a different track. Different aspects of the case are varied in various ways (e.g. whether the subject would throw a random passerby to a track to prevent the trolley reaching the four tied people or, to prevent an option of inaction, the subject is forced to turn the lever at the crossroads, etc.).

The often surprising results of experiments have provoked various responses among philosophers. In the case of experiments with the definition of knowledge some authors have questioned the very possibility of universality of a definition of knowledge (Knobe and Nichols 2017). Also, the role of intuitions in our knowledge of certain basic moral or epistemological rules and situations has been questioned. This is a highly interesting and valuable result of the X-phi in its own right but what interest us here are the surprising rates of replicability of the experiments.

High reproducibility rates of the experiments in X-phi

A recent paper by Cova et al (2018) demonstrated that the results of the X-phi studies have substantially high reproducibility rate. Forty studies had a 70% reproducibility success, compared to 35% for the Reproducibility Project in psychology. Reproducibility rates were high based on subjective assessment (77.5%), p-values (78.4%), and effect size (70.6%) criteria. (Table 1).

One possible reason for this high reproducibility rate that the authors themselves point out is the established relationship between higher effect sizes and higher replicability rates.

Table 1: Reproducibility rates of 40 experiments in X-phi assessed based on three standard criteria. N stands for a number of experiments assessed in a particular category. The bracketed numbers show the number of experiments meeting the criterion, out of those assessed based on the given criteria (The table from Cova et al 2018).

Most cited (N = 14)	Subjective assessment	p-values	Effect sizes
	64.30%	64.3% (9 out of 14)	54.5% (6 out of 11)
Random (N = 26)	84.60%	87% (20 out of 23)	78.3% (18 out of 23)
TOTAL	77.50%	78.4% (29 out of 37)	70.6% (24 out of 34)

When publication bias and regression to the mean are assumed in X-phi and OSC, effect sizes are higher in X-phi. Also, they estimate that this effect is likely not due to oversampling from highly cited publications. Another reason the authors point out is that the X-phi studies are, on average, easier to run and thus cheaper than the studies in experimental psychology. (Ibid., Sections 4.1-4.3) The nature of the studies enables larger sample sizes, and easier re-running and replications by other groups. Yet, as they point out, the easier studies in OSC do not fare better than hard ones. Finally, the studies are mostly content-based studies in X-phi, that is, less context-based (thus, require less varying in the context; e.g. first-person and third-person formulations of the tests) and demographic (cultural context does not play the role) (Ibid., Section 4.4).

Another set of reasons for high reproducibility rates has to do with the X-phi teams being more sensitive to methodological questions. The philosophers, usually trained in psychology as well, who participate in the X-phi research teams focus in their research on the methodological issues of experimentation and replication. They publish in the academic culture with high rate of null-hypothesis publications and the statistical inconsistencies are lower in their publications. (Liao 2015) In philosophy as a discipline there is less publish-or-perish attitude, and it is a field that does not require quantitative studies to be published at a rate comparable to psychology. All this may amount to higher reproducibility.

The reasons for high reproducibility rates in X-phi: two hypothesis and their testing

Our first hypothesis (H1) concerning the reproducibility rates in X-phi concerns the culture of the discipline itself. We will test whether the results of studies performed by psychologists who also concentrate on methodological questions, and/or psychological theory in their work are significantly more reproducible than those of others. We plan to use questionnaires and available data (through OSC data-base), individual researchers' websites, and e-archives of published papers. If the hypothesis turns out to be correct, it is likely that experimental philosophers owe much of the reproducibility of their results to their methodological

background and interests. This can have a normative weight in psychology as well – more focus and discussion of methodological questions may be beneficial across the field.

Our second hypothesis (H2) is that there is less pressure to publish, hence more time to work on a single experiment, in X-phi than in psychology. We will test whether there is a lack of pressure to churn out empirical results with the frequency of a typical psychology laboratory. Philosophy as a discipline concentrates primarily on conceptual analysis, leaving researchers significantly more time to dedicate to each segment of their empirical studies. So we will compare the average time experimental philosophers take to design and implement a test with the average time that design and implementation of a similar test takes in psychology laboratories. We will use existing data on timelines of relevant experimental projects, and questionnaires if necessary.

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Chronometry and meta-reasoning in a modified Cognitive Reflection Test

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Abstract

The Cognitive Reflection Test (CRT) has become a common measurement of analytical thinking. The original version contains three problems designed to induce heuristic (biased) thinking which commonly leads to the wrong response. The aim of this study was to introduce an additional three items and modify the CRT by including chronometric and metacognitive measures. Participants were presented with a problem and four alternatives which included a correct response, heuristic response, filler incorrect response and a “none of the above” response. Their task was to choose their preferred response as fast as possible. After each response, participants provided a judgment of confidence. Participants mostly responded by choosing heuristic responses. The response time analysis revealed a significant effect of response type with slightly faster responses for heuristic responses. The confidence ratings analysis revealed that participants were generally more confident when providing correct responses, but this was significant for only three of the six problems. Additionally, correlation analysis revealed significant negative correlations between response times and confidence ratings for both correct and heuristic responses. Shorter response times were accompanied by higher confidence. Modifications of the CRT (item number expansion and 4-choice paradigm) proved to be successful.

Keywords: Cognitive Reflection Test; meta-reasoning; metacognition; heuristic bias; analytical thinking

Introduction

The Cognitive Reflection Test (CRT) was developed by Frederick (2005). It has become a common tool to evaluate one’s ability to override the induced heuristically biased response and to provide the correct response based on analytical thinking. The theoretical background for this distinction is the dual-processing approach (see Evans, 2008; Evans & Stanovich, 2013) which differentiates between Type 1 (intuitive and based on heuristics) and Type 2 (analytical and more demanding) processes. This approach is complemented with implications of meta-reasoning framework (Ackerman & Thompson, 2015, 2017) which attempts to explain metacognitive processes accompanying reasoning.

The aims of this study were to introduce additional items to the CRT and to include response times and judgments of confidence. Chronometric and metacognitive measures should enable additional analyses that test the hypotheses based on the implications of the dual-process approach and meta-reasoning framework.

Method

A total of 70 (7 males) students participated in the study. All participants solved an expanded CRT battery which included three original and three additional problems. The complete

set of problems is listed in the Appendix (Table A1). In order to obtain a more precise chronometry, choice rather than production paradigm was used. In order to avoid the possible confounding effect of a two-alternative choice, the participants were presented with four-alternative choice responses. One was the correct analytic response, another based on a heuristic, the third a filler incorrect response and the final alternative was “none of the above”. Filler responses were generated to be distanced enough from both the heuristic and analytic response. Answers were arranged in four areas on the computer screen. The spatial placement of the answers corresponded with four arrows on a computer keyboard: left, right, up and down. The answers’ position was rotated between the problems. Problems were presented in a randomized order for each participant. The participant’s task was to read the problem and then to press a key that corresponded to her preferred response. After each response, the participant provided a metacognitive judgment of confidence on a seven-point scale (1 – not confident at all; 7 – completely confident).

Results and discussion

Descriptive statistics for all six CRT items are presented in Table 1. The percentage of both analytical and heuristic types varied predictably: for all six problems there were more heuristic than analytic responses. This finding suggests that all six CRT problems induced similar patterns of response among participants, although their content might prompt different heuristic processes. This allows their incorporation into the same test. Average confidence ratings for all six tasks are above the middle value (4.34 – 6.01). These ratings are relatively high when compared with the percentage of correct responses which was lower than 33%. This suggests that most participants overestimated their performance. This is a common finding in many meta-reasoning studies (Mata, Ferreira, & Sherman, 2013). The average participant achieved 1.67 points. For a more detailed distribution of efficiency see Table A2 in the Appendix. Response time differences among the tasks were tested with one-way ANOVA.

Table 1: Descriptive statistics for six CRT items. Standard deviations for response times (RT) and judgments of confidence in parentheses.

CRT problem	Correct [%]	Heuristic	“none of the above” [%]	Filler response [%]	RT [ms]	Confidence [1-7]
1	21.43	72.86	4.29	1.43	14617.24 (10252.54)	5.56 (1.58)
2	37.14	42.86	8.57	11.43	17765.79 (12047.27)	4.93 (1.85)
3	30.00	34.29	25.71	10.00	19470.21 (10076.33)	4.34 (2.03)
4	20.00	54.289	22.86	2.86	17969.36 (10118.39)	4.41 (1.59)
5	25.71	67.14	7.14	0.00	12904.19 (5354.79)	6.01 (1.41)
6	32.86	45.71	21.43	0.00	18129.66 (8834.19)	4.69 (1.78)
Mean	27.86	52.86	15.00	4.29	16809.41	4.99

The effect proved significant ($F(5, 345) = 6.44, p < .01, \eta_p^2 = .09$), and post-hoc analysis (Tukey HSD) revealed that item 5 was solved faster than all other items with the exception of item 1, and that item 1 was also solved faster than item 3 (the slowest, see Figure 1). Other differences in response times were insignificant. The same analysis was conducted on confidence ratings. The effect of the CRT item was significant ($F(5, 345) = 14.06, p < .01, \eta_p^2 = .17$). Post-hoc analysis revealed that participants were significantly more confident when solving item 5 compared to their confidence on all other items with the exception of item 1. Participants were also more confident when solving item 1 compared to their confidence in items 3, 4 and 6. It is apparent in Figure 1 that changes in average confidence judgments across CRT items consistently follow changes in average response times. On average, the faster the response the higher the confidence rating. Additionally, if response times and confidence ratings are compared with the percentage of the heuristic responses (Table 1), further regularity is apparent. On average, tasks with the higher percentage of heuristic responses were also solved faster. Both of these findings are in line with basic assumptions of the dual-process theory of reasoning and meta-reasoning framework. Firstly, heuristically biased responses are often easier and faster than analytic. Similar result was obtained in other studies (see Stupple, Pirchford, Ball, Hunt, & Steel, 2017). This explains not only the relatively high percentage of heuristic responses, but also differences in response times. Secondly, according to the meta-reasoning framework, our metacognitive monitoring in reasoning is not so firmly based on actual accuracy, but rather on indirect cues such as fluency that result from reasoning processes (see Ackerman & Zalmanov, 2012). This explains why items that were solved faster were rated with higher confidence ratings.

Heuristic vs Analytic responses

The modification in the procedure enabled additional analysis based on response types. It was important to compare heuristic and analytic responses on response times. Two 2(H-A) X 6(CRT items) ANOVAs were conducted, one on response times and one on confidence ratings.

The results of the first ANOVA revealed the significant main effect of response type on log transformed response times ($F(1, 327) = 5.60, p < .05, \eta_p^2 = .02$). Heuristic responses had shorter response times when compared to analytic responses. However, post-hoc analysis revealed that response time difference is significant only for CRT item 1. The second ANOVA revealed a significant main effect of response types on confidence ratings $F(1, 327) = 11.62, p < .01, \eta_p^2 = .09$). Participants were generally more confident when providing correct responses, than when responding heuristically which is in line with finding of De Neys, Rossy and Houdé (2013).

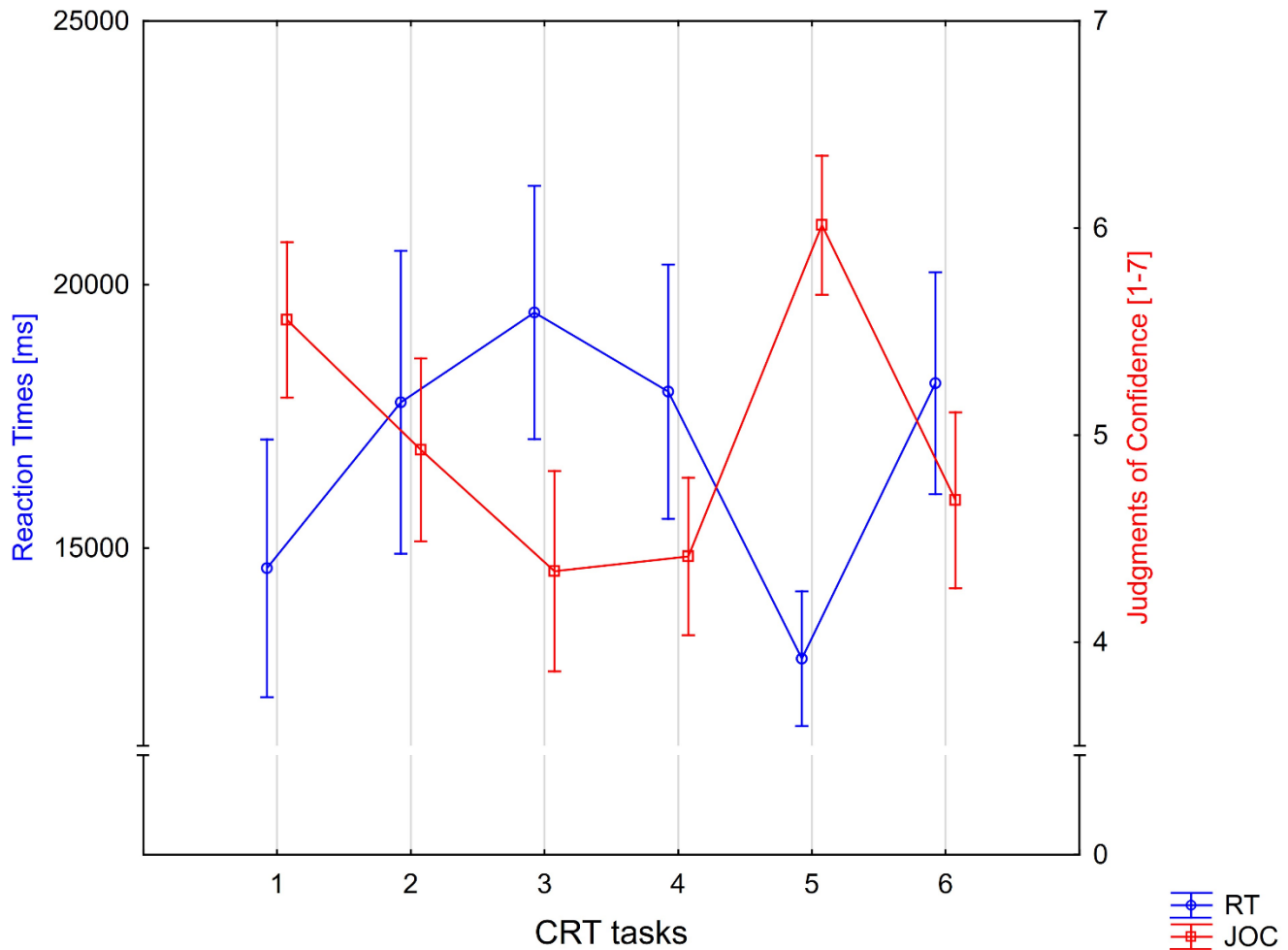


Figure 1: Comparison of average response times (RT) and judgments of confidence (JOC) for six CRT problems. Spreads represent 95% confidence. Post-hoc analysis revealed that this difference in confidence was significant for three CRT items (2, 3 and 4). Some would expect lower confidence is related to analytic responses. However, this is not the case taking into account that heuristic responses were not always faster than analytic responses. Additionally, the correlations between response times and confidence ratings are significant and negative for analytic responses ($r(115) = -.29, p < .01$) and heuristic responses ($r(220) = -.35, p < .01$). This finding is in accordance with the significance of fluency as a metacognitive cue in reasoning.

Finally, it would be interesting to see the participants' confidence when providing "none of the above" (NOA) responses. If this response is chosen, this suggests that both heuristics and analytical processes failed to generate the response. Hence, it is to be expected that these responses are accompanied with lowest confidence. This proved true for CRT items 2, 3, 4, and 5. NOA responses were accompanied with the lowest confidence rating (lower than 4), and all answer type ANOVAs on confidence were significant (all $F > 3.57, p < .02$).

In conclusion, methodological modifications of the CRT proved successful in both incorporating the additional problems, as well as the application of the 4-choice paradigm in a laboratory setting. Furthermore, it has been confirmed that CRT problems that induce more heuristic responses are generally responded to faster and have higher confidence

ratings. The negative correlation between response times and confidence ratings has been confirmed for both heuristic and analytic answers. Finally, there is a tendency within particular tasks for analytic answers to be slower and accompanied by higher confidence ratings.

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Appendix A

Table A1: Expanded CRT test. First three items are taken from Frederick’s (2005) original version. Fourth item is taken from Toplak et al. (2014). Last two items were developed for this study. Heuristic (H), analytic (A), and filler (F) responses that were presented in the study follow each task.

	CRT Item
(1)	A bat and a ball cost \$1.10 in total. The bat costs a dollar more than the ball. How much does the ball cost? H: 0.10; A: 0.05; F: 0.48
(2)	If it takes 5 machines 5 minutes to make 5 widgets, how long would it take 100 machines to make 100 widgets? H: 100; A: 5; F: 20
(3)	In a lake, there is a patch of lily pads. Every day, the patch doubles in size. If it takes 48 days for the patch to cover the entire lake, how long would it take for the patch to cover half of the lake? H: 24; A: 47; F: 32
(4)	John received both the 15th highest and the 15th lowest mark in the class. How many students are in the class? H: 30; A: 29; F: 35
(5)	Mr. Markovitz has 7 daughters. Each daughter has 1 brother. How many male members there are in the family, including Mr. Markovitz? H: 8; A: 2; F: 4
(6)	Planet Earth weights 6 thousand billion tons. Imagine that the wall is built that weights 1 thousand billion tons. How many thousand billion tons is the weight of the Earth now? H: 7; A: 6; F: 10

Table A2: Distribution of efficiency in 6-items CRT test used in this study.

Number of correct responses	Percentage of the participants (N=70) [%]
6	1.43
5	2.86
4	7.14
3	14.29
2	18.71
1	35.71
0	20.00

Trolley problem: Psychopathy or virtue?

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Abstract

In Trolley problem (TP) one must choose between sacrificing one person to save many. The TP is often used as a task in moral psychology research, but recent findings showed that TP judgements reflect subclinical psychopathy rather than a genuine utilitarian perspective. We examined variations of the TP in relation to psychopathy and voluntarism. 68 college students (75% females) rated their willingness to do volunteer work, impression management (IM), and psychopathy. A month later, participants again completed the IM scale and made the TP judgements for scenarios in which: (A) They must push one person in front of the trolley to save five people. (B) They are the one being pushed. (C) They are one of the people being saved by the push. They also rated: (1) approvals of someone being pushed, (2) morality of the actions, (3) levels of emotional disturbance, and (4) how much were they able to imagine themselves in the situations. The TP assessments and IM were uncorrelated. Emotional disturbance assessments had low/moderate negative correlations with psychopathy, and two positive correlations with voluntarism. The psychopathy showed a general low positive correlational trend with the pushing approvals and moral endorsements of the scenarios. Thus, our results confirm that TP judgements share a proportion of variance with psychopathy and are not valid measures of moral virtue.

Keywords: trolley problem, utilitarian morality, ethics, virtue, psychopathy

Introduction

Two of the most influential philosophical concepts adopted in recent moral psychology research are Deontology and Utilitarianism (Bartels & Pizarro, 2011; Kahane, Everett, Earp, Farias, & Savulescu, 2015). Utilitarianism views morality as ‘choosing the greater good’. Deontology assumes that morality is not dependent upon consequences, but rather some prior normative rules. Although much more complex Deontological systems exist (e.g., Molyneux, 2018), moral psychology research adopts a simplistic view of Deontology as mere rejections of Utilitarian views.

Specifically, Utilitarian morality is often studied using so called Trolley problem/dilemma, a classical thought experiment in which one must decide if they will sacrifice

one person to save many, that would otherwise be killed by a trolley (Bartels & Pizarro, 2011; Greene et al., 2009; Greene, Sommerville, Nystrom, Darley, & Cohen, 2001; Kahane et al., 2015). When individuals endorse ‘sacrificing one for the many’, they are described as making Utilitarian judgement, and when they reject it, they are assumed to be making Deontological judgements (Kahane et al., 2015).

However, recent research showed that judgements from such ‘sacrificial dilemmas’ correlate with psychopathy and other ‘dark’ personality traits, endorsements of ethical transgressions, etc. (Bartels & Pizarro, 2011; Kahane et al., 2015), with no correlations with ‘morally virtuous’ tendencies, such as willingness to self-sacrifice, to assist distant people in need, etc. (Kahane et al., 2015). This brings into question the appropriateness of the Trolley problem and similar tasks as measures of a ‘genuine’ Utilitarian perspective. To explore this issue, we constructed several variations of the Trolley problem in which participants were asked to put themselves in different hypothetical roles. We were interested in establishing if there are any variations of the Trolley problem (e.g., doing a push, versus being sacrificed or saved by it) and its specific aspects (i.e., judgements/endorsements of making a sacrifice and its morality, etc.) that do not correlate with the measure of psychopathy, but do correlate with virtuous behaviors and attitudes (such as voluntarism). There are two main variations of the Trolley problem (Greene et al., 2009): the ‘switch’ dilemma (e.g., five people can be saved by diverting the trolley onto a side-track via a switch, where it will kill one person) and the ‘footbridge’ dilemma (e.g., five people can be saved by pushing someone off a footbridge, which will kill that person, but will stop the trolley, thus saving others). Fewer people tend to endorse the sacrifice in the ‘footbridge’ Trolley dilemma, likely due to higher emotional disturbance caused by this scenario (Greene et al., 2001; Greene et al., 2009). That is the reason why we opted to focus on this version of the dilemma, as arguably more sensitive to ‘psychopathy influences’.

Method

Sample, procedure, and measures

68 college students (75% females; mean age: 19.82 years) first rated their willingness to do volunteer work and completed impression management (IM; refers to the overly positive self-presentation, mainly directed at others; Subotić, Dimitrijević, & Radetić-Lovrić, 2016) and (subclinical) psychopathy scales, as parts of larger, multi-purpose data gathering effort.

Willingness to do volunteer work was measured by several yes-no questions (see Table 1 in the Results), related to the intent to invest personal time and effort to help others in need. We also included a series of questions about actual volunteer and charity work, but those variables were dropped due to very low observed frequencies.

The IM was measured by a subscale ($\omega = .75$) of the short BIDR-6 questionnaire (BCS adaptation; Subotić et al., 2016).

Psychopathy was measured by a subscale ($\omega = .82$) of the Short Dark Triad questionnaire (SD3; Jones & Paulhus, 2014).

A month later, participants again completed the IM scale ($\omega = .81$) and made the Trolley problem assessments. Psychopathy and volunteerism were separated from the Trolley assessments to make the research problem less obvious. Answers from two phases were matched using ID codes created by the participants themselves.

Participants made Trolley problem assessments for scenarios in which: (A) They must push one person in front of the trolley to save five people. (B) They are the one being pushed to save five people. (C) They are one of the people being saved because somebody else was pushed to death. For every trolley scenario, participants also assessed: (1) an approval/justification of someone being pushed (yes-no), (2) an assessment of morality of the action (10-point scale), (3) a level of emotional disturbance caused by the scenario (10-point scale), and (4) a level in which participants were able to imagine themselves in the situation (10-point scale). Option (3) was included due to previously established relevance of emotional disturbance for the ‘footbridge’ Trolley dilemma (Greene et al., 2001; Greene et al., 2009). Option (4) was included to control for so called ‘unconscious realism’ (Greene et al., 2009).

Results

Due to substantial intercorrelations between voluntarism assessments, they were aggregated into a single (as suggested by all common procedures; Subotić, 2013) principal component (PC), as shown in Table 1.

Table 1: Voluntarism PC (57% variance).

Willingness to...	Λ
... volunteer in an orphanage.	.82
... volunteer in a public kitchen.	.77
... participate in a humanitarian action aimed at helping sick kids.	.74
... travel to refugee camps and provide help.	.69

Volunteerism PC had moderate negative correlation with the psychopathy score ($r = -.35$, $p = .004$) and was uncorrelated with the endorsements (push approvals) and morality assessments of all three scenarios. There were, however, significant small positive correlations with 2/3 assessments of emotional disturbance (A3: $r = .24$, $p = .048$; B3: $r = .18$, $p = .153$; C3: $r = .24$, $p = .046$).

The psychopathy showed a positive (albeit not always significant) correlational trend of small intensity with the endorsements and moral assessments for the scenarios (A) (A1: $r = .27$, $p = .025$; A2: $r = .15$, $p = .207$) and (C) (C1: $r = .23$, $p = .056$, C2: $r = .33$, $p = .006$), and negative trend of low to moderate intensity with the levels of emotional disturbance in all three scenarios (A3: $r = -.32$, $p = .008$; B3: $r = -.27$, $p = .027$; C3: $r = -.33$, $p = .005$).

The test or retest IM levels did not correlate with any of the Trolley assessments, but they showed small to moderate positive association with the Volunteerism PC (IM_{T1}: $r = .22$, $p = .068$; IM_{T1}: $r = .34$, $p = .005$) and moderate negative association with psychopathy (IM_{T1}: $r = -.35$, $p = .004$; IM_{T1}: $r = -.35$, $p = .003$). Assessed ability to imagine oneself in the Trolley scenarios did not correlate with any other variables and assessments.

Discussion

Regardless of the Trolley problem variation, our results suggest that moral endorsements of such dilemmas do not reflect aspects of moral virtue, but they may reflect (subclinical) psychopathy.

Obtained correlations with psychopathy are not strong, but they do indicate that higher psychopathy implies higher likelihood for approving of someone being pushed into death to save others and for viewing such actions as moral. The only Trolley scenario unrelated to psychopathy is the one in which the participant is being pushed to save others, but that scenario, like the other two, is also unrelated to moral virtue. Note that moral virtue assessments here are only represented by an intent for volunteerism, which may be ‘narrow’ and ‘insincere’ (i.e., a mere impression management) measure, but intent is arguably a necessary precursor for morally virtuous behavior.

In conclusion, our results confirm that Trolley problem judgements/endorsements share some proportion of variance with psychopathy and that they are not valid measures of moral virtue (Bartels & Pizarro, 2011; Kahane et al., 2015). They should be avoided as tasks in moral psychology research.

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CLINICAL PSYCHOLOGY

Understanding Cyberchondria in the Context of Attachment and Injunction “Don’t Be Well!”

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Abstract

The aim of this research is to examine the relation between the Attachment and the injunction “Don’t be well!” with Cyberchondria, defined as compulsive tendency to seek information about one’s health which creates an exaggerated fear for one’s current health. The results showed that there is a significant correlation between Cyberchondria with both dimensions of Attachment; and also a significant correlation with the injunction “Don’t be well!”. The final hierarchical regression model shows that only the injunction “Don’t be well!” can be seen as a significant predictor of Cyberchondria. The relation between dimensions of Attachment, injunction, and Cyberchondria can be discussed through a behavioral manner of getting ill in order to get the attention of others through the maintenance of the behavior patterns of cyberchondria.

Keywords: Cyberchondria, Attachment, injunctions, Don’t be well

Cyberchondria

The Internet has become relevant and widely used source of medical information (Poel, Baumgartner, Hartmann, & Tanis, 2016) and provides answers to questions about symptoms that might indicate various serious diseases and illnesses (White & Horvitz, 2009). Such information might be misinterpreted, have negative effects and can lead to health-anxiety. Health anxiety, termed as cyberchondria (Taylor & Asmundson, 2004; Fergus, 2014), is a state where the individual is over-concerned about his health status (Starcevic & Berle, 2013). Cyberchondria combined with endangered distress leads to an increase in the percentage of individuals seeking medical care caused by medicine-related online searching (White & Horvitz, 2009). Starcevic (2017) points out that almost all definitions of cyberchondria across the literature include two components: (1) excessive or repeated searching for medical information on the Internet and (2) feeling of anxiety about one’s health.

Attachment

One of the widely used and popular theoretical concepts in the context of developmental psychology is the concept of attachment (Holmes, 2004). Emotional availability and responsiveness to the child’s needs determinate the quality of

this relationship and through these interactions, the child develops a “working model” (Collins & Read, 1990). Kim Bartholomew suggests the dimensional approach based on Bowlby’s systematization of the existing working model (Bartholomew, 1990). Within this dimensional approach, we can differentiate two bipolar dimensions: complementary representation of the formed model of self (*anxiety*) and the model of others (*avoidance*) formed through emotional availability and responsiveness to child needs (Bartholomew, 1990; according to Stefanović-Stanojević, 2015). According to inner working models, we can conclude that the model of self and model of others can be positive and negative.

Injunction

Eric Berne (1972) defines injunction as repeated and traumatic early messages received from the parents, that can lead to chronic dysfunction of a vital area of life, limit individual freedom, discourage child’s development and create difficulties in life (Budisa, Gavrilov-Jerkovic, Dickov, Vuckovic & Martinovic-Mitrovic, 2012). Received injunctions form a life script, a complex set of unconscious patterns formed in any developmental stage and inhibit spontaneity and limit the capacity in problem-solving activities, health maintenance and have an impact on relationships with other people (Erskine, 2019). Goulding and Goulding (1976) state that a child must agree with the injunction and obey it. The injunction “Don’t be well!” can be seen as a restriction of physical or mental health. The child receives attention only when he/she gets physically sick or simulates a mental disorder. When confronted with a stressful event, such individuals may run into illness in order to get attention from significant others.

Problem of the Study

It is common for insecurely attached ones (especially those with a negative working model of oneself) and for those with internal injunction “Do not be well!” to be able to show concern for their own state of health, with the aim of attracting the attention of others (Stefanović-Stanojević, 2015; Goulding & Goulding, 1976). It is a strategy they learned at the earliest of their lives. In this paper, we want to examine whether cyberchondria can be viewed as an adult

strategy, where an adult, fearing for his/her own health attracts the attention of others.

Method

Participants

The sample consisted of 193 subjects (f = 110; m = 83), aged 18 to 49 ($M = 24.97$; $SD = 6.55$). The sample consisted mostly of students (76.7%), while the rest were employed (16.6%) and unemployed (6.7%) people.

Measures

Short Cyberchondria scale (Jokić-Begić, Mikac, Curzik & Sangster Jokić, 2019). It is a one-dimensional construct that contains four items. Respondents gave an answer to a five-point Likert scale. The findings of the initial study suggest that SCS is a satisfactory instrument for measuring cyberchondria.

Revised Adult Attachment Scale (Collins, 1996). This instrument is used for attachment measurement of adults. Respondents gave an answer to a five-grade Likert scale. The instrument consisted of 18 items and measured two dimensions: Anxiety and Closeness/Dependency. The dimension showed good reliability in the initial study.

Scale of injunction (Gavrilov-Jerković, Budiša, Lekić-Babić & Čolović, 2010). Scale contains three items. Respondents gave an answer to a five-grade Likert scale. The reliability measured by Cronbach's alpha in the initial sample was .58.

Results

In Table 1 are presented the basic descriptive and statistical measures of the variables used in this study.

Table 1: Descriptive Statistics measures, distribution skewness and kurtosis and measures of reliability.

	<i>M</i>	<i>SD</i>	<i>Sk</i>	<i>Ku</i>	α
Cyberchondria	2.43	1.05	.40	-.75	.819
Anxiety	2.49	.99	.39	-.57	.860
Closeness/ Dependency	3.20	.67	-.13	-.48	.802
“Don’t be well”	1.68	.75	1.23	1.35	.406

The results shown in Table 2 show Spearman's correlation coefficient between variables.

Table 2: Correlations between Cyberchondria, Attachment dimensions and injunction.

	Anxiety	Closeness /Dependency	“Don’t be well”
Cyberchondria	.22**	-.15*	.17*

Note: **- $p < .01$; *- $p < .05$

In the first step of the prediction model, the predictors of the dimension of attachment are inserted. In the second step, the dimension “Do not be well!” is added.

The dimensions of attachment made a statistically significant contribution to the prediction of cyberchondria ($R^2 = .06$; $F(2, 189) = 5.67$; $p < .00$). The second regression model was also statistically significant ($\Delta R^2 = .08$; $F(3, 188) = 5.57$; $p < .00$), and a change between the two steps ($R^2_{\text{change}} = .02$; $Sig. F_{\text{Change}} = .025$). The final hierarchical regression model shows that only the injunction “Don’t be well!” can be seen as a significant predictor of Cyberchondria ($\beta = .17$; $p < .05$). The results are shown in Table 3.

Table 3: Multiplier hierarchical regression of cyberchondria prediction based on dimensions of attachment (1) and injunction “Do not be well!” (2).

	β	r_o	$r^2_{a(b,c)}$
1 st set of predictors			
Anxiety	.18*	.22	.03
Closeness/Dependency	-.10	-.17	.01
2 nd set of predictors			
Anxiety	.13	.22	.01
Closeness/Dependency	-.07	-.17	.00
“Don’t be well”	.17*	.24	.02

Note: β – standardized beta; r_o – zero-order correlation; $r^2_{a(b,c)}$ – squared semi partial correlation; *- $p < .05$;

Discussion and Conclusion

The results showed that there is a significant correlation between Cyberchondria with both dimensions of Attachment; and also a significant correlation with the injunction “Don’t be well”. Such a result confirms our hypothesis. However, although initially they have been shown to be significant, in the final model just injunction “Don’t be well!” remains the predictive value of cyberchondria, while dimensions of attachment lose their predictive power. Bearing in mind that people who have internalized the injunction “Don’t be well!” often know how to get sick to gain the attention of others, as well as people who are ambivalently linked, who display their symptoms with the same goal, search for information on the Internet. It can be discussed through a behavioral manner of getting ill in order to get the attention of others through the maintenance of the behavior patterns of cyberchondria, just as assumed by the research hypotheses.

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PERSONALITY PSYCHOLOGY

Typology Of Perpetrators Of Certain Criminal Offenses With Elements Of Violence

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Abstract

The aim of this research was to examine the profiles of Zuckerman's Alternative Five-Factor Model on offenders convicted for criminal acts with elements of violence, and their relations to the type of criminal offense and life events. A secondary aim was to compare psychological profiles on prison and the general population. The sample of offenders consisted of 178 and a general population sample consisted of 589 males. Latent profile analysis indicates two profile in prison sample (Unadapted and Hyperadapted), but three in a general population sample (Emotionally unstable, Adapted, and Asocial). There were no significant differences between profiles in the category of a criminal offense, however, there are differences in a number of life events: offenders from Unadapted profile experienced more negative controllable life events. Differences between profiles in relation to life events can be considered as the first findings of the predictive validity of isolated offender profiles.

Keywords: offenders, violent criminal delicts, murder, rape, Zuckerman's Alternative Five-Factor Model, life events

Introduction

There are two basic approaches to studying individual differences: (1) a dimensional or variable-centered approach, and (2) a typological or person-centered approach (Mervielde & Asendorpf, 2000). Although the dimensional approach is dominant, the advantage of the typological approach is that it can include a wider constellation of personality traits, including different relationships between them (Herzberg & Roth, 2006). Within a dimensional approach, there is a certain consensus that five to seven basic traits are optimal for a comprehensive description of the personality (John & Srivastava, 1999; Lee & Ashton, 2018; Tellegen, Grove, & Waller, 1991). On the other hand, from the perspective of the typological approach, there is no clear consensus on the number and content of the types that are optimal for personality descriptions. Previous researches suggested solutions of three (York & John, 1992) to seven types (Pulkkinen, 1996). However, on the basis of five-factor Resilient type members achieve below-average scores on the Neuroticism and above-average scores on all other traits. Members of a Hypercontrolled type achieve above-average on the Neuroticism and below-average scores on the

Extraversion, while members of a Hypocontrolled type achieve below-average scores on both Consciousness and Agreeableness and above-average scores on the Neuroticism.

Regarding the prison population, authors within the field of psychology of individual differences and criminal psychology agreed that there are significant differences in personality types compared to the general population, as well as differences in personality types between members of the prison population who committed various crimes (Cleas et al., 2012; Herzberg & Hoyer, 2009), but there is no consensus regarding their number and content. The inconsistency of the results is due to a very small number of such studies (Claes et al., 2012; Dinić, Barna, Trifunović, Angelovski, & Sadiković, 2016; Herzberg & Hoyer, 2009; Herzberg & Roth, 2006; Mitrović, Smederevac, Čolović, Kodžopeljić, & Dinić, 2014; Sârbescu & Boncu, 2018) and due to application of questionnaires assessing different personality models. In these studies, two to five types of convicts could be distinguished, where the most commonly identified types were Resilient and Hypocontrolled type (see Claes et al., 2012). Resilient type is characterized by increased Emotional stability (low Neuroticism) and reduced Impulsivity, while the Hypocontrolled type is characterized by inverse characteristics, reduced Emotional stability (elevated Neuroticism) and increased Impulsivity.

The aim of this research was to identify profiles of violent offenders and to compare these profiles in regard to types of a criminal offense, as well as the characteristics of life events. A secondary aim is to compare profiles on offenders' sample with profiles obtained on the general population.

Method

Participants

Sample from the offender's population consisted of 179 men, aged 23 to 84 ($M = 41.15$, $SD = 11.42$), who were serving a prison sentence in the penitentiary correctional institutions in the towns of Nis, Pozarevac, Padinska skela and Sremska Mitrovica, for criminal offenses: murder (32,30%), severe murder (44,40%) and rape (23,30%). Sample from the general population included 589 males, aged from 18 to 84 years ($M = 42.04$, $SD = 15.07$).

Instruments

Zuckerman-Kuhlman Personality Questionnaire-50-CC (ZKPQ-50-CC; Aluja et al., 2006) comprises of 50 items measured Alternative Five Factor Model: Activity ($\alpha_{\text{general/prison}} = .68/.60$), Aggression / Hostility ($\alpha = .72/.74$), Impulsive Sensation Seeking ($\alpha = .70/.72$), Neuroticism / Anxiety ($\alpha = .75/.71$), and Sociability ($\alpha = .74/.62$).

Life events questionnaire (LEQ; Kandler, Biedom, Riemann, & Spinath, 2011) comprises of 31 life events and

measured frequency of the controllable positive life events (13 events, $\alpha = .63/.70$), controllable negative life events (8 events, $\alpha = .60/.58$), and uncontrollable negative life events (10 events, $\alpha = .58/.61$).

Results

Descriptive parameters are shown in Table 1.

Table 1: Descriptives for all variables

	General population (589)		Offenders population (179)	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Activity	4.94	2.69	6.81	2.29
Aggression/Hostility	4.60	2.54	4.02	2.58
Sociability	5.18	2.63	5.11	2.26
Neuroticism/Anxiety	4.78	2.54	4.00	2.52
Impulsive Sensation Seeking	3.49	2.58	3.45	2.40
Controllable negative life events	3.67	2.76	4.59	2.99
Uncontrollable negative life events	6.86	3.36	7.86	3.63
Controllable positive life events	9.49	4.11	11.09	4.82

In order to obtain latent profiles, latent class analysis (LPA) was conducted in R package "mclust" (Scrucca, Fop, Murphy, & Raftery, 2016). Based on Bayesian information criterion (BIC) two profiles could be extracted on offenders sample (1) Unadapted profile (40%), characterized by a very high score on Aggression/Hostility, a high score on Impulsive Sensation Seeking, and slightly increased scores on Activity and Neuroticism/Anxiety, and (2) Hyperadapted profile (60%), characterized by increased scores on Activity and very low scores on Aggression/Hostility and Impulsive Sensation Seeking (Figure 1).

($d = 0.43$). On the other hand, there were no significant differences between profiles in positive ($d = 0.21$) and negative uncontrollable events ($d = 0.17$).

Results on general population sample indicated a solution with three profiles (1) Emotionally unstable (25%), characterized by a very high score Neuroticism/Anxiety and slightly increased scores on Aggression/Hostility, (2) Adapted (47%) characterized by about the average scores on all five dimensions, and (3) Asocial (28%), characterized by increased scores on Impulsivity Sensation Seeking, slightly increased scores on Aggression/Hostility and slightly decreased scores on Sociability (Figure 2).

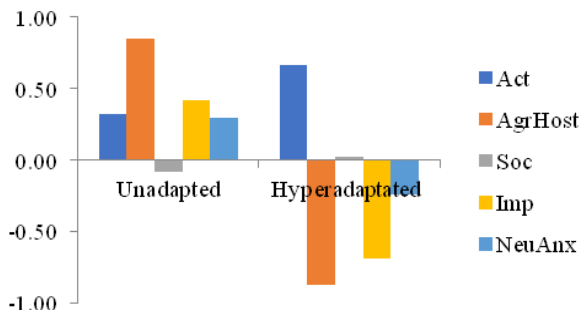


Figure 1: Profiles on offenders sample.

Differences in personality traits between profiles were all significant at $p < .01$ (Cohen's d ranged from 0.41 to 3.38), except in Sociability ($d = .09$). There are no significant differences between profiles in the category of a criminal offense ($\chi^2(1) = 1.05, p > .05$). However, there are differences in the number of life events. Offenders from Unadapted profile experience significantly more negative controllable life events

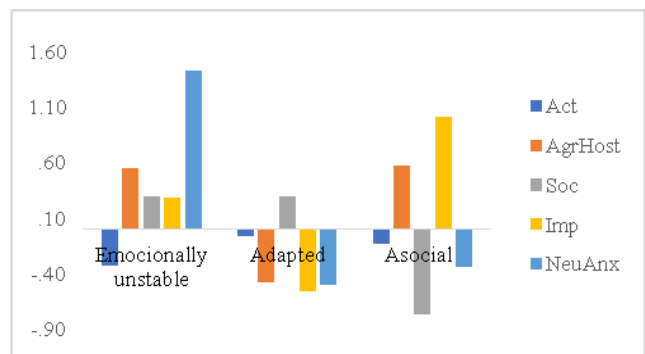


Figure 2: Profiles on a general population sample.

Differences in personality traits between profiles were all significant at $p < .05$ (η^2 ranged from 0.02 to 0.64). There were no significant differences in profile in controllable positive life events ($\eta^2 = .00$), but there were significant differences in both negative controllable ($\eta^2 = .05$) and negative uncontrollable

life events ($\eta^2 = .02$), with the same pattern of differences: Emotionally unstable > Asocial > Adapted.

Discussion

The two identified profiles within the prison population confirm the results of previous research, which indicate that prisoner types differ in Impulsiveness and Emotional stability (Claes et al., 2012). However, the key dimension that separates those two types is Aggression/Hostility, which is consistent with results obtained in some earlier domestic studies (Dinić et al., 2016). Bearing in mind the entire configuration of types, it can be assumed that affective, reactive aggression is a key feature that separates profiles. Isolated types to a certain degree resemble a Resilient and Hypocontrolled type (e.g., Herzberg & Hoyer, 2009; Poythress et al., 2010). However, there were no differences in the type of crime between the two profiles. One possible explanation is that this finding is due to the fact that the sample included only persons who committed violent offenses, that the prisoner's sample was homogeneous. On the other side, members of Unadapted profile experienced significantly frequent negative controllable life events, compared to Hyperadapted profile.

Isolated types on members of the general population are fully in line with the results of previous researches when it comes to an Emotionally unstable type that corresponds to the Overcontrolled type (Herzberg & Hoyer, 2009) and the Adapted type that corresponds to the Ordinary type (Xie et al., 2016). Asocial type is a combination of Approaching (Mitrović et al., 2014) and Strain type (Sârbescu & Boncu, 2018). It can be noted that the types isolated in the prison and the general population differ qualitatively and quantitatively, which was not obtained in previous research (e.g., Herzberg & Roth, 2006). In the light of these findings, it can be concluded that a different configuration of personality traits can most adequately describe the prison population and the general population, i.e. that typology on prisoners is a specific typology.

When it comes to life events, types isolated on both populations that have above-average scores on dimensions Neuroticism/Anxiety, Impulsive Sensation Seeking, and Aggression/Hostility reported more negative life events. This finding is expected because these dimensions are considered as risk factors for the occurrence of negative life events (Headey & Wearing, 1989).

The lack of information on recidivism as well as the length of the sentence are limitations of the research. A longer prison sentence, as well as a greater number of perpetration of the same criminal offense, could moderate the relationship between personality traits and life events, but may also affect the reference frame of the respondents when answering self-report questionnaires.

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Facilitatory and Inhibitory Effects of Personality Traits on Syllogistic Reasoning

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Abstract

The aim of the research was to assess if people high on a personality trait would score better or worse on syllogisms indicative of that trait. The syllogisms corresponded to both ends of a trait continuum. Three hundred students participated in the study. The syllogisms were specifically constructed for the purpose of the research so that NEO-PI-R items were transformed in a syllogistic form. The NEO-PI-R questionnaire was used to assess the Big Five personality traits. Low and high personality scores were calculated as the lowest 25% and the highest 75% participants on the trait. A total of 20 syllogisms of affirming the consequent (AC) were used. Four syllogisms corresponded to a trait, with two of them being formulated in a trait direction and the other two in a counter-trait direction. All conclusions were formulated in the first person. The results showed that participants high on Neuroticism scored better than participants low on Neuroticism on Neuroticism-related syllogisms. Those high on Introversion scored better than those low on the trait on Introversion-related syllogisms. Those high on Openness, Agreeableness, and Conscientiousness scored more poorly than those low on these traits on the syllogisms related to both ends of a trait continuum. The findings suggest that some traits might be true facilitators or inhibitors irrespective of the trait valence.

Keywords: personality traits; reasoning; syllogisms

Introduction

It has often been shown that reasoning is based on the believability of inferences rather than their validity, known as a belief-bias effect (Evans, Barston, & Pollard, 1983; Markovits & Nantel, 1989; Oakhill, Johnson-Laird, & Garnham, 1989; Stanovich & West, 2008). The effect is most often manifested as accepting a plausible, but an invalid inference.

The most elaborate account of the phenomenon is given in dual-process theory (Denes-Raj & Epstein, 1994), mental models theory (Johnson-Laird, 1975), and hyper-emotion theory (Johnson-Laird, Mancini, & Gangemi, 2006).

According to dual-process theory, two distinct systems influence information processing in reasoning. System 1 is automatic, fast and effortless, whereas System 2 is deliberate, slow, and effortful (De Neys, 2006). In no-conflict syllogisms where accepting or rejecting the conclusion based

on content does not contradict logic, using the content as a cue will suffice. But, when syllogistic content is in conflict with logic rules, System 2 should be activated to override automatic response in order to provide a normative response. In the reasoning context influenced by personality, we presumed that, on conflict syllogisms, for persons high in a trait, the trait-related content could serve as a plausible cue when evaluating invalid syllogism, so they would erroneously accept the conclusion related to the trait they score high in.

Mental models theory, as an alternative explanation, presumes that people will seemingly search for alternative models that match the conclusion and reject it if alternative solutions are possible. According to the theory, on conflict syllogisms, where more than one model could be constructed, people should be better reasoners on a trait-related content, considering that they might have more mental models in their working memory related to their personality trait.

Hyper-emotion theory originates from the clinical domain, where better performance has been verified on ego-syntonic inferences related to psychological disorder (Cardella & Gangemi, 2015; Johnson-Laird, Mancini, & Gangemi, 2006). The apparently counter-intuitive findings can be explained through hyper-emotion, a state of a very intense emotion that justifiably follows specific stressor, but is too intense in its quantity. As a consequence, the emotion maintains psychological symptoms, producing hyperlogicality as a side effect. According to Fumero, Santamaría, and Johnson-Laird (2011), the same could be applied to personality. It is presumably easy to imagine that personality traits facilitate reasoning but only on trait-related syllogisms. This is congruent with mental models theory in that people high in a personality trait are presumed to be expert reasoners in the domain related to a trait.

The aim of this study was to test two seemingly opposing hypotheses: that of dual-process versus mental models theory. To our knowledge, only one study (Fumero et al., 2011) tested hyper-emotion hypothesis in personality context, showing a facilitating effect of Neuroticism and Extraversion, independent of the trait direction, and facilitating effect of Agreeableness on reasoning opposite to trait direction. Considering a lack of research in this domain

and ambiguous previous results, we wanted to assess trait-related reasoning in order to check whether personality traits could be considered universal reasoning facilitators. In line with this, we expected people high compared to those low in these traits to be better reasoners on trait-related syllogisms.

Method

Sample

The sample comprised 300 (240 females) psychology students from the University of Sarajevo, Bosnia & Herzegovina and University of Belgrade, Serbia. The average age of participants was 20.08 years ($SD = 2.02$). All participants signed an informed consent and were given course credit in exchange for their participation in the study.

Instruments

NEO-PI-R (Costa & McCrae, 1992). The instrument for measuring Big Five personality traits consisted of 240 items related to five domains. In this study, the Serbian version was used (Knežević, Džamonja-Ignjatović, & Đurić-Jočić, 2004). Cronbach's alpha reliability of the subscales ranged from .71 for Openness to .84 for Conscientiousness.

K-KOGTEL (Hadžiahmetović, Opačić, & Teovanović, 2015). The Quasi-cognitive test of personality consisted of syllogisms specifically constructed for the purpose of this research. Syllogisms were constructed from the NEO-PI-R items, so that particular item was transformed in premises and conclusion. For example, the NEO-PI-R item for Conscientiousness that read: "I have clear goals and try to accomplish them systematically", was transformed in the following syllogistic form:

Premise 1: *All who have clear goals try to accomplish them systematically.*

Premise 2: *I try to accomplish goals systematically.*

Conclusion: *Therefore, I have clear goals.*

There were 20 syllogisms, four syllogisms per trait, of which two were trait-directed, and two were counter-trait directed. All task syllogisms were cognitive fallacies of affirming the consequent. We also used 40 filler syllogisms of modus ponens (MP), modus tollens (MT), and denying of antecedent (DA). All syllogisms showed high Cronbach's alpha reliability ranging from .84 for Conscientiousness to .90 for Agreeableness.

Results

Low and high trait groups were compared in this study. For that purpose, we used the lowest 25% (1st quartile) and the highest 75% (4th quartile) participants in a trait. The whole sample was first divided into four quartile ranges based on the lowest scores greater than 25%, 50%, and 75% of scores, respectively. Hence, the first quartile group ranged from minimum distribution value to 25th percentile (Q1), the

second quartile group ranged from Q1 + 1 to the median (Q2), the third quartile range encompassed the median + 1 score to 75th percentile (Q3), and the fourth quartile group ranged from Q3 + 1 to the maximum distribution value (Q4). Following the procedure by Fumero et al. (2011), whereby the lowest and highest scores in a trait were compared, we used only the first and fourth quartile subgroups in further analysis. Both groups had about equal number of participants (Table 1). The dependent variable was operationalized as a biased acceptance of the invalid believable conclusions, scored 1. The total sum of scores was calculated, representing the score of biased reasoning.

Descriptive statistics are shown in Table 1.

Table 1: Descriptive statistics of biased reasoning for groups.

	n	Trait direction	Trait direction		Counter-trait direction	
			<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
N	66	low	1.55 _a	0.79	1.44 _a	0.81
	69	high	1.26 _b	0.87	1.28 _a	0.87
E	72	low	1.32 _a	0.86	1.15 _a	0.91
	69	high	1.51 _a	0.82	1.46 _b	0.82
O	72	low	1.00 _a	0.90	0.89 _a	0.90
	64	high	1.45 _b	0.80	1.27 _b	0.82
A	66	low	1.31 _a	0.89	1.10 _a	0.93
	68	high	1.59 _b	0.86	1.52 _b	0.79
C	69	low	1.07 _a	0.90	1.09 _a	0.87
	69	high	1.62 _b	0.60	1.46 _b	0.76

Note: different subscript within a trait indicates significant effect

As is shown in Table 1, high N group accepted fewer trait-directed biased inferences compared to low N group, ($t(133) = -1.99, p < .05, d = -0.35$). No such difference was obtained on counter-trait inferences ($t(133) = 1.13, p > .05$).

Low E group had fewer Introversion-directed errors compared to high E group $t(139) = -2.13, p < .05, d = -0.36$. No difference was found on Extraversion inferences ($t(139) = -1.13, p > .05$).

Open, agreeable, and conscientious group made more biased errors in a trait-directed (O: $t(134) = 3.93, p < .01, d = 0.53$; A: $t(132) = 1.97, p = .05, d = 0.34$; C: $t(136) = 4.25, p < .001, d = 0.71$), as well as, counter-trait directed reasoning (O: $t(134) = 2.54, p < .05, d = 0.44$; A: $t(132) = 2.76, p < .01, d = 0.49$; $t(136) = 2.71, p < .01, d = 0.45$).

Discussion and Conclusion

Our results partially confirmed our hypothesis. Neuroticism and Introversion were found to be trait-related facilitators, which is in line with Fumero, et. al.'s (2011) study. The rest of the Big Five model showed the opposite pattern; people high in these traits were worse at reasoning indicative for the whole domain. It seems that N and E have a universal facilitating effect, replicable in research. Other Big Five traits

might presumably have an inhibitory effect on automatic conclusion acceptance, as a form of acquiescence bias. However, more caution should be made in generalizing these findings, since a variety of methods could be applied to determine lower and upper comparison subgroups (Langford, 2006).

In further research, the link between personality and emotion intensity should be examined more directly within the hyper-emotion framework. It would also be important to test believability of the trait vs. counter-trait syllogisms for participants high and low in a trait.

This study gives an interesting preliminary result of the link between personality and reasoning.

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Adult attachment styles described by personality traits from the Alternative Five-Factor Model

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Abstract

The research aim was to examine differences in personality traits in respondents that differ by dominant style of adult attachment. 259 respondents (185 female), between the ages of 20 and 68, were examined. Personality traits were assessed using Zuckerman-Kuhlman-Aluja Personality Questionnaire-Revisited Form (ZKA-PQ-RF) and adult attachment was assessed using Relationships Questionnaire (RQ). In the first analysis personality traits were positioned as predictors while dominant attachment pattern was the dependent variable. In the second discriminant analysis Neuroticism facets were predictors, while in the third discriminant analysis Aggression facets were predictors. Discriminant analysis with personality traits defined as predictors identified one significant discriminant function which is primarily defined by Neuroticism and Aggression. Values of the centroid indicate that respondents with preoccupied attachment pattern achieve highest scores on the discriminant function. Findings suggested that Neuroticism was the most important predictor of one's attachment style.

Keywords: adult attachment styles, personality traits, alternative five-factor model

Introduction

Bartholomew's attachment model (1993) includes the working model of oneself, represented by the dimension of Anxiety, and the working model of others, represented by the Avoidance dimension. Based on these two dimensions four-category attachment model is formed: secure, preoccupied, dismissive and fearful pattern of attachment. The studies on the relationship between attachment and personality traits emphasize negative correlation between Neuroticism and a secure attachment pattern (Carver, 1997; Neyer & Voigt, 2004; Shaver & Brennan, 1992) and positive correlation between Neuroticism and preoccupied and dismissive attachment style (Shaver et al., 1996; Shafer, 2001). Positive links of Extraversion with the secure, and negative one with the preoccupied and dismissive attachment styles, were reported, as well as the positive relationship of Agreeableness and Consciousness with secure, and negative with dismissive attachment style.

Psychobiological models are far less common than lexical personality models in partnership-related studies. In one such study (Feeney, Noller & Hanrahan, 1994), the relationship

between Neuroticism and preoccupied attachment style was established, as well as of Extraversion and secure style.

Actual study aim is to consider relationship between adult attachment styles and personality traits from the Zuckerman's Alternative Five-factor Model (AFFM), which conceptualizes personality as a dynamic system of physiologically based and hierarchically organized five basic personality traits: Neuroticism, Extraversion, Sensation Seeking, Aggression and Activity (Aluja, Zuckerman & Kuhlman, 2010). To this date, results on stable relationships with personality measures from other biological (Zuckerman & Cloninger, 1996) and lexical personality models (García, Escorial, García, Blanch & Aluja, 2012), and cross-cultural generalizability of AFFM (Rossier et al., 2016), were already established.

In this study, respondents with different patterns of adult attachment, assessed using the short Bartholomew & Horowitz's measure (1991), have been compared according to differences in AFFM personality measures. It is generally assumed that the results will be compatible with the findings of previous studies, and that respondents with different attachment patterns should primarily differ in Neuroticism.

Method

Sample

The sample included 259 subjects (185 female) aged between 20 and 60 ($M = 40.84$, $SD = 8.50$). Subjects from the general population with at least one close relationship that lasted for more than a year were recruiting by students. Participation was completely voluntary and anonymous.

Instruments

Relationships Questionnaire (RQ; Bartholomew & Horowitz, 1991) aims at assessing adult attachment. It includes four descriptions that correspond to each attachment style. Respondents choose one description that is most accurate for them.

The Zuckerman – Kuhlman – Aluja Personality Questionnaire – Shortened Form (ZKA-PQ-SF; Aluja et al., 2019) was applied in the assessment of AFFM personality traits: Neuroticism, Extraversion, Sensation Seeking, Aggression and Activity. In addition to the items, a four-point

scale of agreement is given, ranged from 1 (totally incorrect) to 4 (completely true). It is possible to get estimates of four facets within each scale.

Statistical analysis

Respondents were categorized according to their self-assessment at RQ scale as following: secure (156), dismissive (22), preoccupied (40) and fearful (41). Differences in personality traits and facets among respondents with different attachment styles were considered using ANOVA and discriminant analysis.

Results

The most significant difference emerged in Neuroticism. The highest Neuroticism ($p < .01$; $\eta^2 = .143$) is registered in respondents with a preoccupied attachment pattern. There is a less pronounced difference in Aggression ($p < .05$; $\eta^2 = .041$), which is the most pronounced in those with a preoccupied attachment style. Differences in Extraversion are on the verge of statistical significance ($p = .49$; $\eta^2 = .030$).

Table 1: ANOVA, Differences in personality traits in respondents with different attachment styles.

	Attachment Style	M	SD	W	p	F(3,255)	P	η^2
AC	Secure	41.57	7.41	.824	.481	.935	.424	.011
	Dismissive	43.41	6.31					
	Preoccupied	43.23	8.14					
	Fearful	41.29	6.88					
AG	Secure	34.67	7.19	1.709	.166	3.609	.014	.041
	Dismissive	36.41	8.00					
	Preoccupied	38.9	8.22					
	Fearful	34.46	8.51					
EX	Secure	49.9	6.44	.461	.710	2.656	.049	.030
	Dismissive	46.73	7.03					
	Preoccupied	47.3	7.67					
	Fearful	49.27	6.31					
SS	Secure	38.38	6.79	.392	.759	1.005	.391	.007
	Dismissive	40.55	7.85					
	Preoccupied	39.98	7.24					
	Fearful	38.88	7.19					
NE	Secure	34.93	8.1	.235	.872	14.211	.000	.143
	Dismissive	36.5	7.88					
	Preoccupied	44.1	9.21					
	Fearful	34.44	7.7					

Notes: W – Levene's test of homogeneity

To shed a light on the relationship of attachment styles with Neuroticism, Aggression and Extraversion results for

specific personality facets were analyzed (Table 2). Respondents with a preoccupied pattern achieved the highest scores ($p < .01$) on all facets of Neuroticism and Aggression facets AG3 and AG4. Respondents with secure and fearful pattern achieved the highest scores on Extraversion facet EX2 ($p < .05$).

Table 2: Differences in facets in respondents with different attachment styles

	Attachment style	M	SD	F(3, 255)	p	η^2
NE1 Anxiety	Secure	7.97	2.55	8.761	.001	.093
	Dismissive	8.55	2.15			
	Preoccupied	10.43	3.12			
	Fearful	8.39	3.06			
NE2 Depression	Secure	8.4	2.52	10.639	.001	.111
	Dismissive	8.95	2.85			
	Preoccupied	11.05	3.18			
	Fearful	8.66	2.54			
NE3 Dependency	Secure	9.52	2.55	13.864	.001	.140
	Dismissive	9.77	2.41			
	Preoccupied	12.03	2.37			
	Fearful	8.8	2.18			
NE4 Low self-esteem	Dismissive	9.03	1.89	8.657	.001	.092
	Preoccupied	9.23	2.29			
	Fearful	10.6	2.24			
	Secure	8.59	1.61			
EX2 Social warmth	Secure	12.03	2.36	4.694	.003	.052
	Dismissive	10.59	3.11			
	Preoccupied	10.7	3.12			
	Fearful	12.29	2.87			
AG3 Anger	Secure	8.72	2.65	3.849	.010	.043
	Dismissive	9.05	3.03			
	Preoccupied	10.3	2.83			
	Fearful	8.66	2.57			
AG4 Hostility	Secure	8.08	2.09	9.552	.001	.101
	Dismissive	8.86	2.1			
	Preoccupied	9.85	2.19			
	Fearful	7.51	2.52			

One statically significant discriminant function was identified ($R = .38$; $\lambda = .832$; $\chi^2(15) = 46.61$; $p = .000$). It is primarily determined by Neuroticism and Aggression (Table 3). Values of group centroids (Table 4) show that the highest discriminant score is achieved by respondents with a preoccupied pattern.

Table 3:
Discriminant
function structure

	f1
NE	.99
AG	.49
EX	-.33
SS	.19
AC	.21

Table 4: Group
centroids

	f1
Secure	-.19
Dismissive	.05
Preoccupied	.93
Fearful	-.24

Discussion and Conclusion

Obtained results are compatible with findings provided within lexical models of personality (Shaver et al., 1996; Baekstroem & Holmes, 2001; Shafer, 2001). This primarily refers to the finding that the trait of Neuroticism from the AFFM dominantly defines differences between the preoccupied and other patterns of adult attachment. Respondents with the dominant preoccupied pattern of adult attachment have significantly higher scores on all Neuroticism facets suggesting that the trait of Neuroticism is a significant determinant of the pattern of adult attachment, at least in terms of qualitative distinction between the preoccupied form and other attachment styles. The contribution of Anger (AG3) and Hostility (AG4), as Aggression facets, in the differentiation of the preoccupied pattern is in accordance with the earlier studies.

Overall findings suggest that the starting hypothesis can be partially accepted. The findings on the relationship between the adult attachment, estimated by the RQ questionnaire, and Neuroticism from the AFFM of personality traits, are compatible with earlier studies. The relationship between attachment styles and the Aggression are partially confirmed, while the findings on relationship between Extraversion and attachment styles were not confirmed. Differences with the previous findings may be the result of different conceptualizations of personality traits. It would be desirable for following studies of adult attachment to simultaneously use the ZKA-PQ-RF and NEO-PI-R measures. Withal, when interpreting the obtained results, it should be borne in mind that only a short scale **RQ** was used to evaluate patterns of attachment.

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PSYCHOLOGY OF EDUCATION

PISA 2012 mathematics achievement: Interpreting the results in the context of individual and contextual predictors

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Abstract

The achievement of Serbian students in PISA 2012 assessment of mathematical literacy is statistically significantly below the OECD average. The aim of this research was to reveal the complex relations between the individual characteristics of students, the dimensions of teacher-student interaction, the socio-demographic context and achievement. In order to examine the relations between those dimensions, a path model was constructed, based on the secondary analysis of 2012 PISA data. The path model parameters were acceptable ($CFI = .92$; $RMSEA = .049$; $TLI = .88$), indicating that the model fits the existing data. Self-efficacy has been singled out as the best predictor of students' achievement.

Keywords: achievement, mathematics, PISA, path model, self-efficacy

Introduction

The primary aim of the Programme for International Student Assessment (PISA) is to assess the degree to which the students who are nearing the end of their general education have mastered the competences relevant for continuing their education and participating in social life (Pavlović Babić & Baucal, 2013). The central concept of PISA testing is literacy, which is assessed in three key domains: mathematics, reading and science. The "central" domain in the 2012 cycle was mathematical literacy, defined as *an individual's capacity to formulate, implement and interpret mathematics in different contexts* (OECD, 2013; Pavlović Babić & Baucal, 2013). Mathematical literacy entails mathematical reasoning and the use of mathematical concepts, procedures, facts, and "tools" in order to describe, explain and predict a certain phenomenon. It serves to help people recognize the role of mathematics in the world and make well-based judgements and decisions that are necessary to constructive, interested and reflexive citizens (OECD, 2013).

In 2012, mathematical literacy achievement of Serbian students was 449 points on average. This is significantly

below the OECD average, i.e. approximately one-half of a standard deviation lower than the average international achievement (OECD, 2013).

Besides student achievement on knowledge tests, PISA also provides data on the way students perceive and assess their own motivation for learning, learning strategies, success in fulfilling school requirements, their attitudes towards school and future education. The relations between these variables and mathematics achievement have been the subject of many studies and primary PISA results (Pavlović Babić & Baucal, 2013). It has been shown that intrinsic motivation for mathematics is the key factor to success in this field, along with the factors such as ability, understanding the instructions and school and home climate (Walberg & Uguroglu, 1980, in Gottfried, 1985). A meta-analysis of 26 studies has found that very frequently there is a negative correlation between anxiety and achievement, which is consistent across genders, grades and ethnic groups (Ma, 1999, in Radišić & Videnović, 2016). However, there are also some results indicating that certain students can profit from their own anxiety because it encourages motivation and achievement (Pekrun et al., 2007, in Radišić & Videnović, 2015).

Aim of the study

The studies so far have mainly focused on analysing the isolated effects of a small number of variables, while in this research we tried to analyse multiple interactions between the variables that both influence one another and the achievement. The aim of the research was to investigate the relations between the individual and socio-demographic characteristics of students, their experience with mathematics and teacher-student interaction and mathematics achievement in PISA testing.

Method

The sample included 4684 students from Serbia who participated in PISA testing in 2012. A secondary analysis of PISA data was performed and the Path model was constructed. The model consisted of four groups of variables – 1. Individual (mathematics anxiety, mathematics intentions, mathematics self-efficacy, intrinsic motivation, instrumental motivation, attributions of failure); and 2. Socio-demographic characteristics of students (ESCS, ICT resources, use of ICT in mathematics lessons, home possessions, highest parental occupational status); 3. Teacher-student interaction (disciplinary climate, teacher behavior: formative assessment, teacher behavior: student orientation, teacher behavior: teacher-directed instruction, teacher support, cognitive activation in mathematics lessons, mathematic teachers support, teacher student relations); and 4. Experience with mathematics (perseverance, openness for problem solving, experience with pure mathematics tasks in school, familiarity with mathematical concepts).

Results

The path model parameters were satisfactory ($CFI = .92$; $RMSEA = .049$; $TLI = .88$), which indicates that the model fits the existing data. Model is presented in Appendix 1.

Mathematics self-efficacy (as an individual characteristic) was singled out as the best predictor of student achievement (Table 1). The model shows that *Motivation* does not have a direct effect on achievement, but rather that it exerts influence via *Self-efficacy*. The variable *Cognitive activation of students*, belonging to the domain of teacher-student interaction, influences achievement in the same way, while *Teacher behaviour: Student orientation* had a negative effect on achievement. In addition to these, *Familiarity with mathematical concepts* (domain of experience) and the *Highest level of parental occupation* (domain of socio-demographic characteristics) had a positive effect on achievement via *Self-efficacy*.

Besides *Self-efficacy*, *Mathematics anxiety* (as an individual characteristic) was another variable which had a direct (but negative) influence on achievement. Students' anxiety was higher if they had lower *Mathematics intentions* and external attribution to failure and were less familiar with math concepts.

In addition to an indirect effect, *Familiarity with mathematical concepts* also has a direct positive effect on achievement, and hence the students who are more familiar with mathematics concepts have a better achievement in PISA testing.

When it comes to socio-demographic characteristics, the variables *Highest level of parental occupation* and *ICT resources* exert a direct positive effect on achievement.

Discussion and Conclusion

The aim of the current analysis of the PISA data was to obtain insight into the complex relations between numerous individual and contextual factors and mathematics

achievement. *Self-efficacy* was singled out as the key dimension, while *Motivation* did not have a direct effect on achievement. *Self-efficacy* was assessed via student responses on how much they felt they were capable of solving various mathematics problems, and, in practice, the obtained link indicates that the more students believe in their abilities to solve mathematics tasks, the better will their mathematics achievement be. The absence of a direct link between motivation and achievement can be explained by the decline in intrinsic motivation for doing mathematics with age, as has been shown in previous studies (Wigfield & Eccles, 2000). We can assume that at this age motivation has already become an integral part of the experience of students' self-efficacy, so it consequently influences self-efficacy, but not achievement.

It has also been shown that the more anxious students are about mathematics, the lower their achievement. This result is in line with previous findings that anxiety negatively affects achievement in situations which demand a deeper cognitive processing of content, such as PISA tasks (Ahmed et al., 2013; Pekrun, 2006; Radišić, Videnović, & Baucal, 2015).

Mathematics anxiety is influenced by *Students' attribution to failure*, but also by their intentions for further engagement with mathematics. The attribution to failure refers to the extent to which students attribute internal responsibility for achievement to themselves, while the intention to pursue mathematics implies students' desire to deal with something that is related to mathematics in the future. The direction of these influences is clear – the more students attribute failure to themselves, the more anxious they will be, while, on the other hand, the higher their intentions to pursue mathematics, the less prominent mathematics anxiety will be.

When it comes to the domain of teacher-student interaction, the results show that cognitive engagement is the most important for students' achievement, i.e. the extent to which the teacher encourages deeper information processing and independent solving of complex problems. The studies that emphasize pedagogical support as one of the most important dimensions of interaction (Pianta et al., 2008) additionally confirm this finding.

The negative direction of the relationship between *Self-efficacy* and *Teacher behaviour: Student orientation* implies teachers' orientation towards individualized forms of work, non-typical for our education (e.g. Differentiates between students when giving tasks).

The impact of *Familiarity with mathematics concepts* on *Self-efficacy* indicates that the students who are more familiar with math concepts assess that they feel more capable of solving mathematical tasks. This is in line with Bandura's theory of self-efficacy, which argues that one of the main sources is precisely previous experience with mathematics (Schunk & Pajares, 2002). *Familiarity with mathematics concepts* also has a direct effect on achievement, which means that, besides self-efficacy, knowledge plays an important role as well. The children who do not have the level

of knowledge of the concepts demanded by PISA tasks spend more resources on recalling, which affects their achievement.

The results also indicate that children of parents with higher occupations demonstrate higher self-efficacy in solving mathematical tasks. The parents with higher occupations have more knowledge, as well as all other resources to support the learning of mathematics and their children's education, which in turn contributes to the development of positive attitudes towards mathematics and the feeling of self-efficacy (Baucal, 2012; Chiu & Xihua, 2008; Baucal & Pavlović Babić, 2010).

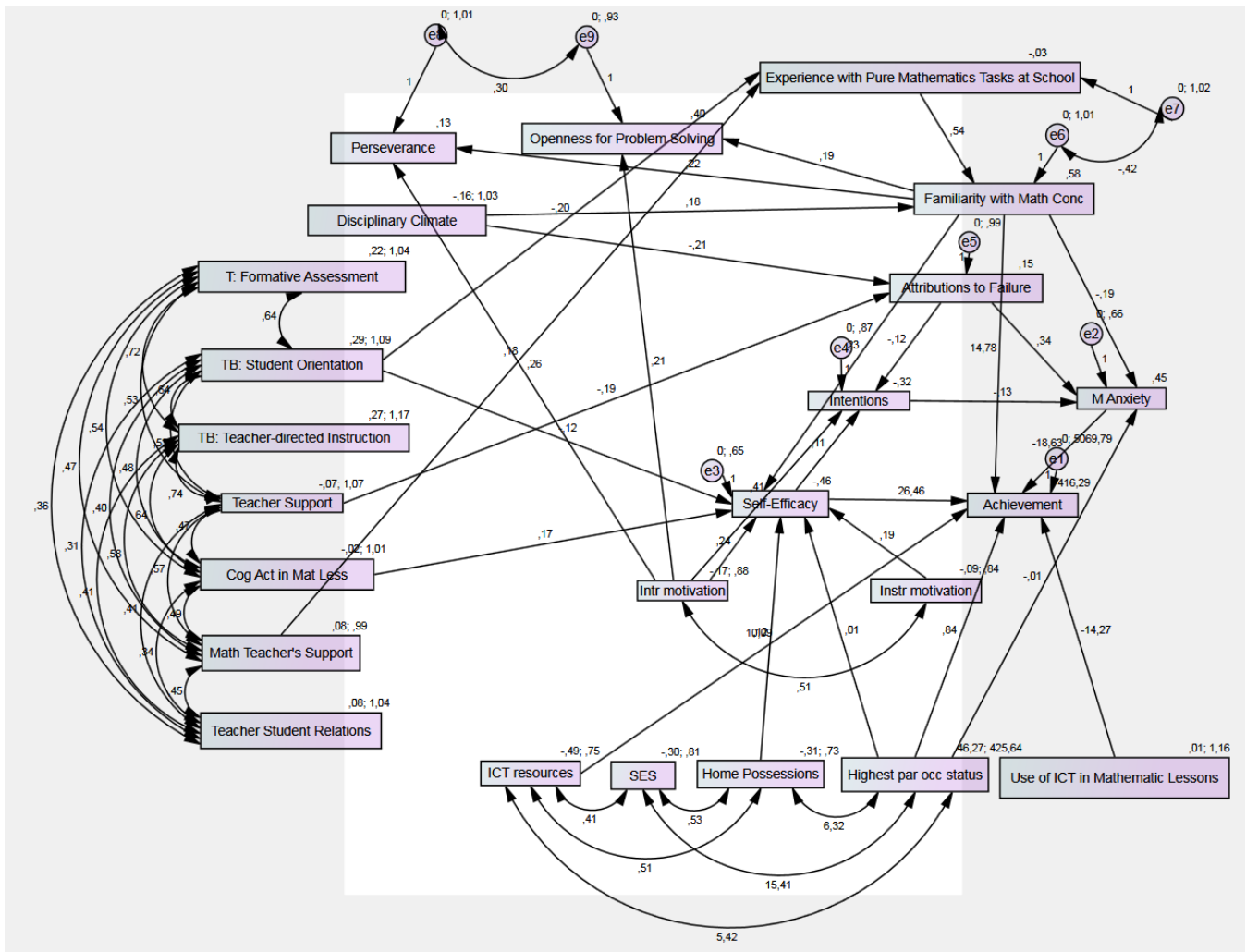
The constructed model shows that "individual characteristics", which include self-efficacy, attribution to failure, anxiety, intentions related to mathematics and intrinsic and extrinsic motivation, contribute most to explaining the achievement on PISA tests. Self-efficacy proved to be the best predictor of achievement on PISA tests.

These results indicate that student achievement rely largely on their socioemotional skills, like self-efficacy, motivation, attribution of failure, anxiety. Since anxiety is a significant part of everyday school life and our study showed negative impact on achievement, it is necessary to put more attention on students academic emotions. Having in mind that development of socioemotional skills and emotional wellbeing of students are one of the key educational goals in the 21st century, teacher roll should not be just in transferring math knowledge, but also to support students' socioemotional learning. Besides an appropriation of math knowledge, math class should be also an opportunity for teachers to help improve students' self-awareness, self-regulation and learning strategies in order to have higher self-efficacy, be more motivated and engaged in learning math, and to better regulate negative emotions toward math. Organising interesting, pragmatic and engaging class activities would enable both teachers and students to be active participants in the teaching/learning. Furthermore, familiarity with mathematical concepts is a strong predictor of mathematical achievement which indicated that teachers should make an additional effort to enable students to better understand the relationship between math knowledge they learn in school and everyday life and how math knowledge could empower students to cope with everyday challenges.

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Appendix 1: The full path model



The Effect of Internet Search on the Assessment of Knowledge Base

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Abstract

The aim of this study was to examine the effects of Internet search on knowledge acquisition and verification. Two experiments were conducted to test whether findings obtained in the American population (Ward, 2013) could be replicated in the current Serbian sample. The first experiment (with $N = 80$) successfully mirrored the original results: Participants that were allowed to use the Google to find answers to test questions were more prone to wrongly „locate the source” of information and mix the knowledge they acquired via the Internet with their own knowledge base than those that used a low-ranked search engine. The second experiment (with $N = 240$) assessed effects that the Internet search has on cognitive self-esteem. The results of this experiment failed to replicate the original findings: The level of cognitive self-esteem was fairly equal in both groups of participants—those that were allowed to use the Internet and those that had to rely on their own knowledge whilst answering test questions. The results of these two experiments are further discussed in the light of the Transactive Memory System theory (Wegner, Giuliano, & Hertel, 1985) and compared to findings obtained in other cultures.

Keywords: Transactive Memory System, Internet search, Google effect, cognitive self-esteem

Introduction

To study and explain shared knowledge within groups, Wegner introduced the concept of transactive memory or the Transactive Memory System (TMS; Wegner, Giuliano, & Hertel, 1985). As per Wegner, to increase the efficiency of our memory and boost knowledge acquisition in different areas, we have to rely on external information sources and create TMS (Wegner et al., 1985; Wegner, Erber, & Raymond, 1991). The main feature of the TMS is distribution of information between system members (partners) based on two major principles – the domain of expertise of each member, and the availability of information (Peltokorpi, 2008; Wegner et al., 1991).

Partners in the TMS are not necessarily other people, but could be any objects that we rely on when we try to remember something (Fisher et al., 2015; Petlokorpi, 2008). Thus, one of the “hot” questions is whether the Internet can pose as a TMS partner? Ward distinguishes several Internet attributes that make it a “supernormal” partner—maximum expertise, omnipresence, and unlimited knowledge base (Ward, 2013b). To corroborate these assumptions, Ward undertook a series of experiments clearly demonstrating effects of everyday-life Internet use on metacognitive processes and personality (Ward, 2013a). Ward’s findings report on the so-called “Google effect”—the phenomenon of frequent reliance on the Internet search when storing and later retrieving information. Interestingly, Ward’s experiments and “Google effect” exerted greater influence on theoretical (Danovitch, 2019;

Storm, 2019), rather than on empirical studies. Considering that this phenomenon is still becoming popular among researchers and that there is not much empirical evidence of its existence outside the U.S. population, the aim of this study was to check whether some of the Ward’s findings could be replicated in Serbian sample.

Experiment 1

Experiment 1 represents the replication of Ward’s study that aimed to verify the existence of the so called “mixed sources effect” in which the TMS members fail to distinguish their own knowledge from the knowledge shared within a formed system (Sparrow et al., 2011; Ward, 2013a). Ward (*ibid.*) examined this effect in an experiment with the (Internet) search engine as the TMS partner and found that under those circumstances participants tend to attribute knowledge stored on the Internet to their own knowledge corpus. In order for this effect to be assigned to the specific search engine as the TMS partner, Ward used a two group design in which one grouped used a well-known and frequently used search engine (which was considered a potential TMS partner), while the other group relied on a less known and rarely used browser. In this way, the effect of familiarity, i.e. previous experience with the search engine was controlled.

Design and Procedure

In the first experiment, 80 students ($M_{age} = 24.33$, $SD_{age} = 2.20$) were randomly assigned into two groups. Participants from the first group used *Google.com* (very frequently used search engine) to look for answers on the general information test, while those in the second group were allowed to use *DuckDuckGo.com* (very rarely used search engine). Both browsers were equal in design of output and search quality for each question. During the first phase, participants answered 32 general information questions – 16 with online search and 16 without (these were randomly arranged). In the second phase, participants were again given these 32 questions accompanied with additional 16 new questions and then asked to assess the degree of familiarity with both the questions and their answers by choosing one of the options: 1 – *I did not see this question*, 2 – *I’ve seen this question but I do not know the answer*, 3 – *I’ve seen this question and I knew the answer (without searching the Internet*, and 4 – *I’ve seen this question and I found (verified) the answer on the Internet*.

A dependent variable in the study was the “mixed source”, which referred to the attribution of “external” knowledge to

one's own; it was defined as a binary (1/0) variable, where the value 1 was to be assigned in cases when in the second phase of the experiment participants choose options 2 or 3 in situations described by option 4.

All data were collected online, via the Google Forms platform, and the questionnaire was distributed through social networks. It took about 25 minutes for respondents to go through all the stages of the experiment.

Results and Discussion

A one-way ANOVA was used to test between-group differences in the “mixed source” level. Results of the ANOVA turned significant ($F(1, 78) = 5.61, p < .05$), with the *Google.rs* group ($M = 13.65, SD = 2.28$) being more prone to attribute information found/verified on the Internet to their own knowledge than the *DuckDuckGo.com* group ($M = 12.03, SD = 3.69$). The size of the Cohen’s d (.53) implies that the search engine effect was in the medium range and non-trivial. Of note, high M s of both groups (with the maximum being 16) show that in general participants tended to mix the source of information; however, those that used the *Google.rs* did it significantly more often than those that relied on the low-ranked search engine.

Findings from Ward’s (Ward, 2013a) study were fully replicated: When participants rely on the familiar search engines (such as *Google.rs*), while answering general information questions, the Internet becomes a TMS partner, as described by Wagner et al. (Wegner et al, 1991). On the other hand, the *DuckDuckGo.com* does not assume the role of a TMS partner, primarily because users are less accustomed to this browser and its characteristics.

Experiment 2

Experiment 2 is a replication of another Ward’s study, in which the goal was to test the impact of the search engine as the TMS partner on cognitive self-esteem (Ward, 2013a). Ward’s (*ibid.*) findings confirmed his hypothesis on effects that the Internet search has on specific aspects of the self-image by reporting higher general cognitive self-esteem when participants rely on the TMS partner.

Design and Procedure

In this experiment, 240 students ($M_{age} = 23.58, SD_{age} = 2.79$) were randomly assigned into three groups—two experimental and one control group. All participants had to answer 10 general information questions, with group 1 receiving instruction to use the *Google.rs* search engine to answer each question, group 2 instructed not to use the Internet while answering these questions, and the control group receiving no instruction regarding the use of Internet.

In the next phase, respondents filled in the *Cognitive Self-Esteem Scale* (CSE; Ward, 2013a), which is a 14-item self-assessment scale measuring three aspects of cognitive self-esteem: thinking, memory and ability to locate information (transactive memory). Prior to the experiment, the CSE scale was adapted for Serbian population. Participants responded

on a 5-point Likert scale from strongly disagree to strongly agree.

Results and Discussion

Internal consistency ($\alpha \geq .87$) and structural validity of the Serbian CSE were satisfactory. However, as Table 1 shows, scores on all three subscales were quite high, with distribution-related coefficients implying that the majority of participants expressed high cognitive self-esteem.

Table 1: Descriptives of adapted version of CSE scale in experimental and control groups

Group	Subscale					
	Thinking		Memory		Transactive Memory	
	M	SD	M	SD	M	SD
EXP1: Internet search	24.39	3.89	14.34	3.23	17.63	2.39
EXP2: No Internet search	23.79	3.65	13.56	3.37	17.95	1.99
Control: No instruction	24.58	3.79	14.15	3.27	18.39	2.01

In our sample, results of ANOVA failed to confirm expected between-group differences in general cognitive self-esteem ($F(2, 237) = 1.33, p = .267$); the same result was obtained for all three subscales as well. Thus, Experiment 2 findings completely diverge from those established by Ward (Ward, 2013a), which we would be mostly inclined to attribute to fairly low variability of self-esteem scores in all three groups.

General discussion

Experiments we have performed only partially confirmed the existence of the Google effect among the student population in Serbia. Experiment 1 fully mirrored findings obtained in the USA (Ward, 2003a), but Experiment 2 did not. Future studies should seek to clarify these inconsistent effects.

Both experiments had been conducted in line with procedures proposed in the original study (Ward, 2013a). However, it should be noted that an online distribution of tests and questionnaires in these experiments requires researchers to trust participants and fully rely on their honesty in test-taking situation. We would suggest additional control of the testing conditions.

Although we can assume that our samples were well representative of the Serbian student population, we should note that Ward’s original experiments were performed on samples representative of a more general population. Also, the mean age of participants in the Ward’s and the current study were very similar, but there was an apparent difference in the overall educational level of participants. It is possible that this is one of the reasons for the reduced variability and high scores on the CSE test, and inability to obtain the effect

from Ward's study. These factors should be addressed by future studies concerned with effects of Internet use.

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Psychological Capital as a Factor of Roma College Students' Academic Success

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Abstract

Given that Roma students are underrepresented at the tertiary educational level, and that few studies investigated factors of academic success of youth from marginalized groups, our aim was to determine what personal characteristics, school and family experiences characterize Roma attending college and if there are any differences compared to students from general population. We analyzed family educational and financial status, frequency of discriminatory experience in primary and secondary school, academic resilience, optimism and belief in self. In total 89 Roma college student and 118 college students from general population filled in the questionnaire. Significant differences between two groups were obtained for all analyzed variables. It can be concluded that, despite low family's educational and financial status, and discrimination in school, Roma college students have developed high level of psychological capital. Factors that might have contributed to such a capital and practical implications are further elaborated.

Keywords: psychological capital; discrimination; academic achievement; college students; Roma

Introduction

Challenges regarding access of Roma children and youth to all educational levels, especially to the tertiary education¹, could be attributed to factors such as: poverty and social exclusion of Roma families, discrimination towards Roma, lack of systemic and institutional support (Jovanović, 2013; Macura-Milovanović, 2013; Radovanović & Knežević, 2014). However, insights on intrapersonal and family-related factors of academic success of youth from marginalized groups are scarce.

Studies conducted with general population have found that higher optimism, proactive stance, self-confidence and self-efficacy, hope, and resilience are important drivers of academic success (Burton & Dowling, 2005; Isik et al. 2018; Snyder et al. 2002; Vanderbilt-Adriance & Shaw, 2008). All of these features could be put under umbrella of a *psychological capital (PsyCap)* which is characterized by *self-efficacy*, i.e. having confidence to take on and put in the necessary effort to succeed at challenging tasks, *optimism* about succeeding, persevering toward goals and, if needed,

redirecting paths to goals in order to succeed, together with keeping *hope* and demonstrating *resiliency* to attain success when beset by problems and adversity (Luthans et al., 2007). At the family level, it is shown that family's socioeconomic and educational status, quality of the relationship with parents, their support to autonomy in decision making, and support from other significant persons, represent drivers of academic success (Isik et al., 2018; Masten & Reed, 2002; Soenens et al., 2007).

Studies that investigated factors of academic success of Roma youth emphasized the following academic success factors: family's levels of education, access to early childhood education, incidence of discrimination, robust teacher, peer, and financial support systems in schools (Bhabha et al., 2017). Given that Roma youth is underrepresented in higher education in Serbia and that there are few studies on factors of their academic success (for this research defined as being a college student), our aim was to determine what personal characteristics, school and family experiences characterize Roma attending college and if there are any differences compared to students from general, non-Roma population.

Method

Sample and Procedure

Participants in this research were 89 Roma (56.2% females) and 118 non-Roma students (71.2% female). At the moment of the research they were studying mostly Social Sciences and Humanities (47.8%) and one of four Serbian state universities and 28.1% of them attended 4th study year.

Within the project "Romani champions" Roma Social Sciences students were trained for the role of a researcher by the authors of this paper. Through their personal contacts and Roma student organizations they reached Roma students from their universities. In the same time, the authors collected data for non-Roma students, using the online questionnaires distributed on social media.

Variables and instruments

For this research we analyzed the following variables: family educational and financial status, frequency of discriminatory

¹See: Republički zavod za statistiku Republike Srbije & UNICEF, 2014; Roma at Glance Serbia, 2018

experience in primary and secondary school, academic resilience, optimism and belief in self.

Family educational and financial status were assessed through six categories. For the experience of discrimination, we asked “How often were you a victim of discrimination on ethnic grounds in primary/secondary school?” with five categories offered (from “Hardly ever” to “Almost every day”). Academic resilience, defined as the ability to persevere despite challenges in the academic context, was assessed through the *Academic Resilience Scale* (ARS, seven-point Likert-like scale, Martin & Marsh, 2006). The Social Emotional Health Module – Middle & High School Questionnaire (Furlong et al., 2013) was applied; for this research we focused on the subscales assessing *Optimism* (4-point Likert scale) and *Belief in Self* (composite score for *Self-efficacy*, *Self-awareness* and *Persistence*, 4-point Likert scale).

Statistical analyses

In addition to descriptive statistics particularly relevant for Roma student subsample, we compared two groups of students using Chi-Square and t-test. We merged categories of family educational and financial status, as well as frequency of discrimination experience in order to meet the requirements for the Chi-Square of at least five occurrences in each category. Finally, we applied binary logistic regression with the nationality (Roma and non-Roma) being dependent variable.

Cronbach's alpha coefficients of reliability of the scales used were: ARS ($\alpha = .91$), Optimism scale ($\alpha = .69$) and Belief-in-Self scale ($\alpha = .84$).

Results

Roma students' typical “profile” could be described as: they are at either the 1st (24.7%) or the 2nd (22.4%) study years, with the $M_{\text{age}} = 23.4$. Fourty percent of them enrolled in the college via affirmative measures and 51.7% of them study Social Sciences and Humanities, with $M_{\text{GPA}} = 8.1$. Their mothers usually completed primary schools (34%), and their fathers – four-year secondary schools (37%). For 27% of them buying clothes and shoes is a problem. During primary education 15% of Roma students experienced discrimination on ethnic basis often or almost every day, whereas during secondary education they reported regular or almost everyday discrimination in 4% of the cases. Their score on *Academic Resilience* was $M = 5.31$, on *Optimism* – $M = 3.42$ and on *Belief-in-Self* it was $M = 3.3$.

Comparison of Roma and non-Roma students yielded significant differences for all analyzed variables. Educational status of parents of non-Roma students was higher compared to Roma students' parents (for mothers: $\chi^2(3, N = 206) = 64.648, p < .00$ and for fathers: $\chi^2(3, N = 198) = 31.869, p < .00$). Financial status of students from non-Roma families was higher than those of Roma families ($\chi^2(4, N = 207) = 50.344, p < .00$). Discrimination rates were higher for Roma

students than for non-Roma students (for primary school: $\chi^2(3, N = 207) = 8.242, p < .041$ and for secondary school: $\chi^2(2, N = 207) = 6.030, p < .049$). Finally, *Academic resilience*, *Optimism* and *Belief-in-Self* were higher for Roma students than for the non-Roma students ($t(204) = 2.99, p < .00$), $t(202) = 2.98, p < .00$ and $t(201) = 2.17, p < .05$ respectively).

The logistic regression model was statistically significant, $\chi^2(8) = 100.963, p < .000$ and explained 55.3% (Nagelkerke R^2) of the variance in students' status and correctly classified 82.2% of cases.

Discussion and conclusions

Despite experience of being discriminated against (known as a predictor of low resilience) and despite unfavourable educational and financial family status (known as predictors of low academic achievement), Roma students developed *high PsyCap* (Luthans et al., 2007), that prove to play central role in the way students adjust to the requirements of their academic environment (Brisette et al., 2002; Hazan Liran & Miller, 2019; Heiman & Kariv, 2004). Relying on the finding that Roma students are more likely to attribute their success to inner factors than students from general population (Bhabha et al., 2017), we can assume that those who succeeded despite the unfavourable conditions tend to value themselves more, become more resilient and prepared to cope with future challenges. That is why school counsellors and teachers, as well as policy makers need to give high priority to fully exploiting potential of *PsyCap* to facilitate (Roma) students' effective adjustment to school / college. They need to be “equity literate” (Gorski, 2013) in order to recognize biases and discriminatory practices in education, respond to them and redress them in order to cultivate and sustain oppression-free and equitable learning environment for all students. School and college staff should provide learning situation in which (Roma) students would have opportunities to show their competence, be successful and relate that success to their competences (sense of control over own achievements).

We should point to one limitation of this study. Differences in data collection procedures with Roma and non-Roma students resulted in unequal distribution of study years in the subsamples, which might have impacted the results. Future studies should involve larger and more homogeneous subsamples with regard to the study year/age, as well as Roma youth who do not study and should use qualitative data in order to better understand the relation between different aspects of *PsyCap* and academic success.

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Relationship between life stressors, depressiveness, and school achievement in late elementary and late high school students

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Abstract

We examined the association between life stressors and depressiveness and their relationship with the GPA in late elementary school (ES) vs. late high school (HS), when controlling for the student's gender, personality, and general intelligence (*g*). We used representative samples of 497 ES 9th grade students and 513 4th grade HS students from the Republic of Srpska. The results show that when adjusted for the personality, gender, and *g*, stressors predicted higher depressiveness. This effect was not moderated by the ES-HS status (but was higher in girls). Depressiveness directly predicted lower GPA, while stressors had borderline direct effect. These effects were also not moderated by the ES-HS status (nor gender). There was a small but significant indirect effect of stressors through depressiveness on lower GPA, similar for ES and HS. It can be concluded that correlation between life stressors and depressiveness is similarly in late ES and late HS students and they similarly predict lower GPA in both groups. The effect of depressiveness is more direct, while the effect of life stressors is indirect. Although small, these effects on the GPA persist regardless of gender, intelligence, and personality differences. Thus, an efficient detection and management of students' depressiveness would be a uniquely important strategy for supporting their scholastic achievement.

Keywords: life stressors, depressiveness, school achievement, Big 5 personality, general intelligence

Introduction

Research findings from various cultures show that life (di)stressors and adversities are linked with depressiveness (Cheung, 1995; Daniels & Moos, 1990; Hankin, 2015; Hankin, Mermelstein, & Roesch, 2007; Kaloeti et al., 2018; O'Connor, Rasmussen, & Hawton, 2010; Rudolph et al., 2000; Subotić, Marinković, & Zečević, 2018; Takakura &

Sakihara, 2001) and that both tend to be negatively linked with school/academic achievement on all levels of education (Alva & de Los Reyes, 1999; Crystal et al., 1994; Bethell, Newacheck, Hawes, & Halfon, 2014; Fathi-Ashtiani, Ejei, Khodapanahi, & Tarkhorani, 2007; Fröjd et al., 2008; Grannis, 1992; Quiroga, Janosz, Bisset, & Morin, 2013; Shahar et al., 2006; Souers & Hall, 2016; Subotić, et al., 2018). Sometimes, effects of life stressors/adversities can be mediated by depressiveness (Subotić et al., 2018).

We aim to explore the link between life stressors and depressiveness and, most importantly, to examine how they are (directly and indirectly) related to school achievement (i.e., grade point average, GPA) in late elementary school (ES) vs. late high school (HS) age students. We have chosen these ages specifically, since they represent periods of adolescent life when academic pressures intensify. Adolescents (who decide to pursue further education) should select and get into desired HS/college. Such decisions can impact mental health (Schulenberg, Sameroff, & Cicchetti, 2004), including an increase in depressive symptoms (Brazil & Andersson, 2018), which, in turn, could negatively influence academic success.

When studying the links between life stressors, depressiveness and school achievement, research tends to neglect many variables important for the academic success. Gender (with female gender predicting higher GPA; Voyer & Voyer, 2014) is often accounted for (with a tendency for stressors-depression correlation to be stronger in girls; e.g., Hankin et al., 2007; Fröjd et al., 2008; Rudolph et al., 2000). However, other important predictors of the GPA, such as general personality (namely Conscientiousness; Poropat, 2009) and intellectual ability (Roth et al., 2015), are usually

not adjusted for. We considered all said variables, i.e., we wanted to establish how life stressors and depressiveness interrelate, and how they, directly and indirectly, predict GPA for late ES and HS students, when gender, personality, and general intelligence are all controlled for.

Method

Sample, procedure, and measures

We used representative samples of 497 (51.7% girls) ES 9th grade students and 513 (58.3% girls) 4th grade HS students (outliers on key variables removed) from the Republic of Srpska. Life stressors were assessed via a 28-item check list (constructed for this research project) of various (di)stressful events (e.g., death in a family, health issues, bullying, poor life conditions, etc.; full sample total score: $M=2.80$; $SD=2.85$). In addition to depressiveness (PHQ-9; Kroenke & Spitzer, 2002; Kroenke, Spitzer, & Williams, 2001; total score was used (Subotić et al., 2015), full sample: $M=6.37$; $SD=5.11$) and the GPA (full sample: $M=3.71$ (out of 5.00); $SD=0.81$), we also measured students' Big 5 personality traits (BFI-44; John, Donahue, & Kentle, 1991; John, Naumann, & Soto, 2008) and general intelligence, i.e., g (ICAR's short test of Matrix Reasoning; Condon & Revelle, 2014).

Data was collected using self-report pan & paper procedure, during 2017/18 school year, as a part of a large project (see Acknowledgements).

Analyses were done in SmartPLS 3.2.8 (Ringle, Wende, & Becker, 2015) and JASP 0.9.2 (JASP Team, 2018).

Results

HS students report slightly more life stressors ($t(1002.94) = -3.89, p < .001, d = 0.24$), higher depressiveness ($t(1007.56) = -3.39, p = .001, d = 0.21$), and lower GPA ($t(987.58) = 5.15, p < .001, d=0.32$) than ES students.

On the combined ES-HS sample, both total life stressors ($r = -.08, p=.012$) and depressiveness ($r = -.09, p = .004$) show weak, but significant bivariate negative correlations with the GPA, while being moderately correlated themselves ($r = .33, p < .001$).

The main analysis is shown in Figure 1. When adjusted for the personality, gender, and g (notable covariate effects: higher N, lower C & A, female gender, being in HS), total stressors predict higher depressiveness, and this effect is not moderated by the ES-HS status (Mod. 1). Regarding the GPA, Depressiveness directly predicts lower GPA, while stressors have borderline direct negative effect (notable covariate effects: female gender, higher g & C, borderline effect of higher E). These effects are also not moderated by the ES-HS status (Mod. 2 & 3, respectively). There is also a small but significant negative indirect effect of stressors through depressiveness on the GPA: $\beta = -.015, 95\% \text{ CI } [-.029, -.001]$. The strength of this indirect effect does not vary significantly between the ES and HS groups ($\Delta p = .624$), but the effect is more reliably obtained in the HS group:

$\beta = -.03, 95\% \text{ CI } [-.062, -.003]$, than in the ES group: $\beta = -.02, 95\% \text{ CI } [-.053, .014]$.

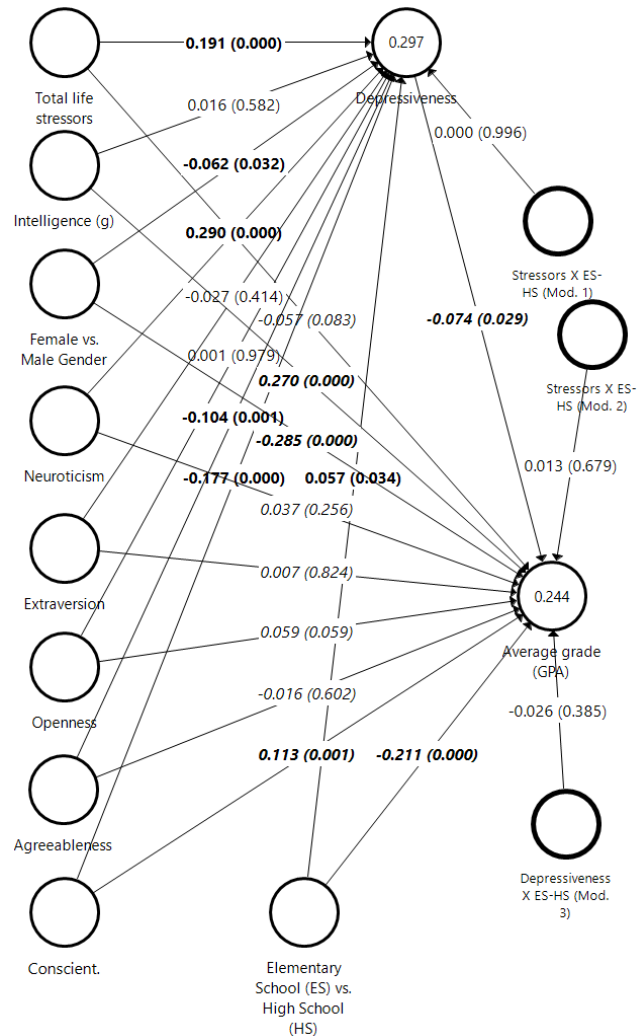


Figure 1: Path model. Values are given as: $\beta(p)$, with sig. paths (bootstrapped, $k = 10000$) bolded. Paths predicting GPA are Italicized. Values in circles for Depressiveness and GPA are R^2 s. Bolded circles are moderation terms.

Additionally, if interaction terms involving gender are added (Hankin et al., 2007; Fröjd et al., 2008; Rudolph et al., 2000), a tendency towards higher correlation between stressors and depression is found for girls ($\beta = -.099, p = .001$), but neither depression ($\beta = -.045, p = .149$) nor stressors ($\beta = .011, p = .731$) predict lower GPA significantly differently for girls and boys.

Discussion

As expected (Cheung, 1995; Daniels & Moos, 1990; Hankin, 2015; Hankin et al., 2007; Kaloeti et al., 2018; O'Connor et al., 2010; Rudolph et al., 2000; Subotić et al., 2018; Takakura & Sakihara, 2001) life stressors and depressiveness are robustly related to each other. That is, life stressors represent similar risk factors for depressions for both ES and HS

students, regardless of their personality or intelligence. The correlation also “survives” the control of gender, even though the effect is (expectedly) stronger for girls (Hankin et al., 2007; Fröjd et al., 2008; Rudolph et al., 2000).

More importantly, life stressors and depressiveness predict lower GPA similarly in both ES and HS students, although more reliably so in the latter case. The effect of depressiveness is more direct, while the effect of life stressors is mainly manifested indirectly, through an increase in depressiveness. Although small, these effects on the GPA persist regardless of general intelligence or personality differences (with *C* and *g* expectedly being significant predictors of GPA; Poropat, 2009; Roth et al., 2015). The effects are not even affected by gender, i.e., despite stronger correlation between stressors and depressiveness for girls (and girls expectedly having higher GPA than boys; Voyer & Voyer, 2014), negative impact that they have on the GPA are similar for the genders. Thus, our findings and their implications mimic and strengthen earlier recommendations that students with observed difficulties in scholastic performance should be screened for depression, as providing assessments and treatments for them might “promote school performance, and through that, future academic aspirations” (Fröjd et al., 2008, p. 496).

That is, an efficient detection and management of students’ depressiveness would be a uniquely important strategy for supporting students’ achievement, that would be relevant in both late elementary and (perhaps even slightly more in) late high school, for students of all genders, personality, and general intelligence makeups.

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Should they stay or should they go? Dropout in higher education

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Abstract

Dropping out of higher education is a global phenomenon which affects virtually all universities. The main aim of this research is to determine the factors which have the most predictive value for students' satisfaction with their studies and dropout intentions. The research was conducted on the sample of 673 students who completed a self-description questionnaire which included 22 dimensions of students' perceptions of their studies. Based on a two-step cluster analysis, we have identified the group of students at risk of dropout. ANOVA has shown that the two groups differ on almost all investigated dimensions. Individual-related factors, developed in a specific context, are the main predictors of students' dropout from higher education. Understanding of these factors can improve the system of early detection of students at risk of dropping out.

Keywords: dropout; higher education; individual and institutional factors; prediction

Introduction

In most of the countries worldwide, higher education is recognized as an important factor which supports social, cultural and economic development of both individuals and societies. According to data from the OECD (2010), around one-third of higher education students drop out before the completion of the first-degree studies. Lowering the dropout rate among HE students is one of the main goals of the EU strategy for jobs and growth (Europa 2020). Due to the significance of this issue, a number of studies have been focused on the factors leading to dropping out of the educational system.

Dropping out of HE is a major concern both for the educational system and policy-makers (Tinto, 2006). It is a universal problem which has significant economic and academic consequences at the individual, institutional, and societal levels (UNESCO, 2004). Available data suggest that workforce participation is the lowest for the youth who dropped out of high school and the highest for the youth who graduated with a four-year college degree (Sandoz, Kellum & Wilson, 2017).

A number of studies that researched dropout factors indicated that dropout was influenced not by a single factor, but rather by a combination of different factors (Bernardo, Esteban, Fernandez, Cervero, Tuero & Solano, 2016; Kim &

Kim, 2018). Based on rich empirical data, most researchers agree that the causes for dropout can be found in a specific combination of individual, familial, institutional, and societal factors (Bennett, 2003, Tinto, 1993). Still, there are no coherent data which define the combination of factors which leads to students' dropping out of higher education. Since dropout is a complex and multifactorial problem, there is no single solution that can be applied as a prevention measure in all situations and in all higher education institutions (Thomas & Hovdhaugen, 2014). Hence, there is a need for research into the factors which have a major effect on students' dropout in the specific cultural, societal and institutional contexts.

In the academic year 2017/2018, at the University of Belgrade, there were around 102,000 students enrolled in the previous year of studies. At the end of that academic year, around 12% of students graduated, a similar number of students repeated the year, and more than 3% dropped out. The current study focuses on the students at risk of dropping out of the University and the factors that increase that risk.

Aim of the study

The research presented here is a part of a large international project SunStar, focused on the development of an online learning platform as a support for students at risk of dropping out. The aim of this study was to determine the factors which have the most predictive value for students' study satisfaction and dropout intentions in the Serbian context.

Method

For the purposes of this study, a sample of 673 students (mean age 21.39, 79% females) participated in an online survey. Almost all participants were from the state university (96%), at four-year bachelor studies (95%), and most of them studied social sciences (70%). A self-description questionnaire comprised of 22 dimensions and 143 items (most of them on 6-point Likert scales, from 'strongly disagree' to 'strongly agree') was administered online. The dimensions included several aspects of students' perceptions and the evaluation of their university and their studies, referring to both individual and institutional factors: study organization, contacts with teachers, social atmosphere,

identification with the university, help-seeking behaviour, self-efficacy, self-evaluation certainty, attainment, emotional positivity, emotional support, emotional stability, worries, job perspective, relevance to practice, self-discipline, achievement, learning strategies, intrinsic and extrinsic motivation, concentration, cost-effectiveness, and intellectual development. The questionnaire also included the socio-demographic variables and questions about parental education, special educational needs, satisfaction with life conditions, and funding.

Results

Various socio-demographic variables, parental education, special educational needs and the variables describing the type of studies (the state/private university, science/social studies, semester, previous studies) did not show significant prediction.

Study satisfaction among our participants was very high (mean 4.5) while their dropout intention was very low (mean 1.38). Science students and the students from private universities were more satisfied with their studies and university compared to social science students and those from the state university.

Based on a two-step cluster analysis, we could identify the group of students at risk of dropout ($N = 206$). ANOVA has shown that two groups differ on almost all investigated dimensions, except funding and extrinsic motivation. The multiple regression model ($F(28) = 16.564, p = .000$) has shown that 39% of dropout intentions can be explained by the following dimensions (Figure 1): help-seeking, self-efficacy, attainment, emotional positivity, emotional support, self-evaluation certainty, living conditions, grades and funding (active - e.g. paid work and passive - e.g. parental support). Various socio-demographic variables, such as parental education, special educational needs and the variables describing the type of studies, did not show significant prediction.

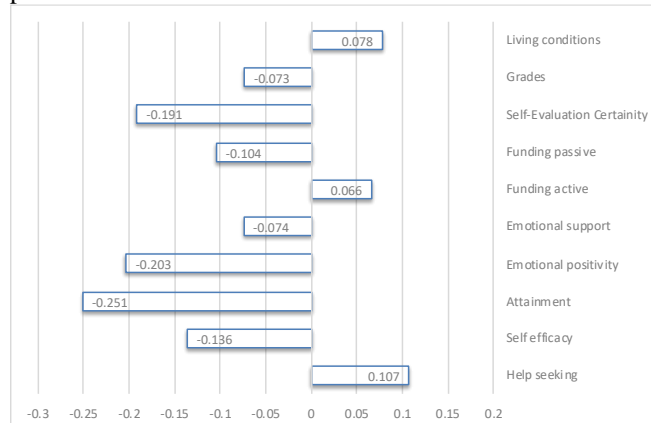


Figure 1: Dimensions predicting the dropout intention

Around 72% of students' study satisfaction ($F(28) = 62.334, p = .000$) can be explained by the following dimensions (Figure 2): study organization, self-evaluation certainty, emotional positivity, intrinsic motivation,

intellectual development, relevance to practice and living conditions.

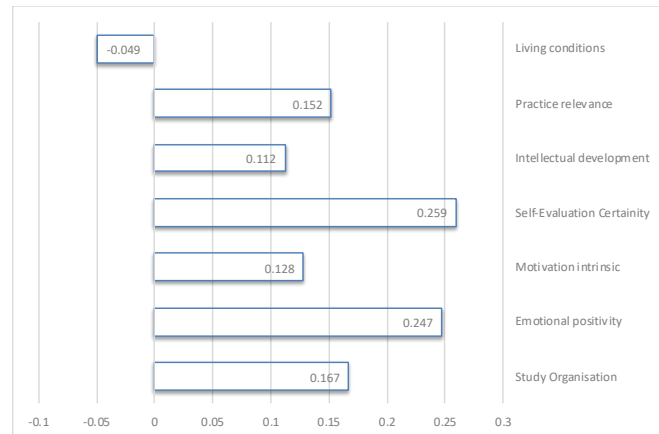


Figure 2: Dimensions predicting the study satisfaction

Discussion and conclusion

The dimensions relevant for the prediction of students' study satisfaction and dropout intentions refer to several institutional factors (e.g. study organization, practical relevance), but mostly to individual factors (e.g. students' motivation, help seeking behaviour, self-efficacy, learning strategies, living conditions). Although previous studies have shown significant effects of SES, gender, and similar socio-demographic characteristics, in our research these factors showed no relevance for the prediction of students' study satisfaction or dropout intentions. Our results suggest that the individual-related factors are the main predictors of students' dropout from higher education. However, this finding also reflects a specific institutional setting that does not provide any support system for the students at risk of dropping out. Theoretically, these results are relevant for a better understanding of the factors that influence the likelihood of dropout. Understanding of these factors can improve the system of early detection of students at risk of dropping out. The results also imply that prevention and intervention measures should be focused primarily on students.

The current research justifies the development of tools for both detecting the students at risk and providing adequate support in accordance with their needs.

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WORK PSYCHOLOGY

The Relation between Emotional Intelligence and Performance in Direct Sales

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Abstract

Salespeople and their performance are central for success of every company. Sales success can be influenced by emotions and Emotional Intelligence (EI), which is particularly important in sales. Objective of this research is to examine the contribution of EI in understanding the performance in direct sales presented through subjective and objective measures. EI is evaluated using the Trait Emotional Intelligence Questionnaire (TEIQue) and sales performance is measured by Subjective Sales Performance scale (SSP) and monthly bonuses, which represent objective measure. Analyses showed a significant prediction of SSP scores with TEIQue used as predictor. A significant prediction exists also when bonuses are used as criterion. A significant contribution of the TEIQue factors - Wellbeing and Sociability leads to the conclusion that people who are more social and successful in forming relationships with others, and, on the other hand, satisfied with their lives, see themselves as more successful in selling. EI can help salespersons to better understand complex emotions and manage their own emotions. An important implication of this research is possibility to develop EI in salespersons and improve sales performance.

Keywords: emotional intelligence; TEIQue; subjective performance; direct sales; bonuses

Introduction

Nowadays, relationships with clients are emphasized, which is the result of an increasing number of service work positions that require direct contact and a large volume of daily communication with clients. Performance plays an important role for the growth and development of the organization, where the success of an individual contributes to organizational efficiency (Vratskikh, Al-Lozi, & Maqableh, 2016).

Emotions are an inseparable part of everyday life and affect behavior during working hours (Sony & Mekoth, 2016). Different working positions require employees with different levels of understanding and emotion management. For this reason, EI is particularly important in sales, where salespersons have to adapt and deal with difficult customers (Weitz, Castleberry, and Tanner 2000). EI can therefore be a factor that makes the difference between the average and the extraordinary salesperson (Deeter-Schmelz & Sojka, 2003). For employees, EI can be an advantage over other colleagues and should be used even during daily work assignments (Kumari & Priya, 2017).

Trait EI refers to the behavioral predispositions and perceived abilities and is assessed using self-assessment measures. It includes some of the aspects that can be closely linked to the domain of personality, such as empathy and

assertiveness, as well as constructs in the field of social intelligence (Petrides, 2009). EI, presented in this way, is strongly linked to other traits, both at the level of its facets and globally (Pérez González & Sanchez-Ruiz, 2014). EI viewed as part of this model is a special plot of emotional self-perception that is localized at lower levels of the personality hierarchy (Extremera & Fernandez-Berrocal, 2005).

Problem and objectives of the research

EI has been the subject of many researches for years because of its link with different variables and the findings are most often inconsistent (Rojell, Pettijohn & Parker, 2006). First aim of the research is to analyze psychometric properties of used scales. The main objective of this research is to examine the specific contribution of trait EI and the contribution of its individual aspects in understanding the performance in direct sales, presented through subjective and objective measures.

Method

Sample

The sample was consisted of 92 employees in the field of telecommunications in direct sales, due to previous findings about moderating effect of product type (Borg & Johnston, 2013). Sample included 65 men (70.7%). The age of the subjects ranged from 19 to 49. Years of experience in sales ranged from 2 to 15 years. The fixed salary of the respondents ranged from 35,000 to 50,000 RSD, and bonuses from 10,000 to 51,000 RSD.

Instruments

EI was assessed using Trait Emotional Intelligence Questionnaire (TEIQue). It is a self-assessment inventory with 153 items, 15 facets and 4 factors, which form a global factor. Response is given on the seven-point Likert scale with a response range of 1 - generally I do not agree to 7 - I completely agree. Reliability by facets ranges from .67 to .89, by factors from .75 to .84, and at global level it ranges from .89 to .92 (Petrides, 2009).

Subjective Sales Performance scale (SSP) (Behrman & Perreault, 1982) was operationalized with 31 items. The respondents are required to evaluate their current level of performance for each sales behavior and compare it with the average employee on the same position, in similar situations. Responses are given on a seven-point Likert scale (1 - Need to improve, 7 - Outstanding). Items are divided into five

factors: Sales presentation (6 items, $\alpha = .90$, AS = 33.46), Providing information (5 items, $\alpha = .81$, AS = 26.52), Technical knowledge (6 items, $\alpha = AS = 32.41$), Sales targets (7 items, $\alpha = .87$, AS = 38.15), Cost control (7 items, $\alpha = .82$, AS = 39.96). When looking at the scale in its entirety, the reliability is .93 and mean is 170.51.

Procedure

Questioners were sent to employees by email. Respondents had the opportunity to read the informed consent. The time spent on participation is roughly 20 minutes.

Results

The range of scores on the SSP scale is slightly narrower, given that the minimum is significantly higher (141) and the maximum is slightly lower (203) than theoretically expected and scores are negatively asymmetric regarding the fact that standardized Kurtosis is -3.036.

Metric characteristics of the TEIQue show, except for the scale Expression of Emotion and Impulse Control, that the lower scores are poorly covered by the empirically obtained findings. When considering the distribution normality, two facets that most drastically deviate from the normal distribution are Wellbeing and Optimism.

RTT10G macro (Knežević & Momirović, 1996) was performed on the TEIQue facets. Representativeness (KMO = .998) and reliability ($\alpha = .884$) were at a satisfactory level, while homogeneity (H5 = .243) was below its criterion. The reliability was below the expected criterion for facets Motivation, Stress Management, Emotion Management, Adaptability, Assertiveness, and Self-Control and Sociability. Reliability of the SSP scale is .895.

When it comes to predicting monthly bonuses based on the scores on the TEIQue, the coefficient of determination is .96. Considered as one linear composite, facets significantly predict the amount of monthly bonuses ($F(14, 91) = 145.2$, $p < .000$). The only facet that does not have a significant contribution is Perception of emotions.

Bonus amount can also be predicted using the TEIQue factors. In this case, determination coefficient is .181. The only factor that does not have a significant contribution is Self-control.

Regression analysis with facets of TEIQue as predictors and SSP as a criterion showed a coefficient of determination of .822. When factors are considered as predictors, significant ones were Self-control and Sociability, while the coefficient of determination was .380.

Discussion

Through the prism of relations with other variables, EI at global level is significantly associated with the SSP. Positive

correlation exists for the factors of Wellbeing and Sociability, which leads to the conclusion that people who are social and successful in forming relationships with others and, on the other hand, satisfied with their own life, see themselves as more successful in selling. These findings coincide with previous research, with the lack of connection with the self-control (Siegling, Nielsen, & Petrides, 2014).

In relation to monthly bonuses, there is no significant correlation with global EI, while they relate to factors and facets in low to medium intensity. Correlations at the level of factors indicate that people who earn higher amount of money monthly feel good about themselves and their lives, who are not too focused on their own and the emotions of others, and those who are more optimistic, not involved in the perception of other emotions and ones who form deeper relationships with clients.

Unlike bonuses that represent performance in financial terms, the SSP represents performance in a more qualitative way, encompassing many aspects of the job besides financial, which relate, for example, to customer relationships, which is closely related to the content of the EI. The only inconsistency is the negative correlation with the aspect of Impulse control and SSP.

Conclusion

The main goal of the study was examination of relationship between EI and sales performance. Direct effect of EI is the finding that current study confirms in the Serbian speaking area. EI can help salespersons to be better at understanding complex or mixed emotions and the impact of their emotions on behavior. This ability can enable vendors to separate themselves from negative affective states when necessary and to adopt appropriate emotional reactions, adequate to a particular situation, buyer or colleagues (McFarland, Rode, & Shervani, 2016).

An important implication of this research is pointing out the possibility to influence the development of EI in sales. Sales managers may be able to implement strategies designed to modify EI. For practitioners, improving EI in vendors can be seen as a three-step process: 1) assess the salesperson's current EI level; 2) improve salesperson's EI through exercises; 3) evaluate sales performance for feedback purposes (Sojka & Deeter-Schmelz, 2002). Instead of using standardized development programs for all employees, which often do not have positive effects precisely because they do not meet the needs of an individual employee, managers need to use an individualized EI training program that can help each vendor maximize their emotional abilities and thereby increase performance (Rojell, Pettijohn, & Parker, 2006).

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The Effects of Brand Popularity and the Big Five on Perceived Quality of Refreshment Products: An Exploratory Study

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Abstract

The aim of this study was to explore the effect of brand popularity on general quality evaluation of different potato chips and energy drinks products in two separate studies. In each study, 136 respondents were included. We used a 2×3 repeated measures design where we manipulated the brand awareness condition (blind vs. informed, where brand names were revealed) and where we used three brands representing different ordinal categories of popularity (strong, medium, and weak brand) for potato chips and energy drinks. Additionally, we wanted to examine whether the Big Five traits can explain some variance of the effect, so we administered the Ten-Item Personality Inventory. For potato chips, we observed significant brand awareness effect. The highly popular brand was evaluated better, whereas the lowly advertised brand was evaluated worse in the informed condition. For energy drinks, we observed an analogous, but a statistically insignificant trend. More popular brands were overall perceived as somewhat better tasting for both types of products. Only neuroticism was found to be a plausible correlate of the absolute change in ratings dependent on the awareness condition with potato chips. Within the energy drinks study, the largest correlation was again obtained for neuroticism, but its magnitude was weaker and statistically inconclusive.

Keywords: brand popularity; brand awareness; perceived quality; Big Five; refreshment products

Introduction

The brand belongs to the most important non-sensory factors affecting consumers' choice of food products (Varela, Ares, Gimenez, & Gambaro, 2010). The elements of a brand are all things serving to identify the brand in general as well as to differentiate it from other brands. The brand is seen as a promise, a guarantee or a contract with the manufacturer (Keller, 1998). The product brand creates an image of the product in the consumer's mind which is often associated with quality, and so becomes the basic motive for the consumers' choice of a particular product (Aaker, 1991).

A strong relationship has been already found between the brand name and perceived quality (Beneke & Trappler 2015). The brand name tends to lead people to evaluate the quality of food products as either higher or lower depending on the strength of the brand name (Hilgenkamp & Shanteau 2010). In various studies (Dopico & Tudoran, 2008, Dimra & Skuras, 2003; Kuhar & Tic, 2007; Breneiser & Allen, 2011; Field, Bergiel, Giesen, & Fields, 2012) people were invited to report sensory perceptions of food in the presence of the brand packaging and in absence of it. Consistently, sensory

perceptions were rated higher when the brand image was stronger.

The ability of the Big Five model to help explain the human behavior has attracted marketing interest from researchers (Casidy Mulyanegara, Tsarenko, & Anderson, 2009). The largest number of studies tried to explore the relationship between the consumer's Big Five traits and the brand personality and brand loyalty in the context of fashion products. The findings suggest that the Big Five traits are significantly related to preferences on particular dimensions of brand personality and brand loyalty; e.g. conscientious and persons higher on neuroticism tend to be more loyal to a brand and they tend to demonstrate preferences towards trusted brands, whereas extroverted persons tend to show preferences towards sociable brands (Aaker, 1997; Ghorbani & Mousavi, 2014; Matzler, Bidmon, & Grabner-Kräuter, 2006; Milas & Mlačić, 2007; Seimiene, 2012).

For marketing practice, it is important to examine the role of brand and consumer personality traits in the perception of refreshment products. The aim of this study was to explore the effect of brand popularity on general quality evaluation of different potato chips and energy drinks products in two separate studies. In addition, we wanted to examine whether the Big Five traits can explain some variance of this effect. These results can be useful for marketing professionals in positioning refreshing products in consumers' mind and, therefore, in the market.

Method

Sample

A total of 136 students (40.1% male), aged 19 to 40 years ($M = 22.15$, $SD = 2.87$) evaluated the quality of potato chips products. The same number of participants (36.8% male), aged 18 to 31 years ($M = 21.84$, $SD = 2.22$) evaluated energy drinks. All participants were students of the University of Banja Luka.

Design and Procedure

The study was a 2×3 repeated measures design where was manipulated the brand awareness condition (blind vs. informed, where brand names were revealed) and used three brands representing different ordinal categories of popularity for both potato chips and energy drinks. Based on a survey with 60 university students, we selected following potato chips brands: Marbo Chipsy (strong brand), Soko Stark Chipsos (medium brand) and Mercator (weak brand), and

following energy drink brands: Red Bull (strong brand), Burn (medium brand) and B52 (weak brand). After blind-tasting products, the participants rated the general quality of each of them on a 7-point Likert scale (from 1 = “extremely dislike” to 7 = “extremely like”). After that, they tasted and rated the products in the informed condition. Water was used as a palate cleanser between tasting individual products.

After the tasting procedure, the participants filled in the Ten Item Personality Inventory (TIPI; Gosling, Rentfrow, & Swann, 2003), a brief ten-item measure of the Big Five traits. The response options were on a 5-point Likert scale (from 1 = “strongly disagree”, to 5 = “strongly agree”).

Results

For potato chips (Figure 1), brand awareness effect was significant (interaction: $F(2, 268) = 11.23, p < .001, \eta^2 = .08$). The highly popular brand was evaluated better ($t(134) = 2.13, p = .035, d = 0.18$), whereas the lowly advertised brand was evaluated worse ($t(134) = -4.22, p < .001, d = -0.36$) in the informed condition. Taken together, the absolute adjustment of ratings was obvious ($t(134) = 4.47, p < .001, d = 0.39, BF_{10} = 886.0$).

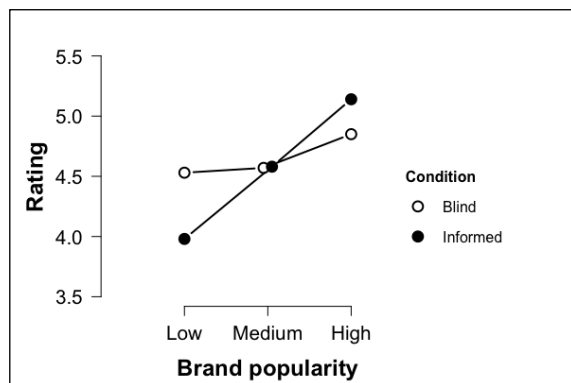


Figure 1: Average product ratings disaggregated by condition and brand popularity for potato chips.

For energy drinks (Figure 2), we observed an analogous, but statistically insignificant trend ($F(2,270) = 1.77, p = .172, \eta^2 = .01$). The magnitude of the combined absolute adjustment effect was noticeably smaller and statistically inconclusive ($t(134) = 1.75, p = .082, d = 0.15, BF_{10} = 2.37$).

More popular brands were overall perceived as somewhat better tasting (for both types of products: all $ps < .001$ for linear trends, $ps < .05$ for simple effects of brands across conditions). Brand awareness did not impact the rating of moderately popular brands.

When it comes to the Big Five traits, within the potato chips study only Neuroticism was found to be a plausible correlate ($r_s(132) = .21, p = .015, BF_{10} = 3.54$) of the absolute change in ratings dependent on the awareness condition. Within the energy drinks study the largest correlation was again obtained for neuroticism, but its magnitude was weaker and statistically inconclusive ($r_s(134) = .11, p = .209, BF_{01} = 2.36$).

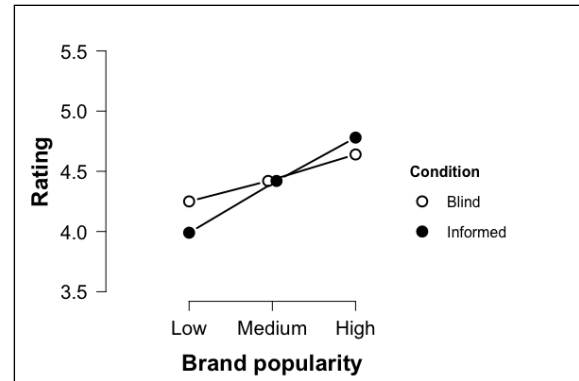


Figure 2: Average product ratings disaggregated by condition and brand popularity for energy drinks.

Discussion and Conclusion

The present study demonstrates that brand popularity indeed tends to influence the sensory assessment of refreshment products. A brand with a stronger position on the market is evaluated as better in labeled tests, while the lowly advertised brand is evaluated worse than in the blinded condition. Hence, our results replicate the finding that the brand name leads people to evaluate the quality of food products as either higher or lower depending on the strength of the brand name (Hilgenkamp & Shanteau 2010). Similar results were obtained in other investigations (i.e. Dopico & Tudoran, 2008; Di Monaco, Cavella, Di Marzo & Masi, 2004; Field et al., 2012; Kuhar & Tic, 2007; Varela et al., 2010).

When it comes to the Big Five traits as predictors of the change in ratings dependent on the awareness condition, we found that neuroticism could be a plausible correlate. Our results suggest that higher on neuroticism – who tend to often feel more worried, insecure, and inadequate – might be more inclined to search for trust in established brands, and consequently this might moderate the sensory perceptions of a product. Indeed, previous research found that persons higher on neuroticism prefer trusted brands to reduce their anxiety (Mulyanegara, Tsarenko & Anderson, 2007).

Admittedly, our conclusions are limited by the fact that we used only two different refreshment products and that we assessed the Big Five with an extremely brief self-report instrument. Nevertheless, the findings seem to be congruent with the truism that brand value is an important marketing feature and something which adds value to a product (Fornerino & D’Hauteville, 2010; Keller, 1998). Finally, our finding that persons higher on neuroticism might be less consistent when rating the quality of refreshment products is certainly worth researching further, knowing that the switch to personalized marketing is inevitable.

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DEVELOPMENTAL PSYCHOLOGY

Differences between Adolescents and Adults in Logical Reasoning and Executive Functioning Performance

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Abstract

The purpose of this study was to determine whether adolescents' performance in a logical reasoning task and in the tests of presumably underlying executive functions differs from that of adult subjects. We also explored the possibility of predicting the performance in the reasoning task based on the achievement in the tests of executive functions. The sample was comprised of two groups of subjects - adults and adolescents - each of which containing 20 participants, with a balanced gender ratio in both groups. Successfulness in logical reasoning was tested by the use of Wason Selection Task and treated as a binary variable. Executive functions including inhibitory control and attention shifting performance were measured through reaction time on Stroop Color-Word Test and Trail-Making-Test respectively. Significant differences were found between the groups in logical reasoning achievement and in both executive functions tests' performance, the latter not being a significant predictor of successfulness in the reasoning task. Practical implications and limitations of the study are discussed.

Keywords: logical reasoning; executive functions; adolescence

Introduction

The period of adolescence incorporates dramatic changes in self-awareness and cognitive flexibility (Rutter & Rutter, cited in Blakemore & Choudhury, 2006). Logical reasoning is known to progressively improve throughout adolescence. Although inference processes are similar between adults and adolescents, some heuristics and biases become more prominent and frequent in adolescence (Reyna & Farley, 2006).

The development of logical inference abilities lasts approximately until the age of eighteen (Overton, 1990), which correlates with the maturation of prefrontal cortex. This brain region is the last one to complete its development (Casey, Giedd, & Thomas, 2000; Giedd, 2004; Luna & Sweeney, 2004, all cited in Eshel, et al. 2007) and is considered crucial for highest aspects of cognition such as planning, inference and executive functioning (EF). Due to the incomplete process of myelination in the immature frontal lobes, the efficiency of information processing might be limited in adolescents compared to adults, which could lead to evident differences in EF (Anderson, Anderson, Northam, Jacobs, & Catroppa, 2001).

A more thorough investigation of developmental trajectory of EF would undoubtedly provide us with a deeper insight into differences in logical reasoning ability between

adolescents and adults. There is a broad spectrum of cognitive abilities that are covered by the term of EF in literature, however, the most renowned and conceptually established model of EF is the one by Miyake (Miyake, et al., 2000), which encompasses three EF: Attention Shifting, Memory Updating and Inhibition. The research presented in this paper will be based on this model.

There are few examples (e.g. Ward & Overton, 1984) of logical reasoning and deductive inference tests in the literature that are discriminative to developmental differences. Thus, the question arises whether adolescents significantly differ from adults in logical reasoning performance and whether this performance is related to differences in the development of EF. The purpose of this study was to determine whether adolescents' performance in a reasoning task and in tests of underlying EF differs from that of adults. We also explored the possibility of predicting the performance in the reasoning task based on the achievement in the tests of EF.

Method

Sample and Procedure

The convenience sample was balanced by gender and it consisted of 40 participants: 20 adult (students aged 20-29 years) and 20 adolescent (aged 13-14 years) subjects.

All testing was conducted individually in a paper-pen format and all participants received identical verbal instructions. The sequence of test assignments was randomized in order to avoid possible fatigue effects.

Measures

Wason Selection Task (WST) is one of the most frequently used tests of logical reasoning in experimental psychology and was used to assess that ability in this study. Subjects were given four cards containing letters and numbers and a certain rule formulated as a statement concerning those cards. Their task was to check if the rule is correct via as few attempts as possible. A single possible solution is deemed correct so the outcome measure is binary: subject either solves the task or not.

Stroop Color-Word Test (SCWT) (Scarpina & Tagini, 2017) represents a measure of EF Inhibitory control (Stroop, 1935, cited in Langenecker, Zubieta, Zoung, Akil, & Nielson, 2007). The test consists of three levels where subjects are

required to name the color of stimuli as fast as possible while reaction time and errors are recorded and the scores are obtained by subtracting the mean of level 1 and 2 from level 3.

Trail Making Test (TMT, forms A and B) (Bowie, Christopher & Harvey, Philip, 2006) was used as a measure of EF Attention shifting. Dependent measures are time required to complete the simple visual attention task (form A) and the more complex task that requires attention shifting (form B). Time and the number of errors is measured in both forms, and the total score is calculated as the difference in time required for the fulfillment of Form A and B.

Results

When it comes to achievement in logical reasoning task (WST), the results have shown that only quarter (25%) of the sample managed to solve it successfully. In the adult group 40% of participants were successful in this task, whereas in the adolescent group this number dropped to mere 10% (Figure 1).

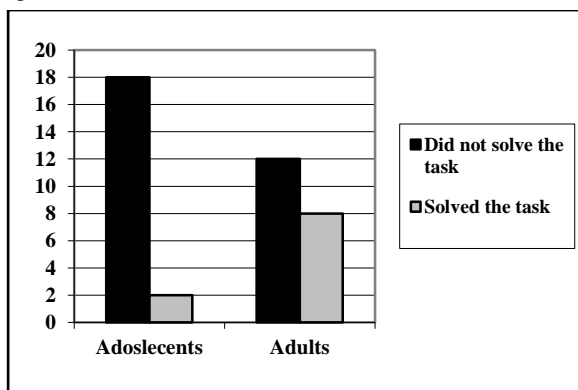


Figure 1: Group differences in logical reasoning task achievement

Chi-square test revealed significant differences between adult and adolescent subjects in their successfulness in the logical reasoning task ($\chi^2 (1, N = 40) = 4.80, p = .028, \phi = .346$).

Significant differences were also found between the groups in the performance on both of the EF tests, as demonstrated by MANOVA results ($F(2, 37) = 15.94, p < .001$; Wilks' $\lambda = .54$, partial $\eta^2 = 0.46$). Furthermore, age i.e. group membership had a significant effect on each test of EF performance independently (Figures 2 and 3). Namely, adolescents' inhibition ability as measured by SCWT differs significantly from that of adults ($F (1, 38) = 11.43; p = .002$; partial $\eta^2 = .23$). Same holds true for shifting ability assessed by TMT ($F (1, 38) = 25.85; p < .001$; partial $\eta^2 = .41$).

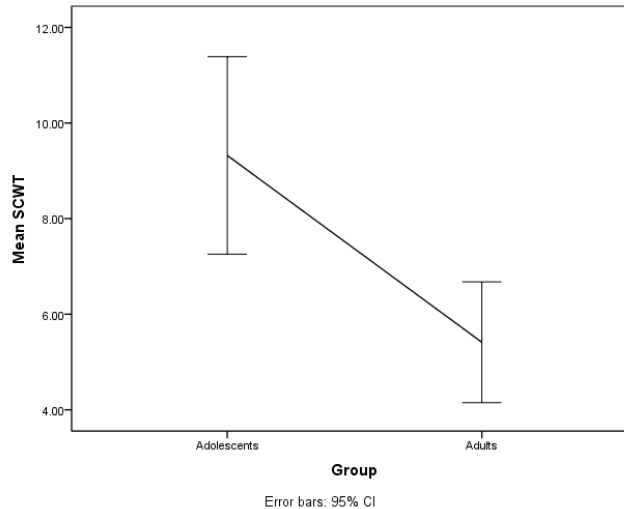


Figure 2: Group differences in reaction time on Stroop Color-Word test

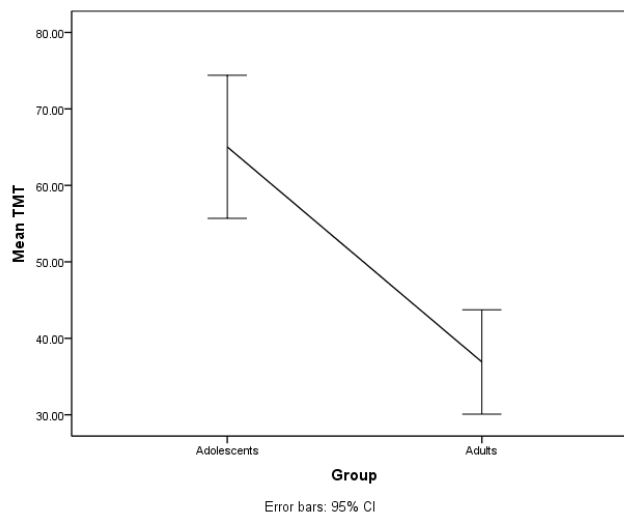


Figure 3: Group differences in reaction time on Trail Making Test

With regards to predicting successfulness (as a binary variable) in the logical reasoning task based on performance on both EF tests, the model was not significant ($\chi^2 (2, N = 40) = 3.09, p = .213$).

Discussion and Conclusion

The results obtained in this study support the assumption that age-related, developmental differences in the ability to logically reason do, in fact, exist. A significantly higher percentage of adults successfully solved the WST, compared to adolescent respondents. The obtained Fi-coefficient indicates a moderate association of age with the ability of reasoning in the given sample. The results also support the assumption that adult subjects are more successful in the tests of EF Inhibition and Attention-shifting: 46% of the variance of performance on the tests of EF is explained by age differences between respondents. These findings are in line

with research results that show developmental differences in the executive functions (Anderson, et al., 2001; Leon-Carrion, Garcia-Orza, & Perez-Santamaria, Luna, Garver, Urban, Lazar, & Sweeney, cited in Blakemore & Choudhury, 2006). Finally, obtained data does not support the possibility of predicting success on the reasoning task based on the achievement on EF tests, regardless of age.

The findings of this study map the well-known neural findings regarding developmental differences in logical reasoning and executive functioning on a cognitive-behavioral level. This approach is useful because it allows quantitative developmental comparison of abilities associated with frontal cortex. Practical implications of such an approach may prove particularly important in educational context (e.g. coursework materials, discipline measures).

The main limitations of the study were its transversal nature due to which definitive conclusions about the cause-effect relationship between age and measured abilities cannot be made; the binary approach to logical reasoning ability assessment (which yielded a small successfulness rate in WST); and a relatively small sample, which might explain the statistical insignificance of the prediction model. Furthermore, the adult group of the sample consisted of students - a highly selected and educated group, while the adolescent group consisted of primary school students (general population). Therefore, a replication study using a more representative sample, more tests of logical reasoning ability and longitudinal design could prove more beneficial.

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Gender Role Identification – Developmental Perspective

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Abstract

The aim of this study was to explore the way gender role identification changes during adolescence. Bem Sex Role Inventory was filled in by elementary school fifth graders ($N = 80$, $M_{age}=10.82$), high school first graders ($N = 104$, $M_{age} = 14.8$) and high school fourth graders ($N = 102$, $M_{age} = 17.74$). ANOVA showed no statistically significant differences on either masculinity or femininity in the male subsample across three age groups, while the youngest female participants had statistically significantly higher scores on femininity compared to other age groups ($F(2, 179) = 5.05$, $p = .007$). Gender differences appeared in the youngest group, where females scored higher on femininity than males ($t(78) = -3.91$, $p = .000$) and in the oldest age group, where males scored higher on masculinity than females ($t(100) = 2.51$, $p = .014$). Males' gender role identification proved to be stable during adolescence, while more complex tendencies are perceived among girls, both findings being contrast to Gender intensification hypothesis.

Keywords: gender roles; masculinity; femininity; adolescents; change

Introduction

Gender roles refer to behaviours, attitudes and personal traits which are typically attributed to and expected from a person of one gender in a particular historical and cultural context. (Steensma, Kreukels, De Vries & Cohen-Kettenis, 2013). They are developed through socialization – parents, teachers and society in general (including media) play the major roles in adapting gender roles (Topuz & Yildizbas, 2014). Sandra Bem (1974) defined feminine and masculine as two dimensions of gender roles. Masculinity comprises characteristics that are perceived as typical for men, such as assertiveness, independence, dominance and rationality, whereas femininity comprises characteristics that are perceived as typical for women, such as emotionality, sensibility, kindness and similar (Holt & Ellis, 1998). The level of identification with masculinity or femininity has implications for our wellbeing and behaviour in many situations (Priess, Lindberg, & Shibley Hyde, 2009; Topuz & Yildizbas, 2014), therefore suggesting there is a need for further exploration of gender role identification changes in one of the most sensitive life periods – adolescence.

Although many studies addressed the cross-cultural differences in gender roles, as well as changes in gender roles since seventies (when Bem created Bem Sex-Role Inventory), there have been fewer studies that adopted developmental perspective. We know that identification with gender roles starts in early childhood, when gender roles are strictly separated, and gets revised and reformulated during adolescence. According to Gender intensification hypothesis (Hill & Lynch, 1983) girls and boys in early adolescence face

increased pressure to conform to culturally defined gender roles. Through middle and late adolescence, they become increasingly aware of gender-expected behavior and tend to stick firmly to the characteristics expected from their own gender. According to these authors, such a strong identification helps them form heterosexual relationships and adjust to job related roles. Contemporary cognitive development theories, however, postulate that the changes in the levels of gender role identification are not that linear – people move from oversimplified or disorganized states of sex-role perceptions (in early adolescence) towards more stable and complex perceptions that imply further integration of both masculine and feminine characteristics (in late adolescence) (Gullotta, Adams & Markstrom, 2000). Some findings suggest that girls and boys in early adolescence differ only on masculinity, and not femininity (Egan & Perry, 2001; Galambos, Almeida & Petersen, 1990), whereas others point to the stability of gender roles identification through childhood and adolescence (Diamond & Butterworth, 2008; Wichstrom, 1999). There are some indications that persons tend to stick to gender roles of their own gender in stressful situations, such as transitions from one to another level of education (Caspi & Moffitt, 1993).

Given that studies yielded inconsistent results regarding the changes in gender role identification during adolescence and given that there were no such studies in the Serbian context, the aim of this research was to determine if there are differences in gender role identification between Serbian adolescents of different age and gender.

Method

Sample

Participants in this research were 286 elementary and high school students (104 male and 182 female) from Belgrade. There were 80 students at the stage of early adolescence (five-graders, $M_{age} = 10.82$, 52.5% female), 104 students at the stage of middle adolescence (high school first-graders, $M_{age} = 14.8$, 67.3% female) and 102 students at the stage of late adolescence (high school fourth graders, $M_{age} = 17.74$, 68.6% female). They participated on voluntary basis by filling-in the questionnaire distributed during their classes at school.

Instruments

The short form of Bem Sex Role Inventory (BSRI) that includes ten *masculinity* and ten *femininity* traits (Colley, Mulhern, Maltby & Wood, 2009), was applied. Participants were asked to rate themselves on each of the traits on 7-point Likert type scale. In general, this instrument demonstrates even better reliability and validity than the standard form (Choi, Fuqua, & Newman, 2009), while in this research

Cronbach's Alpha was moderate ($\alpha = .745$ for Masculinity, $\alpha = .863$ for Femininity, $\alpha = .77$ in total).

Results

Scores on *masculinity* and *femininity* were calculated for both boys and girls in three age groups according to the authors' instructions (Bem, 1974; Colley et al., 2009). Average scores for *masculinity* and *femininity* in the subsample of boys were 5.4 ($SD = .77$) and 5.1 ($SD = .98$) respectively, while for girls they were 5.12 ($SD = .78$) and 5.43 ($SD = .97$), respectively. Correlation between *masculinity* and *femininity* scores was insignificant, suggesting that these two constructs are independent from each other, as it was postulated by Bem and her followers.

ANOVA showed no statistically significant differences on either *masculinity* or *femininity* in the male subsample across three age groups. Among girls age differences appeared only for *femininity* – the youngest female participants had higher scores on compared to other age groups ($F(2,179) = 5.05$, $p = .007$).

Gender differences appeared in the youngest group, where females scored higher on *femininity* than males ($t(78) = -3.91$, $p = .000$) and in the oldest age group, where males scored higher on *masculinity* than females ($t(100) = 2.51$, $p = .014$). In the 15-year-old group there were no gender differences on either *masculinity* or *femininity*. Effect of gender x age interaction did not reach statistical significance.

Discussion and conclusions

Through the application of short BSRI we strived to determine if there are differences in gender role identification between adolescents of different age and gender. Average scores on both *masculinity* and *femininity* are similar to those obtained in other studies (e.g. see, Choi, Fuqua & Newman, 2008; Vuletić & Vuletić, 2016). Our results showed that males' gender role identification is stable during adolescence, which is in line with results from previous studies (Diamond & Butterworth, 2008; Wichstrom, 1999). More complex tendencies are perceived among girls – namely, females tend to identify less with the female-typed attributes as they move from early to late adolescence. This is in opposition to Gender Intensification hypothesis (Hill & Lynch, 1983), but in line with theories that postulate the trend toward the integration of different characteristics in late adolescence (see e.g. Coleman & Hendry, 1996; Gullotta, Adams, & Markstrom, 2000) and development of more flexible attitude over time due to increased cognitive complexity (see e.g. Marcell, Eftim, Sonenstein, & Pleck, 2011). Given that contemporary Western societies promotes characteristics such as independence and assertiveness (Hofstede, 1991), it is possible that girls in their late adolescence tend to adopt these values and integrate them with a certain selection of the values typically seen as feminine. One should note that our results for both males and females might be explained by the characteristics of our sample, consisting of adolescents from

central Belgrade schools. It can be assumed that their parents promoted less stereotypical views and less traditional values.

Although the sample size and small number of boys in some subcategories prevents us from making reliable generalizations, we believe this research confirmed the relevance of this issue in the Serbian context. It provided record against Gender intensification hypothesis and for more complex theories of gender role identification development and suggested that particular attention should be paid to the further exploration of the development of gender role perceptions among girls.

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Perception of Parental Behavior as a Predictor of Academic Self-Efficacy in Early Adolescence

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Abstract

For the overall individual's development, family environment is very important. Parents through their emotionality and control influence the formation of child's characteristics and self-image. Since the self-efficacy is a concept which involves self-assessment of own abilities and which particularly pronounced during adolescence, the aim of this study was to examine whether parental behavior is a significant predictor of academic self-efficacy in early adolescence. The obtained results indicate that the way in which adolescents perceive the behavior of their parents significantly contribute to their success in school and the fulfillment of school expectations. It has been shown that emotionality is a dimension of parenting which gives the greatest contribution to the development of academic self-efficacy. This means that warm, acceptable and supportive parents contribute significantly to the quality of the child's learning and the positive aspects of his/her self-awareness.

Keywords: dimensions of parental behavior, academic self-efficacy

Introduction

Self-efficacy is the concept of the theory of social learning (Ashford & LeCroy, 2010). According to this theory it is possible to talk about different forms of self-efficacy depending on the context in which the assessment is carried out (Milanović-Dobrota & Radić-Šestić, 2006). Self-efficacy is particularly investigated in the period of adolescence. Academic self-efficacy refers to an individual's belief (conviction) that they can successfully achieve at a designated level on an academic task or attain a specific academic goal (Bandura, 1993).

Previous psychological research has shown that the start of the development of individual's self-efficacy is related to the early family environment. According to Maddux (2002) self-efficacy is not a hereditary trait. It is evolving over time starting from childhood. Thus, the aim of this research is to examine whether parental behavior is a significant predictor of academic self-efficacy in early adolescence. The parents' behavior is operationalized through the basic dimensions of parenting – emotionality and control. Emotionality refers to love, care, acceptance, warmth, support and friendly behavior towards children (Sorić & Vulić-Prtorić, 2006). Unlike the dimension of emotionality, control is a regulatory and

disciplinary dimension. It is possible to distinguish between behavioral and psychological control (Cummings, Davies & Campbell, 2000; Darling & Steinberg, 1993). The main difference between behavioral and psychological control is reflected in the goals that parents want to achieve using them in the upbringing of their children (Barber, Olsen & Shagle, 1994). Behavioral control refers to parental attempts to regulate child's inadequate behavior, and is reduced mainly to the determination of the boundary and the rules of behavior (Keresteš, 1999). Psychological control includes intrusive parental behavior, manipulative control, coercion and passive aggression (Buljan-Flander, Hundić & Handabaka, 2015; Silk, Morris, Kanaya & Steiberg, 2003). The consequence of high parents control is the difficult process of individuation (Barber, Olsen & Shagle, 1994).

The attitudes and beliefs that parents have about the child's abilities are also a source of information for the formation of child's self-efficacy (Reić-Ercegovac & Koludrović, 2010). Messages that parents through emotionality and control sent to their children can be directed to what children do, but also to label children as a person (Stjuart & Džoins, 2011). Research shows that parents who are accepting often send messages of support to children such as "You Can Do It" and "I Believe in You", as opposed to parents who using psychological control. Encouraging messages and fostering child's autonomy are a stimulating environment and encourage children to actively explore (Macuka, 2008). In this way, children develop abilities that will enable them to successfully solve tasks of varying complexity. On the contrary, excessive control and emotional rejection are an inadequate way to treat a child, because they prevent children to being independent and solve own problems and this has the effect of doubting its own efficiency.

Method

Participants

The sample consisted of 243 elementary school students, aged 11 to 14 years. There were 134 (55.1%) female and 109 (44.9%) male respondents.

Measures

Children's Report of Parental Behavior Inventory (CRPBI-57) was used for an assessment of adolescents' perceptions

of parental behavior (Keresteš, 1999) related to the three basic dimensions: acceptance, psychological control and behavioral control. The questionnaire consists of 57 items and includes two identical versions (the version for assessment of parental behavior of mother and the version for assessment of parental behavior of father). The result on each of the subscales is formed as the mean of the responses and the higher score indicates a more highly pronounced respective dimension.

Self-efficacy Questionnaire for Children (The SEQ-C) (Muris, 2001). This questionnaire consists of 3 subscales (8 items per subscale) which measure: academic, emotional and social self-efficacy. *The socio-demographic questionnaire* (sex and age of respondents) was designed for the research purposes.

Results

The data were analyzed using multiple linear regression (program SPSS, version 20) with six dimensions of parental behavior as predictors (set predictors of parental behavior, which consists of mother's and father's emotionality, behavioral control and psychological control) and academic self-efficacy as a criterion. The results showed that the model ($F(6) = 10.15, p < 0.05$) explains 20.7% of the variance of academic self-efficacy (Table 1).

Table 1: The results of the regression analysis with academic self-efficacy as a criterion

Predictors	β	p
Mother's emotionality	0.38	0.00*
Mother's psychological control	-0.04	0.67
Mother's behavioral control	0.01	0.95
Father's emotionality	0.06	0.48
Father's psychological control	-0.12	0.18
Father's behavioral control	0.07	0.41
Model (set predictors)	$R^2 = .207; p = .000$	

Note: * Significant predictors.

As can be seen from table (Table 1), mother's emotionality ($\beta = .38, p < 0.05$) gives the greatest contribution to the prediction (7%) and it is the only statistically significant predictor of academic self-efficacy.

Table 2: The relations between perceptions of dimensions of parental behavior and academic self-efficacy

Dimensions of parental behavior	Academic self-efficacy
Mother's emotionality	0.42**
Mother's psychological control	-0.10
Mother's behavioral control	0.14*
Father's emotionality	0.33**
Father's psychological control	-0.13*
Father's behavioral control	0.13*

Note: * $p < 0.05$, ** $p < 0.01$

Also, we calculated linear correlations between perceptions of dimensions of parental behavior and academic

self-efficacy. As can be seen from table (Table 2) parental emotionality and behavioral control positively correlate with academic self-efficacy, while psychological control (mother's and father's) correlate negatively with academic self-efficacy.

Discussion and conclusion

The obtained results confirm that the perception of parental behavior is a predictor of academic self-efficacy. The results are consistent with the results of research conducted by Grolnick, Deci & Ryan (1991), which indicate a significant association of perceived parental support and control with perceived school competence. Adolescents most often perceive such parenting behavior as a reflection of parental interest and concern (Copeland-Linder, Lambert, & Jalongo, 2010), and this is shown to be significant for developing skills and capacities that underpin academic self-efficacy.

In this study, mother's emotionality makes the greatest contribution to prediction and it is the only statistically significant predictor of academic self-efficacy. Respondents who perceive their mothers like as accepting and supportive persons, have a higher score on the scale of academic self-efficacy. This is confirmed by the statistically significant correlation between the two variables, which is consistent with the results of other researchers, according to which high acceptance of children, significantly contributes to the development of a child's academic self-efficacy (Milinković & Stjepanović, 2013; Quazi, 2009; Tam et al., 2012; Turner et al., 2009).

The perception of control as a dimension of parenting did not prove to be a significant predictor of academic self-efficacy. This could be explained by the goal that control as a dimension of parenting has. Behavioral control involves monitoring, disciplining and controlling the impulsiveness of the child, and its goal is better social integration of the child (Milenković & Hadži- Pešić, 2006). Psychological control results in emotional insecurity and dependence on parents. Because of this, it is assumed that control as a dimension of parenting, might prove more significant to other forms of self-efficacy such as social or emotional.

Lastly, it is important to note that the results of the research represent the subjective perceptions of adolescents, but not the assessment by the parents. Therefore, one cannot speak of the real impact that dimensions of parenting have on the academic self-efficacy of children. Also, this study provides support for the methodological value of examining the parenting dimensions independently as opposed to combining them to form parenting styles.

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Adolescents' Hobbies and Their Well-being

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Abstract

This research was a part of a broader study that investigated adolescents' leisure activities in the context of positive youth development. Our intention was to explore how well-being is connected with hobbies in adolescence. Hence, the aim was to determine if there are correlations between certain creative activities, operationalized through hobbies (blog writing, creative writing, drawing/painting, graphic design, music, jewelry making, computer related and artistic photography), and five aspects of well-being (Engagement, Perseverance, Optimism, Connectedness and Happiness). Higher scores on Engagement, Perseverance and Connectedness for adolescents who are engaged in hobbies are expected, concerning hobbies as individual and intrinsically motivated activities. Data show that Engagement is the most dominant aspect of well-being among adolescents who practice investigated hobbies. Happiness is the only aspect with exclusively negative connections, while Optimism has both positive and negative values. Drawing distinguishes as the sole hobby with only negative aspects of well-being. Results point to the importance of further investigation of well-being aspects in positive development of adolescents and to the different well-being experiences of those who practice various hobbies.

Keywords: adolescents; hobbies; well-being; EPOCH scale; leisure time

Introduction

Psychological well-being usually “refers to inter and intra individual levels of positive functioning that can include one's relatedness with others and self-referent attitudes that include one's sense of mastery and personal growth...” (Burns, 2016). In this work adolescence is considered in the context of positive development (Larson, 2000). Individuals with low self-esteem and life satisfaction participate rather in unchallenging activities and undirected spare-time use, which is negatively related to well-being. Engaging in various, especially intimate, leisure activities improves well-being at all ages (Brajša-Žganec, Merkaš & Šverko, 2010). Hobbies represent a specific aspect of serious leisure time activities and involve routine, perseverance, effort, enjoyment, skills, and identification with chosen pursuits. There is also no social obligation to engage in them (Stebbins, 1992). Hence, we defined hobbies as voluntary, intrinsically motivated, creative and mainly individual activities, pursued in leisure time, not guided or imposed by adults, but chosen and structured by adolescents themselves.

We assumed that engagement in hobbies could be connected with SES (financial support/limitation – family background), school grades (indicator of school engagement and success) and important relationships (hobbies are

predominantly individual activities). Studies show that these variables are significant for adolescent's well-being (Ciarrochi, Heaven & Davies, 2007; McLeod & Owens, 2004; Nada Raja, McGee & Stanton, 1992), so they are included in this research.

Aims of the study

The basic research question concerns the relationship between engaging in various creative activities and experience of well-being in adolescence. Hence, the main aim was to determine if there are correlations between chosen adolescents' hobbies and five aspects of well-being.

Additional aim was to determine whether engaging in hobbies is connected with SES, school grades, quality of relationships with parents, peers, best friend and partner.

Method

Sample

Included 1358 secondary school students from 10 Serbian towns (61.8% –vocational; 38.2% – gymnasium). 51.3% are in first class, others in third, and 56% are girls.

Instruments

Questionnaire regarding adolescents' leisure time. Among other questions in applied questionnaire, adolescents were asked to estimate (Likert, 1-5) how often they engage in specific creative activities. Based on adapted Questionnaire from 2015 (Davidović, Vuletić & Krnjaić, 2016, 2017), following hobbies were selected: blog writing, creative writing, drawing/painting, graphic design, composing/playing music, making jewelry/clothes, computer related activities and artistic photography. This questionnaire also provided data about SES (scale 1-6), school grades (increasing scale), and quality of relationships (1-5).

The EPOCH Measure of Adolescent Well-being (20 items) (Kern, Benson, Steinberg & Steinberg, 2016). The scale consists of five different positive characteristics that support higher levels of well-being (Likert, 1-5):

1. Engagement (*E*) – the capacity to become absorbed in and focused on what one is doing, as well as involvement and interest in life activities and tasks.
2. Perseverance (*P*) – refers to the ability to pursue one's goals to completion, even in the face of obstacles.
3. Optimism (*O*) – hopefulness about the future, a tendency to take a favorable view of things, and

evaluating negative events as temporary, external and specific to situation.

4. Connectedness (*C*) – sense that one has satisfying relationships with others, believing that one is cared for and valued, and providing support to others.
5. Happiness (*H*) – steady states of positive mood and feeling content with life, rather than momentary emotion.

Adaptation of the hobby variables In accordance with previous research (Krnjaić & Stepanović, 2013; Davidović et al., 2017), not many adolescents in Serbia engage in mentioned hobbies. Concerning these low percentages, merging of categories was necessary and a five-point scale was transformed into binary (1 to 1 – never, 2 and 3 to 2 – even a little bit). In this paper similar procedure was followed (1 to 1 – never and 2, 3, 4, 5 to 2 – even a little bit) and the obtained percentages are shown in Table 1. Well-being aspects in a Likert-type enabled the usage of point-biserial correlation (r_{pb} for Tables 2-4). One continuous variable was made, by summarizing and averaging the scores for all hobbies, so they represent the engagement in total for each person.

Results and discussion

The occurrence of analyzed hobbies remained almost the same as in the previous research, so the joining of categories was meaningful (Table 1).

Table 1: Occurrence of the hobbies presented by merged categories.

Hobbies	% 2017	% 2019
Blog	24.2	23.4
Writing	18.9	22.4
Drawing	35.0	37.5
Design	19.4	15.9
Music	19.3	21.8
Jewelry	12.5	15.2
Computer	17.7	19.0
Photography	29.5	28.1

Results show that *E* is the most dominant aspect of well-being in all hobbies. *C* is the least represented one and *H* has only negative correlations with particular activities (Table 2). It has also been determined that the more adolescents engage in different hobbies, the higher are scores on *E* ($r = .080, p < .01$), *P* ($r = .105, p < .01$) and *C* ($r = .087, p < .01$). These increased scores are expected, considering hobbies as individual, intrinsically motivated activities, structured by adolescents themselves.

Since jewelry making could be time-consuming (*P*) and doesn't require high *E*, these activities might be used for discharge of affectivity. Bloggers, who write in order to communicate with audience, seem to feel continuous *C* interacting with their social network. Photographers might have high scores on *O*, because modern technology offers them instant feedback, which enables a favorable view of things.

Drawing has only negative correlations with *H* and *O*.

Table 2: The correlations of well-being aspects and engagement in hobbies.

Hobbies	Well-being aspects				
	E	P	O	C	H
Blog		.079**		.062*	
Writing	.055*				-.073**
Drawing			-.057*		-.102**
Design	.086**				
Music	.108**				
Jewelry		.089**			
Computer	.074**				
Photo	.070*		.076**		

Note: * $p < .05$, ** $p < .01$ (for all tables).

Most of the hobbies correlate positively with school grades and half of them are connected to lower SES (Table 3).

Table 3: The correlation of SES, school-grades and engagement in hobbies.

Hobbies	SES	Grades
Blog	-.076**	.113**
Writing	-.076**	.116**
Drawing	-.065*	.111**
Design		
Music		.059*
Jewelry	-.072**	.114**
Computer		
Photography		.136**

Results point to decreased SES and unsatisfying relations with peers and best friend (Table 4) among adolescents who practice drawing and writing.

Table 4: The correlation of quality of the relationships and engagement in hobbies.

Hobbies	Relationships			
	Parents	Peers	Best friend	Partner
Blog				
Writing		-.054*	-.056*	
Drawing		-.064*	-.069*	
Design				.078*
Music	-.055*			.077*
Jewelry				
Computer				
Photo				.079*

One research on creative activities among adolescents provides an explanation, claiming that drawing could be beneficial as a distraction in contrast to venting (Drake & Ellen, 2012). Hence, we assume that these activities might be useful as stress management strategies.

In conclusion, the more adolescents engage in hobbies more positive well-being aspects are expressed and diverse well-being experiences established within different hobbies. Hobbies that correlate negatively with relationships quality or lower SES could be used as coping strategies to overcome mentioned difficulties. Some of the hobbies reflect adaptability and positive development among adolescents, such as programming and graphic design, which might motivate them towards possible career choices, concerning their popularity.

For further research, qualitative methods, especially focus groups, are highly recommended. It would be useful to investigate the nature of hobbies as coping strategies and their level of efficiency. There are indications that, in choosing a specific hobby family income, satisfaction with relationships and integrative capacities of adolescents could be important.

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PSYCHOLOGY OF ART

Factor Structure and Convergent Validity of the Creative Achievement Questionnaire (CAQ)

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Abstract

The Creative Achievement Questionnaire (CAQ) is a measure of creative achievement across 10 domains of creativity. The goal of this study was to examine the factor and convergent validity of the CAQ's Serbian translation on a general sample from the Republic of Srpska. A total of 300 participants ($M = 24.48$, $SD = 3.07$ years; 66.3% female; 75.3% college students or graduates) completed the CAQ, a measure of self-assessed creative behaviour, and a creative personality checklist. Both two-factor (Arts and Science) and three-factor (Expressive, Performance, and Scientific) CAQ models achieved good fit. However, even though the data supports both two- (slightly better) and three-factor structures of the CAQ, there is an issue with the dimensions' low reliabilities (slightly worse in the three-factor model) and pronounced correlations of residuals. The mean CAQ score is also much lower than the referent value. Because of this, even though the convergent measures, i.e., correlations with self-assessed creativity and creative personality are in the expected range (albeit slightly lower for the creative personality than the referent value) and the CAQ is often used for the non-artist general (namely: student) samples, we are reluctant to fully recommend its usage on the general samples in our culture, as the CAQ's content might be "too hard" for our participants.

Keywords: creativity, creative achievement, creative personality, questionnaire validation

Introduction

Creativity can be studied and measured on different 'levels', most commonly conceptualized as the '4P's' (Gruszka & Tang, 2017; Rhodes, 1961), which stands for: person, product, process, and press (of the environment). In this paper, we were interested in psychometric validation of the Creative Achievement Questionnaire – CAQ (Carson, Peterson, & Higgins, 2005), which measures the product/achievement aspect of creativity. The CAQ assumes that creativity is domain specific, i.e., creative achievement in one creativity domain does not necessarily imply creative excellence in all areas (Carson et al., 2005).

The CAQ is the most frequently used self-reported creativity measure (Wang, Ho, Cheng, & Cheng, 2014), utilized in various creativity-related research (e.g., Jauk, Benedek, & Neubauer, 2014; Kaufman, 2013; Kaufman et al., 2016; Mar, DeYoung, Higgins, & Peterson, 2006; Silvia, Kaufman, Reiter-Palmon, & Wigert, 2011; Kéri, 2011;

Silvia, Kaufman, & Pretz, 2009; White & Shah, 2011). The CAQ measures creative accomplishments in 10 domains: visual arts, music, dance, architectural design, creative writing, humor, invention, scientific discovery, theater/film, and culinary arts. Each domain is measured with 7 true/false items.

Regarding the CAQ's latent structure, Carson and colleagues (2005) originally proposed the three-factor solution, comprised of Expressive, Performance, and Scientific achievement factors, but they also considered the two-factor solution, which assumes Arts and Science factors. Note that some other findings, based on the Rasch analysis, supported the two-factor structure (Wang et al., 2014).

The CAQ has been shown to have low to moderate correlations with IQ (i.e., $r = .14$, Carson et al., 2005; $r = .34$, Mar et al., 2006) and divergent thinking tests (i.e., $r = .21$; Silvia & Kimbrel, 2010; $r = .47$, Carson et al., 2005), and moderate correlations with Openness to Experience (i.e., $r = .33$, Carson et al., 2005), and broader measures of creative personality, such as the scores on the Creative Personality Scale (Gough, 1979) (i.e., $r = .33$, Carson et al., 2005). The CAQ also strongly correlates with other self-report creativity measures, e.g., with the Creative Behavior Inventory, which is a measure of everyday creativity ($r = .59$; Dollinger, 2003).

Given the fact that the CAQ is the most popular creativity measure (Wang et al., 2014), which has not been formally validated to date in the Republic of Srpska's territory, we wanted to test its factor structure and to establish some aspects of its convergent validity, namely in relation to the Creative Personality Scale (Gough, 1979) and self-reported creative behaviours (Batey, 2007; Batey & Furnham, 2008). Since the CAQ can be used on both general samples and artists, we focused our analysis on the general sample participants (Carson et al., 2005).

Method

Sample, procedure, and measures

A total of 300 general sample participants from the Republic of Srpska ($M = 24.48$, $SD = 3.07$ years; 66.3% female; 75.3% college students or graduates) completed the Serbian translation of the CAQ (Carson et al., 2005), another measure

of self-assessed creativity, which targets the creative behaviours (i.e., Biographical Inventory of Creative Behaviours; Batey, 2007; Batey & Furnham, 2008), and the Creative Personality Scale (Creative Personality Scale; Gough, 1979).

The data was gathered anonymously, using an online survey disseminated via the social networks.

The confirmatory factor analysis (CFA) was conducted in the “lavaan” program (Rosseel, 2012) and other analyses in JASP 0.9.2 (JASP Team, 2018).

Results

Both two-factor (CFI = .969, TLI = .957, RMSEA = .046 90% CI [.017, .070], SRMR = .063) and three-factor (CFI = .969, TLI = .953, RMSEA = .047 [.019, .072], SRMR = .061) CAQ models achieved good fit (Hooper, Coughlan, & Mullen, 2008). Since Carson and colleagues (2005) also use the total scale score, we tested a single-factor model, which also achieved the overall acceptable fit values (Hooper et al., 2008): CFI = .921, TLI = .898, RMSEA = .065 [.046, .084], SRMR = .089. Internal consistencies, however, were generally low in both two- and three-factor models (two-factor: Arts: $\alpha = .76$, $\omega = .63$, Science: $\alpha = .55$, $\omega = .41$; three-factor: Expressive: $\alpha = .58$, $\omega = .49$; Performance: $\alpha = .71$, $\omega = .57$; Scientific: $\alpha = .55$, $\omega = .41$) and only somewhat better for a total scale score ($\alpha = .81$, $\omega = .68$).

Table 1: The CFA factor loadings for two-factor model.

No.	Domains	Loadings (Λ)	
		Arts	Science
9	Drama (theater/film)	.66	
5	Creative writing	.69	
6	Humor	.51	
2	Music	.68	
1	Visual arts	.45	
3	Dance	.60	
7	Invention		.56
8	Scientific discovery		.50
10	Culinary arts		.62

Notes: Architectural design is not included in the two-factor model, since it had weak loadings on Science factor in the original study by Carson and colleagues (2005). Including Architecture in the model resulted in worsening of the fit: CFI = .924, TLI = .899, RMSEA = .065 [.046, .085], SRMR = .089.

There were between 6 and 9 substantially correlated (i.e., $\geq .20$) residual pairs, depending upon a model. Factors were interrelated in a lower-to-moderate range (two-factor model: .31; three-factor model: .25, .21, and .27, respectively). Due to marginally better overall fit and somewhat better internal consistencies of the two-factor model compared to the three-factor model, we are reporting factor loadings for the former (see Table 1).

The mean CAQ score was low, with pronounced lower value frequencies (see Figure 1). For example, total scale

score from our sample was substantially lower than student sample mean scores of 14.4 reported by Carson and colleagues (2005): $t(299) = -27.55$, $p < .001$, $d = 1.59$.

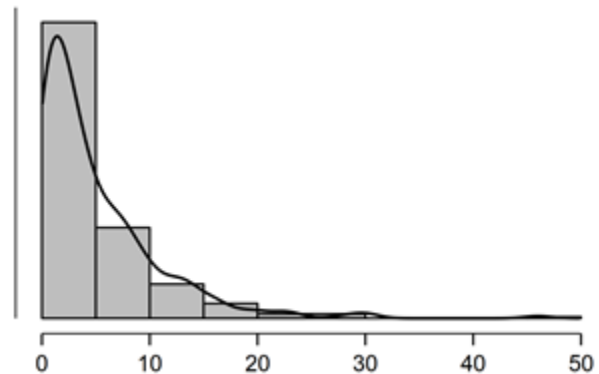


Figure 1: The CAQ total summary scores distributions. $M = 5.09$, $SD = 5.85$, $Sk = 2.52$, $Ku = 10.16$.

The CAQ total score correlated with self-assessed creative behavior in a moderate range: $r = .40$, $p < .001$, and with creative personality in a lower range: $r = .18$, $p = .001$.

Discussion

Overall, even though the data supports both two- and three-factor structures of the CAQ on a general sample of participants from the Republic of Srpska, there is an issue with the dimensions’ low reliabilities and pronounced correlations of residuals. Since two-factor model showed marginally better fit and better (i.e., “less bad”) internal consistencies, we are giving it a slight advantage over the three-factor model. Although Carson and colleagues (2005) favored the three-factor solution, they also noted that “some researchers may find it useful to employ the arts versus science dichotomy of the two-factor solution” (p. 46). Other researchers also provided support for the two-factor CAQ model (Wang et al., 2014).

Convergent measures, i.e., CAQ’s correlations with self-assessed creative behaviours and creative personality are in the expected range, albeit slightly lower for the creative personality than the referent value reported by Carson and colleagues (2005).

The CAQ is often used for the non-specialized (i.e., non-artist), namely student samples. However, the mean CAQ scores on our sample (which is predominantly comprised of students and college graduates) are much lower than referent values from a similar sample used in the study by Carson and colleagues (2005). Because of this, and because of the pronounced ‘measurement error’ (i.e., low internal consistencies) we are reluctant to fully recommend the CAQ’s usage on general samples in our culture, as the CAQ’s content might simply be “too hard” for our participants.

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Aesthetic Preference for Photographs: The Role of Affective Experience

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Abstract

Previous studies on aesthetic experience of paintings suggested that visual artworks induce a wide range of different cognitive and affective responses in beholders. In the present study we examined the role of affective experience in aesthetic preference for photographs. In the first phase of the study participants rated aesthetic experience of photographs and were asked to report what they had in mind while making aesthetic evaluation. In the second phase of the study participants rated their affective experience of verbal responses collected in the first phase of the study. Results showed that linear combination of valence, arousal and cognitive evaluation of verbal responses explained 98,3 percentage of variance in aesthetic experience of photographs. Valence and arousal showed statistically significant contribution in a multiple regression model, while cognitive evaluation did not reach statistical significance. Findings of the study are discussed within the framework of VACe model of aesthetic experience, implying that the model can be successfully generalized to include not only the visual artworks but also photography and visual scenes in general.

Keywords: photography, VACe model, aesthetic preference, affective experience

Introduction

Visual stimuli and visual artworks induce a wide range of different cognitive and affective responses in beholders (Janković, 2015a; Lang, Greenwald, Bradley & Hamm, 1993; Marković, Janković & Subotić, 2002; Parsons, 1987; Silvia, 2005). Our previous studies on aesthetic experience of abstract and representational paintings suggested that preference of an artwork is determined by an affective experience of all meanings activated in the mind of the beholder while observing an artwork (Janković, 2015b). According to VACe model, affective experience of different artworks is mostly determined by valence (to what degree a person finds a stimulus as being pleasant or unpleasant), arousal (whether a person finds a stimulus to be interesting or boring, impressive or not impressive) and cognitive evaluation (is that stimulus familiar or unfamiliar, meaningful or meaningless, clear or unclear to the beholder), which can be regarded as the basic dimensions of affective experience (Janković, 2000; 2017). Linear combination of valence, arousal and cognitive evaluation of meanings activated in the mind of beholder during the observation of paintings can explain 94% – 98% of variance in aesthetic

preference depending of the age of respondents and applied experimental procedure. Aesthetic evaluation of paintings is mostly based on the criteria like colour, subject matter, formal aspects of paintings and interpretation/cognitive elaboration of artworks (Janković, 2018).

In the present study we analysed the role of affective experience in aesthetic preference of photographs depicting scenes from everyday life. The aim of the study was to evaluate whether the VACe model of aesthetic experience, originally based on findings obtained on paintings, can be generalized to include the wider domain of visual objects and scenes – in this case photographs depicting scenes from everyday life.

Method

Participants

As part of a course requirement, thirty-nine students (71.8% female) from the Department of Psychology, University of Belgrade participated in the study ($M_{\text{age}} = 19.5$; $SD = 0.82$). All participants had normal or corrected-to-normal vision.

Stimuli

The set of fourteen photographs depicting scenes from everyday life was used in the study. Stimuli were not selected for their “artistic value”, since artworks were not the focus of this study. Instead photographs were selected to cover a wide spectrum of different themes, objects, scenes and affective experiences in general. In addition, photographs were chosen to be unfamiliar to respondents in order to reduce the confounding effects of factors beyond the scope of this study (e.g., attitude towards the author or the person presented in the photo).

All stimuli were transferred to JPEG format and adjusted according to resolution and size so that they match the presentation requirements on the computer monitor. Images were processed using VSO Image Resizer 4 (VSO Software SARL, 2010) to have uniform height of 350 pixels (on the computer screen about 9cm), and the width depended on the dimensions of the original image.

Design and Procedure

Stimuli were presented on a computer screen (centred, in the upper part of the screen) one by one and in randomized order for all participants. In the first phase of the study participants

rated their aesthetic experience of fourteen photographs on the seven-step bipolar beautiful-ugly scale and were asked to report what they had in mind while making aesthetic evaluation of each photo. Once a participant had completed the task for one stimulus, the page with the next stimulus was presented on the screen. In the second phase of the study, the same group of participants rated their affective experience of verbal responses collected in the first part of the study on scales that measure the valence (unpleasant-pleasant), arousal (unimpressive-impressive), and cognitive evaluation (unclear-clear). The average duration of the study was 20 minutes.

Results

A total of 546 verbal responses (meanings that participants had in mind while making aesthetic evaluation of photographs) were collected. Correlations between dimensions of affective experience of verbal responses and aesthetic preference of photographs were high and statistically significant (Table 1).

Table 1: Correlations between affective dimensions and aesthetic preference

	<i>r</i>	<i>p</i> <
Valence (pleasant)	.98	.001
Arousal (impressive)	.90	.001
Cognitive evaluation (clear)	.86	.001

The results of multiple regression analysis (Figure 1) showed that linear combination of valence, arousal and cognitive evaluation of verbal responses explained 98.7 percentage of variance in aesthetic preference of photographs ($F(3,10) = 245.3, p < .001$).

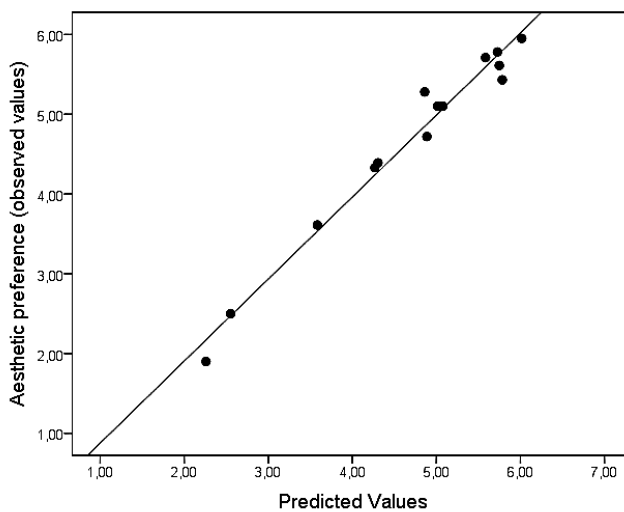


Figure 1: Results of multiple regression analysis

Affective dimensions valence ($p < .001$) and arousal ($p < .01$) showed statistically significant contribution in explained variance of aesthetic preference in the model, while cognitive evaluation did not reach statistical significance ($p = .058$), but was close to the margin (Table 2).

Table 2: Coefficients from linear regression

	β	t	p
Valence	.902	10.899	.000
Arousal	.297	3.471	.006
Cognitive evaluation	-.196	-2.136	.058

Discussion and Conclusions

The goal of this study was to analyse the role of affective experience in aesthetic preference of photographs. To be more precise, we wanted to evaluate whether the VACe model of aesthetic experience, originally based on findings obtained on paintings, can be generalized to include the wider domain of visual stimuli - photographs depicting scenes from everyday life.

Results of the study confirmed the important role of three dimensions of affective experience in the aesthetic experiences of photographs. The more we experience different meanings of visual scenes depicted in a photo as pleasant, impressive and clear, more intense will be our aesthetic experience of that photo.

Findings of this study suggested that the VACe model of aesthetic experience (Janković, 2015b, 2017) can be successfully generalized to include not only the visual artworks like paintings, but also photographs. In the following studies we will test whether the VACe model of aesthetic experience can be generalized to include wider domain of 3-D objects, design and visual scenes in general, but also the artworks that cover other sensory modalities.

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Relation between Personality Traits and Preference for Warm and Cool Colors

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Abstract

The aim of this research was to determine whether there is a statistically significant correlation between the preference of warmer or cooler color tones and the dimensions of the Big Five Model of Personality, as well as to examine if certain personality traits could be presupposed based on the preference for color. The data was analyzed through the correlation analysis and regression analysis in which the predictors were the participants' preference for warmer or cooler colors, while the criterion variables were personality traits. The results showed a statistically significant correlation between the variable Preference for warm colors and the dimensions Extraversion, Agreeableness, Conscientiousness, and Openness, whereas, on the other hand there existed a statistically significant correlation between the variable Preference for cool colors and the dimension Agreeableness. The contribution of this research lies in the better understanding of the relationship between the personality traits and the color preference of the same person. Furthermore, the research shows that based on the color preference of an individual, one can presuppose their personality traits.

Keywords: Big Five personality traits, Color preference, Preference for cool colors, Preference for warm colors

Introduction

Color as a physical phenomenon is the ray of light of certain wavelengths, and each wavelength represents a single color. However, the color can also be explained through three dimensions: biological, esthetic and symbolic (Schaie, 1966).

The biological dimension refers to the physical aspect of the color that affects the sensor apparatus. The biological aspect of color refers to their role in finding food in nature, as well as the mating partner. There is a theory based on this dimension, which explains the color preference. Nicholas Humphrey proposes the evolutionary approach, according to which the color preference is derived from the signal that color transmits to the organisms (Palmer & Schloss, 2010). Thus, individual colors send the “come” signal (the colors of flowers attract insects to dust the flower) or the “avoid” signal (the colors of poisonous frogs that refuse predators). It has

been observed that even organisms that do not perceive color still respond to the dark-light dimension.

When it comes to the biological aspect, the question arises whether the color preference is conditioned by the stimulus itself or the situation. While Gilford (1934) considers that the preference is not affected by the environment, but only the saturation and brightness of the color, Osgood(1953) emphasizes that preference is influenced by learning (Schaie, 1966).

The second dimension, aesthetics, creates more diverse answers than the biological dimension. Color affects emotions, but also on tactile, kinesthetic and perceptual feelings. In addition, the aesthetic aspect of colors can play a role in the aspiration of associations. What is important to emphasize is that it is rare that the color itself is the carrier of aesthetic dimension, since it is always in relation to the background (Schaie, 1966).

Each color has its own symbolic meaning that can be religious, status, or political in nature. Also, the source of the symbolism of colors can be in the individual association of colors with objects and ideas. For example, for one group of people, red was a symbol of love, while others reported that red reminds them of blood, evil, and Satan. Thus, the symbolism of colors is diverse and depends on several factors (Schaie, 1966).

Research shows that the color preference depends on the meaning that the color has for the viewer, and the meaning of color, according to one idea, is constructed under the influence of emotions. Ou and associates cite emotions as an explanation why we like one and dislike other colors (Ou, Luo, Woodcock & Wright, 2004). The value (positive-negative) of an emotion that the color causes affects the preference of this color, says Ou (Palmer & Schloss, 2010).

Comparing the research on color preference (Palmer & Schloss, 2010), it was noticed that there was no consistency in the preferences. Various researchers reported on the different colors that were chosen as the most preferred. However, consistency in color aversion was noticed. The colors that were least pleasing to the respondents were brown

and black and they tied these colors with dirt, while the preferred color associations were varied.

By examining the correlation of colors and emotions, many authors have focused on the influence of warm and cool colors on emotions. In a study that examined children's color vision, bright colors (yellow, blue) are associated with positive emotions, while dark colors (black, gray) are associated with negative emotions. Hemphill in his study on the student population confirmed these results. (Kaya, 2014)

Bailey, Reynold, Grim, Cindy, Davoli and Chris (2016) have reported that colors that are closer to the red end of the spectrum are perceived as "warm", and on the other hand, colors that are closer to the purple end of the spectrum are perceived as "cold". Cold colors are seen as calm and relaxing, while warm colors are perceived as stimulating and active.

The research that examined the color depth showed that warm colors are perceived as closer to the observer as opposed to cold ones that are perceived as more distant. A survey conducted by Bailey in 2006 (Bailey, 2006) partly confirms this conclusion.

There were also studies regarding relation between personality and color preference. For example, in Birren's paper (Birren, 1973) the author states that color carries more emotions with it than shape does, and that, by a consequence, through color preference we can draw some conclusion regarding personality. Also, one study (Rosenbloom, 2006) showed that individuals high on sensation seeking prefer more complex images when it comes to color, more precisely, they preferred images with more than 1 color on them. Further, one study (Bjerstedt, 1960) showed that warm and cool colors have different psychological meaning, and that they activate different psychological themes.

Because the possibility of predicting personality by the individual's color preference has been an object of interest of many previous researchers, but we did not find studies regarding prediction of personality traits from the Big Five model (one of the most often used model of personality) by

the color preference, the aim of this research was to check if those personality traits could be predicted by the preference for warm and cool colors.

Method

Participants

The convenience sample was used, and it consisted of 193 students from the University of Nis, of which 56 (29.02%) are male and 137 (70.98%) female, aged 19-30 years ($M = 22.28$).

Instruments

Big Five Inventory (BFI: Goldberg, 1993). This is a self-assessment questionnaire consisting of 44 Likert-type items and it measures personality dimensions: Extraversion, Agreeableness, Conscientiousness, Openness, Neuroticism.

Set of drawings (Krupić, 2014) which contains 16 stimuli, 8 images with colored shapes of hot and 8 images with colored shapes of cold colors. The stimuli were evaluated on the 7-point scale of Likert type. The Cronbach alpha coefficients of the internal consistency for warm scales are $\alpha = .88$, and for cool $\alpha = .90$.

Results

The analysis was conducted separately on the sample of cool color images and warm color images. The results showed a statistically significant correlation between the Preference for warm colors and personality traits: Extraversion ($r = .424$, $p = .000$), Agreeableness ($r = .681$, $p = .000$), Conscientiousness ($r = .337$, $p = .000$), and Openness ($r = .305$, $p = .000$). Preference for cold colors correlated statistically significantly with Agreeableness ($r = .211$, $p = .003$).

When it comes to regression analysis, models with criterion variables Extraversion, Agreeableness, Conscientiousness and Openness were statistically significant, while model with Neuroticism as criterion variables wasn't statistically significant.

Table 1: Multiple regression analysis

Dependent variable	Predictor	β	R ²	F	p
Extraversion	Preference for cool color	-.052	.182	21.185	.000
	Preference for warm color	.434**			
Agreeableness	Preference for cool color	.076	.469	84.004	.000
	Preference for warm color	.666**			
Conscientiousness	Preference for cool color	.055	.117	12.528	.000
	Preference for warm color	.326**			
Openness	Preference for cool color	.051	.095	10.007	.000
	Preference for warm color	.294**			
Neuroticism	Preference for cool color	.074	.015	1.490	.228
	Preference for warm color	-.116			

Note: β - standardized beta coefficient; ** - $p < .01$

The result show that by preference for warm and cool colors following personality traits can be predicted: Extraversion, Agreeableness, Conscientiousness and Openness. Preferences for cool and warm colors wasn't statistically significant predictors for Neuroticism.

Discussion and Conclusions

We did not find studies regarding prediction of personality traits from the Big Five model by the color preference so the aim of this research was to check if personality traits could be predicted by the preference for warm and cool colors.

The research shows that based on the color preference of an individual, one can presuppose their personality traits. More precisely, Extraversion, Agreeableness, Conscientiousness, and Openness can be predicted by the preference for warm colors. This data could suggest that individuals who are sociable, who have good relation with others, who are responsible and open prefer warm colors. If we recall that Birren (1973) showed that color carries more emotions with it that shape does and that warm and cool colors have different psychological meaning (Bjerstedt, 1960) we can presuppose that warm colors carry more positive and intense emotions with them, characteristic of individuals with above mentioned personality traits.

This data are very significant for practical purposes, they shows us that, in the future, we could maybe examine personality traits of individuals in a quicker way, and without risk of socially acceptable answers by respondents to personality inventories. Of course, this is only the beginning of the research in this direction. Also, we recommend that the sample is not exclusively student population. Further studies need to be conducted in order to gain more precise data on this topic.

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Aesthetic Reception of Unfamiliar Symbols

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Abstract

The relation between the space orientation and appreciation of aesthetic objects has been observed. For the purpose of this research, Chinese ideograms, unknown to subjects have been presented as aesthetic objects. According to the results of the previous researches, it is expected that ideograms in their original forms will be estimated as more beautiful than their inverted versions. This research was focused on the type of space orientation and tested the power of left-right and upside down transformations, while the complexity-simplicity of ideograms has been controlled. Together with authentic forms, left-right and upside down inverted forms of objects have been presented to subjects, in order to test the effects of transformations on the process of appreciation. Subjects were 23 students of painting, average age 21. The level of appreciation has been measured by 7-grade scale (from 'ugly' to 'beautiful'). Results show that regarding upside down transformations, authentic forms of ideograms have been estimated as more beautiful than their inverted forms. General negative effect of upside down inversion appeared as stronger factor than the effect of left-right inversion. It is demonstrated that upside down inversions of ideograms affected aesthetic appreciation, while left-right inversions didn't appear as significant factor of aesthetic evaluation.

Keywords: aesthetic evaluation, symbols, inversion

Left – Right Orientation of Aesthetic Objects

Effects of the space orientation on aesthetic evaluation, left-right and upside down inversions of unknown symbols are in the focus of this research. The effects of space transformations of objects on the process of perception and aesthetic evaluation appeared as a problem very early in art and art history. Lateral orientation of paintings and the symmetry have been analyzed by many artists and researchers. Medieval artists during the process of creating graphic prints and tapestries faced with the question of differences between aesthetic impressions induced by original or inverted forms of works of art. It has been noticed that space transformations changed the general impression of art works. Left – right problem in art has been related with the composition of objects and constellation of elements in the space or on the surface. In most of the cases, space transformations affected general impression of the aesthetic quality. Many studies confirmed that lateral transformation of works of art changed the aesthetic evaluation, the meaning, the composition balance and that way, the general impression of the spectator. Inverted paintings have been often

experienced as misbalanced and less understandable (Arnheim, 1974; Freimuth & Wapner, 1979; Gross & Bornstein, 1978; Levy, 1976; McLaughlin et al., 2002; Mead & McLaughlin, 1992). As a result of inversion, the aesthetic impression could be slightly or completely changed depending on the particular painting. Differences in impressions appeared also when different works of the same artist were analyzed (Gordon & Gardner, 1974). Research identified some visual clues that helped recognizing original from the inverted forms of paintings, such as: position of the light source (frequently from the left), orientation of the profile (frequent to the left), and the position of main figure, where upper right quadrant positions were preferable (Swartz & Hewitt, 1970). Researchers also showed that gender and space orientation of human objects played significant role in aesthetic evaluation of the inverted paintings (Pejić i Škorc, 2015). The portraits of the females were more frequently experienced as changed by inversion than the portraits of the male models, making space for the assumption that the artistic clues for presentation were „gender sensitive“ and differed according to the models. In addition, the inversions of paintings changed aesthetic responses to the right oriented and *en face* portraits, but not responses to the left oriented portraits. Some other researchers identified correlation between the space orientation of visual elements and right-handedness of the observers (Levy, 1976; Freimuth & Wapner, 1979; Mead & McLaughlin, 1992; Škorc i Pejić, 2012). Also, it has been noticed that the effects of inversion appeared when paintings were presented side by side or one after another, but disappeared when order has been interrupted by other inserted paintings of different types (McLaughlin & Kermisch, 1997; McLaughlin & Cramer, 1998, McLaughlin et al., 2002).

The Aim of the Research

The aim of this research was to test the effects of the type of inversion of visual forms on the aesthetic appreciation. The research was focused on effects of space orientation on the appreciation of unfamiliar symbols (Chinese ideograms). The question of interest was: were there differences in aesthetic evaluation between the authentic, left-right inverted and upside down inverted forms of symbols?

Method

Stimuli

Ten symbols were selected according to their complexity – simplicity and were rotated on horizontal or vertical axes. For that purpose, unknown symbols, Chinese ideograms, were presented as aesthetic objects (Figure 1). The research tested the relation between the space orientation and appreciation of symbols. It was expected that authentic forms of symbols would be recognized as more beautiful. The stimuli were balanced according to their complexity and space orientation. A total of 30 forms has been presented including 10 simple ideograms (containing 6 or less lines), 10 complex ideograms (8 – 16 lines) and in addition, 5 simple and 5 complex ideograms presented in two types of inverted forms: upside down and left-right.

Ideograms have been balanced according to the levels of complexity and space orientation.



Figure 1: Simple ideogram presented in authentic, upside down and laterally inverted form (left to right)

Procedure

Ideograms were presented as aesthetic objects to subjects who were aesthetically sensitive but not familiar with symbols. Their task has been to estimate the level of appreciation. The complexity-simplicity of ideograms as formal characteristic of objects has been balanced and controlled. Authentic and inverted forms have been presented in order to test the power of inversion as a criterion of appreciation.

Ideograms have been randomly presented one by one to the subjects, who have been asked to estimate the level of appreciation of the presented objects.

The level of appreciation has been measured by 7-grade scale (ugly – beautiful). The time of exposure was not limited.

Subjects

23 students of painting and visual arts participated as subjects. There were 74% female and 26% male subjects included, average age 20. They were not familiar with Chinese ideograms. They were assumed to be aesthetically sensitive to visual stimuli.

Results and Discussion

The analysis of variance showed no statistically significant effect of complexity: $F(1) = 2.14$, $p > .05$, $M_{\text{complex}} = 4.89$, $M_{\text{simple}} = 4.72$. There were no differences in the levels of appreciation between complex and simple symbols. The analysis of variance showed statistically significant effect of

the type of inversion ($F(2) = 3.78$; $p < .05$, $M_{\text{authentic}} = 4.96$; $M_{\text{upside down inversion}} = 4.65$; $M_{\text{left-right inversion}} = 4.79$). There were statistically significant differences in the levels of appreciation between the authentic and inverted forms, showing authentic forms as more beautiful. Pair comparisons showed that authentic forms were experienced as more beautiful than their upside down inverted pairs ($M_{\text{authentic}} - M_{\text{upside down}} = .31$; $p < .05$), but were evaluated equally as their left-right inverted pairs ($M_{\text{authentic}} - M_{\text{left-right}} = .18$; $p > .05$).

The analysis of variance showed no statistically significant interaction between the complexity and authenticity of symbols ($F(2) = 2.00$, $p > .05$).

Conclusions

According to the results, the complexity appeared as less powerful factor of appreciation compared with the inversion of objects. Also, the two types of inversion brought different effects to the process of aesthetic evaluation of symbols. The authentic (original) ideograms have been seen as more beautiful than their upside down inverted versions but there were no differences between the original and left-right inverted forms. It could be assumed that, compared with upside down, left-right inversion is more subtle and less invasive visual transformation that cannot be perceived by the observers and doesn't affect the general aesthetic impression.

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Complexity and Authenticity as Components of Appreciation of Unfamiliar Symbols

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Abstract

In this research relation between complexity and appreciation of aesthetic objects has been observed. According to the results of the previous researches, it is expected that more complex forms will be estimated as more beautiful. For the purpose of this research, Chinese ideograms have been presented as aesthetic objects. Complexity-simplicity of ideograms as formal characteristic of objects was combined with their authentic-inverted forms in order to test the power of complexity as a criterion of appreciation. Subjects were 58 students of painting, average age 21. The level of appreciation has been measured by 7-grade scale (from “ugly” to “beautiful”). Univariate analysis of variance showed no statistically significant effect of complexity. Results show that authentic forms of ideograms have been estimated as more beautiful than their inverted forms. It is demonstrated that subjects were more sensitive to authenticity of ideograms than to their complexity – simplicity. The results show that authenticity of symbols appears as more powerful criterion than complexity.

Keywords: complexity, appreciation, ideograms, symbols

Complexity and Appreciation

There are many hypotheses regarding interaction between the complexity of aesthetic objects and their aesthetic values. One of the oldest, Birkhoff model predicts negative linear relation between complexity and the level of appreciation (Birkhoff, 1933). According to this, regular and simple aesthetic objects will be estimated as more beautiful than the complex and irregular forms. Eysenck's hypothesis (Eysenck, 1941), which inspired many researches, suggested linear relation between complexity and level of appreciation. According to it, most complex visual forms will be estimated as most beautiful (Nicki & Moss, 1975). Berlyne observed complexity as powerful *colative variable* which is seen as most powerful factor of aesthetic response for the medium interval of its presence (Berlyne, 1970). The relation between complexity and appreciation is linear but could be active only within the interval of medium level of complexity. Berlyne's findings inspired new researches of the symmetry, composition, quantity of information, ambiguous meaning and other characteristics of visual objects.

Martindale's research identified complexity as relatively weak predictor of appreciation, the power of which depended on the type of the stimuli. Estimations of representative and

abstract styles of paintings showed negative correlations between the complexity and aesthetic preference (Martindale, Moore & Borkum, 1990). Some researchers identified complexity as a relatively weak predictor of appreciation for modern works of art (Furnham & Avison, 1997). It appeared to be powerful predictor of appreciation for simple visual forms but not for the aesthetic evaluation of works of “high art” (McLaughlin, Dunckle & Brown, 1999). In addition, some researches demonstrated the influence of the observer factor (Kreitler, Zigler, & Kreitler, 1974; Rump, 1968) and weak experimental control (Moyles, Tuddenham, & Block, 1965). The factor of observer, subjectivity of aesthetic evaluation, appeared as intervening variable difficult to be controlled and complexity could be described as more subjective than objective characteristic of visual object (Silvia, 2005a, 2005b, 2007).

The Aim of the Research

The aim of this research was to test the effects of complexity and inversion of visual forms on the aesthetic appreciation. The research was focused on complexity - simplicity and space orientation of unfamiliar symbols (Chinese ideograms) and their relation with appreciation. The focus was on the power of complexity as an aesthetic criterion of appreciation.

Method

Stimuli

As stimuli, Chinese ideograms have been presented to subjects (Figure 1). The total of 30 ideograms has been included in the research. Ideograms have been balanced according to the level of complexity and space orientation. For this purpose, 10 simple (6 lines or less per symbol) and 10 complex (8 - 16 lines per symbol) have been selected. In addition, 5 simple and 5 complex ideograms have been presented upside down.

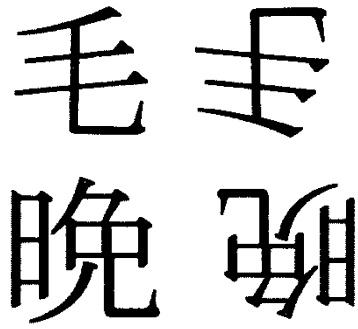


Figure 1: Pairs of simple (upper row) and complex (lower row) ideograms presented in authentic (left) and inverted (right) forms

Procedure

Based on previously implemented method, ideograms were presented as aesthetic objects to subjects who were aesthetically sensitive but not familiar with them. Their task has been to estimate the level of appreciation. The complexity-simplicity of ideograms as formal characteristic of objects was combined with their authentic-inverted forms in order to test the power of complexity as a criterion of appreciation.

The stimuli were balanced according to their complexity and space orientation. A total of 30 forms have been presented including 10 simple ideograms (containing 6 or less than 6 lines), 10 complex ideograms (8 - 16 lines) and in addition, 5 simple and 5 complex ideograms presented turned upside down. Ideograms have been randomly presented one by one to the subjects, who have been asked to estimate the level of appreciation of the presented objects. The level of appreciation has been measured by 7-grade scale (ugly – beautiful).

Subjects

58 students of painting participated as subjects. There were 69% female and 31% male subjects included. The average age was 21. They were not familiar with Chinese ideograms. They were assumed to be aesthetically sensitive to visual stimuli.

Results and Discussion

According to findings of previous researches (Berlyne, 1974), it was expected that complex forms would be highly appreciated, regardless on their authentic or inverted forms. Univariate analysis of variance showed no statistically significant effect of complexity ($F(1) = .07, p > .05, M_{\text{complex}} = 3.44, M_{\text{simple}} = 3.46$). There were no statistically significant differences between simple and complex ideograms. Univariate analysis of variance showed statistically significant effects of the authenticity ($F(1) = 4.58, p < .05, M_{\text{original}} = 3.52, M_{\text{inverted}} = 3.38$). There were statistically significant differences between authentic and inverted forms, showing that authentic (original) ideograms have been seen as more beautiful than their inverted versions. The analysis showed no statistically

significant interaction between the complexity and authenticity ($F(1) = 1.24, p > .05$).

Conclusions

The results are not in accordance with Berlyne's prediction that complexity will be strongest factor of appreciation. Clear, linear relation between the two was not approved. Authenticity of symbols appeared as more powerful criterion than complexity. Probably, appreciation of visual object is the process under the influence of the network of factors and is entangled with interactive set of formal characteristics. Also, this finding could be related with the idea of implicit, connotative meaning of symbols (Osgood et al, 1975) which assumes implicit sensitivity to semantics of unknown symbols. Upside down deformations of original objects appeared to be stronger negative factor of the aesthetic evaluation than the low complexity of the objects. Connotative meaning could probably be, in this case, the factor that explains the results.

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PERCEPTION

The Role of Visual Attention in Localization and Identification Processes in Visual Perception

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Abstract

The main goal of this research is to examine the process of localization and identification of simple stimulus through specific experimental procedure of inattention blindness. With this approach it can be analyzed the role of attention in the processes of visual perception. Also, this study sought to determine whether the localization and identification in inattention condition depend on the characteristic of the stimulus (position). The total number of 126 subjects have participated in experiment. The obtained results show that the localization of critical stimulus is possible in inattention condition. Efficiency in identification of critical stimulus was statistically lower than in localization, but existed. Identification depends on the position of the stimulus.

Keywords: localization, identification, inattention blindness, stimulus position

Introduction

For people to react adequately in an environment that surrounds them, it is necessary to process visual information's efficiently. First of all, it implies accurate localization in surroundings, as well as accurate identification. Perceptual localization could be defined as an estimate of the stimulus position in the relation to the point of intersection of horizontal and vertical lines at right angles (Vishwanatah & Kowler, 2003), while the identification relates to the extraction of the basic characteristics of the stimuli that set it apart and different from other visual inputs (Ghorashis, Enns, Klein, & Di Lollo, 2010).

Although equally important in visual perception, it is not entirely clear whether the localization and identification are functionally independent processes, or whether they are placed in the same stages of perception. Two stages of perception could be distinguished – early or preattentive and late or attentive. If something is seen in regions that have not been attended, it is called preattentive (Treisman & Gelade, 1980; Wolfe, 2015). There are three theoretical approaches to the problem of localization and identification in perception. According to the first approach, known as the Feature integration theory, analysis of visual information in the early stages of perception involves determining the identity of the stimulus without signaling the place where it is located (Treisman & Gelade, 1980). Localization of stimulus takes place in the late, higher phase of perception that requires the engagement of attention. According to the second approach (Sage & Jules, 1985; Newby & Rock, 2001) it is possible to detect the location of stimulus at an early stage, without the participation of attention, while identification is possible only in a phase of focused perception. The third approach that was represented by Wolf (Cave & Wolfe, 1992; Wolfe, 1994)

points out that the localization and identification are under the strong influence of attention and that there is interdependence between these processes. Empirical studies did not provide precise results that give dominance and validity of one of these approaches.

This study aims to determine the relationship of localization and identification of the stimulus through specific experimental procedure of inattention blindness. Inattention blindness is a phenomenon of unsuccessful perception of visible inputs within the visual field when attention is focused on other inputs (Mack & Rock, 1998). Full involvement in a task that engages the attention, leads to temporary “blindness” and disables the processing of other sensory information. Accordingly, this procedure allows examining the role of attention in various processes in visual perception. In a number of empirical studies it has been found that the amount of inattention blindness depends on certain characteristics of the stimuli such as: size, shape, color (Mack & Rock, 1998) and position (Most, Simons, Scholl, & Chabris, 2000). Consequently this study is also trying to answer the question whether processes of localization and identification depend on the position of the stimuli that are perceived.

Method

Sample

The final sample consisted of 126 participants (79% female), students of the University of Banja Luka. Their mean age was 20.9 years. All participants had normal or corrected to normal vision and were tested individually.

Design and Procedure

Classical experimental procedure for testing the “inattention blindness” was applied in this research. Participants were sitting at distance of 50 cm from the computer and head position was not fixed. Before each trial, a fixation point (1°) was presented at the center of the screen for 500 ms. It was followed by a cross centered at fixation for 200 ms. The primary task was to judge which line of the cross was longer – the horizontal one or the vertical one. Each participant completed a total of three trials. In the last trial, an unexpected critical stimulus appeared on the screen at the same time as cross appeared. Appearance of critical stimulus was ended in the same time as the cross. The critical stimulus was square and it was always presented on one of the imaginary 45° line bisecting the quadrants of cross. After the last trial, all participants answered the question whether they had seen something else besides the cross. If the answer was “yes”, they were to specify quadrant in which the new

stimulus was shown. This was the localization task. Participants were also given an identification task in which they should identify the correct square in the series of offered stimuli. The order of the tasks was randomized. One group of participants first performed the localization task, and the other group first performed the identification task. These groups were approximately equal. Spatial dimension of unexpected critical stimulus was varied. There were two positions – center and periphery. Central position referred to the presentation of the square within the “zone of attention“, whereas the peripheral position referred to the presentation outside the “zone of attention“. “Zone of attention” was determined by a circular area around the lines of cross.

Results

The obtained results show that the number of correct answers in localization task is greater than the number of correct answers in identification task (Figure 1). This difference is statistically significant ($\chi^2(1, 126) = 65.470, p < .01$).

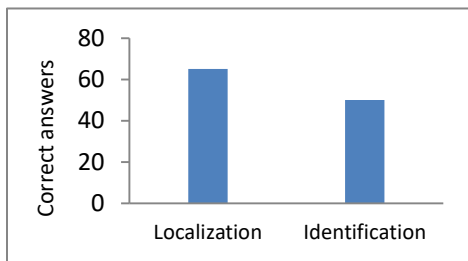


Figure 1: Number of correct answers in localization and identification tasks

Identification is also possible in inattention condition, but this process depends on the position of the stimulus (Figure 2). The stimuli shown near the fixation point are more accurately identified than the stimuli shown outside the “zone of attention” ($\chi^2(1, 126) = 4.775, p < .05$).

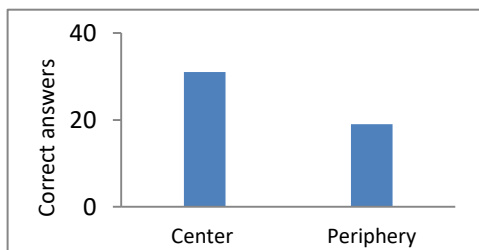


Figure 2. Number of correct answers in identification task in relation to the stimulus position

There was no effect of the task order on the accuracy of localization or identification ($\chi^2(1, 126) = .270, p > .05$ for localization; $\chi^2(1, 126) = 1.226, p > .05$ for identification).

Discussion and conclusion

The results show that, in inattention condition, significantly more participants accurately determine the location of

exposed stimuli in relation to the identification. Based on this we can conclude that the localization process takes place in the early stages of the perception. These results partially confirm the model offered by Sagi and Julesz (1985), as well as subsequent research based on their model (Donk & Meinecke, 2001), as they show that the stimulus localization is performed without attention. According to these authors, our visual system has the capability for early detection of the presence of the stimulus and to determine its position in space. Neri and Heeger (2002) pointed out that in the early stage of perception it comes to contrast energy extraction and that is a strong indicator of salient features presence at particular location in the visual field. Tsal and Bareket (2005) also found that coarse localization is possible without attention, while the fine localization requires attention. In this study, the determination of the quadrant in which a critical stimulus is presented can be considered as coarse localization. A fine localization would be a precise indication of the critical stimulus position. But, when it comes to the identification process the results are not fully consistent with the model of Sagi and Julesz (1985) and research of Donk and Meinecke (2001). Although efficiency in identification task was lower than in localization task, there were some correct answers in absence of attention. Such results are consistent with hypothesis that similar processes mediate identification and localization (Busey & Palmer, 2008). Results of this study also show that the identification of the stimulus in inattention condition is under the influence of stimulus characteristics such as position. Distancing of stimuli outside the zone of attention reduces the probability of correct identification. Such results can actually fit into the location-based models of perception (Most, Simons, Scholl & Chabris, 2000). According to these models, attention can function as a reflector (Posner, 1980; Gvozdenovic, 2011), which illuminates and better processes a stimulus, which is in the focus of attention in relation to the less illuminated stimuli in their environment.

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Reach out I'll Be Further – Anisotropy of Perceived Arm Length

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Abstract

Previous research showed that vertical distances are perceived as longer from physically equal horizontal ones. We investigated if the perceived length of one's arm is changed regarding viewing direction and one's disorientation. In experiment 13 participants had a task to set cubic stimuli at a distance they estimated to be reachable by the top of their fingers, which was considered as their perceived arm length. Task was done in horizontal and vertical direction, by guiding the experimenter to move the stimuli at the desired distance. In half of the trials participants were disoriented before distance estimation. The results have shown that participants who were not disorientated perceived the length of their own arm as shorter on vertical than on horizontal axis. However, participants' disorientation led to a reduction of difference in distortion of perceived arm length on two directions and it was statistically insignificant. These results are in line with previous findings since we can argue that the arm length might be used as a distance measure.

Keywords: anisotropy of perceived distance, proprioceptive information, vestibular information, perceived arm length.

Introduction

Action of grasping is a habitual motor activity, conducted through coordination of information taken from visual, proprioceptive and vestibular apparatus. Earlier research showed that one uses visual information in order to identify an object, but visual information is also used during the planning and performing of actions toward the object. To be more exact, taking into account estimated distance of the object, primary contribution of visual information is in the control of programmed motor actions directed toward object and movement guidance (Goodale & Humphrey, 1998; Bagesteiro, Sarlegna & Sainburg, 2006). Proprioceptive information is primary used for correction of the arm movements during the execution of the fast action of grasping (Bagesteiro, Sarlegna & Sainburg, 2006). Vestibular information has a role in perception of body position as in linear and angled acceleration (Lackner & DiZio, 2005). However, vestibular information has its role in evaluating distance assessment accuracy (von Der Heyde, Riecke, Cunningham and Bulthoff, 2000). Previously we showed that best accuracy in estimating distance is achieved if combination of visual and proprioceptive information is used (when participants move stimuli themselves) (Todić Jakšić & Tošković, 2018). It has been shown that changing of the position of the head leads toward increase in perceived distance toward zenith, in comparison to physically equal horizontal distances (Tošković, 2009, 2010). During the change of head

position, proprioceptive information of neck muscles and vestibular information are also altered, so we are able to assume that the interaction between those sensory modalities with visual, contributes to the change of judged distance on vertical direction.

The aim of this research is to examine whether the arm length is perceived differently on vertical and horizontal axis according to changes in vestibular and proprioceptive information. One of the hypotheses may be that perceived length of one's own hand is used as a unit of measurement corresponding to which distance of objects is being perceived.

Method

Participants

The research included 13 students of both genders, age 18 to 28 years. All participants had normal or corrected to normal vision.

Apparatus and stimuli

We used a white platform, 10cm x 90cm, with black line across its center. Platform was adjusted to reach nose level, and it could be positioned horizontally (perpendicular to the body) or vertically (parallel to the body). A yellow cuboid (1.2x4.5x1 cm) was used as stimulus for distance estimation (Figure 1).



Figure 1: Experimental setting

Procedure

Participants guided the experimenter to set the stimulus on such a distance that appeared to be reachable with the top of their fingers. In this way effectively they were estimating their arm length, on both, horizontal and vertical axes. During the evaluations participants wore glasses with narrow horizontal

apertures in order to prevent eye movements in sagittal plane while maintaining convergence availability.

In half of experimental situations participants were disoriented by rotating around vertical body axis, in order to examine the role of vestibular information on arm length assessment. Order of situations with and without rotation was randomized. After the experiment participant's hands were measured from shoulder to fingertips, in order to control for their true arm length during data analysis.

Results

First we calculated deviations of estimated reached distance by hand from true hand length of each participant (values were positive if hand length was overestimated or negative if it was underestimated).

By two-factorial analysis of variance for repeated measures we tested effects of direction (horizontal or vertical), disorientation (with and without) and their interaction. Main effects of both factors were significant as well as their interaction (Table 1).

Table 1. Statistical significance of direction and disorientation effects and their interaction

	df	F	p	η^2
direction	1;13	4.75	.048	.268
disorientation	1;13	5.207	.040	.286
direct.*disorient.	1;13	8.224	.013	.387

Participants overestimated length of their arms on horizontal axis (perceived it as longer) while on the vertical axis they underestimated it (perceived it as shorter). But, since interaction of two factors was significant, we tested whether this is true for both, disoriented and non-disoriented situations. Sidak's post-hoc tests showed that differences in deviations of arm's length are significant only in situations when participants have not been rotated before the estimation. Perceived lengthening of the arm on the horizontal axis is of comparable intensity to the perceived shortening on the vertical axis (figure 2). However, differences in deviations of perceived arm length on horizontal and vertical direction remain in the same direction, but they are smaller and stop being statistically significant in situations in which participants were rotated (disorientated) before performing the estimates.

Comparing the differences in deviations of the estimated arm length in relation to participant's disorientation, results show that they perceive arm's length on vertical axis as shorter when they are not disoriented then when they are disoriented. There were no differences in deviations of perceived arm length on horizontal axis between situations with and without disorientation (Figure 2).

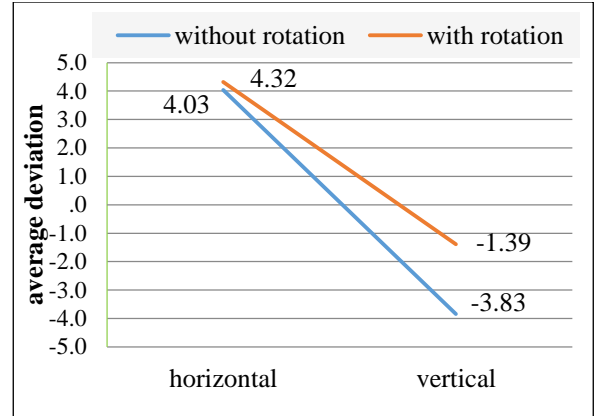


Figure 2: Deviations in perceived arm length on two directions, for situations with and without disorientation of participants

Discussion

Previous research showed that vertical distances are perceived as longer from physically equal horizontal ones. The phenomenon is called anisotropy of perceived distance and it is attributed to information integration from visual, proprioceptive and vestibular system. Importance of multisensory integration for perceived distance anisotropy is considered through perception and action coordination. Namely, movement towards the object, which is positioned above one's head, would oppose to gravity, and it would require more effort. Therefore, perceiving distance toward zenith as further would improve action performance (Tošković, 2009). Further research showed that anisotropy phenomena exists even if distance estimation is being performed in virtual reality as well as it remains after training participants to hit the target on given distances, on both horizontal and vertical axis (Milosavljević & Tošković, 2019).

Having in mind that manual operations, such as grabbing, are performed in peripersonal space as well as above mentioned researches which relate distance perception to action, we have constructed hypothesis which claims that participants could use perceived length of their arm as a measurement unit for perceiving and estimating distances. Results showed that participants perceive their arm as shorter on vertical than on horizontal axis. Also, they underestimate arm length on vertical axis in comparison to their true arm length, and overestimate it on horizontal axis. This is in accordance with our hypothesis because if participants overestimate their arm length on horizontal axis while using it as a distance measurement unit, then perceived object distances on that axis will be shorter. Furthermore, they underestimate arm length on vertical axis and according to that it is expected to perceive distances on that axis as longer, because it contains more subjective measurement units. Differences in perceived distances on horizontal and vertical directions are already shown in previous researches (Tošković, 2009).

But, our results showed that differences in perceived arm length are statistically significant only when participants were

not disoriented. Disorienting participants leads to diminishing differences in deviation of perceived arm length on two axes; i.e. after the disorientation, estimated arm length on vertical axis enlarges and stops being significantly different from the same estimate on horizontal axis. This information points out the importance of vestibular input on distance perception because it shows that disorientation diminishes differences in perceived arm length and most likely in perceived object distances on two directions.

To conclude, the same arm is perceived as shorter on vertical axis which is in accordance with previously mentioned hypothesis stating the importance of perception-action coordination for distance perception. Disorientation diminishes differences in perceived arm length, which indicates the importance of vestibular information for space and distance perception.

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SOCIAL PSYCHOLOGY

Susceptibility to Visual Merchandising and Compulsive Buying: Examining the Mediating Effect of Hedonic Shopping Motivations

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Abstract

Compulsive buying is the consumer's tendency to be preoccupied with buying that is revealed through repetitive buying and a lack of control over buying. The aim of this study was to determine whether the relationship between susceptibility and impacts of visual merchandising and compulsive buying was mediated by hedonic motivations. The sample consisted of 180 respondents (63.9% female). We used the Compulsive Buying Scale, Visual Merchandising Susceptibility Questionnaire, and Hedonic Shopping Motivations Scale. Results of mediation analysis showed that a total direct effect of the visual merchandising on the compulsive buying is significant. When the hedonistic motives variable is entered as a mediator, the effect of visual merchandising on the compulsive buying becomes insignificant. There is a significant indirect effect of the visual merchandising on the compulsive buying through the hedonistic motives, such that the visual merchandising predicts a higher compulsive buying through higher hedonistic motives. This study revealed that one of the mechanisms by which visual merchandising tools can trigger compulsive buying is through activating hedonistic motives.

Keywords: compulsive buying; susceptibility to visual merchandising; hedonic motivations; mediating effect

Introduction

Compulsive buying behavior is defined as a consumer's tendency to be preoccupied with buying that is revealed through repetitive buying and a lack of control over buying. Typically compulsive buying leads to severe negative consequences, especially severe financial debt, and at the extreme point where the shopping and spending process becomes addictive, the daily life of the consumer is severely disrupted (Edwards, 1993).

Many studies (e.g. Khurram & Seemab, 2014; Mehta & Chugan, 2013; Neha & Pawan, 2014) have shown that the visual merchandising tools influence shopping decisions of customers. The customer is often unknowingly subjected to merchandising activities that affect the perception of the products and increase the desire to purchase. Four distinctive visual merchandising practices that largely influence a buying tendency are window display, in-store design, floor merchandising, and promotional signage (Kim, 2003; Ajith, Reni, & Vipinkumar, 2018).

Previous studies (e.g. Dittmar, 2007; Escalas & Bettman, 2005; Kukar-Kinney, Ridgway & Monroe, 2012; Rindfleisch, Burroughs & Denton, 1997; O'Guinn & Faber, 1989; Roberts, Manolis & Tanner, 2006) show that compulsive

buying is positively related to hedonic motivations. Buying has become easily accessible, and socially approved leisure and lifestyle activity (Horváth & Adıgüzel, 2018). Consumers are therefore increasingly engaged in shopping for hedonistic purposes, such as immediate gratification (Elliott, 1994). Compulsive buyers pursue chronic, repetitive purchasing that becomes a primary response to negative events or feelings (O'Guinn & Faber, 1989). Studies show that compulsive buyers are engaged in shopping for primarily hedonic motivations; to escape from negative feelings (O'Guinn & Faber, 1989) and experience positive emotions (Rindfleisch, Burroughs & Denton, 1997; Roberts, Manolis & Tanner, 2006); to improve their self and social image; and to express themselves (Dittmar, 2007; Escalas & Bettman, 2005; Kukar - Kinney, Ridgway & Monroe, 2012).

Accordingly, the aim of this study was to determine whether the relationship between susceptibility and impacts of visual merchandising and compulsive buying was mediated by hedonic motivations.

Method

Participants and Procedure

The research was conducted on a sample of 180 respondents (63.9% female) from Banja Luka, aged 18 to 75 ($M = 31.56$, $SD = 13.06$). Participants' level of education ranged from two- or three-year school degree for skilled or highly skilled workers (11.1%), high school degree (62.2%), college degree (5%) to a university degree (21.7%). The sample was divided into three groups according to the material circumstances: 19% below the average, 77.2% average and 3.4% above the average.

Data collection was performed through the paper/pencil method, in the shopping malls where the respondents were doing their shopping. Completing the questionnaire was conducted individually. Participation was on a voluntary and anonymous basis.

Instruments

Compulsive Buying Tendency Scale (Edwards, 1993). The scale consists of 13 items that measure compulsive buying tendencies: the tendency to spend, compulsion/drive to spend, feelings about shopping and spending, dysfunctional spending, and post-purchase guilt. The participants' responses to the items are given on a 5-point Likert type scale from 1 (*strongly disagree*) to 5 (*strongly agree*). For this

study, a total score had acceptable internal consistency: $\alpha = .74$.

Visual Merchandising Susceptibility Questionnaire (Kim, 1991). The questionnaire consists of 14 items that measure distinctive visual merchandising practices that influence buying tendency: window display, in-store design, floor merchandising, and promotional signage. The participants' responses to the items are given on a 5-point Likert type scale from 1 (*strongly disagree*) to 5 (*strongly agree*). For this study, a total score had good internal consistency: $\alpha = .88$.

Hedonic Shopping Motivations Scale (Arnolds & Reynolds, 2003). The scale consists of 18 items that measure adventure, gratification, role, value, social, and idea shopping motivations. The participants' responses to the items are given on a 5-point Likert type scale from 1 (*strongly disagree*) to 5 (*strongly agree*). For this study, a total score had good internal consistency: $\alpha = .90$.

Results

Table 1 shows descriptive statistics and bivariate correlation for all variables in the study.

Table 1: Descriptive statistics and correlations

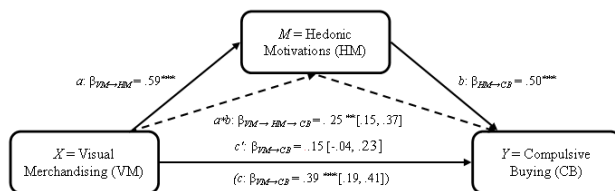
Scale	<i>M</i>	<i>SD</i>	<i>Sk</i>	<i>Ku</i>	Correlations	
					CB	VM
CB	23.94	7.89	-.73	.19		
VM	39.16	10.07	.50	.05	.39***	
HM	50.74	13.76	-.02	-.49	.50***	.59***

Note. CB – Compulsive Buying, VM – Visual Merchandising, HM – Hedonic motivations

*** $p < .001$

Bivariate correlations between the visual merchandising, hedonic motivations and compulsive buying are positive and of moderate to strong intensity (Cohen, 1988).

For mediation analyse the Hayes' PROCESS for SPSS (Hayes, 2013) was used and the results are shown in Figure 1.



Note: *** $p < .001$; ** $p < .01$; CIs were obtain using $k = 10\,000$ bootstrapping samples.

Figure 1: Mediation model, Visual Merchandising (*X*) on Compulsive Buying through (*Y*) Hedonic Motivations (*M*).

A total direct effect (*c* path) of the visual merchandising on the compulsive buying is significant. When the hedonic motivations variable is entered as a mediator, the effect of visual merchandising on the compulsive buying (*c'* path) becomes insignificant. There is a significant indirect effect (*a*b* path) of the visual merchandising on the compulsive buying through the hedonic motivations, such that the visual merchandising predicts a higher compulsive buying through higher hedonic motivations. Therefore, it can be concluded

that the hedonic motivations mediate the relation between the visual merchandising and the compulsive buying.

Discussion and conclusion

The obtained results are consistent with the results of previous studies (e.g. Dittmar, 2007; Escalas & Bettman, 2005; Kukar-Kinney, Ridgway & Monroe, 2012; Rindfleisch, Burroughs & Denton, 1997; O'Guinn & Faber, 1989; Roberts, Manolis & Tanner, 2006), suggesting positive relations between compulsive buying and hedonic motivations.

Further, this study revealed that one of the mechanisms by which visual merchandising tools can trigger compulsive buying is through activating hedonic motivations. In other words, visual merchandising tools evoke anticipation of satisfaction and positive emotions without which the consumer's tendency for repetitive buying with a lack of control wouldn't be activated.

While our findings imply that the impact of visual merchandising on compulsive buying behavior is rooted in hedonistic shopping motivations, it is as yet unclear how much the different hedonic motivations for shopping (adventure, gratification, role, value, social, and idea shopping motivations) contribute to compulsive buying and which of them are the most important. Future studies should fill this gap.

Compulsive buying behavior afflicts more and more individuals who, as a result, often find themselves in deep debt (Unger & Raab, 2015). Understanding the predisposing factors that indicate a tendency for compulsive buying can help in intervention strategies aimed at correcting this problem.

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Science skepticism: Endorsement and Psychological Predictors

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Abstract

There is growing distrust in government institutions and official sources of information in recent years; science skepticism is one of the symptoms of the mentioned phenomenon. People have been constantly exposed to a variety of non-scientific illegitimate common sense knowledge and misinformation mostly from the Internet, shaping their attitudes and behavior, in addition to sound research scientific data that does not have such high reach. Distrust in scientific facts has catastrophic consequences and therefore it is important to identify groups that report lower trust in science, and to explore their socio-demographic and psychological characteristics. Drawing from a nationally representative sample of adult Serbian population from May year 2018 ($N = 1480$), we investigated: a) the endorsement of science skepticism in Serbia, b) the validation of distrust in science scale, c) socio-demographic and psychological predictors of science skepticism. Results revealed moderate trust in science in Serbia, confirming psychological variables as significant predictors of science skepticism.

Keywords: science skepticism, trust, media literacy, Serbia

Introduction

Science explores systematic procedures that builds and organizes facts and knowledge providing the way to understand the world around us. Scientific and technological advances have made the world safer, more comfortable and kinder to humans. Anyways a number of people are losing trust in the scientific community, fighting scientific facts with common sense, conspiracy belief or pseudoscientific facts. This should not come as a surprise, since even scientists have a hard time understanding scientific findings outside their own expertise (Shtulman and Valcarcel, 2012). Science has become too hard for lay people to understand, and the uncertainty only continues to grow as a result of absence of scientific consensus. Scientific facts are no longer enough for a socially binding truth, and other spheres take over the role in deciding in what contradictory claims to believe in (Beck, 1992). The lay population is divided on many important issues such as vaccination, climate change, GMO (Hamilton, Hartter, Saito, 2015; Kahan, 2012). Conspiracy belief is coherent with distrust in science, and has enormous consequences on public health behavior (Oliver & Wood, 2014), political participation (Goertzel, 1994; Jolley & Douglas, 2014), and radicalization (Van Prooijen et al., 2015). Growing science skepticism can be

partly attributed to media outlets painting scientists as an uncohesive group (Aupers, 2012), but also as a by-product of growing general distrust in the world (Robinson and Jackson, 2001; Levi and Stoker, 2000; Gauchat, 2012). Current research examines: a) the endorsement of science skepticism in Serbia b) the validation of distrust in science scale, composed of two factors: general trust in science (GTS), and support for science in policy (SSP) (McCright, Dentzman, Charters, Dietz, 2013); c) socio-demographic and psychological predictors (political cynicism, media literacy, social dominance, trust in institutions, authoritarianism) of science skepticism. According to our knowledge, this was the first time prevalence of science skepticism has been tested in Serbia on a national representative sample.

Method

Sample

Data was collected using a nationally representative sample for Serbia ($N = 1480$), conducted in May 2018 (53% male, average age = 42.81). Respondents reported on average about 13 years in the educational system, being of medium socioeconomic status (2.96 from a five-point scale).

Instruments

To measure endorsement of science skepticism we employed a short version of support for science scale consisting of two indicators: GTS (Cronbach $\alpha = .85$) and SSP ($\alpha = .83$). Scale items are available in table 1 (McCright, Dentzman, Charters, Dietz, 2013).

Political cynicism was assessed using eight questions (e.g. “*The greatest concern of politicians is how to stay in power for as long as possible*”) (Dekker and Meijerink, 2012; Pavlović, 2013). Cronbach $\alpha = .95$.

Media literacy was assessed using six questions (e.g. “*I check who the author of the text I am reading is*”) (UNICEF report, 2018). Cronbach $\alpha = .92$.

Social dominance orientation was tested using eight questions (egg. “*Some groups are simply more inferior to others*”) (Ho et al. 2015). Cronbach’s alpha was .72.

Trust in institution was assessed using sixteen questions (egg. “*How much do you believe in the educational system?*”). Cronbach’s alpha was .93.

Authoritarianism was tested using nine questions (egg. „*The most important virtues that children should learn are obedience and respect for authority*”) (Altmeyer, 1988, 1998; Todosijević, 2013). Cronbach’s $\alpha = .90$.

Sociodemographic variables were also measured (religion, socioeconomic status, education, age, gender)

Results

A) Serbian citizens had an ambivalent opinion about science. They did not fully trust that scientists create objective and useful knowledge, nor that this knowledge is integrated in the policy making process (see table 1). B) The distrust in science scale was a valid measure of science skepticism in Serbia. As in the original research, two factors of science skepticism were extracted (principal component analysis, without rotation): trust in science general (explaining 45% of the variance), and science support for policy (explaining 28% of the variance)

(Table 1) (McCright, Dentzman, Charters, Dietz, 2013) C) We performed two regression analyses, one with the GTS as criterion variable and the other with the SSP. In both regression analyses all measured variables were listed as predictors. First regression analysis (with GTS as criterion variable) showed that all psychological variables, except social dominance, were significant predictors of general trust in science ($R^2 = .20$, $F(7) = 31.20$, $p < .01$). Media literacy had greatest predicting power ($\beta = .314$, $p < .01$). Only education was significant from the set of the sociodemographic variables. However the second regression analysis (with SSP as criterion variable) was less successful. Only political cynicism and social dominance were significant predictors of this factor, and none of the sociodemographic variables. They explained 7% of the variance ($R^2 = .07$, $F(3) = 26.381$, $p < .01$).

Table 1: Average score and factore loading for each item from the science support scale (scale from 1 to 5)

	Mean	SD	Factor 1 loadings	Factor 2 loadings
Scientists create accurate and unbiased knowledge.	3.45	1.12	.762	
Scientists create useful knowledge.	3.60	1.08	.762	
Scientists advise government officials about policies.	3.29	1.18	.764	
Scientists inform the public on important issues.	3.25	1.19	.721	
Science is too concerned with theory and speculation to be of much use in making concrete government policy decisions that will affect the way we live.	2.90	1.17		.720
Science is too influenced by the politics of scientist to be of much use in making concrete government policy decisions that will affect the way we live.	2.90	1.15		.761
Science is too influenced by government funding to be of much use in making concrete government policy decisions that will affect the way we live.	2.74	1.16		.525

Table 2: Correlation matrix for psychological variables

	1	2	3	4	5	6	7
Trust Sceince General (1)	1						
Science Support For Policy (2)	.231**	1					
Political Cynicism scale (3)	.102**	.083**	1				
Media Literacy scale (4)	.328**	.100**	.120**	1			
Social Dominance scale (5)	.017	.109**	-.047	-.052	1		
Trust in Institutions (6)	.119**	.039	-.368**	-.010	.093**	1	
Authoritarianism scale (7)	.004	.065*	-.092**	.037	.290**	.336**	1

Discussion and conclusion

Scientific advancement has had a lot of explicitly positive consequences on the overall human population wellbeing, and some minor controversial issues (experiments on animals). Despite that, research has shown moderate level of trust in science. Scholars suggest two streams of explanations of these findings: a) lack of knowledge and understanding leads to the lack of trust as arguing in science comprehension thesis (Sturgis, Allum, 2004); b) people tend to fit interpretation of science to their general

cultural ideologies as explained in cultural cognition thesis (Kahan, Jenkins-Smith, Braman, 2011). Further research could be focused on testing those assumptions, since studies do not reveal unambiguous confirmation of both models (Kahan et al., 2012).

Data on a probability sample in Serbia indicate science skepticism is rather evenly distributed through different socio-demographic groups; more endorsed among those who are also critical toward political system and government institutions; psychological variables as more successful in predicting GTS than SSP, showing media literacy as the best predictor of GTS. Citizens need to understand that science is not a company, but rather a process of systematic understanding of phenomena, for the benefit of humanity. Therefore results of this study uphold the need to restore humanities faith in science, so science can regain the global monopole of truth, enabling progress for the better society rather than for economical interest of most advantage groups.

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Right-wing Authoritarianism and Social Dominance Orientation as Predictors of Prejudice Towards Specific Social Groups

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Abstract

According to the dual process model, RWA and SDO predict distances to specific groups. While the RWA is a predictor of distance towards dangerous groups, SDO predicts distance to subordinate groups. Together, constructs predict prejudices against dissident groups. Problem of this research was the verification of this model in the Bosnian-Herzegovinian context. The sample consisted of 346 high school students (169 female respondents), who filled questionnaires of RWA, SDOs and attitudes towards groups. Factor analysis yielded three factors: dangerous, subordinate and dissident groups. The regression analysis showed that SDO predicted distance to the dangerous and subordinate groups, while the distance to the dissident groups was predicted dominantly by RWA, with a significant prediction by SDO. The results generally confirm the model of dual processes in our context. The implications of the study are discussed, with a focus on the influence of Bosnian context on the results.

Keywords: Right-wing authoritarianism, Social Dominance Orientation, prejudice, social distances

Introduction

We define prejudice as "positive or negative evaluation of the social group and its members" (Mackie & Smith, 1998). This paper examines the influence of right-wing authoritarianism and the orientation to social domination on prejudices.

Altemeyer defined Right-wing authoritarianism (acronym: RWA) as a characteristic of people inclined to subjugate authority and maintain social order (Altemeyer, 1998; Duckitt and Sibley, 2010). The RWA scale contains elements that measure three sets of attitudes: submissiveness, aggression and conventionalism (Altemeyer, 1998).

Social dominance orientation (acronym: SDO) refers to the individual tendencies to support the ideology of social domination (Sidanius, Pratto, van Laar & Levin, 2004). SDO points to the attitudes of the person towards the intergroup relations on the hierarchical-egalitarian continuum (Duckitt, 2001).

Although explored as separate constructs, RWA and SDO are theoretically and empirically intertwined. An important aspect of interweaving is the domain of prejudices, where they form over fifty percent variance in the explanation of generalized prejudices (Altemeyer, 1998; Sibley, Robertson & Wilson, 2006). Studies have shown that RWA is more

related to homophobia, unlike SDO (Sibley, Robertson & Wilson, 2006; Stones, 2006). Both constructs showed connection with sexism. (SDO with hostile sexism, RWA with hidden sexism, Whitley, 1999; Christopher & Wojda, 2008). RWA is a better predictor of ethnocentric, while SDO is a better predictor of racist attitudes (Whitley, 1999; Van Hiel & Mervielde, 2005).

Based on these results, Duckitt and Sibley (2007) researched the differential effect of RWA and SDO on prejudices. Authors used factor analysis to determine specific groups, dubbed threatening, subordinate, and dissident. The prejudice to the first is predicted by RWA, second by SDO, the third by both constructs (Duckitt & Sibley, 2007).

The problem is that the results are obtained in the Anglo-American cultural context, which affects the generalization of the results. Research has shown different interaction of the constructs in societies that differ in socio-political conditions (correlations are larger in countries with sharper political divisions like the countries of Europe, see Ciarrochi & Leeson, 2011; Cohrs & Asbrock, 2009; Duckitt, 2001; Van Hiel & Mervielde, 2005). In addition, replication studies are scarce, and given the discussion about the importance of replicating research (Earp & Trafimow, 2015), we encounter a double problem with these findings: the lack of replicative studies and the impossibility of cross-cultural generalisation. Since Bosnia and Herzegovina belongs to the continental-European cultural milieu and has a history of harsh political divisions, and concerning the importance of replicating research in psychology, we propose the following hypotheses:

1) *SDO better explains distances to groups that are perceived as low-status groups but not as threatening, rather than RWA.*

2) *RWA better explains distances to groups that are perceived as threatening to social order and stability, rather than SDO.*

3) *SDO and RWA participate equally in explaining distances towards groups that are perceived as dissident (low status and threatening).*

Method

The research is replicative, survey type study. It is quantitative and correlative. The survey was conducted on a sample of 346 high school students (169 female) from two

cities (Banja Luka and Prijedor) in Republika Srpska, aged between 15 and 19 years old, with average age being $M = 17.38$ ($SD = 1.11$).

Variables and instruments

Right-wing authoritarianism was operationalized using a 5-point scale, Likert's type, based on the authoritarian scale of well-known researchers and adapted through Todosijević's (2013) research. The reliability of the scale is $\alpha = .83$.

Social dominance orientation is operationalized using a scale based on a 5-point SDO scale and consists of two subscales, Egalitarianism and Social domination Todosijevic, (2013).

Dependent variables in the research are attitudes towards different groups, tested with an affective thermometer (from 0 = cold to 10 = warm). In this research, an assessment of

attitudes towards 14 groups will be made: Immigrants, mentally challenged, psychiatric patients, homosexuals, terrorists, violent criminals, housewives, drug dealers, drug addicts, social system critics, marijuana legalization lawyers, prostitutes, fighters for the rights of LGBT population, feminists.

Statistical data processing

Descriptive statistical measures included the average scores on the RWA and SDO constructs at the level of the entire sample.

Principal component analysis was conducted on affective thermometer questionnaire, and the differential effect of RWA and SDO on the prejudices against these components was evaluated with the multiple linear regression procedure.

Results

Table 1. Descriptives for RWA and SDO

	M	SD	Sk	Ku
Egalitarianism	2.74	.77	.06	-.21
Social dominance	3.77	.81	-.98	.97
Authoritarianism	3.40	.62	-.16	.86

Principal Component Analysis (PCA)

Direct Oblimin rotation was used. The existence of three superior components has been verified: dangerous, subordinate and dissident groups. The invoice data is determined. This solution explains a total of 50.12% of the variance, with the first explaining 22.65%, the other 18.00%, and the third component explained 9.48% of the

variance. The dangerous groups component was made up by: Violent criminals, drug addicts, drug dealers, prostitutes, marijuana legalisation activists and terrorists. Housewives, psychiatric patients and mentally challenged entered the component of the subordinate group. The dissident group component was made up of: homosexuals, LGBT activists, immigrants, feminists and system critics.

Regression analysis

Table 2. Prediction of prejudice towards groups with RWA and SDO expressed with beta coefficients and percent of explained variance

	Dangerous groups	Subordinate groups	Dissident groups
Authoritarianism	***	***	B = -.33*
Social Dominance	$\beta = -.27^*$	$\beta = .23^*$	B = .17*
Egalitarianism	***	***	***
variance (%)	11.30	4.80	14.80

*significant on 0.01 level ***no significant prediction

Discussion

Examination of the differential effect of RWA and SDO on prejudice has shown that the "subordinate group" component is positively predicted by the dimension of social domination. This phenomenon is a product of the observation of these groups as helpless and harmless, and the patronizing attitude towards them (Sidanius et al., 2016)

What completely deviates from the data we replicated is the prediction of distance to dangerous group. Although the main predictor should be authoritarianism, it's the dimension of social domination. The explanation of this can be found in the theory of social domination applied to the BiH context. Namely, individuals, regardless of their position in society, tend to maintain the social hierarchy. Certain groups within the "dangerous group" factor can be interpreted as groups that seek to rapidly change their position upward in the hierarchy, if we look at the economic aspect. Due to the nature of the transition period, we can hypothesize that crime is not perceived to such an extent as dangerous to societies values, but threatening to the hierarchy, an important developmental atavism of the society we live in. Therefore, by perceiving these groups as threatening to hierarchy, and therefore repulsive and undesirable, it is possible to explain the prediction of the distance to these groups by the dimension of social domination (Sidanius, Cotterill, Sheehy-Skeffington & Kteily, 2016).

Lastly, the distance toward dissident group component, was predicted by Authoritarianism and Social dominance. When we look at the groups that make up this factor, it's noticeable that they are particularly repulsive to conservative-fundamentalist authoritarians (Sibley et al., 2006; Stones, 2006; Whitley, 1999).

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Cognitive and Emotional Predictors of Religious Orientations

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Abstract

Need for Cognition (NFC) and Emotional processing (EP) are constructs which were correlated with various psychological functions. In this research we examined the connection of these constructs with Religious Orthodoxy (refers to tendency to evaluate religion in a more literal, dogmatic way) and Quest (refers to tendency to approach religion in a critical, more profound way). We postulated that individuals who are less cognitively involved and better in emotion processing are also more prone to religious Orthodoxy and less prone to religious Quest (and vice versa). Study was conducted on a sample of 400 university students and was quantitative and correlative. In results we evaluated the relations between constructs. Analysis partly confirmed our predictions. Although Need for Cognition predicted Quest and Orthodoxy in an expected manner, Emotional processing was not a significant predictor of neither Religious Quest nor Orthodoxy, which we attributed to different natures of these constructs.

Keywords: Religious Quest, Religious Orthodoxy, Need for Cognition, Emotional processing

Introduction

Individuals can approach religion on different levels of complexity, from literal interpretation of religious texts to a more complex examination of existential dilemmas through the prism of religiosity. Preference for these different approaches to religious contents was postulated in constructs named Orthodoxy and Quest. Orthodoxy describes tendencies towards rigid, dogmatic thinking and literal interpretation of religious teachings (Duriez, Fontaine & Hutsebaut, 2000). Quest, on the other hand, describes an approach to religiosity which is more critical and explorative, and individuals with this kind of approach are more prone to question religious teachings and draw their own conclusions (Batson & Schoenrade, 1991).

Religious orientations such as Orthodoxy and Quest represent specific ways of interacting with religious content. To find the psychological basis for Orthodoxy and Quest, we examined the relation of these constructs with Emotional Processing (EP) and Need for Cognition (NFC) as means of approaching emotional events and cognitive tasks in general.

EP refers to processes that enable individual to deal with disruptions in emotional functioning in a way that will not interfere with other experiences and behaviors (Baker, Thomas, Thomas & Owens, 2007; Baker et al., 2010), while NFC refers to one's proclivity for engaging in and finding

pleasure in thinking and analyzing (Cacioppo, Petty & Kao, 1984).

Research indicates that individuals who are more oriented to religious examinations are more prone to emotional distress and mental health issues (Johnson & Hayes, 2003; Hunsberger, Pratt & Pancer, 2002), which could be an indicator of a less developed emotional processing ability.

On the contrary, research connecting Quest with cognitive processing indicates that those who examine religious questions with more rigor also have more complex reasoning and tend to think and analyze the world around them more (Batson & Raynor-Prince, 1983).

Individuals who accept religious teachings seem to also showcase more adequate emotional processing skills. Emotional shocks seem to be less disturbing to their daily lives, with religion serving as a buffer, and thus, they are less likely to reexamine their beliefs (George, Ellison & Larson, 2002; Koenig, McCullough & Larson, 2001). These individuals also showcase more rigid cognitive style, prefer predictable outcomes and tend to approach life questions in a simplified manner (Schwartz & Huismans, 1995).

Above mentioned results indicate that tendencies to approach religious experiences and behaviors in specific ways is related to general tendencies in approaching emotional and cognitive tasks. Therefore, the purpose of this research is to explore whether Orthodoxy and Quest, as religious orientations can be predicted from EP and NFC.

Considering the previously written, we propose following hypotheses:

- 1) *Individuals who better process emotions will be a) less prone to reexamination of their religious views and b) tend to be more rigid in their interpretation of religion*
- 2) *Individuals higher in their need for cognition will more readily a) question their religious views and b) be less prone to interpret religion in a literal sense*

Method

Survey was conducted on a 400 participants from Republic of Srpska (75% female). Most respondents were university students (392 respondents) and the rest were high school students.

Variables and instruments

In this paper we used a revised scale of Emotional Processing (EPS) with 25 items and 5 factors (Suppression, Unregulated emotions, Avoidance, Impoverished emotional experience,

Signs of untamed emotions; Baker et al., 2010). The reliability of the EPS scale was $\alpha = .874$.

The NFC testing was carried out using the NFC scale (18 items) by Cacioppo, Petti, & Kao (1984), and a five-step Likert type scale was used for this research. The reliability of the NFC scale was $\alpha = .718$

Quest scale consisted of 12 items (Batson & Schoenrade, 1991), while the Orthodoxy Scale, with 6 items by Duriez et al (2000), was used to test literal religiosity. The reliability of the Orthodoxy scale was $\alpha = .826$, and the Quest scale, after elimination of the unnecessary items, was $\alpha = .705$.

Statistical analysis

Descriptive statistical measures included the average scores on the NFC, EPS subscales, Orthodoxy and Quest scales at

the level of the entire sample. Effect of NFC and EPS scales (individual and total) on Religious Orthodoxy and Quest was evaluated by the multiple linear regression procedure.

Results

Table 1 presents the results of descriptive statistics (mean and standard deviation) for the variables NFC, EPS, Quest and Orthodoxy.

We can see higher average scores on the NFC scale and lower average scores on Impoverished Emotional Experience subscale of EPS. The rest of the results are close to scale average.

Table 1: Descriptive statistics of research relevant scales

Scales	M	SD
Need for Cognition	3.37	0.52
EPS Suppression	2.75	1.01
EPS Unprocessed Emotions	3.00	0.74
EPS Unregulated Emotions	2.66	0.86
EPS Avoidance	3.07	0.85
EPS Impoverished Emotional Experience	2.43	0.94
Quest	2.89	0.68
Orthodoxy	2.75	0.88

Regression analysis was used to verify the influence of NFC scale and EPS subscales on the prediction of Quest and Orthodoxy. Preliminary analyses have shown that the assumptions about normality, linearity, multicollinearity and homogeneity have not been violated. The data is presented in Table 2. We can see that NFC is a significant

predictor of both Quest and Orthodoxy, and EPS subscales fail to make a predictive impact on either of religious scales.

Table 2: Prediction of Quest and Orthodoxy with EPS subscales and NFC scale with linear regression analysis

	Quest		Orthodoxy	
	β	p	β	p
EPS Suppression	-.03	.58	-.08	.20
EPS Unprocessed Emotions	.10	.16	.02	.60
EPS Unregulated Emotions	-.07	.25	.05	.45
EPS Avoidance	.09	.07	.10	.07
EPS Impoverished Emotional Experience	.08	.19	.03	.68
Need for cognition	.22	.01	-.20	.00
$R^2 = .043, F = 2.946, p < .01$		$R^2 = .065, F = 4.504, p < .01$		

Discussion

Considering the obtained results, we can see a significant prediction of tendency to analyze one's religious views more analytically (represented with Quest scale) by the more general tendency to engage in thinking and analyzing (represented with Need for Cognition scale). This is in line with empirical results that indicate people who are more prone to think in a more analytical way, process the inputs more thoroughly and draw their own conclusions are also more inclined to tackle existential questions head on and question their spirituality beyond what religious dogmas say (Bahçekapili & Yilmaz, 2017). Individuals who show a more pronounced need for cognitive action were also less likely to be rigid and dogmatic in their religious orientation (represented with Orthodoxy scale), as shown in this study. This is in line with ideas presented in the introduction.

Relation between the emotional processing and religiosity scales in this study is more eluding. Emotional Processing subscales were not significant predictors of either religious Quest or Orthodoxy. Although these results are surprising at first, looking at the nature of Quest and Orthodoxy constructs sheds more light on these results. These constructs are more cognitive in nature and more concerned with thoughts on religious experiences and teachings. Also, as implicated in previous research, religion can serve as a protection against emotional distress and thus, can positively modify reactions to emotional events. This implicates that religiousness could be a predictor of emotional reacting, not the other way around.

In conclusion, this study is a contribution to the body of research positively connecting the readiness to engage in critical thinking with a more analytical approach to religiosity. Future research should address the interaction between Emotional Processing and religious orientations, with attention on potential mediators, such as mindfulness meditation (Emmons, 2005) to better explain the relation between these constructs.

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The Role of Crowding in Youth's Perception of Pleasantness in Public Transport

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Abstract

Efficient, reliable and pleasant public transport is central in sustainable mobility planning. However, in spite of recent efforts to improve and modernize the experience of bus transport, the number of passengers in Ljubljana is slowly but steadily declining. Present research looked into the commuting experience of university students (representing roughly a third of bus passengers in Ljubljana), hoping to better understand the effect of environmental and psychological factors in their public transport usage rates and loyalty. Specifically, we focused on how they define crowding, and how it affects their perception of commute pleasantness. Most of the participants experienced crowding daily and rated it as one of the most unpleasant environmental factors, surpassed only by delays (other highly unpleasant factors include stale air, malodor and unsafe driving). The highest consensus in the proposed definitions of crowding were those defining it as the time when no new passengers can easily board the bus, when the driver turns on the audio notifications, and when other people are touching the respondents. The perceptions of crowding's unpleasantness and frequency were both correlated negatively with the overall pleasantness of the commute, suggesting further improvements should also be focused on reducing the density of passengers by increasing the frequency or capacity of the buses.

Keywords: public transportation; buses; crowding; college students; environmental psychology

Introduction

With rising environmental concerns and recent daily struggles with traffic congestions, dysfunctional P+R system, and scarce car-parking options for people living or working in Ljubljana, the importance of efficient, reliable and pleasant public transport is central in environmentally sustainable mobility planning (Milovanovič, 2017; Vrčko, Pelko, & Jurman, 2017). This is especially true as perceived pleasantness and satisfaction are linked directly to higher usage and loyalty to the public transport (Carreira et al., 2014), however, research conducted in the specific local context of Ljubljana in scarce.

Even though Ljubljana was awarded the European Green Capital title by the European Commission in 2016, recognizing the effort of local authorities in achieving high environmental standards and their dedication to sustainable development (EGP, 2016), the number of public transport passengers is steadily declining in the past years (LPP, 2017a; 2019). In response, the officials have been working hard to

improve the infrastructure and promote bus transport by replacing the older diesel vehicles, altering routes, and promoting monthly tickets (i.e., focusing on infrastructure and ecology; LPP, 2017b), while failing to assess specific factors, which is encouraged in the field (e.g., Tyrinopoulos & Antoniou, 2008). The latter is of great importance as people's commuting decisions are based on myriad of factors, with psychological ones being central in their commuting decisions (Van Lierop, Badami, & El-Geneidy, 2017).

Among those, crowding specifically was found to have great influence on both the overall perceived pleasantness, but also perception of other psychological aspects of the commute, such as perception of time spent commuting (Tirachini et al., 2017). In turn, crowding can thus also influence the choice of bus as a mean of transport and contribute to loyalty in the future (Mohd Mahudin, Cox, & Griffiths, 2011; 2012; Haywood, Koning, & Monchambert, 2017).

Arguably the most important segment of passengers in terms of their potential to develop loyalty to public transport is students and youth, representing roughly a third of all the yearly passengers in Ljubljana. As little research has been conducted to date with this demographic (which is specific in terms of their physical abilities, income, schedule etc.), even in global scale, we focused on their perceptions of bus transport and crowding. We hypothesized crowding will be frequent and perceived as highly unpleasant. Further, we expected both its frequency and perceived unpleasantness to be related to the lower overall pleasantness of the commute and more negative perceptions of other aspects of commute.

However, as no consensus is offered on how to define crowding (Li & Hensher, 2013; Tirachini, Hensher, & Rose, 2013), we also aimed to detect how students define it in local context. Moreover, as some suggest not all passengers are affected equally by crowding (Börjesson & Rubensson, 2019; Tirachini et al., 2017) we were interested in whether different groups of youth also exist in regards to unpleasantness of specific factors and their mobility behaviours and explore their experiences with crowding.

Method

Participants

The sample consisted of 127 participants ($M_{age} = 23.5$, $SD = 2.7$), mostly students (73.3%; others were

professionally active or unemployed). They all lived in Ljubljana ($M = 2.3$ years, $SD = 0.5$), and most commuted during peak hours.

Measures and procedure

Data was collected online, using the web platform Ika. Participants reported their demographics (e.g., age, gender, field of studies, how long they have lived in Ljubljana), and their mobility (e.g., how they commute, how often they use buses, when and which lines they take, duration of their daily commute). Furthermore, they rated perceived unpleasantness of a range of factors, and agreement with each of the proposed definitions of crowding, using a 5-point scale. Both lists were drawn from the responses of a 10-member pilot group and literature (Efthymiou et al., 2014; 2018; see Tables 1 and 2). They also reported the frequency of experiencing each of the factors/definitions and overall pleasantness of their commute.

Results

Defining and experiencing crowding

Participants reported frequent crowding: 18% report crowding in every commute, 39% every day and 21% more than once a week. Frequency of crowding correlated positively with the duration of commute ($r = .21$, $p = .031$), frequency of bus travels ($r = .30$, $p = .002$), and moderately negatively with perceived pleasantness ($r = -.24$, $p = .017$).

Based on when they mostly use the bus, we segmented the participants into three groups: peak time only commuters (15.5%), rare/afternoon commuters (43.7%) and time dispersed commuters (using the bus in no particular pattern; 40.8%). As would be expected, more crowding was perceived in dispersed-time and peak hour only commuters ($F(2, 100) = 12.07$, $p < .000$, $\eta^2 = .19$).

The highest consensus among definitions of crowding was with *new passengers cannot easily board the bus* (99%), *there are more people standing than sitting* (98%), *the driver turns on the audio notification, asking people to move to the back of the bus* (96%), and *people are touching me* (95%). See Table and Figure 1 for detailed results.

Table 1: Consensus and agreement for each of the definitions of crowding

Definition	Consensus*	<i>M</i>	<i>SD</i>
New passenger cannot easily board the bus.	99	4.86	0.56
There are more people standing than sitting.	98	3.97	1.13
Other people are touching me.	96	4.32	1.05
The driver turns on the audio notification, asking people to move to the back of the bus.	95	4.34	1.05
There are people in my personal space.	93	4.08	1.12
I cannot see through the window.	90	3.44	1.24
There are some people standing (they have nowhere to sit).	74	2.68	1.36
All the seats are full.	71	2.50	1.32

*Percentage of participants who agree with the definition of crowding

Crowding and perceived pleasantness of commute

Overall perceived pleasantness of commute was mild ($M = 4.07$, $SD = 1.42$), and was lower in those changing lines ($t(103) = -2.04$, $p = .04$, $d = -0.40$) or commuting longer ($r = -.33$, $p = .001$). The factors they perceived as most unpleasant were delays ($M = 4.36$), crowding (4.16), stale air (4.16), and malodour (4.11). Perceived unpleasantness and frequency of crowding were also positively correlated with perceived unpleasantness of some of the other surveyed factors (see Table 2 for detailed results).

Based on what they found most unpleasant, we assigned the passengers into 6 groups using cluster analysis: moderate (18%, indifferent to the environmental factors, such as heat, crowding, and stale air, but bothered by drive related factors, such as frequent stops and dangerous driving); drive oriented (16%, bothered by drive related factors), busy-bees (6%, time sensitive, and bothered by whatever prolonged their

commute), carefree (6%, nothing is unpleasant), environmentalists (23%, bothered by environmental factors), and dissatisfied (31%, both environmental and drive factors perceived as unpleasant).

We observed between group differences in perceived pleasantness ($F(5, 97) = 5.34$, $p < .000$, $\eta^2 = .22$) and frequency of crowding ($F(5, 97) = 2.51$, $p = .035$, $\eta^2 = .11$): environmentalists and dissatisfied commuters perceive lower pleasantness than carefree, and dissatisfied commuters perceived crowding in their commute more often. Furthermore, environmentalists and dissatisfied passengers find crowding more unpleasant than moderate and carefree passengers ($F(5, 97) = 4.74$, $p < .001$, $\eta^2 = .20$), while those who perceive crowding as more unpleasant, also experience it more frequently ($r = .31$, $p = .001$), and perceive their commute as more unpleasant ($r = -.31$, $p = .001$). The latter correlation persisted even after controlling for the frequency of experienced crowding ($r = -.26$, $p = .004$).

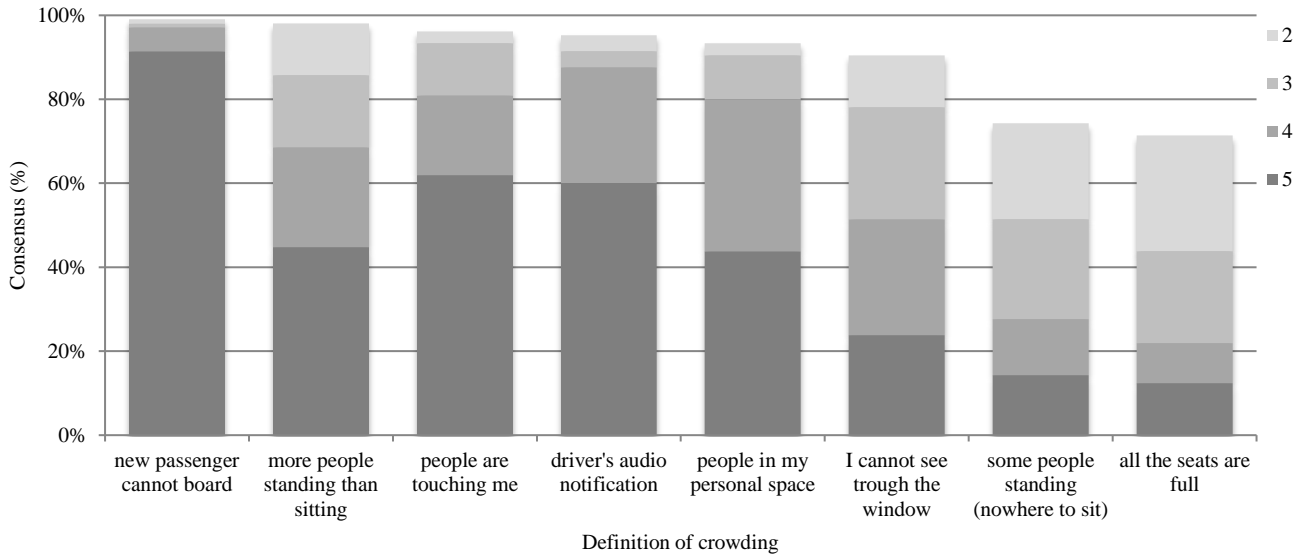


Figure 1. Distribution of agreement scores for each of the definitions of crowding (2 – I somewhat agree, 5 – I strongly agree).

Table 2: Perceived unpleasantness of the surveyed factors and their correlations with perceived unpleasantness and frequency of crowding

Factor	<i>M</i>	<i>SD</i>	<i>r</i> _{unpl.}	<i>r</i> _{frequency}	Factor	<i>M</i>	<i>SD</i>	<i>r</i> _{unpl.}	<i>r</i> _{frequency}
Delays	4.36	0.87	.22 *	.14	Driver's bad attitude	3.38	1.27	.17	.11
Crowding	4.16	0.95	—	.31 ***	Proximity to others	3.32	1.26	.46 ***	.28 **
Stale air	4.16	1.11	.38 ***	.21 *	(Un)cleanliness	3.30	1.15	.25 **	.19 *
Bad smell/malodour	4.11	1.14	.35 ***	.15	Touching the poles/buttons	3.17	1.31	.22 *	.25 *
Dangerous driving	4.09	1.06	.20 *	.16	Stickers on the windows	2.30	1.52	.03	.06
Frequent stops	3.89	1.09	.26 **	.34 ***	Payment options	2.11	1.35	.02	-.06
High temperatures	3.78	1.21	.20 *	.21 *	Sitting in the direction, opposite to driving	2.00	1.32	.22 *	.18
Waiting at the station	3.45	1.01	.12	.12	Ticket controls	1.97	1.10	.07	.29 *
Timetable	3.45	1.19	.16	.14	Sound alerts	1.48	0.84	-.00	.13

Note: Higher mean score corresponds to higher perceived unpleasantness (5-point scale). **p* < .05, ***p* < .01, ****p* < .001

Discussion

As expected, crowding was perceived often and was highly unpleasant (only delays were perceived as more unpleasant). Both frequency and perceived unpleasantness of crowding were linked to more negative perception of commute pleasantness. Based on what our participants found most unpleasant, there were differences between subgroups in how frequently they experienced crowding and how unpleasant it was for them, supporting previous findings from general population which focused on demographic, rather than commute-related characteristics of different subgroups (Börjesson & Rubensson, 2019; Tirachini et al., 2017). Furthermore, those who perceived crowding as more unpleasant or experienced it more frequently were more likely to be also bothered by other aspects of their commute.

As our research was correlational, the results cannot be interpreted as causal (negative) effects of crowding on perception of specific aspects of commute, however they suggest that the role of crowding could be more complex than crowding simply being one of the assessed factors. Further experimental or in situ research is thus needed in order to assess whether crowding and other aspects are all influenced by common psychological traits of the passenger or whether crowding itself can negatively influence the perception of other aspects of commute.

With high consensus on different definitions of crowding, the results support the notion of its subjectivity (Li & Hensher, 2013). However, regardless of their definition, participants reported of frequent crowding, perhaps also suggesting one clear definition is not even needed.

The results also showed that the perception of pleasantness could be affected not only by drive-related and environmental factors (many were rated relatively high on unpleasantness), but also those, related to participants' mobility behaviours (e.g., length of the commute, changing lines), which were not yet addressed thoroughly in the literature. Moreover, most likely due to the modernization effort of LPP's fleet, the vehicles themselves are not perceived as unpleasant (e.g., cleanliness), suggesting further improvements should indeed focus primarily on improving the commute experience by reducing the density of passengers, increasing the frequency of the buses or increasing their capacity, all found to be strong predictors of public transport loyalty (Val Lietrop et al., 2017).

Since the sample in the present study was specific, we must be cautious when making inferences. However, the segment of youth passengers is important for building loyalty and retaining high bus usage rates in their adult life, thus warranting the research interest. In future, researchers should also look into motivational factors of bus usage (e.g., image of the company/buses, perceived value, one's environmental orientation) and differences in perceived pleasantness of commuters on specific lines, as lines differ significantly both in frequency and number of passengers. Similarly, as mobility behaviours and schedules differ significantly between age groups (e.g., using the bus primarily during vs.

after peak hours, when buses are less frequent), other age groups, such as working population and elderly, should also be included. This would offer better insight into the interplay of crowding and other factors in affecting the satisfaction of passengers, hopefully providing evidence for more focused policy planning.

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Exploring the multidimensionality of active citizenship: A preliminary study

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Abstract

Online communication is becoming a prevailing way of interaction, sometimes even substituting face-to-face interaction, and transforming active citizenship into an online engagement. In our preliminary study, we aimed to identify various domains of citizenship practices and explore whether they mirror the online/offline divide or converge into a single spectrum. The Slovenian emerging adults reported about the frequency of their engagement in online (e.g., commenting, sharing articles or posting civic content on social media, signing petitions) and offline (e.g., attending protests and meetings that benefit society) activities. The surveyed activities did not converge into a single dimension and they grouped beyond a mere online-offline division. We also noted that civic engagements in both online and offline settings were relatively scarce as almost a quarter of the participants reported they had never engaged in any form of active citizenship behaviour. However, a small percentage reported on frequent engagement across most of the activities considered. Further studies should consider the multidimensionality of civic engagement to provide a better insight into emerging adults' reasons for civic (non)engagement, focusing on the group of highly engaged individuals, and possible effects of their personality and living conditions on their online and offline civic activities.

Keywords: civic engagement; community involvement; online/offline activism; emerging adulthood; university students

Introduction

Over the last decade, digital (online) communication has become a prevailing way of interaction that gradually substitutes more traditional (e.g., face-to-face) engagements. The prominence of digital communication is especially visible in the field of civic engagement. A wide range of interest groups is formed on social media (SM), social issues are debated online and petitions are signed, which emulates civic behaviours once engaged in "offline", and possibly results in real life activities (e.g., 2012 anti-government protests in Slovenia, 2016 civil riots in Bosnia and Herzegovina, and 2018 protests in Serbia were all initiated and/or coordinated through online platforms).

Accordingly, research has recently documented a notable decline of offline active citizenship behaviours, which may have been gradually replaced by the respective online engagements (Bermudez, 2012; Metzger et al., 2015), even

though the skills and resources needed to engage in civic activities offline versus those online differ. The former could be constrained by parents, teachers or financial resources, whereas online participation is not (Kann et al., 2007). Yet, the online activities require computer skills (digital literacy) and access to the Internet.

In general, young people are digitally fluent and could engage in online activities easily. However, the shift from offline to online civic engagement may not be straightforward. Both modes of participation are correlated and have been proposed to converge into a single measure of civic activity (Hirzalla & van Zoonen, 2011). An activity in one domain can namely lead to an increase in another one (Boulianne, 2015; Calenda & Meijer, 2009; Calenda & Mosca, 2007; Gil de Zúñiga et al., 2010).

Further distinction of civic activities could be made in terms of involvement (Brunsting & Postmes, 2002), both online and offline. Some require little or no effort (e.g., commenting or sharing content on SM), while others demand substantially more time and involvement, even knowledge, research, and evaluation of accessible information (e.g., starting a petition, writing a blog).

In Slovenia, political activation of youth has been diminishing (Flere, Klanjšek, & Rutar, 2019), but little is known about the broader scope of civic involvement either online or offline. As civic engagement varies between ethnic groups and is country-specific (Jugert et al., 2013), we aimed to explore: (i) the multidimensionality vs. unidimensionality of civic engagement activities, and (ii) the incidence, frequency and relevance of various online and offline civic engagement activities in Slovenian emerging adults.

Method

Participants

The convenience sample consisted of 212 Slovenian emerging adults (64.6% female), aged between 19 and 29 years ($M = 22.1$, $SD = 2.06$). Most of them were university students (89%), predominantly psychology and educational science students, who were asked to participate and invite additional participants.

Instruments and procedure

The data was collected using an online questionnaire. A list of potential online and offline practices was formed (Table 3), and emerging adults reported about the frequency of their engagement in each activity (1 – never, 5 – very often). In this way, we collected data on how often they engaged in various civic activities, overcoming limitations of previous studies (Milošević - Đorđević & Žeželj, 2017). In addition, we collected the participants' demographic data (age, gender, field of studies).

Results

Using exploratory factor analysis with minimum residual estimator, we examined whether the surveyed activities grouped into separate dimensions. As we expected correlations among the potential dimensions, we used a promax rotation. The results indicated 4 dimensions (see Table 1 for the four dimensions, their mean scores and internal consistencies), explaining 62.6% of the variance ($RMSEA = .061$, $CI = .021-.076$, $\chi^2(24) = 43$, $p = .010$, $TLI = .96$). The loadings of items on the respective factors were satisfactory (above 0.4) and no cross loadings were observed (see Table 3 for surveyed activities and respective item loadings). However, signing petitions and contacting public servants by e-mail did not load significantly on any factor and were thus excluded.

We compared the 4-factor to a single factor solution (41.3%, $RMSEA = .155$, $CI = .139-.161$, $\chi^2(77) = 462$, $p < .001$, $TLI = .66$), proposed in some previous research (e.g., Hirzalla & van Zoonen, 2011). The 4-factor solution provided a better fit to the data, and explained a larger portion of the variance, even though the correlations between the dimensions were moderate to high (Table 2).

To explore the prevalence of specific activities, the sample was divided into three groups, based on their level of engagement: not active (never engaged in any of the surveyed activities, 23.1%), occasionally active (engaged at least once in at least one activity, 62.3%), and very active (very often engaged in at least one activity, 14.6%). The overall engagement was higher online (70%) than offline (52%). We observed no gender differences in group membership regarding the level of activity (not, occasionally or very active; $\chi^2 = 1.74$, $p = .419$), yet females reported on a high level of engagement less frequently than males ($t(210) = 2.35$, $p > .020$, $d = 0.34$). The number of activities correlated with the frequency of engagement — those participants who

Table 1: Mean scores and internal consistency of the dimensions of online and offline civic activities.

	α	M	SD
Social media engagement (SME)	.83	1.41	0.72
High-engagement activities (HEA)	.79	1.12	0.43
Commenting (C)	.81	1.59	0.67
Rallying (R)	.72	1.55	0.77

Note: The scale scores were calculated as an average score per item

Table 2: Correlations between the dimensions of online and offline civic activities.

	SME	HEA	C	R
SME	—			
HEA	.53	—		
C	.64	.54	—	
R	.42	.48	.48	—

Note: All $ps < .001$.

engaged in more activities also engaged more frequently ($\tau = .87$).

The highest percentage of participants reported signing petitions (56.6%), followed by attending a societal event (42%) and sharing political content on SM (34.9%). Although more than a half of the participants engaged in signing petitions at least once, its average frequency score was the lowest ($M = 2.39$), whereas participation in forums with political or societal content had the highest average frequency score ($M = 3.15$). See Table 3 for details.

Discussion

Medium to high correlations among the four civic engagement dimensions suggest the presence of general civic activism. However, we also revealed different civic engagement domains that spread beyond the online-offline split. The proposed four dimensions/scales differ in terms of mode and level of engagement, and show better fit than the one-factor solution, suggesting the need for considering both aspects of civic engagement (namely level of involvement and mode of participation) in future research and policy planning.

The results of our preliminary study on online and offline civic activities further showed considerably restricted civic engagement of the participating emerging adults in our sample. Even the participants who engaged in any of the listed activities did so only occasionally. However, some participants reported their engagement across all the surveyed activities, and those who engaged in more activities at least once also practiced them more frequently.

In explaining the relatively poor civic engagement of emerging adults in Slovenia as compared to the civic engagement of youth in the western Balkan regions (Flere et al., 2019; Milošević-Đorđević & Žeželj, 2017), we have to consider the fact that the political climate in Slovenia is quite favourable, and the feeling of anomie is relatively prevalent in the Slovenian youth (Flere et al., 2019), which may both contribute to less civic activation.

Further research and policy planning should thus reach beyond digital citizenship, and consider both cultural characteristics and multidimensionality of civic engagements. We also suggest focusing on how relevant specific domains (e.g., social and environmental issues) are for the participants' activation, and to include some additional (offline) civic activities, such as boycotting, spreading political messages with t-shirts or badges, and volunteering. We should also explore how the more active participants differ from those who are less active,

Table 3: Factor loadings, percentage and frequency of engagement in surveyed activities.

Dimension	Factor loading	Activity	Ever engaged	M^*	SD
C	.71	participating in forums	29.25%	3.15	1.03
C	.82	commenting news	25.94%	3.13	1.49
HEA	.86	organising petitions	4.25%	3.02	0.97
R	.62	initiating societal events	28.77%	2.93	1.07
HEA	.42	writing a blog	7.08%	2.80	0.83
HEA	.62	organising protests	7.08%	2.73	0.91
C	.54	responding to blogs	24.06%	2.73	1.17
SME	.73	longer posts on SM	17.45%	2.72	0.89
SME	.97	posts/comments on SM	21.70%	2.64	1.03
R	.48	participating in protests	22.17%	2.61	0.94
		contacting public servants	10.85%	2.51	0.85
R	.73	attending events	41.98%	2.49	0.83
SME	.57	sharing content on SM	34.91%	2.47	0.64
		signing petitions	56.60%	2.39	0.66

Note: SM = Social media engagement, HEA = High-engagement activities, C = Commenting, R = Rallying. Two of the activities did not load significantly on any of the dimensions (factor loading < .4). *Mean frequency scores of the engagement of the participants who engaged in the respective activity at least once.

which factors influence their engagement (e.g., personality, SES, living conditions), and how to use such findings in promoting engagement in civic activities among youth.

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The Strategies of Interethnic Interaction in Serbia

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Abstract

The aim of this article is to present the results of the empirical research of interaction strategies between ethnic groups who live in Serbia, but who experienced the interethnic conflict, namely, between the Serbs as a majority population and Bosniaks and Croats as ethnic minorities. Interaction strategies are a set of attitudes and behaviors which express readiness for interaction with other ethnic group on individual and group level. In our study, we have found that the Serbs and Croats favor multiculturalism / integration strategy, while the Bosniaks favor separation and integration. Melting pot / assimilation and exclusion / marginalization are not desirable strategies of any group. The results indicate that there is a psychological basis for improving interaction among ethnic groups in Serbia, as most of them are ready to integrate. Nevertheless, Bosniaks tendency to separate can be an issue on the way to develop tolerance between groups, as it is not a desirable strategy among Serbian majority.

Keywords: strategies of interethnic interaction; ethnic minorities and majority, integration, multiculturalism

Introduction

The strategy of interethnic interaction is understood as a set of attitudes (preferences) and behaviors (intentions and outcomes), concerning the way ethnic groups wish to interact in a plural society (Berry, 2005). Based on identity maintenance and participation in dominant culture, there are different strategies: monistic, pluralistic and interactionistic assimilation (Taft, 1957), personal, cultural and institutional absorption (Eisenstadt, 1954), integration, assimilation, segregation, genocide (Bochner, 1982); integration, assimilation, separation, marginalization (Berry, 1997), assimilation, multiculturalism, collective actions to maintain cultural heritage, maneuvering with identity (Moghaddam, 1988); multiple inclusion, assimilation, segmentation, marginality (Esser, 1999), consonant, dissonant and selective acculturation (Portes & Rumbaut, 2001).

It was assumed that assimilation strategy suits both for the immigrants and the host society (Park, 1950; Eisenstadt, 1954; Gordon, 1964; Esser, 1999). Immigrants, or ethnic minorities, continuously lose their cultural identity and start to identify with the dominant culture, by adapting to its values, customs and behavior patterns (Park, 1950). Imposed assimilation, known as „melting pot“, often results in discrimination and intolerance (Moghaddam, 1988).

Therefore, researches of the acculturation model proposed an “*integration hypothesis*” (Ataca & Berry, 2002; Berry, 1997; Berry, Phinney, Sam, & Vedder, 2006; Berry & Sabatier, 2011; Nguyen & Bennet-Martinez, 2013; Ward,

Okura, Kennedy & Kojima, 1998), which means that maintaining ethnic culture, while obtaining dominant culture values and interacting with the majority, leads to psychological well-being and socio-psychological adaptation. *Separation* (maintaining ethnic culture and refusing dominant culture) and *marginalization* (refusing both cultures) lead to psychological disadaptation and psychosomatic disorders. Therefore, it is the integration that gives positive outcomes and harmonic bicultural identity, so called „constructive marginality“ (Bennett-Martinez, 1993).

Integration can be successfully implemented only if it meets „acculturation expectations“ of the ethnic majority: multiculturalism, melting pot, segregation, exclusion (Berry, 2005; Berry et al., 2006). As acculturation means mutual adaptation, it is important that interaction strategies become equally accepted by all groups in contact, otherwise, conflicts can arise (Bourhis, Moise, Perreault, & Senecal, 1997). Due to the post-war situation in Serbia, the aim of this study was to determine preferred strategies among ethnic groups in Serbia, and their mutual compatibility.

Method

Sample

The sample included 536 respondents of three ethnic groups in Serbia: Serbs ($n = 316$, 55.4% female, age $M = 32.6$), Bosniaks ($n = 115$, 53% female, age $M = 29.5$) and Croats ($n = 105$, 56.2% female, age $M = 39.1$). All participants were recruited by snowball technique and asked to fill an online survey according to their ethnic affiliation. Ethnic minorities were recruited in places they were concentrated the most, and partly in other regions.

Instruments

To measure interethnic strategies, we applied two scales developed by J. Berry and his colleagues for the international research project on intercultural attitudes². We measured acculturation strategies of the minority groups: integration ($\alpha = .725$), separation ($\alpha = .808$), assimilation ($\alpha = .756$), marginalization ($\alpha = .711$); and acculturation expectations of the majority population: multiculturalism ($\alpha = .763$), segregation ($\alpha = .704$), melting pot ($\alpha = .744$), exclusion ($\alpha = .736$). For each strategy we used 5 items.

Results

Based on Berry’s acculturation model, groups can use different strategies and have one or more favorable ones. The

²MIRIPS: Mutual Intercultural Attitudes in Plural Societies, 2006: <https://www.victoria.ac.nz/cacr/research/mirips>

strategies with mean score $M > 3$ are considered to be “favorable, preferred”, and those with $M < 3$ are considered to be “unfavorable, undesirable”. The results, presented in Table 1, show that multiculturalism / integration strategy is highly expressed among Serbs and Croats, and according to previous remarks, this is their only favorable strategy. On the other hand, Bosniaks favor two strategies – separation and integration, both expressed at medium level. Undesirable strategies are marginalization / exclusion and assimilation / melting pot, which are expressed very low among all groups. Also, segregation strategy is undesirable among the Serbs.

Table 1: Interethnic interaction strategies among groups

	Integration / Multicultural.		Separation / Segregation		Assimilat. / Melting Pot		Marginaliz. / Exclusion	
	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>	<i>M</i>	<i>SD</i>
Majority (Serbs)	4.10	.78	2.10	.71	1.95	.75	1.73	.68
Minorities (all)	3.42	.88	3.03	1.0	1.57	.64	1.67	.67
<i>Bosniaks</i>	3.16	.85	3.41	.97	1.67	.68	1.64	.74
<i>Croats</i>	3.71	.82	2.62	.94	1.46	.58	1.70	.58

We compared groups based on the criteria of their ethnic status in the country. We found significant differences between ethnic majority (the Serbs) and minority groups (Bosniaks and Croats) in the strategies of multiculturalism / integration ($t(534) = 9.27, p < .001$, two-tailed), separation / segregation ($t(534) = -12.44, p < .001$, two-tailed) and assimilation / melting pot ($t(534) = 6.15, p < .001$, two-tailed). The magnitude of the differences in the means for multiculturalism / integration (mean difference = .67, 95% CI: .53 to .81) was very large (eta squared = .13), as well as for the separation / segregation (mean difference = -.94, 95% CI: -1.10 to -.79; eta squared = .21), while for the assimilation / melting pot (mean difference = .38, 95% CI: .26 to .50) was moderate (eta squared = .06). No significant differences were found in the marginalization strategy.

Discussion and conclusion

Highly expressed integration / multiculturalism strategy among Serbs and Croats, and moderately expressed among Bosniaks, represent the basis for tolerant relations among cohabitant ethnic groups as this strategy implies group’s readiness to interact with each other (Berry et al., 2006; Kymlicka, & Opalski, 2001). This means that the Croats will obtain basic norms and values of the dominant Serbian culture and actively participate in social life, and at the same time they will maintain their ethnic identity and integrity. Serbs will support minorities by allowing them to maintain cultural heritage, participate in social activities, and feel secure in a multiethnic environment (Kalin & Berry, 1996; Moghaddam, Taylor & Wright, 1993). Serbs and Croats have compatible strategies as they both tend to integrate. This confirms the reciprocity in strategies chosen between cohabitant ethnic groups (Kalin & Berry, 1996; Brewer & Campbell, 1976; Ben-Shalom & Horenczyk, 2003).

Among Bosniaks, both separation and integration were expressed at the same level. We assume that they use “situational strategy” or “maneuvering with identity” (Moghaddam, 1988), which means that in some situations they integrate, and in others they separate by limiting contacts with other groups, especially with the majority. Considering that Bosniaks sample mostly included local majority from Novi Pazar, Sjenica and Tutin, they probably perceive the environment ethnically homogeneous. A strive for autonomy and separation is common when a certain minority group becomes highly concentrated in one particular region. Taking into account that Serbs do not support segregation as a possible type of interaction with the minorities, the separation of Bosniaks could lead to a conflict situation, which often occurs due to different preferences of strategies (Bourhis et al., 1997).

A strive for tolerance is seen in a fact that strategies of assimilation / melting pot and marginalization / exclusion are very low. From the majority point of view, this means that the Serbs do not wish to assimilate the minorities, even less to exclude them from the society. From the minority point of view, this means that Bosniaks and Croats do not wish to give up their identity in order to adapt to the dominant society, or maybe they don’t see the majority as a desirable group to identify with, due to the past conflict.

The possible reason for multiculturalism and melting pot strategies being significantly higher among Serbs than the minorities lays in the fact that ethnic majority, due to its dominant status or perceived threat, often unintentionally, imposes cultural values and norms to other ethnic groups in the society in order to protect their culture (Moghaddam et al., 1993). Taking into account common elements of language, history and “Balkan mentality”, a certain level of assimilation is to be expected (Kymlicka & Opalski, 2001). Either way, this is not a desirable strategy of our groups.

Common cultural elements and intense interaction can also lead minority groups to separate in order to maintain cultural integrity and identity (Moghaddam et al., 1993). That is probably why the separation strategy is significantly higher among ethnic minorities than among Serbs. The other possible reason could be the past war conflict, whereas minorities refuse to integrate to the “hostile” society.

This study shows that groups are ready for interaction in terms of integration, but an obstacle to multiculturalism can be separation orientation among minorities. Therefore, it is important to develop a strategy equally accepted by both the majority and the minority groups, because only then it can be successfully implemented in Serbian society.

Further studies of interethnic strategies in Serbia should give greater attention to local composition of ethnic groups (homogeneous or heterogeneous environment) and possibilities of live interaction between them, as it can lead to different preferences of interethnic strategies.

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