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VALIDATION OF THE INTERNATIONAL AFFECTIVE PICTURE SYSTEM (IAPS) IN SERBIA: COMPARISON OF A SERBIAN AND A HUNGARIAN SAMPLE[2]

The purpose of this study was to extend the International Affective Picture System to Serbia, which is worldwide workrelated to the ratings. A total of 158 students participated in the study, which included ninety Hungarian students and sixty-eight Serbian students. The participants were required to rate sixty pictures from the IAPS database on the dimensions of valence, arousal and dominance. One of our main aims was to compare the results from Serbia and the North American ratings. We found a significant group difference on the dimension of arousal between the North American and the Hungarian group. Additionally, we found differences between the two groups from Serbia: in Serbian and Hungarian students, as majority and minority groups, there were differences on a dimension arousal. The differences that were statistically significant in relation to the ratings from Hungary were the ones between the Hungarian group from Hungary and the North American ratings, as well as between the Hungarian group from Hungary and our Hungarian group, on the dominance dimension. Sex differences were also found significant regarding arousal and dominance. These differences were in line with other cross-cultural comparisons. We also correlated the results from the USA, Hungary, Bosnia, and our two subgroups, and we found the highest correlations between the two groups from Serbia. Based on the overall results we could conclude that the affective evaluations were similar in Serbia and in other countries, and that the IAPS database could be used for the research purposes in Serbia.

Keywords: emotional stimuli, IAPS, validation

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Introduction

The Relevance of Emotions and Emotional Stimuli in Psychological Research

In the past several years there has been a growing number of studies aimed at exploring emotions and affective processing (Kelberer, Kraines, & Wells, 2018; Schwager & Rothermund, 2013), as well as emotional stimuli (Bradley & Lang, 2007; Brosch, Pourtois, & Sander, 2010; Gong, Wong, & Wang, 2018). Emotionally charged stimuli "possess high relevance for the survival and well-being of the observer" (Brosch et al., 2010: 381). There are numerous studies that underpin the relevance of the research by using emotional stimuli: e.g., a recent one showed that optimism varies on an individual level with differences in attention to (negative) emotional stimuli, the former being a concept that is linked to emotional well-being in the everyday life (Kelberer et al., 2018).

As Uhrig et al. (2016: 1) stated: „There is a longstanding tradition in psychological research of trying to create emotional states in the laboratory for scientific aims." However, they also added that many of these brought about ethical or standardization difficulties. In order to overcome these problems, film clips, sounds or words with varying emotional content have been used as emotion eliciting stimuli in many experimental designs' pictures (Bradley & Lang, 2000; Gilman et al., 2017; Kurdi, Lozano, & Banaji, 2017). Pictures differ from movie clips in the fact that they are static in nature, but they have all the other visual characteristics as movies in depicting a scene. Recent studies combine different kinds of emotion evocative stimuli (e.g., words and pictures, words and sounds, etc.) (e.g., Alčaković, Orlić, & Đurić, 2018; Fan et al., 2018; Orlić, 2012), thus norms on the emotional dimensions for the stimuli being used would provide a big methodological help. Picture databases can also differ from each other in showing various contents, and in our opinion there are two big categories of pictures: the ones in which we can see facial expressions (e.g., FACES: Ebner, Riediger, & Lindenberger, 2010), and the others, which use more diverse topics like animals, nature, objects, people, events (Bradley & Lang, 2007; Kurdi et al., 2017).

Previous studies have established that in the case of cross-cultural comparisons, researchers need to check the material they want to use for the cross-cultural consistency, or have country-specific norms for the same affective stimuli (Bradley & Lang, 2007). One of the most widely used and validated picture/photograph databases is the International Affective Picture System (IAPS) (Lang, Bradley, & Cuthbert, 2005), which has its normative ratings on the American sample. The aim of our study was to validate the IAPS in Serbia, and make a cross-cultural comparison with the American and Hungarian results from Hungary. We also compared a Hungarian minority group and a Serbian majority group from Serbia, coming from the same cultural background, but prone to varying emotional reactions. Our aim was to see whether there were differences between the groups.

This additional aim was important for us, because there were many studies dealing with and comparing Hungarian and Serbian respondents from Serbia. We also wanted to test the correlations with ratings from the American group and groups from the two neighbouring countries, Hungary and Bosnia, to check for cross-cultural stability.

Theoretical Background and Cross-Cultural Usage of the IAPS

In recent years, many studies have used the IAPS pictures/photographs (Alčaković et al., 2018; Lang et al., 2005; Orlić, 2012,), in the cultural contexts other than the American. As we have mentioned above, the pictures/photographs in this system depict various topics: people, animals, objects, scenes, and show different positive, negative or neutral contexts and settings (Bradley & Lang, 2007). They are used for studying reactions to affective material and cognitive processing in various cultural contexts.

The picture system relies on the theoretical assumption called the dimensional view of emotions (Bradley & Lang, 1994, 2007; Osgood, Suci, & Tannenbaum, 1957). The main idea here is that the emotional world can be accounted for by determining the values on two to three dimensions: valence, arousal, and dominance (the latter is sometimes omitted as the third dimension) (Barrett, 1998; Bradley & Lang, 2007; Russell, 2003). Thus, the dimensional view does not work with basic emotion categories, but with values on the respective dimensions (Brosch et al., 2010). According to this view, all emotional events and experiences can be described by combining values of these (two or) three dimensions (Bradley & Lang, 2007; Lang et al., 2005). The meanings of the three dimensions are the following: valence is the quality of the emotional experience, arousal shows its intensity, and dominance refers to the perceived subjective control over the experience.

The International Affective Picture System (Lang et al., 2005) has been tested in many countries worldwide. Normative ratings for the IAPS have been established for numerous languages and cultures so far, including Flemish (Verschuere, Crombez, & Coster, 2001), Spanish (Moltó et al., 1999), Brazilian (Lasaitis, Ribeiro, & Bueno, 2008), German (Grühn & Scheibe, 2008), Chilean (Dufey, Fernández, & Mayol, 2011; Silva, 2011), Hungarian (Deák, 2011; Deák, Csenki, & Révész, 2010), Indian (Lohani, Gupta, & Srinivasan, 2013), Bosnian (Drače, Efendić, Kusturica, & Landžo, 2013), and European Portuguese (Soares et al., 2015). These studies vary in the sample size, the rated number of pictures, the used picture sets, the testing procedure, and the dimensions on which the ratings have been done.

In this research we decided to follow the work of Verschuere et al. (2001), because they selected pictures which were good representatives of the affective space, and because the subjects rated a smaller number of pictures in most of the previous studies. This last detail is mainly important due to the limited capacity of the attention functioning and fatigue (Lasaitis et al., 2008). Many of the above

mentioned studies found cross-cultural differences in the ratings of the pictures. We have reviewed these differences in the following section.

Arousal ratings were higher in the Chilean sample than in the American sample when the ratings were done only on valence and arousal dimensions (Dufey et al., 2011). Silva (2011) reported that when the ratings for different pictures were checked, lower arousal scores were found in the Chilean sample in comparison to the American one. In Bosnia and Herzegovina, Drače et al. (2013) found higher arousal ratings than the ones reported for the North America. Soares et al. (2015) found higher arousal levels for European Portuguese participants in comparison to the American results. This was also the case in Lasaitis et al. (2008) study and Lohani et al. (2013) study conducted with Brazilian and Indian participants.

Dominance levels were lower in the Flemish sample than in the ratings of the sample from the North America (Verschuere et al., 2001), but higher in the Hungarian sample (Deák, 2011; Deák et al., 2010), the Chilean sample (Silva, 2011) and the Indian sample (Lohani et al., 2013). Soares et al. (2015) found that dominance ratings of the European Portuguese participants were lower than those of the American participants, and this was also the case with Brazilian research participants (Lasaitis et al., 2008). These results implied that the valence/pleasure dimension seemed to be a cross-culturally more stable one, since few studies found variation in this respect. Only the research of Soares et al. (2015) showed lower levels of hedonic quality ratings in the European Portuguese participants in comparison to the American ones. It appeared that the dimensions of arousal and dominance were more prone to cultural specificity and change in values across cultures and nations than the dimension of valence.

Current Study: Validating the IAPS in Serbia

The main objective of our research was to test whether the pictures/photographs from the IAPS database could be used in a similar manner in Serbia as in the other countries. We wanted to establish whether there were cultural differences between the Serbian and American results, and whether sex differences would emerge in the results of the respondents from Serbia. Additionally, we wanted to compare two groups speaking the same language, Hungarian, but from dissimilar cultural backgrounds. We used the ratings from a majority Hungarian group living in Hungary and compared them to the answers of our minority Hungarian group living in Serbia. We also had an exploratory aim: we wanted to compare the assessments of the three dimensions in the Serbian group and the Hungarian group from Serbia. Majority and minority group status could affect emotional functioning (Gross & John, 2003): members of minority groups sometimes controled the expression of emotions. We also hypothesized that the members of our minority group might develop a bicultural identity (assimilate both to the Serbian majority country and norms and expectations and effects of the Hungarian culture from Hungary). This aim also had practical implications: the ratings on the pictures

could serve as a baseline for other studies, while similarities and dissimilarities could advance stimuli selection in future studies. We assumed that if there had been differences, then they would have been found on the arousal and dominance dimensions, since these dimensions showed variability in studies conducted so far. Lastly, we wanted to demonstrate the cross-cultural validity of our results by testing the correlations between the ratings from the American group, other neighbouring countries, Hungary, Bosnia, and our results.

Method

Participants

Ninety Hungarian-speaking students and sixty-eight Serbian-speaking students participated in the study in Subotica, Serbia. Hungarian language was the mother tongue in the Hungarian group. These students went to school with instructions in their native language. Serbian language was the mother tongue and the language of instruction in the Serbian group. The participants were enrolled at the University of Novi Sad, Hungarian Language Teacher Training Faculty, Academy of Arts and the Subotica Tech – College of Applied Sciences. In the Hungarian group, there were forty male and fifty female participants. In the Serbian group, there were forty-five male members and twenty-three female members. The age range of the participants was between 19-21. The study was run in nine small groups in three institutions, where students were grouped by their year of study and group membership in theoretical and practical classes. Accordingly, the two groups from Serbia had partly shared cultural background, but somewhat different linguistic backgrounds.

Stimuli and Measures

The study used the same pictures from the IAPS database as Verschuere et al. (2001), which were also used in Deák et al. (2010)[3]. These pictures were selected by Verschuere et al. (2001) because they could be grouped into 27 strata to represent all possible combinations of valence, arousal and dominance levels (mean results on a 9-point scale), with combinations of low ($x < 4$), average ($4 \leq x \leq 6$) and high ($x > 6$) levels of valence, arousal and dominance. Although Deák et al. (2010) used a larger number of pictures ($n = 239$), we decided to follow the work of Verschuere et al. (2001), because Deák et al. (2010) divided their pictures into sets, and their larger number of pictures subsumed the pictures from Verschuere

[3] The following pictures were used: 1090, 1201, 1390, 1463, 1601, 1660, 1710, 1740, 1812, 2030, 2080, 2110, 2190, 2391, 2520, 2620, 2751, 2752, 2890, 3100, 3190, 3280, 3350, 3530, 4532, 4598, 4652, 4669, 4770, 5260, 5460, 5532, 5533, 5594, 5750, 5760, 6010, 6540, 6570, 7010, 7030, 7060, 7150, 7190, 7200, 7235, 7260, 7360, 7560, 7640, 8021, 8300, 8400, 8461, 8540, 9140, 9330, 9411, 9432, 9571, 9600, 9620.

et al. (2001). We used a paper-and-pencil version of the Self-Assessment Manikin Graphic Rating Scale (Lang et al., 2005). Each scale had verbal labels to help the interpretation procedure of the scale, like in Deák's rating procedure (Deák, 2011).

Procedure

The study closely followed the procedure of Verschuere et al. (2001). Picture presentation was done by using Microsoft Power Point presentation software. The rating procedure was done in nine groups in the three institutions. They were formed relying on a preexisting schedule: as students come to theoretical and practical classes.

In the first step, oral instructions were given to the participants regarding the structure of the study and the rating task. They were acquainted with the way in which they were required to give the answers. Also, they were given a detailed explanation of the meaning of the dimensions. All this was followed by written instructions and participants were asked if they had questions. They signed an informed consent to participate in the study, and they were given two practice trials to check if they had fully understood all the instructions. Afterwards, the experimental part started. First, they were presented a slide for 5 seconds to get ready. Next, the picture to be rated was shown for 6 seconds, only once. This was followed by a slide that instructed the participants which page they should open in their booklets to give their answers. The participants were given 15 seconds to rate each picture on the three scales.

The pictograms and scales for giving the answers on the three dimensions were randomized, and the groups also saw randomized picture sets following the work of Bradley & Lang (2007). We had four picture orders, which were created by using a random number generator, and these were used in different groups (the picture order did not have a significant effect on the ratings). In the rating booklets, the number of the page corresponded to the number of the photograph shown, and the participants saw a warning slide, which showed the number of the page on which they had to rate the photograph.

Results

Reliability

The agreement between different measurements or reliability was tested in three ways: 1) by calculating the correlations between groups of participants who rated the pictures, 2) by calculating the split-half correlations using the data of participants with even and odd numbers, and 3) by using Cronbach's alpha. There were nine separate groups of participants who rated the pictures at different

times. In the Hungarian group, the Pearson correlations between the six groups on the valence dimension of the sixty rated pictures ranged between r = .89 - .97, p< .001. This means that there was a high positive correlation between groups on the rating of the valence dimension. On the arousal dimension, the correlation between various group ratings ranged between r = .74 - .90, p < .001, which indicated a high positive correlation. On the means of the dominance dimension, the association of the sixty pictures ranged between r = .81 - .93, p < .001, which was also a high positive correlation.

In the Serbian group, the Pearson correlations between the three groups on the valence dimension of the sixty rated pictures ranged between r = .91 - .97, p < .001. This means that there was a high positive correlation between groups on the rating of the valence dimension. On the arousal dimension, the correlation between various group ratings ranged between r = .73 - .84, p < .001, which indicated a high positive correlation. On the means of the dominance dimension, the association of the sixty pictures ranged between r = .78 - .90, p < .001, which was also a high positive correlation.

For the split-half correlation, we divided the Hungarian and the Serbian group of participants into two subgroups: one subgroup consisting of participants with an even number, and the other subgroup consisting of participants with an odd number. The Pearson correlations on the means of the pictures by dimensions are in Table 1 for the both groups.

Table 1
Correlations on the three dimensions by even and odd participants in both groups

		Even participants		
		Valence dimension	Arousal dimension	Dominance dimension
		Serbian/ Hungarian	Serbian/ Hungarian	Serbian/ Hungarian
Odd participants	Valence dimension	.98/.99		
	Arousal dimension		.94/.95	
	Dominance dimension			.94/.96

Note. All correlations are significant at p < .001.

The Cronbach's alpha coefficient in the Hungarian group for the valence dimension was .62, for arousal .87, and for dominance .88. In the Serbian group, the Cronbach's alpha coefficient for valence was .68, for arousal was .93, for dominance was .95. The mean ratings and standard deviations for the sixty pictures are

given in the Appendix, separately for the Hungarian and Serbian subgroups from Serbia (Table A and Table B).

Differences between the Hungarian Sample from Serbia, Serbian Sample from Serbia, the American Sample, and the Hungarian Sample from Hungary

In the next step, we wanted to check if there were differences among the ratings of the Hungarian sample from Serbia, the Serbian sample from Serbia, the American sample, and the Hungarian sample from Hungary. We presumed that the American results, i.e. their normative ratings, could be taken as the baseline.

The American, Serbian, and Hungarian group from Serbia, and the Hungarian group from Hungary were compared with MANOVA. For the analysis, we used the mean ratings of the pictures as the dependent variable, and the group status (Hungarian from Serbia, Serbian from Serbia, American, Hungarian from Hungary), and sex (male or female) as the independent variables. There were statistically significant differences between the groups regarding the group status, $F(9,1416) = 14.82$, $p < .001$, *Pillai's Trace* = .26, partial $\eta^2 = .09$, as well as regarding sex, $F(3,470) = 14.85$, $p < .001$, *Pillai's Trace* = .09, partial $\eta^2 = .09$.

There were significant differences on the arousal dimension with the group status as the independent variable, $F(3,472) = 3.68$, $p = .01$, partial $\eta^2 = .02$. Bonferroni post hoc comparisons showed that there was a statistically significant difference between the results of the Hungarian group from Serbia and the Serbian group from Serbia at $p = .03$, and the Hungarian group from Serbia and the American group at $p = .05$. The means and standard deviations are shown in Table 2.

Table 2
Descriptive statistics for arousal in the Hungarian group from Serbia, the Serbian group from Serbia, the American group for male and female participants

Arousal	*N*	*M*	*SD*
Hungarian group from Serbia	120	5.32	1.43
Serbian group from Serbia	120	4.80	1.32
American group	120	4.85	1.26

Note. N – number of participants; *M* – mean; *SD* – standard deviation.

There were significant differences on the dominance dimension with the group status as the independent variable: $F(3,472) = 7.69$, $p < .01$, partial $\eta^2 = .05$. Bonferroni post hoc comparisons showed a statistically significant difference between the Hungarian group from Serbia and the Hungarian group from Hungary, $p < .001$, and the Hungarian group from Hungary and the American group, $p = .002$. The means and standard deviations of the groups are shown in Table 3.

Table 3
Descriptive statistics for dominance in the Hungarian group from Serbia, the American group, the Hungarian group from Hungary for male and female participants

Dominance	N	M	SD
Hungarian group from Serbia	120	5.00	1.52
Hungarian group from Hungary	120	5.79	1.38
American group	120	5.18	1.20

Descriptive statistics for males and females on the arousal and dominance dimensions are shown in Table 4.

Table 4
Descriptive statistics for arousal and dominance in the male and female group (Hungarian from Serbia, Serbian from Serbia, American, Hungarian from Hungary)

		Arousal		Dominance	
	N	*M*	*SD*	*M*	*SD*
Males	120	5.10	1.42	5.20	1.31
Females	120	5.55	1.42	4.81	1.70

Regarding sex, significant differences were found on the arousal dimension $F(1,472) = 6.72$, $p = .01$, partial $\eta^2 = .01$. The dominance dimension also showed significant differences with respect to sex $F(1,472) = 19.27$, $p < .001$, partial $\eta^2 = .04$. The interaction between language and sex was not significant.

The Relationship between the Valence of Positive and Negative Pictures and Arousal Ratings (for the Serbian and the Hungarian Groups from Serbia)

We separated the stimuli to analyze the approach and avoidance motivational systems. Mean valence and arousal ratings of the pictures were used to test the relationship of valence and arousal, separately for negative pictures and separately for positive ones. We dichotomized the pictures by using the mean valence rating, with the cut point set on the value five. All the pictures with mean valence ratings below five were categorized as negative, and above five as positive.

In the Serbian subgroup, the Pearson correlation between valence and arousal for the positive pictures was $r = .61$, significant at the level $p < .001$, for thirty-six pictures. The correlation between the two dimensions for the negative pictures was $r = -.68$, significant at the level $p < .001$, for twenty-four pictures.

The dichotomization procedure in the Hungarian group was the same as in the previous description. For a total of thirty-four positive pictures, the correla-

tion was r = .48, significant at a level p = .004. The Pearson correlation of the valence and arousal ratings of the negative pictures was r = -.59, significant at p = .002 for twenty-six pictures.

In both groups there was a positive linear correlation between valence and arousal for the positive pictures, and a negative linear correlation for the negative ones. This implies that the motivational systems of approach (positive pictures) and avoidance (negative pictures) were mirrored in the answers of the two groups.

Correlations between the Results of the Two Groups from Serbia, the Group from America, the Group from Bosnia and the Results of the Hungarian Group from Hungary

Correlations between ratings of two groups from Serbia and ratings from other groups are presented in Table 5. All of them are high, between r = .80-.97, which means that the ratings are similar in the countries in question.

Table 5
Correlations between ratings of two groups from Serbia and ratings from other groups

		Hungarian ratings from Serbia	Bosnian ratings	American ratings	Hungarian ratings from Hungary	Serbian ratings from Serbia
				Valence		
Ratings from Serbia	Serbian rating	.97	.97	.94	.96	1
	Hungarian rating	1	.97	.95	.96	.97
				Arousal		
	Serbian rating	.92	.83	.87	.80	1
	Hungarian rating	1	.88	.88	.87	.92
				Dominance		
	Serbian rating	.94	.91	.88	.85	1
	Hungarian rating	1	.91	.87	.85	.94

Note. All correlations are significant at p < .001.

Curve Fit Estimation – Hungarian and Serbian Subgroups from Serbia

We applied a curve fit estimation analysis to see whether a linear or a quadratic relationship was more applicable to our data. Following Verschuere et al.

(2001) we used for the analysis the groups of positive and negative pictures which were previously dichotomized.

In the Hungarian group, for the negative pictures of valence and arousal dimensions, the curve fit estimation showed that both the linear (R^2 = .35, p= .002) and the quadratic (R^2 = .35, p = .007) relationship was significant. We accepted the quadratic relationship, where the non-standardized *b1* = 1.26, *b2* = -.06. Thus, the slope was steeper, bigger, and positive for the first half, and small and negative for the second half.

The estimation for the Hungarian group for the positive pictures on the valence and arousal dimensions showed both the linear (R^2 = .23, p = .004) and quadratic (R^2 = .29, p = .005) relationship as significant. We accepted the quadratic relationship, where the non-standardized *b1* = 1.71, *b2* = -.013. Thus, the slope was steeper, bigger and positive for the first half, and small and negative for the second half.

The analysis for the Serbian group for the negative pictures on the valence and arousal dimensions showed that both the linear (R^2 = .47, p < .001) and the quadratic (R^2 = .47, p = .001) relationship was significant. We accepted the quadratic relationship, where the non-standardized *b1* = .25, *b2* = .05. The slope was steeper, a little bigger and positive for the first half, and small and also positive for the second half.

In the Serbian group, the analysis showed for the positive pictures that both the linear (R^2 = .38, p < .001) and quadratic (R^2 = .37, p < .001) relationships are significant on the valence and arousal dimensions. We accepted the quadratic relationship, where the non-standardized *b1* = .89, *b2* = -.05. Thus, the slope was somewhat steeper, bigger and positive for the first half, and small and negative for the second half.

In all the cases, this quadratic relationship means that as arousal grows, valence grows, but after the half of the slope it stagnates.

Discussion

Our study was aimed at checking the ratings of the pictures/photographs of the International Affective Picture System (Lang et al., 2005) in Serbia. It was done on two groups with a different native language, but from the same cultural background, a Serbian group and a Hungarian group.

There was a need for checking the validity of the pictures for inducing emotional reactions on the population from Serbia, because numerous studies use emotion-laden stimuli in the field of affective sciences. While normative ratings for the IAPS exist for various languages and cultures, to the best of our knowledge, no such ratings have been established for Serbia so far (e.g., Alčaković et al., 2018; Deák, 2011; Deák et al., 2010; Drače et al., 2013; Dufey et al., 2011; Grühn & Scheibe, 2008; Lohani et al., 2013).

Additionally, the cross-cultural – Hungarian, Serbian from Serbia, Hungarian from Hungary, and American comparison can give us a valuable insight into the modulating effect of cultural contexts and national habits or trends in rating differences. In addition to this, the comparison of the two subgroups from Serbia has a pragmatic explanation and an exploratory aim: we want to have ratings for both of these groups for further studies. Also, we hypothesize that if there are differences between the two groups, they might be either in arousal or dominance or in both. This hypothesis is connected to the more flexible migrations and traveling opportunities between the countries (including Serbia and Hungary), which can result in the fact that minority group members may develop (or have a chance for developing) different cultural (or a mixed, bicultural) identities. This fact and the minority group status may further affect emotional functioning in both positive and negative ways, and result in different response patterns in this group.

Our results have shown that regarding the affective space, we have found a positive linear relationship between the valence and arousal dimensions for the positive pictures in both subgroups, and also a negative linear relationship between the dimensions of valence and arousal for the negative pictures. The more positive or more negative the picture was, the more arousing it was perceived. Thus, the approach-avoidance motivational systems are implied in the results of the ratings. The affective states induced by positive and negative pictures seem to differ in pleasantness and their arousing nature. For the results of Hungarian and Serbian groups, it seems that a quadratic fit is more applicable, and therefore valence grows as arousal grows for all the results in the first half of the curve. As arousal is higher, valence is also growing, but after a certain amount of arousal, the valence dimension does not show a change. Studies so far have found that linear, quadratic or both relationships can be significant for the affective space (Bradley & Lang, 2007; Deák, 2011; Deák et al., 2010).

To compare our results cross-culturally and check for consistency, we also correlated the picture ratings from America, Bosnia, Hungary, our Hungarian group from Serbia, and our Serbian group from Serbia. The highest connections were found between the two groups from Serbia, showing similarly evoked emotional reactions, but the correlations with other neighboring countries were also very high. Thus, we could conclude that the validity of the IAPS database was replicated in our study. The the pictures/photographs could be used in Serbia in a similar way as in the other foreign countries, although cultural specificities emerged (e.g., Deák, 2011; Deák et al., 2010; Drače et al., 2013).

Previous studies have shown that cross-cultural variation mostly occurs on the dimensions of arousal and dominance (e.g., Deák et al., 2010; Drače et al., 2013; Dufey et al., 2011; Lasaitis et al., 2008; Lohani et al., 2013; Verschuere et al., 2001), and this study confirms these findings as we have found cross-cultural variation on these dimensions as well.Three existing studies have proved to be especially valuable for us since the respondents who participated in the studies

are from a similar linguistic and cultural background as the participants in the following study: Deák (2011), Deák et al. (2010), and Drače et al. (2013).

We have found a significant difference in arousal comparing the results of the American sample and our Hungarian group, where the ratings are higher in our Hungarian group. Also, there is a difference between the two groups from Serbia: Hungarians obtainhigher ratings in this dimension. On the dominance dimension, we have replicated the findings of Deák et al. (2010) on a smaller set of pictures, as dominance was higher in the Hungarian group from Hungary than in the American one. Our Hungarian sample differs from the sample from Hungary because our Hungarian group has shown higher arousal ratings in comparison to the Americans, but there is no significant difference in dominance. This means that our Hungarian group might have a lower level of the threshold for arousal than the American one, since the pictures appear to have a more intensive impact on our group. Our Hungarian group has shown lower dominance ratings than the Hungarian group from Hungary. This means that our Hungarian group feels less dominant while viewing the pictures/photographs with the affective content, meaning that they are more prone to be affected by emotionally impacting effects from the surroundings than the Serbian group or the Hungarian group from Hungary. The Hungarian minority group has had less control over the emotional reactions elicited by the pictures. Drače et al. (2013) have found that Bosnian arousal ratings are higher than the American ones, but in this respect, we have not found any differences between the Serbian and the American ratings.

Some researchers argue that one possible explanation for the cross-cultural differences is the existence of a conceptual and semantic difference among languages and cultures (Dufey et al., 2011; Lasaitis et al., 2008), and therefore the meanings of the dimensions differ. Another explanation suggests that there may be a variation in the emotional disposition (Bradley & Lang, 2007; Drače et al., 2013; Dufey et al., 2011), especially in ratings of the arousal dimension, which might be related to emotional expressivity (Drače et al., 2013; Dufey et al., 2011). Concretely, lower arousal ratings mean "calmer emotional reactions" (Bradley & Lang, 2007: 34.). We hypothesize that our Hungarian subgroup is more emotionally expressive and more easily emotionally dislocated than the American and the Serbian group, and also, that this group has less control over their emotions and higher responsiveness to the shown stimuli (see Silva, 2011, on a reverse pattern). Regarding the dominance dimension, Deák et al. (2010) argue that the cultural context and social learning might have an effect on it, and this might hold true in the present research as well.

Sex differences have also emerged in our study. Accordingly, the arousal ratings are higher in females, and the dominance ratings are higher in males. These results are in line with the results of the previous studies: Soares et al. (2015) have found higher levels of valence and dominance in male ratings, and Deák (2011) and Deák et al. (2010) have found higher dominance ratings for males. In addition to this, Deák et al. (2010) have found higher arousal ratings in the female

group. Our results resemble the results from Deák et al. (2010) study, who have found the same differences.

The general conclusion is that the valence dimension is a culturally robust dimension, which is stable between genders, since no variations have been found in this respect among the groups. This means that people tend to perceive the positive, negative, and neutral qualities of nature, objects, living creatures, social situations in a very similar way in Serbia and also world-wide. Based on our results, the valence dimension is cross-culturally stable, which can also indicate its importance in the hierarchy of the "three dimensions/qualities of emotional experience". However, we cannot exclude the other two dimensions, because they can give us additional information about the culture and gender-specific reactions, evaluations and subjective experience in the emotional domain.

Future studies in this field might include different sets of stimuli from the IAPS and various age groups, and should also combine the age groups with sex differences to give new insights into the emotional world of different groups of participants from Serbia. Also, the pictures from the IAPS could be used with specific groups of the research participants, like the patients with mood disorders and various psychopathological diagnoses, and people with behavioral problems and antisocial conduct.

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Appendix

Table A
The means and standard deviations on the pictures in the Hungarian group from Serbia

IAPS		All subjects - Hungarian ratings from Serbia					
		Valence		Arousal		Dominance	
PICTURE NUMBER	Title	*M*	*SD*	*M*	*SD*	*M*	*SD*
1090	Snake	3.63	1.63	6.97	1.93	3.59	2.23
1201	Spider	3.17	2.25	7.06	2.35	3.14	2.42
1390	Bees	5.06	1.90	5.70	2.29	4.54	2.41
1463	Kittens	7.79	1.52	4.63	2.79	6.27	2.08
1601	Giraffes	7.82	1.26	4.59	2.68	6.38	2.09
1660	Gorilla	5.30	2.18	4.91	2.08	4.56	1.99
1710	Puppies	8.54	0.98	5.75	2.88	6.80	1.89
1740	Owl	6.52	1.70	3.70	2.28	5.51	1.82
1812	Elephants	7.62	1.60	4.46	2.69	5.80	2.05
2080	Babies	7.99	1.62	4.86	2.58	5.96	2.03
2110	Angry Face	3.89	1.84	5.25	2.11	4.97	2.41
2190	Man	5.11	0.95	3.56	1.63	5.00	1.64
2391	Boy	7.99	1.24	5.66	2.59	7.36	1.46
2520	Elderly Man	3.97	2.13	4.01	1.95	3.65	1.94
2620	Woman	6.00	1.49	3.31	2.00	5.68	1.74
2751	Drunk Driving	2.28	1.87	6.13	2.10	3.42	2.35
2752	Alcoholic	4.18	2.21	5.34	1.79	4.46	2.17
2890	Twins	5.07	1.33	3.60	1.97	5.11	1.47
3100	Burn Victim	1.30	0.70	6.69	2.12	1.76	1.45
3190	Scar	3.32	1.81	5.62	2.02	3.38	1.93
3280	Dental Exam	3.43	1.90	6.20	2.09	3.07	2.04
3350	Infant	1.79	1.44	6.39	2.12	2.35	1.94
3530	Attack	1.72	1.24	7.39	1.79	2.00	1.72
4532	Attr Man	7.25	1.73	4.44	2.65	6.83	1.87
4598	Couple	6.46	2.86	6.59	2.38	5.48	2.56
4652	Erotic Couple	7.62	1.38	7.45	1.79	6.96	1.78

4669	Erotic Couple	7.99	1.30	7.52	2.02	7.25	1.68
4770	Female Kiss	5.54	2.46	6.11	2.08	5.82	1.98
5260	Waterfall	7.25	1.70	5.73	2.80	5.31	2.44
5460	Astronaut	5.81	1.78	6.01	2.55	4.88	2.59
5532	Mushrooms	5.44	1.30	3.38	1.98	5.15	1.71
5533	Mushrooms	5.63	1.51	4.04	2.24	5.30	1.53
5594	Sky	6.22	2.00	4.47	2.49	4.74	1.97
5750	Nature	7.34	1.46	3.15	2.42	6.23	1.91
5760	Nature	8.19	1.31	3.64	2.87	7.03	2.06
6010	Jail	3.17	1.84	5.08	2.00	3.18	2.07
6540	Attack	2.86	2.64	6.90	2.39	3.51	2.88
6570	Suicide	1.83	1.44	6.74	2.29	3.52	2.73
7030	Iron	4.90	1.20	3.42	2.49	5.96	2.01
7060	Trash Can	4.69	1.15	3.16	1.99	5.59	1.62
7150	Umbrella	5.18	1.41	2.63	1.79	5.92	1.85
7190	Clock	5.18	1.77	3.99	2.23	4.94	2.27
7200	Brownie	7.49	1.46	4.90	2.65	6.75	1.73
7235	Chair	5.43	1.54	2.17	1.71	5.97	1.95
7260	Torte	7.93	1.87	5.54	2.76	6.90	2.17
7360	Flies On Pie	5.99	3.09	5.93	2.40	5.79	2.53
7560	Freeway	4.61	1.93	4.94	2.55	4.71	2.32
7640	Skyscraper	4.60	1.59	6.93	2.47	4.74	2.68
8021	Skier	7.25	1.57	7.03	2.17	6.65	2.05
8300	Pilot	7.30	2.05	7.46	1.90	5.67	2.43
8400	Rafters	6.83	1.76	7.62	1.70	6.04	2.26
8461	Happy Teens	8.14	1.43	6.17	2.32	6.76	1.70
8540	Athletes	7.80	1.56	5.76	2.72	7.10	1.82
9140	Cow	1.73	1.26	5.59	2.16	2.54	1.85
9330	Garbage	1.99	1.49	5.36	2.31	3.31	2.03
9411	Boy	3.60	1.90	6.77	1.87	4.30	2.56
9432	Mastectomy	2.77	1.80	5.43	1.96	3.21	2.06
9571	Cat	1.87	1.51	6.03	2.13	2.86	2.06
9600	Ship	2.01	1.37	7.04	1.99	2.20	2.00
9620	Shipwreck	2.11	1.66	6.84	1.97	2.77	2.29

Table B
The means and standard deviations on the pictures in the Serbian group from Serbia

IAPS		All subjects - Serbian ratings from Serbia					
		Valence		Arousal		Dominance	
PICTURE NUMBER	Title	*M*	*SD*	*M*	*SD*	*M*	*SD*
1090	Snake	5.41	1.98	5.04	2.34	5.23	2.32
1201	Spider	4.26	2.05	5.54	2.60	4.78	2.74
1390	Bees	5.68	2.12	4.80	2.36	5.38	2.36
1463	Kittens	7.84	1.49	5.82	2.50	6.86	1.75
1601	Giraffes	7.72	1.33	5.10	2.01	7.26	1.54
1660	Gorilla	5.38	1.54	4.58	2.18	5.58	2.12
1710	Puppies	8.56	0.95	6.76	2.19	7.44	1.54
1740	Owl	6.69	1.42	4.27	1.90	6.55	1.72
1812	Elephants	7.50	1.15	4.68	2.13	6.32	1.91
2080	Babies	7.32	1.83	5.00	2.56	6.24	2.13
2110	Angry Face	4.73	1.27	3.22	1.83	6.02	1.85
2190	Man	5.30	1.13	2.66	1.70	6.10	1.72
2391	Boy	6.92	1.74	4.65	2.34	7.41	1.61
2520	Elderly Man	4.63	1.94	3.69	1.92	5.18	2.03
2620	Woman	6.24	1.36	3.56	1.93	6.48	1.80
2751	Drunk Driving	2.96	1.77	5.78	2.26	4.24	2.57
2752	Alcoholic	4.52	2.26	4.30	2.02	5.26	2.38
2890	Twins	5.02	1.22	2.60	1.93	5.84	2.01
3100	Burn Victim	2.22	1.71	5.73	2.40	3.51	2.33
3190	Scar	4.24	1.48	4.27	1.82	4.71	2.36
3280	Dental Exam	3.66	1.85	5.14	2.52	4.52	2.83
3350	Infant	2.38	1.78	5.85	2.27	3.50	2.16
3530	Attack	3.08	1.81	6.16	2.09	3.86	2.53
4532	Attr Man	6.10	1.34	3.72	2.21	6.94	1.61
4598	Couple	5.14	2.78	5.46	2.31	5.56	2.26
4652	Erotic Couple	7.38	1.64	7.26	1.60	7.18	1.96
4669	Erotic Couple	7.60	1.48	6.81	2.09	7.46	1.77
4770	Female Kiss	6.24	2.03	6.00	2.21	6.56	1.79

5260	Waterfall	6.63	1.58	5.18	2.41	6.16	2.04
5460	Astronaut	6.16	1.96	5.78	2.50	5.76	2.45
5532	Mushrooms	5.66	1.44	3.22	1.94	6.00	2.14
5533	Mushrooms	5.32	1.27	3.28	1.69	5.62	1.74
5594	Sky	6.86	1.54	3.55	2.52	6.37	2.07
5750	Nature	7.06	1.57	3.46	2.57	7.10	1.67
5760	Nature	7.82	1.47	4.63	2.71	7.49	1.58
6010	Jail	3.74	1.83	4.42	1.91	4.12	2.42
6540	Attack	2.63	1.78	5.81	2.15	4.21	2.42
6570	Suicide	2.94	2.20	5.31	2.51	4.55	2.78
7030	Iron	5.33	1.46	2.34	2.08	6.61	1.98
7060	Trash Can	5.27	1.18	2.22	2.07	6.44	1.95
7150	Umbrella	5.17	1.46	2.33	1.85	5.90	1.80
7190	Clock	5.33	1.56	3.08	2.25	6.24	2.06
7200	Brownie	6.50	1.23	4.32	2.27	6.96	1.64
7235	Chair	5.51	1.17	1.73	1.28	6.85	1.94
7260	Torte	7.58	1.53	4.83	2.57	7.19	1.77
7360	Flies On Pie	5.10	2.43	4.30	2.27	5.72	2.41
7560	Freeway	4.84	1.61	3.98	2.25	5.39	2.08
7640	Skyscraper	4.59	1.58	5.98	2.75	5.04	2.47
8021	Skier	7.54	1.46	6.27	2.48	6.73	1.87
8300	Pilot	7.60	1.53	6.48	2.54	6.38	2.27
8400	Rafters	6.61	2.01	6.19	2.61	5.77	2.23
8461	Happy Teens	7.29	1.40	5.38	2.48	6.85	1.70
8540	Athletes	6.30	1.61	4.42	2.35	6.88	1.84
9140	Cow	2.40	1.85	5.31	2.35	4.31	2.49
9330	Garbage	2.80	1.74	4.25	2.49	4.94	2.51
9411	Boy	4.22	1.64	5.50	2.04	4.82	2.14
9432	Mastectomy	3.24	1.84	4.46	2.10	4.51	2.17
9571	Cat	2.26	1.93	5.66	2.32	3.88	2.45
9600	Ship	3.00	1.86	5.70	2.33	4.02	2.51
9620	Shipwreck	3.18	1.76	5.42	2.20	3.60	2.44

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VALIDACIJA MEĐUNARODNE BAZE AFEKTIVNIH FOTOGRAFIJA (IAPS) U SRBIJI: POREĐENJE SRPSKOG I MAĐARSKOG UZORKA

Cilj rada je bio da proširi istraživanja koja se vrše u svetu na Međunarodnoj Bazi Afektivnih Fotografija (IAPS) i na Srbiju. U istraživanju je ukupno učestvovalo 158 studenata, devedesetoro mađarskih i šezdeset osmoro ispitanika srpske nacionalnosti. Ispitanici su ocenjivali šezdeset slika iz IAPS baze na dimenzijama valence, pobuđenosti i dominantnosti. Jedan od glavnih ciljeva bio je poređenje rezultata dobijenih u Srbiji sa rezultatima iz Severne Amerike. Našli smo značajne međugrupne razlike na dimenziji pobuđenosti između grupe iz Severne Amerike i mađarske grupe. Pored toga, dobili smo značajne razlike između mađarske i srpske grupe iz Srbije, kao manjinske i većinske grupe. Rezultati su pokazali da se ove dve grupe značajno razlikuju na dimenziji pobuđenosti. Uzimajući u obzir rezultate iz Mađarske, statistički je značajna razlika između mađarske grupe iz Mađarske i američke grupe, kao i mađarske grupe iz Mađarske i naše mađarske grupe na dimenziji dominantnosti. Polne razlike su dobijene na dimenziji pobuđenosti i dominantnosti. One su u skladu sa rezultatima prethodnih kros-kulturalnih istraživanja. Rezultati korelacije ocena iz Amerike, Bosne, Mađarske i dveju grupa iz Srbije pokazuju da je najjača povezanost dobijena među odgovorima kod podgrupe iz Srbije. Na osnovu svih dobijenih rezultata možemo zaključiti da su afektivne ocene u Srbiji slične onima iz drugih zemalja i da se IAPS baza može koristi u istraživačke svrhe u Srbiji.

Ključne reči: emocionalni stimulusi, IAPS, validacija