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Subjective experience of architectural objects: A cross-cultural study

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The purpose of the present study was to compare Serbian and Japanese participants in their subjective experience of Serbian and Japanese architectural objects. Subjective experience was operationalized through the ratings on the bipolar scales (e.g. pleasant-unpleasant). In the Preliminary study 1, a set of twelve rating scales was generated. In the Preliminary study 2 twelve Serbian and twelve Japanese architectural objects were specified. In the main experiment two groups of participants, twenty-one Serbian and twenty Japanese, rated twelve Serbian and twelve Japanese objects. A factor analysis extracted three dimensions of subjective experience: Beauty, Firmness and Fullness. Analysis of variance have shown that both Serbian and Japanese participants agreed that Japanese architectural objects looked more beautiful and firmer than Serbian objects. These finding is generally in line with perceptualist hypothesis that stimulus constraints are more effective than culture. However, interactions revealed some cultural differences that are consistent with culturalist hypothesis: compared to Serbian participants, Japanese participants rated Japanese architectural objects as more beautiful, whereas, compared to Japanese, Serbian participants rated Serbian objects as less fragile and emptier than Japanese objects. Generaly, our study have shown that Serbian (Western) and Japanese (Eastern) participants show general similarity in their subjective experience of architectural objects.

Keywords: subjective experience, cross-cultural, architecture, Serbia, Japan

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Subjective experience of architectural scenes, objects and interiors could be specified as a composite of different affective impressions (e.g. pleasantness, interestingness, aggressiveness, etc.) and implicit meanings (e.g. dynamics, strength, richness, etc.) (cf. Marković & Alfirević, 2015; Marković & Radonjić, 2008). Using a metodological and conceptual framework of *semantic differential,* subjective experience (in general) can be operationally defined on two levels: (1) level of elementary impressions and meanings that are expressed through the ratings on the bipolar scales (e.g. pleasant-unpleasant, strong-weak, active-passive etc.) and (2) level of higher order (latent) dimensions that encompass clusters of elementary impressions and meanings (e.g. Evaluation, Potency and Activity, cf. Osgood, May, & Miron, 1975; Osgood, Succi, & Tannenbaum, 1957). This approach was originally introduced by Osgood and collaborators (Osgood et al., 1975; Osgood et al., 1957) and further developed by Berlyne and collaborators (Berlyne & Ogilvie, 1974; Cupchik, 1974), whereas different versions of semantic differential were extensively used in many studies of the subjective experience of architecture (Alp, 1993; Bishop, 2007; Canter, 1970; Cass & Hershberger, 1972; Craik, 1968; Franz, von der Heyde, & Bülthoff, 2003; Hung & Nieh, 2009; Kasmar, 1970; Nasar, 1994; Rezazadeh, 2011).

In a realm of general aesthetic experience, complex networks of aesthetically related terms (descriptors) were identified (Augustin, Carbon, & Wagemans, 2012; Augustin, Wagemans, & Carbon, 2012). These meanings refer to diferent psychological and behavioral domains, such as cognitive and emotional (Wolz & Carbon, 2014), perceptual, cognitive and affective (Marković, 2011) or perceptual, cognitive, affective and motivational (Marković, 2014).

Using a semantic differential method, in our recent study we specified four dimensions of subjective experience of expressiveness in architecture: Aggressiveness, Regularity, Color and Aesthetics (Marković & Alfirević, 2015). Cluster analysis of buildings that were rated on these dimensions revealed two wide clusters: ‘Phlegmatic’ cluster (buildings rated as less aggressive, more regular and less colorful., e.g. building A, Figure 1) and ‘Choleric’ cluster (buildings rated as more aggressive, less regular and more colorful, e.g. building B, Figure 1).

Figure 1. Casa Guerrero, Cadiz, Spain – Alberto Campo Baeza, 2005 (left) and Casa Batlló, Barcelona, Spain – Antoni Gaudí, 1877 (right). These 'collage-pictures' were used as stimuli in a study of Marković and Alfirević (2015).

According to Arnheim, subjective experience of visual scenes, including the architectural objects, is rather perceptual than cognitive phenomenon (Arnheim, 1949, 1969, 1980). In other words, we do not need to think and infer which object in Figure 1 is 'calmer', but we simply *see* it. Many authors generally agree with this 'perceptualist' idea that aesthetic impressions are based on the visual processing of elementary and structural stimulus features (Di Dio, Macaluso, & Rizzolatti, 2007; Gregory, Harris, Heard, & Rose, 1995; Ramachandran & Hirstein, 1999; Redies, 2007; Redies, Hasenstein, & Denzler, 2007; Spehar, Clifford, Newell, & Taylor, 2003; Vartanian et al., 2013; Zeki, 1999). More specifically, neuroimaging and electrophysiological studies identified various cortical and sub-cortical areas that are involved in the visual processing and ratings of architectural objects (Aguirre, Zarahn, & D'Esposito, 1998; Epstein & Kanwisher, 1998; Ishai, Ungerleider, Martin, Schouten, & Haxby, 1999; Mecklinger, Kriukova, Mühlmann, & Grunwald, 2014; Oppenheim et al., 2010). Numerous studies indicated that even simple visual features can induce elementary implicit (expressive) meanings of visual objects: for instance, oblique lines induce impression of dynamics, red color induces impression of warmth, etc. (cf. Burr, 2000; Gori, Pedersini, & Giora, 2008; Janković & Marković, 2001; Köhler, 1947; Oyama et al., 2008; Palmer & Schloss, 2010). Results of a recent cross-cultural study support the perceptualist idea, showing that low-level visual processes influence the aesthetic judgment of buildings irrespectively of culture, Italian and Japanese (Vannucci, Gori, & Kojima, 2014).

On the other hand, cognitivist approaches, such as Gombrich's conceptualistic theory (Gombrich, 1969, 1973), argue that an aesthetic appraisal requires a certain level of personal expertise and mastering (Augustin & Leder, 2006; Belke, Leder, & Augustin, 2006; Leder, Belke, Oeberst, & Augustin,

2004; Leder, Carbon, & Ripsas, 2006; Neperud, 1989; Winston, & Cupchik, 1992), previous experience with artistic stimuli (Russell, 2003; Ullan & Belver, 1999), socio-cultural 'expertise', such as fashion or Zeitgeist (Carbon, 2010, 2011), or acquired meaning of artistic objects (Black, 1972; Hekkert & van Wieringen, 1996; Jacobsen, 2006; Kennedy, 1984; Kreitler & Kreitler, 1972; Penrose, 1973). This approach is close to 'culturalist' idea that socio-cultural ideology determines basic psychological processes and personal experiences (Benson, 2000; Bruner, 1990, 1996; Kitayama, 2002; Markus & Kitayama, 1991; Shweder & Sullivan, 1993). Similarly, the appraisal theories of emotion hold that subjective experience is not induced by objective features of external stimulus itself, but it is rather subjectively constructed through the cognitive process of appraisal of external objects (Lazarus, 1991; Scherer, 2001; Schorr, 2001; Silvia, 2005). The dominant factor of appraisal is past experience with certain types of objects or events within the specific cultural or sub-cultural background.

Some authors argue that East Asians differ from Westerners in various cognitive processes, such as categorization, causal explanation, and logical vs. dialectical inference (Nisbett, Peng, Choi, & Norenzayan, 2001). According to this approach, one can expect that although the observers in both Western and Eastern cultures see the same physical features in minimalistic architectural scenes, such as building A, Figure 1 (lot of empty space, achromatic surfaces, reduced decoration etc.), they will interpret and evaluate them differently. Namely, concept of *emptiness*, as a key feature of minimalistic scene, has very different, if not the opposite, meanings and evaluative interpretations in two cultures. In Western culture *emptiness* has more negative meanings and it is associated with poverty, absence and non-existence, whereas Eastern cultures evaluate it more positively and associate it with spirituality, peace, eternity, and so foth (Karlfried, 1974; Lebra, 1976; Pasqualotto, 1992; Verhetsel, & Heynen, 2013; for Zen-Buddhist concept of emptiness – *ma* see Eckel, 1992; Moore, 1967; Pilgrim, 1986; Tsunoda, De Barry, & Keene, 1964).

Some studies indicated that understanding and experiencing of many concepts are culturally specific. For instance, Uchida, Norasakkunkit and Kitayama (2004) demonstrated cross-cultural differences in Western and Eastern understanding of concept *happiness*: in Western cultures *happiness* is experienced as personal achievement, while in East Asian cultures it is experienced as a realization of social harmony. Similarly, Oyama and collaborators (2008) found that Western participants (US and Serbia), compared to Eastern participants (Japan and Taiwan), rated concept *happiness* higher on Activity-related semantic differential scales (dynamic, noisy, joyful). In addition, Western participants rated concept of *surprise* higher on Evaluation-related scales compared to Eastern participants. However, this study have shown that cross-cultural differences were smaller in the domain of subjective experience of abstract forms: both Western and Eastern cultures show similar ratings of forms on semantic differential dimensions (Oyama et al., 2008).

Purpose of the study

The main purpose of the present study is to investigate the role of culture in subjective experience of architecure. According to 'perceptualist' hypothesis, all observers, regardless of their cultural background, see architectural objects similarly and therefore they should experience them similarly (Arnheim, 1949, 1969, 1980; see also Di Dio et al., 2007; Gregory et al., 1995; Ramachandran & Hirstein, 1999; Redies, 2007; Redies et al., 2007; Spehar et al., 2003; Vartanian et al., 2013; Zeki, 1999). On the other hands, 'culturalist' hypothesis predicts that subjective experience of architectural scenes is culture-bound (Gombrich, 1969, 1973). According to this hypothesis, the culture is not effective only as explicite bias for same-culture objects (e.g. Japanese like Japanese objects, Serbs like Serbian objects), but it is effective in processesing of all perceptual stimuli (Benson, 2000; Bruner, 1990, 1996; Kitayama, 2002; Markus & Kitayama, 1991; Shweder & Sullivan, 1993).

In this study we compared the experience of Serbian and Japanese participants. Serbian participants represented Western culture, whereas Japanese participants represented Eastern culture (we were aware that Serbia is not typical representative Western culture, but for Japanese standards it is definitively Western). We must emphasize that the purpose of this study is to specify the general effect of culture (Western-Eastern), but not to study specific cultural dimensions of Serbia and Japan.

In the two preliminary studies sets of architectural objects (stimuli) and descriptors of subjective experience (scales) were selected. In the main experiment two groups of participants, Serbian and Japanese, rated the set of selected Serbian and Japanese architectural objects on a set of selected scales. Factor analysis of the ratings was performed in order to reduce the ratings on elementary scales to smaller number of subjective dimensions (factors). Analyses of variance was used in order to specify the effects of participants' Country (Serbia and Japan) and Category of architectural objects (Serbian and Japanese) on subjective ratings. Discriminant analysis were used in order to investigate the correspondence between categorization based on subjective ratings and objective categorization of both architectural objects (Serbian and Japanese) and participants (Serbian and Japanese).

Preliminary study 1: Selection of stimuli

Selection of stimuli was based on four criteria.

1 *Two-cultures.* Objects from both cultures Serbian and Japanese were included in stimulus set.

2. *Basic cultural effects.* In order to eliminate explicite cultural bias and direct effect of familiarity, we excluded all typical and well-known Serbian and Japanese buildings, such as churches, temples, historical buildings, classical ethnic houses and so forh. Only less known objects from both cultures were selected.

3. *Minimalistic objects.* Architectural objects (exteriors and interiors) were made of concrete, stone, wood and sheet metal. They have plain and almost achromatic facades, with simple, regular (rectangular) forms. Interiors are almost completely empty, with only a few pieces

of furniture. Objects have either residential or public functions (technical objects, public toilets, shelters, storages and so on).

4. *Objects balance.* We selected two parallel sets of architectural objects, twelve Japanese and twelve Serbian: for each Japanese object we found corresponding (similar) object in Serbia (see Figure 2). Similarity criterion was purely visual (color, shape, contours orientation and surface distribution). The larger set of twenty-four photographs of Japanese objects was downloaded from internet, whereas the Serbian objects were photographed by the authors of the present study. The authors attempted to reach the greatest possible similarity between photographed scenes and corresponding Japanese models. From the set of twenty-four pairs of objects twelve pairs were selected for final stimulus set. In short interview with group of twelve participants we did not find that they were able to notice that objects belonged to different cultures.

Figure 2. Japanese and Serbian architectural objects that were used as stimuli (j = Japanese, s = Serbian).

Preliminary study 2: Selection of descriptors

The purpose of this preliminary study was to select appropriate pairs of descriptors in order to create the instrument (set of bipolar rating scales) for the main experiment. The selection was not theoretically biased (e.g. based on sociological or anthropological analyses), but it was empirical. A group of five participants, experts in architecture and cognitive psychology were asked to list attributes (adjectives) that describe their experience of presented 24 architectural objects (see the stimuli selected in Preliminary study 1). Having in mind that the present study was focused on specific category of architectural objects, participants were asked to concentrate only on presented objects, not to architecture in general. In order to get the complete impression of objects category, participant were presented with all 24 architectural objects (slide show, one by one stimulus). After this observation trial, participants started to make a list of descriptors while images of architectural objects were repeatedly shown. The list of twelve most frequent descriptors (adjectives) was selected and, in order to generate bipolar rating scales for the main experiment, adjectives with opposite meaning were specified (e.g. adjective 'Beautiful' was associated with its antonym, 'Ugly'). These twelve pairs of adjectives are shown in Table 1.

Table 1
Twelve pairs of adjectives selected in Preliminary study 1 are shown in English, Serbian and Japanese.

English translation		Serbian adjectives		Japanese adjectives	
BORING	INTERESTING	DOSADNO	ZANIMLJIVO	一時的な	永久的な
SIMPLE	COMPLEX	JEDNOSTAVNO	SLOŽENO	脆い	頑健な
FRAGILE	FIRM	KRHKO	ČVRSTO	空	一杯
UNIPOSING	IMPOSING	NAMETLJIVO	NENAMETLJIVO	単純な	複雑な
UNPLEASANT	PLEASANT	NEPRIJATNO	PRIJATNO	不完全な	完全な
INCOMPLETE	COMPLETE	NEZAVRŠENO	ZAVRŠENO	古い	新しい
RAMSHACKLE	PRESERVED	OSTARELO	OČUVANO	不快な	快い
EMPTY	FULL	PRAZNO	PUNO	老朽化した	保存状態の良い
TRANSIENT	DURABLE	PROLAZNO	TRAJNO	退屈な	面白い
UGLY	BEAUTIFUL	RUŽNO	LEPO	貧しい	豊かな
POOR	RICH	SIROMAŠNO	BOGATO	差し出がましい	差し出がましない
OLD	NEW	STARO	NOVO	見苦しい	美しい

Experiment

In the final experiment Serbian and Japanese participants rated both Serbian and Japanese architectural objects on descriptors of subjective experience.

Method

Participants. Twenty-one students from the Department of Psychology, University of Belgrade, Serbia (9 males, 12 females, mean age 22.2) and twenty students from the Kyoto University, Japan (11 males, 9 females, mean age 26.5) and participated in the experiment.

Stimuli. Twenty four photographs of architectural objects (12 Serbian and 12 Japanese objects) previously selected in the Preliminary study 2 (see Figure 2).

Procedure. The twenty-four stimuli were presented to Serbian and Japanese participants in same pseudo-randomized order. Experiment was conducted separately in two Laboratories, Laboratory of Experimental Psychology in Belgrade and Kyoto University. In both Laboratories stimuli were shown on computer screens (Belgrade: resolution 1920x1080; Kyoto: resolution 2560x1600). Stimuli subtended visual angle of 13 deg vertically and 15 deg horizontally. Stimuli were presentend in random order. Participants were asked to rate the stimuli on 12 seven-step bipolar scales (see Table 1). Participants were told that grades *–2* and *2* indicate the extreme intensity of descriptors expression. Information about the origin of architectural objects (Serbian or Japanese) was not provided to participants.

Results

Factor analysis

Three-dimensional data matrix Participants × Stimuli × Scales were reduced in two-dimensional matrix using the so-called 'string-out' method: individual matrices for 24 stimuli were arranged one below the other in the single matrix (see Osgood et al., 1957, 1975). We were aware that the 'stringing out' method was not ideal, but it served as the best possible solution for the purpose of our study. Namely we were primarily interested in general factorial structures of ratings, but not in individual differences, so we could allow the multiplication of the relatively small participant sample that caused the artificial reduction of variance coming from participants (the same subjects sample is repeated 24 times).

A principal component analyses with *Varimax* rotation revealed three interpretable factors with eigenvalues above 1 (non-rotated solution and oblique rotations, such as *Promax*, revealed almost identical factorial structures). Factors, with percentages of explained variance and scales with the highest loading indexes (above 0.600), are shown in Table 2.

Table 2
Results of the principal component analysis with Varimax rotation are shown. Three factors with the percent of explained variance and the loadings indexes of most loaded scales. Full titles of scales (positive and negative poles) are shown in Table 1 and Appendix 2.

F1: BEAUTY	40.69 %	F2: FIRMNESS	10.63 %
Beautiful	.786	Firm	.812
Pleasant	.781	Durable	.811
New	.778		
Preserved	.748	F3: FULLNESS	9.60 %
Rich	.703	Full	.772
Interesting	.671	Complex	.686

Analysis of variance

Participants' ratings were further analyzed using a two-way mixed-design ANOVA with *Country* as a between-subjects factor (Serbia and Japan) and *Category* of architectural objects as a within-subjects factor (Serbian and Japanese objects). Ratings were transformed from bipolar (–2 to 2) to unipolar values (1–5), and then the ratings for the two categories of stimuli (Serbian and Japanese) were averaged (12 stimuli per category, see Appendix 1). Separate analyses were conducted for the ratings of three dimensions of subjective experience. Each dimension was represented by the mean value of the two most loaded scales: Beauty (Beautiful and Pleasant), Firmness (Firm and Durable) and Fullness (Full and Complex). Two scales per dimension were selected because the dimensions Firmness and Fullness included only two scales with loadings above .600. Dimension Beauty had more high loaded scales, but we selected only two most loaded scales in order to equalize it with other two dimensions. Ratings for all dimensions were shown in Figure 3.

Beauty. The main effect of *Country* was significant, F (1, 39) = 8.67, $p<.01$, ηp^2 = .877: Japanese participants rated the architectural objects as more beautiful and more pleasant (i.e. less ugly and less unpleasant) than Serbian participants. The main effect of *Category* was significant as well, F (1, 39) = 326.80, $p<.01$, ηp^2 = .172: Japanese architectural objects was rated as more beautiful and more pleasant (i.e. less ugly and less unpleasant) than Serbian objects. *Country* x *Category* interaction was significant, F (1, 39) = 22.39, $p<.01$, ηp^2 =.346. Post hoc tests (Bonferroni) indicated that this interaction is based on a difference in ratings of Japanese architectural objects ($p<.01$), whereas the difference in ratings of Serbian objects was not significant: Japanese participants rated the Japanese objects as more beautiful and more pleasant (i.e. less ugly and less unpleasant) than Serbian participants (see Figure 3).

Firmness. The effect of *Country* did not reach significance, while the effect of *Category* was significant, F (1, 39) = 68.45, $p<.01$, ηp^2 = .637: Japanese architectural objects were rated as firmer and more durable than Serbian objects. *Country* x *Category* interaction was significant, F (1, 39) = 24.62, $p<.01$, ηp^2 = .387. Post hoc tests (Bonferroni) indicated that this interaction is based on difference in ratings of architectural objects ($p<.01$), whereas the difference in ratings of Japanese objects was not significant: Serbian participants rated Serbian objects as firmer and more durable than Japanese participants (see Figure 3). In addition, post hoc tests indicated the significant difference in Firmness between Japanese and Serbian objects, but only for Japanese participants ($p<.01$), whereas, Firmness was not discriminative for Serbian participants (see Figure 3).

Fullness. The main effect of *Country* was significant F (1, 39) = 5.49, $p<.05$, ηp^2 = .123:. The main effect of *Category* was significant, F (1, 39) = 10.87, $p<.01$, ηp^2 = .218: Japanese architectural objects cluster was rated as fuller and more complex than Serbian objects. *Country* x *Category* interaction

was significant, F (1, 39) = 4.03, p<.01, ηp^2 =.094 Post hoc tests (Bonferroni) indicated that this interaction is based on difference in ratings of Serbian architectural objects (p<.01), whereas the difference in ratings of Japanese objects was not significant: Japanese participants rated the Serbian objects as more fuller and complex than Serbian participants (see Figure 3). In addition, Japanese participants rated similarly both Serbian and Japanese objects (no significant difference obtained), whereas Serbian participants rated Serbian objects emptier and simpler than Japanese objects (p<.01).

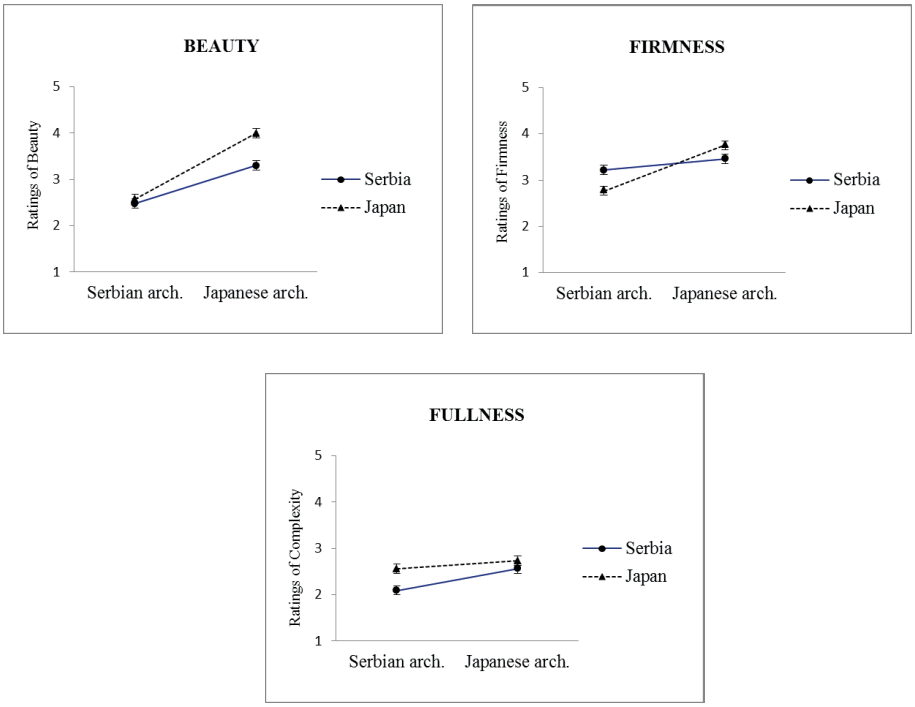

Figure 3. Mean ratings of Serbian and Japanese architectural objects on three dimensions of subjective experience: Beauty, Firmness and Fullness. Ratings of Serbian and Japanese participants are represented by separate lines.

Discriminant analysis

Two groups of discriminant analyses were used in order to specify the classification power of three dimensions, Beauty, Firmness and Fullness. In the first group we intended to investigate whether the subjective experience of 24 architectural objects (i.e. the profiles of objects' ratings on Beauty, Firmness and Complexity) corresponded to their objective categorization (two categories: 12 Serbian and 12 Japanese objects). The second group of analyses were performed

in order to investigate the categorization of Serbian and Japanese participants according to their subjective experience.

Categorization of objects.

Serbian participants. A single discriminant function of objects for Serbian participants was obtained. Standardized canonical coefficients and a structure matrix for the dimensions Beauty, Firmness and Complexity are shown in Table 3. The canonical correlation was significant: .592, $\chi^2(3) = 8.84$, $p<.05$. As the structure matrix has shown, Beauty had the highest canonical coefficient and highest index of structure matrix. The discriminant function correctly classified seven of twelve Serbian architectural objects (58.3%), while five of them were misclassified in category of Japanese architectural objects. In addition, discriminant function correctly classified nine of twelve Japanese architectural objects (75%) and three of them were misclassified as Serbian architectural objects.

Table 3
Results of discriminant analysis of objects for Serbian and Japanese participants

	Standardized canonical discriminant function coefficient	Structure matrix
Serbian participants		
Beauty	1.025	.992
Firmness	.103	.265
Fullness	-.084	.522
Japanese participants		
Beauty	1.124	.991
Firmness	-.161	.602
Fullness	-.131	.131

Japanese participants. A single discriminant function of objects for Japanese participants was obtained. Standardized canonical coefficients and a structure matrix for the dimensions Beauty, Firmness and Complexity are shown in Table 4. The canonical correlation was significant: .713, $\chi^2(3) = 14.53$, $p<.01$. As the structure matrix has shown, Beauty had the highest canonical coefficient and highest index of Structure matrix. The discriminant function correctly classified ten out of twelve Serbian architectural objects (83.3%), and two of them were misclassified into the category of Japanese architectural objects. In addition, discriminant function correctly classified nine out of twelve Japanese architectural objects (75%), while three of them were misclassified as Serbian architectural objects.

Categorization of participants.

Serbian objects. A single discriminant function of participants for Serbian objects was obtained. Standardized canonical coefficients and a structure matrix for the dimensions Beauty, Firmness and Complexity are shown in Table 4.

The canonical correlation was significant: .638, $\chi^2(3) = 19.60$, $p<.01$. Beauty had the highest canonical coefficient and highest index of structure matrix. The discriminant function correctly classified eighteen out of twenty-one Serbian participants (85.7%), while three of them were misclassified into the category of Japanese participants. In addition, discriminant function correctly classified eighteen out of twenty Japanese participants (90%) and two of them were misclassified as Serbian participants.

Table 4
Results of discriminant analysis of participants for Serbian and Japanese objects

	Standardized canonical discriminant function coefficient	Structure matrix
Serbian objects		
Beauty	-.146	.125
Firmness	.848	.791
Fullness	-.523	-.595
Japanese objects		
Beauty	.993	.864
Firmness	.357	.722
Fullness	-.403	-.011

Japanese objects. A single discriminant function of participants for Japanese objects was obtained. Standardized canonical coefficients and a structure matrix for the dimensions Beauty, Firmness and Complexity are shown in Table 5. The canonical correlation was significant: .655, $\chi^2(3) = 20.99$, $p<.01$. As the structure matrix has shown, Firmness had the highest canonical coefficient and highest index of Structure matrix. The discriminant function correctly classified sixteen out of twenty-one Serbian prticipants (76.2%), and five of them were misclassified into the category of Japanese participants. In addition, discriminant function correctly classified sixteen out of twenty Japanese participants (80%), while four of them were misclassified as Serbian participants.

Correlations

All inter-group (Serbia-Japan) correlations between ratings of architectural objects on three dimensions were significant: Beauty, $R(23)= .781$, $p<.01$, Firmness $R(23)=.662$, $p<.01$ and Fullness, $R(23)= .708$, $p<.01$.

Correlations between dimensions whithin groups revealed interesting results. In the Serbian group Beauty was significanly positively correlated with Fullness, $R(23)=.655$, $p<.01$, while other correlations were not significant. In the Japanese group Beauty was significanly positively correlated with Firmness $R(23)=.765$, $p<.01$, while other correlations were not significant.

Discussion

The purpose of the present study was to compare Serbian and Japanese participants in their subjective experience of Serbian and Japanese architectural objects. Subjective experience was operationalized trough three dimensions that were obtained in a factor analysis of the elementary semantic differential ratings: Beauty (scales Beautiful and Pleasant), Firmness (scales Firm and Durable) and Fullness (scales Full and Complex).

Analyses indicated significant correlations between Serbian and Japanese participants in objects ratings on all three dimensions, suggesting high inter-cultural congruency. In addition, discriminant analyses have shown that both groups of participants were relatively highly sensitive for objective categorization of architectural objects into Serbian and Japanese categories. More precisely, both Serbian and Japanese participants agreed that Japanese architectural objects looked more beautiful and firmer than Serbian objects (Figure 1). These findings suggest that, although two categories of stimuli are very similar in many aspects (scene structure, objects shape, size, color, texture, etc.; see Figure 1), some cross-category differences are sufficiently strong to induce the differences in participants experience. Further studies are needed to specify these discriminative stimuli features. On the other hand, both groups of participants are perceptually sensitive to the same stimulus features, demonstrating that they may share similar subjective experience of architectural objects. Generaly, this is in line with perceptualist hypothesis that expects no substantial cultural differences in subjective experience (Arnheim, 1949, 1969, 1980; Ramachandran & Hirstein, 1999; Redies, 2007). Our findings are also congruent with results of Vannucci and colaborators' study (Vannucci et al., 2014). In this study Italian and Japanese participants performed aesthetic judgment task on drawings of buildings with higher and lower aesthetic rank. The results revealed that aesthetic judgment of buildings depends on stimulus aesthetic rank irrespectively of particpants native culture.

However, besides the general agreement between Serbian and Japanese participants, we identified some cultural differences. Discriminant analyses relatively correctly categorized Serbian and Japanese participants, and analysis of variance indicated a partial bias for objects that belong to self– and other-culture. Compared to Serbian participants, Japanese participants rated Japanese architectural objects as more beautuful, while, compared to Japanese, Serbian participants rated Serbian objects as less fragile and emptier than Japanese objects (Figure 1). These findings are partially consistent with culturalist hypothesis that East Asians and Westerners use different cognitive strategies in information processing, such as causal explanation, and logical vs. dialectical inference (Nisbett et al., 2001). However, inter-group bias can not be fuly accounted for by the cultural hypothesis. Namely, we did not identify systematic tendency of our participants to evaluate the products of one's own group more positively and products of other groups more negatively (cf. Hewstone, Rubin, & Willis, 2002). We only found differences in degree: compared to Serbian participants

Japanese participants rated Japanese objects more beautiful (possible cultural bias), but both groups rated Japanese objects more beautiful than Serbian objects (no cultural bias).

Alternative culturalist interpretation of aforementioned 'differences in degree' could come from the studies of perceptual style in two cultures. These studies suggest that East Asian participants tend to employ greater attention to contextual information than participants in Western cultures (Ji, Peng, & Nisbett, 2000; Kitayama, Duffy, Kawamura, & Larsen, 2003) and that Japanese participants are aesthetically more sensitive to visual context than US participants (Masuda, Gonzales, Kwan, & Nisbett, 2008). However, the difference in perceptual style can not predict the direction of inter-cultural differences obtained in our study. For instance, if Japanese participants would be more sensitive for minute details in Serbian architectural scenes that allude the 'atmoshere' of decrepitude and disrepair, than they should rate them uglier than Serbian participants do. However, that was not the case, because both groups rated Serbian objects equally ugly.

Habituation for same-culture objects could be also taken into account as a possible factor of obtained inter-cultural differences. Namely, mere exposure of stimulus (Zajonc, 2001) combined with so-called 'bias for status quo maintenance' (Eidelman, & Crandall, 2012) could induce the preference for same-culture objects. According to the processing fluency theory, mere exposure of stimulus facilitates the information processing fluency and consequntly induces a positive affect – easily processed stimulus is preferred stimulus (Reber, Schwarz, & Winkielman, 2004). However, this approach can not account for all our data. For instance, Serbian participants are definitely not more familiar with Japanese objects, but they rated them more positevely (as more beautiful) than their own culture objects.

Finally, correlational analyses revealed interesting inter-group differences. In Serbian group Beauty is significantly correlated only with Fullness (the fuller the more beautiful, the emptier the uglier), while in Japanese group Beauty is significantly correlated only with Firmness (the firmer the more beautiful, the more fragile the uglier). Both correlations and analysis of variance indicate that Firmness is aesthetically more important for Japanese participants (greater correlation with Beauty and greater difference between two categories of objects, see Figure 3), whereas Fullness is more important for Serbian participants (greater correalion with Beauty and greater difference between two categories of objects, see Figure 3).

Our data support the culturalist idea that Western culture evaluates emptiness negatively, but they are not in line with the idea that Eastern cultures evaluate emptiness more positively (e.g. some authors argue that Westerners associate emptiness with poverty and nothingness, whereas Eastern Asians associate it with spirituality, peace, eternity, etc.; cf. Karlfried, 1974; Keene, 1969; Lebra, 1976; Pasqualotto, 1992; Verhetsel et al., 2013). Nevertheless, aesthetic sensitivity of Japanese participants to firmness and durability could

be interpreted within culturalist framework as well. For instance, preference for durability in Eastern cultures could be a manifestation of general appreciation of eternity (cf. Karlfried, 1974; Lebra, 1976; Pasqualotto, 1992; Verhetsel et al., 2013). On the other hand, preference for durability is not in line with traditional Japanese (Zen-Buddhist) aesthetic and ethic values that are derived from the concept of emptiness (*ma*), aesthetic appreciation for transience, imperfection, insufficiency or incompletion (wabi-sabi) (Cox, 2003; De Barry, 1995; Eckel, 1992; Isozaki, 2006; Kato, 1971; Marra, 2001; Moore, 1967; Parkes, 1995; Pilgrim, 1986; Saito, 1997; Tsunoda et al., 1964).

Further studies should specify more precisely the aesthetic experience of durability and firmness in two cultures. In addition, the concept of culture should be specified as more complex system that include different sub-cultures, different philosophical and religious influences, and so on. Namely, Western and Eastern cultures are not monolithic systems. Serbian and Japanese cultures are complex cultures as well, so, some traditional concept encompasses different sub-cultures. For instance, in his analysis of the Japanese aesthetics of 'imperfection and insufficiency', Saito (1997) stressed: "The Japanese aesthetic tradition, just like any other cultural tradition, encompasses diverse tastes and arts. They range from the minimalism of Noh theater to the flamboyance of Kabuki theater, the somber severity of monochrome brush ink paintings to the opulence of gold-gilded screen paintings, and the simple rusticity of tea huts to the august majesty of castles." (Saito, 1997, p. 377).

In summary, our study have shown that Serbian (Western) and Japanese (East Asian) participants show general similarity in their subjective experience of architectural objects. This similarity is most probably based on similar, culturally independent perceptual, affective and cognitive underlying processes. The role of culture is specified as evaluative and directional: the ratings of architectural objects are directed by some culturally specific values (e.g. fullness, firmness etc.).

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