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Milošević, M. & Ristić, I. J.

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## APPRAISAL OF FAMILIARITY WITH CONTENT: ITS RELATIONSHIP WITH DIMENSIONS OF EMOTIONAL EXPERIENCE

*Miloš Milošević<sup>1</sup> & Irena J. Ristić<sup>2</sup>*

*<sup>1</sup>Singidunum University, Serbia <sup>2</sup>University of Arts in Belgrade, Serbia*

**Abstract:** The aim of this study was to examine the relationship between the dimensions of the emotional experience (valence and arousal), the quality of emotions (happiness, sadness, fear, anger, surprise, and disgust), and the appraisal of familiarity with content. Ninety-two participants assessed how familiar the content of the 40 photographs were to them. The photographs were selected from the NAPS database and systematically varied along the dimensions and qualities of the emotional experience. Statistically significant correlations were obtained between the appraisal of familiarity and the dimensions of the emotional experience. The correlation of familiarity appraisal with arousal was negative, unlike findings from earlier studies. Significant positive correlation with happiness and negative correlations with sadness, fear, surprise, anger, and disgust were also found.

**Key words:** Appraisal, Arousal, Emotional experience, Familiarity, Valence

### INTRODUCTION

Theories explaining emotions can be divided into dimensional and discrete emotion approaches. The two-dimensional model, advocated by various theorists (see Mauss & Robinson, 2009), is grounded on findings from neurophysiological studies, which explain emotions as the cognitive interpretation of information from two neurophysiological systems—valence and arousal (Posner, Russell, & Peterson, 2005). Valence refers to the basic quality of subjective experience - positive or negative affectivity, while arousal represents the degree of neurophysiological activation. However, findings from other research suggest that the two-dimensional model is not sufficient for the valid description of all the variations of subjective experiences (Bigand, Vieillard, Madurell, Marozeau, & Dacquet, 2005), with surprise being strongly related to appraisals of novelty and unpredictability, as the most obvious one (Fontaine, Scherer, Roesch, & Ellsworth, 2007). The discrete models of emotions, on the other hand, rely on the qualitative differences of basic emotions, such as happiness, sadness, fear, surprise, anger, and disgust (Ekman, 1992), and, hence, focus on manifest variations of

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**Address:** Miloš Milošević, Faculty of Physical Education and Sport Management, Singidunum University, Danijelova 32, 11 000 Belgrade, Serbia. E-mail: milosmilosevic80@yahoo.com

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emotional experience. Research showing that the presumed neurophysiological bases of the primary emotions are not confirmed constitutes the greatest criticism of such models (Posner et al., 2005). Nevertheless, there are studies highlighting neurophysiological that lay the foundation for the further study of emotions, through both the dimensional and the discrete emotions approach (Tettamanti et al., 2012). In addition to this, given that both theoretical approaches are greatly overlapping in their explanatory value (Reisenzein, 1994), using a combined approach, investigating both the intensity of basic emotions (happiness, anger, fear, disgust, sadness, and surprise) and the affective dimensions of valence and arousal (Riegel et al., 2016), in further studies are justified and also needed (Briesemeister, Kuchinke, Jacobs, & Braun, 2015; Eerola & Vuoskoski, 2011; Hinojosa et al., 2016). Turning discrete emotions in continuous variables, that is, using the intensity of basic qualities of emotions, is one possible way of achieving this, which was used in previous studies (Briesemeister et al., 2015; Mikels et al., 2005; Riegel et al., 2016; Ristić & Milošević, 2017a, b; Stevenson et al., 2008).

The neglect of the cognitive processes underlying the emotional experience (Nerantzaki & Efklides, 2019), is one of the basic objections to the dimensional or discrete emotions theories. Appraisal theories posit that cognitive activity, namely the appraisal of features of the emotion-arising stimuli rather than the stimuli themselves, is a crucial component of emotional experience (Fernandoa, Kashimaa, & Lahama, 2017; Roseman, Antoniou, & Jose, 1996). These theories are closer to the discrete approach to emotions (Roseman et al., 1996), but empirical studies also suggest that appraisals can be a dimension of the affective experience space (Gillioz, Fontaine, Soriano, & Scherer, 2016; Horiuchi et al., 2015). Yet, the exact nature of the relationship between appraisals and emotions is still unclear (Fernandoa et al., 2017).

The process of familiarity appraisal is one such cognitive process assumed to play a significant role in the emotional experience, both in discrete (Roseman et al., 1996) and dimensional emotion theories (Janković, 2014). Along with recollection, familiarity is a process underlying recognition memory (Wixted, 2007) and can be described as a feeling about memory content without additional retrieval information (Migo, Montaldi, Norman, Quamme, & Mayes, 2009). The source of recognition of a specific stimulus and its connection to feeling of familiarity can primarily be explained through the person's previous encounters and experience with the stimulus, which leaves behind a trace in memory, regardless of whether recognition is directly connected with the memory trace, or indirectly through processing fluency (Whittlesea & Williams, 2000). Namely, even if processing fluency can be artificially induced, leading to a false sense of recognition, under normal circumstances it is the consequence of the traces in memory that are related with current stimulus, and lead to correct recognition, or only appear to do so, which leads to errors, or rather, to false recognition. Feeling of familiarity is explained as unconscious attribution about the fluency of current processing performance (Kelley & Jacoby, 1990) or alternatively as perception of a discrepancy between the actual and expected fluency of processing (Whittlesea & Williams, 2000). Empirical evidence is also supporting the hypothesis that feelings of familiarity can be caused by autonomic arousal associated with cognitive resource allocation in situations when information about the previous experience with the stimuli is

difficult to retrieve (Morris et al., 2008). Still, the nature of the relationship of familiarity with dimensions of emotional experience is still insufficiently researched and controversial.

Highly positive correlations of valence and feeling of familiarity were found in research on the development of aesthetic preferences (Janković, 2014) and its origins (Chenier & Winkielman, 2009), emotional experience in music listening (Huron, 2006; McLachlan, Marco, Light, & Wilson, 2013; Orr & Ohlsson, 2001; Schellenberg, Peretz, & Vieillard, 2008; Szpunar, Schellenberg, & Pliner, 2004; Van den Bosch, Salimpoor, & Zatorre, 2013), food preference (Padulo et al., 2017), and assessing of emotional experience evoked by words (Yao, Wu, Zhang, & Wang, 2017). While there seems to be consensus about the positive correlation between valence and appraisal of familiarity, the relationship of arousal with appraisal of familiarity is less researched (Van den Bosch et al., 2013). Positive correlations of arousal and familiarity have been obtained in some of the mentioned studies (Janković, 2014; Van den Bosch et al., 2013) but absence of significant correlations were also found (Yao et al., 2017). Furthermore, new research on the role of emotions in the creative process suggests that the correlation between arousal and the appraisal of the familiarity with content is negative. The arousing stimuli were marked as unfamiliar by the artists-participants, which might be explained by their preference of novelty, or by the psychodynamic mechanism of repression (Ristić & Milošević, 2017a, b). The association of familiarity appraisal with basic discrete emotions is an even less researched topic, as most of the studies in this field are dealing with relationship of familiarity appraisal and valence. Consequently, if we take into account two-dimensional theories of emotion (see Mauss & Robinson, 2009) results of mentioned studies can be interpreted as a positive correlation with positive emotions such as happiness, and negative correlation with negative such as fear, anger or disgust. Similar results have been obtained in research on the role emotions in the creative process (Ristić & Milošević, 2017a, b). However, because this association was not the primary object of the above studies, these findings should be considered with caution. Finally, it should be noted that in most of the studies dealing with the relationship of familiarity appraisal and emotions, familiarity appraisal was the predictor variable. The question is whether the same relationships would be obtained if the dimensions of emotional experience (valence and arousal) were the predictors of familiarity appraisal.

### ***The present study***

The aim of this study was to examine the association between appraisals of familiarity and the dimensions of the emotional experience (valence and arousal) as well as the quality of emotions (happiness, sadness, fear, anger, surprise, and disgust). While the findings of research investigating the association of emotional and cognitive processes are contradictory, especially when it comes to the relationship of arousal and appraisal of familiarity, based on results of our earlier studies it is possible to assume that the correlation between arousal and the appraisal of familiarity is negative (Hypothesis 1). Furthermore, the correlation between valence and the appraisal of familiarity with content is positive. Specifically, positive

valence will be associated with higher appraisal of familiarity with content, and negative valence with lower appraisal of familiarity (Hypothesis 2). Moreover, as valence is associated with the quality of emotional experience, namely the specific emotions experienced, stimuli that evoke positive emotions, such as happiness, will be assessed as more familiar than those that evoke negative emotions, namely, sadness, fear, anger, and disgust (Hypothesis 3). Finally, the dimensions of the emotional experience (specifically, valence and arousal), as well as the quality of emotions (specifically, happiness, anger, fear, sadness, disgust and surprise), will predict the appraisal of familiarity (Hypothesis 4).

## **METHOD**

### ***Participants***

A convenience sample of 92 college students was used. There were 47 men and 45 women, with a mean age of 21.1 ( $SD = 2.45$ ,  $RG = 18-34$  years). The sample size was determined after applying a power analysis. For one tail  $t$  tests - Correlation: Point biserial model, with  $\alpha = .05$ , power  $1-\beta = 0.80$ , and medium effect size ( $\rho = 0.30$ ) (Faul, 2014), the sample size should comprise at least 64 participants. A fixed model was used for the linear multiple regression: with  $R^2$  deviation from zero with  $\alpha = .05$ , power  $1-\beta = 0.80$ , large effect size ( $f^2 = 0.15$ ), and six predictors (Faul, 2014), for which a minimal sample size should comprise 46 participants.

### ***Material – Stimuli***

Photographs from the standardized Nencki Affective Picture System (NAPS BE) set (Riegel et al., 2016), frequently used in psychological research due to its solid metric characteristics (Marchewka, Zurawski, Jednoróg, & Grabowska, 2014), were used as visual stimuli. Every photo in NAPS BE has its validated values: valence (ranging from 1 = very negative to 9 = very positive, with 5 = neutral/ambivalent); arousal (ranging from 1 = relaxed to 9 = aroused, with 5 = neutral), happiness, sadness, fear, anger, surprise, and disgust (with 1 indicating “not at all” happy, sad, afraid, surprised, angry, disgusted; and 7 indicating “very much” of the same quality of emotion evoked by each image). In this way, the discrete emotions evoked by stimuli turned in continuous variables, which was the procedure used in a lot of previous studies (Briesemeister et al., 2015; Mikels et al., 2005; Stevenson et al., 2008). To dissociate the emotion evoked by the photo from its content, as much as possible, various techniques such as automatic color/contrast adjustment were used in the construction of the base (Marchewka et al., 2014). For this study, it is important to note that all the photos in the base were original and the depicted scenes, persons and places were not widely known (Marchewka et al., 2014).

For this study, 40 colored photographs were selected in order to proportionally cover the whole dimensional affective space (see Appendix 1), that is, 6 photos of animals, 10 photos of faces, 5 photos of landscapes, 8 photos of objects, and 8 photos of people. The colored photos of animals, persons, faces, objects, and landscapes were evenly distributed across the whole valence/arousal spectrum. The participants were divided into six groups, which made possible that the order of stimuli presentation be counterbalanced. After the gathering of demographic data, the participants were shown the 40 photographs on a 42-inch plasma screen, with participants sitting in front of screen in average distance of two meters. Photos were presented full screen with resolution of 1600x1200 (20,5 \* 36.5 inch).

## ***Measures***

### *Familiarity appraisal*

The familiarity with the content of each photograph was measured with the question "According to your personal experience, how familiar is to you what you see in the photo? Rate at the scale from 1 to 9". Instructions explicitly stated that participants were not expected to rate whether they had seen the specific photographs earlier, but rather how familiar was the content of each photo to them. Familiarity ratings were noted on answer sheets containing a nine-point unipolar scale spanning from 1 (totally unfamiliar) to 9 (totally familiar). There was no time limit for the response. The answer sheets were completed right after the presentation of each photograph and before the next one was presented. When all participants were ready to go on, the researcher pressed ENTER for the next picture to appear on the screen and reminded the instructions.

## ***Procedure***

Participation in the study was voluntary. All participants provided written consent, while the experiment was conducted in accordance with the Code of Ethics of the University of Arts and Singidunum University in Belgrade, as well as with the European Commission's General Data Protection Regulation - GDPR, and the APA-prescribed Ethical Principles and Code of Conduct.

## **RESULTS**

The descriptives of the familiarity scores showed that both skewness ( $\gamma_1 = .016$ ) and kurtosis ( $\gamma_2 = -.313$ ) were within the normal distribution. Pearson correlation analysis was performed to determine the association between the familiarity with content appraisal and the emotional experience characteristics, as given in NAPS based on the standardization of the photos' values. As expected, statistically significant correlations were found between the appraisal of

familiarity with content, on the one hand, and the variables of the emotional experience, on the other. Specifically, there was high negative correlation with surprise,  $r = -.73, p < .001$ , and moderate negative correlations with arousal,  $r = -.52, p < .01$ , fear,  $r = -.58, p < .001$ , disgust,  $r = -.57, p < .001$ , sadness,  $r = -.42, p < .01$ , and anger,  $r = -.34, p < .05$ . There was a moderate positive correlation with valence,  $r = .52, p < .01$ , and happiness,  $r = .45, p < .01$ . These findings are in line with Hypotheses 1, 2, and 3.

**Table 1. Regression analysis of criterion variable appraisal of familiarity with content and predictor variables valence and arousal (Model 1) and happiness, sadness, fear, surprise, anger, and disgust (Model 2)**

Model 1	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	$\beta$		
(Constant)	5.519	1.134		4.868	.000
Valence	.326	.142	.348	2.294	.028
Arousal	-.428	.187	-.347	-2.288	.028
Model 2	Unstandardized Coefficients		Standardized Coefficients	t	Sig.
	B	Std. Error	$\beta$		
(Constant)	7.679	.761		10.097	.000
Happiness	.283	.176	.250	1.609	.117
Sadness	-.114	.188	-.109	-.609	.547
Fear	-.099	.333	-.057	-.296	.769
Surprise	-1.656	.436	-.779	-3.797	.001
Anger	.700	.283	.444	2.473	.019
Disgust	-.057	.236	-.044	-.241	.811

To test Hypothesis 4, multiple linear regression analysis was performed with ENTER method. The results of the regression analysis (see Table 1) indicated that 36% of the variance of the appraisal of familiarity with content was explained by valence and arousal,  $F(2, 39) = 10.527, R^2 = .36, p < .001$ . Likewise, in the second multiple linear regression

analysis, the qualities of emotion explained about 63% of the variance of the appraisal of familiarity,  $F(6, 39) = 9.530$ ,  $R^2 = .63$ ,  $p < .001$ , but only surprise and anger were statistically significant predictors. These results are in line with Hypothesis 4.

## **DISCUSSION**

This study aimed to examine the relationship of the familiarity with content appraisal with the dimensions of the emotional experience, namely, valence and arousal, and the quality of emotions (happiness, sadness, fear, anger, surprise, and disgust). Statistically significant correlations were obtained between all variables. Further, both dimensions of emotional experience and the quality of emotions were significant predictors of the appraisal of familiarity with content.

Our findings suggest that the less arousing the content of a photo the more familiar it was judged. This finding is in line with the first hypothesis. It is also in accordance with the results of research on emotions in the creative process (Ristić & Milošević, 2017a, b), but is contrary to findings of research on emotional experience in music listening (Van den Bosch et al., 2013) and the aesthetic experience (Janković, 2014). It is also contrary to findings of studies in which the source of familiarity was automatic arousal (e.g., Morris et al., 2008). The difference of our finding from other related studies could be attributed to the fact that in the mentioned studies the source of familiarity was examined exclusively in situations in which additional allocation of cognitive resources was needed in order for that stimulus to be defined as familiar or unfamiliar. This was not the case in the present research, in which the photos were relatively easy to process. That is why our finding would not be interpreted as evidence against the theory of automatic arousal as source of the appraisal of familiarity. On the other hand, the present study demonstrated that the connection of arousal and familiarity is far more complex than it seemed from the results of previous studies (Van den Bosch et al., 2013). When the study design was changed, and when arousal was manipulated instead of familiarity, the direction of correlation was also changed, that is, the connection became negative. This finding can be explained by a bi-directional relationship between appraisal of familiarity with content and arousal. Nevertheless, the relationship between arousal and appraisal of familiarity needs to be further investigated.

When it comes to the relations of familiarity appraisal with valence and quality of the emotional experience, the results were in line with the starting assumptions and, therefore, Hypotheses 2 and 3 were confirmed. The findings on the positive association between valence and appraisal of familiarity are in line with the majority of the findings from earlier research (Chenier & Winkielman, 2009; Huron, 2006; Janković, 2014; McLachlan et al., 2013; Orr & Ohlsson, 2001; Padulo et al., 2017; Ristić & Milošević, 2017a,b; Schellenberg et al., 2008; Szpunar et al., 2004; Van den Bosch et al., 2013; Yao et al., 2017).

With respect the predictive power of the dimensions and quality of emotional experience of the familiarity appraisal, the regression analyses showed that both valence and arousal as well as the quality of emotional experience predicted the familiarity appraisal,



thereby also confirming Hypothesis 4. These findings underscore the role of emotions in the cognitive process of appraisal of familiarity with content. However, in the case of the quality of emotional experience only surprise and anger were significant predictors, although all emotions contributed. The above findings suggest that surprise and appraisal of the familiarity with content, although closely related, are not the same phenomenon, as suggested by some researchers (Riegel et al., 2016). A clear distinction can be made between the cognitive and emotional process. Together with findings of earlier research (Chenier & Winkielman, 2009; Janković, 2014; Morris et al., 2008) it is plausible that there is a bi-directional relationship between cognitive processes, such as appraisal of familiarity with content, and dimensions of emotional experiences. The theoretical explanation of such a relationship, however, is not clear. For example, it is difficult to see how they fit with the evolutionary theory (Klein, Cosmides, Tooby, & Chance, 2002), fluency theory (Chenier & Winkielman, 2009; Kelley & Jacoby, 1990; Whittlesea & Williams, 2000) or the 3D dimensional affective space model (Janković, 2014). More detailed analyses discussing which of the existing theoretical explanations can better accommodate requires further research.

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**Appendix 1**

**Emotional experience characteristics for the 40 visual stimuli as given in the NAPS and mean appraisal of familiarity with content**

Photo	Happiness	Sadness	Fear	Surprise	Anger	Disgust	Arousal	Valence	Familiarity
Animals_007_h	1.95	1.29	3.44	2.33	1.51	1.5	4.74	4.82	5.1
Animals_022_h	2.3	1.42	3.02	2.3	1.37	1.6	3.75	5.11	4.72
Animals_055_h	2	1.13	2.98	2	1.18	1.35	3.61	4.54	4.27
Animals_062_h	1.7	1.84	1.48	1.51	1.4	3.14	2.55	4.56	5.98
Animals_065_h	1.38	1.26	1.92	1.92	1.24	3.77	3.39	3.71	5.29
Animals_074_h	1	5.49	3.21	3.05	4.51	3.36	5.82	1.97	5.12
Animals_136_h	3.7	1.07	1.42	1.17	1.02	1.12	2.98	6.35	7.83
Animals_173_h	5.15	1.05	1.18	2.56	1.03	1	3.87	7.49	4.97
Animals_205_h	1.05	2.39	3.02	2.77	1.75	4.05	3.98	3.43	3.74
Faces_001_h	5.23	1.03	1.39	1.32	1.08	1.05	3.72	7.26	7.5
Faces_017_h	1.34	4	1.82	1.67	1.79	1.71	4.05	3.11	4.11
Faces_019_h	1.26	4.2	2.25	3.11	2.39	2.89	4.07	3.2	4.47
Faces_104_h	4.31	1	1.03	1.29	1	1	3	7.03	7.74
Faces_166_h	1.55	2.7	1.53	1.64	1.3	1.26	2.43	4.2	5.17
Faces_172_h	1.03	5.49	3.15	2.62	2.92	2.69	5.21	2.05	4.11
Faces_182_h	2.7	1.17	1.07	1.14	1	1	1.49	5.43	6.87
Faces_190_h	1.52	2.28	1.42	1.31	1.12	1.42	1.98	4.63	5.91
Faces_301_h	1.3	3.03	1.92	1.76	1.18	1.16	3.36	4.08	5.55
Faces_363_v	2.41	1.55	1.12	1.17	1.42	1.07	2.05	5.07	8.58
Landscapes_042_h	2.55	1.39	1.14	1.5	1	1.05	1.84	5.14	6.4
Landscapes_063_h	2.26	1.34	1.16	1.26	1.19	1.08	2	5.33	7.52
Landscapes_075_h	2.79	1.16	1.11	2.03	1	1.08	2.62	5.68	4.77
Landscapes_130_h	2.32	1.3	1.3	1.26	1.08	1.2	2.22	5.05	6.57
Landscapes_183_h	5	1.13	1.03	1.5	1	1.03	3.59	7.27	6.74
Objects_010_h	1	1.26	1.21	1.66	1.2	2.71	2.49	4.53	4.36

*Emotions and appraisal of familiarity*

Objects_019_h	1.18	1.83	1.53	1.88	1.53	3.12	2.98	4	6.15
Objects_060_h	1	5.15	2.59	2.49	2.46	2.46	4.22	2.2	3.24
Objects_093_h	5	1.05	1.59	2.13	1	1	4.28	7.46	5.72
Objects_115_h	1.18	1.25	1.33	1.78	1.1	1.1	1.98	4.73	3.89
Objects_126_h	1.05	2.75	2.34	2.61	2.55	4.3	4	3.39	2.77
Objects_245_h	2.05	1.05	1.11	1.42	1.03	1.21	1.49	5.13	8.47
Objects_276_h	1.88	1.05	1.2	2.54	1.03	1.38	2.29	5.12	4.51
People_075_v	1	3.17	2.73	2.66	4.32	3.29	4.44	2.63	5.61
People_122_h	1.05	4.95	3.74	3.59	2.64	3.18	6.38	1.84	4.3
People_127_h	1.02	3.34	3.16	2.68	4.39	2.95	5	2.59	6.11
People_164_h	1.3	1.5	1.45	2.02	1.26	2.93	2.43	4.41	6.73
People_180_h	4.36	1	1.87	1.74	1	1	3.95	6.74	5.2
People_190_h	1.08	4.72	2.49	1.55	1.45	1.11	3.97	3.05	6.77
People_220_h	1	3.82	3.95	4.27	2.64	5.7	5.91	2.05	2.08
People_226_h	3.45	1.14	1.26	1.73	1	1.19	2.82	6	6.6