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Emotions and Familiarity of Content in Generative Processes of Prospective Artists

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Relations between creativity, dimensions of emotional experience (valence and arousal), and familiarity of content were examined in an experiment with 92 students, grouped into two sub-samples: art and non-art students. For stimulation, 40 photos were selected from the Nencki Affective Picture System, so that the values of the dimensions were systematically varied. Students were exposed to the photos and asked to rate the familiarity of their content, and then to generate a creative title for each of them. Measuring creativity was based on the coefficients, specially constructed and derived from the assessment of titles' originality. The analysis shows that valence, arousal, and familiarity might be the predictors of creativity and that unpleasant and novel content induces more creative answers. Generative processes of art-students show certain peculiarities: they are more sensitive to the external clues, especially novel and disturbing, which might be explained by the action model of creativity.

Key words: creativity, artists, emotion, valence, arousal, familiarity of content

Emotion can be defined as the actual, personal, internal response to external stimuli or mental representations, manifested not only through physiological changes and specific behaviors, but through the experiences as well (Cacioppo et al., 2000). The findings from cognitive and behavioral neuroscience suggest that all emotional states are cognitive interpretations of the sensations produced by two independent neurophysiological systems, marked as valence and arousal (Posner, Russell, & Peterson, 2005). Valence is a first dimension of emotion often labeled as hedonic tone: it describes the basic quality of an experience, that is the degree of (dis)pleasure evoked by specific stimulation. Arousal is a second dimension and it refers to the degree of neural activity that indicates the lev-

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el of tension in a particular emotional state. Results of studies also reveal the additional neurophysiological mechanism that confirms the existence of the special function related to emotional experience – an assessment of familiarity (Eichenbaum, Yonelinas, & Ranganath, 2007; Squire, Wixted, & Clark, 2007).

According to the findings from the last decades, the dimensions of emotional experience, that are valence and arousal, as well as assessment of familiarity might be relevant for generative processes within creative production. But the findings are quite contradictory. On the one hand, researchers offered the conclusion that positive mood can facilitate creative thinking (Baas, DeDreu, & Nijstad, 2008; Benjafield, 1996; Isen, 1993, 1999; Isen & Baron, 1991; Hirt, McDonald, & Melton, 1996; Subramaniam et al., 2013; Shapiro & Weisberg, 1999; Shapiro, Weisberg, & Alloy, 2000; Showers & Cantor, 1985). A moderate hypo manic state can encourage generative processes (Jamison, 1993), since people in a positive mood are more willing to explore new procedures (Ruder & Bless, 2003; Russ, 1993; Unkelbach et al., 2008). Positive content is integrated better within memory so it enables the spread of activation and increases the possibility of making remote associations, which are crucial for creative thinking (Isen, 1999). According to the study on different neural regions and processes which are involved in metaphorical comprehension, Subramaniam et al. have suggested "that positively valenced stimuli facilitate creative metaphoric processes (specifically novel metaphoric processes) by mediating attention and cognitive control processes required for the access, integration, and selection of semantic associations" (2013, p. 211). On the other hand, results from a series of studies suggest the existence of stimulating effects of moderately negative moods on creativity (Feist, 1999; Forgas, 2000; George & Zhou, 2002; Russ, Robins, & Christiano, 1999; Vosburg & Kaufmann, 1999).

Contradictory findings on the effects of emotional states on creativity can be explained by the impacts of contextual factors (Martin & Stoner, 1996), by different kind of tasks presented to respondents (Davis, 2009), or by matching with specific production phase (Kaufmann & Vosburg, 2002). Also, we should keep in mind that there are two different affective processes which might be relevant for creativity (Russ, 1993). The first is related to the ability of the individual to access affect-laden thoughts (induced by the creative task), while the second refers to the direct experience of certain affective states influenced by external stimuli (and not related to the creative task). In this study we are primarily focused on the affective processes from the first kind, while the results about effects of induced moods, which are not related to the content of creative production, refer more to the second kind. Therefore, a stronger foundation for our study comes from the action theory of creativity, as well as from biometric and psychodynamic perspectives.

According to Freud, an intra-psychic conflict is at the core of a creative process (Freud, 1908/1959; Kim, Zeppenfeld, & Cohen, 2013), and an emergence of content from the unconscious through primary processes can be a difficult and challenging experience for the creator, followed by anxiety and negative emotional states (Rothenberg, 1994). Consequently, one might expect that creativity is associated with negative valence and high level of arousal, which could be a distinctive feature of generative processes of artists. As Freud argued, artists and writers rely on a 'certain degree of laxity in the repressions' (1916–1917, p. 376) and show the ability to think and express certain emotional states through creative production (Freud, 1908). The concept of functional regression explains

the access to the content of the primary processes that arise from the intra-psychic conflict and carry a strong emotional charge (Kris, 1952). So, creativity could be associated with negative valence but also with a higher level of arousal, due to the anxiety caused by disturbing contents. The empirical evidence has confirmed that highly creative individuals show a higher degree of anxiety and use more different defensive mechanisms that are positively correlated with fluency measure in the creativity test (Carlsson, 2002). Results of biometric experiments have shown that arousal is correlated with the achievement of participants on tests of creative thinking (Martindale & Greenough, 1973), and that highly creative individuals have a slightly higher resting level of arousal, in comparison with others (Martindale, 2005), with certain additional specificities. Creative individuals have a stronger need for stimulation (Farley, 1985), and prefer novelties which are known to increase arousal (Houston & Mednick 1963; Martindale, 2005). Consequently, the familiarity of the content that evokes emotions might be relevant for creative production and be related to basic dimensions of emotional experience. Recognition of particular contents or experiences as parts of personal history, or their accessibility, might influence the subjective experience, and consequently the level of creativity. Familiar contents can de-stimulate, or even inhibit creativity if they are associated with an unpleasant experience. On the other hand, the unfamiliar images may provoke interest and stimulate the generative processes. Young and Claypool (2010) have shown that mere exposure "has differential effects on attention depending on initial stimulus threat" (p. 425). According to the empirical evidence, they have concluded that "novel threatening objects will be more affectively charged, and therefore capture greater attention" (p. 426). Results from our preliminary study suggest that art students become more creative when they are exposed to disturbing images (Ristić & Milošević, 2017b). Regression model confirmed that valence and arousal can be good predictors of familiarity. The correlation is positive between valence and familiarity, and negative between arousal and familiarity, which leads to the conclusion that the content that causes unpleasant emotions and increases arousal is not perceived as familiar, which in turn might result in a higher degree of creativity (Ristić & Milošević, 2017a). The previous findings can be explained by the action theory of creativity and the model of complex interactions and interdependence proposed by Glaveanu et al. (2013). Namely, the insights from the interviews with 60 recognized French creators have confirmed "that creative action takes place not 'inside' individual creators but 'in between' actors and their environment" (p. 176). However, it is still questionable, in what way the valence, arousal, and the familiarity affect the creative production, and whether the process of highly creative individuals such as art students shows a certain level of peculiarity.

In this research, the degree and type of correlations between the creativity of the answer, and the dimensions of the emotional experience (valence and arousal) and the familiarity of the content were examined with different student populations. Also, it was tested whether the creativity of art students and non-art students varies in different ways depending on the presence of the dimensions of emotional experience and familiarity of content.

According to previous research, we can assume that unpleasant content that evoke negative valence and higher level of arousal induces more creative answers from participants (H1); that content which is perceived not as familiar but as novel and unknown induces more creative answers (H2); that the

dimensions of emotional experience and familiarity of content are good predictors of creativity (H3); that a creativity of art students (in comparison with non-art students) is more sensitive to varying levels of familiarity of content, specifically selected to evoke emotions of different levels of valence and arousal (H4).

Method

Participants

The experiment was conducted with a convenience sample of 92 college students (47 men, 45 women), with a mean age of 21.5 (*SD* = 2.45, *RG* = 18-34 years) from all departments of the Faculty of Dramatic Arts at the University of Arts in Belgrade [FDU], the Faculty of Physical Education and Sport Management at Singidunum University, and the School of Electrical and Computer Engineering of Applied Studies in Belgrade. The sample size was determined after applying a power analysis.[1] The students were grouped in two subsamples: art-students and non-art students. Art students from FDU are strictly selected, highly creative and talented individuals, partially trained and experienced in an artistic production. Non-art students from other faculties are young people without a formal education in art or experience in academic art production.

Stimuli

For visual stimulation, 40 photos were selected from the Nencki Affective Picture System [NAPS][2], so that the values of the dimensions of the emotional experience (valence and arousal) were systematically varied. Every photo in NAPS 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). All the photos in the data 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, that is, 9 photos of animals, 10 photos of faces, 5 photos of landscapes, 8 photos of objects, and 8 photos of people. The selected photos were evenly distributed across the whole valence/arousal spectrum.

The participants were divided into groups, to make it possible to counterbalance the order of stimuli presentation.

Procedure

All participants voluntarily signed up for the experiment. They were introduced in advance, verbally and in written form, to the experimental tasks and informed that the data will be used only anonymously and that they can withdraw from the experiment at any time without any consequences. The participants provided written consent, while the experi-

[1] The sample size was determined after power analysis. For one tail *t*-tests – Correlation: Point biserial model, with α = .05, power 1-β = .80 and medium effect size (ρ = 0.30) – sample size should be at least 64 participants. For Linear multiple regression: Fixed model, R^2 deviation from zero with α = .05, power 1-β = .80, large effect size (f^2 = 0.15), and six predictors (Faul, 2014), minimal sample size is 46 participants. For *F* tests – ANOVA: Fixed effects, special, main effects and interactions with α = .05, power 1-β = .80, large effect size (f = 0.4), *df* = 2 and four groups, sample size should be at least 64 participants.

[2] The Nencki Affective Picture System (NAPS) is a standardized set of 1356 realistic, high-quality photographs divided into five categories (people, faces, animals, objects and landscapes). NAPS has been characterized primarily along the affective dimensions of valence and arousal. It was designed in 2014, has good metric characteristics and has been used widely in psychological research.

Picture 1 Examples of stimuli from Nencky Affective Picture System (NAPS) included in the sample: photographs that induce emotions of different level of valence and arousal.

ment was conducted in line with the Code of Ethics of the University of Arts and the 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.

Participants were divided into four groups so the data collection was carried out during four experimental sessions. In each session, in addition to recording the demographic variables, students were exposed to the 40 photographs (one by one) and were asked to rate the familiarity of their content on nine-point unipolar scales, ranging from 1 (completely unfamiliar) to 9 (completely familiar). First photograph was used for the exercise. The stimuli order in each group was counterbalanced. The photographs were displayed via a 42-inch plasma monitor. The participants were sitting in front of the screen at a distance of two meters on average. Photos were presented on a full screen with a resolution of 1600x1200 (20.5*36.5 inch), and students were asked to use the special lists for assessment of familiarity. In the second part of experimental session, the same photographs were exposed again (one by one), but this time the students were asked to generate the most creative title for each stimuli and to enter it into the list. Procedure for all photos was repeated without time limitation, as before.

Measures

To test the relations of creativity, dimensions of emotional experience and familiarity of content – several variables were measured. The measure of familiarity of content for each photo was obtained directly from the participants' assessments in the first part of the experimental ses-

sion. The measures of valence and arousal for each photo were taken from the NAPS.

The creativity of the titles was assessed by coefficients, following the improved version of the standardized scoring procedure in divergent thinking tests. The first step in this procedure is a classification of the titles, the second step is a calculating the creativity coefficient.

In the first step, all titles were classified into categories according to similarity, in line with the principles of categorization (Rosch, 1988; Rosch & Loyd, 1979) often used for processing open-ended questionnaires (more on categorization of answers in creativity assessing in Snyder et al., 2004). Next, the products that were assessed as original were subjected to further assessment, in line with the findings of previous studies (Runco & Charles, 1993; Diedrich et al., 2015): it was rated whether the produced response is an intentional novelty – the result of rational thinking and a sensible response to the task – or not (Weisberg, 2015). The product marked as unintentional novelty was added to the less original group, that was the broadest category, which included frequent responses. The reliability of classification performed by two coders was tested by Cronbach Alpha coefficient (α = .73).

Subsequently, in the second step, assessments of creativity were made by calculating the creativity coefficient and the uniqueness coefficient, which rely on Guilford's components of divergent thinking (Guilford, 1967).

The creativity coefficient was calculated as the ratio of obtained and possible different titles at the variable level (all answers for one stimuli): **CC = N/n** where: **CC** is the variable's creativity coefficient, **N** is the number of obtained different answers, and **n** is the number of participants. The uniqueness coefficient as a measure of originality of single answers was calculated as the ratio of number 1 and the number of participants who gave the same answer: $\mathbf{UC_i = 1/m}$ **[**u = 1,....,n**]** where: $\mathbf{UC_i}$ is the uniqueness coefficient of the subject's answer, and **m** is the number of participants who gave the same answer. The mean of the uniqueness coefficients for all the participants for one stimulus is equal to the creativity coefficient of the variable: $\mathbf{M = (UC_1 + UC_2 + ... UC_n) / n = CC}$ where: M is the mean of the uniqueness coefficient of all single participant's answer, $\mathbf{UC_1, UC_2,...,UC_n}$ is the uniqueness coefficient of a single participant's answer, *n* is the number of participants, and **CC** is the variable's creativity coefficient.[3] In previous validation studies with drawings and verbal products, good metric characteristics of coefficients were verified (Milošević & Ristić, 2019; Milošević & Ristić, 2016; Ristić & Milošević, 2018).

To describe the characteristics of the sample, demographic variables (gender and age) were also measured. Once data were quantified in this manner, correlation analyses and regression were performed in order to test the four hypotheses.

Data were analyzed using SPSS version 22.0.

Results

The skewness and kurtosis values indicate that in the case of the creativity coefficient there are not significant deviations from normal distribution, which justifies the further use of parametric statistics (Table 1).

[3] For example, if ten participants were asked to come up with the most creative title for a visual stimulus, and all ten participants gave different responses, then the creativity coefficient at the variable level would be maximal, CC = 10/10 = 1. Contrastingly, if all ten participants give the same response, then the creativity coefficient at the variable level would be minimal, CC = 1/10 = 0.1. In the first case the uniqueness coefficient for each individual would be the same, UCi = 1/1 = 1, while the mean of the uniqueness coefficient for all ten participants would be M = (1 + 1…1)/10 = 1. In the second case, the uniqueness coefficient for each participant would be UCi = 1/10 = 0.1, while the mean of the uniqueness coefficient for all ten participants would be M = (0.1 + 0.1…0.1)/10 = 0.1. These are two extreme cases, depicted here for illustration only.

For the whole sample, the analysis revealed moderate negative correlations of creativity with valence and with familiarity of content. Correlation of creativity with arousal is not statistically significant (Table 2).

An analysis by the subsamples indicates specificities of generative processes of art students: their creative answers revealed the negative correlations of creativity with valence and with familiarity of content.

The results of regression analysis of the criterion variable Creativity, for the sub-samples – the art and non-art students, are depicted in the following scatterplots.

Although a large difference in the slopes of the regression lines can be observed for the subsamples when the relationship of creativity and arousal is observed (Figure 1), the models are not statistically significant, either for art students (R^2 = 0.024; p > 0.05) or for non-art students (R^2 = 1.142E-4; p > 0.05).

Again, large difference in the slopes of the regression lines indicates interaction of valence and creativity among the subsamples (Figure 2), but this time the regression model for art students is statistically significant (R^2 = 0.199; p < 0.01).

When it comes to the relationship of creativity and familiarity (Figure 3), regression lines for subsamples are almost parallel (slope difference is less than 0.07), and only the model for art students is statistically significant (R^2 = 0.183; p < 0.01).

The values of arousal, valence and familiarity as the predictors of creativity of subsamples were shown by the results of multiple regression analysis of the hierarchical type (Table 3). After adding familiarity to the 2D

Table 1 *The descriptive statistical analysis for valence, arousal and familiarity for the entire sample, and Creativity Coefficients (CC) for the entire sample, and for both sub-samples – the ART and NON-ART students (N = 39)*

	M		Std. Deviation	Skewness		Kurtosis	
	Statistic	Std. Error	Statistic	Statistic	Std. Error	Statistic	Std. Error
ALL CC	.50	.010	.062	-.077	.378	-.862	.741
ART CC	.62	.013	.081	-.171	.378	-.433	.741
NON-ART CC	.34	.011	.071	-.073	.378	-.407	.741
Valence	4.59	.261	1.63	.060	.378	-.715	.741
Arousal	3.41	.199	1.24	.510	.378	-.274	-741
Familiarity	5.53	.246	1.54	.036	.378	-.379	.741

Table 2 *The values of Pearson correlation coefficients (r) and their statistical significance (p) for the variables valence, arousal, familiarity of content and creativity, for 39 photos, assessed by ART and NON-ART students*

Creativity		Valence	Arousal	Familiarity
ALL	r	-.40	.11	-.44
	p	.011	.495	.005
ART	r	-.45	.16	-.43
	p	.004	.343	.007
NON-ART	r	-.14	-.01	-.30
	p	.407	.949	.066

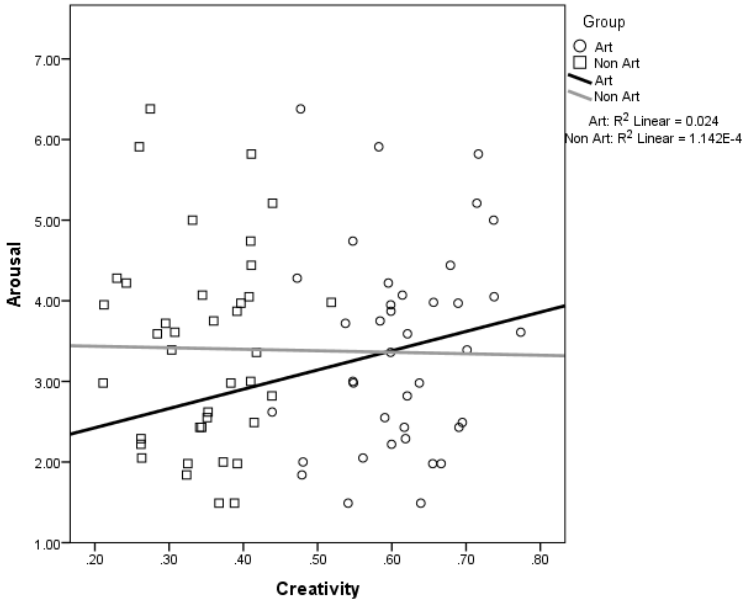

Figure 1 Differences in scattering the Creativity between the sub-samples – the ART and NON-ART, for the variable Arousal.

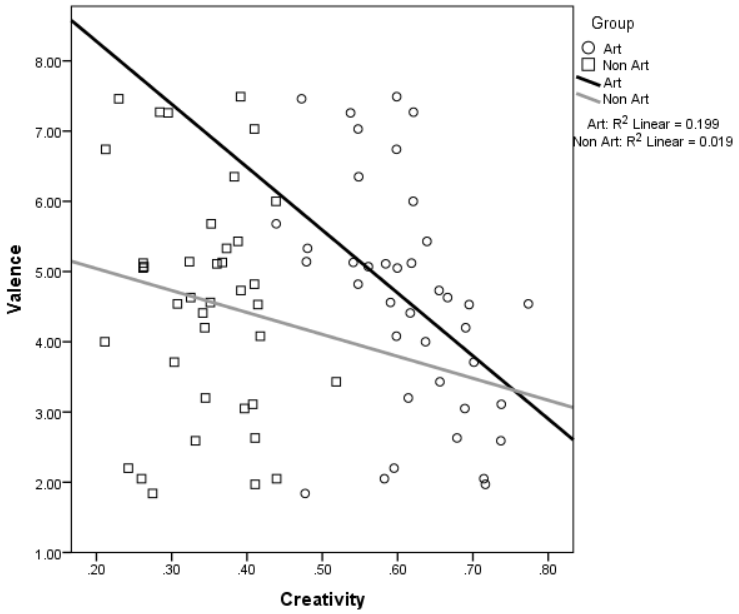

Figure 2 Differences in scattering the Creativity, between the sub-samples – the ART and NON-ART, for the variable Valence.

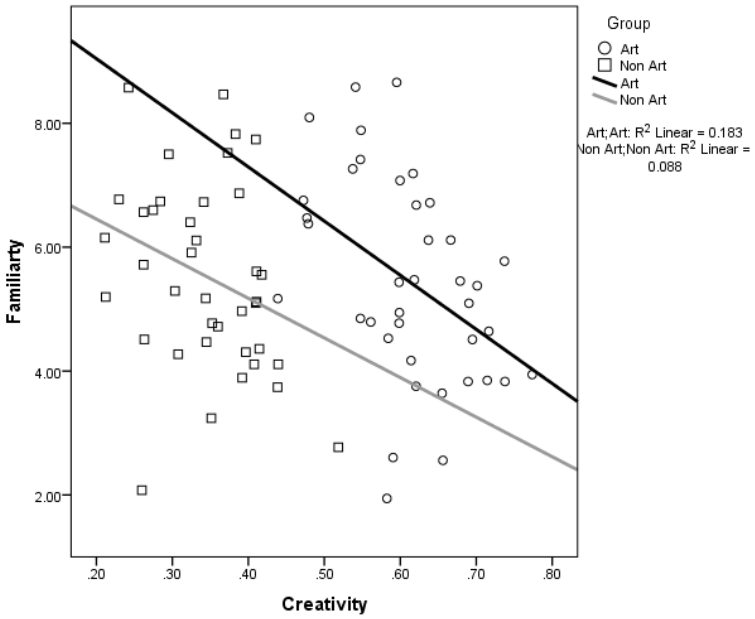

Figure 3 Differences in scattering the Creativity, between the sub-samples – the ART and NON-ART students, for the variable Familiarity.

Table 3 *Results of hierarchical multiple regression analysis of creativity for predictors valence, arousal, and familiarity for both subsamples – ART and NON-ART students*

	Predictor	B	Std. Error	*β*	*p*	R^2	*F*	*p*
ART	Arousal	-0.006	0.011	-0.087	0.61	0.2	4.63	0.02
Step 1	Valence	-0.024	0.009	-0.489	0.01			
	Arousal	-0.01	0.011	-0.152	0.36	0.3	5.01	0.01
	Valence	-0.02	0.008	-0.409	0.02			
Step 2	Familiarity	-0.017	0.007	-0.339	0.03			
NON-ART	Arousal	-0.006	0.011	-0.104	0.58	0.03	0.5	0.61
Step 1	Valence	-0.008	0.008	-0.189	0.32			
	Arousal	-0.008	0.011	-0.14	0.46	0.1	1.36	0.27
	Valence	-0.005	0.008	-0.112	0.56			
Step 2	Familiarity	-0.014	0.008	-0.296	0.09			

model (arousal and valence), the percentage of explaining variance of creativity rises from 20% to 30% for art students and from 3% to 10% for non-art students.

Regression analysis by sub-samples also showed some specific characteristics of the students. In the artistic population the valence and familiarity are statistically significant predictors of creativity. For the sample of non-art students, regression model with dimensions of emotional experience and familiarity of content is not statistically signifi-

cant, and none of the criterion variables were confirmed as the significant predictor of creativity. We can see that the effect of valence is primarily driven by the art students rather than the non-art students.

Discussion

The results show that unpleasant content induces more creative answers, as proposed in the first hypothesis. To the extent the content is less pleasant – the result is more creative. Further analysis has confirmed significant correlation of valence and creativity, supporting the outcomes of other studies and showing that it is precisely the negative incentives that can be preconditions for creative thinking (Mraz & Runco, 1994; Ristić & Milošević, 2017a; 2017b; Runco, 1999; Martin et al., 1993). However, the first hypothesis can be accepted only partially, as the starting assumption that participants will be more creative in response to the contents that evoke a higher arousal was not confirmed. Although creative individuals show a higher resting level of arousal (Martindale, 2005), it seems that arousal is not in linear relation with creativity of titles, so the arousing content does not have the particular effects on creativity, not even to art-students. The question is whether the physiological correlate of cortical activation of participants, measured without initial stimulation, is completely analogous to the arousal that occurs after specific stimulation during the experimental procedure. In this research, the induced tension that arises due to exposure to unpleasant content could increase not the level of arousal itself but its variability. Although the arousal variability during the creative production was not subjected to our analysis, nor was it measured, it still could have had an indirect impact on creativity. Consequently, the variability of arousal might be a more accurate indicator of creative thinking, instead of the increased level alone. Previous findings suggest this possibility. In one of the biometric experiments, Martindale and Hasenfus (1978) showed that creative individuals, in contrast to the less creative ones, have a lower level of neural activation while imagining a new story (analogy of inspiration), but also a higher level during the writing of the story (analogy of elaboration). And this is precisely what Kris (1952) has pointed out when he wrote about the ability of quick alteration in the level of mental function, due to which creative people have easier access to the content of the primary process, which was subsequently confirmed in several studies (Hudson, 1975; Martindale, 2005). Another explanation could be that arousal needs to be at a moderate level to induce creativity. It would be indicative to examine the isolated effects of arousal: to check how the level of creativity is changed when stimulation varies systematically solely at the arousal level.

The second hypothesis – that content which is perceived not as a familiar but as a novel and unknown will induce more creative answers – was directly confirmed in the analysis. The negative correlation between familiarity and creativity is statistically significant, as well as the main effect of familiarity onto creative production. Together with valence, familiarity is a good predictor of creativity, as it is shown in the regression model, but these effects are primarily driven by the art students. At this point, the psychoanalysts would offer a certain interpretation, giving the primacy to unconscious processes in artistic production: Forbidden sexual and aggressive desires are suppressed and buried in the unconscious, where they can be redirected, masked and transformed, and then expressed through actions that are socially acceptable, and even desirable (Freud, 1908/1959; Kim et al., 2013). On the trace of psychodynamic insights we can conclude that unpleasant and suppressed

contents are fertile, while pleasant contents, with no disturbing effects, are familiar and accessible to conscious processes, but without creative potential. But difficulty in empirical validation of defense mechanisms remains an open question, without dispute. Unlike other mechanisms that have been tested repeatedly, very few studies are available in which sublimation was subjected to empirical analysis (Domino et al., 2002; Vaillant & Vaillant, 1990). Therefore, the obtained results might be explained more precisely by the action model of creativity, relying on Dewey's interpretation of human experience (Glaveanu et al., 2013). The interviews with prominent creators revealed the complex process with certain peculiarities in different domains, but still based on a similar pattern:

The creative action starts […] with an impulsion and is directed toward fulfillment. In order for action to constitute experience though, obstacles or constraints are needed. Faced with these challenges, the person experiences emotion and gains awareness (of self, of the aim, and path of action). Most importantly, action is structured as a continuous cycle of "doing" (actions directed at the environment) and "undergoing" (taking in the reaction of the environment) (Glaveanu, 2013, p. 176).

Impulsion to create, to make, to express, to see, to understand – might be the crucial moment for action to start in. And that is not an internal, isolated process. Frequently, impulsion comes from the external reality, from the world and the artistic works of others: "Undergoing always precedes doing and, at the same time, is continued by it. It is through these interconnected processes that action can be taken forward and become a 'full' experience." (p. 176). Although artists are in a highly receptive state, almost constantly, some impulses may be stronger than others. As Young and Claypool (2010) pointed out, the novel and threatening stimuli might capture a greater attention, resulting in a higher creativity of artistic output. The results of this study have shown exactly that: the art students become more creative when they are exposed to the novel and negatively-valenced stimuli, which is consistent with our preliminary study (Ristić & Milošević, 2017b). However, these findings are not consistent with the claims of Subramaniam et al. (2013) that creativity is facilitated by a positive mood because it requires greater attentional and cognitive computations. Although positively-valenced stimuli and positive affect might induce broader attention, they can also lead to increasing distractibility due to reducing attentional selectivity (Dreisbach & Goschke, 2004), while the negatively-valenced stimuli might have the opposite effect.

The third hypothesis can also be accepted. The certain dimension of emotional experience, specifically valence, was confirmed as a statistically significant predictor of creativity. The dimensional model appears to be adequate to explain a relation of emotional experience and cognitive processes involved in creative production. In addition, the findings suggest that the dimensional model of emotional experience with arousal and valence, should be explored further and expanded eventually, in a way to include the dimension of cognitive evaluation, especially familiarity of content which requires special attention of researchers. One of the alternatives, proposed by Trnka et al. (2016), is a 3D hypercube-projection derived from the data of a study in which participants had judged 16 discrete emotions in terms of valence, intensity, controllability, and utility. Lack of significant correlation has confirmed that these dimensions represent clearly different qualities of emotion, and that the traditional 2D analytical approach can provide biased insights about complex structure of emotional experience.

The differences between prospective artists and students from other faculties are evident, so the fourth hypothesis is undoubtedly confirmed. All significant correlations and regression model come from the sub-sample of art-students, while the effect of academic profile on creativity is very strong. Without the intention to make premature judgment about the origin of these differences, we can certainly note that the generative processes of prospective artists show some peculiarities in comparison with the non-art students. They are more sensitive to the external clues, especially the novel and disturbing ones. Facing the stimulation, which can evoke negative affective states, they become more responsive and react in a creative way. This ability of the artists to access affect laden thoughts, to think of the material with a strong emotional charge and to express it through creative action, might be the core of aesthetic sensitivity, which is frequently stressed as a distinctive feature of artists and highly creative individuals (Russ, 1993; Ognjenovic, 1994). Yet, further research is required to explain the role of emotions in generative processes of artists, and all aspects of the dynamic cognitive mechanism that underlie creativity.

It is especially important to emphasize that the emotional experience of participants was not measured directly in this study. The levels of valence and arousal for each photo were taken from the NAPS, but the participants did not rate how pleasant and arousing the pictures were according to their own view. Beside the small sample, this is the major limitation of the study.

The results expand the insights on the role of initial impulsion in a complex dynamic process of creative production. A unique methodological approach for further examination of the role of emotions in the generative processes has been proposed in this study, and the relationships of creativity with familiarity of content and with dimensions of emotions have been examined. For further research, it might be of special interest to explore cognitive strategies of highly creative individuals in responding to emotional stimuli, when they work together – within a collective process which is far more challenging than individual work, as the emotional resonance among the participant might make the effects even stronger, and consequently more relevant for creative production. A closer look into specific conditions related to the emotional experience could be crucial in explaining the complex phenomenon of collective creativity, present in a wide scope of disciplines, and currently essential not only for artists working in collectives, but also for scientists and creators of public policies.

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