

EMOTIONAL CREATIVITY INVENTORY: FACTOR STRUCTURE, RELIABILITY AND VALIDITY IN A GEORGIAN-SPEAKING POPULATION

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Abstract

The concept of emotional creativity is based on a social constructivist theory of emotion and refers to an individual's ability to experience and express novel, sincere, and effective mixtures of emotions. The present research examines the psychometric properties of the Georgian version of Emotional Creativity Inventory (G-ECI; Averill, 1999). 834 individuals across five studies completed the G-ECI. Results from exploratory factor analysis indicate that the factor structure of the original ECI broadly replicates in the Georgian translation. The Cronbach's alpha reliabilities of the G-ECI scales are mostly acceptable. There are significant gender differences. Examining the construct validity of G-ECI with other constructs (namely, with emotional intelligence, creativity and flow) showed the expected relationships. In conclusion, the Georgian version of the emotional creativity inventory seems well suited for future research purposes.

Keywords: *emotional creativity, emotional intelligence, creative abilities, dispositional flow.*

Introduction

People differ from each other in ability to experience novel, different and unusual emotions. The phenomenon is conceptualized as trait emotional creativity - concept based on the social constructivist theory of emotion, refers to an individual's ability to experience and express novel, sincere, and effective mixtures of emotions (Averill & Thomas-Knowles, 1991). How can we detect creativity in emotional processes?

Csikszentmihalyi (1996) posits that creativity should be observed in relation to an external system – a domain, which consists of a set of symbolic rules and procedures. According to the social - constructivist approach, emotions are culturally constructed syndromes, which are constituted and regulated by social rules and expectations. Emotions that differ from socially constructed stereotypes should be considered creative.

Studies suggest that emotional and cognitive creativity are empirically independent constructs (Ahmadi, Ahmadi, & Delshad, 2015; Averill & Thomas-Knowles, 1991; Fuchs, Kumar, & Porter, 2007;

Ivcevic, Brackett, & Mayer, 2007). According to Amabile's (1996) componential model, creativity occurs in presence of three variables: domain-relevant skills, creativity relevant skills, and "creative personality". Emotional creativity (EC) is associated to different measures of self-report creativity inventories (Ahmadi et al., 2015; Averill & Thomas-Knowles, 1991; Fuchs et al., 2007) and shows high correlations to personality traits associated with creativity (Fuchs et al., 2007; Ivcevic et al., 2007). On the contrary, ability measures of creativity show inconsistent correlations with emotional creativity. Creative abilities measured by Cognitive Consequences Test (Torrance, 1962; 1974) and Remote Associations Test (Shames, 1985) were not correlated to emotional creativity (Ivcevic et al., 2007), while Averill and Thomas-Knowles (1991) found that EC weakly correlated to cognitive consequences. EC is related to creative activities, but only when emotional context is relevant for the activity. In particular, EC is successful in prediction of behavioral creativity only when the creative product involves expression of emotions, such as writing a poem about an emotional state (Ivcevic et al., 2007). Emotionally creative people better integrate and express complex feelings in symbols. Their narratives and paintings are distinguishable by richness, complexity and originality (Gutbezahl & Averill, 1996). Holt (2004) also demonstrated EC's positive link to creative activities and interests (as cited, Fuchs, 2007). These studies, addressing direct relation of EC and creativity, assessed mostly the "little C creativity" (Kaufman & Beghetto, 2009), which refers to everyday creative activities in which average individuals participate. One of the components in componential model - specialization of domain-relevant skills - is largely demonstrated by accomplishment level in specific field and possibly, is free from emotional context. Accomplishment level or creative achievement (Diedrich, Jauk, Silvia, Gredlein, & Neubauer, in press) is manifestation of the "Big C creativity", representing professional level of creativity driven by exceptional gift and dedicated training (Kaufman & Beghetto, 2009).

To address Amabile's third component of creativity, motivation, EC is an important predictor of intrinsic motivation (Oriol, Amutio, Mendoza, De Costa, & Miranda, 2016). Csikszentmihalyi (1975) investigated the nature and conditions of enjoyment among people who were engaged in intrinsically rewarding activities, like chess players, musicians, and artists. Flow was defined as a state of intrinsic motivation in which people get fully immersed in difficult tasks for the sake of the activity itself (Baumann & Scheffer, 2011). Accordingly, we can assume that emotional creativity might be related with flow.

The factors of emotional creativity (preparedness, effectiveness, novelty and authenticity) show a significant conceptual overlap with the construct of emotional intelligence (EI), but theoretically, the element of novelty or originality differentiates EC from EI. Confirmatory factor analyses demonstrated that EI and EC could indeed be modeled as distinct abilities (Ivcevic et al., 2007). According to these authors the relationship between emotional intelligence and emotional creativity should be similar to the relationship of cognitive intelligence and creative ability, i.e. the threshold hypothesis (cf. Jauk, Benedek, Dunst, & Neubauer, 2013)

While EC predicts academic achievement, it does not show significant correlations with IQ (Averill, 1999). But research revealed that EC predicts metacognitive skills, which are important predispositions of academic success (Ahmadi et al., 2015).

EC was found to be related also to well-being (Frolova & Novoselova, 2015). It shows a complex relationship with alexithymia (Abuladze & Martskvishvili, 2016; Averill, 1999). Emotionally creative people see challenges where others see threats (Averill, 1999). Emotionally creative people perceive differently negative affect, enjoy benefits of solitude (Long & Averill, 2003) and overcome hardness (Frolova & Novoselova, 2015). They tend to experience such positive emotions as gratitude, hope, and love (Oriol et al., 2016).

Present Research

The aim of the research is to examine the psychometric properties and factor structure of the Georgian translation of Emotional Creativity Inventory (ECI; Averill, 1999). The instrument represents a self-report questionnaire and consists of 30 items rated on a 5-point Likert scale from 1 (strongly disagree) to 5 (strongly agree). The original ECI items load on four factors: Emotional Preparedness - tendency to think about and understand emotions, analyze emotional experience;

Effectiveness - to experience emotions that have positive impact on one's or other people's goals; Authenticity - ability to experience emotions consistent to one's self; Novelty - tendency to experience new, different, unusual emotions. The current research investigates the factor structure, reliability and construct validity of the ECI by examining the relations to emotional intelligence, IQ, flow, and creativity.

Methodology of Research

The quantitative study has been designed to examine the psychometric properties of the Georgian translation of Emotional Creativity Inventory (ECI; Averill, 1999). A factor analysis has been used to define the factor structure of the instrument. Descriptive statistics and internal consistencies have also been checked and for assessing the instrument validity correlational analysis has been used.

Participants

Data collection was based on five independent samples. As the presented results, depending on the relationships under examination, involve either one or several samples, we report only the total sample size, mean age, and reliability coefficients (Cronbach's alphas) for each of the variables.

In the research for measuring factor structure of the Emotional Creativity Inventory, 834 participants (534 females) were examined (M age= 23.43, SD = 8.91).

Instrument and Procedures

Emotional creativity Inventory. Prior to the present study, a panel of experts prepared two independent translations. After discussion, the two translated versions were combined to create the first Georgian version of ECI (G-ECI). Next, the questionnaire was back-translated to check whether the content of items matched the original content. As a result, a number of items were amended. Following this, five experts assessed the content validity of the 30 items on a 3-point Likert type scale ranging from 1 (absolutely unsuitable for the scale), to 3 (absolutely suitable for the scale). Those items for which there was a large disagreement between expert ratings were revised. Next, an initial administration of the test was conducted (N = 40) to assess item coherence, as a result of which, several items have been modified.

Creative potential. The creative potential was measured by Alternative Uses (AU) and Alternative Instances (AI) tasks (cf. Jauk et al., 2013). Participants were expected to produce original and useful uses of such usual objects as knife, brick and hairdryer. Also, they had to find original and useful answers to such questions as "What can make noise?" "What can be elastic?" and "What could one use for locomotion?". To accomplish each of the tasks participants were given two minutes. Ideational fluency was defined as the number of ideas given in the task. Ideational originality was measured by averaging four independent raters' assessments. Originality was assessed on the 3-point scale where 1 means "not creative" and 3 - "very creative".

Creative activities and creative achievements. Creative activities and achievements were assessed by The Inventory of Creative Activities and Achievements (ICAA; Diedrich, Jauk, Silvia, Gredlein & Neubauer, in press) which assesses creative activities and creative achievements in eight domains different domains (literature, music, arts and crafts, creative cooking, sport, visual art, performing art and science and engineering): 1) how often creative activities were conducted, 2) the amount of creative achievements, and 3) the time spent in the domain.

Intelligence. Intelligence was measured by The Raven's Advanced Progressive Matrices Test (APM, Set II with 40 min time limit; Raven, 1976), which is independent from language and formal schooling and is one of the most robust predictors of general intelligence.

Emotional competencies. For measuring emotional competencies, we used The Emotional Management Abilities Test (EMA; Freudenthaler & Neubauer, 2005; Freudenthaler, Neubauer, & Haller, 2008). This Situational Judgment Test allows assessing interpersonal and intrapersonal skills. Intrapersonal emotion regulation is assessed by 23 situations and the ability to manage oth-

ers' emotions (intrapersonal) is assessed by 18 situations. Participants are expected to choose one of four given answers to each emotionally loaded situation, which are rated from 1 to 4 depending on expert-rated effectiveness to deal with the emotional situation.

Trait emotional intelligence. Emotional intelligence as a personality trait was measured by the Georgian version (Martskvishvili, Arutinov, & Mestvirishvili, 2012) of The Trait Emotional Intelligence Questionnaire (TEQue; Petrides, 2009). 153 items of the questionnaire allow us to assess 15 aspects and 4 main factors of emotional intelligence as well as the global score of emotional intelligence.

Flow. The Dispositional Flow Scale (Jackson & Eklund, 2002) used in the study, was composed of 36 items assessing nine scales: (1) Challenge/skill balance; (2) Action awareness; (3) Sense of control; (4) Clear goals; (5) Concentration; (6) Clear Feedback; (7) Loss of self-consciousness; (8) Time transformation; (9) Autotelic experience. Respondents indicated the extent of their agreement with the items on a 5-point Likert scale ranging from 1 (strongly disagree) to 5 (strongly agree).

Means, standard deviations, and reliability coefficients (Cronbach's alpha) of the used measures are reported in Table 1.

Table 1. means, standard deviations, and reliability coefficients of the measures.

	N	Item N	Cronbach's α	M	SD
ICAA					
Creative activities	322	48	.90	.857	.48
Creative achievements	322	87	.86	5.41	4.48
Creative potential					
Ideational fluency	342	6	.89	19.17	7.28
Originality	342	4	.77	6.06	.55
Intelligence	342	36	.87	109.75	14.23
DFS					
Challenge-skill balance	80	4	.64	14.66	8.35
Action awareness	80	4	.64	13.09	9.65
Clear goals	80	4	.88	15.11	4.18
Feedback	80	4	.88	15.13	3.49
Concentration	80	4	.84	14.61	3.86
Control	80	4	.77	14.39	3.21
Consciousness	80	4	.87	13.40	4.68
Time	80	4	.81	15.58	3.94
Enjoy	80	4	.86	15.60	3.81
Flow total score	80	36	.94	132.56	23.9
TEIQue					
Adaptability	320	9	.76	4.36	.94
Assertiveness	319	9	.77	4.70	0.97
Emotion Expression	318	10	.81	4.39	1.12
Emotion Management	319	9	.73	5.18	.86
Emotional Perception	319	10	.77	4.74	.91
Emotion Regulation	319	12	.71	4.11	.85
Impulsiveness	318	9	.68	4.52	.93
Relationships	320	9	.65	5.18	.87
Self-esteem	319	9	.73	4.97	.93

	N	Item N	Cronbach's α	M	SD
Self –motivation	320	10	.73	4.64	.92
Social Awareness	320	11	.73	4.91	.77
Stress management	320	10	.69	4.40	.94
Trait empathy	318	11	.80	5.27	.84
Trait happiness	320	8	.81	5.21	1.03
Trait optimism	320	8	.78	4.99	1.09
Emotionality	315	4	.68	4.90	.68
Sociability	318	3	.77	4.93	.72
Well-being	319	3	.81	5.06	.88
Self-control	317	3	.78	4.34	.76
Global Score	309	15	.88	4.77	.57
Emotional Management Abilities					
Intrapersonal	140	18	.54	52.39	7.37
Interpersonal	140	23	.51	68.50	6.97

Note: ICAA=Inventory of Creative Activities and Achievements, DFS= Dispositional Flow Scale, TEIQue=Trait Emotional Intelligence Questionnaire

Results of Research

Factor Structure

30 items of the ECI were submitted to a principal axis factor analysis (Table 2). Before, the suitability of data for PCA was assessed. The KMO value was .88, exceeding the recommended value of .6 (Kaiser, 1974) and Bartlett's Test of Sphericity (Bartlett 1954) reached statistical significance, supporting the factorability of the correlation matrix. The scree plot and Kaiser Eigenvalue extraction criteria suggested the presence of four factors (the first four eigenvalues were, respectively, 6.327, 1.999, 1.841, 1.452). The eigenvalues and standard deviations were generated through the "Marley Watkins Monte Carlo PCA for Parallel Analysis" program (Watkins, 2002) using the following parameters: 30 variables, 834 participants, and 1,000 replications. The results supported a four-factor structure of emotional creativity inventory. The four factors explained 38.7 % of the total variance. The factor pattern matrix and factor intercorrelations are presented in Table 2 and Table 3, respectively.

Table 2. Factor pattern matrix G-ECI items

	Authenticity	Effectiveness	Novelty	Preparedness
EC20	.692			
EC23	.584			
EC5	.560			
EC4	.494			
EC13	.489			
EC2	.380			.366
EC11	.375			
EC14	.317			
EC18		.770		

	Authenticity	Effectiveness	Novelty	Preparedness
EC22		.621		
EC6		.515		
EC10		.510		.323
EC25		.326		
EC7			.679	
EC19			.657	
EC1	.322		.540	
EC17		.347	.512	
EC3	.334		.500	
EC9			.479	
EC27			.460	
EC21			.457	
EC30			.427	
EC15			.423	
EC29			.321	
EC28				.710
EC12				.605
EC16				.567
EC24				.556
EC8				.504
EC26		-.388		.424

Principal component analysis.

Rotation: Oblimin with Kaiser normalization.

Table 3. G-ECI Inter factor correlations.

	Novelty	Effectiveness	Authenticity	Preparedness
Novelty	-	-	-	-
Effectiveness	.344**	-	-	-
Authenticity	.558**	.353**	-	-
Preparedness	.427**	.259**	.511**	-

*Note. **p < .01*

Descriptive Statistics and Internal Consistencies

Minimum, maximum, skewness, and kurtosis of the four factors, and the global EC score are given in Table 4. Also, descriptive statistics and internal consistencies of G-ECI are provided for men and women, respectively. According to our results, significant gender differences were detected, females scoring higher on all EC facets, though with small effect sizes. The global construct of emotional creativity and factors 1 and 3 display acceptable reliabilities. However, preparedness and effectiveness have Cronbach's alphas below .60.

Table 4. Descriptive statistics and internal consistence of the emotional creativity inventory (N = 834).

	N of items	Cronbach's α			Male		Female		t	η^2	Minimum	Maximum	Skewness	Kurtoses
		Global	Male	Female	M	SD	M	SD						
Novelty	11	.74	.71	.77	3.18	.629	3.29	.661	-2.35**	.01	1.09	5.00	-.142	-.208
Effectiveness	5	.60	.56	.61	3.29	.720	3.48	.702	-3.67**	.02	1.00	5.00	-.253	.009
Authenticity	8	.73	.64	.71	3.66	.697	3.94	.647	-5.87**	.04	1.38	4.75	-.506	.087
Preparedness	6	.53	.55	.49	3.44	.702	3.61	.697	-3.56**	.02	1.00	5.00	-.511	.126
EC global score	30	.85	.83	.84	3.26	.504	3.43	.481	-4.74**	.03	1.33	4.63	-.311	.357

Note. ** $p < .01$

Construct Validity

Correlations with other constructs are provided in Table 5. Emotional creativity is basically positively correlated with trait emotional intelligence indices - with the global score as well as with almost all main factors and facets with some exceptions. Namely, it is negatively correlated to the self-control factor and the facets of impulsiveness and emotional regulation.

The global score of emotional creativity is associated with creative activities ($r = .130, p < .01$) but not with creative achievements and creative potential (ideational fluency and originality). Emotional creativity as unitary construct is not correlated with IQ, but the aspect of effectiveness is negatively associated with IQ ($r = -.149, p < .01$). Emotional creativity is associated with flow ($r = .327, p < .01$) as with a unitary construct as well as with its subscales. The strength of correlation varies across factors, but still remains logical and significant. Moreover, it conforms well with expectations that emotional creativity correlates significantly with intrapersonal but not with interpersonal emotional management abilities.

Table 5. Correlations matrix.

	Age							
	N	M	SD	ECI	N	E	A	p
ICAA								
Creative Activities	577	23.94	9.75	.130**	.146**	.170**	.081	.037
Creative Achievements	577	23.94	9.75	.038	.065	.095*	-.022	-.32
Creative Potential								
Fluency	342	21.87	5.83	.086	.033	.088	.107*	.078
Originality	342	21.87	5.83	.048	.055	-.046	.104	.006
IQ (RAPM)	339	21.87	5.83	-.083	-.105	-.149**	.058	-.003
DFS								
Challenge skill balance	80	21.74	1.84	.291**	.181	.251*	.108	.308**
Action awareness	80	21.74	1.84	.176	.113	.244*	.008	.129
Clear goals	80	21.74	1.84	.219	.151	.218	.120	.126
Feedback	80	21.74	1.84	.261*	.160	.277*	.173	.126

	Age							
	N	M	SD	ECI	N	E	A	p
Concentration	80	21.74	1.84	.268*	.243*	.187	.082	.195
Control	80	21.74	1.84	.342**	.307**	.175	.195	.237*
Consciousness	80	21.74	1.84	.095	.085	.179	.012	-.040
Time	80	21.74	1.84	.294**	.241*	.206	.188	.221*
Enjoy	80	21.74	1.84	.230*	.114	.241*	.154	.176
Flow total score	80	21.74	1.84	.327**	.241*	.301**	.157	.214
TEIQue								
Adaptability	339	21.87	5.83	.199**	.137*	.230**	.126*	.157**
Assertiveness	339	21.87	5.83	.166**	.161**	.241**	.085	-.016
Emotion Expression	339	21.87	5.83	.321**	.109	.571**	.185**	.272**
Emotion Management	339	21.87	5.83	.341**	.291**	.271**	.281**	.198**
Emotion Perception	339	21.87	5.83	.083	-.076	.250**	.047	.176**
Emotion Regulation	339	21.87	5.83	-.113*	-.128*	-.037	-.150**	.026
Impulsiveness	339	21.87	5.83	-.199**	-.274**	-.057	-.203**	.051
Relationships	339	21.87	5.83	.107	-.053	.302**	.075	.136*
Self-esteem	339	21.87	5.83	.216**	.087	.321**	.149**	.181**
Self-motivation	339	21.87	5.83	.053	-.012	.128*	-.068	.207**
Social Awareness	339	21.87	5.83	.317**	.204**	.404**	.197**	.235**
Stress management	339	21.87	5.83	-.095	-.129*	.010	-.124*	.004
Trait empathy	339	21.87	5.83	.378**	.252**	.312**	.332**	.347**
Trait happiness	339	21.87	5.83	.166**	.053	.224**	.147**	.131*
Trait optimism	339	21.87	5.83	.122*	.033	.211**	.034	.147**
Emotionality	339	21.87	5.83	.318**	.091	.511**	.225**	.326**
Sociability	339	21.87	5.83	.325**	.263**	.362**	.220**	.155**
Well-being	339	21.87	5.83	.193**	.065	.290**	.125*	.177**
Self-control	339	21.87	5.83	-.163**	-.212**	-.034	-.188	.032
Global Score	339	21.87	5.83	.225**	.067	.375**	.118*	.249**
Emotional Management Abilities								
Intrapersonal	140	21.13	1.73	.250**	.085	.205*	.313**	.140
Interpersonal	140	21.13	1.73	.068	-.045	.025	.151	.102

** $p < .01$ * $p < .05$ Note: ECI = Emotional Creativity Inventory; N = Novelty; P = Preparedness; A = Authenticity; E = effectiveness, ICAA=Inventory of Creative Activities and Achievements, DFS= Dispositional Flow Scale, TEIQue=Trait Emotional Intelligence Questionnaire

Discussion

The factor structure of ECI is similar to the original idea (Averill & Thomas-Knowles, 1991), which suggests four factors of emotional creativity, but inconsistent with the later study (Averill, 1999) suggesting a three-dimensional factor structure. Our results indicate that the scales of effectiveness and authenticity belong to different factors.

Results replicate previous studies in most aspects of emotional creativity relations to self-report and ability measures of emotional intelligence. Correlations are not so strong that we could view them identical constructs. Generally, the results expand the knowledge with the insight that

EC is associated with intrapersonal but not interpersonal emotional competencies. Previous studies measuring emotional competencies did not include such a differentiation. Emotional creative people are more skillful to manage or regulate their inner emotional experiences than to deal with interpersonal emotional situations.

There is no significant correlation between EC and IQ as it was expected based on previous research (Averill & Thomas-Knowles, 1991; Ivcevic et al., 2007).

Results indicate correlations between EC and creativity, but only with creative activities. Creative achievement and creative potential are not linked to emotional creativity.

Results are consistent to the findings that EC is not linked to ability measures of creativity (Fuchs et al., 2007) except of Averill and Thomas-Knowles' study (1991), which indicates moderate correlation between ECI and Cognitive Consequences Test. The results are explainable by the notion that EC is related to creativity only when emotional involvement is appropriate for the activity (Ivcevic et al., 2007).

The results in this article indicate that emotional creativity is manifested in everyday creative activities. It was expected considering previous findings about emotionally creative people's distinguished ability to express their emotions in a symbolic way (Gutbezahl & Averill, 1996), better performance at creative behavior test (which includes writing poems on emotional state) (Fuchs et al., 2007), inclination toward creative activities and interests (Holt, 2004; as cited in Fuchs et al., 2007). In addition, empirical evidence supports the hypothesis that art faculty students have higher emotional creativity than non-art faculty students (Abuladze & Martskvishvili, 2016).

Results of the present study, regarding relation between EC and creative achievements indicate that level of accomplishment is not associated with EC. It should be mentioned, that the creative achievement test follows highly skewed distribution and the result may be influenced by this factor. Although, there were no relevant studies indicating relation of "Big C creativity" and EC, results are somehow contributed by finding that emotionally creative people do not use a creativity strategy of final product orientation (Fuchs et al., 2007). Instead, they are intrinsically motivated and mostly engage in process for the activity itself, which is manifested in EC's strong relation to flow presented in this article. According to empirical research, EC predicts intrinsic motivation by generating positive affect (Orio, Amutio, Mendoza, Da Costa, & Miranda, 2010). Besides, emotionally creative people are prone to engage in creative activities as it was mentioned, and therefore, not surprisingly, they have frequent experiences of flow. Affective change during flow (Baumann & Scheffer, 2009) may also facilitate the tendency of flow experience among emotionally creative people, because individuals make combinations of contradicting emotional states like changes from negative to positive affect.

Conclusions

In conclusion, psychometric properties of Georgian version of ECI are satisfactory. Factor analysis suggests four factors of ECI structure consistent to most of previous studies. Construct validity was also confirmed. In sum, because of its factor structure, the internal consistencies and convergent validities regarding other constructs, the Georgian version of The Emotional Creativity Inventory seems well suited for future research purposes.

Acknowledgements

This Research was supported by the grant from The Shota Rustaveli National Science Foundation of Georgia.

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Received: November 19, 2017

Accepted: December 26, 2017

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