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## Individual Difference Predictors of Creative Ideation

Sakhavat Mammadov, Ph.D. 

### Abstract

Researchers have long been interested in individual difference variables as predictors of creativity. The focus of most studies has been on the later stages of the creativity process through which creative ideas are transformed into tangible forms, but until recently a very limited empirical base existed to answer questions about why some individuals come up with creative ideas more often than others. The present study examined individual difference predictors of creative ideation among high ability undergraduate students and tested the role of well-being as a moderator in explaining these relationships. Three main findings are revealed. First, openness and extraversion were significantly associated with creative ideation, both positively. Second, creative ideation was also predicted by creative personal identity. Third, subjective well-being had both main and moderating effects on creative ideation. It moderated the relationship between creative personal identity and creative ideation.

**Keywords:** *Big Five • personality traits • creative ideation • creative personal identity • well-being*

In their investment theory of creativity, Sternberg and Lubart (1996) described creativity as a two-part process. The first part, buying low, refers to investing in novel and unusual ideas, and the second part, selling high, concerns the transmission of those ideas into products. Buying low requires the generation and development of new ideas through creative ideation. Although coming up with creative ideas does not guarantee creative accomplishment, without this initial phase, creativity cannot occur. From the creativity literature, we know specific individual characteristics (e.g., perseverance) and favorable environmental conditions (e.g., autonomy support) are necessary for the successful transmission of creative ideas into products (Anderson et al., 2017; Barbot et al., 2016; Mammadov, 2021a; Yoon et al., 2015). The relatively less explored but highly relevant question is what factors account for differences in creative ideation. Why do some individuals come up with creative ideas more often than others? To that end, the present study sought to examine individual difference predictors of creative ideation, namely, personality traits and creative personal identity, and test the role of well-being as a moderator in explaining these relationships.

Personality and its predictive power for important life outcomes have always been of great interest to researchers and the public. As a formal scientific field, personality psychology dates back to when Allport (1937) published his book, *Personality: A Psychological Interpretation*. The field since then has been developed and given birth to competing theories on individual differences. One area of study has been about identifying the basic dimensional constructs that make up personality. A number of models and taxonomies have been proposed. The Big

Five or the five-factor model (Goldberg, 1981; John & Srivastava, 1999; McCrae & Costa, 1996) is the most popular conceptual model of personality widely used in studying the personality-creativity relationship. As its name suggests, the model consists of five personality traits: openness to new experiences, conscientiousness, extraversion, agreeableness, and neuroticism or emotional stability.

Of the Big Five, openness has been found to be a strong and consistent predictor of creativity across domains and measurements (Furnham et al., 2006; Puryear et al., 2017). Openness, in a broad sense, refers to the extent to which an individual actively seeks a variety of novel experiences and accepts new learning, ideas, and change (McCrae & Costa, 1999). Specific facets of openness such as active imagination and intellectual curiosity seem to tap core aspects of creative engagement. Open individuals tend to entertain novel ideas and unconventional values (Costa & McCrae, 1992). Extraversion has emerged as a second frequently reported personality factor associating with various dimensions of creativity (Feist, 1999; Mammadov et al., 2019). Extraversion refers to the extent to which people are sociable, assertive, and outgoing. Extraverts' tendency to engage in social interactions might be an impetus for creative thinking and ideation.

The association between neuroticism and creative ideation has not been studied extensively but is interesting and worth investigating. Neuroticism refers to individual differences in negative emotionality, anxiety, and emotional reactivity. Some argue that the root cause of neuroticism is the tendency to self-generate negative thoughts and feelings (Perkins et al., 2015). This tendency may lead less emotionally stable individuals to dwell on problems and ideas more often than others. Strong et al. (2007) argued that neurotic tendencies may provide a creative advantage by increasing one's access to a range of affective experiences, particularly negative affects.

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Empirical support for this positive relationship is weak. Only few studies have shown that individuals who score high on neuroticism tend to be more creative than those with low scores (Gelade, 1997; Götzt & Götzt, 1979). Pickering et al. (2016) published a comment on Perkins et al.'s (2015) proposal in which neuroticism was argued to stem from individual differences in neural processes within the default mode network (DMT) that control self-generated thoughts. Pickering suggested that the processes determining the extent to which self-generated thoughts become emotionally negative are largely driven by structures outside the DMT. Creative geniuses who are known to be highly neurotic may achieve creativity not because of their neurotic tendencies but in spite of them.

The traits of agreeableness (i.e., the tendency to be prosocial, cooperative, and empathetic) and conscientiousness have not emerged as correlates of creative ideation. And there is not a convincing conceptual or theoretical basis to anticipate such relationships. Conscientiousness refers to individual differences in self-control, organization, discipline, persistence, hard work, and responsibility (Goldberg, 1993). These characteristics may be important in the transition of creative ideas to products but do not seem to account for individual differences in creative ideation. In their systematic review, Puryear et al. (2017) teased out the personality-creativity relationship by coding the creativity measures as ideation-based (e.g., measures of creative ideation such as divergent thinking tasks) and production-based (e.g., inventories of creative activities). They found that conscientiousness is not related to ideation-based creativity but had a weak positive correlation with production measures. The focus of the present study concerns only three of the Big Five traits: openness, extraversion, and neuroticism.

Creative ideation is also contingent on the individual capability to generate original and potentially useful ideas. One's confidence that one is capable of coming up with creative ideas in solving problems is the key factor in determining the effectiveness of creative functioning (Kaufman & Beghetto, 2009). Creative personal identity, i.e., the belief that creativity is an important part of one's identity, is an integral element of person's self-description (Jausi et al., 2007). Individuals with strong creative role identity are likely to find creativity-related tasks meaningful and be motivated to engage in creative ideation and other creativity inducing activities (Farmer et al., 2003). Creative personal identity, in the present study context, should be conceived as a domain-general view of the self, because the way creative ideation is conceptualized concerns little-c creativity (see Beghetto et al., 2011; Kaufman & Beghetto, 2009).

There are theoretically plausible reasons to expect that happiness or subjective well-being may associate

with creative ideation and possibly moderate the effects of personality traits and creative personal identity. For example, it may be the case that individuals who are open to new experiences, insightful, and aesthetic tend to engage in creative ideation more often when they experience increased happiness. A similar example can be given for extraverted individuals or those with strong creative personal identity. According to Runco (2007), positive mood or affect enhances creativity. Amabile et al. (2005) reported positive associations of creative thinking with positive affect and psychological adjustment. Consistent with these findings, other studies documented that individuals experience greater flourishing and positive affect when they engage in creative ideation and activity (e.g., Conner et al., 2018).

With these in mind, the present study has two primary objectives: (a) to examine the associations of creative ideation with three Big Five personality traits (openness, extraversion, and neuroticism), creative personal identity, and well-being, and (b) to test the moderating role of subjective well-being in terms of the effects of its interactions with other independent variables on creative ideation using a standard procedure (Barron & Kenny, 1986). The sample selected for this study consisted of high ability undergraduate students in honors programs. The sample is unique in that participants are likely to differ from the general population with respect to their personality, creativity, and daily experiences of well-being. High-ability students, on average, were reported to be more open and less neurotic compared to the general population (McCrae et al., 2002; Zeidner & Shani-Zinovich, 2011). Prominent theories of giftedness (e.g., Differentiated Model of Giftedness and Talent, Three-Ring Conception) recognize creativity as an important component of high-ability (Gagné, 2005; Renzulli, 2005). Creativity, along with cognitive ability and academic achievement, is believed to provide a more comprehensive understanding of students' overall abilities.

## Method

### Participants

A total of 389 (73% female) honors college students from the southeast US participated in this study. Participants ranged in age from 17 to 23, with a mean range of 19.2. Of these participants, 256 (67%) identified themselves as White; 70 (17%) as African American; 33 (9%) as Hispanic and Latino American; and 8 (2.5%) as Asian. The demographic breakdown of participants represents that of the honors college population. The data and criteria that are considered for admission to the honors college include high school GPA of 3.5 or above, rigorous high school courses, high scores on standardized tests such as SAT and ACT, application essay, and recommendation letters.

**Table 1:** Zero-order Correlations, Descriptive Statistics and Scale Reliabilities ( $N = 389$ )

	O	E	N	CPI	SWB	CI
O	(.75)					
E	.20**	(.88)				
N	-.09*	-.26**	(.83)			
CPI	.59**	.13**	.03	(.90)		
SWB	.13**	.47**	-.59**	.02	(.90)	
CI	.63**	.28**	-.16**	.66**	.26**	(.83)
M	3.60	3.24	3.07	3.88	4.18	4.86
SD	0.56	0.71	0.84	0.92	0.78	1.27

**Note:** O = Openness, E = Extraversion, N = Neuroticism, CPI = Creative Personal Identity, SWB = Subjective Well-Being, CI = Creative Ideation. Scale reliabilities are shown along the diagonal.

\*Correlation is significant at the .05 level (two tailed)

\*\*Correlation is significant at the .01 level (two tailed)

## Measures

### Personality Traits

Openness, extraversion, and neuroticism were measured using the revised version of the Big Five Inventory (BFI; John et al., 1991). The three subscales, representing these personality traits, were openness (10 items; e.g., "I see myself as someone who is curious about many different things"), extraversion (8 items; e.g., "I see myself as someone who is full of energy"), and neuroticism (8 items; e.g., "I see myself as someone worries a lot"). The items were rated on a 5-point Likert scale (from 1 = "strongly disagree" to 5 = "strongly agree").

### Creative Personal Identity

Five items from Karwowski's (2011) Short Scale of Creative Self were used to measure creative personal identity (e.g., "Being a creative person is important to me"). The items were rated on a 5-point Likert scale (from 1 = "definitely not" to 5 = "definitely yes").

### Subjective Well-Being

Participants' subjective well-being or overall happiness was measured using the Oxford Happiness Inventory (OHI; Argyle et al., 1989). The OHI is a 29-item self-report scale (e.g., "I often experience joy and elation") with items rated on a 6-point Likert scale (from 1 = "strongly disagree" to 6 = "strongly agree"). The overall happiness score was calculated as an average of all items.

### Creative Ideation

The following three items were used to assess creative ideation: "How frequently do you have creative insights?", "How frequently do you come up with novel plans or goals?", and "How frequently do you think of creative solutions to problems?" (Thrash et al., 2010). Items were rated on a scale from 1 = "never" to 7 = "very often."

## Procedure

The sample was recruited by e-mail through student listservs. Participants completed self-report measures of personality traits, creative personal identity, well-being, and creative ideation using Qualtrics. The survey also consisted of several demographic items. Little's (1988) chi-square test were used to examine patterns of missing data. Results revealed that missing data were missing completely at random (MCAR), suggesting case deletion to be valid (Rubin, 1976). To minimize potential effects of missing data, nine cases with more than 15% missing data were excluded. Stochastic regression imputation was used to estimate and replace the remaining missing values. Analyses were conducted using MPlus 8.4 (Muthén & Muthén, 2017).

## Results

Scale reliabilities, descriptive statistics, and zero-order correlations among the study variables are presented in Table 1. Scales demonstrated acceptable reliabilities ranging from  $\alpha = .76$  (openness) to  $\alpha = .93$  (subjective well-being). Extraversion had a moderate positive association with subjective well-being ( $r = .47$ ) and small positive associations with creative personal identity and creative ideation ( $r = .13$  and  $r = .28$ , respectively). Neuroticism was strongly correlated with subjective well-being, but the direction was negative ( $r = -.59$ ). Neuroticism had also a small negative correlation with creative ideation ( $r = -.16$ ). Openness was positively and strongly related to creative personal identity ( $r = .59$ ) and creative ideation ( $r = .63$ ). Subjective well-being did not have a significant association with creative personal identity but was significantly and positively correlated with creative ideation ( $r = .26$ ).

Hierarchical multiple regression analysis was performed to examine the hypothesized relationships. Predictors were entered into the model in sets and in four steps. In the first block, creative ideation was regressed on personality traits (openness, extraversion, and neuroticism). Creative personal identity and subjective

**Table 2:** Hierarchical Regression Analysis Results Using Creative Ideation as the Criterion

Predictors	Step			
	1	2	3	4
O	.64 ***	.39***	.38***	.38***
E	.15**	.13**	.11**	.11**
N	-.05	-.07*	-.02	-.03
CPI		.40***	.41***	.42***
SWB			.14**	.13**
O x SWB				.04
E x SWB				.01
N x SWB				.03
CPI x SWB				-.08*
$\Delta R^2$	.50***	.10***	.02**	.01

**Note:** O = Openness, E = Extraversion, N = Neuroticism, CPI = Creative Personal Identity, SWB = Subjective Well-Being.

\* $p \leq .05$ , \*\* $p < .01$ , \*\*\* $p < .001$ .

well-being were introduced in the second and third steps, respectively. Moderating effects of subjective well-being were explored by introducing interaction variables of personality traits and creative personal identity with happiness in the last step. All predictor variables were mean-centered prior to creating interaction terms to eliminate multicollinearity problems (Aiken & West, 1991). In addition, because data were obtained in the same context through self-report, common method bias was examined using post-hoc Harman's single-factor test and a single-method-factor approach (Podsakoff et al., 2003). Results indicated that the common method effects were not likely to distort the study results.

Regression results are summarized in Table 2. Creative ideation was associated with personality traits, with about 50% of variance being explained largely by openness and extraversion ( $R^2 = .498$ ,  $p < .001$ ). Neuroticism did not emerge as a significant predictor. Creative personal identity explained an additional 9% of variance in creative ideation ( $R^2$  change = .078,  $F$  change = 86.49,  $p < .001$ ). A significant change in  $R^2$  was observed by inclusion of subjective well-being ( $R^2$  change = .009,  $F$  change = 8.48,  $p = .004$ ). Including interactions in the final step did not yield a significant improvement in the overall model. Only the effect of creative personal identity was found to be moderated by subjective well-being ( $\beta = -.08$ ,  $p = .04$ ). Further analysis suggested that creative ideation was significantly predicted only for students with average subjective well-being ( $\beta = .23$ ,  $p < .001$ ). The slopes were not significant for those with high (+1 SD above mean) and low (-1 SD below mean) subjective well-being levels. No collinearity issue was observed for the regression analysis. All Variance Inflation Factors (VIF) were below 2.

## Discussion

The present results add to our growing understanding of how openness is critical throughout the process of creative endeavors. Openness emerges as an extremely

functional and essential personality trait for a wide range of educational and life outcomes, including creative productivity (Gatzka, 2021; Mammadov, 2021b;). Ideation is an important constituent of creative productivity concerning its initial stages where generation, development, and communication of diverse thinking take place. It serves as a starter for a creative process. The role of openness in this process appears to be significant from the beginning and throughout the process. It may even be more important in the initiation than in the transmission of ideas into products. Previous studies reported that the relationship of openness with creative ideation was stronger than its relationship with creative products (e.g., Bridges & Schendan, 2019).

Originality (i.e., relative novelty of ideas) and fluency (i.e., the quantity of different ideas one generates) are two independent constituents of creative thinking. Flexibility enhances the capacity of individuals to achieve these outcomes and be able to approach problems from unexpected angles (Baas et al., 2013). Cognitive flexibility is the ease with which individuals can shift to a different thought and approach (Sanders et al., 2008). Individuals with high cognitive flexibility are likely to find new connections among ideas by using broad and inclusive cognitive categories (Eysenck, 1993; Friedman & Förster, 2010). Flexibility has also been studied in the personality literature. Openness is closely related to flexibility (Baas et al., 2013). Individuals with high scores on openness tend to receive new information without fear and prejudice (Thurston & Runco, 1999). Therefore, they have more flexibility in generating novel ideas through insightful understanding of that information.

Another notable result was the significant relationship between extraversion and creative ideation. Extraversion has been found to be related to various dimensions of creativity (Feist, 1998; Furnham & Bachtar, 2008; Mammadov et al., 2019; Puryear et al., 2017), including when assessed with divergent thinking tasks (King et al., 1996). This link could be interpreted in terms of flexibility, too. Extraverts, like open individuals, tend to explore their environments more often than others (Jung, 1971). Constant engagement with their environment and frequent social interactions may provide them with varied experiences and, therefore, heightened flexibility.

A further possible explanation may be linked to Mednick's (1962) model on creativity-related differences in associative hierarchies. Associative hierarchies refer to "the idea that for any given concept there is a set of associations which can be arranged in the order of their associative strength" (Benedek & Neubauer, 2013, p. 274). Mednick argued that creative individuals are characterized by flatter associative hierarchies, which means that they are able to retrieve more remote association responses when presented with a new concept. Both openness and extraversion are related to the use of flat associative hierarchies (Martindale, 1995). Open and extravert

individuals are not as able as others to filter out previously experienced seemingly irrelevant stimuli from their attentional focus, which leads those stimuli to enter their working memory easily (Peterson et al., 2002). These diverse and available elements enhance originality and fluency and lead them to generate creative ideas (Baas et al., 2013; Carson et al., 2003).

Creative personal identity was another significant predictor of creative ideation, explaining an additional 9% of the variance. This result confirms the findings from previous studies on the importance of self-beliefs in creative thinking and behaviors (Karwowski et al., 2013; Tierney & Farmer, 2011). Participants seeing creativity as a part of their identity seemed to report that they frequently have creative insights and very often come up with novel plans or goals. Creative personal identity can also be interpreted in terms of the value people attribute to creativity (Plucker & Makel, 2010). Creative ideation is an activity that people, in general, are autonomously motivated to pursue. The more value an individual places on it, the more they are engaged in creative ideation.

The moderating role of subjective well-being in the relationship between creative personal identity and creative ideation is worth noting. Results suggested that creative personal identity predicted ideation only for students with average happiness. No significant relationships were observed for students with happiness scores outside one standard deviation of the mean. Subjective well-being had also a significant main effect on creative ideation. This result is in line with the findings from previous studies, demonstrating the tendency for happiness to be positively correlated with elements of creativity (Amabile et al., 2005; Baas et al., 2008; Runco, 2007). The results imply that happy people engage in creative ideation more often than others. There is evidence from previous research that the state of unhappiness (i.e., being sad or angry) might lead to increased creative ideation, too, but it does decline over time (Baas et al., 2011). Perhaps those individuals tend to switch between ideas without meaningful connections. In addition, individuals with low happiness may engage in creative ideation but are less likely to have a systematic and structured way of approaching creative tasks.

Several possible limitations to the present study are worth noting. First, data were collected through self-report

measures. Although efforts were undertaken to examine and control common method bias, multiple data sources would allow more accurate estimates. Second, using a facet-level personality scale would be helpful in better understanding relationships. For example, neuroticism did not emerge as a significant predictor, but it might be possible that specific sub-traits do, in fact, contribute to creative ideation. Third, the sample was limited to honors college students from one state. This limitation precludes our ability to generalize findings to all honors and other undergraduate students.

## Conclusion

The present study sought to investigate individual difference predictors of creative ideation—with a particular interest in personality traits, creative personal identity, and subjective well-being. It revealed three main findings. First, consistent with prior research (Puryear et al., 2017; Mammadov, 2021a), openness and extraversion were significantly associated with creative ideation. These personality traits are malleable and dynamic (Roberts & DelVecchio, 2000). The positive qualities of traits can be developed and reinforced as a part of school pedagogy and college readiness pathway. Second, creative ideation was also predicted by creative personal identity. The stronger the creative personal identity, the more frequently one experiences creative ideation. Students, in both K-12 and university settings, could be encouraged to be frequently involved in creative activities which may result in creativity become a stronger component of how they see themselves. Third, subjective well-being had both main and moderating effects on creative ideation. Positive interventions and support in the honors college context are quite important for helping students to improve or maintain their well-being. These students may experience more challenges and stressors than other undergraduate students due to increased achievement pressure in a competitive learning environment of honors program. Students with positive well-being are not only likely to excel academically, but also likely to engage in creative ideation and productivity in various domains.



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