

A Correlational Study of Creativity, Happiness, Motivation, and Stress from Creative Pursuits

Michael W. Ceci · V. K. Kumar

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Abstract This study examined the relationship of creative capacity with happiness, affect, motivation, and stress from creative pursuits using a sample of 420 students. In addition, it tested whether a relationship existed between overall creative capacity and specific styles or approaches to creative expression. A composite creative capacity score was derived from four creative capacity measures. Creative capacity was not significantly correlated with happiness, but it correlated significantly with positive and negative affect scales and with their absolute sum. Creative capacity correlated highest with intrinsic motivation (IM) among all variables. Creative capacity and IM correlated similarly in direction and magnitude with creativity styles subscales of Belief in Unconscious Processes, Use of Techniques, and Use of Senses, and negative correlations with the Use of People and Final Product Orientation Subscales.

Keywords Creativity · Happiness · Affect · Mood · Intrinsic motivation · Extrinsic motivation · Stress

1 Introduction

The purposes of this study were to explore whether or not (a) a relationship existed between happiness and creativity, (b) measures of affect, motivation, and stress from creative pursuits correlated with creativity, and (c) the relationship between happiness and creativity was moderated by affect (positive and negative), by the type of motivation (extrinsic and intrinsic) for creative work, and/or by any stress experienced in creative pursuits. An additional purpose was to examine the relationship between happiness and other trait measures with styles of creativity.

M. W. Ceci · V. K. Kumar (✉)
Department of Psychology, West Chester University of Pennsylvania, West Chester, PA 19383, USA
e-mail: kkumar@wcupa.edu

Creativity, arguably a most important human attribute, has allowed us to evolve from a hunter-gathering existence to a sophisticated free-market lifestyle. Implicit in all creative efforts is the hope that we can create a better life for all species with which we share this world. As such, it seems reasonable to expect that positive feelings would generally accompany this sense of hope and that creative people would tend to be happier and show greater everyday positive affect. Satisfaction with life or subjective well-being, commonly referred to as happiness (Diener 1984), does tend to be accompanied by more positive affect and less negative affect in the individual (Ryan and Deci 2001). However, there seems to be a distinction between overall happiness and affective states. While positive affect may typically accompany happiness, positive affect alone is not normally seen as synonymous with happiness. Similarly, the presence of negative affect does not necessarily diminish one's overall sense of well-being.

Yet, when one considers the Vincent Van Goghs, Virginia Woolfs, Sylvia Plaths, Ernest Hemingways, Jackson Pollocks and William Faulkners, it is difficult to conclude that creativity always goes hand in hand with a general sense of happiness or even with positive affect. Jamison (1989) observed that many artists are most prolific when they are least emotionally stable. It is possible that creative but disturbed individuals might find relief from negative affect while they are actively engaged in creative work, a negative reinforcement contingency. Amabile et al. (2005, p. 375) noted that evidence from qualitative research and anecdotal accounts suggest that artists and scientists often report elation following a creative insight. "For example, Einstein called his 1907 general theory of relativity 'the happiest thought of my life'" (Rothenberg 1990, p. 375). Similarly, Virginia Woolf (1955) wrote, "Odd how the creative power at once brings the whole universe to order" (p. 185).

Many highly creative individuals possibly suffer from enduring depressed moods when not engaged creatively over a period of time. Nevertheless, studies have generally only examined the role of moods as state variables, not as dispositional characteristics as in the present study. Amabile et al. (2005) noted that evidence concerning whether engagement in creative work impacts mood "is still very tentative" (p. 375). Citing Feist (1994), they noted that, while the mood of art students improved significantly following an artistic creative task, the science students showed no such improvement in mood after engaging in a scientific creative task. In the same study, Amabile et al. (2005) examined the relationship between affect and creativity in a longitudinal study in three industrial firms. Their measure of creativity was a daily self-narrative of any "one event from today that stands out as relevant to the target project" (p. 377) gathered over 9–38 weeks. They found a small number of instances in thought narratives (14 out of 364) containing references to experiencing positive emotions (enjoyment) from simply working on creative projects; this, however, may be an underestimate since no specific instructions were given to report on certain types of feelings to complete the daily narratives.

Amabile et al.'s (2005) analysis of these spontaneous daily narratives also suggested a linear and positive relationship between positive mood and creativity but a lack of correlation between affective ambivalence (simultaneous experiencing of positive and negative moods), mood variability, and mood improvement with creativity. They also found some evidence for a positive affect consequence of creative thought events such as joy and pride (86 % of 71 event descriptions contained references to "a direct emotional reaction" (p. 387), but they also noted expressions of negative affect (anger, sadness, fear), albeit only in 14 % of 71 event descriptions. A high percentage (295 out of 364 or 80 %) of event descriptions did not contain references to affect consequences of creative thought

events. Positive and negative affect consequences of coworkers' comments were observed in a small number of event descriptions.

According to Runco (2007a), both positive and negative moods are found to facilitate creativity, but positive mood appears to be a more reliable facilitator of creativity. Runco reviewed earlier research that suggests positive moods facilitate performance on Remote Associates Test, insight problems, and word association tasks. Negative moods might help with category fluency, but it is not clear why. A recent study by Bass et al. (2011) found that angry moods led to initially higher creativity that declined over time. Bass et al. explained that an angry person uses an unsystematic and unstructured approach to creativity and tends to switch from one thought category to another, which likely activates remote concepts stored in memory, and, as a result, thinks divergently.

A contributing factor to the enduring disturbed affect of some tortured artists might have been the heavy pressure to sustain high performance levels to maintain their reputation. Perhaps with growing reputation, work becomes driven by extrinsic, rather than intrinsic, motivation. By contrast, artists who remain intrinsically motivated in their everyday creative efforts, being free from such outside pressures, may be happier and generally carry positive affect after engaging in self-driven creative work. Thus, the relationship between creativity and affect (positive or negative) might be moderated by the type of motivation (intrinsic or extrinsic) that individuals have in their creative pursuits as well as the stress that the creative process itself engenders in them. While affect is typically studied as states, in the present study we examined it as a relatively enduring, trait-type characteristic. It is hypothesized that creativity would be positively correlated with positive affect, but negatively with negative affect.

In addition to factors of happiness and affect, the type of motivation, intrinsic or extrinsic, would seem to be correlated with creativity. For example, while extrinsic motivation is not always detrimental to creativity (e.g., Eisenberger and Cameron 1996), studies by Amabile and her colleagues (Amabile 1985; Amabile et al. 1976; Amabile et al. 1994) suggest that intrinsic motivation is fundamental to creativity. Their studies suggest that externally imposed deadlines diminish intrinsic interest in tasks and that extrinsic motivations reduce the quality of work.

Intrinsically motivated creative individuals are possibly happier than extrinsically motivated creative individuals. Extrinsically motivated individuals may carry more negative affect and experience stress while engaged in creative tasks. Thus, our interest in this study was not only to examine whether intrinsic and extrinsic motivation correlated with creativity, but also whether they moderated the relationship between creativity and happiness.

An additional question of interest to this study was to examine if creativity styles correlated with measures of happiness, affect, motivation, and stress. Some investigators (e.g., Gough and Woodworth 1960; Helson and Crutchfield 1970; Katz 1984) have looked at beliefs, attitudes, work habits, and stylistic approaches of creative people. Kumar et al. (1991) described seven styles of creativity, which they defined as the beliefs and approaches people use to facilitate their creative work. Using the Creativity Styles Questionnaire (CSQ; Kumar and Holman 1989) and its revised version CSQ-R, Kumar and colleagues (Kumar et al. 1991, 1997; Pollick and Kumar 1997) have found that more creative individuals tend to report (a) greater belief in unconscious processes, (b) using more techniques to greater degree for being creative, and (c) being intrinsically motivated to pursue ideas, rather than to produce final products.

1.1 This Study

While researchers have focused on the relationship between affect as states and creativity, to the best of the authors' knowledge, no studies have been conducted on evaluating the relationship between tendencies for happiness (subjective well-being) and affect with creativity. Also, to our knowledge, earlier studies have not examined if the creativity-happiness relationship is moderated by type of motivation, affect, and stress from pursuing creativity activities.

Based on the work of Amabile and others reviewed earlier, we expected that happier people would more likely report being more creative and that this relationship would be stronger for people who are intrinsically motivated, have stronger positive affect, and do not find creative work stressful. We also expected that more creative individuals are likely to report being more intrinsically motivated with stronger positive than negative affect. Stress from the pursuit of creative work might act in similar ways to negative affect by either facilitating or hampering creativity. Prior studies have examined the relationship between creativity and general stress (see Runco 2007a) but not between creativity and stress that specifically emanates from the creative effort itself. It is possible that, given their reward orientation, extrinsically motivated people are likely to find creative work inherently more stressful than intrinsically motivated individuals who approach creativity for challenge and enjoyment. It can be argued, therefore, that the moderating effect of stress from creativity on the happiness-creativity relationship would be similar to extrinsic motivation inasmuch as those who find creative efforts more stressful are likely to report being less happy and less creative.

Although no predictions were possible from prior research as to the relationships between happiness and styles of creativity, the results of prior studies that showed that creative people have greater belief in unconscious processes, use greater number of techniques to a greater degree, and have low final product orientation (more intrinsically motivated) were expected to be replicated.

This study has both theoretical and practical significance. Many investigators have been interested in the pattern of relationships between creativity and different variables that seem to have a bearing on creativity. This study includes subjective well-being, tendencies for positive and negative affect, and stress from creative work itself, variables which have not received much attention from prior investigators. The study includes styles of creativity and their relationships with affect, stress, and motivational variables which have not been examined before to the best of our knowledge. It also includes four measures of creativity covering self-perceptions of creativity as well as interest and engagement in creative activities. While the study is correlational, it may still contribute to an understanding of what can be done to encourage creativity.

2 Method

2.1 Participants

Participants were 420 undergraduate students of Introduction to Psychology classes and art classes at West Chester University of Pennsylvania. Of these participants, 285 were female, 134 male, and 1 unspecified. Regarding ethnic identification, 377 (89.8 %) identified themselves as White; 30 (7.1 %) as African American; 6 (1.4 %) as Hispanic; 5

(1.2 %) as Asian and 2 (.5 %) as multi-racial. The participants ranged in age from 18 to 50 years old with an average age of 20.5 years (median and mode = 21 years).

Participants' education levels were as follows: College, Year 1 = 284 (67.6 %); College, Year 2 = 89 (21.2 %); College, Year 3 = 27 (6.4 %); College, Year 4 = 18 (4.3 %); Earned Bachelors = 1 (.2 %). The participants came from a variety of majors including Business, Government/Politics, Humanities, Arts, Education, Math/Science, and others; therefore, they possibly represented a broad range of creative interests, rather than specialized creativity in one domain.

Participation was voluntary, and students were free to terminate their participation at any time during the study without penalty. Students from Introduction to Psychology classes received credit for fulfilling their research participation requirement for their respective classes.

2.2 Instruments

We included existing measures of creativity, happiness, and motivation, but the stress from pursuing creative efforts scale was constructed for this study as none were found in the literature. The Cronbach alpha reliability values for various scales and subscales obtained in the present study are reported in Table 1. Because of omissions and inaccuracies (e.g., choosing more than one response) in responding, the reliability values were based on 393–420 participants.

2.2.1 Creative Capacity

To ensure the measurement of creative capacity comprehensively (i.e., including self-perceptions of creative capacity and accomplishments), three instruments were used to assess creative ideation, creative accomplishment (with two subscales), and creativity styles.

Table 1 Reliability of Instruments

Scale	Cronbach α	Creativity style	Cronbach α
Ideation Behavior Scale	.91	Belief in Unconscious Process	.68
SPCC	.76	Use of Techniques	.77
GMCC-Interests	.86	Use of People	.69
GMCC Activities	.86	Final Product Orientation	.35
Subjective Well-Being	.83	Environmental Control	.77
Positive Affect	.84	Superstition	.59
Negative Affect	.84	Use of Senses	.75
Intrinsic Motivation (IM-Total)	.73		
IM Enjoy	.69		
IM Challenge	.63		
Extrinsic Motivation (EM-Total)	.60		
EM Outward	.57		
EM Comp	.69		
Stress From Creative Pursuits	.85		

The third revision of the Runco Ideational Behavior Scale (RIBS-III; Runco 2007b; Runco et al. 2000–2001), which treats creative ideas as valid products to assess creativity, was used. The RIBS-III includes an accuracy scale consisting of seven items designed to assess the honesty of responses. These items included statements such as “I say something and later regret it” and “I wonder what it would be like to make more money?” The RIBS-III items are anchored 0 (never); 1 (approximately once a year); 2 (once or twice every month, approximately); 3 (once or twice each week, approximately); and, 4 (just about every day, and sometimes more than once each day). Runco’s (2007b) analysis of the psychometric properties of the original 93-item measure suggests that the instrument has strong internal consistency reliability (Cronbach’s $\alpha = .92$).

Since no cutoff scores are available (see Runco 2007b) to determine candid responding, a preliminary analysis was performed to develop a way of screening out less candid responses based on the responses to the seven honesty items. The RIBS-III items are anchored 0 (never) to 4 (just about every day, and sometimes more than once each day). The other three responses are 1 (approximately once a year), 2 (once or twice every month, approximately), and 3 (once or twice each week, approximately). It was assumed that an honest response required an admission of having thought or behaved in the manner indicated in the item on at least a monthly basis. Any response indicating that the thought or behavior was experienced on a “yearly basis” or “were never experienced” were assumed to be less candid responses.

The response for each item was then dichotomized into two ordinal categories of 1 (honest) and 0 (less honest) on each of the seven honesty items on the RIBS-III scale. A total score of the seven items, ranging between 0 and 7 points, was then derived to get an assessment of their overall honesty in responding.

To determine how the accuracy of responding affected the reliability of the 39 items of the RIBS-III Ideational Behavior Score (IBS), Cronbach alpha coefficients were computed for all participants and separately for those who responded honestly. The reliability of the IBS scale over all participants was .91 ($n = 411$).

With total scores ranging from 0 to 7 on the honesty scale, it was assumed that a score of 4, being just above the median of 3.5, would be a reasonable cutoff value for screening participants who responded candidly. Cronbach alpha coefficients were then computed on screened participants who met the cutoffs of 4, 5, and 6 points. Interestingly, the reliability values were not impacted, as all Cronbach values were approximately .91 regardless of the cutoff score used; thus, all participants were used in all analyses.

The Griffin and McDermott Creativity Checklist (GMCC; Griffin and McDermott 1998) was used to measure creative accomplishment. The GMCC consists of a list of activities for participants to identify those in which they have an active interest and/or have recently participated. The items are rated True or False. Its content focuses exclusively on various artistic expressions including the visual, performing, and domestic arts. This tool showed moderate reliability and validity properties (Griffin and McDermott 1998; Dowell 2008). The total numbers of creative interests and creative activities were used as two separate measures of creative capacity and will be abbreviated throughout this study as GMCC-Interests and GMCC-Acts, respectively. The two subscales each yielded Cronbach alpha reliability values of .86 in this study.

The Creativity Styles Questionnaire-Revised (CSQ-R, Kumar et al. 1997) contains a two-item measure of self-perceived creative capacity (SPCC) and 76 additional items that measure specific beliefs about creativity and the strategies used to be creative (Kumar et al. 1997). The items are rated from 1 (strongly agree) to 5 (strongly disagree). The CSQ-R was a revision of a previously unpublished questionnaire (the CSQ, Kumar and Holman 1989) and was measured to have improved reliability (median Cronbach’s alpha for the subscales = .74; Kumar et al. 1997). The SPCC measure was also found to have significant

convergent validity with other measures of creative capacity (Dowell 2008; Fuchs et al. 2007; Lack et al. 2003; Manmiller et al. 2005). The Cronbach reliability values for the CSQ-R subscales found for the present study are reported in Table 1. The values were low for Final Product Orientation (.35), Superstition (.59), Belief in Subconscious Processes (.68), and Use of People (.69); for other subscales, alpha coefficients values ranged between .75 and .77.

2.2.2 Happiness Measures

Separate measures of affect and satisfaction with life were included in line with the suggestion of Diener et al. (1999) and research showing that measures of affect are most valid when positive affect and negative affect are treated as independent constructs rather than opposite extremes on the same continuum (Diener et al. 1999; Watson et al. 1988).

The Positive and Negative Affect Schedule (PANAS) consists of two ten-item scales that allow a separate score for each mood scale—Positive Affect (PA) and Negative Affect (NA; Watson et al. 1988). The items are rated from 1 (very slightly or not at all) to 5 (extremely). Both scales have been shown to have strong internal and test–retest reliabilities and are largely uncorrelated (Crawford and Henry 2004; Watson et al. 1988). The instructions for this instrument allow the test user to specify the specific time frame (e.g., today, past few weeks, the past year, etc.) that the subject should consider when completing the scales. In this study, participants were asked to “Indicate to what extent you *generally* feel this way, that is, how you feel on the average” so as to measure affect as a trait. Higher scores reflect higher enduring affect levels. Both PA and NA yielded a Cronbach alpha reliability value of .84 in this study.

The Satisfaction with Life Scale (Diener et al. 1985) referred to as a measure of subjective well-being (SWB) was used in this study. The SWB consists of five items (anchored on a seven-point scale) and is a global life satisfaction measure that does not address satisfaction in any particular domain (e.g., financial, interpersonal, etc.). It is a widely used measure with high internal consistency, temporal reliability, and discriminant validity from measures of affect (Pavot and Diener 1993). For the convenience of gathering data on electronic scan sheets with five options, the seven-point scale were anchored to 5, ranging from 1 (strongly disagree) to 5 (strongly agree). The Cronbach alpha for SWB was found to be .83 in this study.

2.2.3 Motivation

Amabile’s Work Preference Inventory (WPI; Amabile et al. 1994) was used in this study. The WPI is widely used as a measure of enduring motivation orientation of individuals that informs their basic attitude towards their work and anchored on a four-point scale from 1 (never or almost never true of you) to 4 (always or almost always true of you). Amabile et al. (1994) demonstrated that the instrument measures “stable motivation orientations” (p. 963). In addition to the primary scales of Intrinsic Motivation (IM-Total Score) and extrinsic motivation (EM-Total Score), there exist four reliable subscales based on factor analysis: Challenge Motivation (inspired by challenge of the task), Enjoyment Motivation (intrinsic pleasure of working on the task), Outward Motivation (other directed, or recognition seeking), and Compensation Motivation (reward oriented). The WPI scales and subscales have been reported to have satisfactory internal consistency and test–retest reliability. There are two versions of the WPI, one for general adult populations and one for students. Both versions reportedly have strong, virtually identical psychometric properties.

The student version was used in this study. The Cronbach alpha values ranged between .57 and .69 for the IM and EM scales and subscales in this study.

2.2.4 Stress from Creative Pursuits Scale

This scale (Kumar and Ceci 2011) was constructed for this study to measure perceived stress that individuals experience as a result of engaging in creative work. The initial measure consisted of 15 items anchored 1 (never or almost never true of you) to 4 (always or almost always true of you). The items included negative affect statements such as “I worry how people will view my creative products/work” as well as positive affect statements such as “I find engaging in creative work to be enjoyable.”

Five of the 15 items were dropped to improve the scale’s reliability. The corrected-item total correlations of the remaining ten items ranged between .44 and .53 yielding an acceptable Cronbach alpha coefficient of .85. The validity of the abridged ten-item Creative Stress scale was evaluated by correlating the scores of this scale with those of the following five scales: WPI’s intrinsic motivation (IM-Total Score), WPI’s Extrinsic Motivation (EM-Total Score), PANAS’s Positive Affect (PA), PANAS’s Negative Affect (NA), and SWB. As expected, the stress scale correlated negatively with PA ($r = -.17$, $p = .001$, $n = 403$) and IM ($r = -.12$, $p = .016$, $n = 404$) and correlated positively with NA ($r = .29$, $p = .000$, $n = 398$) and EM-Total Score ($r = .37$, $p = .000$, $n = 401$). It did not correlate significantly with SWB ($r = -.09$, $p = .084$, $n = 404$). The aforementioned correlations of the abridged Stress from Creative Pursuits Stress scale were in the expected directions with four of the five scales suggesting good nomothetic validity.

2.3 Procedures

Students were tested in groups ranging in size from 25 to 90. All students completed the questionnaires in the same order. Students were first told of the nature of the study and then asked to complete the informed consent form that affirmed that their completion of the survey was entirely voluntary and that all responses would remain anonymous.

3 Results

3.1 Preliminary Analyses

3.1.1 Derivation of a Composite Creative Capacity Score

In this study, four creative capacity measures (SPCC, RIBS-III IBS, GMCC-Interests and GMCC-Acts) were included. An earlier study by Dowell (2008) found high correlations among these measures and consequently employed a composite measure based on principal component analysis in his study. Thus, to evaluate whether one or more composite scores

Table 2 Correlations among the creative capacity scales

	SPCC	IBS	GMCC-Interests
IBS	.29	–	–
GMCC-Interests	.34	.32	–
GMCC-Acts	.30	.31	.67

All correlations significant at $p = .000$ level

might be derived from the four creative capacity scales, the correlations among the scales were examined. Consistent with the findings of Dowell (2008), all four scales were significantly correlated ($p < .001$). Table 2 shows the correlations among the four creative capacity scales that suggest a common latent factor underlying these scales.

The principal component analysis on the four scales revealed only one factor exceeding the Eigenvalue of 1.0. The factor had an Eigenvalue of 2.13 and accounted for 53.23 % of the common variance among the four variables. The loading of the four variables were as follows: SPCC = .67, GMCC-Interest = .81, GMCC-Acts = .80, and RIB-IBS = .63. Given these findings, regression-based factor scores were computed and converted to McCall's T (where $T = 10Z + 50$) to eliminate negative values for use in all subsequent analyses. The derived factor scores shall henceforth be referred to as the Composite Creativity Capacity Score (CCCS) in this article. The internal consistency reliability of the composite CCCS score was .71, computed using a procedure recommended by Judd and McClelland (1998). Higher CCCS scores may be construed to reflect strong creative ideation as well as greater interest, engagement, and creative everyday accomplishments.

3.2 Relationship of the CCCS with SWB, Affect, Motivation and Stress from Creative Pursuits

Table 3 displays the correlation coefficients between CCCS and each measure of affect (PA, NA, and their absolute total score), subjective well-being, and motivation. The PANAS-Absolute Total score is assumed to reflect the intensity with which an individual experiences both positive and negative emotions, with high scores reflecting greater experiencing of positive and negative affect, middle of the range scores reflecting moderate intensity of experiences of either affect, and low score reflecting a flat affective pattern.

Given 11 correlations listed in Table 3, a Bonferroni $p = .009$ was used to evaluate their significance to keep the overall type 1 error probability at .10 level. As shown in Table 3, the Subjective Well-being, Stress, Extrinsic Motivation scores were not significantly correlated with CCCS. Of the three affect scores, PA and PANAS-Absolute Total were significantly and positively correlated with CCCS, but NA was only marginally and positively correlated ($p = .032$). The PANAS-Absolute Total scores correlated with CCCS, the strongest among all three affect scores. All intrinsic motivation subscales were

Table 3 Correlations of composite creativity capacity score with other measures

Scale	<i>r</i>	<i>p</i>	<i>N</i>
Subjective Well-Being	.02	.643	393
Positive Affect	.19	.000	392
Negative Affect	.11	.032	387
Affect Absolute Total	.24	.000	386
Stress	.03	.617	386
Intrinsic Motivation (IM-Total)	.36	.000	393
IM Enjoy	.34	.000	393
IM Challenge	.22	.000	393
Extrinsic Motivation (EM-Total)	-.07	.182	390
EM Outward	-.09	.073	393
EM Compensation	.00	.969	390

significantly and positively correlated with CCCS; the Extrinsic Motivation scales were not.

Univariate analyses of variance were performed on the different affect and motivation variables with CCCS as the dependent variable to examine if there were any non-linear relationships. Participants were divided into three groups (low, medium, and high) on each affect and motivation variable based on quartile points as cut-off scores. The results of these analyses were consistent with those obtained from the correlational analysis with no significant non-linear trends for any of the variables. Consequently, these results are not being reported in detail here.

3.3 Motivation, SWB and Affect

The correlations of IM and EM scales and subscales with SWB and Affect scales are reported in Table 4. Given 24 correlations, a Bonferroni $p = .002$ was used to evaluate their significance for an overall type 1 error probability of .05. According to Table 4, the IM-Total and IM-Challenge scores were significantly and positively correlated with SWB ($r = .20$, $p = .000$, and $r = .18$, $p = .000$, respectively). The EM-Compensation score was significantly and positively correlated with SWB ($r = .17$, $p = .001$). Additionally, the IM-Total and subscales were more strongly correlated with PA than with SWB and Absolute Affect scales than were Extrinsic Motivation (EM) Total and its subscales; there were two exceptions—EM-Compensation and PA subscales $r = .35$, ($p = .000$) and EM-Outward and NA subscales $r = .24$, ($p = .000$).

3.4 Moderation of CCCS-SWB and CCVS-Affect by Selected Variables

To determine if the relationship between creativity and subjective well-being was moderated by affect, motivation, and stress variable several regression analyses were conducted where SWB and another variable predictor variable (e.g., positive affect) were always entered in the first step and the interaction between SWB and the predictor variable entered in the second step. Thus two models were tested: the main effects due to SWB and a predictor variable, and the Interaction between SWB and the predictor variable.

It was noted earlier that the correlation between SWB and CCCS was negligible ($r = .02$), thus we wanted to see if the interaction between SWB and another predictor

Table 4 Correlation of motivation with SWB and affect

Motivation scales	SWB		Positive Aff.		Negative Aff.		Absolute Aff.	
	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>	<i>r</i>	<i>p</i>
IM-Total	.20	.000	.47	.000	-.17	.001	.22	.000
IM-Challenge	.12	.019	.33	.000	-.16	.001	.12	.016
IM-Enjoyment	.18	.000	.40	.000	-.10	.044	.22	.000
EM-Total	.04	.483	.14	.004	.13	.010	.21	.000
EM-Compensation	.17	.001	.35	.000	-.12	.019	-.17	.000
EM-Outward	-.09	.082	-.08	.103	.24	.000	.13	.008

variable accounted for any significant variance in creativity above and beyond the two predictor variables.

When the moderation effects due to Positive affect was tested, adding the SWB-Positive Affect interaction term increased the R^2 from .04 to .05 (F change = 5.20, p = .023) suggesting minimal moderation effects due to Positive Affect (R^2 change = .01). The results with respect to negative affect were similar—adding the SWB-negative affect interaction term at the third step increased the R^2 from .02 to .03 (F change = 4.67, p = .031), suggesting minimal moderation effects. For Intrinsic Motivation, adding the interaction term did not significantly change R^2 (.002 increase; F change = 1.08, p = .299). The moderation effects due to Extrinsic Motivation and Stress were not significant (R^2 change = .008 and .003, respectively, F = 1.02 and .68, respectively).

The results were similar when the relationship between CCCS and Affect variables were tested for moderation effects by other trait measures and thus are not described in detail here.

3.4.1 Styles of Creativity

The correlations of CCCS, affect, and motivational variables with creativity styles as measured by the CSQ-R are reported in Table 5

Given that there are 42 correlations, only correlations at p = .002 were considered significant to keep the overall type 1 error at .10 level. Some marginal correlations were also indicated at p = .005 significance level. CCCS was correlated positively and significantly with belief in Unconscious Processes, Use of Techniques, and Use of Senses and negatively and significantly with Final Product Orientation. CCCS was marginally significantly correlated with Use of People and Environmental Control. Superstition was the only subscale that had any significant, albeit marginal, correlation with the SWB scale. Positive Affect was significantly correlated with Use of Techniques. Negative Affect was marginally significantly correlated with Belief in Unconscious Processes and significantly correlated with Environmental Control. The PANAS-Absolute total score was correlated significantly with Belief in Unconscious Processes and marginally with Use of Techniques.

Table 5 Correlations of creativity styles with CCCS, affect and motivational

Creativity style	CCCS	SWB	Pos Aff.	Neg Aff.	Affect Abs. Total	Stress	IM- Total	EM Total
Belief in Unconscious Processes	.44**	-.05	.09	.15*	.19**	.01	.29**	-.09
Use of Techniques	.49**	.11	.16**	.03	.15*	.03	.41**	-.02
Use of People	-.15*	.13	.05	-.13	-.07	.03	-.24**	.04
Final Product Orientation	-.25**	-.09	-.04	.04	-.00	.20**	-.29**	.27**
Environmental Control	.16*	-.05	-.10	.17**	.07	.09	.01	-.13
Superstition	.13	-.14*	-.08	.09	.01	-.01	.02	-.09
Use of Senses	.33**	-.02	.10	-.04	.05	-.05	.18**	-.06

** Significant at Bonferroni p = .001 level (2-tailed)

* Marginally significant p = .005 level (2-tailed)

The stress from Creative Pursuits scale was only significantly and positively correlated with Final Product Orientation.

Of the motivational orientation scales, Intrinsic Motivation-Total correlated significantly with all of the creativity styles except Environmental Control and Superstition; whereas, Extrinsic Motivation-Total only correlated with Final Product Orientation in the expected direction.

4 Discussion

4.1 Reliability

Miller et al. (2011) noted that although there is no set or fixed value for adequate reliability for all types of tests, typically values of .70 or above are considered adequate among researchers. The instruments which yielded reliabilities lower than .70 were the subscales IM Enjoyment (.69), IM Challenge (.63), Extrinsic Motivation (.60), EM Outward (.60), EM Compensation (.69), Final Product Orientation (.35), and Superstition (.59). Therefore, their results should be treated with caution even though some of the results were in the expected direction. It is not clear as to why the reliabilities were lower in the present sample—one possibility is that given the number of instruments used, the participants became somewhat careless in their responses. All other scales, including the new Stress From Creative Pursuits scale, yielded Cronbach alpha coefficients within the acceptable range of reliabilities for research instruments.

4.2 Are Creative People Happier?

Contrary to our expectation, the results of this study suggested neither a linear nor a curvilinear relationship between happiness (SWB), as measured by the satisfaction with life scale, and the composite measure of creative capacity. It is not easy to explain why the traits of creativity and happiness were not correlated, particularly since the results of the present study, consistent with earlier studies (e.g., Amabile et al. 2005; Runco 2007a; Bass et al. 2008), showed that the tendency for positive affect to be correlated with creativity. A plausible moderator of this relationship may be the degree of success individuals experience in their creative efforts, an idea worth testing in future studies.

A finding consistent with prior results was the marginally significant positive correlation between negative affect and creative capacity (Amabile et al. 2005). While this relationship was not as strong, it does seem to suggest that consistently negative moods may be an important quality of creative people. These results extend prior work on moods measures as states that suggests the association between positive moods and creativity is more reliably found than negative mood (Runco 2007a).

Perhaps the finding that brings both types of affect together is the most telling. The PANAS-Absolute Total score (absolute sum of the positive and negative affect scores) had the highest correlation of the three affect variables with CCCS. This high absolute affect score may be understood to reflect the capacity to feel extreme or intense emotions. The results suggest, the more intense, possibly more passionate participants (those with higher combined scores of positive and negative affect), had higher Composite Creative Capacity scores than those having generally flatter affect.

The higher correlation of CCCS with the tendency for absolute affect is consistent with the popular perception of highly creative writers, artists, musicians, and even scientists, as

passionate and emotionally volatile people. Indeed, Feist's (1998) conclusions from a meta-analytic study are noteworthy: "Creative people are more autonomous, introverted, open to new experiences, self-accepting, driven, ambitious, dominant, hostile, and impulsive. Out of these the largest effect sizes are on openness, conscientiousness, self-acceptance, hostility, and impulsivity" (p. 299).

Not surprisingly, the relationship between creativity and mood seems to be as complex as the temperament of the classic tortured artist. A reliable finding in psychological research is the association between bipolar disorder and creativity (Rybakowski and Klonowska 2011). Although not a part of this study, it is reasonable to wonder if the mood swings experienced by creative people might frequently rise to a clinical-level imbalance such as bipolar disorder. Often manic states are related to high productivity followed perhaps by depressed moods. It is unclear from the literature whether or not regulating emotions via psychotherapy or medication might reduce productivity of highly creative individuals suffering from a bipolar disorder. Schou (1979) found 6 out of 24 of manic-depressive artists showed lower productivity as a result of prophylactic lithium treatment; 12 out of 24 showed an improvement, and 6 out of 24 showed no change. Schou suggested that lithium's effects might depend on other factors such as severity of illness, sensitivity, and the ability to make productive use of manic episodes.

As expected, the Intrinsic Motivation-Total Score was more strongly positively correlated ($r = .20, p = .000$) with SWB and Positive Affect ($r = .47, p = .000$) than Extrinsic Motivation-Total Score (SWB $r = .04, p = .483$; PA $r = .14, p = .004$). Thus, intrinsic motivation was associated with being creative, happy, and in positive mood. Interestingly, contrary to expectations, Extrinsic Motivation-Compensation was significantly correlated with Positive Affect ($r = .35, p = .000$) perhaps suggesting the role rewards can play in maintaining positive affect.

4.2.1 Moderating Effects on the Creativity-SWB and Creativity-Affect Relationships

Regression analyses suggested minimal moderation effects due to positive and negative affect, but none of the other variables. These minimal effects may be more due to the large sample size used in the study than real effects. Results were very similar when the moderation effects due to different predictor variables were tested in accounting for CCCS and Affect Variables (Positive and Negative).

4.3 Creative Capacity, Motivation and Stress from Pursuing Creative Activities

The correlation between creativity and intrinsic motivation was so strong ($r = .36, p = .000, n = 393$) that it was necessary to evaluate the creativity measures to determine if there was any bias inherent in the measures of creative capacity included in the study. An examination of the items of the different creativity scales used in this study indicated that this concern is unwarranted. For example, the GMCC instrument was determined to be unbiased since it was simply comprised of a list of various creative activities about which the participants were asked if they had participated. A careful re-reading of the RIBS-III questionnaire showed that all of its questions appeared to be neutral with respect to motivational orientation (intrinsic or extrinsic), thus this relationship between creative capacity and intrinsic motivation can be assumed to be a correlation of two related constructs, rather than an artifact of similarity of item content.

The finding of the close relationship between creativity and intrinsic motivation has been documented in many prior studies (e.g., Amabile 1985), and thus not surprising. It

appears that one needs to be intrinsically inspired or self-motivated for any sustained creative efforts. In contrast to the close relationship between creativity and intrinsic motivation, the correlation between creativity and extrinsic motivation was not significant. While these findings are consistent with prior research (Runco 2007a) that shows that creativity correlates more significantly with intrinsic than extrinsic motivation, these results are not to be construed to imply that extrinsic motivators do not foster creativity; indeed they might in some circumstances, especially competitive ones. Runco (2007a) observed both intrinsic and extrinsic motivation “can energize the creative person” (p. 308). It is interesting that the extrinsic motivation subscale Compensation was significantly correlated with positive affect ($r = .35, p = .000$), but it had negligible correlation with creativity suggesting that a reward orientation possibly plays a role in the tendency to maintain positive affect, but not in creativity.

The Stress From Creative Pursuits scale was not significantly correlated with creative capacity, but it was significantly correlated with the Extrinsic Motivation scale ($r = .37, p = .000$). Further, considering that the Stress from Creative Pursuits Scale was significantly correlated with Final Product Orientation ($r = .20, p = .001$) and a small significant negative correlation with Intrinsic Motivation ($r = -.12, p = .016$), it seems that individuals who pursue creative work for a livelihood or expected to be creative on a regular basis may experience greater stress, an idea worth testing in a future study.

4.4 Creativity Styles

Happiness was generally uncorrelated with styles of creativity. The marginally significant correlation of happiness with superstition ($r = .14, p = .005$) is difficult to explain, but an interesting question to pursue in a future study. However, those with greater PA and PANAS-Absolute Total (absolute affect) reported greater use of techniques to be creative ($r = .16, p = .001$; $r = .15, p = .005$, marginally significant; respectively).

Interestingly, those with negative affect were more likely to use environmental and behavioral control strategies. This finding makes sense in light of an earlier study that showed that anger triggers an unsystematic approach to creativity (Bass et al. 2011) and using environmental and behavior control strategies might help people with high negative affect and possibly anger stay focused. The aforementioned finding echoes Lack et al.’s (2003) finding that particular types of individuals may benefit from using environmental control and self-regulation strategies. In particular, Lack et al. had found that fantasy prone individuals were more likely to report using environmental control and self-regulation strategies.

Further demonstrating the close relationship between creativity and intrinsic motivation, the CCCS and the IM-Total Score each correlated in the same direction and magnitude with various creativity styles. Participants who scored higher on creativity or intrinsic motivation tended to score higher on the following three creativity styles subscales: Belief in Unconscious Processes, Use of Techniques, and Use of Senses. As would be expected, both CCCS and IM-Total Score correlated negatively with the use of people and Final Product Orientation subscales. By definition, use of people and final product orientation are types of extrinsically motivated behaviors, and the negative correlation supports the connection between intrinsic motivation and creativity. The only creativity style subscale that was not significantly correlated with either creative capacity or intrinsic motivation was Superstition.

The correlations of creativity with styles of creativity were generally consistent with previous research (Dowell 2008; Kumar et al. 1991; Kumar et al. 1997; Lack et al. 2003). Specifically, creativity was significantly correlated with Belief in Unconscious Processes,

Use of Techniques, and Use of Senses, but negatively correlated with the Use of People and Final Product Orientations. Together, these results suggest that more creative people tend to believe in being self-motivated and to rely on both unconscious processes and conscious strategies to facilitate their creative efforts. Creative individuals also report engaging the various senses to a greater degree in their creative efforts. Perhaps creativity is aided by balancing the hidden, uncontrolled, internal experiences with the tangible, consciously controlled, external experiences. The correlation of intrinsic motivation with the Use of Techniques suggests that self-inspired creativity may be actively fostered through the disciplined use of specific techniques. Perhaps, the delicate interplay of inspiration and discipline is key to maximizing creativity.

The negative correlation of creative capacity with Use of People suggests that creative individuals tend to engage in their creative work isolated from others. Given the delicate balance of conscious activities and unconscious processes that underlie creativity, the presence of others would possibly be a distraction.

The negative correlation with Final Product Orientation suggests that creative people are not primarily focused on achieving a final product; rather, their primary focus is on the creative process in and of itself. Their main goal is to engage creatively, not to produce a finished piece. Interestingly, the positive correlation of Final Product Orientation style with both the Stress From Creative Pursuits Scale and Extrinsic Motivation—neither of which correlated with creative capacity—seems to suggest that being focused on the final creative product is not an effective means of fostering creativity. A question of interest for further study is to test the possibility that the stress felt by some “tortured artists” may be the result of a feeling of pressure to produce in order to maintain their reputations.

5 Conclusions

There are three limitations of the study that are to be noted while interpreting the results of the present study. First, the reliabilities of several instruments were low, possibly attenuating some of the relationships being examined. It is not clear as to why the reliabilities on these scales were low, even though many results were in the expected direction. Perhaps the low reliabilities may be unique to the sample of students included in the study or that students having to respond to a large number of questions were not careful in responding to the items. Second, the generalizability of the study is limited by the use of convenience samples enrolled in various psychology courses at the university and may be specific to their life stage. The results may be different for older adults. Third, it is possible that while affect was measured as how participants “generally” feel, their responses might have been influenced by the way they felt at the time of completing the questionnaires, making it difficult to separate the trait from state aspects.

Despite the limitations noted, the findings of this study corroborate conventional wisdom about the nature of creativity and its relationship to our general tendencies for affect and sense of satisfaction with life. Happier individuals are not necessarily more creative, and this relationship was not moderated by affect, motivational and stress emanating from creative pursuits variables. However, people with the ability to experience both positive and negative emotions do report being more creative. Consistent with previous research, creativity is correlated more strongly with tendency for positive than with negative affect. More creative individuals also tend to be more intrinsically inspired or self-motivated. External motivators such as money and recognition from others do not serve as major incentives for highly creative individuals and such motivation may be related to higher stress.

The study results may have both theoretical and applied implications for fostering creativity. Creativity is a complex process that can occur under happy or sad circumstances, positive or negative affect, stressful, or more relaxed environments. There may also be individual differences in the way people respond to creative tasks—with some responding better under stress than others. Clearly, more research is needed to clarify the role of individual differences in creative work.

A robust finding of this study as well as in the literature of both correlational and experimental studies appears to be the role of intrinsic motivation in facilitating creativity. Thus, it makes sense to foster intrinsic motivational aspects of curiosity, challenge and enjoyment in making people more creative. Additionally, higher intrinsic motivation is associated with greater positive affect, subjective well-being, belief in unconscious processes to facilitate creativity, use of techniques, and use of senses, but lower negative affect and lower use of other people in being creative. Extrinsic motivation on the other hand was not significantly correlated with creativity, subjective well-being, belief in unconscious processes, use of techniques to be creative, and use of senses, but it was positively correlated with final product orientation and stress from creative pursuits.

Some earlier studies (e.g., Amabile 1985; Amabile et al. 1976; Amabile et al. 1994), had suggested that extrinsic motivation generally undermines creativity should not be seen to imply that extrinsic motivation is always a negative thing—rather it may have a useful place in promoting creative work in certain circumstances, for example, in competitive environments. A competitive spirit of excelling relative to others might serve as a significant motivator for some individuals. It is interesting that more intrinsically motivated individuals reported greater use of various techniques to be creative, while there was no correlation between extrinsic motivation and use of techniques to be creative. It is possible for extrinsically motivated individuals an incentive might spur them to action to use variety of techniques to be creative, something that may be worth testing in a future study.

The findings related to creativity styles suggest that no single approach stimulates divergent thinking, but rather a variety of approaches are needed and should be encouraged. For example, believing in unconscious process to facilitate creativity is neither inherently wrong nor right. However, solely relying on unconscious processes must be discouraged. Similarly, the use of superstitious strategies, although seemingly illogical, may work for some and they should not be discouraged from using such strategies. The involvement of other people may be helpful or harmful depending upon how sensitive the person is to criticism and feedback. But, as we know, most scientific creativity is collaborative and working with others is essential. Since by definition creativity depends upon producing diverse ideas, it probably would be helpful to encourage people to use diverse strategies to be creative. It might also be helpful to encourage people to engage all senses in their creative efforts, particularly in artistic work. Finally, it might be helpful to encourage the use of environmental control and behavioral self-regulation strategies, particularly in those who are less intrinsically inclined and need structure to sustain their creative efforts.

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