EXAMINING THE MODERATING EFFECTS OF AFFECTIVE, COGNITIVE, AND PERSONALITY FACTORS ON THE RELATIONSHIP BETWEEN CREATIVE POTENTIAL AND CREATIVE PERFORMANCE

by

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ABSTRACT

Although a considerable amount of research has focused on different aspects of creativity, there is a notable paucity of empirical studies exploring the affective, cognitive, and personality factors that might impact the relationship between creative potential and creative performance. This study examined the moderating effects of extroversion, agreeableness, conscientiousness, neuroticism, openness to experience, rational/experiential cognitive style, positive/negative affect, and attitudes and values on the relationship between creative potential and creative performance in a sample of university students. Findings revealed that extroversion had a moderating effect on the relationship between individuals' creative potential and creative performance such that there was a stronger relationship between creative potential and creative performance for individuals who had lower levels of extroversion. Results further showed that while neuroticism and negative affect were only associated with creative potential, extroversion and experiential cognitive style were only related to creative performance and that openness to experience, rational cognitive style, positive affect, and attitudes and values were all associated

with both creative potential and creative performance. These findings also suggested distinguishing explicitly between creative potential and creative performance in studying the creativity of individuals.

INDEX WORDS: Creativity, Moderators, Moderating effects, Extroversion, Agreeableness, Conscientiousness, Neuroticism, Openness to experience, Rational cognitive style, Experiential cognitive style, Positive affect, Negative affect, Attitudes and values, Creative potential, Creative performance

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DEDICATION

To my parents, Fazilet and Mehmet Bayhan Oztunc

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My most heartfelt thanks first and undoubtedly foremost to my parents for all the sacrifices they have made and all the dedication they have shown for my education, and then to my wife, my sons, my brother and my mentor for all of their encouragement, support and inspiration.

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CHAPTER 1

INTRODUCTION

Creativity has long been a topic of interest and research in many fields. However, although a considerable amount of research has focused on different aspects of creativity, there is a notable paucity of empirical studies examining the factors that might impact the relationship between creative potential and creative performance. In other words, despite a growing body of research focusing on affective, cognitive, and personality factors associated with creativity, there are no existing studies that have explored the moderating effects of those factors on the relationship between creative potential and creative performance.

The present study focused on the moderating role of affective, cognitive, and personality factors in the relationship between creative potential and creative performance. More specifically, the purpose of this study was to examine the moderating effects of affective, cognitive, and personality factors, as represented by the positive and negative affects as well as attitudes and values, the rational and experiential cognitive styles and the Big Five personality factors, respectively, on the relationship between creative potential and creative performance.

Rationale

While much of what has been written about creativity has not explicitly distinguished between creative potential and creative performance, there are a few theories in the creativity literature that could help understand the relationship between creative potential and actual creative performance as well as the crucial role of moderators in this relationship. For example, in his theory concerning the influence of family on the achievement of eminence, Albert (1978,

1980, 1991) focuses on the life experiences of eminent individuals and emphasizes that the creative potential of an individual in childhood or adolescence does not guarantee his or her creative performance in adulthood and that it is crucial to look at the early family background of a youth with creative potential in predicting his or her adult creative performance. According to Albert, it is the early family experiences that allow for the optimum intellectual and personal growth of a child and that promote his or her cognitive skills and motivational drives. For that reason, according to Albert, it is again the early family experiences of a child that stimulate the translation of his or her creative potential into actual creative performance, which could therefore be considered moderators having a moderating effect on the relationship between creative potential and creative performance. Discussing some of the family characteristics of those children who are more likely to convert their creative potential into creative performance, Albert underscores the importance of parents' personalities, family values, and parents' relationships with each other, their own parents and their potentially creative child. For instance, based on the results of earlier studies (e.g., Albert, 1971; Brooks, 1973; Dewing & Taft, 1973), Albert suggests that individuals who translate their creative potential into actual creative performance are more likely to come from the families that are harmonious, committed to achievement and experience-producing and that put forth considerable effort to meet the special aspirations they have for their potentially creative child. In this respect, according to Albert, the family sets the stage for the healthy emotional and cognitive development of a child which makes possible the transformation of his or her early creative potential into actual creative performance. However, Albert does not argue that parents have to demonstrate a heroic parenting in order to provide the optimum environment for such a healthy development in their child. Rather, referring to Winnicott's (1965, 1971) description of "good enough" mother and father, Albert suggests that

parents should be adequately responsive and sensitive to their child's potentials, emotions and needs while also encouraging their child to have his or her own experiences and to deal with and learn from those experiences. As a consequence, Albert (1991) points out that "the family is the first and a highly important influence on the development of children who achieve eminence as adults" (pp. 77).

Another theory that could help understand the relationship between creative potential and actual creative performance as well as the crucial role of moderators in this relationship is the hierarchical framework proposed by Runco (2007a, 2007b) for the study of creativity. Emphasizing the relationship and distinction between creative potential and actual creative performance, Runco reorganizes the traditional framework that has been used over the years in studying creativity. As opposed to the traditional framework relying mostly on person, process, product and press, the hierarchical framework distinguishes between creative potential and creative performance, each of which represents one of the two main categories of the framework and involves certain subcategories (e.g., person, process and press for creative potential and products and persuasion for creative performance). In emphasizing the relationship and distinction between creative potential and creative performance in his hierarchical framework, Runco provides a number of strong rationales offering substantial insight into the study and nature of human creativity. For example, Runco highlights the fact that many individuals, including most children and students, have creative potential which is not yet translated into manifest creative performance. Furthermore, Runco also stresses the fact that even individuals who demonstrate a certain level of creative performance might still have a great deal of unfulfilled creative potential. In this regard, the hierarchical framework suggests studying potential moderators that could stimulate the translation of creative potential into actual creative

performance, and presents a new line of thought and research for creative studies as it allows for a clear distinction between creative potential and creative performance and underlines the necessity of examining and focusing on creative potential and moderators in addition to manifest creative performance. As a result, according to Runco (2009), the examination of creative potential and moderators is of crucial importance when studying creativity since studies focusing only on manifest creative performance might not provide a deeper understanding of "how mere potential can be fulfilled such that the individual develops what it takes to actually perform in a creative fashion" (pp. 464).

Thus, the present study was guided by the following rationale:

1) Many individuals have creative potential which is not yet translated into manifest creative performance,

2) There might be certain affective, cognitive, and personality factors that could help individuals translate their creative potential into manifest creative performance, and

3) Once discovered, those affective, cognitive, and personality factors could be promoted in individuals in order to stimulate the translation of their creative potential into manifest creative performance, making a considerable difference in the realization of their creative potential.

The affective, cognitive, and personality factors chosen as the moderators for the purposes of this study are discussed in the following chapters. While there are no existing studies examining the moderating effects of those factors on the relationship between creative potential and creative performance, empirical literature indicates that those factors are associated with individuals' creativity, which suggests studying them as potential moderators in various exploratory studies. Thus, as one of the first of such exploratory studies, the present study is unique in its examination of these relevant factors as moderators.

Research Questions

In keeping with the purpose and rationale above, the following research questions were addressed in the current study:

1. Research Question 1: Does extroversion have a moderating effect on the relationship between creative potential and creative performance?
2. Research Question 2: Does agreeableness have a moderating effect on the relationship between creative potential and creative performance?
3. Research Question 3: Does conscientiousness have a moderating effect on the relationship between creative potential and creative performance?
4. Research Question 4: Does neuroticism have a moderating effect on the relationship between creative potential and creative performance?
5. Research Question 5: Does openness to experience have a moderating effect on the relationship between creative potential and creative performance?
6. Research Question 6: Does rational/experiential cognitive style have a moderating effect on the relationship between creative potential and creative performance?
7. Research Question 7: Does positive/negative affect have a moderating effect on the relationship between creative potential and creative performance?
8. Research Question 8: Do attitudes and values have a moderating effect on the relationship between creative potential and creative performance?

This strand presented the purpose, rationale and research questions of the current study while also highlighting the notable lack of empirical studies exploring the moderating effects of affective, cognitive, and personality factors on the relationship between creative potential and creative performance. Thus, given its research questions and objectives, the focus of this study

was exclusively on the moderating effects of extroversion, agreeableness, conscientiousness, neuroticism, openness to experience, rational/experiential cognitive style, positive/negative affect, and attitudes and values on the relationship between creative potential and creative performance. The following strand reviews the empirical studies conducted in order to examine the relationships between individuals' creative potential and creative performance and between creativity and various affective, cognitive, and personality factors.

CHAPTER 2

LITERATURE REVIEW

Creative Potential and Creative Performance

The relationship between creative potential and actual creative performance has been examined and revealed by several studies in the literature of creativity. These studies have differed to some extent in terms of how they measured creative potential and creative performance. For example, while some studies used divergent thinking tests, others employed creative personality scales in order to measure the creative potential of individuals. Similarly, while some studies employed creative achievement questionnaires, others used different measures of creative productivity in order to assess the creative performance of individuals.

Hocevar (1980) studied a total of 94 undergraduate students using the Alternate Uses Scale (Christensen, Guilford, Merrifield, & Wilson, 1960), the Plot Titles Scale (Berger & Guilford, 1969), the Consequences Scale (Christensen, Merrifield, & Guilford, 1958) and the Creative Activities and Achievement Inventory (Hocevar, 1979). While the Alternate Uses Scale, the Plot Titles Scale and the Consequences Scale were used to measure participants' creative potential, the Creative Activities and Achievement Inventory was employed to measure participants' creative performance. Findings of this study showed a significant relationship between creative potential and actual creative performance. Specifically, results revealed that while creative potential was significantly and positively correlated with actual creative performance in the domains of performing arts, math, science and crafts, there were no significant relationships between creative potential and actual creative performance in the

domains of art, literature and music. These results contradict earlier research suggesting that creative potential is significantly associated with actual creative performance in the domains of art and literature and that no significant relationships exist between creative potential and actual creative performance in the domain of performing arts (Milgram & Milgram, 1976; Wallach & Wing, 1969). With regard to study limitations, it should be noted that the Math-Science subscale of the Creative Activities and Achievement Inventory demonstrated relatively low reliability and that this might potentially limit the precision of the study results.

In another study, Helson and Pals (2000) examined the association between creative potential and actual creative performance by focusing particularly on whether achieved identity moderated the relationship between individuals' creative potential and creative performance. This study had a sample consisting of 109 female adults ranging in age from 21 to 52 years. While creative potential was measured using the Creative Temperament Scale (Gough, 1992; Gough & Bradley, 1996), the Originality and Complexity Scale (Barron, 1955, 1965; Hathaway & McKinley, 1943), the Creative Personality Scale (Gough, 1979; Gough & Heilbrun, 1983), the High Origence and Intellectence Scale (Gough & Heilbrun, 1983; Welsh, 1975) and the Imaginative and Artistic Scale (Helson, 1966), creative performance was assessed using the Occupational Creativity Scale (Helson, Roberts, & Agronick, 1995). For the study purposes, achieved identity was defined as valuing own independence, being productive, warm and compassionate, showing ethically consistent behavior, and having insight into own behavior as well as a clear and consistent personality. Results of this study revealed that achieved identity moderated the relationship between creative potential and creative performance. More specifically, Helson and Pals reported that the relationship between creative potential and creative performance was stronger for women with high achieved identity than for those with

low achieved identity. Moreover, Helson and Pals also found that creative potential was a strong predictor of creative performance and that the creative potential in early adulthood had a considerable association with the creative performance in middle age. Based on these results, Helson and Pals concluded that the translation of creative potential into creative performance was significantly associated with identity achievement, suggesting that any problems in identity achievement could hinder the translation of creative potential into actual creative performance. In terms of study limitations, however, the generalizability of these findings should be considered with caution as the sample of this study consisted only of female participants.

A study conducted by Milgram and Milgram (1976) explored the relationship between creative potential and actual creative performance in a sample of 145 high school students. While creative potential was measured using the Wallach and Kogan (1965) Creativity Battery, creative performance was assessed using a self-report questionnaire of creative performance. Milgram and Milgram found that while there was a significant positive relationship between creative potential and creative performance in the domains of social leadership, writing, community service and fine arts, there were no significant relationships between creative potential and creative performance in the domains of music, science, drama, sports and dance. The findings of this study are consistent with previous research indicating that creative potential is significantly related to creative performance in the domains of leadership, art and writing and that no significant relationships exist between creative potential and creative performance in the domains of drama and music (Wallach & Wing, 1969). The major limitation of this study concerns the self-report questionnaire used in order to measure participants' creative performance. That is to say, the self-report questionnaire of creative performance used in this

study might limit the precision of the study results as it demonstrated a relatively low alpha reliability.

Researchers have also conducted longitudinal studies in order to investigate the relationship between creative potential and actual creative performance. For example, Helson (1999) studied a total of 100 female college students ranging in age from 27 to 52 years in a longitudinal study examining the association between creative potential and creative performance. For the purposes of this study, creative potential was assessed using the Creative Temperament Scale (Gough, 1992), the Originality Scale (Barron, 1963) and the Complexity Scale (Barron, 1963) whereas creative performance was measured using the Occupational Creativity Scale (Helson, Roberts, & Agronick, 1995). Results indicated that there was a significant positive relationship between individuals' creative potential in early adulthood and their creative performance in middle age. Moreover, results also revealed that individuals could actualize their creative potential in self-discovery, especially through relationships, rather than in careers. The results of this study are consistent with other research suggesting that the creative potential in early adulthood had a considerable relationship with the creative performance in middle age (Helson & Pals, 2000). As with the study conducted by Helson and Pals (2000), the sample of this study consisted only of female participants, which should be taken into account when considering the generalizability of its results.

The Torrance longitudinal studies represent a significant milestone in the examination of the relationship between individuals' creative potential and actual creative performance. Initiated in the 1950s, these longitudinal studies have provided great insight into how the creative potential of individuals in childhood or adolescence could predict their actual creative performance in the later stages of life. In measuring the creative potential of participants, these

studies mainly used participants' scores on the Torrance Test of Creative Thinking as obtained from its initial administration in the 1950s. The 7-year follow-up study was conducted in a total sample of 46 participants who had been senior high school students at the initial administration of the Torrance Test of Creative Thinking (Torrance, 1969). The creative performance of participants was assessed through the use of a questionnaire including a checklist of creative achievements, a question about aspirations and an inquiry about participants' most creative achievements. Results revealed a significant positive relationship between the quantity of participants' creative achievements and their fluency, flexibility, originality and elaboration subscale scores and between the quality of participants' creative achievements and their fluency, flexibility and originality subscale scores. Moreover, results also showed that there was a significant positive association between the creative motivation of participants and their fluency, flexibility and originality subscale scores. Next, in a larger sample of participants, Torrance (1972a, 1972b) conducted the 12-year follow-up study in which he assessed participants' creative performance using a questionnaire that was similar to the one employed in the seven-year follow-up. Torrance had a sample consisting of 236 participants who had been high school students at the initial administration of the Torrance Test of Creative Thinking. Findings of this study showed that the quantity and quality of participants' creative achievements were significantly and positively correlated with their scores on the fluency, flexibility, originality and elaboration subscales. In addition, findings also revealed a significant relationship between participants' creative motivation and their fluency, flexibility, originality and elaboration subscale scores.

Unlike the earlier follow-up studies, the 22-year follow-up was conducted in a sample of participants who had been elementary school students at the initial administration of the

Torrance Test of Creative Thinking (Torrance, 1980, 1981a, 1981b). In this follow-up study, Torrance had a total sample of 220 participants with mean age 27.5 and assessed participants' creative performance through the use of questionnaires asking about high school creative achievements, self-assessed most creative achievements, future career images, post high school creative achievements and creative style of life achievements. As a result of the 22-year follow-up, Torrance found that there was a significant positive relationship between the creative potential of participants and the number of their high school creative achievements, post high school creative achievements and creative style of living achievements. Moreover, Torrance also reported that participants' creative potential was significantly and positively associated with the quality of their highest creative achievements and future career image.

The 40-year follow-up of the Torrance longitudinal study was reported by Cramond, Matthews-Morgan, Bandalos and Zuo (2005). The sample of the 40-year follow-up consisted of 99 adults, and the creative performance of participants was assessed using a questionnaire asking about the quantity and quality of participants' creative achievements. Results of this follow-up study revealed that the fluency and originality subscale scores of participants were significantly and positively correlated with the quantity of their creative achievements. In addition, results also showed that there was a significant positive relationship between participants' scores on the flexibility and originality subscales and the quality of their creative achievements. Finally, in the 50-year follow-up study, Runco, Millar, Acar and Cramond (2010) had a total sample of 60 adults, with mean age 56, who were among the participants of the previous follow-up. For the purposes of this study, the creative performance of participants was assessed using Torrance's (2002) creative style of life achievements scale and creative achievement measure. Findings revealed that while participants' fluency, flexibility and elaboration subscale scores were

significantly and positively associated with their personal achievement, there were no significant relationships between the subscale scores of participants and their public achievement. Overall, the Torrance longitudinal studies have shown that the creative potential of individuals in childhood or adolescence might predict their actual creative performance in the later stages of life. With regard to the potential limitations of longitudinal studies, however, Runco et al. cautioned that longitudinal studies might involve some inherent sampling issues such as systematic and attrition biases. Therefore, these potential limitations should be kept in mind when considering the generalizability of longitudinal study results.

In another study, Puccio, Treffinger and Talbot (1995) examined the association between creative potential and actual creative performance in a sample consisting of 140 adults with mean age 33.7. Puccio et al. used the Kirton Adaption-Innovation Adjustment Scale (Kirton, 1987) and the Survey of Creative and Innovative Performance Scale (Besemer & Treffinger, 1981) in order to measure participants' creative potential and creative performance, respectively. The researchers found that while the creative performance demonstrated by individuals with adaptive creative potential could be characterized as fulfilling intended purposes, following rules associated with any given task, exhibiting high-quality craftsmanship and having practical applications, the creative performance demonstrated by individuals with innovative creative potential might be described as being new and unusual, attracting others' attention, helping view things from different perspectives, responding to requirements associated with any given job and communicating intended purposes and advantages in a clear way. Based on these results, Puccio, Treffinger and Talbot drew the crucial conclusion that individuals having adaptive creative potential tend to exhibit creative performance that assures usefulness whereas individuals having innovative creative potential tend to demonstrate creative performance that ensures novelty, both

of which might be regarded as the core characteristics of the creativity complex. In terms of study limitations, it should be noted that this study was conducted with a sample of predominantly male participants, potentially limiting the generalizability of its findings.

Examining the relationship between creative potential and actual creative performance, Oldham and Cummings (1996) studied a total of 171 adults, with mean age 41, who were employees in manufacturing organizations. In this study, the Creative Personality Scale (Gough, 1979; Gough & Heilbrun, 1965) was used in order to measure the creative potential of participants. In assessing the creative performance of participants, however, Oldham and Cummings used creative performance ratings in which participants were assessed by their supervisors in terms of the novelty and usefulness of their work. Findings of this study revealed a significant association between creative potential and creative performance. More specifically, Oldham and Cummings reported that individuals' creative potential had the greatest positive association with their creative performance when they worked on challenging and complex jobs under the supervision of supportive and non-controlling supervisors. Results further revealed that individuals' creative performance was adversely influenced by the absence of high creative potential, challenging and complex jobs, or supportive and non-controlling supervision. According to Oldham and Cummings, these results suggest that the creative performance of individuals having high creative potential could be considerably enhanced by providing them with challenging, enriched and complex jobs that are managed by supportive and non-controlling supervisors. However, Oldham and Cummings also caution that placing individuals with low creative potential in challenging and complex jobs managed in a supportive and non-controlling fashion might negatively influence their creative performance as they might feel overstretched

and overwhelmed. In terms of study limitations, this research suffers from the lack of adequate evidence regarding the psychometric properties of the creative performance measure used.

In another study, Tierney and Farmer (2002) verified the relationship between creative potential and actual creative performance. Tierney and Farmer studied a total of 742 adults working in consumer products and high-tech companies. Participants' creative potential was assessed using a creative self-efficacy scale developed by the researchers specifically for the purposes of this study. In order to measure participants' creative performance, however, Tierney and Farmer employed supervisors' ratings of creative performance in which participants were assessed by their supervisors using the Tierney, Farmer and Graen's (1999) 6-Point Likert Scale. Results of this study showed that there was a significant positive relationship between individuals' creative potential and creative performance. Furthermore, Tierney and Farmer reported that individuals' job self-efficacy moderated the relationship between their creative potential and creative performance. That is to say, individuals' creative potential had the strongest positive association with their creative performance when they had high job self-efficacy which was defined as one's view of his or her capability to perform any given job. However, Tierney and Farmer also found that job self-efficacy did not moderate the relationship between creative potential and creative performance when individuals had low creative potential. Results also showed that individuals with high creative potential had the lowest creative performance when they lacked the necessary skills to successfully perform a job in any given domain. One major limitation of this study concerns the lack of adequate information regarding the study participants. In other words, since this study presented no information regarding the age and gender make-up of its sample, the generalizability of the study findings should be considered with caution.

Only a small number of studies have focused on younger students in exploring the relationship between creative potential and actual creative performance. For example, Dewing and Taft (1973) examined the association between creative potential and creative performance in a sample of 394 middle school students ranging in age from 11 to 12 years. In this study, while the Alternate Uses Test, the Circles Test and the Squares Test of the Minnesota Tests of Creative Thinking (Torrance, 1962) were used in order to measure participants' creative potential, the creative performance of participants was assessed using teachers' ratings, the Torrance's (1962) inventory of leisure interests, peer ratings, the Creative Motivation Preference Inventory (Golann, 1962) and the Torrance's (1962) imaginative composition task. Results of this study provided great insight into the relationship between creative potential and creative performance in general and the influence of parental and family factors on younger students' translation of creative potential into creative performance in particular. More specifically, Dewing and Taft found that family and parental factors could considerably influence whether children with high creative potential would adequately realize their creative potential in different forms of creative performance. For example, results revealed that children with high creative potential were more likely to translate their creative potential into creative performance if their fathers worked in higher-level occupations. Similarly, Dewing and Taft reported that the parenting attitudes of mothers, such as being more equalitarian or less authoritarian, were more likely to influence children's translation of creative potential into creative performance. Moreover, results showed that the characteristics of parents were more associated with children's creative performance than with their creative potential. With regard to study limitations, although Dewing and Taft attempted to use various measures of creative performance, it should be kept in mind that the intercorrelations among those measures appeared to be relatively low.

In a study of 150 fifth through eighth grade students, Runco (1986) provided strong evidence for the relationship between creative potential and actual creative performance. For the purposes of this study, participants' creative potential was measured using the Instances Test, the Uses Test, the Similarities Test, the Pattern-Meanings Test and the Line-Meanings Test of the Wallach and Kogan Creativity Battery (Wallach & Kogan, 1965). In measuring the creative performance of participants, however, Runco developed and used a questionnaire assessing individuals' creative performance in the domains of writing, art, crafts, music, science, public presentation and performing arts. Runco also assessed the quality of participants' creative performance by having two independent judges evaluate the participants' most creative activity for each of the seven domains. Findings of this study revealed that while there was a significant positive association between creative potential and creative performance in some domains, no significant relationships existed between creative potential and creative performance in some others. For example, results showed that individuals' creative potential, as measured by divergent thinking tests, was positively associated with their creative performance in the domains of writing, art and performing arts. Furthermore, Runco also found that individuals' creative potential was not related to the quality of their creative performance. According to Runco, it is crucial to emphasize this finding since the quality of individuals' creative performance is considered more important than the quantity of their creative performance in the real world. In terms of study limitations, Runco cautioned that the use of a self-report measure in assessing participants' creative performance might involve some inherent problems such as participants' memory and honesty. Therefore, one should keep in mind these potential limitations when considering the generalizability and accuracy of the study results.

A recent study by Kaufman and Baer (2004) examined the relationship between creative potential and actual creative performance in a sample of 241 college students. The researchers measured participants' creative potential using the Creative Personality Scale developed based on the creativity facet of the Hogan Personality Inventory (Hogan & Hogan, 1995). The creative performance of participants, however, was assessed using a 5-point Likert scale on which participants rated their own creative performance in the domains of science, writing, interpersonal relationships, art, interpersonal communication, solving personal problems, crafts, bodily/physical movement and mathematics. As a result of this study, Kaufman and Baer found that in certain domains there was a significant positive relationship between creative potential and creative performance. Specifically, Kaufman and Baer reported that individuals' creative potential was significantly related to their creative performance in the domains of writing, science, art, interpersonal relationships, solving personal problems, interpersonal communication and bodily/physical movement. These results are consistent with previous research suggesting that there is a significant association between creative potential and creative performance in the domains of writing and art (Milgram & Milgram, 1976; Runco, 1986; Wallach & Wing, 1969). The major limitation of this study concerns the use of a self-rated scale in measuring the creative performance of participants. That is to say, since the self-rated scale used in this study asked participants to rate their own creative performance in different domains, it might be open to substantial bias, potentially limiting the accuracy of the study findings.

Finally, in another recent study, Stumm, Chung and Furnham (2011) examined the relationship between creative potential and actual creative performance in a sample consisting of 656 college students with mean age 20.53. Stumm, Chung and Furnham used the Guilford's (1967) Divergent Thinking Test and the Biographical Inventory of Creative Behaviors (Batey,

2007) in order to measure participants' creative potential and creative performance, respectively. The researchers identified three groups of individuals using latent class analysis of creative performance. The first group consisted of individuals with no or low creative achievements whereas the second group comprised individuals having medium creative achievements. The second group was also characterized as having a considerable tendency for further creative achievement. The third group, however, included individuals with high creative achievements in various domains. Results of this study revealed that individuals' creative potential was not a significant predictor of their latent class membership for any of these three groups. In other words, Stumm, Chung and Furnham found that no significant relationships existed between individuals' creative potential and creative performance. These results contradict earlier research indicating that creative potential is significantly related to creative performance. For example, Carson, Peterson and Higgins (2005) studied 86 university students with mean age 20.68, and used a total of four Divergent Thinking Tests (Torrance, 1968) including the Alternate Uses Test and the Consequences Test in order to measure the creative potential of participants. Carson, Peterson and Higgins, using the Creative Achievement Questionnaire (Carson et al., 2005) to assess participants' creative performance, found that individuals' creative potential was significantly and positively associated with their creative performance. When considering the generalizability and accuracy of these findings, however, it should be noted that this study was conducted with a relatively small sample consisting of 86 university students. In the same way, it should also be noted that the inconsistency between the results of these two studies may have resulted from the use of different measures, such as the Biographical Inventory of Creative Behaviors vs. the Creative Achievement Questionnaire, in assessing the creative potential and

creative performance of participants. Overall, existing studies have suggested a significant relationship between individuals' creative potential and actual creative performance.

Personality Factors and Creativity

The relationship between personality and creativity has long been an area of interest for researchers. Emanating from several decades of empirical research involving numerous samples, the Big Five Personality Factors Model represents one of the most important and evidence-based models of personality (Caroli & Sagone, 2009; Costa & McCrae, 1992; Zhang & Huang, 2001). According to this model, human personality consists of five different factors including Openness to Experience, Agreeableness, Extraversion, Conscientiousness and Neuroticism. Furthermore, this model proposes that these five personality factors are adequate to describe the variability in individuals' personality (Gelade, 2002; Taylor & MacDonald, 1999; Zhang & Huang, 2001).

Several studies have investigated the relationship between the Big Five personality factors and creativity. For example, Furnham, Crump and Swami (2009), using the Revised NEO (Neuroticism-Extroversion-Openness) Personality Inventory (Costa & McCrae, 1992) and the Consequences Divergent Thinking Test (Christensen, Merrifield, & Guilford, 1953), studied a total of 585 adult participants with mean age 45.35. While the Revised NEO Personality Inventory was used to measure Extraversion, Agreeableness, Conscientiousness, Neuroticism and Openness to Experience as the Big Five personality factors, the Consequences Divergent Thinking Test was employed to measure the creativity of participants. Results of this study revealed a significant relationship between the Big Five personality factors and creativity. Specifically, results showed that Openness to Experience and Extraversion were strongly and positively correlated with individuals' creativity and that Openness to Experience was the

strongest correlate and predictor of creativity. Furnham et al. further examined the relationship between personality and creativity, and found significant positive correlations between creativity and vulnerability to stress, assertiveness, activity, excitement seeking, positive emotions, fantasy, feelings, actions, ideas, values, competence, achievement striving, and deliberation. These findings support previous research indicating that Openness to Experience, compared to the other four Big Five personality factors, has the strongest relationship with creativity (Furnham & Chamorro-Premuzic, 2004). In terms of study limitations, it should be noted that social desirability may have affected participants' responses to the personality and creativity measures as this study was conducted within the context of an assessment center.

A study conducted by George and Zhou (2001) specifically examined how two of the Big Five personality factors, namely, Openness to Experience and Conscientiousness, were related to individuals' creativity. The sample for this study consisted of 149 adult participants with mean age 42.6. While Openness to Experience and Conscientiousness were assessed using the NEO Five Factor Inventory (Costa & McCrae, 1992), creativity was measured using a 5-point scale on which participants were assessed in terms of various creative characteristics. As a result of this study, George and Zhou found that there was a significant relationship between Openness to Experience and creativity, and that individuals with high openness to experience exhibited the highest level of creativity. However, George and Zhou also reported that there was a significant but negative relationship between Conscientiousness and creativity, and that individuals with high conscientiousness demonstrated the lowest level of creativity. One major limitation of this study is the lack of an objective creativity measure that could provide a more accurate assessment of participants' creativity. Therefore, this limitation should be kept in mind when considering the generalizability of the study findings.

In a recent study, Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe and Riggs (2009) explored the association between the Big Five personality factors and creativity. The researchers, using the Big Five Factor Markers Scale (Goldberg, 1999) in order to measure Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism, studied a total of 242 adults including employees and university students. In this study, the Revised Creativity Domain Questionnaire (Kaufman, 2006) was used in order to measure the creativity of participants. The results of this study showed a significant positive relationship between creativity and the Openness to Experience factor consisting of different personality facets including openness to fantasy, aesthetics, feelings, actions, ideas and values. In addition, Kaufman et al. found that Extraversion had a strong positive correlation with creativity. However, the findings of this study contradict previous research in terms of the Agreeableness and Emotional Stability factors. For example, while Kaufman et al. reported a positive association between creativity and Agreeableness, the study conducted by Soldz and Vaillant (1999) showed a negative relationship between Agreeableness and creativity. Similarly, although Kaufman et al. found a positive correlation between Emotional Stability and creativity, Caroli and Sagone (2009) reported that Emotional Stability was negatively correlated with creativity. With regard to study limitations, it should be kept in mind that this study had a relatively small sample size compared to other studies using self-report measures of creativity and that this might potentially limit the precision and generalizability of its results (Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe, & Riggs, 2009).

In another study, Furnham and Bachtiar (2008) explored the relationship between the Big Five personality factors and creativity by focusing particularly on whether those five personality factors could predict individuals' creativity. While Neuroticism, Openness to Experience,

Conscientiousness, Agreeableness and Extraversion were assessed using the NEO Five-Factor Inventory (Costa & McCrae, 1992), participants' creativity was measured using the Guilford Divergent Thinking Test (Guilford, 1967), the Biographical Inventory of Creative Behaviors (Batey, 2007), the Self-Rating of Creativity Scale (Batey, 2007) and the Barron-Welsh Art Scale (Welsh, 1987). Studying a total of 176 participants with mean age 18.6, Furnham and Bachtiar found that the Big Five personality factors could predict individuals' creativity and that Openness to Experience and Extraversion were the two strongest positive predictors of creativity. The results of this study are consistent with previous studies reporting Extraversion and Openness to Experience to be the significant positive correlates of creativity (Aguilar-Alonso, 1996; Dollinger, Urban, & James, 2004; Furnham & Chamorro-Premuzic, 2004; King, Walker, & Broyles, 1996; Stavridou & Furnham, 1996; Wolfradt & Pretz, 2001; Wuthrich & Bates, 2001). The use of a self-rated scale to measure participants' creativity appears to be a major limitation of this study. More specifically, the self-rated scale of creativity used in this study might be open to considerable bias as it asked participants to rate themselves as compared to other people (Furnham & Bachtiar, 2008).

Very few researchers have used a longitudinal design in examining the relationship between the Big Five personality factors and creativity among adults. For instance, in a longitudinal study investigating the relationship between personality and a range of life course variables including creativity, Soldz and Vaillant (1999) studied a total of 163 men with approximate age 67–68. While the NEO Personality Inventory (Costa & McCrae, 1985) was used to assess Openness to Experience, Agreeableness, Neuroticism, Conscientiousness and Extraversion, creativity was measured using a 4-point scale on which participants were assessed in terms of creative products, artistic achievement, artistic public interest and sustained artistic

hobby. Findings of this longitudinal study revealed that while there was a significant positive association between creativity and Openness to Experience, a significant negative relationship existed between Agreeableness and creativity. However, in terms of study limitations, the generalizability of these findings should be considered with caution as the sample of this study consisted only of male participants.

In a study of 204 college students with mean age 23.06, Wolfradt and Pretz (2001) reported considerable evidence for the relationship between the Big Five personality factors and creativity. Wolfradt and Pretz, using the NEO Five Factor Inventory (Costa & McCrae, 1985) consisting of 60 items that measure Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness and the three different measures of creativity including Creative Personality Scale (Gough, 1979), ratings of written stories and lists of personal hobbies, found Openness to Experience and Extraversion to have significant positive correlations with individuals' creativity. Furthermore, Wolfradt and Pretz reported Extraversion to be the best predictor of creativity. Previous research confirms the findings of this study. For example, while Stavridou and Furnham (1996) found a positive correlation between creativity and Extraversion, Martindale and Dailey (1996) reported no relationship between Neuroticism and creativity. Similarly, in another study, King, Walker and Broyles (1996) found Openness to Experience to be positively related to individuals' creativity. With regard to study limitations, although Wolfradt and Pretz attempted to use various creativity measures, it should be kept in mind that using a list of personal hobbies as a measure of creativity might not be a sufficient assessment of individuals' creativity as it could be somewhat difficult to determine which hobbies were creative and which were not (Wolfradt & Pretz, 2001).

With a particular emphasis on the importance of openness to experience for individuals' creativity, Dollinger, Urban and James (2004) explored the relationship between the Big Five personality factors and creativity. Studying 151 university students with mean age 22, Dolligner et al. used the Oliver John's Big Five Inventory (Benet-Martinez & John, 1998) in order to measure Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness. In this study, participants' creativity was measured using the Urban and Jellen Test of Creative Thinking-Drawing Production (Urban & Jellen, 1996), the Domino 59-Item Creativity Scale (Domino, 1970), the Gough 30-Item Creativity Scale (Gough, 1979), and the Hocevar's 90-Item Creative Behavior Inventory (Hocevar, 1979). Results of this study showed a significant positive correlation between Openness to Experience and creativity. Findings also revealed that Extraversion was positively correlated with individuals' creativity. Based on these results, Dollinger, Urban and James concluded that Openness to Experience, compared to the other four factors of personality, was the strongest and most important predictor of creativity. This study suffers from an obvious limitation. Namely, as a result of the large group administration of measures reducing motivation on the task, participants had lower scores on the Urban and Jellen Test of Creative Thinking-Drawing Production than most other samples in previous studies (Dollinger, Urban, & James, 2004).

In another study, King, Walker and Broyles (1996) studied 75 college students with mean age 20.9 in order to examine the relationship between the Big Five personality factors and creativity. Using the 44-item version of the Big Five Inventory (John, Donahue, & Kentle, 1991) and the Torrance Tests of Creative Thinking (Torrance, 1990) to measure the five factors of personality (Neuroticism, Extraversion, Openness to Experience, Agreeableness and Conscientiousness) and creativity, respectively, King et al. found that Extraversion and Openness

to Experience were significantly and positively correlated with creativity and that there were no relationships between creativity and Agreeableness, Conscientiousness and Neuroticism. Although this study suffers from a relatively small sample size in terms of its limitations, King, Walker and Broyles drew a very crucial conclusion based on its results. That is to say, King et al. highlighted that individuals with high openness to experience but low creative ability might be a source of substantial creative potential and that future research might investigate how different interventions could help those individuals in realizing their creative potential.

A study conducted by Batey, Chamorro-Premuzic and Furnham (2010) verified the relationship between the Big Five personality factors and creativity among college students. Batey et al. had a sample comprising a total of 158 college students ranging in age from 18 to 27 years, and used the Revised NEO Personality Inventory (Costa & McCrae, 1992) in order to assess the Neuroticism, Agreeableness, Extraversion, Openness to Experience and Conscientiousness factors as well as the 30 personality facets underlying those factors. The Runco Ideational Behavior Scale (Runco, Plucker, & Lim, 2000) was used in this study in order to measure participants' creativity. Findings of this study revealed significant relationships between creativity and three personality factors. Specifically, while Openness to Experience and Extraversion were reported to be positively related with creativity, Conscientiousness was found to be negatively associated with creativity. In further examining the relationship between creativity and personality facets underlying the five personality factors, Batey, Chamorro-Premuzic and Furnham found that the aesthetics, angry hostility, ideas and competence facets of personality were positively related to creativity and that there were negative associations between the vulnerability, actions and deliberation facets of personality and creativity. Some of these results contradict earlier research suggesting positive relationships between creativity, and

actions, deliberation and vulnerability (Furnham, Crump, & Swami, 2009). In terms of study limitations, it should be noted that this study was conducted with a sample of predominantly female college students, potentially limiting the generalizability of its findings.

Exploring the relationship between creativity and the Big Five personality factors, Ivcevic and Mayer (2009) studied a total of 416 college students ranging in age from 17 to 22 years. The researchers used the 44-item Big Five Inventory (John, Donahue, & Kentle, 1991) in order to assess Openness to Experience, Conscientiousness, Neuroticism, Extraversion and Agreeableness. In measuring participants' creativity, however, Ivcevic and Mayer developed and used the Life-Space Questionnaire consisting of 222 items on creative activities. Results of this study showed a significant association between creativity and personality factors. More specifically, Ivcevic and Mayer found that Openness to Experience, Extraversion and Agreeableness were positively related to individuals' creativity. One major limitation of this study concerns the lack of adequate evidence regarding the psychometric properties of the creativity measure used.

In another recent study, Sung and Choi (2009) investigated the association between the Big Five personality factors and creativity. Sung and Choi had a sample of 304 university students with mean age 19.8 and used the Goldberg's Big Five Factors Scale (Goldberg, 1992) to assess Extraversion, Agreeableness, Conscientiousness, Emotional Stability and Openness to Experience. Participants' creativity was measured using a four-item index specifically developed by the researchers for the purposes of this study. Sung and Choi found Openness to Experience and Extraversion to have a positive association with individuals' creativity. Findings also revealed that Extraversion was the strongest predictor of creativity. Based on these results, Sung and Choi concluded that individuals with high openness to experience and extraversion were

more likely to demonstrate various characteristics, such as being enthusiastic, energetic and flexible, and accepting different perspectives, that would considerably stimulate their creativity. With regard to study limitations, it is likely that participants' responses may have been affected by social desirability as the researchers failed to ensure the anonymity of responses (Sung & Choi, 2009).

One recent study focused particularly on female college students in examining the relationship between the Big Five personality factors and creativity. Kelly (2006) studied a total of 61 female university students with mean age 26.4 and confirmed the relationship between creativity and the Big Five factors of personality. Kelly used the Big Five Mini Markers Scale (Saucier, 1994) in order to measure Openness to Experience, Conscientiousness, Extraversion, Agreeableness and Neuroticism. In this study, creativity was measured using the Scale of Creative Attributes and Behavior (Kelly, 2004). Results showed that Extraversion and Openness to Experience were positively correlated with creativity. In addition, consistent with the results of other studies, Kelly reported Openness to Experience and Extraversion to be the best predictors of individuals' creativity (Dollinger, Urban, & James, 2004; Furnham & Bachtiar, 2008; Furnham, Batey, Anand, & Manfield, 2008; Furnham, Crump, & Swami, 2009; Wolfradt & Pretz, 2001). Based on these results, Kelly drew the conclusion that creative individuals could be characterized as being more extraverted and open to new experiences. This study suffers from several limitations. For example, it should be noted that this study was conducted with a relatively small sample consisting of 61 university students. Similarly, it should also be noticed that the sample of this study comprised only females. As a result, both of these limitations should be taken into account when considering the precision and generalizability of the study results.

Only a few researchers have used a longitudinal research design in order to investigate the relationship between the Big Five personality factors and creativity among college students. For example, in a longitudinal study of the relationship between the Big Five personality factors and creativity, Furnham, Zhang and Chamorro-Premuzic (2005) studied a total of 64 college students ranging in age from 20 to 55 years. For the purposes of this study, Furnham et al. used the Barron-Welsh Art Scale (Barron & Welsh, 1952) and the Revised NEO Personality Inventory (Costa & McCrae, 1992) as the measures of creativity and the five personality factors (Neuroticism, Conscientiousness, Extraversion, Openness to Experience and Agreeableness), respectively. Results indicated that Openness to Experience and Conscientiousness were significantly associated with creativity. More specifically, while Openness to Experience was found to be positively correlated with creativity, Conscientiousness was reported to be negatively correlated with creativity, consistent with the results of other studies (Batey, Chamorro-Premuzic, & Furnham, 2010; Caroli & Sagone, 2009; George & Zhou, 2001). Moreover, Furnham, Zhang and Chamorro-Premuzic also found Openness to Experience to be the best predictor of individuals' creativity. According to Furnham et al., these results suggested that creative individuals could be described as being greatly open to a variety of new experiences and as having low levels of conscientiousness. As with the studies conducted by Kelly (2006) and King, Walker and Broyles (1996), this study suffers from a relatively small sample size, which might be regarded as its major limitation.

Caroli and Sagone (2009) studied the relationship between the Big Five personality factors and creativity in a sample of 112 elementary school children ranging in age from 8 to 10 years. The Test of Creative Thinking (Williams, 1994) measuring children's creativity in terms of fluency, flexibility, originality, elaboration and production and the Big Five Questionnaire for

Children (Barbaranelli, Caprara, Rabasca, & Pastorelli, 2003) measuring children's personality in terms of Openness to Experience, Conscientiousness, Emotional Stability, Energy and Agreeableness in a child-friendly language were used in the study. Caroli and Sagone found a negative relationship between the Conscientiousness factor of personality and the flexibility factor of creativity and between the Emotional Stability factor of personality and the production factor of creativity. Interestingly, unlike previous studies, this study revealed no relationship between creativity and Openness to Experience (Dollinger, Urban, & James, 2004; Furnham, Crump, & Swami, 2009; King, Walker, & Broyles, 1996; Wolfradt & Pretz, 2001). According to Caroli and Sagone, two possible explanations could be provided regarding this result. First, unlike earlier studies involving various samples of adults, this study was conducted with a sample of elementary school children. Second, instead of using a battery or set of creativity tasks or measures, this study used only one measure of creativity, which might also be regarded as one of its major limitations.

Finally, in another study, Furnham, Batey, Anand and Manfield (2008) explored the relationship between the Big Five personality factors and creativity in a sample of 128 students with mean age 16.6. For the purposes of this study, the NEO Five-Factor Inventory (Costa & McCrae, 1992) was used as the measure of Extraversion, Neuroticism, Openness to Experience, Conscientiousness and Agreeableness whereas the Guilford Divergent Thinking Test (Guilford, 1967), the Self-Rating of Creativity Scale (Batey, 2007) and the Biographical Inventory of Creative Behaviors (Batey, 2007) were used as the measures of creativity. In examining whether the Big Five factors of personality could predict individuals' creativity, this study revealed some results which are very consistent to those generated from the studies by Wolfradt and Pretz (2001) and Furnham and Bachtiar (2008). More specifically, Furnham, Batey, Anand and

Manfield found Extraversion to be the strongest predictor of creativity. In addition to Extraversion, Openness to Experience and Agreeableness were also reported to be the significant predictors of creativity, consistent with the findings of previous studies (Dollinger, Urban, & James, 2004; Furnham, 1999; Furnham, Zhang, & Chamorro-Premuzic, 2005). The major limitation of this research is similar to that of the study by Furnham and Bachtiar (2008). That is, since the self-rated creativity scale used in this research asked participants to rate themselves as compared to other people, it might be open to substantial bias, potentially limiting the precision of the study results. Overall, it was thus considered that the Big Five personality factors might be among the important moderators that can explain the translation of individuals' creative potential into actual creative performance.

Affective Factors and Creativity

Unlike the association between personality factors and creativity, the relationship between affective factors and creativity has been examined in a smaller number of studies in the literature of creativity. For instance, Eubanks, Murphy and Mumford (2010) explored the relationship between affective factors and creativity in a sample of 320 college students with mean age 19 who were classified as intuitive or non-intuitive for the study purposes. Participants were exposed to the induction of positive or neutral affect through the music they listened to and then were asked to work on a particular creative problem solving task. Participants' creativity was assessed in terms of the quality, originality and elegance of the solutions they provided for the creative problem solving task. Results of this study showed that individuals, regardless of being intuitive or non-intuitive, who were exposed to the induction of positive affect generated

more original solutions compared to those who were non-intuitive and exposed to the induction of neutral affect.

A study conducted by Gasper (2004) investigated the relationship between affective factors and creativity by focusing on how individuals' mood could influence their generation of creative ideas. The sample of this study consisted of 120 college students with mean age 19.17. Participants were first exposed to a mood manipulation which was carried out by asking them to describe a recent life event making them feel happy and positive or sad and negative, and then were asked to complete a creative idea generation task asking them to write as many examples as possible for the things that could fly. Findings revealed that individuals who were in a happy and positive mood generated more original and new ideas than those who were in a sad and negative mood.

Friedman, Forster and Denzler (2007) studied a total of 65 college students in examining the relationship between affective factors and creativity. As with the study conducted by Gasper (2004), a mood manipulation was carried out by asking participants to imagine and describe as vividly and completely as possible a past life event making them feel either really good or really bad at the time. Next, participants were randomly assigned to either fun task framing group or serious task framing group and then were asked to complete a creative generation task which was presented as either a fun task or a serious task depending on the group. Participants completed the creative generation task by listing as many creative uses as possible for a brick. As a result of this study, while individuals in negative moods were found to be more productive when the creative generation task was framed and presented as a serious task, individuals in positive moods were reported to be equally productive regardless of task framing and presentation.

In another study, Henderson (2004) conducted an in-depth qualitative examination of the relationship between affective factors and creativity. In a sample of four inventors ranging in age from 31 to 40 years, Henderson carried out intensive interviews in order to explore the role of affective factors in the creative and innovation experiences of inventors. Results of this in-depth qualitative study revealed that inventors consistently expressed a substantial level of enjoyment in their creative and innovation experiences. In addition, results also showed that the creative and innovation experiences of inventors involved a considerable level of affective pleasure in creating, self-expression, focus, technical perspective taking, problem solving and challenge, and that inventors had the ability to experience, enjoy and tolerate intense affect, such as frustration, anger and anxiety, in their creative and innovation experiences.

Lastly, focusing particularly on the association between the positive and negative affect and individuals' creativity, George and Zhou (2007) studied a total of 161 adults, with mean age 46.3, working in a large company. While George and Zhou used the Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988) in order to assess participants' positive and negative mood, the creativity of participants was measured using supervisor ratings of creativity in which each participant was assessed by his or her own supervisor through the use of Zhou & George's (2001) 13-item Likert scale. As a result of this study, George and Zhou found that there was a significant positive relationship between individuals' positive mood and creativity. Overall, it was thus considered that affective factors might be among the important moderators that can explain the translation of individuals' creative potential into actual creative performance.

Attitudes, Values, and Creativity

In the literature of creativity, researchers have also examined whether the attitudes and values of individuals might be associated with their creativity. For instance, Dollinger, Burke and Gump (2007) studied 278 university students with mean age 21.9 in order to examine the relationship between values and creativity. Using the Schwartz Values Survey (Schwartz, 1992) and a self-report measure of creative accomplishments, Dollinger, Burke and Gump found that the creative accomplishments of participants significantly correlated with the values of self-direction, universalism, and stimulation. However, findings of this study also revealed significant negative correlations between participants' creative accomplishments and the values of tradition, conformity, security, and power. As a result, Dollinger, Burke and Gump concluded that there was a significant association between values and creativity, leading creative individuals to endorse some values such as self-direction, stimulation, and universalism, and to reject others such as tradition, conformity, and power.

The results of Dollinger, Burke and Gump (2007) were supported in another study. With an emphasis on the relationship between values and creativity, Kasof, Chen, Himsel and Greenberger (2007) investigated the association between value types and creative behavior. In a sample of 248 college students with mean age 22.1, Kasof, Chen, Himsel and Greenberger conducted an in-depth examination of values and creativity using the Schwartz Values Survey (Schwartz, 1994) and several tasks of verbal, artistic, and mathematical creativity. Results showed that the creative performance of participants positively correlated with the values of self-direction, stimulation and universalism, while at the same time negatively correlating with the values of tradition, conformity, and security. However, while Dollinger, Burke and Gump reported a negative association between participants' creative accomplishments and the value of

power, results of this study showed no significant relationships between the creative performance of participants and the value of power.

In a cross-cultural study, Zha, Walczyk, Griffith-Ross, Tobacyk and Walczyk (2006) explored whether individuals' values and attitudes were associated with their creativity. The researchers had a sample consisting of 111 university students (55 American with mean age 25.90 and 56 Chinese with mean age 27.54), and used the attitudes and values subscales of the Individualism–Collectivism Test (Triandis, 1989, 1994) in order to assess participants' attitudes and values. In this study, the creativity of participants was measured using the divergent thinking subscale of the Creativity Assessment Packet (Williams, 1991). Findings of this study indicated that a significant negative relationship existed between the value of individualism and creative elaboration for American participants and between the attitudes towards individualism and creative fluency for Chinese participants.

A study conducted by Williams (2004) investigated the relationship between attitudes and creativity in a sample consisting of 208 adults working in different departments of a large university. The attitudes of participants were assessed using Basadur and Finkbeiner's (1985) attitudes measure along with another attitudes scale specifically developed for the purposes of this study, whereas participants' creativity was measured using supervisors' ratings of creativity, co-workers' ratings of creativity, and rated creativity of participant suggestions for organizational improvement. As a result of this study, Williams found that there was a significant positive relationship between the attitudes of individuals towards divergent thinking and their creativity.

Finally, Taft and Gilchrist (1970) studied a total of 193 college students in exploring the relationship between the creativity of individuals, and their attitudes and values. The attitudes,

values, and creativity of participants were assessed using the Zimmerman-Guilford Interest Inventory (Zimmerman & Guilford, 1963), a value inventory specifically developed for the study purposes, and the ratings of participants' creative activities, respectively. Findings showed that the values and attitudes of individuals towards creative interests and activities were significantly and positively associated with their creativity. Overall, it was thus considered that the attitudes and values of individuals might be among the important moderators that can explain the translation of their creative potential into actual creative performance.

Cognitive Factors and Creativity

As with affective factors, a smaller number of studies have explored the relationship between cognitive factors and creativity. For example, Meneely and Portillo (2005) investigated the relationship between cognitive factors and creativity in a sample of 41 female college students with mean age 19.7. While participants' cognitive styles were assessed using the Herrmann Brain Dominance Instrument (Herrmann, 1989), the creativity of participants was measured using the Domino Creativity Scale (Domino, 1970) as well as a design task asking each participant to design and construct an original three-dimensional model of furniture for book storage purposes. Meneely and Portillo found that individuals having a flexible cognitive style, which was characterized as the ability to use at least three of the four thinking modes (perceiving-intuiting, thinking-introversion, sensing-judging and feeling-extraversion), demonstrated higher levels of creativity, as measured using the Domino Creativity Scale, compared to those having an inflexible cognitive style, which was characterized as the ability to use at most two of the four thinking modes.

O'Hara and Sternberg (2001) studied a total of 114 college students with mean age 18.7 in exploring the relationship between cognitive factors and creativity. The cognitive styles of participant were assessed through the use of Sternberg and Wagner's (1991) Thinking Styles Inventory. In measuring participants' creativity, however, O'Hara and Sternberg used a writing task asking participants to read a passage describing a real-life problem and then to generate possible solutions for that problem. As a result of this study, while legislative thinking style was reported to have a positive association with creativity, judicial thinking style was found to have a negative association with creativity. In addition, O'Hara and Sternberg also reported that there were no relationships between executive thinking style and individuals' creativity.

In another study, Brophy (2001) examined the relationship between creativity and various cognitive factors. The sample of this study comprised a total of 350 college students. Several measures were employed in this study in order to assess the cognitive styles of participants. Specifically, the cognitive preference for ideation vs. evaluation, the cognitive preference for innovation vs. adaptation and the cognitive preference for intuition vs. reasoning were assessed using the Preference for Ideation and Evaluation Scale (Basadur & Finkbeiner, 1985), the Kirton Adaption- Innovation Inventory (Kirton, 1976) and the Myers–Briggs Type Indicator Scale (Myers & McCaulley, 1985), respectively. The creativity of participants was measured using divergent thinking and convergent thinking tasks in which participants were asked to generate as many ideas as possible on given topics (e.g., word phrases, story titles, uses of items, grouping of items, completion of analogies) and to find the best answer among a set of options for given topics and questions (e.g., visual figures with particular goals, logical ordering of events, identification of conclusions for different premises), respectively. Results of this study provided great insight into the relationship between cognitive factors and creativity. That is, Brophy found

that individuals with higher cognitive preference for reasoning demonstrated higher creativity as indicated with the significant difference between their divergent and convergent thinking performances. Furthermore, Brophy also found that individuals having higher cognitive preference for ideation and innovation exhibited higher creativity than those having higher cognitive preference for evaluation and adaption.

Last but not least, a study conducted by Baer, Oldham and Cummings (2003) examined the relationship between cognitive factors and creativity in a sample of 171 adults with mean age 41 working in two manufacturing companies. The cognitive styles and creativity of participants were assessed using the Kirton Adaption-Innovation Inventory (Kirton, 1976) and the supervisors' ratings of creativity (Oldham & Cummings, 1996), respectively. Findings of this study revealed that there was a significant positive association between innovative cognitive style and creativity. Overall, it was thus considered that cognitive factors might be among the important moderators that can explain the translation of individuals' creative potential into actual creative performance.

This strand reviewed the empirical studies conducted on the relationships between individuals' creative potential and creative performance and between creativity and affective, cognitive and personality factors. The following strand presents the methodology of the current study.

CHAPTER 3

METHOD

Participants

The sample of this study consisted of a total of 80 university students pursuing undergraduate or graduate degrees across the United States. University students were considered to be an appropriate sample for this study as they were old enough to have demonstrated manifest creative performance through various types of behaviors, products, accomplishments, activities, traits and characteristics. Participants were recruited through electronic media (e.g., listserv, email) and in-person (e.g., class, call) announcements. The mean age of the sample was 29.51. The breakdown of the sample by gender, level of education, and region is presented in Table 1.

Table 1

Breakdown of the Sample by Gender, Level of Education and Region

	n	%
Gender		
Male	37	46.2
Female	43	53.8
Level of Education		
Graduate	75	93.8
Undergraduate	5	6.2
Region		
Northeast	9	11.2
South	64	80.0
Midwest	6	7.5
West	1	1.2

Measures

This study used various measures in examining the moderating effects of affective, cognitive and personality factors on the relationship between creative potential and creative performance. Descriptions of these measures are as follows:

Big Five Inventory. The Big Five Inventory (John, Donahue, & Kentle, 1991) was used to measure the big five personality factors, namely, Openness to Experience, Agreeableness, Extraversion, Conscientiousness and Neuroticism. The Big Five Inventory is a Likert-type self-

rating scale which consists of 44 items ranging in responses from 1 (disagree strongly) to 5 (agree strongly). An example from the items of the each Big Five Inventory subscale is as follows: Openness to Experience, “I am someone who is curious about many different things”; Agreeableness, “I am someone who likes to cooperate with others”; Extraversion, “I am someone who is talkative”; Conscientiousness, “I am someone who does things efficiently”; and Neuroticism, “I am someone who gets nervous easily”. The directions for the Big Five Inventory are as follows: “Here are a number of characteristics that may or may not apply to you. Please use the following scale to indicate the extent to which you agree or disagree with each statement.” The rationale for using the Big Five Inventory for the purposes of this study included (a) existing studies, as discussed in Chapter 2, have suggested significant relationships between the Big Five personality factors and creativity; (b) the Big Five Inventory has demonstrated good psychometric properties (e.g., alpha reliability ranging from .75 to .90 with an average above .80, construct validity) in assessing the Big Five personality factors; and (c) the Big Five Inventory, due to its psychometric properties, has been one of the most widely used measures of the Big Five personality factors in existing empirical research studies (John, Donahue, & Kentle, 1991; John & Srivastava, 1999; Noftle & Robins, 2007). In this study, the alpha reliabilities for Extroversion, Agreeableness, Conscientiousness, Neuroticism, and Openness to Experience were .88, .67, .84, .77 and .82, respectively.

Rational-Experiential Inventory. The Rational-Experiential Inventory (Pacini & Epstein, 1999) was used to assess the rational and experiential cognitive styles, with the rational cognitive style being reason oriented, intentional, open to change, analytical and emotion free, and the experiential cognitive style being pleasure-pain oriented, automatic, resistant to change, holistic and emotionally driven. The Rational-Experiential Inventory is a Likert-type self-rating

scale consisting of 40 items which range in responses from 1 (definitely false) to 5 (definitely true). An example from the items of the each Rational-Experiential Inventory subscale is as follows: Rational Cognitive Style, "Using logic usually works well for me in figuring out problems in my life"; and Experiential Cognitive Style, "I often go by my instincts when deciding on a course of action". The directions for the Rational-Experiential Inventory are as follows: "Please rate the following statements about your feelings, beliefs, and behaviors using the scale below. Work rapidly; first impressions are as good as any." The rationale for using the Rational-Experiential Inventory for the purposes of this study included (a) previous studies, as discussed in Chapter 2, have suggested significant associations between creativity and particular cognitive factors, and it was thus considered that the rational and experiential cognitive styles might also be among those factors; (b) the Rational-Experiential Inventory has demonstrated good psychometric properties (e.g., alpha reliability ranging from .81 to .95, construct validity) in assessing the rational and experiential cognitive styles; and (c) the Rational-Experiential Inventory, due to its psychometric properties, has been often used in earlier research studies in order to assess individuals' rational and experiential cognitive styles (MacLaren, Fugelsang, Harrigan, & Dixon, 2012; Pacini & Epstein, 1999; Pretz & Totz, 2007). In this study, the alpha reliabilities for Rational Cognitive Style and Experiential Cognitive Style were .89 and .90, respectively.

Positive and Negative Affect Schedule. The Positive and Negative Affect Schedule (Watson, Clark, & Tellegen, 1988) was used to assess the positive and negative affects. The Positive and Negative Affect Schedule is a Likert-type self-rating scale which consists of 20 items ranging in responses from 1 (very slightly or not at all) to 5 (extremely). Each of the scale items describes a different feeling or emotion and asks individuals to indicate to what extent they

generally feel that way. Examples from the items of the each Positive and Negative Affect Schedule subscale are as follows: Positive Affect, "Active", "Enthusiastic", and "Excited"; and Negative Affect, "Upset", "Scared", and "Distressed". The directions for the Positive and Negative Affect Schedule are as follows: "This scale consists of a number of words that describe different feelings and emotions. Read each item and indicate to what extent you generally feel this way, that is, how you feel on the average. Use the following scale to record your answers." The rationale for using the Positive and Negative Affect Schedule for the purposes of this study included (a) earlier studies, as discussed in Chapter 2, have suggested significant relationships between creativity and particular affective factors including the positive and negative affects; (b) the Positive and Negative Affect Schedule has demonstrated good psychometric properties (e.g., alpha reliability ranging from .83 to .91, construct validity) in assessing the positive and negative affects; and (c) the Positive and Negative Affect Schedule, due to its psychometric properties, has been often used in previous research studies as the measure of positive and negative affects (Denollet & Vries, 2006; Ntoumanis & Biddle, 1998; Watson, Clark, & Tellegen, 1988). In this study, the alpha reliability for both Positive Affect and Negative Affect was .86.

Runco Attitudes and Values Scale. The Runco Attitudes and Values Scale (Runco, 2012) was used to assess individuals' values and attitudes towards creativity. The Runco Attitudes and Values Scale is a newly developed Likert-type self-rating scale consisting of 15 items which range in responses from 1 (totally disagree) to 5 (totally agree). Examples from the items of the Runco Attitudes and Values Scale are as follows: "Even if some method has worked well in the past, it is a good idea to question and perhaps change it on a regular basis", "If you produce a large number of ideas, you are likely to find some high quality ideas and solutions", and "Originality can be very useful at work or in school". The directions for the Runco Attitudes

and Values Scale are as follows: “Use the 1-5 scale given below to indicate how much you agree or disagree with a certain statement. You may need to approximate. Please indicate how you really think and behave, not how you would like to. Remember no names are used. Your responses are confidential.” The rationale for using the Runco Attitudes and Values Scale for the purposes of this study included (a) existing studies, as discussed in Chapter 2, have suggested significant associations between the attitudes and values of individuals and their creativity; (b) attitudes and values, as significant predictors of creative performance, have been suggested to be the easiest component of creativity to change in individuals (Basadur & Hausdorf, 1996; Davis, 1999); and (c) it was thus considered to be good and useful to involve attitudes and values in investigating the moderating effects of affective, cognitive and personality factors on the relationship between individuals’ creative potential and creative performance. In this study, the alpha reliability for the Runco Attitudes and Values Scale was .82.

Measures of Creative Potential and Creative Performance

A total of three measures were used in order to assess the creative performance of participants. The rationale for using those three measures for the purposes of this study was that there is no wide agreement in the field of creativity about the best criterion of individuals’ creative performance and that using multiple measures can take into account this criterion problem by allowing a consideration of creative performance from multiple perspectives (Runco, 2009; Vernon, 1960). Therefore, the following three measures were used in order to assess creative performance from multiple perspectives including ideational creative behaviors, real-world creativity and recognized creative accomplishments, and creative behavior traits and characteristics.

Runco Ideational Behavior Scale. The Runco Ideational Behavior Scale (Runco, Plucker, & Lim, 2001) was used as one of the three measures of creative performance. The Runco Ideational Behavior Scale is a Likert-type self-rating scale consisting of 30 items which range in responses from 1 (never) to 5 (very frequently), and assesses individuals' actual overt production and use of ideas in real life. The Runco Ideational Behavior Scale has been often used in earlier creativity research and has demonstrated good psychometric properties (e.g., alpha reliability ranging from .88 to .93, construct validity) in assessing the creative performance of individuals (Batey, Chamorro-Premuzic, & Furnham, 2010; Cohen & Ferrari, 2010; Plucker, Runco, & Lim; 2006; Runco, Plucker, & Lim, 2001). Examples from the items of the Runco Ideational Behavior Scale are as follows: "I consider many options and alternatives when solving a problem", "I am good at combining ideas in ways that others have not tried", and "I see better ways of doing routine things". The directions for the Runco Ideational Behavior Scale are as follows: "Use the following scale to indicate how often each of the phrases describes your thinking and behavior. Please respond as accurately as possible! Please indicate how you really think and behave, not how you would like to. Remember no names are used. Your responses are confidential. For each item, please choose one of the following options in order to indicate how often you have done each activity." In this study, the alpha reliability for the Runco Ideational Behavior Scale was .90.

Runco Activity Check List. The Runco Activity Check List (Runco, 1987, 2011) was used as one of the three measures of creative performance. The Runco Activity Check List, as a self-report scale assessing individuals' creative activities and accomplishments, is an updated version of checklists that have been used many times with great success in creativity research (e.g., Cramond, Matthews-Morgan, Bandalos, & Zuo, 2005; Hocevar, 1981; Holland, 1961;

Milgram & Milgram, 1976; Runco, Millar, Acar, & Cramond, 2010; Torrance, 1969, 1972a, 1972b, 1981a, 1981b; Wallach & Wing, 1969). This scale has demonstrated good psychometric properties (e.g., alpha reliability ranging from .69 to .85, criterion validity) in assessing the creative performance of individuals and consists of 40 items, each of which ranges in responses from 0 (never) to 4 (more than three times) and asks participants to indicate if and how many times they have done particular creative activities. Examples from the items of the Runco Activity Check List are as follows: "How often have you programmed a computer or calculator to solve a problem (e.g., math, science, other)?", "How often have you written poetry, lyrics to a song, or short story?", "How often have you painted an original picture or made a sculpture?", "How often have you designed a piece of furniture or any similar object?", "How often have you designed a website or a blog, or helped another person design a website or a blog?", "How often have you used computer graphics to make a craft (e.g., poster, card, etc.)?", and "How often have you drawn cartoons or pictures just to express an idea or feeling?". The directions for the Runco Activity Check List are as follows: "In this inventory, we are interested in your activities and accomplishments. For each item, please choose the answer that best describes you." In this study, the alpha reliability for the Runco Activity Check List was .91.

Self-Rating of Creative Performance Scale. Based on earlier research finding self-ratings to be very useful and effective in assessing creative performance, a new Self-Rating of Creative Performance Scale (Runco, 2012) was developed specifically for the purposes of this study (e.g., Kaufman, 2006; Kaufman & Baer, 2004; Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe, & Riggs, 2009; Kaufman, Cole, & Baer, 2009). This scale was prepared to fit the purposes and sample involved in the present research. The Self-Rating of Creative Performance Scale is a Likert-type self-rating scale which consists of 15 items ranging in

responses from 0 (never) to 5 (always) and assesses how individuals view and describe themselves. Examples from the items of the Self-Rating of Creative Performance Scale are as follows: “To what degree or how often are you original - your behavior is different from other people’s”, “To what degree or how often are you authentic - you are yourself and do not try to be someone you think you should be”, and “To what degree or how often are you creative - you think or act in a creative fashion”. The directions for the Self-Rating of Creative Performance Scale are as follows: “There are 15 items that may or may not fit with how you view your own behavior. Use the scale below to rate yourself on each of the 15 descriptors. It is important that you use your own opinion to rate yourself. Don’t think about what other people think of you. Focus on what you think. No one will know your ratings – your name is not on this page. Don’t compare items; it does not matter how they fit together or contradict one another. In fact, work quickly, no need to give any single item much thought. Thank you.” In this study, the alpha reliability for the Self-Rating of Creative Performance Scale was .77.

Divergent Thinking Test. The Instances and Realistic Divergent Thinking Tests (Runco, 2011), which were very similar to those that have been successfully employed in previous research, were used as the measure of creative potential (e.g., Chand & Runco, 1993; Green & Williams, 1999; Guilford, 1968; Harrington, Block, & Block, 1983; Torrance, 1969, 1995; Torrance & Safter, 1989; Wallach & Kogan, 1965; Wyver & Spence, 1999). The rationale for using these tests for the purposes of this study was that these two divergent thinking tests have been often used in creativity research as the reliable and valid measures of individuals’ creative potential (e.g., alpha reliability ranging from .70 to .92, criterion validity) and that using both of these measures allows for representing the full range of human divergent thinking when assessing creative potential. In other words, while the Instances Divergent Thinking Test offers

very wide open questions that put very few constraints on creative idea generation, the Realistic Divergent Thinking Test provides results that generalize very directly to the natural environment (Cheung, Lau, Chan, & Wu, 2004; Runco, 1991, 2012; Runco & Acar, 2012; Runco, Dow, & Smith, 2006; Okuda, Runco, & Berger, 1991; Wallach & Kogan, 1965; Wallach & Wing, 1969). The Instances Divergent Thinking Test includes three open-ended questions asking individuals to list as many alternative instances as possible for particular categories of objects. The three items of the Instances Divergent Thinking Test are as follows: "List as many alternative instances as you can for the things that make noise", "List as many alternative instances as you can for the things that move on wheels", and "List as many alternative instances as you can for the things that are square". The directions for the Instances Divergent Thinking Test are as follows: "For each of the following categories, please list as many alternative instances as you can. For example, if we gave the category 'round things', you could list tire, the earth, donuts, coins and many other things. Please give as many ideas as you can. Do list as many ideas as you can. Spelling does not matter. The more things you list, the better." Similarly, the Realistic Divergent Thinking Test consists of three open-ended questions asking individuals to list as many solutions as possible for particular real-life problems. The three items of the Realistic Divergent Thinking Test are as follows: "Your friend Pat sits next to you in class. Pat really likes to talk to you and often bothers you while you are doing your work. Sometimes he distracts you and you miss an important part of the lecture, and many times you don't finish your work because he is bothering you. What should you do? How would you solve this problem?", "It is a great day for sailing, and your buddy, Kelly, comes to your work and asks you if you want to go sailing. Unfortunately, you have a big project due tomorrow, and it requires a full day to complete. You would rather be sailing. What are you going to do? ", and "You are about half

way through your daily walk when the clouds that were in the sky all morning suddenly disappear. You really need to avoid a sunburn and the UV rays, but you did not bring a hat. What might you do?" The directions for the Realistic Divergent Thinking Test are as follows: "On this page, we will describe three problems which may occur at school or work. Please first read about the problem and then try to write down as many solutions as you can for each problem. Please give as many solutions as possible." In this study, the alpha reliabilities for fluency and originality were .82 and .84, respectively.

Demographics Questionnaire. A demographics questionnaire was used to obtain information on participants' age, gender, level of education and region.

Procedure

This study involved several steps in examining the moderating effects of affective, cognitive, and personality factors on the relationship between creative potential and creative performance. First, participants were recruited through electronic media (e.g., listserv, email) and in-person (e.g., class, call) announcements. During the recruitment process, potential participants were provided detailed information about the purpose of the study. Next, data were collected online from the recruited participants using the study measures obtained from authors and published literature. Online data collection has been carried out in earlier creativity research and offers several advantages including flexibility in the administration and format of measures, lowered cost, and ability of receiving more complete and comprehensive responses (Epstein, Schmidt, & Warfel, 2008; Granello & Wheaton, 2004; Kaufman, Baer, Cole, & Sexton, 2008; Lefever, Dal, & Matthiasdottir, 2007; Simmons & Ren, 2009). In this study, the online data collection was carried out through Qualtrics which provided the advantages mentioned above

and has been successfully used in creativity research (e.g., Forgeard, 2013). During the data collection, recruited participants were provided an access to the online versions of the study measures and were asked to complete the measures in their earliest convenience. The study measures were provided to the participants in a random order by the online system in order to eliminate any potential order effects, and completion of all the measures took around 40-50 minutes. Following the data collection, a dataset was created to compile all of the participants' responses. Finally, the data were analyzed using hierarchical multiple regression. Given its research questions and objectives, the focus of this study was exclusively on moderators and their moderating effects on the relationship between creative potential and creative performance. Thus, as presented in Chapter 4, a series of hierarchical multiple regression analyses was performed for each moderator (extroversion, agreeableness, conscientiousness, neuroticism, openness to experience, rational/experiential cognitive style, positive/negative affect, and attitudes and values) in order to examine their moderating effects on the relationship between creative potential and creative performance. This strand described the methodology of the current study. The following strand presents the study findings.

CHAPTER 4

RESULTS

Descriptive Statistics and Overview of Analyses

The means, standard deviations, correlations and alpha reliabilities are presented in Table 2. Creative potential as measured by fluency and originality was significantly correlated with creative performance as measured by ideational behavior and self-rating of creative performance. More specifically, there was a significant positive relationship between the fluency scores from the Divergent Thinking Test and the creative performance scores from the Runco Ideational Behavior Scale ($r = .29$, $p < .01$) and between the originality scores from the Divergent Thinking Test and the creative performance scores from the Runco Ideational Behavior Scale ($r = .36$, $p < .01$). Similarly, a significant positive relationship existed between the fluency scores from the Divergent Thinking Test and the creative performance scores from the Self-Rating of Creative Performance Scale ($r = .38$, $p < .01$) and between the originality scores from the Divergent Thinking Test and the creative performance scores from the Self-Rating of Creative Performance Scale ($r = .47$, $p < .01$). However, no such relationship was found when creative potential and creative performance was measured by fluency/originality and activity check list, respectively. In other words, there were no significant associations between the fluency/originality scores from the Divergent Thinking Test and the creative performance scores from the Activity Check List.

Given the research questions and objectives of this study, the more important findings were focused on moderators and their moderating effects. Following Baron and Kenny (1986), the moderating effect of each moderator variable was tested by examining whether an interaction

existed between the predictor variable (fluency or originality as creative potential) and the moderator variable (extroversion, agreeableness, conscientiousness, neuroticism, openness to experience, rational/experiential cognitive style, positive/negative affect, or attitudes and values) in predicting the criterion variable (ideational behavior or self-rating of creative performance as creative performance). To this end, a series of hierarchical multiple regression analyses was performed for each moderator. Following the recommendation of Aiken and West (1991) and Cohen, Cohen, West and Aiken (2003), all the independent variables were mean-centered prior to computing interaction terms in order to address any potential multicollinearity. Since, as mentioned above, no significant association was found between the fluency/originality scores and activity check list scores, no moderation analyses were performed with these variables. Also, since age was significantly correlated with ideational behavior ($r = .28$, $p < .01$), it was controlled for in the moderation analyses involving ideational behavior as the criterion variable.

Table 2

Means, Standard Deviations, Correlations, and Alpha Reliabilities for All Variables

Variable	M	SD	1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16
1. ACL	1.47	0.73	(.91)															
2. RIBS	2.31	0.52	.56**	(.90)														
3. SRCP	2.89	0.53	.47**	.69**	(.77)													
4. Flu	8.47	6.10	.14	.29**	.38**	(.82)												
5. Org	2.72	2.92	.15	.36**	.47**	.93**	(.84)											
6. Ext	3.20	0.87	.40**	.36**	.27*	.10	.13	(.88)										
7. Agr	3.87	0.55	.02	.00	-.06	.14	.14	.38**	(.67)									
8. Con	3.64	0.72	.11	.18	.13	.02	.08	.30**	.15	(.84)								
9. Neu	2.87	0.70	-.07	-.08	-.09	-.26*	-.30**	-.27*	-.30**	-.35**	(.77)							
10. Ope	3.60	0.66	.56**	.76**	.68**	.33**	.39**	.39**	.03	.19	-.07	(.82)						
11. Rat	75.41	10.47	.35**	.54**	.36**	.29**	.35**	.30**	.12	.54**	-.34**	.53**	(.89)					
12. Exp	66.00	11.40	.41**	.51**	.41**	.13	.15	.25*	.09	.15	.03	.44**	.32**	(.90)				
13. PA	35.05	6.34	.40**	.55**	.48**	.14	.23*	.50**	.24*	.53**	-.31**	.51**	.51**	.37**	(.86)			
14. NA	20.91	6.67	-.04	-.14	-.20	-.28*	-.30**	-.23*	-.29**	-.38**	.64**	-.21	-.18	-.12	-.25*	(.86)		
15. AV	3.81	0.53	.32**	.58**	.47**	.55**	.58**	.28**	.28*	.33**	-.21	.55**	.60**	.45**	.47**	-.29**	(.82)	
16. Age	29.51	6.48	.08	.28**	.12	.32**	.33**	.16	.04	.24*	-.26*	.21	.31**	.11	.29**	-.14	.33**	-

Note. ACL: Activity Check List, RIBS: Runco Ideational Behavior Scale, SRCP: Self-Rating of Creative Performance, Flu: Fluency, Org: Originality, Ext: Extroversion, Agr: Agreeableness, Con: Conscientiousness, Neu: Neuroticism, Ope: Openness to Experience, Rat: Rational Cognitive Style, Exp: Experiential Cognitive Style, PA: Positive Affect, NA: Negative Affect, AV: Attitudes and Values

Alpha reliabilities are shown in parentheses along the diagonal.

** $p < 0.01$

* $p < 0.05$

Research Question 1: Does extroversion have a moderating effect on the relationship between creative potential and creative performance?

The first hierarchical multiple regression analysis was performed in order to examine whether extroversion had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively. As presented in Table 3, results revealed a significant interaction between fluency and extroversion in predicting ideational behavior ($\beta = -.28$, $p < .01$). The nature of this interaction was further explored by plotting regression lines for individuals who had low (1 *SD* below the mean) and high (1 *SD* above the mean) levels of extroversion (Cohen, Cohen, West, & Aiken, 2003). As shown in Figure 1, there was a stronger relationship between fluency and ideational behavior for individuals who had lower levels of extroversion. These results indicated that extroversion had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively.

Table 3

Multiple Regression Results for Fluency-Extroversion Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.171	.242*
Predictor			
Fluency		.204	.257*
Extroversion		.319**	.303**
Moderator			
Fluency X Extroversion			-.280**
R^2	.083	.226	.295
R^2 Change		.143**	.069**
F	7.055*	7.412***	7.845***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

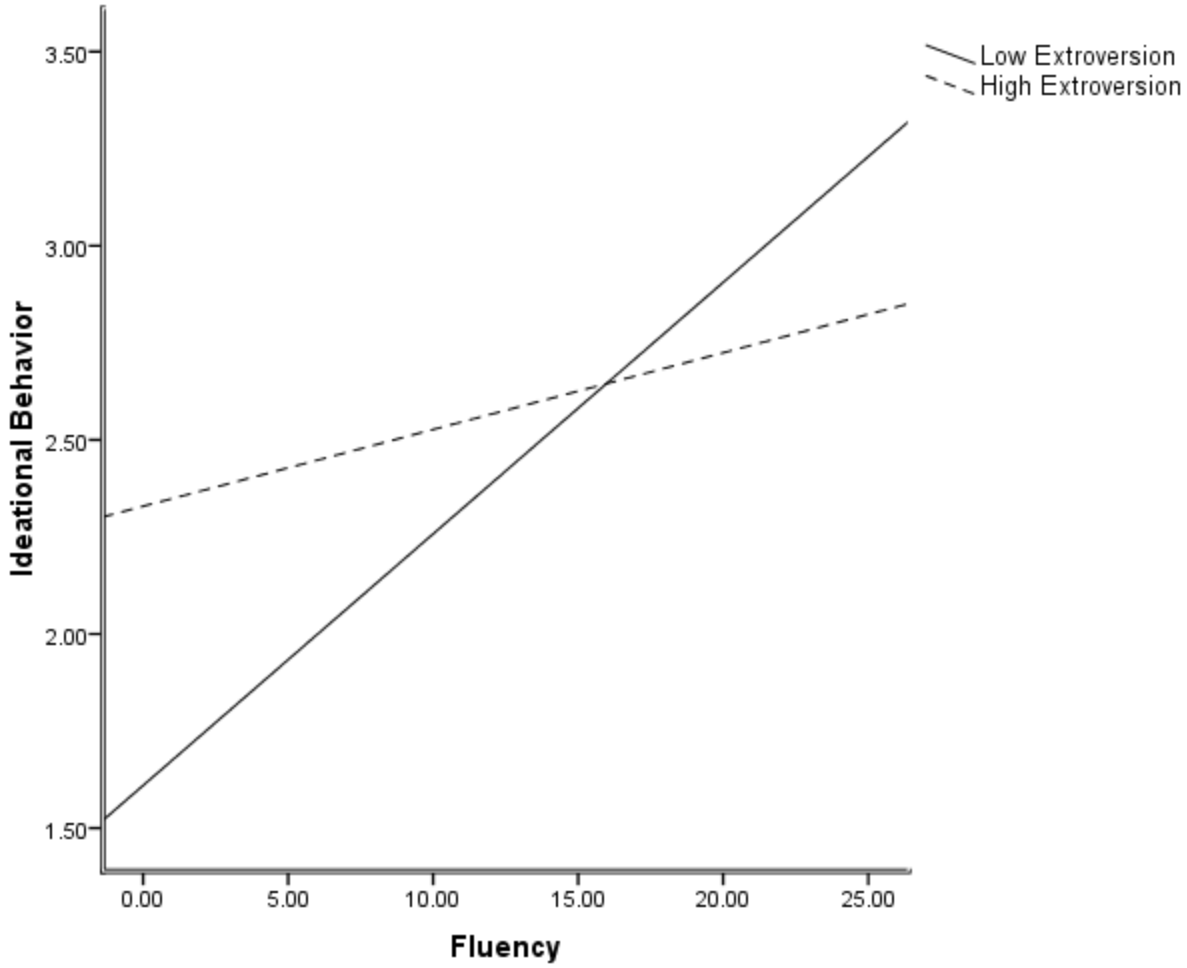

Figure 1

Nature of interaction between fluency and extroversion in predicting ideational behavior

The second hierarchical multiple regression analysis was conducted in order to examine whether extroversion had a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively. A significant interaction was found between originality and extroversion in predicting ideational behavior ($\beta = -.23$, $p < .05$). The results are displayed in Table 4. To further explore the nature of this interaction, regression lines were plotted for individuals who had low (1 *SD* below the mean) and high (1 *SD* above the mean) levels of extroversion (Cohen, Cohen, West, & Aiken, 2003).

As presented in Figure 2, a stronger relationship existed between originality and ideational behavior for individuals who had lower levels of extroversion. These findings revealed that extroversion had a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively.

Table 4

Multiple Regression Results for Originality-Extroversion Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.147	.207
Predictor			
Originality		.276*	.307**
Extroversion		.306**	.293**
Moderator			
Originality X Extroversion			-.230*
R^2	.083	.256	.303
R^2 Change		.173***	.047*
F	7.055*	8.729***	8.169***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

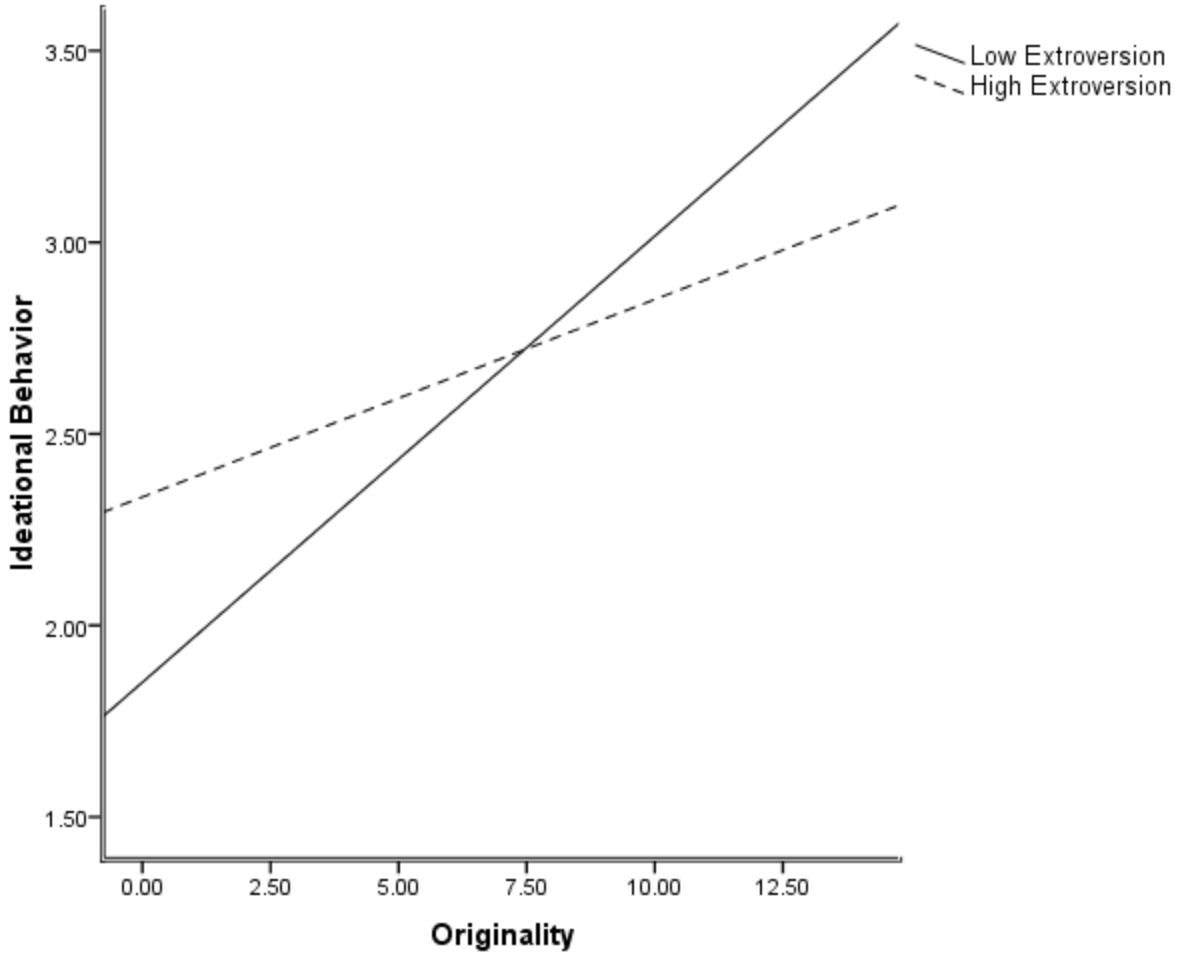

Figure 2

Nature of interaction between originality and extroversion in predicting ideational behavior

The third hierarchical multiple regression analysis was performed in order to examine whether extroversion had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively. No interaction was found between fluency and extroversion in predicting self-rating of creative performance. The results are presented in Table 5. These findings showed that extroversion did not have a moderating effect on the relationship between creative potential and

creative performance as measured by fluency and self-rating of creative performance, respectively.

Table 5

Multiple Regression Results for Fluency-Extroversion Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Fluency	.357**	.355**
Extroversion	.235*	.236*
Moderator		
Fluency X Extroversion		.007
R^2	.200	.200
R^2 Change		.000
F	9.645***	6.348**

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The final hierarchical multiple regression analysis for the first research question was conducted in order to examine whether extroversion had a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively. As shown in Table 6, there was no interaction between originality and extroversion in predicting self-rating of creative performance. These results indicated that extroversion did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively.

Table 6

Multiple Regression Results for Originality-Extroversion Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Originality	.448***	.440***
Extroversion	.212*	.213*
Moderator		
Originality X Extroversion		.039
R^2	.272	.273
R^2 Change		.001
F	14.375***	9.529***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Research Question 2: Does agreeableness have a moderating effect on the relationship between creative potential and creative performance?

The first hierarchical multiple regression analysis was performed in order to examine whether agreeableness had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively. No interaction was found between fluency and agreeableness in predicting ideational behavior. The results are presented in Table 7. These findings showed that agreeableness did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively.

Table 7

Multiple Regression Results for Fluency-Agreeableness Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.216	.221
Predictor			
Fluency		.229*	.251*
Agreeableness		-.040	-.036
Moderator			
Fluency X Agreeableness			-.118
R^2	.083	.129	.143
R^2 Change		.046	.013
F	7.055*	3.763*	3.121*

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The second hierarchical multiple regression analysis was conducted in order to examine whether agreeableness had a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively. As shown in Table 8, there was no interaction between originality and agreeableness in predicting ideational behavior. These results indicated that agreeableness did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively.

Table 8

Multiple Regression Results for Originality-Agreeableness Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.187	.189
Predictor			
Originality		.312**	.316**
Agreeableness		-.050	-.046
Moderator			
Originality X Agreeableness			-.059
R^2	.083	.168	.171
R^2 Change		.085*	.003
F	7.055*	5.115**	3.879**

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The third hierarchical multiple regression analysis was performed in order to examine whether agreeableness had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively. No interaction was found between fluency and agreeableness in predicting self-rating of creative performance. The results are reported in Table 9. These findings showed that agreeableness did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively.

Table 9

Multiple Regression Results for Fluency -Agreeableness Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Fluency	.399***	.406***
Agreeableness	-.119	-.117
Moderator		
Fluency X Agreeableness		-.036
R^2	.159	.160
R^2 Change		.001
F	7.294**	4.843**

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The final hierarchical multiple regression analysis for the second research question was conducted in order to examine whether agreeableness had a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively. As displayed in Table 10, there was no interaction between originality and agreeableness in predicting self-rating of creative performance. These results indicated that agreeableness did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively.

Table 10

Multiple Regression Results for Originality -Agreeableness Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Originality	.496***	.495***
Agreeableness	-.131	-.132
Moderator		
Originality X Agreeableness		.005
R^2	.245	.245
R^2 Change		.000
F	12.472***	8.208***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Research Question 3: Does conscientiousness have a moderating effect on the relationship between creative potential and creative performance?

The first hierarchical multiple regression analysis was performed in order to examine whether conscientiousness had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively. No interaction was found between fluency and conscientiousness in predicting ideational behavior. The results are presented in Table 11. These findings showed that conscientiousness did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively.

Table 11

Multiple Regression Results for Fluency- Conscientiousness Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.182	.160
Predictor			
Fluency		.232*	.248*
Conscientiousness		.130	.113
Moderator			
Fluency X Conscientiousness			.086
R^2	.083	.144	.150
R^2 Change		.061	.006
F	7.055*	4.249**	3.311*

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The second hierarchical multiple regression analysis was conducted in order to examine whether conscientiousness had a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively. As shown in Table 12, there was no interaction between originality and conscientiousness in predicting ideational behavior. These results indicated that conscientiousness did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively.

Table 12

Multiple Regression Results for Originality-Conscientiousness Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.159	.156
Predictor			
Originality		.305**	.305**
Conscientiousness		.116	.113
Moderator			
Originality X Conscientiousness			.012
R^2	.083	.178	.178
R^2 Change		.095*	.000
F	7.055*	5.493**	4.069**

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The third hierarchical multiple regression analysis was performed in order to examine whether conscientiousness had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively. No interaction was found between fluency and conscientiousness in predicting self-rating of creative performance. The results are reported in Table 13. These findings showed that conscientiousness did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively.

Table 13

Multiple Regression Results for Fluency-Conscientiousness Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Fluency	.379**	.386***
Conscientiousness	.127	.108
Moderator		
Fluency X Conscientiousness		.073
R^2	.162	.167
R^2 Change		.005
F	7.420**	5.061**

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The final hierarchical multiple regression analysis for the third research question was conducted in order to examine whether conscientiousness had a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively. As displayed in Table 14, there was no interaction between originality and conscientiousness in predicting self-rating of creative performance. These results indicated that conscientiousness did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively.

Table 14

Multiple Regression Results for Originality-Conscientiousness Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Originality	.469***	.465***
Conscientiousness	.097	.076
Moderator		
Originality X Conscientiousness		.080
R^2	.237	.243
R^2 Change		.006
F	11.966***	8.137***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Research Question 4: Does neuroticism have a moderating effect on the relationship between creative potential and creative performance?

The first hierarchical multiple regression analysis was performed in order to examine whether neuroticism had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively. No interaction was found between fluency and neuroticism in predicting ideational behavior. The results are presented in Table 15. These findings showed that neuroticism did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively.

Table 15

Multiple Regression Results for Fluency-Neuroticism Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.222	.212
Predictor			
Fluency		.229*	.203
Neuroticism		.029	.041
Moderator			
Fluency X Neuroticism			-.120
R^2	.083	.129	.142
R^2 Change		.046	.013
F	7.055*	3.736*	3.091*

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The second hierarchical multiple regression analysis was conducted in order to examine whether neuroticism had a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively. As shown in Table 16, there was no interaction between originality and neuroticism in predicting ideational behavior. These results indicated that neuroticism did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively.

Table 16

Multiple Regression Results for Originality-Neuroticism Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.198	.188
Predictor			
Originality		.319**	.282*
Neuroticism		.061	.065
Moderator			
Originality X Neuroticism			-.125
R^2	.083	.169	.183
R^2 Change		.086*	.014
F	7.055*	5.144**	4.188**

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The third hierarchical multiple regression analysis was performed in order to examine whether neuroticism had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively. No interaction was found between fluency and neuroticism in predicting self-rating of creative performance. The results are reported in Table 17. These findings showed that neuroticism did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively.

Table 17

Multiple Regression Results for Fluency-Neuroticism Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Fluency	.384**	.360**
Neuroticism	.008	.019
Moderator		
Fluency X Neuroticism		-.094
R^2	.146	.154
R^2 Change		.008
F	6.559**	4.598**

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The final hierarchical multiple regression analysis for the fourth research question was conducted in order to examine whether neuroticism had a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively. As displayed in Table 18, there was no interaction between originality and neuroticism in predicting self-rating of creative performance. These results indicated that neuroticism did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively.

Table 18

Multiple Regression Results for Originality-Neuroticism Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Originality	.495***	.463***
Neuroticism	.059	.064
Moderator		
Originality X Neuroticism		-.100
R^2	.231	.240
R^2 Change		.009
F	11.566***	7.994***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Research Question 5: Does openness to experience have a moderating effect on the relationship between creative potential and creative performance?

The first hierarchical multiple regression analysis was performed in order to examine whether openness to experience had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively. No interaction was found between fluency and openness to experience in predicting ideational behavior. The results are presented in Table 19. These findings showed that openness to experience did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively.

Table 19

Multiple Regression Results for Fluency-Openness to Experience Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.124	.106
Predictor			
Fluency		.005	-.019
Openness to Experience		.740***	.732***
Moderator			
Fluency X Openness to Experience			.082
R^2	.083	.607	.612
R^2 Change		.524***	.005
F	7.055*	39.058***	29.564***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The second hierarchical multiple regression analysis was conducted in order to examine whether openness to experience had a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively. As shown in Table 20, there was no interaction between originality and openness to experience in predicting ideational behavior. These results indicated that openness to experience did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively.

Table 20

Multiple Regression Results for Originality-Openness to Experience Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.116	.106
Predictor			
Originality		.039	.010
Openness to Experience		.728***	.726***
Moderator			
Originality X Openness to Experience			.057
R^2	.083	.608	.610
R^2 Change		.525***	.002
F	7.055*	39.249***	29.293***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The third hierarchical multiple regression analysis was performed in order to examine whether openness to experience had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively. No interaction was found between fluency and openness to experience in predicting self-rating of creative performance. The results are reported in Table 21. These findings showed that openness to experience did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively.

Table 21

Multiple Regression Results for Fluency -Openness to Experience Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Fluency	.172*	.164
Openness to Experience	.626***	.623***
Moderator		
Fluency X Openness to Experience		.022
R^2	.493	.494
R^2 Change		.000
F	37.475***	24.699***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The final hierarchical multiple regression analysis for the fifth research question was conducted in order to examine whether openness to experience had a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively. As displayed in Table 22, there was no interaction between originality and openness to experience in predicting self-rating of creative performance. These results indicated that openness to experience did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively.

Table 22

Multiple Regression Results for Originality-Openness to Experience Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Originality	.244**	.250*
Openness to Experience	.586***	.587***
Moderator		
Originality X Openness to Experience		-.011
R^2	.517	.517
R^2 Change		.000
F	41.262***	27.158***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Research Question 6: Does rational/experiential cognitive style have a moderating effect on the relationship between creative potential and creative performance?

The first hierarchical multiple regression analysis was performed in order to examine whether rational/experiential cognitive style had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively. No interaction was found between fluency and rational/experiential cognitive style in predicting ideational behavior. The results are presented in Table 23. These findings showed that rational/experiential cognitive style did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively.

Table 23

Multiple Regression Results for Fluency-Rational/Experiential Cognitive Style Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.227*	.222
Predictor			
Fluency		.212	.251
RE Cognitive Style		.100	.106
Moderator			
Fluency X RE Cognitive Style			-.076
R^2	.083	.138	.142
R^2 Change		.055	.004
F	7.055*	4.043*	3.098*

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The second hierarchical multiple regression analysis was conducted in order to examine whether rational/experiential cognitive style had a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively. As shown in Table 24, there was no interaction between originality and rational/experiential cognitive style in predicting ideational behavior. These results indicated that rational/experiential cognitive style did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively.

Table 24

Multiple Regression Results for Originality-Rational/Experiential Cognitive Style Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.197	.194
Predictor			
Originality		.293*	.311*
RE Cognitive Style		.086	.089
Moderator			
Originality X RE Cognitive Style			-.035
R^2	.083	.173	.174
R^2 Change		.090*	.001
F	7.055*	5.288**	3.938**

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The third hierarchical multiple regression analysis was performed in order to examine whether rational/experiential cognitive style had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively. No interaction was found between fluency and rational/experiential cognitive style in predicting self-rating of creative performance. The results are reported in Table 25. These findings showed that rational/experiential cognitive style did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively.

Table 25

Multiple Regression Results for Fluency-Rational/Experiential Cognitive Style Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Fluency	.368**	.426**
RE Cognitive Style	.169	.178
Moderator		
Fluency X RE Cognitive Style		-.117
R^2	.174	.184
R^2 Change		.010
F	8.105**	5.708**

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The final hierarchical multiple regression analysis for the sixth research question was conducted in order to examine whether rational/experiential cognitive style had a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively. As displayed in Table 26, there was no interaction between originality and rational/experiential cognitive style in predicting self-rating of creative performance. These results indicated that rational/experiential cognitive style did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively.

Table 26

Multiple Regression Results for Originality–Rational/Experiential Cognitive Style Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Originality	.462***	.502***
RE Cognitive Style	.152	.160
Moderator		
Originality X RE Cognitive Style		-.081
R^2	.251	.256
R^2 Change		.005
F	12.882***	8.694***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Research Question 7: Does positive/negative affect have a moderating effect on the relationship between creative potential and creative performance?

The first hierarchical multiple regression analysis was performed in order to examine whether positive/negative affect had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively. No interaction was found between fluency and positive/negative affect in predicting ideational behavior. The results are presented in Table 27. These findings showed that positive/negative affect did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively.

Table 27

Multiple Regression Results for Fluency-Positive/Negative Affect Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.216	.216
Predictor			
Fluency		.212	.212
PN Affect		.170	.170
Moderator			
Fluency X PN Affect			.000
R^2	.083	.156	.156
R^2 Change		.073*	.000
F	7.055*	4.696**	3.476*

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The second hierarchical multiple regression analysis was conducted in order to examine whether positive/negative affect had a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively. As shown in Table 28, there was no interaction between originality and positive/negative affect in predicting ideational behavior. These results indicated that positive/negative affect did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively.

Table 28

Multiple Regression Results for Originality-Positive/Negative Affect Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.190	.190
Predictor			
Originality		.286*	.267
PN Affect		.151	.153
Moderator			
Originality X PN Affect			.019
R^2	.083	.188	.188
R^2 Change		.105*	.000
F	7.055*	5.863**	4.339**

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The third hierarchical multiple regression analysis was performed in order to examine whether positive/negative affect had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively. No interaction was found between fluency and positive/negative affect in predicting self-rating of creative performance. The results are reported in Table 29. These findings showed that positive/negative affect did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively.

Table 29

Multiple Regression Results for Fluency-Positive/Negative Affect Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Fluency	.371**	-.166
PN Affect	.154	.186
Moderator		
Fluency X PN Affect		.548
R^2	.169	.183
R^2 Change		.014
F	7.829**	5.667**

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The final hierarchical multiple regression analysis for the seventh research question was conducted in order to examine whether positive/negative affect had a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively. As displayed in Table 30, there was no interaction between originality and positive/negative affect in predicting self-rating of creative performance. These results indicated that positive/negative affect did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively.

Table 30

Multiple Regression Results for Originality-Positive/Negative Affect Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Originality	.463***	-.096
PN Affect	.124	.183
Moderator		
Originality X PN Affect		.565
R^2	.243	.254
R^2 Change		.011
F	12.355***	8.622***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

Research Question 8: Do attitudes and values have a moderating effect on the relationship between creative potential and creative performance?

The first hierarchical multiple regression analysis was performed in order to examine whether attitudes and values had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively. No interaction was found between fluency and attitudes and values in predicting ideational behavior. The results are presented in Table 31. These findings showed that attitudes and values did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and ideational behavior, respectively.

Table 31

Multiple Regression Results for Fluency- Attitudes and Values Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.116	.114
Predictor			
Fluency		-.069	-.140
Attitudes and Values		.583***	.604***
Moderator			
Fluency X Attitudes and Values			.138
R^2	.083	.353	.368
R^2 Change		.270***	.015
F	7.055*	13.839***	10.937***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The second hierarchical multiple regression analysis was conducted in order to examine whether attitudes and values had a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively. As shown in Table 32, there was no interaction between originality and attitudes and values in predicting ideational behavior. These results indicated that attitudes and values did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and ideational behavior, respectively.

Table 32

Multiple Regression Results for Originality-Attitudes and Values Interaction in Predicting Ideational Behavior

Variables	Step 1	Step 2	Step 3
Control			
Age	.288*	.103	.103
Predictor			
Originality		.018	-.109
Attitudes and Values		.539***	.572***
Moderator			
Originality X Attitudes and Values			.167
R^2	.083	.350	.366
R^2 Change		.267***	.016
F	7.055*	13.662***	10.826***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The third hierarchical multiple regression analysis was performed in order to examine whether attitudes and values had a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively. No interaction was found between fluency and attitudes and values in predicting self-rating of creative performance. The results are reported in Table 33. These findings showed that attitudes and values did not have a moderating effect on the relationship between creative potential and creative performance as measured by fluency and self-rating of creative performance, respectively.

Table 33

Multiple Regression Results for Fluency-Attitudes and Values Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Fluency	.170	.105
Attitudes and Values	.380**	.399**
Moderator		
Fluency X Attitudes and Values		.124
R^2	.245	.257
R^2 Change		.012
F	12.510***	8.778***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

The final hierarchical multiple regression analysis for the eighth research question was conducted in order to examine whether attitudes and values had a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively. As displayed in Table 34, there was no interaction between originality and attitudes and values in predicting self-rating of creative performance. These results indicated that attitudes and values did not have a moderating effect on the relationship between creative potential and creative performance as measured by originality and self-rating of creative performance, respectively.

Table 34

Multiple Regression Results for Originality-Attitudes and Values Interaction in Predicting Self-Rating of Creative Performance

Variables	Step 1	Step 2
Predictor		
Originality	.304*	.190
Attitudes and Values	.297*	.327**
Moderator		
Originality X Attitudes and Values		.150
R^2	.286	.299
R^2 Change		.013
F	15.426***	10.787***

Note. Standardized beta coefficients are reported.
* $p < .05$. ** $p < .01$. *** $p < .001$.

This strand presented the results of the current study. The following strand discusses the study findings.

CHAPTER 5

DISCUSSION

The purpose of this study was to explore the moderating effects of affective, cognitive and personality factors on the relationship between creative potential and creative performance. More specifically, this study examined whether extroversion, agreeableness, conscientiousness, neuroticism, openness to experience, rational/experiential cognitive style, positive/negative affect, and attitudes and values had a moderating effect on the relationship between creative potential and creative performance. Given the research questions and objectives of this study, the more important findings were focused on moderators and their moderating effects. We were focused on moderators rather than main effects. Main effects using the affective, cognitive and personality factors have been demonstrated in previous research, which is why they were chosen for the present investigation. This study was unique in its examination of these relevant variables as moderators.

Consistent with previous studies and as expected, the current study revealed a significant positive relationship between individuals' creative potential and creative performance (e.g., Carson, Peterson, & Higgins, 2005; Helson & Pals, 2000; Tierney & Farmer, 2002). That is, the individuals' creative potential as measured by fluency and originality was found to be significantly and positively associated with their creative performance as measured by ideational behavior and self-rating of creative performance. Although the relationship between creative potential and creative performance was clear when creative performance was measured by ideational behavior or self-rating of creative performance, one unexpected finding was that no

such relationship existed when creative performance was measured by activity check list. One potential explanation for the lack of significant relationship may be that the current study used a shortened version of the Runco Activity Check List (Runco, 1987, 2011) and that this might have prevented the scale from adequately capturing the creative activities and accomplishments of participants. In this regard, future research might benefit from using the full version of the activity check list in order to conduct a more comprehensive assessment of individuals' creative activities and accomplishments. Moreover, it is also worth noting that the majority of participants in this study (93%) were individuals pursuing graduate degrees and that their mean age was 30. Given these two characteristics of the sample, it is likely that the majority of study participants might be full-time working individuals whose creative activities and achievements might be demonstrated in ways that were pertinent to their professional roles but could not be captured by the activity check list used in this study. For this reason, although it was beyond the scope of this study, future research might examine more closely the creative activities and achievements of working individuals by developing much more specific activity check lists that would be pertinent to the professional roles of those individuals (e.g., Oldham & Cummings, 1996; Tierney & Farmer, 2002). Furthermore, it is also worthwhile to note that the critique of Runco, Plucker and Lim (2001) about the use of activity check lists as the criterion of individuals' creative performance might be equally relevant to the lack of significance for the association between fluency/originality and activity check list scores reported in this study. Specifically, Runco, Plucker and Lim underscored that since the activities and achievements listed on those checklists would require various types of resources and opportunities, the use of activity check lists as the only criterion of creative performance might not always provide an accurate assessment of creative performance for all individuals. Therefore, it is possible that the

participants of the current study might not have had the resources and opportunities through which they could demonstrate their creative performance as described by the activities and achievements on the activity check list used in this study.

In addition to the association between individuals' creative potential and creative performance, results of the present study also support the findings of previous research in terms of the relationship between individuals' creative potential scores. Specifically, this study revealed that there was a high correlation between the fluency and originality scores of individuals, which has been consistently reported in earlier studies (e.g., Abernathy-Tannehill, 1998; Chase, 1985; De Vet & De Dreu, 2007; Dixon, 1979; Kim, 2006; Kim, Cramond, & Bandalos, 2006; Silvia, Winterstein, & Willse, 2008; Speller & Schumacher, 1975; Torrance, 2008). Consistent with the reasoning and work of Torrance and Safter (1999), and Kim, Cramond and Bandalos (2006), this finding suggests that individuals who can come up with a greater number of ideas are much more able to generate unique ideas. As a result, the ability of individuals to produce as many ideas as possible is of fundamental importance because fluency may be considered crucial for originality which has been regarded as the most important and widely recognized aspect of creativity (e.g., Carson & Runco, 1999; Runco, 2003; Runco & Charles, 1993; Runco, Illies, & Eisenman, 2005; Runco & Jaeger, 2012; Runco & Okuda, 1991).

Moderators and Moderating Effects

In examining the moderating effect of extroversion on the association between individuals' creative potential and creative performance, the current study yielded crucial findings. Specifically, the results of this study showed that extroversion had a moderating effect on the relationship between individuals' creative potential and creative performance such that

there was a stronger relationship between creative potential and creative performance for individuals who had lower levels of extroversion. This finding is of critical importance.

Namely, although research on the relationship between extroversion and creativity consistently shows that individuals with higher levels of extroversion demonstrate higher levels of creativity (e.g., Batey, Chamorro-Premuzic, & Furnham, 2010; Dollinger, Urban, & James, 2004; Furnham, Batey, Anand, & Manfield, 2008; Ivcevic & Mayer, 2009; Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe, & Riggs, 2009; Kelly, 2006; King, Walker, & Broyles, 1996; Sung & Choi, 2009; Wolfradt & Pretz, 2001), this finding suggests that individuals with lower levels of extroversion may be more able to translate their creative potential into creative performance. Thus, this result also suggests that individuals with lower levels of extroversion might be a very promising population of creative performers. Here, it seems quite important to identify the creative potential of individuals who have lower levels of extroversion because once identified, those who have higher levels of creative potential among such individuals might be provided with various opportunities (e.g., educational or professional) through which they can use their ability to translate creative potential into creative performance in order to become great creative performers. This finding may be considered one of the most important and unique contributions of the current study to the field of creativity, which might offer scholars a new avenue of research on the identification and development of creative potential in introverted individuals.

In considering the positive relationship between extroversion and creativity mentioned above, it might be worthwhile to note whether earlier studies used creative potential measures or creative performance measures in assessing the creativity of individuals. In this regard, while Batey, Chamorro-Premuzic and Furnham (2010), Ivcevic and Mayer (2009), Kaufman,

Waterstreet, Ailabouni, Whitcomb, Roe and Riggs (2009), Kelly (2006), Sung and Choi (2009), and Wolfradt and Pretz (2001) employed creative performance measures to assess individuals' creativity, Dollinger, Urban and James (2004), Furnham, Batey, Anand and Manfield (2008), and King, Walker and Broyles (1996) employed both creative potential measures and creative performance measures for the same purpose. Regardless, previous research has found extroversion to be positively related to creativity in a variety of samples including university students (e.g., Batey, Chamorro-Premuzic, & Furnham, 2010; Dollinger, Urban, & James, 2004; Ivcevic & Mayer, 2009; Kelly, 2006; King, Walker, & Broyles, 1996; Sung & Choi, 2009; Wolfradt & Pretz, 2001), secondary school students (e.g., Furnham, Batey, Anand, & Manfield, 2008), and adults (e.g., Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe, & Riggs, 2009).

While the results of the present study revealed that extroversion had a moderating effect on the relationship between individuals' creative potential and creative performance, there was no such effect for agreeableness. That is, this study showed that the association between the creative potential and creative performance of individuals was the same regardless of their levels of agreeableness. Moreover, although earlier studies reported differing results in terms of the relationship between agreeableness and creativity (e.g., Furnham, Batey, Anand, & Manfield, 2008; Ivcevic & Mayer, 2009; Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe, & Riggs, 2009; Soldz & Vaillant, 1999), the current study supported the findings of Furnham, Batey, Anand and Manfield (2008) which showed that there was no relationship between agreeableness and creativity.

Looking more closely at the inconsistency among the findings of previous studies regarding the relationship between agreeableness and creativity, it might be important to consider whether those studies focused on creative potential or creative performance in assessing

the creativity of individuals. For example, as with the current study, Furnham, Batey, Anand and Manfield (2008) used both creative potential measures and creative performance measures when assessing individuals' creativity but reported no significant associations between agreeableness and creative potential or creative performance. In contrast, Ivcevic and Mayer (2009) employed creative performance measures in assessing the creativity of individuals and found that agreeableness was positively related to creative performance. Similarly, Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe and Riggs (2009) assessed individuals' creativity using creative performance measures and reported a significant positive relationship between agreeableness and creative performance. On the contrary, Soldz and Vaillant (1999) used creative performance measures in assessing the creativity of individuals and found that agreeableness was negatively associated with creative performance. The study conducted by King, Walker and Broyles (1996), however, employed both creative potential measures and creative performance measures when assessing individuals' creativity but revealed that while there were no significant relationships between agreeableness and creative potential, a significant negative association existed between agreeableness and creative performance. Here, it might also be worthwhile to note the samples of earlier studies in considering the conflicting research findings on the relationship between agreeableness and creativity. For example, while some studies used a sample of university students (e.g., Ivcevic & Mayer, 2009; King, Walker, & Broyles, 1996), others had a sample consisting of adults (e.g., Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe, & Riggs, 2009; Soldz & Vaillant, 1999) and secondary school students (e.g., Furnham, Batey, Anand, & Manfield, 2008). Thus, given the differing findings from previous research as well as the lack of moderating effect reported in the present research, it appears that many more studies are needed to determine the actual influence of agreeableness on creativity.

Similar results were found regarding the moderating effect of conscientiousness on the association between the creative potential and creative performance of individuals. Namely, as with agreeableness, the findings of the current study showed that conscientiousness did not have a moderating effect on the relationship between individuals' creative potential and creative performance. In other words, the relationship between the creative potential and creative performance of individuals was the same, irrespective of their conscientiousness levels. Likewise, while previous research yielded inconsistent results concerning the relationship between conscientiousness and creativity (e.g., Batey, Chamorro-Premuzic, & Furnham, 2010; Caroli & Sagone, 2009; Furnham, Zhang, & Chamorro-Premuzic, 2005; George & Zhou, 2001), the present research revealed that there was no association between conscientiousness and creativity, consistent with the results of King, Walker and Broyles (1996).

Since differing results have been reported in earlier studies regarding the relationship between conscientiousness and creativity, it might be worthwhile to take a closer look at whether creative potential measures or creative performance measures were used in those studies in assessing the creativity of individuals. For instance, Batey, Chamorro-Premuzic and Furnham (2010) employed creative performance measures when assessing individuals' creativity and reported that conscientiousness was negatively related to creative performance. In contrast, although George and Zhou (2001) assessed the creativity of individuals using creative performance measures, they found no significant associations between conscientiousness and creative potential. Caroli and Sagone (2009), and Furnham, Zhang and Chamorro-Premuzic (2005), however, used creative potential measures in assessing individuals' creativity and reported that a significant negative relationship existed between conscientiousness and creative potential. Nevertheless, as with the present study, King, Walker and Broyles (1996) used both

creative potential measures and creative performance measures when assessing the creativity of individuals but found no significant relationships between conscientiousness and creative potential or creative performance. In considering these differing findings on the association between conscientiousness and creativity, it might also be important to keep in mind the samples of previous studies. For instance, whereas some studies had a sample consisting of university students (e.g., Batey, Chamorro-Premuzic, & Furnham, 2010; Furnham, Zhang, & Chamorro-Premuzic, 2005; King, Walker, & Broyles, 1996), others used a sample comprising adults (e.g., George & Zhou, 2001) and elementary school students (e.g., Caroli & Sagone, 2009). As a result, the inconsistent findings from earlier studies and the lack of moderating effect reported in this study suggest that much more research should be conducted in order to better understand the actual effect of conscientiousness on creativity.

With regard to the moderating effect of neuroticism on the relationship between individuals' creative potential and creative performance, the findings of this study were in line with those reported for agreeableness and conscientiousness above. That is to say, the current study showed that neuroticism did not have a moderating effect on the relationship between individuals' creative potential and creative performance, suggesting that the creative potential of individuals was uniformly related to their creative performance, no matter what their level of neuroticism. In addition, although differing results were reported in earlier studies regarding the association between neuroticism and creativity (e.g., Caroli & Sagone, 2009; Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe, & Riggs, 2009; King, Walker, & Broyles, 1996), the present study supported the results of Batey, Chamorro-Premuzic and Furnham (2010) which revealed that there was no relationship between neuroticism and creativity as assessed by creative performance.

Given the inconsistent findings reported in the literature concerning the relationship between neuroticism and creativity, it might be worth looking more closely at whether previous studies focused on creative potential or creative performance in investigating this relationship. For example, Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe and Riggs (2009) used creative performance measures in assessing individuals' creativity and found that there was a significant negative relationship between neuroticism and creative performance. In contrast, while Batey, Chamorro-Premuzic and Furnham (2010), and Ivcevic and Mayer (2009) also employed creative performance measures when assessing the creativity of individuals, they reported that no significant associations existed between neuroticism and creative performance. Furnham, Zhang and Chamorro-Premuzic (2005), however, employed creative potential measures in assessing individuals' creativity and found no significant relationships between neuroticism and creative potential. Although Furnham, Batey, Anand and Manfield (2008), and King, Walker and Broyles (1996) used both creative potential measures and creative performance measures when assessing the creativity of individuals, they found that there were no significant associations between neuroticism and creative potential or creative performance. Nevertheless, although the current study also employed both creative potential measures and creative performance measures in assessing individuals' creativity, the present findings revealed that while neuroticism was negatively related to creative potential, no significant associations existed between neuroticism and creative performance. Here, it might also be worth noting the samples of earlier studies in considering the inconsistent research findings on the relationship between neuroticism and creativity. For example, while some studies had a sample comprising university students (e.g., Batey, Chamorro-Premuzic, & Furnham, 2010; Ivcevic & Mayer, 2009; Furnham, Zhang, & Chamorro-Premuzic, 2005; King, Walker, & Broyles, 1996), others used a sample of secondary

school students (e.g., Furnham, Batey, Anand, & Manfield, 2008) and adults (e.g., Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe, & Riggs, 2009). Consequently, given the differing results from previous studies as well as the lack of moderating effect found in the current study, it seems that much more research is needed to determine the actual impact of neuroticism on creativity.

Lastly, the current study reported similar findings in terms of the moderating effect of openness to experience on the relationship between individuals' creative potential and creative performance. Specifically, as with agreeableness, conscientiousness and neuroticism, this study revealed that openness to experience did not have a moderating effect on the relationship between individuals' creative potential and creative performance. Namely, the association between the creative potential and creative performance of individuals was the same regardless of their openness to experience levels. Moreover, the present study showed that there was a strong positive association between openness to experience and creativity, which has been consistently found in previous studies (e.g., Batey, Chamorro-Premuzic, & Furnham, 2010; Dollinger, Urban, & James, 2004; Furnham, Crump, & Swami, 2009; Furnham, Zhang, & Chamorro-Premuzic, 2005; Ivcevic & Mayer, 2009; Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe, & Riggs, 2009; Kelly, 2006; King, Walker, & Broyles, 1996; Soldz & Vaillant, 1999; Sung & Choi, 2009; Wolfradt & Pretz, 2001). Furthermore, the results of this study also supported previous research finding that openness to experience was one of the strongest positive predictors of creativity (e.g., Dollinger, Urban, & James, 2004; Furnham & Bachtiar, 2008; Furnham, Crump, & Swami, 2009; Furnham, Zhang, & Chamorro-Premuzic, 2005; Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe, & Riggs, 2009; Kelly, 2006).

In considering the strong positive relationship between openness to experience and creativity reported in earlier studies, it might be useful to note whether those studies employed creative potential measures or creative performance measures in order to assess the creativity of individuals. For instance, while Batey, Chamorro-Premuzic and Furnham (2010), Ivcevic and Mayer (2009), Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe and Riggs (2009), Kelly (2006), Soldz and Vaillant (1999), Sung and Choi (2009), and Wolfradt and Pretz (2001) used creative performance measures to assess individuals' creativity, Furnham, Crump and Swami (2009), and Furnham, Zhang and Chamorro-Premuzic (2005) employed creative potential measures for the same purpose. Dollinger, Urban and James (2004), King, Walker and Broyles (1996), and Furnham, Batey, Anand and Manfield (2008), however, used both creative potential measures and creative performance measures when assessing the creativity of individuals. Regardless, previous studies have consistently found openness to experience to be strongly and positively associated with creativity in a variety of samples including university students (e.g., Batey, Chamorro-Premuzic, & Furnham, 2010; Dollinger, Urban, & James, 2004; Furnham, Zhang, & Chamorro-Premuzic, 2005; Ivcevic & Mayer, 2009; Kelly, 2006; King, Walker, & Broyles, 1996; Sung & Choi, 2009; Wolfradt & Pretz, 2001), secondary school students (e.g., Furnham, Batey, Anand, & Manfield, 2008), and adults (e.g., Furnham, Crump, & Swami, 2009; Kaufman, Waterstreet, Ailabouni, Whitcomb, Roe, & Riggs, 2009; Soldz & Vaillant, 1999), which was also supported by the findings of the current study.

In addition to the moderating effects of extroversion, agreeableness, conscientiousness, neuroticism and openness to experience on the relationship between individuals' creative potential and creative performance, the present study also examined the moderating effects of rational/experiential cognitive style, positive/negative affect, and attitudes and values on the

association between the creative potential and creative performance of individuals. As with the majority of the personality factors discussed above, the results of this study showed that rational/experiential cognitive style did not have a moderating effect on the relationship between individuals' creative potential and creative performance. In other words, the creative potential of individuals was uniformly associated with their creative performance, regardless of whether they had a rational or experiential cognitive style. Moreover, contrary to very limited previous research reporting that creativity was not related to rational or experiential cognitive style (e.g., Dane, Baer, Pratt, & Oldham, 2011), the current study revealed that creativity was positively associated with both rational and experiential cognitive styles.

A closer look at whether creative potential measures or creative performance measures were used in the previous and current research when assessing the creativity of individuals might be helpful in considering the differing results reported in those studies. In this regard, while Dane, Baer, Pratt and Oldham (2011) assessed individuals' creativity using creative potential measures, the present study employed both creative potential measures and creative performance measures in assessing the creativity of individuals. Even though both studies were conducted with a sample of university students, inconsistent results were found with regard to the relationship between rational/experiential cognitive style and creativity. That is, although Dane et al. reported that neither rational cognitive style nor experiential cognitive style was associated with creative potential, the findings of the current study revealed that while rational cognitive style was positively related to both creative potential and creative performance, experiential cognitive style was positively associated with creative performance but not with creative potential. Consequently, the inconsistencies among the findings of the previous and current research as well as the lack of moderating effect reported in this study suggest that much more

research should be carried out to better understand the actual effect of rational/experiential cognitive style on creativity.

As for the moderating effect of positive/negative affect on the relationship between the creative potential and creative performance of individuals, similar results were reported in the present study. That is, the findings of this study indicated that positive/negative affect did not have a moderating effect on the relationship between individuals' creative potential and creative performance, suggesting that the association between the creative potential and creative performance of individuals was the same, regardless of whether they experienced positive or negative affect. Additionally, consistent with very limited earlier research (e.g., George & Zhou, 2007), this study showed that there was a positive relationship between positive affect and creativity.

Here, it might be important to note whether the earlier and current research employed creative potential measures or creative performance measures in assessing the creativity of individuals. In this respect, whereas George and Zhou (2007) used creative performance measures in order to assess individuals' creativity, the current study employed both creative potential measures and creative performance measures for the same purpose. Also, George and Zhou used a sample consisting of adults whereas the current study had a sample of university students. As a result, while George and Zhou reported that there was a positive association between positive affect and creative performance and that no significant relationship existed between negative affect and creative performance, the results of the present study showed that while positive affect was positively related to both creative potential and creative performance, negative affect was negatively associated with creative potential but not with creative performance. Thus, despite the consistency among the findings of these studies, the paucity of

relevant research in the literature as well as the lack of moderating effect found in the present research suggests that many more studies are needed to determine the actual impact of positive/negative affect on creativity.

Last but not least, besides extroversion, agreeableness, conscientiousness, neuroticism, openness to experience, rational/experiential cognitive style and positive/negative affect, the current study also involved attitudes and values, and examined their moderating effect on the association between individuals' creative potential and creative performance. Similar to the findings reported for the majority of these factors, the results of the present study revealed that attitudes and values did not have a moderating effect on the relationship between the creative potential and creative performance of individuals. That is to say, the creative potential of individuals was uniformly associated with their creative performance, irrespective of their attitudes and values. Moreover, the findings of this study also suggested that attitudes and values were positively related to creativity, which was in line with the results reported in previous studies (e.g., Taft & Gilchrist, 1970; Williams, 2004).

Again, it might be worth taking a closer look at whether those studies used creative potential measures or creative performance measures in assessing the creativity of individuals. In this respect, while Taft and Gilchrist (1970) employed creative performance measures in order to assess individuals' creativity, the Williams (2004) and the present study used both creative potential measures and creative performance measures when assessing the creativity of individuals. Additionally, whereas Williams had a sample consisting of adults, the current and the Taft and Gilchrist study used a sample of university students. Regardless, these studies have reported attitudes and values to be positively associated with creativity. Overall, however, the obvious lack of earlier research in the literature as well as the lack of moderating effects found in

this study warrants further research on the actual influences of rational/experiential cognitive style, positive/negative affect, and attitudes and values on individuals' creativity.

Limitations

As with all studies, this study has some limitations that should be noted. One limitation concerns the activity check list used in measuring the creative performance of participants. As discussed above, given that the majority of participants in this study were middle-aged individuals pursuing graduate degrees and that they might also be full-time working individuals whose creative activities and achievements might be pertinent to their professional roles, the use of an activity check list that did not involve such creative activities and achievements might not have provided an accurate assessment of their creative performance. Similarly, given the possibility that the majority of participants might be full-time working individuals whose creative activities and achievements might be demonstrated in ways that were pertinent to their professional roles, another limitation may concern the use of self-report scales in assessing their creative performance. Thus, the use of creative performance evaluations in which participants would be assessed by their supervisors might have allowed for a more objective and accurate assessment of the participants' creative performance (e.g., Oldham & Cummings, 1996; Tierney & Farmer, 2002). Additionally, the cross-sectional nature of the current study should be noted as it might limit the generalizability of the study findings. In this regard, no inferences of causality can be conclusively made based on the results. Likewise, statistical assumptions should also be considered in terms of the generalizability of the study findings. Moreover, it should be kept in mind that the sample of the current study consisted predominantly of middle-aged individuals pursuing graduate degrees. Therefore, the generalizability of the present findings to younger or

older individuals should be considered with caution. Furthermore, it might be worthwhile to replicate the current study with paper-and-pencil data collection in order to determine whether there would be any differences in findings for such reasons as administering measures in a group setting or removing all time constraints on divergent thinking measures. Finally, it should also be noted that the absence of previous research on the same topic prevented the comparison of findings across studies.

Future Research

The present study suggests several avenues for future research. For instance, in line with the rationale of this study, more research is needed to identify the factors that might have a moderating effect on the relationship between individuals' creative potential and creative performance. For this reason, future studies could first address the limitations discussed above and then investigate the moderating effects of extroversion, agreeableness, conscientiousness, neuroticism, openness to experience, rational/experiential cognitive style, positive/negative affect, and attitudes and values in a variety of samples. Likewise, future research could also focus on other potential moderating factors and explore whether those factors actually have a moderating effect on the relationship between individuals' creative potential and creative performance. Moreover, future studies could use longitudinal research designs and investigate longitudinally how the moderating effects of various factors, including those examined in the current study, on the association between the creative potential and creative performance of individuals would change over time. Lastly, future research could also involve a cross-cultural framework in examining the moderating effects of various cognitive, affective and personality factors on the relationship between individuals' creative potential and creative performance in

order to determine whether the moderating effects of those factors would vary from culture to culture.

Conclusion

In conclusion, this study contributes to the literature by examining the moderating effects of certain affective, cognitive and personality factors on the relationship between individuals' creative potential and creative performance. The results of this study suggest the importance of focusing on potential moderating factors in exploring the association between the creative potential and creative performance of individuals as identifying the ones that would actually moderate this association could be considerably helpful in understanding why some individuals might be more able to translate their creative potential into creative performance than others. Such an understanding could greatly help to stimulate the realization of creative potential in individuals of all ages, which is more important than ever in an era where creativity has been regarded as one of the most sought-after abilities (Isen, 1999; Leung, Kim, Polman, Ong, Qiu, Goncalo, & Sanchez-Burks, 2012; Mumford, Scott, Gaddis, & Strange, 2002; Runco, 2003).

REFERENCES

Abernathy-Tannehill, R. L. (1998). An analysis of selected creativity tests administered to students affiliated with the Cherokee tribe. *Dissertation Abstracts International*, *58*(7-A), 2526.

Aguilar-Alonso, A. (1996). Personality and creativity. *Personality and Individual Differences, 21,* 959-969.

Aiken, L. S., & West, S. G. (1991). *Multiple regression: Testing and interpreting interactions*. Newbury Park, CA: Sage.

Albert, R. S. (1971). Cognitive development and parental loss among the gifted, the exceptionally gifted, and the creative. *Psychological Reports, 29,* 15-26.

Albert, R. S. (1978). Observations and suggestions regarding giftedness, familial influence and the achievement of eminence. *Gifted Child Quarterly, 22,* 201‑211.

Albert, R. S. (1980). Family position and the attainment of eminence: A study of special family positions and special family experiences. *Gifted Child Quarterly, 24,* 87‑95.

Albert, R. S. (1991). People, processes, and developmental paths to eminence: A developmental‑interactional model. In R. M. Milgram (Ed.), *Counseling gifted and talented children* (pp. 75‑93). Norwood, NJ: Ablex.

Baer, M., Oldham, G. R., & Cummings, A. (2003). Rewarding creativity: When does it really matter? *The Leadership Quarterly, 14,* 569–586.

Barbaranelli, C., Caprara, G. V., Rabasca, A., & Pastorelli, C. (2003). A questionnaire for measuring the Big Five in late childhood. *Personality and Individual Differences, 34*, 645-664.

Baron, R. M., & Kenny, D. A. (1986). The moderator - mediator variable distinction in social psychological research: Conceptual, strategic, and statistical considerations. *Journal of Personality and Social Psychology, 51,* 1173-1182.

Barron, F. (1955). The disposition toward originality. *Journal of Abnormal and Social Psychology, 51*, 478–485.

Barron, F. (1963). *Creativity and psychological health.* New York, NY: Van Nostrand.

Barron, F. (1965). The psychology of creativity. In TM Newcomb, *New directions in psychology II* (pp. 1-134). New York, NY: Holt, Rinehart, & Winston.

Barron, F., & Welsh, G. S. (1952). Artistic perception as a possible factor in personality style: Its measurement by a figure preference test. *Journal of Psychology, 33*, 199-203.

Basadur, M., & Finkbeiner, C. T. (1985). Measuring preference for ideation in creative problem-solving training. *Journal of Applied Behavioral Science, 21,* 37–49.

Basadur, M., & Hausdorf, P. A. (1996). Measuring divergent thinking attitudes related to creative problem solving and innovation management. *Creativity Research Journal, 9,* 21-32.

Batey, M. (2007). A psychometric investigation of everyday creativity. *Unpublished Doctoral Thesis.* University of London.

Batey, M., Chamorro-Premuzic, T., & Furnham, A. (2010). Individual differences in ideational behavior: Can the Big Five and psychometric intelligence predict creativity scores? *Creativity Research Journal, 22,* 90-97.

Benet-Martinez, V., & John, O. P. (1998). Los cinco grandes across cultures and ethnic groups: Multitrait multimethod analyses of the Big Five in Spanish and English. *Journal of Personality and Social Psychology, 75,* 729-750.

Berger, R. M., & Guilford, J. P. (1969). *Plot titles.* Beverly Hills, CA: Sheridan Psychological Services.

Besemer, S. P., & Treffinger, D. J. (1981). Analysis of creative products: Review and synthesis. *Journal of Creative Behavior, 15,* 158-178.

Brooks, J. B. (1973). Familial antecedents and adult correlates of artistic interests in childhood. *Journal of Personality, 41,* 110-120.

Brophy, D. R. (2001). Comparing the attributes, activities, and performance of divergent, convergent, and combination thinkers. *Creativity Research Journal, 13,* 439-455.

Caroli, M. E., & Sagone, E. (2009). Creative thinking and Big Five factors of personality measured in Italian school children. *Psychological Reports, 105,* 791-803.

Carson, S., Peterson, J. B., & Higgins, D. M. (2005). Reliability, validity, and factor structure of the creative achievement questionnaire. *Creativity Research Journal, 17,* 37-50.

Carson, D. K., & Runco, M. A. (1999). Creative problem solving and problem finding in young adults: Interconnections with stress, hassles, and coping abilities. *The Journal of Creative Behavior, 33,* 167-188.

Chand, I., & Runco, M. A. (1993). Problem finding skills as components in the creative process. *Personality and Individual Differences, 14,* 155–162.

Chase, C. I. (1985). Review of the Torrance Tests of Creative Thinking. In J. V. Mitchell Jr. (Ed.), *The ninth mental measurements yearbook* (pp. 1631–1632). Lincoln, NE: University of Nebraska

Cheung, P. C., Lau, S., Chan, D. W., & Wu, W. Y. H. (2004). Creative potential of school children in Hong Kong: Norms of the Wallach-Kogan creativity tests and their implications. *Creativity Research Journal, 16,* 69-78.

Christensen, P. R., Guilford, J. P., Merrifield, P. R., & Wilson, R. C. (1960). *Alternate uses:* Beverly Hills, CA: Sheridan Psychological Services.

Christensen, P. R., Merrifield, P. R., & Guilford, J. P. (1953). *Consequences Form A-1*. Beverly Hills, CA: Sheridan Supply.

Christensen, P. R., Merrifield, P. R., & Guilford, J. P. (1958). *Consequences.* Beverly Hills, CA: Sheridan Psychological Services.

Cohen, J., Cohen, P., West, S. G., & Aiken, L. S. (2003). *Applied multiple regression/correlation analysis for the behavioral sciences* (3rd ed.). Hillsdale, NJ: Erlbaum.

Cohen, J. R. & Ferrari, J. R. (2010). Take some time to think this over: The relation between rumination, indecision, and creativity. *Creativity Research Journal, 22*, 68–73.

Colbert, A. E., Mount, M. K., Harter, J. K., Witt, L. A., & Barrick, M. R. (2004). Interactive effects of personality and perceptions of the work situation on workplace deviance. *Journal of Applied Psychology, 89*, 599-609.

Costa, P. T., & McCrae, R. R. (1985). *The NEO Personality Inventory Manual.* Odessa, FL: Psychological Assessment Resources.

Costa, P. T., & McCrae, R. R. (1992). *NEO PI-R Professional Manual*. Odessa, FL: Psychological Assessment Resources.

Costa, P. T., & McCrae, R. R. (1992). *Revised NEO Personality Inventory (NEO PI-R) and NEO Five-Factor Inventory (NEO-FFI) Professional Manual.* Odessa, FL: Psychological Assessment Resources.

Cramond, B., Matthews-Morgan, J., Bandalos, D., & Zuo, L. (2005). A report on the 40-year follow-up of the Torrance Tests of Creative Thinking: Alive and well in the new millennium. *Gifted Child Quarterly, 49,* 283-291.

Dane, E., Baer, M., Pratt, M. G., & Oldham, G. R. (2011). Rational versus intuitive problem solving: How thinking "off the beaten path" can stimulate creativity. *Psychology of Aesthetics, Creativity, and the Arts, 5,* 3-12.

Davis, G. (1999). Barriers to creativity and creative attitudes. In M. A. Runco & S. Pritzker (Eds.), *Encyclopedia of creativity* (pp. 165-174). San Diego, CA: Academic Press.

Denollet, J., & Vries, J. D. (2006). Positive and negative affect within the realm of depression, stress and fatigue: The two-factor distress model of the Global Mood Scale (GMS). *Journal of Affective Disorders, 91,* 171–180.

De Vet, A. J., & De Dreu, C. K. (2007). The influence of articulation, self-monitoring ability, and sensitivity to others on creativity. *European Journal of Social Psychology, 37,* 747-760.

Dewing, K., & Taft, R. (1973). Some characteristics of the parents of creative twelve-year-olds. *Journal of Personality, 41,* 71–85.

Digman, J. M. (1990). Personality structure: Emergence of the Five-Factor model. *Annual Review of Psychology, 41,* 417-440.

Dixon, J. (1979). Quality versus quantity: The need to control for the fluency factor in originality scores from the Torrance Tests. *Journal for the Education of the Gifted, 2,* 70–79.

Dollinger, S. J., Burke, P. A., & Gump, N. W. (2007). Creativity and values. *Creativity Research Journal, 19,* 91-103.

Dollinger, S. J., Urban, K. K., & James, T. A. (2004). Creativity and openness: Further validation of two creative product measures. *Creativity Research Journal, 16,* 35-47.

Domino, G. (1970). Identification of potentially creative persons from the Adjective Check List. *Journal of Consulting and Clinical Psychology, 35,* 48-51.

Epstein, R., Schmidt, S. M., & Warfel, R. (2008). Measuring and training creativity competencies: Validation of a new test. *Creativity Research Journal, 20,* 7-12.

Eubanks, D. L., Murphy, S. T., & Mumford, M. D. (2010). Intuition as an influence on creative problem-solving: The effects of intuition, positive affect and training. *Creativity Research Journal, 22*, 170-184.

Feist, G. J. (1998). A meta-analysis of personality in scientific and artistic creativity. *Personality and Social Psychology Review, 4,* 290-309.

Forgeard, M. J. (2013). Perceiving benefits after adversity: The relationship between self-reported posttraumatic growth and creativity. *Psychology of Aesthetics, Creativity, and the Arts, 7,* 245–264.

Friedman, R. S., Forster, J., & Denzler, M. (2007). Interactive effects of mood and task framing on creative generation. *Creativity Research Journal, 19,* 141-162.

Furnham, A. (1999). Personality and creativity. *Perceptual and Motor Skills, 88,* 407–408.

Furnham, A., & Bachtiar, V. (2008). Personality and intelligence as predictors of creativity. *Personality and Individual Differences, 45,* 613-617.

Furnham, A., Batey, M., Anand, K., & Manfield, J. (2008). Personality, hypomania, intelligence and creativity. *Personality and Individual Differences, 44,* 1060-1069.

Furnham, A. F., & Chamorro-Premuzic, T. (2004). Personality, intelligence, and art. *Personality and Individual Differences, 36,* 705-715.

Furnham, A., Crump, J., & Swami, V. (2009). Abstract reasoning and Big Five personality correlates of creativity in a British occupational sample. *Imagination, Cognition and Personality, 28,* 361-370.

Furnham, A., Zhang, J., & Chamorro-Premuzic, T. (2005). The relationship between psychometric and self-estimated intelligence, creativity, personality and academic achievement. *Imagination, Cognition and Personality, 25,* 119-145.

Gasper, K. (2004). Permission to seek freely? The effect of happy and sad moods on generating old and new ideas. *Creativity Research Journal, 16,* 215-229.

Gelade, G. A. (2002). Creative style, personality, and artistic endeavor. *Genetic, Social, and General Psychology Monographs, 128,* 213-234.

George, J. M., & Zhou, J. (2001). When openness to experience and conscientiousness are related to creative behavior: An interactional approach. *Journal of Applied Psychology, 86,* 513-524.

George, J. M., & Zhou, J. (2007). Dual tuning in a supportive context: Joint contributions of positive mood, negative mood, and supervisory behaviors to employee creativity. *Academy of Management Journal, 50,* 605-622.

Golann, S. E. (1962). The creativity motive. *Journal of Personality, 30,* 588-600.

Goldberg, L. R. (1990). An alternative description of personality: The Big Five factor structure. *Journal of Personality and Social Psychology, 59,* 1216-1229.

Goldberg, L. R. (1992). The development of markers for the Big-Five factor structure. *Personality Assessment, 4,* 26-42.

Goldberg, L. R. (1999). A broad-bandwidth, public domain, personality inventory measuring the lower-level facets of several Five-Factor models. In I. Mervielde, I. Deary, F. De Fruyt,

& F. Ostendorf (Eds.), *Personality Psychology in Europe* (pp. 7-28). Tilburg, Netherlands: Tilburg University Press.

Gough, H. (1979). A creative personality scale for the Adjective Check List. *Journal of Personality and Social Psychology, 37,* 1398-1407.

Gough, H. G. (1992). Assessment of creative potential in psychology and the development of a creative temperament scale for the CPI. In J. C. Rosen & P. McReynolds (Eds.), *Advances in psychological assessment,* (pp. 225–257). New York, NY: Plenum.

Gough, H. G., & Bradley, P. (1996). *California Psychological Inventory Manual*. Palo Alto, CA: Consulting Psychologists Press.

Gough, H. G., & Heilbrun, A. B. (1965). *The Adjective Check List Manual*. Palo Alto, CA: Consulting Psychologists Press.

Gough, H. G., & Heilbrun, A.B. (1983). *The Adjective Check List Manual.* Palo Alto, CA: Consulting Psychologists Press.

Granello, D. H. & Wheaton, J. E. (2004). Online data collection: Strategies for research. *Journal of Counseling and Development, 82,* 387-393.

Green, M. J., & Williams, L. M. (1999). Schizotypy and creativity as effects of reduced cognitive inhibition. *Personality and Individual Differences, 27,* 263-276.

Guilford, J. P. (1967). *The nature of human intelligence.* New York, NY: McGraw-Hill.

Guilford, J. P. (1968). *Creativity, intelligence, and their educational implications*. San Diego, CA: Robert Knapp/EDITS.

Harrington, D. M., Block, J., & Block, J. H. (1983). Predicting creativity in preadolescence from divergent thinking in early childhood. *Journal of Personality and Social Psychology, 45,* 609.

Hathaway, S. R., & McKinley, J. C. (1943). *Manual for the Minnesota Multiphasic Personality Inventory.* New York, NY: The Psychological Corporation.

Helson, R. (1966). Personality of women with imaginative and artistic interests: The role of masculinity, originality and other characteristics in their creativity. *Journal of Personality, 34,* 1–25.

Helson, R. (1999). A longitudinal study of creative personality in women. *Creativity Research Journal, 12,* 89-101.

Helson, R., & Pals, J. L. (2000). Creative potential, creative achievement and personal growth. *Journal of Personality, 68,* 1-27.

Helson, R., Roberts, B.W., & Agronick, G. (1995). Enduringness and change in creative personality and the prediction of occupational creativity. *Journal of Personality and Social Psychology, 69,* 1173–1183.

Henderson, S. J. (2004). Product inventors and creativity: The finer dimensions of enjoyment. *Creativity Research Journal, 16,* 293-312

Herrmann, N. (1989). *The creative brain*. Lake Lure, NC: Brain Books.

Hocevar, D. (1979). The development of the creative behavior inventory (CBI). Paper presented at the 1979 conference of the Rocky Mountain Psychological Association, Las Vegas, NV.

Hocevar, D. (1980). Intelligence, divergent thinking, and creativity. *Intelligence, 4,* 25-40.

Hocevar, D. (1981). Measurement of creativity: Review and critique. *Journal of Personality Assessment, 45,* 450-464.

Hogan, R., & Hogan, J. (1995). *Hogan Personality Inventory Manual.* Tulsa, OK: Hogan Assessment Systems.

Holland, J. L. (1961). Creative and academic performance among talented adolescents. *Journal of Educational Psychology, 52,* 136-147.

Isen, A. M. (1999). On the relationship between affect and creative problem solving. In S. W. Russ (Ed.), *Affect, creative experience and psychological adjustment* (pp. 3–17). Philadelphia, PA: Taylor & Francis.

Ivcevic, Z., & Mayer, J. D. (2009). Mapping dimensions of creativity in the life-space. *Creativity Research Journal, 21,* 152-165.

John, O. P., Donahue, E. M., & Kentle, R. L. (1991). *The Big Five Inventory - Versions 4a and 4b.* Berkeley, CA: Institute of Personality and Social Research, University of California.

John, O. P., & Srivastava, S. (1999). The Big-Five trait taxonomy: History, measurement, and theoretical perspectives. In L. Pervin & O. P. John (Eds.), *Handbook of personality: Theory and research* (pp. 102-138). New York: Guilford Press.

Kasof, J., Chen, C., Himsel, A., & Greenberger, E. (2007). Values and creativity. *Creativity Research Journal, 19,* 105-122.

Kaufman, J. C. (2006). Self-reported differences in creativity by gender and ethnicity. *Journal of Applied Cognitive Psychology, 20,* 1065-1082.

Kaufman, J. C., & Baer, J. (2004). Sure, I'm creative - but not in mathematics!: Self-reported creativity in diverse domains. *Empirical Studies of the Arts, 22,* 143-155.

Kaufman, J. C., Baer, J., Cole, J. C., & Sexton, J. D. (2008). A comparison of expert and nonexpert raters using the consensual assessment technique. *Creativity Research Journal, 20,* 171-178.

Kaufman, J. C., Cole, J. C., & Baer, J. (2009). The construct of creativity: A structural model for self-reported creativity ratings. *Journal of Creative Behavior, 43,* 119-134.

Kaufman, J. C., Waterstreet, M. A., Ailabouni, H. S., Whitcomb, H. J., Roe, A. K., & Riggs, M. (2009). Personality and self-perceptions of creativity across domains. *Imagination, Cognition and Personality, 29,* 193-209.

Kelly, K. E. (2004). A brief measure of creativity among college students. *College Student Journal, 38,* 594-596.

Kelly, K. E. (2006). Relationship between the Five-Factor model of personality and the scale of creative attributes and behavior: A validational study. *Individual Differences Research, 4,* 299-305.

Kim, K. H. (2006). Is creativity unidimensional or multidimensional? Analyses of the Torrance Tests of Creative Thinking. *Creativity Research Journal, 18,* 251-259.

Kim, K. H., Cramond, B., & Bandalos, D. L. (2006). The latent structure and measurement invariance of scores on the Torrance Tests of Creative Thinking–Figural. *Educational and Psychological Measurement, 66,* 459-477.

King, L. A., Walker, L., & Broyles, S. J. (1996). Creativity and the Five-Factor model. *Journal of Research in Personality, 30,* 189-203.

Kirton, M. (1976). Adaptors and innovators: A description and measure. *Journal of Applied Psychology, 61,* 622–629.

Kirton, M. J. (1987). *Kirton Adaption-Innovation Inventory Manual*. Hatfield, UK:Occupational Research Center.

Lefever, S., Dal, M., & Matthiasdottir, A. (2007). Online data collection in academic research: Advantages and limitations. *British Journal of Educational Technology, 38,* 574-582.

Leung, A. K. Y., Kim, S., Polman, E., Ong, L. S., Qiu, L., Goncalo, J. A., & Sanchez-Burks, J. (2012). Embodied metaphors and creative "acts". *Psychological Science, 23,* 502-509.

MacLaren, V. V., Fugelsang, J. A., Harrigan, K. A., & Dixon, M. J. (2012). Effects of impulsivity, reinforcement sensitivity, and cognitive style on pathological gambling symptoms among frequent slot machine players. *Personality and Individual Differences, 52,* 390–394.

Martindale, C., & Dailey, A. (1996). Creativity: Primary process cognition and personality. *Personality and Individual Differences, 20,* 409-414.

Meneely, J., & Portillo, M. (2005). The adaptable mind in design: Relating personality, cognitive style, and creative performance. *Creativity Research Journal, 17,* 155-166.

Milgram, R. M., & Milgram, N. A. (1976). Creative thinking and creative performance in Israeli students. *Journal of Educational Psychology, 68,* 255-259.

Mount, M. K., & Barrick, M. R. (1995). The Big Five personality dimensions: Implications for theory and practice in human resource management. *Research in Personnel and Human Resource Management, 13,* 153-200.

Mumford, M. D., Scott, G. M., Gaddis, B., & Strange, J. M. (2002). Leading creative people: Orchestrating expertise and relationships. *The Leadership Quarterly, 13,* 705-750.

Myers, I. B., & McCaulley, M. H. (1985). *Manual: A guide to the development and use of the Myers–Briggs Type Indicator*. Palo Alto, CA: Consulting Psychologists Press.

Noftle, E. E., & Robins, R. W. (2007). Personality predictors of academic outcomes: Big five correlates of GPA and SAT scores. *Journal of Personality and Social Psychology, 93,* 116–130.

Ntoumanis, N., & Biddle, S. J. H. (1998). The relationship of coping and its perceived effectiveness to positive and negative affect in sport. *Personality and Individual Differences, 24,* 773-788.

O'Hara, L. A., & Sternberg, R. J. (2001). It doesn't hurt to ask: Effects of instructions to be creative, practical, or analytical on essay-writing performance and their interaction with students' thinking styles. *Creativity Research Journal, 13,* 197-210.

Okuda, S. M., Runco, M. A., & Berger, D. E. (1991). Creativity and the finding and solving of real-world problems. *Journal of Psychoeducational Assessment, 9,* 45-53.

Oldham, G. R., & Cummings, A. (1996). Employee creativity: Personal and contextual factors at work. *Academy of Management Journal, 39,* 607-634.

Pacini, R., & Epstein, S. (1999). The relation of rational and experiential information processing styles to personality, basic beliefs, and ratio-bias phenomenon. *Journal of Personality and Social Psychology, 76,* 972–987.

Plucker, J. A., Runco, M. A., & Lim, W. (2006). Predicting ideational behavior from divergent thinking and discretionary time on task. *Creativity Research Journal, 18,* 55-63.

Pretz, J. E. & Totz, K. S. (2007). Measuring individual differences in affective, heuristic, and holistic intuition. *Personality and Individual Differences, 43,* 1247–1257.

Puccio, G. J., Treffinger, D. J., & Talbot, R. J. (1995). Exploratory examination of relationships between creativity styles and creative products. *Creativity Research Journal, 8,* 157-172.

Raja, U., & Johns, G. (2004). The impact of personality on psychological contracts. *Academy of Management Journal, 47,* 350-367.

Rhodes, R. E., Courneya, K. S., & Jones, L. W. (2005). The theory of planned behavior and lower-order personality traits: Interaction effects in the exercise domain. *Personality and Individual Differences, 38,* 251-265.

Roccas, S., Sagiv, L., Schwartz, S. H., & Knafo, A. (2002). The Big Five personality factors and personal values. *Personality and Social Psychology Bulletin, 28,* 789-801.

Runco, M. A. (1986). Predicting children's creative performance. *Psychological Reports, 59,* 1247-1254.

Runco, M. A. (1987). The generality of creative performance in gifted and nongifted children. *Gifted Child Quarterly, 31,* 121-125.

Runco, M. A. (1991). *Divergent thinking.* Norwood, NJ: Ablex Publishing.

Runco, M. A. (2003). Education for creative potential. *Scandinavian Journal of Educational Research, 47,* 317-324.

Runco, M. A. (2007a). A hierarchical framework for the study of creativity. *New Horizons in Education, 55,* 1-9.

Runco, M. A. (2007b). *Creativity: Theories and themes: Research, development, and practice.* San Diego, CA: Academic Press.

Runco, M. A. (2008a). Commentary: Divergent thinking is not synonymous with creativity. *Psychology of Aesthetics, Creativity, and the Arts, 2,* 93-96.

Runco, M. A. (2008b). Creativity and education. *New Horizons in Education, 56,* 96-104.

Runco, M. A. (2009). Simplifying theories of creativity and revisiting the criterion problem: A comment on Simonton's hierarchical model of domain-specific disposition, development, and achievement. *Perspectives on Psychological Science, 4,* 462-465.

Runco, M. A. (2011). *The Instances and Realistic Divergent Thinking Tests.* Unpublished instrument, University of Georgia, Athens, GA.

Runco, M. A. (2011). *The Runco Activity Check List.* Unpublished instrument, University of Georgia, Athens, GA.

Runco, M. A. (2012). *Creative ideas and divergent thinking.* Cresskill, NJ: Hampton Press.

Runco, M. A. (2012). *The Runco Attitudes and Values Scale.* Unpublished instrument, University of Georgia, Athens, GA.

Runco, M. A. (2012). *The Self-Rating of Creative Performance Scale.* Unpublished instrument, University of Georgia, Athens, GA.

Runco, M. A. & Acar, S. (2012). Divergent thinking as an indicator of creative potential. *Creativity Research Journal, 24,* 66-75.

Runco, M. A., & Charles, R. E. (1993). Judgments of originality and appropriateness as predictors of creativity. *Personality and Individual Differences, 15,* 537-546.

Runco, M. A., Dow, G., & Smith, W. R. (2006). Information, experience, and divergent thinking: An empirical test. *Creativity Research Journal, 18,* 269-277.

Runco, M. A., Illies, J. J., & Eisenman, R. (2005). Creativity, originality, and appropriateness: What do explicit instructions tell us about their relationships?. *The Journal of Creative Behavior, 39,* 137-148.

Runco, M. A., & Jaeger, G. J. (2012). The standard definition of creativity. *Creativity Research Journal, 24,* 92-96.

Runco, M. A., Millar, G., Acar, S., & Cramond, B. (2010). Torrance Tests of Creative Thinking as predictors of personal and public achievement: A fifty-year follow-up. *Creativity Research Journal, 22,* 361-368.

Runco, M. A., & Okuda, S. M. (1991). The instructional enhancement of the flexibility and originality scores of divergent thinking tests. *Applied Cognitive Psychology, 5,* 435-441.

Runco, M. A., Plucker, J., & Lim, W. (2001). Development and psychometric integrity of a measure of ideational behavior. *Creativity Research Journal, 13,* 393–400.

Saucier, G. (1994). Mini-Markers: A brief version of Goldberg's unipolar Big-Five markers. *Journal of Personality Assessment, 63,* 506-516.

Schwartz, S. H. (1992). Universals in the content and structure of values: Theoretical advances and empirical tests in 20 countries. In M. P. Zanna (Ed.), *Advances in Experimental Social Psychology* (Vol. 25, pp. 1–26). San Diego, CA: Academic Press.

Schwartz, S. (1994). Are there universal aspects in the structure and contents of human values? *Journal of Social Issues, 50,* 19–45.

Silvia, P. J., Winterstein, B. P., & Willse, J. T. (2008). Rejoinder: The madness to our method: Some thoughts on divergent thinking. *Psychology of Aesthetics, Creativity, and the Arts, 2,* 109–114

Simmons, A. L. & Ren, R. (2009). The influence of goal orientation and risk on creativity. *Creativity Research Journal, 21,* 400-408.

Soldz, S., & Vaillant, G. E. (1999). The Big Five personality traits and the life course: A 45-year longitudinal study. *Journal of Research in Personality, 33,* 208-232.

Speller, K. G., & Schumacher, G. M. (1975). Age and set in creative test performance. *Psychological Reports*, *36*, 447-450.

Stavridou, A., & Furnham, A. (1996). The relationship between psychoticism, trait-creativity and the attentional mechanism of cognitive inhibition. *Personality and Individual Differences, 21*, 143-153.

Sternberg, R. J., &Wagner, R. K. (1991). *MSG thinking styles inventory manual.* Unpublished manuscript.

Stumm, S. V., Chung, A., & Furnham, A. (2011). Creative ability, creative ideation and latent classes of creative achievement: What is the role of personality? *Psychology of Aesthetics, Creativity, and the Arts, 5,* 107-114.

Sung, S. Y., & Choi, J. N. (2009). Do Big Five personality factors affect individual creativity? The moderating role of extrinsic motivation. *Social Behavior and Personality, 37,* 941-956.

Taft, R., & Gilchrist, M. B. (1970). Creative attitudes and creative productivity: A comparison of two aspects of creativity among students. *Journal of Educational Psychology, 61,* 136-143.

Taylor, A., & MacDonald, D. A. (1999). Religion and the Five-Factor model of personality: An exploratory investigation using a Canadian university sample. *Personality and Individual Differences, 27,* 1243-1259.

Tierney, P., & Farmer, S. M. (2002). Creative self-efficacy: Its potential antecedents and relationship to creative performance. *Academy of Management Journal, 45,* 1137-1148.

Tierney, P., Farmer, S. M., & Graen, G. B. (1999). An examination of leadership and employee creativity: The relevance of traits and relationships. *Personnel* Psychology, *52,* 591-620.

Torrance, E. P. (1962). *Guiding creative talent.* Englewood Cliffs, NJ: Prentice-Hall.

Torrance, E. P. (1968). Examples and rationales of test tasks for assessing creative abilities. *Journal of Creative Behavior, 2,* 165–178.

Torrance, E. P. (1969). Prediction of adult creative achievement among high school seniors. *Gifted Child Quarterly, 13,* 223-229.

Torrance, E. P. (1972a). Career patterns and peak creative achievements of creative high school students twelve years later. *Gifted Child Quarterly, 16,* 75-88.

Torrance, E. P. (1972b). Predictive validity of the Torrance Tests of Creative Thinking. *Journal of Creative Behavior, 6,* 236-252.

Torrance, E. P. (1980). Growing up creatively gifted: A 22-year longitudinal study. *Creative Child and Adult Quarterly, 5,* 148-158.

Torrance, E. P. (1981a). Predicting the creativity of elementary school children (1958-80) – And the teacher who "made a difference". *Gifted Child Quarterly, 25,* 55-62.

Torrance, E. P. (1981b). Empirical validation of criterion-referenced indicators of creative ability through a longitudinal study. *Creative Child and Adult Quarterly, 6,* 136-140.

Torrance, E. P. (1990). *Torrance Tests of Creative Thinking: Norms-Technical Manual*. Bensenville, IL: Scholastic Testing Service.

Torrance, E. P. (1995). *Why fly?* Norwood, NJ: Ablex.

Torrance, E. P. (2002). *The manifesto: A guide to developing a creative career.* Westport, CT: Ablex.

Torrance, E. P. (2008). *The Torrance Tests of Creative Thinking: Norms-Technical Manual, Verbal Tests, Forms A and B.* Bensenville, IL: Scholastic Testing Service.

Torrance, E., & Safter, H. T. (1989). The long range predictive validity of the Just Suppose Test. *The Journal of Creative Behavior, 23,* 219-223.

Torrance, E. P., & Safter, H. T. (1999). *Making the creative leap beyond.* Buffalo, NY: Creative Education Foundation Press.

Triandis, H. T. (1989). The self and social behavior in differing cultural contexts. *Psychological Review, 96,* 506–512.

Triandis, H. T. (1994). Culture and social behavior. New York: McGraw-Hill

Urban, K. K., & Jellen, H. G. (1996). *Test for Creative Thinking - Drawing Production Manual.* Frankfurt, Germany: Swets Test Services.

Vernon, P.E. (1960). *Creativity.* New York, NY: Penguin.

Wallach, M. A., & Kogan, N. (1965). *Modes of thinking in young children: A study of the creativity-intelligence distinction.* New York, NY: Holt, Rinehart & Winston.

Wallach, M. A., & Wing, C. (1969). *The talented student: A validation of the creativity-intelligence distinction.* New York, NY: Holt, Rinehart & Winston.

Watson, D., Clark, L. A., & Tellegen, A. (1988). Development and validation of brief measures of positive and negative affect: The PANAS scales. *Journal of Personality and Social Psychology, 54,* 1063–1070.

Welsh, G. S. (1975). *Creativity and intelligence: A personality approach*. Chapel Hill, NC: University of North Carolina Institute for Research in Social Sciences.

Welsh, G. S. (1987). *Manual for the Barron-Welsh Art Scale*. Redwood City, CA: Mind Garden.

Williams, F. E. (1991). *Creativity assessment packet: Test manual*. Austin, TX: PRO-ED.

Williams, F. E. (1994) *Test Della Creatività e Pensiero Divergente*. Trent, Italy: Centro Studi Erickson.

Williams, S. D. (2004). Personality, attitude, and leader influences on divergent thinking and creativity in organizations. *European Journal of Innovation Management, 7,* 187-204.

Winnicott, D. W. (1965). *The maturational processes and the facilitating environment*. London, UK: The Hogarth and the Institute of Psychoanalysis.

Winnicott, D. W. (1971). *Play and reality*. New York, NY: Basic Books.

Wolfradt, U., & Pretz, J. (2001). Individual differences in creativity: Personality, story writing, and hobbies. *European Journal of Personality, 15,* 297–310.

Wuthrich, V., & Bates, T. C. (2001). Schizotypy and latent inhibition: Non-linear linkage between psychometric and cognitive markers. *Personality and Individual Differences, 30,* 783-798.

Wyver, S. R., & Spence, S. H. (1999). Play and divergent problem solving: Evidence supporting a reciprocal relationship. *Early Education and Development, 10*, 419-444.

Zha, P., Walczyk, J. J., Griffith-Ross, D. A., Tobacyk, J. J., & Walczyk, D. F. (2006). The impact of culture and individualism–collectivism on the creative potential and achievement of American and Chinese adults. *Creativity Research Journal, 18,* 355-366.

Zhang, L., & Huang, J. (2001). Thinking styles and the Five-Factor model of personality. *European Journal of Personality, 15,* 465-476.

Zhao, H., & Seibert, S. E. (2006). The Big Five personality dimensions and entrepreneurial status: A meta-analytical review. *Journal of Applied Psychology, 91*, 259-271.

Zhou, J., & George, J. M. (2001). When job dissatisfaction leads to creativity: Encouraging the expression of voice. *Academy of Management Journal, 44,* 682–696.

Zimmerman, W. S., & Guilford, J. S. (1963). *The Zimmerman-Guilford Interest Inventory.* Beverly Hills, CA: Sheridan.