

# Predicting Creativity: Interactive Effects of Openness to Experience and Emotion Regulation Ability

Zorana Ivcevic and Marc A. Brackett  
Yale University

The creative process is replete with emotion—from curiosity about a new undertaking to frustration at dead ends to the joys of a completed product—and these emotions have to be regulated to support creative behavior. The present study examined links between openness to experience (personality disposition for creativity), emotion regulation ability, and peer-nominated creativity among high school students. We hypothesized a significant emotion regulation ability by openness interaction, such that emotion regulation ability would predict creativity only in individuals relatively high in openness. Furthermore, we hypothesized that the link between emotion regulation ability and openness would be mediated by persistence and passion (measured by teacher reports). Results largely supported the hypotheses. The role of emotion regulation ability in bridging the gap between creative potential and creative achievement is discussed.

*Keywords:* openness to experience, creativity, emotion regulation ability

Emotions play a crucial role in creativity. Unlike previous research, which primarily examined the emotional states associated with creativity (see meta-analysis by Baas, De Dreu, & Nijstad, 2008), here we ask how the ability to influence or regulate emotions affects creativity. Creativity across all domains of human endeavor—from the arts to scientific research to technological and business innovation—is filled with frustration at dead ends or failures, irritation in the face of negative feedback, excitement about new problems and ideas, and elation after the successful completion of a creative product. Strong self-conscious emotions engendered by negative feedback can at times lead to a loss of willingness to engage in a certain creative activity—a phenomenon termed creative mortification (Beghetto, 2014). Managing emotions associated with the creative process can make the difference between persisting or giving up on a project, and either influencing or alienating the gatekeepers (e.g., critics, editors, and reviewers) who make decisions about whether one's creative work is showcased and promoted. In this study, we examine the role of emotion regulation ability in predicting creative behavior, including one possible path of this influence through increased persistence and passion.

Creative behavior is best predicted by a confluence of factors (Amabile, 1996; Sternberg & Lubart, 1995). For instance, a cre-

ative scientist needs to have knowledge of her domain (e.g., physics), the quantitative skills needed to analyze data, and the ability to be original and flexible in thinking. Throughout the creative process, intrinsic motivation—enjoyment and challenge in the activity—has to be maintained, and one has to persist in spite of detrimental social influences, such as evaluation (Amabile, Goldfarb, & Brackfield, 1990; Deci, Koestner, & Ryan, 1999). We propose that emotion regulation ability is an important component in predicting creative behavior in individuals who are open to experience (considered a disposition for creativity; McCrae, 1994, 1996). Furthermore, we hypothesize that emotion regulation ability predicts creativity by affecting continued passion for one's interests and persistence in the face of obstacles.

## Openness to Experience and Creativity

Openness to experience is the personality trait most consistently related to creativity across domains (Feist, 1998; Ivcevic & Mayer, 2009; King, Walker, & Broyles, 1996; McCrae, 1987); leading scholars define it as a personality disposition for creativity (McCrae, 1994, 1996). Openness involves emotional and motivational traits such as seeking new experiences and feeling a wide range of emotions, cognitive traits of intellectuality and imaginative thinking, social expression through nonconformity and liberal attitudes, and traits related to self-regulation, such as absorption and tolerance of ambiguity (McCrae, 1994, 1996). On average, artists and scientists are higher on openness than nonartists and nonscientists (Feist, 1998). Openness is also related to creativity criteria such as the number of creative activities reported by college students (King et al., 1996), and self-reported behavior in everyday creative expression, arts and crafts, performing arts, and scholarly domains (Amabile, Hill, Hennessey, & Tighe, 1994; Griffin & McDermott,

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Zorana Ivcevic and Marc A. Brackett, Yale Center for Emotional Intelligence, Yale University.

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Correspondence concerning this article should be addressed to Zorana Ivcevic, Yale Center for Emotional Intelligence, 340 Edwards Street, New Haven, CT 06511. E-mail: [zorana.ivcevic@yale.edu](mailto:zorana.ivcevic@yale.edu)

1998; Ivcevic & Mayer, 2009; Silvia, Nusbaum, Berg, Martin, & O'Connor, 2009).

Longitudinal studies support the conceptualization of openness as a disposition for creativity. In one study, a representative sample of women graduating from Mills College in 1958 and 1960 completed a comprehensive set of measures of intellect and personality and were followed up at ages 27, 43, 52, and 61 (George, Helson, & John, 2011; Helson, Roberts, & Agronick, 1995). Personality measures of openness, originality, and unconventionality at age 21 predicted measures of creative potential at age 27 (e.g., Creative Personality Scale for the Adjective Checklist), as well as occupational creativity at age 52 (Helson et al., 1995). Similarly, a longitudinal study of male graduate students showed that observer-ratings of originality at age 27 predicted lifetime awards (measured at age 72; Feist & Barron, 2003).

### Emotion Regulation Ability and Creativity

If we conceptualize openness to experience as a broad personality disposition for creativity (McCrae, 1996), the question becomes which personal attributes enable one to transform this disposition into creative behavior. Creative achievement in any domain of human endeavor, from the arts to scientific research to business, is filled with emotions, including curiosity and excitement for new ideas, frustration in the face of obstacles, aggravation from negative feedback, and joy of success. These emotions have to be managed effectively in order for people to maintain interest and persist when faced with difficulties. Because of this, we propose that emotion regulation ability plays a role in enabling individuals to move from a creative disposition, such as evident in trait openness to experience, to creative behavior.

Emotion regulation involves the processes of monitoring, influencing, and changing emotions and emotional reactions in order to reach a goal (Gross, 1998, 2008). Effective emotion regulation requires understanding the consequences of potential reactions in emotion-laden situations and having knowledge of effective strategies for influencing the course of emotional experiences (Brackett, Rivers, & Salovey, 2011). Emotion regulation is necessary for managing negative or distressing emotions (e.g., when stage fright threatens to interfere with performance), and positive, but distracting or overwhelming emotions (e.g., when one cannot focus on writing because of a recent success). Studies with preschool and elementary schoolchildren have shown an association between emotion regulation and pretend play, which is both a form of childhood creativity and a precursor of later creativity (Russ, 2014). Moreover, parental reports of successful emotion regulation are correlated with both imagination in pretend play and scores on tests of divergent thinking (Hoffmann & Russ, 2012).

Emotion regulation can be studied both as typical performance—the tendency to routinely use more or less effective emotion regulation strategies in everyday situations—and as maximal performance—the ability to reason with and about and evaluate the effectiveness of different regulation strategies. An example of a typical performance measure of emotion regulation is the Emotion Regulation Questionnaire (Gross & John, 2003), which asks for self-reports of one's everyday use of regulatory strategies of cognitive reappraisal and expressive suppression (e.g., reappraisal: "When I want to feel less negative emotion, I change the way I'm

thinking about the situation.""). In this paper, we examine maximal performance emotion regulation and measure it with a test that describes common emotional situations and asks respondents to evaluate the efficacy of various strategies for reaching a specified goal (Brackett et al., 2011). Performance on maximal assessments has been extensively validated as distinct from measures of general intelligence and personality traits, and related to social and achievement outcomes (Brackett & Mayer, 2003; Ivcevic & Brackett, 2014a; Mayer, Roberts, & Barsade, 2008).

Both conceptual and measurement analyses support our definition of emotion regulation as an ability. Emotion regulation defined as maximal performance is a component of emotional intelligence (Mayer, Roberts, & Barsade, 2008). A core aspect of an intelligence is abstract understanding and reasoning, visible in emotion regulation ability when one is able to analyze a situation involving complex emotions or competing goals and evaluate the effectiveness of different strategies for reaching a desired outcome (Mayer, Salovey, Caruso, & Sitarenios, 2003). Other, more peripheral aspects of intelligence are also evident in emotion regulation ability; metaprocessing is apparent in crystallized knowledge that emotion suppression strategy is largely unhelpful in managing emotions and the knowledge base processing is evident in the application of knowledge of the effects of various regulatory strategies on emotions and goal fulfillment.

Freud's (1958) psychodynamic theory was the first to describe the role of emotional processes in adult creativity. The theory portrays creativity as based on sublimation—a defense mechanism where socially unacceptable impulses are transformed into socially approved behavior, such as when sexual or aggressive motives are channeled and expressed in works of art. Recent correlational and experimental research offers support for the role of sublimation as an emotion regulation mechanism related to creativity. Experimental priming with damnation words, inducing unacceptable sexual desire or forcing suppression of anger was associated with higher creativity in sculptures, collages, poems, and cartoon captions (Kim, Zeppenfeld, & Cohen, 2013).

In addition to emotions being channeled and transformed into creative expressions, emotion regulation ability is necessary for managing emotions that arise as byproducts of creation, including the feelings associated with failure, poor reception or evaluation of one's work, and potentially overwhelming emotions like ecstasy in the face of great success. What's more, emotion regulation ability is necessary to successfully negotiate the social aspects of creativity, whether in the form of effective communication with colleagues and collaborators (e.g., on scientific teams) or with gatekeepers (e.g., responding to editors' comments). This form of emotion regulation ability, a general ability to identify effective regulation strategies, can be assessed using a subset of a performance measure of emotional intelligence (Mayer, Caruso, & Salovey, 1999). When measured by performance tests, emotion regulation ability is related to a host of social and achievement outcomes, such as positive interactions with others (Lopes et al., 2004) and effective communication and performance under stress (Brackett, Palomera, Mojsa-Kaja, Reyes, & Salovey, 2010; Lopes, Cote, & Salovey, 2006). The present research is the first to directly examine the conditions and possible mechanisms through which emotion regulation ability relates to creativity.

## Overview of the Present Study

We addressed two questions about the relationship between emotion regulation ability and creativity. First, under what circumstances is emotion regulation ability associated with creativity, and second, what is the mechanism by which emotion regulation ability might influence creativity. Previous research has shown nonsignificant zero-order correlations between emotion regulation ability and creativity measured using ability tests (Remote Associates Test and Consequences) and products created in the laboratory (American Haiku poems; Ivcevic, Brackett, & Mayer, 2007). Here, we examine possible interaction effects between openness to experience and emotion regulation ability. We hypothesize that emotion regulation ability is associated with creativity only in individuals who show relatively high openness to experience. When people do not have artistic interests, do not like playing with ideas, and prefer routine tasks (low openness), creativity will be unlikely regardless of emotion regulation ability. After a certain level of openness to experience (a disposition for creativity), emotion regulation ability is likely to predict creativity, and this relationship will be stronger for higher than medium levels of openness.

In addition, we hypothesize that emotion regulation ability enables a person to maintain high levels of passion necessary for creative achievement and persistence in their work. Intrinsic motivation is crucial for creativity (Amabile, 1996), yet it also is vulnerable to detrimental influences of common social forces, such as evaluation and competition (Amabile et al., 1990; Deci et al., 1999). Hence, in addition to interest and passion, creativity requires persistence in the face of obstacles. While persistence is not significantly related to creative performance on short laboratory tasks (Lubart & Sternberg, 1995), it predicts real-life creativity that requires long periods of sustained activity, often times in the face of substantial difficulties and even open opposition (Csikszentmihalyi, 1996; Guilford, 1975). For instance, women who were described by a Q-sort item “does not give up under conditions of adversity” at ages 21 and 43 had higher occupational creativity at age 52 (Helson et al., 1995). Therefore, we tested a moderated mediation hypothesis to examine whether the effects of emotion regulation ability at relatively high levels of openness to experience on creativity are mediated through students’ persistence and passion for their interests.

## Method

### Participants

Participants were 223 students at a private high school in the Northeast (52% male; median age = 17). The sample was from middle class families (83.2% of mothers and 81.9% of fathers had at least a college degree). Students self-identified as 74.2% White/Caucasian, 13.6% Asian or Asian American, 4.1% Black or African American, 3.8% Hispanic, and 2.7% as mixed race.

### Measures

**Openness to experience.** Self-reported openness to experience was measured by the 10-item scale from the *Big Five Inventory* (wording of some items changed for greater comprehension in

adolescent samples; Soto, John, Gosling, & Potter, 2008). Students rated each item on a 5-point scale (e.g., “likes artistic and creative experiences”;  $\alpha = .78$ ).

**Emotion regulation ability.** The ability to manage emotions was measured using the Mayer, Salovey, and Caruso Emotional Intelligence Test—Youth Version (MSCEIT-YV; Mayer, Salovey, & Caruso, 2004). This is a performance test assessing one’s ability to evaluate effectiveness of strategies for influencing emotions in order to reach a specified goal. The test consists of 6 vignettes that describe everyday situations in which a protagonist feels a certain emotion (e.g., Jill is worried about whether she is “normal,” and she is confused at times about who she is), while facing a challenge or task that requires influencing or changing that emotion (e.g., Jill is going to a friend’s birthday party and would like to deal with feelings of worry). Each vignette is followed by 3 actions—potential regulation strategies in the described situation (e.g., Jill spends time with friends who are similar to her and they do something fun together). Respondents use a 5-point scale to rate how helpful/effective each action would be for the protagonist to reach the specified goal. The test is scored based on the judgments of emotion researchers and supported by research on emotion regulation (i.e., expert scoring criterion of response quality; see Rivers et al., 2012; Roberts, Zeidner, & Matthews, 2001). Test scores are standardized to have a mean of 100 and a standard deviation of 15. In the present study, the reliability of the test was high ( $\alpha = .86$ ).

**Creativity.** Students were asked to nominate several classmates using two criteria: (1) most creative and (2) best at coming up with original ideas in class/assignments. Students in this school are organized into 6 teams—2 teams each for 10th and 11th grades and a single team for 9th and 12th grades. Students were presented a list of their teammates in alphabetical order, and then they were asked to nominate approximately 10% of their classmates for each descriptor. The total number of nominations each student received from their peers was *z*-scored within each team, and the nominations for creativity and originality were averaged,  $r = .70$ ,  $p < .001$ .

Peer nominations of creativity have been previously successfully used in creativity research, including classic studies of creativity in architects (MacKinnon, 1975). These nominations are based on observed real-life behavior and offer an assessment of behavior quality by knowledgeable others. In the present study, peer nominations of creativity were an indication of high school students’ everyday creativity, as expressed in the school context (e.g., classroom assignments, extracurricular activities, project-based learning presentations).

**Mediator variables: Persistence and passion.** Teachers were asked to nominate students they considered to be the most versus least passionate about their interests and persistent versus tending to give up when facing obstacles based on what they have observed in the classes they teach. Teachers were presented with a list of all students they taught (across different courses) in alphabetical order and then asked to select approximately 10% of students for each descriptor. Nominations for low end of the descriptors (e.g., tends to give up in the face of obstacles) were assigned the value  $-1$ , and nominations for high end of the descriptors (e.g., most persistent in the face of obstacles) were assigned the value  $1$ ; students who were not nominated were assigned the value  $0$ . We computed *z* scores for each teacher’s

nominations and then computed mean ratings for each descriptor across all teachers.

Teacher nominations for persistence and passion were highly correlated,  $r = .51, p < .001$ , so the two sets of nominations were combined into a single variable (mean nomination, persistent passion) to increase reliability over single item measures. Combining these variables is also conceptually warranted, as research points to the close relationship between passion and persistence, even defining persistence or commitment to an activity in the face of obstacles as essential features of passion (Moeller, 2013; Vallerand et al., 2003). To fully examine the moderated mediation hypothesis, we also conducted analyses separately for persistence and passion.

**Procedure**

Study measures were administered as a part of a larger study of social and emotional development in high school students. Teachers administered all student measures in small groups (10–15 students), and teacher reports were collected during a faculty meeting using Qualtrics software.

**Results**

Table 1 presents intercorrelations among all study variables. Creativity was significantly predicted by openness and teacher nominations of persistence and passion. Emotion regulation ability also significantly correlated with creativity,  $r = .23, p < .001$ .

We tested our first hypothesis that the level of openness to experience would moderate the relationship between emotion regulation ability and creativity using a hierarchical linear regression analysis. After centering the predictor variables, the main effects of openness and emotion regulation ability were entered in Step 1, and the Openness  $\times$  Emotion regulation ability interaction was entered in Step 2. Step 1 predictors were statistically significant,  $\Delta R^2 = .08, F(2, 218) = 9.75, p < .001$  (confidence interval for B for openness: .079 to .524 and for emotion regulation ability: .002 to .019). In Step 2, the interaction term explained additional variance in creativity nominations,  $\Delta R^2 = .03, F(1, 217) = 6.36, p = .012$  (confidence interval for B: .004 to .035). Thus, openness was a significant moderator of the relationship between emotion regulation ability and creativity. Figure 1 depicts the nature of the openness by emotion regulation ability interaction using simple slopes at low, medium, and high openness. At low openness ( $-1 SD$ ), emotion regulation ability was not significantly predictive of

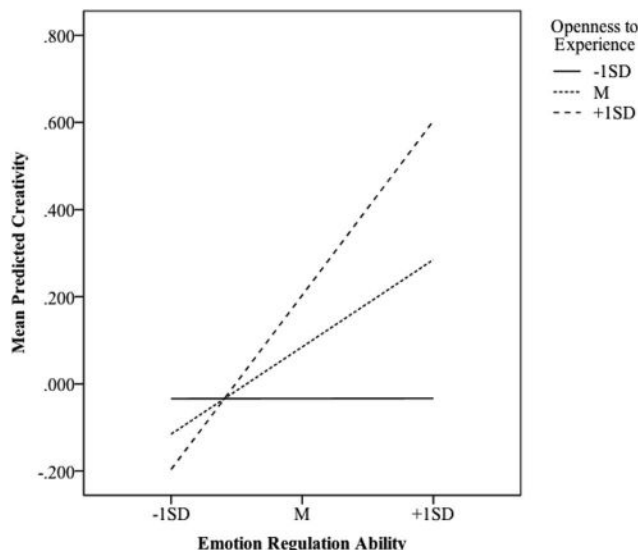


Figure 1. Simple slopes plot depicting the relationship between emotion regulation ability and creativity at different levels of openness to experience.

creativity, but at medium level (mean) and high openness ( $+1 SD$ ), emotion regulation ability predicted peer nominations of creativity.

Next, we tested a moderated mediation effect where the influence of emotion regulation ability on creativity through the proposed mediator variables of persistence and passion depends on the level of openness. Models were tested separately for three mediator variables: persistence, passion, and the average of those two variables labeled persistent passion. While teacher nominations for persistence and passion were highly correlated, warranting combining into a single variable, we also analyzed the two variables separately (akin to the use of both total scale and subscale or facet scores in personality trait research). Moderated mediation hypothesis was tested using an approach developed by Preacher, Rucker, and Hayes (2007) and using their macros for Statistical Package for Social Sciences (SPSS). We tested the effects of low openness at one standard deviation below the mean, medium openness at mean, and high openness as one standard deviation above the mean. Based on simulations testing power and Type I error rates (Preacher et al., 2007), we chose bias-corrected bootstrapping with 5,000 samples to evaluate the indirect effects in the moderated mediation model.

Table 2 presents the lower and upper bounds of the confidence intervals testing conditional indirect effects at three levels of openness. Our hypothesis was largely supported: emotion regulation ability predicted creativity through its influence on persistence and passion when openness is relatively high, but not low. Indirect effects were significant (i.e., zero is not contained in the interval) at medium and high, but not low levels of openness when the effect of emotion regulation ability was modeled through persistent passion or persistence. When the effect of emotion regulation ability was modeled through passion, the indirect effects were significant only at medium levels of openness.

Table 1  
Descriptive Statistics and Correlations Among the Study Variables

|                               | 1      | 2      | 3      | 4      | 5      |
|-------------------------------|--------|--------|--------|--------|--------|
| 1. Openness                   | —      |        |        |        |        |
| 2. Emotion regulation ability | .30*** | —      |        |        |        |
| 3. Persistent passion         | .23*** | .29*** | —      |        |        |
| 4. Persistence                | .19**  | .25*** | .86*** | —      |        |
| 5. Passion                    | .21*** | .25*** | .88*** | .50*** | —      |
| 6. Creativity                 | .23*** | .23*** | .30*** | .26*** | .26*** |

\*\*  $p < .01$ . \*\*\*  $p < .001$ .

Table 2  
*Bias-Corrected Confidence Intervals Testing Conditional Indirect Effects in a Moderated Mediation Model*

| Level of openness | Persistent passion |             | Persistence |             | Passion     |             |
|-------------------|--------------------|-------------|-------------|-------------|-------------|-------------|
|                   | Lower bound        | Upper bound | Lower bound | Upper bound | Lower bound | Upper bound |
| -1 <i>SD</i>      | -.0014             | .0060       | -.0025      | .0038       | -.0004      | .0063       |
| <i>M</i>          | .0011              | .0068       | .0007       | .0061       | .0005       | .0054       |
| +1 <i>SD</i>      | .0014              | .0143       | .0004       | .0136       | -.0003      | .0111       |

Note. Number of bootstrap samples = 5,000.

## Discussion

The present research examined when and why emotion regulation ability relates to creativity. It was hypothesized that emotion regulation ability would predict creativity in individuals with relatively high openness to experience, but not in those low on openness. As predicted, there was a significant interaction effect between openness, which is often described as a personality disposition for creativity (Feist, 1998; McCrae, 1994, 1996), and emotion regulation ability (measured by a performance test; Mayer et al., 2004) in predicting high school students' creativity assessed through peer nominations. The relationship between emotion regulation ability and creativity was mediated by teacher ratings of persistence and passion. Collectively, these results provide insight into the role of emotion regulation in bridging the gap between creative disposition and behavior; the results address both when emotion regulation is predictive of creativity and describe one mechanism of this influence.

Emotion regulation ability by itself does not "make" one more creative—it does not help one to connect remotely associated ideas or generate original ideas, as is the case with creativity-relevant cognitive abilities (Mednick, 1962; Torrance, 1988). However, emotion regulation ability appears to help individuals with high openness to transform their preference for new ideas and intellectual or artistic interests into creative behavior by enabling them to manage and influence emotions experienced in the course of the creative process. The performance test of emotion regulation ability used in this study measures one's ability to evaluate strategies aimed to down-regulate excessive excitement (e.g., being ecstatic about a party invitation when having to study), repair mood (e.g., being self-conscious and concerned about fitting in), and manage feelings in a social setting (e.g., when one is insulted in front of others). Similarly, creative activity can produce a wide range of emotions that have to be regulated in order to reach a goal and generate a creative product. For instance, excitement over inspiration at times has to be muted when one is required to focus, such as when writing a proposal for a new project. Also, frustration due to the lack of anticipated progress and unplanned obstacles has to be managed to maintain motivation for continued goal-pursuit. Research on creative mortification—loss of willingness to engage in a particular creative activity as a result of negative feedback and associated strong self-conscious emotions (Beghetto, 2014)—demonstrates the dire consequences for individual creativity when one is not able to successfully manage emotions in the creative process. Creative mortification is more likely at younger ages, likely because children have not fully developed the ability to regulate their emotions.

Emotion regulation ability has been studied within the model of emotional intelligence and has been shown to have a number of benefits for social, academic, and professional functioning, including less aggression (Brackett & Mayer, 2003), better communication and performance under stress (Lopes et al., 2006), and positive social interactions (Lopes et al., 2004). People are poor judges of their emotion regulation ability (Brackett, Rivers, Shiffman, Lerner, & Salovey, 2006; Dunn, Brackett, Ashton-James, Schneiderman, & Salovey, 2007). It is therefore important to measure emotion regulation ability using performance tests, which assess understanding of emotion-laden situations, knowledge of strategies for managing emotions, and the ability to evaluate effectiveness of different strategies depending on situational demands.

One study of secondary school students in England offers an apt parallel to the present study. Qualter, Gardner, Pope, Hutchinson, and Whiteley (2012) found that emotional intelligence ability at age 11 moderated the effect of general intelligence on academic performance at age 15; individuals with high general intelligence and high emotional intelligence showed the highest performance on national examinations in several subject areas. Similar to the findings of the present study, emotional intelligence interacted with general intelligence (potential for academic success) to predict standardized test performance. Understanding consequences of emotions and strategies for effective emotion regulation (components of emotional intelligence) do not directly offer answers to science or literature questions, but they contribute to better managing of test anxiety and focusing on the task, thus enabling one to transform potential for high academic performance to actual test performance.

The present study showed that the relationship between emotion regulation ability and creativity is mediated by passion for one's interests and persistence in the face of obstacles. Thus, emotion regulation ability might help individuals maintain engagement with the creative activity that can be diminished by social evaluation and rewards (Amabile, 1996; Koestner, Ryan, Bernieri, & Holt, 1984). Passion for one's interests is visible in gifted youth as a "rage to master" one's domain (Winner, 1996; Winner & Martino, 1993). Similarly, biographical studies of eminent creators across domains identify passion for one's work as a major motivator for sustained creative activity (Csikszentmihalyi, 1996). Passion predicts past entrepreneurial experience and present time spent on entrepreneurial activity defined as activities associated with founding and running a new start-up business (Cardon, Wincent, Singh, & Drnovsek, 2009; Murnieks, Mosakowski, & Cardon, 2014).

In addition to passion for one's interests, creativity also requires discipline, hard work, and persistence in the face of difficulties. Creative work is full of obstacles, such as dead ends when working on challenging problems and negative reception or rejection of original ideas, and creative achievement requires years of sustained work (Csikszentmihalyi, 1996; Guilford, 1975). Wilson (1990), for instance, found that successful poets persisted in writing even in times of prolonged economic deprivation and long periods without critical acceptance for their work. Similarly, longitudinal studies show that ratings of persistence in the face of obstacles predict long-term occupational creativity (Helson et al., 1995).

The combination of passion and persistence as assessed by teacher ratings in the present study is reminiscent, but distinct from research on grit (Duckworth, Peterson, Matthews, & Kelly, 2007). Although described as passion for long-term goals and persistence in the face of obstacles, grit is not defined in terms of emotional intensity of engagement, but rather as stamina with which people pursue their interests. We believe that teachers considered the intensity aspect of engagement when asked to give nominations for passion. As noted by Duckworth and colleagues (2007), intensity of engagement can be described by a number of common adjectives (e.g., energetic, thorough), but that is not necessarily the case for the consistency of engagement that constitutes grit. Furthermore, theoretical and empirical research show that intensity of affect and engagement are important aspects of passion (Cardon et al., 2009; Renzulli, Koehler, & Fogarty, 2006; Vallerand et al., 2003), and that this affect intensity is important for creativity (Botella, Zenasni, & Lubart, 2015; Sashin, 1993). Supporting this conceptual distinction, emerging research has shown nonsignificant correlations between grit and creativity (Grohman, Kaufman, & Silvia, 2014; Ivcevic & Brackett, 2014b).

The limitations of this study open new questions and avenues for future research. Openness to experience interacted with emotion regulation ability in the prediction of creativity. We discussed high school students' openness as individual potential for creativity. Although openness is consistently related to criteria of creative behavior in both concurrent and longitudinal studies (Feist, 1998; Helson et al., 1995; Ivcevic, 2007; Ivcevic & Mayer, 2009; King et al., 1996), we acknowledge that it is a limited measure of creative potential. Our interpretation of emotion regulation ability as a bridge from creative potential to achievement would be strengthened by a more comprehensive measure of creative potential that might also include scores on tests of divergent thinking (Torrance, 1988) and self-perceptions of creativity or creative self-efficacy (Beghetto, 2006; Tierney & Farmer, 2002).

Another potential limitation of this study is in a possible "third variable" interpretation or confound. General intelligence has been related to openness (e.g., Ashton, Lee, Vernon, & Jang, 2000; Silvia, 2008), creativity (e.g., Batey & Furnham, 2006; Silvia, 2008), and emotional intelligence (of which emotion regulation ability is a component; Mayer et al., 2008). The present study did not enable us to statistically control for general intelligence. While we acknowledge this limitation, prior empirical research suggests that the observed relationships are not likely to be affected by intelligence. It is noteworthy to mention, that while omnibus tests of emotional intelligence have been shown to correlate significantly with general intelligence, emotion regulation ability component had nonsignificant association with intelligence (Lopes et

al., 2004, 2006; Lopes, Salovey, Coté, & Beers, 2005). Furthermore, openness remains a significant and stronger predictor of creativity when analyzed along with intelligence (Silvia, 2008), and openness (but not intellect aspect of the Big Five trait domain) has been shown to predict creative behavior (Nusbaum & Silvia, 2011). Nevertheless, while we do not have a theoretical reason to anticipate that measured intelligence would change the relationships among openness, emotion regulation ability, and creativity, this question should be addressed in future research.

Finally, the present study used peer nominations as the criterion for creativity in high school students. However, unlike with research in professional samples where nominations for creativity are obtained for a specific domain (e.g., architecture, MacKinnon, 1975), nominations in the present study were not tied to a single domain. A major advantage of this type of assessment is that they are based on real-life observations of behavior. Furthermore, nominations are socially relevant judgments similar to decisions about awards and opportunities for presentations of products (e.g., exhibiting artwork, publishing a scientific article; Csikszentmihalyi, 1999). It is likely that the nominations for creativity were based largely on everyday creativity, as the domain with highest frequency of creative behavior (Ivcevic & Mayer, 2007, 2009).

Our research showed that emotion regulation ability predicts creative behavior in individuals with medium or high creative potential, as measured by self-reported openness to experience. One practical implication of this research is that developing emotion regulation ability could aid in channeling creative dispositions, such as high openness, into creative behavior and reduce creative underachievement. The importance of this finding is underscored by the fact that emotion regulation is typically not represented in creativity training programs (Bull, Montgomery, & Baloché, 1995; Scott, Leritz, & Mumford, 2004). Although improved emotion regulation does not directly help an individual to come up with responses on idea generation or problem-solving tasks, our research shows that this ability has the potential to help one sustain passion and persistence in pursuing goals of creative work. This research invites further study of how other emotional abilities might facilitate the creative process, as well as how to jointly enhance emotion abilities and creativity.

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