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## Conscientiousness Is Not Always a Good Predictor of Performance: The Case of Creativity

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Meta-analyses investigating the relationship between Conscientiousness and performance suggest a positive relationship for a variety of criteria. However, recently it has been argued that Conscientiousness is not always a good predictor of performance, particularly for creative performance. Additionally, it has been suggested that Conscientiousness includes two distinct components, achievement and dependability, which may have different relationships with criterion measures. Two studies were conducted to determine whether the components of Conscientiousness predict creativity better than the full factor. Students in each study completed a measure of the Five Factor Model and a measure of creative performance. In the first study, creative accomplishments were measured and in the second study, creative problem solving was measured. As predicted, both studies revealed a cooperative suppression effect when analyzing the conscientiousness components together such that achievement was positively related and dependability negatively related to creative performance. Also, both studies showed that the overall Conscientiousness factor was not related to creativity.

Much recent research has focused on the role of personality in predicting job and academic performance (Hogan, Hogan, & Roberts, 1996; Poropat, 2009). The development and acceptance of the Five Factor Model (FFM) of personality as a taxonomy of individual differences has been an important contributor to the emergence of personality variables as possible predictors (Costa & McCrae, 1992; Digman, 1990). Among the five factors, Conscientiousness has emerged in numerous studies and meta-analytic reviews as the most consistent and best predictor of job and academic performance (e.g., Barrick & Mount, 1991; Hurtz & Donovan, 2000; Mount & Barrick, 1995; O'Connor & Paunonen, 2007; Saldago, 1998). Conscientiousness can be defined as a combination of a desire to be dependable and reliable and a desire to be achievement-oriented and persevering (Mount & Barrick, 1995). Con-

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scientiousness has been documented as a valid predictor for a variety of criteria such as supervisory ratings, citizenship behavior, job accidents, interactions with team members, exam and essay grades, and grade point average (Hogan, Rybicki, Motowidlo, & Borman, 1998; Mount, Barrick, & Stewart, 1998; O'Connor & Paunonen, 2007; Sackett & Wanek, 1996). However, the relationship between conscientiousness and performance is not consistent across all performance criteria, leading some authors to argue that research in certain areas should focus on the two narrower components that appear to compose the conscientiousness construct: dependability and achievement.

#### **Conscientiousness and creativity**

Hogan and Hogan (1993) suggested that the relationship between Conscientiousness and performance may vary by job type and hypothesized that Conscientiousness would be negatively related to performance in occupations where creativity is important. Similarly, Chamorro-Premuzic (2006) found that conscientiousness was more related to conventional, well-defined academic measures such as written examination than with less conventional measures such as an original research study, which were better predicted by creative thinking. Overall, empirical studies investigating the relationship between creative performance and Conscientiousness have found mixed results, with some showing a positive relationship (e.g., McCrae, 1987), some showing a negative relationship (e.g., Wolfradt & Pretz, 2001), and some showing no relationship (e.g., Chamorro-Premuzic, 2007; Furnham & Bachtiar, 2008; Kelly, 2006).

It is possible that the effect of conscientious on creativity may simply depend upon the creativity criterion being used, which could explain the mixed direct-effect findings. For example, Feist (1998), in a meta-analysis of the relationship between the Big Five and creative performance, reported a positive relationship between Conscientiousness and scientific performance and a negative relationship between Conscientiousness and artistic performance. Also, Furnham, Zhang, and Chamorro-Premuzic (2006) found a negative relationship between Conscientiousness and art appreciation and a positive relationship between Conscientiousness and self-reported creative ability. Finally, McCrae (1987) found Conscientiousness was not related to divergent thinking but was positively related to creative personality.

Alternatively, several researchers have considered the possibility that the effect of Conscientiousness on creativity is moderated by other variables, such as creative ability or motivation, which could also explain the inconsistent direct effects. In a study by King, Walker, and Broyles (1996) focusing on creative accomplishments, the direct relationship between creativity and Conscientiousness was not significant. However, an interaction between creative ability and Conscientiousness was observed such that for those individuals with low creative ability, higher Conscientiousness was related to more creative accomplishments whereas for those individuals with high creative ability, Conscientiousness was not positively related to creative accomplishments.

George and Zhou (2001) also found no direct relationship between Conscientiousness and employee creativity (as rated by supervisors). However, they found that the relationship was moderated by level of supervision and type of environment. For employees high in Conscientiousness, creativity was lower if they were closely monitored in addition to being in an environment where their coworkers (a) were not

helpful, (b) provide all negative work stressors, and (c) have the lowest creativity.

Finally, Prabhu, et al. (2007) found that Conscientiousness is highly related to Creativity. McCrae, et al. (2004) found that Conscientiousness is worth, Peterson, et al. (2004) found that Conscientiousness is correlated directly with Creativity. Specifically, Conscientiousness is positive for those with a high extrinsic

#### **The two components**

It is clear from the literature that the relationship between Conscientiousness and Creativity may be the nature of the job. As the authors have argued, the Big Five may mask important relationships. If the Big Five traits would show (e.g., McCrae & Donovan, 2000; Mount, et al., 1998). While broad traits may perform better on specific criteria (Duckworth, et al., 2005; Jenkins & Griffith, 2002).

There is also discussion about the structure of the broad traits. It may appear to focus most on the two components of dependability and the other components of achievement characteristics (e.g., Barrick, et al., 2005; Quilty, & Peterson, 2002; Jackson et al., 1999; McCrae, et al., 1999). Although both traits are common, they also suggest that the component taps into different areas of challenges whereas the other is responsible, and keep the focus on some researchers to investigate the founding the two components (e.g., McCrae, 1992; Jackson et al., 1999).

An accumulating body of literature suggests that Conscientiousness might be better predictors (e.g., DeYoung, et al., 2005). Studies have shown that Conscientiousness (Hough (1992), for employee performance for many jobs (e.g., Jackson et al. (1996) found that

r a variety of criteria such as, interactions with team (Hogan, Rybicki, Motowyl, & O'Connor & Paunonen, 2007). The relationship between conscientiousness and creativity is complex, leading some authors to propose two narrower components of the conscientiousness construct: dependability and

between Conscientiousness and Creativity. It is clear that Conscientiousness is a broad construct in which where creativity is important. Conscientiousness was more strongly related to creativity in such as written examination research study, which were studies investigating the relationship between conscientiousness have found mixed results (e.g., McCrae, 1987), some showing a positive relationship (e.g., O'Connor & Paunonen, 2007; Kelly, 2008; Bachtiar, 2008; Kelly, 2008).

may simply depend upon the mixed direct-effect relationship between the relationship between Conscientiousness and Creativity. Zhang, and Chamorro-Premuzic (2008) found that Conscientiousness and artistry were related to self-reported conscientiousness was not related to personality.

possibility that the effect of variables, such as creative variables, such as creative consistent direct effects. In a study of creative accomplishments, conscientiousness was not significant. Conscientiousness was observed to be related to higher Conscientiousness and those individuals with high conscientiousness were related to creative accom-

relationship between Conscientiousness and Creativity. However, they found that the relationship between Conscientiousness and Creativity was different by type of environment. For example, if they were closely monitored by coworkers (a) were not

helpful, (b) provided them with inaccurate information, or (c) contributed to an overall negative work situation. Employees low in Conscientiousness, however, showed the lowest creativity when were closely monitored regardless of type of environment.

Finally, Prabhu, Sutton, and Sauser (2008) revealed that perseverance, a construct highly related to Conscientiousness (e.g., DeWitte & Schouwenburg, 2002; Duckworth, Peterson, Matthews, & Kelly, 2007) and sometimes used as part of the definition of Conscientiousness (e.g., Jackson, Paunonen, Fraboni, & Goffin, 1996) was not correlated directly with creativity but interacted with extrinsic motivation in affecting creativity. Specifically, the relationship between perseverance and creativity was positive for those with a low extrinsic motivation orientation and negative for those with a high extrinsic motivation orientation.

### **The two components of conscientiousness**

It is clear from the research reviewed above that the relationship between Conscientiousness and creativity has been mixed. One reason for these divergent findings may be the nature of the broad Conscientiousness construct. Recently, several personality authors have argued that broad personality factors, such as Conscientiousness may mask important relationships with criteria that more narrowly defined personality traits would show (e.g., Ashton, 1998; Costa, 1997; Hough & Furnham, 2003; Hertz & Donovan, 2000; O'Connor & Paunonen, 2007; Sackett & Wanek, 1996; Tett, 1998). While broad traits may be better for predicting general performance, narrow traits may perform better when chosen for their likely ability to predict certain specific criteria (Dudley, Orvis, Lebiecki, & Cortina, 2006; Hogan & Holland, 2003; Jenkins & Griffith, 2004; Mount & Barrick 1995; Paunonen & Ashton, 2001).

There is also disagreement among some researchers about the definition and structure of the broad Conscientiousness factor. Definitions of Conscientiousness appear to focus most often on two main components, to varying degrees. One of these two components addresses achievement, industriousness, or proactive characteristics and the other component addresses dependability, orderliness, or inhibitive characteristics (e.g., Barrick & Mount, 1991; Costa, McCrae, & Dye, 1991; DeYoung, Quilty, & Peterson, 2007; Hough, 1992; Judge, Martocchio, & Thoresen, 1997; Jackson et al., 1996; Roberts, Chernyshenko, Stark, & Goldberg, 2005; Stewart, 1999). Although both components have the hard work aspect of Conscientiousness in common, they also seem to address fairly different characteristics. The achievement component taps into characteristics associated with persevering and meeting challenges whereas the dependability component focuses on being careful, being responsible, and keeping order (Barrick & Mount, 1991). These differences have led some researchers to criticize traditional measures of Conscientiousness for conflating the two components by combining them under one broad factor (e.g., Hough, 1992; Jackson et al., 1996).

An accumulating body of research is showing support for this two component view of Conscientiousness. Several factor analyses have provided evidence that conscientious might be better represented as two separate achievement and dependability factors (e.g., DeYoung et al., 2007; Jackson et al., 1996). In addition, several research studies have shown that these two components often predict criteria differently. Hough (1992), for example, found a positive relationship between achievement and performance for managers and a negative correlation for health care workers. Jackson et al. (1996) found that achievement predicted grade point average and dependability

predicted smoking behavior. Reisert and Conte (2004) revealed that achievement was a significant predictor of destructive behavioral intentions (negatively related) whereas dependability was not. In addition, achievement was more strongly related to constructive behavioral intentions than was dependability (both positive relationships). Stewart (1999) showed that dependability was associated with job performance during the early stage of job tenure whereas achievement was associated with performance in the later stage of job tenure. Finally, Le Pine, Colquitt, and Erez (2000) found that dependability was negatively related to decision-making adaptability. They also found that achievement was positively related to decision-making performance before adaptability was required.

Moon (2001) speculated that the achievement component of Conscientiousness has a "self" focus, that is, a focus on the person completing the task and their goals. The dependability component, on the other hand, has an "other" focus, that is, a focus on other people or other entities. Moon suggested that it is that difference in focus that may be responsible for the differential results seen for achievement and dependability. In support of this argument, Moon showed that neither Conscientiousness as a broad construct nor the two Conscientiousness factors of achievement and dependability were directly related to level of commitment in an escalation of commitment dilemma. However, including both the achievement and dependability components in a single regression equation revealed that achievement was significantly positively related to commitment and dependability was significantly negatively related. Moon argued that the self-interest orientation of those high on achievement motivated them to continue to commit to a losing course of action. A study by Gutkowski and Osburn (1999) showing that the achievement component of Conscientiousness was more strongly related to task performance than was the broader construct, and that the dependability component was more strongly related to contextual performance than was the broader construct also lends support to the self/other notion of these two components as suggested by Moon.

#### **Achievement, dependability, and creativity**

When investigating the relationship between the achievement and dependability components of Conscientiousness and creativity, a similar picture emerges. In a meta-analysis, Hough (1992) reported that the dependability component resulted in an uncorrected mean correlation of  $-.07$  with creativity whereas the achievement component resulted in an uncorrected mean correlation of  $.14$  with creativity. Similarly, a meta-analysis by Mount and Barrick (1995) found that dependability correlated  $-.04$  with creativity whereas achievement correlated  $.19$  (corrected validities). These results are consistent with Barron and Harrington (1981), who concluded based on a review of the personality and creativity literature that creative individuals tend to be more impulsive and take more risks (typically negatively related to Conscientiousness) and tend to see themselves as competent and hard-working (typically positively related to Conscientiousness).

Tett (1998) speculated that the relationship between the dependability component and creativity may likely be negative as it reflects a need for order or "rules." Similarly, Feist (1998, 1999), in literature reviews of the relationship between personality and creativity found that impulsivity and low need for order, both negatively related to dependability, were positively related to creative performance in artists and scientists, suggesting a negative relationship between dependability and creativity. In

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addition, scientists were characterized by high drive and ambition, suggesting a positive relationship between achievement and creativity. Also, in a sample of college students, Mumford, Costanza, Threlfall, Baughman, and Reiter-Palmon (1993) found that solving problems creatively was related to a pattern of personality variables relating to achievement, suggesting a similar pattern in the general population.

The argument that the achievement component of Conscientiousness may be positively related to creativity and the dependability component may be negatively related to creativity is consistent with the distinction by Moon (2001) that achievement reflects a "self" focus and dependability reflects an "other" focus. Creative individuals are often described as independent, persistent, self-confident, and driven (Reiter-Palmon & Illies, 2006). They tend to be intrinsically motivated (Amabile, 1985) and enjoy being alone where they can focus on their creative endeavors (Feist, 1998). Thus, they would appear to be more self-focused than other-focused.

Finally, while the previously cited research and theory suggests a positive bivariate relationship between achievement and creativity and a negative bivariate relationship between dependability and creativity, the picture may not be as clear. Both achievement and dependability are part of the factor of Conscientiousness, which means they should be positively correlated with one another. Because of this, combined with the finding that the Conscientiousness factor is often not directly related to creativity (e.g., Hough, 1992, Furnham & Bachtar, 2008; Kelly, 2006; King et al., 1996), it is possible that cooperative suppression may occur (Cohen & Cohen, 1983). Cooperative suppression refers to the situation where both variables serve as a suppressor. In the present case, the unique relationship that each Conscientiousness component has with creativity may be suppressed by the positive relationship they have with each other, resulting in no or few significant direct effects for the broad factor or the components. This effect was shown by Moon (2001), who found that neither Conscientiousness nor the components of achievement and dependability were correlated with commitment. However, when both components were included in a single regression, achievement was significantly and positively related to commitment and dependability was significantly and negatively related.

### THE PRESENT STUDY

The purpose of this study was to determine whether using the two components of Conscientiousness, as opposed to the full factor, would provide a better understanding of the relationship between Conscientiousness and creativity. Based on the previous discussion the following hypotheses were proposed:

*Hypothesis 1.* The achievement and dependability components of Conscientiousness will show a cooperative suppression effect when used to predict creativity such that the Conscientiousness factor and the two components will produce small or zero bivariate correlations with creativity but when both the components are entered together in a regression equation, achievement will be significantly and positively related to creativity and dependability will be significantly and negatively related to creativity

Because some researchers have called for using even the narrower facets for prediction (Costa, 1997; Hurtz & Donovan, 2000), an exploratory analysis was also conducted using the six facets of Conscientiousness.

*Hypothesis 2.* Achievement striving, self-discipline, and competence will be posi-

tively related to creativity, whereas order and deliberation will be negatively related to creativity. No directional relationship was hypothesized for the facet of dutifulness.

## STUDY 1

### Method

**Participants** Participants for Study 1 were 188 undergraduate students from a Midwestern United States university. Participants received extra-credit or course requirement points in psychology courses. The mean age was 24.16 ( $SD = 6.52$ ). The majority of the students were female (133, 71%) and were equally distributed among years of education.

**Measures** The creative performance measure in this study was creative accomplishments, measured using the Creative Activities Checklist (CACL, Runco & Okuda, 1988). The scale consists of 45 items asking participants to indicate the frequency with which they have participated in a variety of creative pursuits across various domains, such as writing, science, music, and visual arts. Participants respond to each item using a 5-point response scale (*Never, Once, 2-3 Times, 4-5 Times, 6 or More Times*). The Cronbach's alpha reliability in this study was .85. This scale has been used in the past as a measure of creative performance (e.g., Chand & Runco, 1993; Runco, Noble, & Luptak, 1990; Okuda, Runco, & Berger, 1991). In addition, Hocevar (1982), in a review of different measures of creativity, indicated that self-report of creative activities and accomplishments is the most defensible technique.

The predictor in this study was Conscientiousness, which was assessed using Costa and McCrae's (1992) measure of the Five-Factor Model, the *Revised NEO Personality Inventory* or NEO-PI-R. The NEO-PI-R is a 240-item measure. Each of the five factors is measured using 48 items, and each factor comprises six facets, each measured using 8 items. The six Conscientiousness facets are (a) Competence, which refers to a sense that one is capable and effective; (b) Order, which indicates that the person is neat, tidy, and well organized; (c) Dutifulness, which is an adherence to a set of ethical principles and fulfillment of obligations; (d) Achievement striving, which indicates high aspiration levels and hard work to achieve goals; (e) Self-Discipline, the ability to follow through and complete a task; and (f) Deliberation, the tendency to think carefully before acting. Although participants completed the full, 240-item measure, only the conscientious factor and facets were used in this study (reliability estimates are provided in Table 1).

Two Conscientiousness component scores were obtained by averaging individual facets. The facets of competence, achievement striving, and self-discipline were combined to form the achievement component, and the facets of order, dutifulness, and deliberation were combined to form the dependability component. Although Hough and Schneider (1996) suggested that self-discipline should be part of the dependability component, we believe it is more appropriate to place it within the achievement component, which is consistent with LePine et al. (2000). Self-discipline reflects more of a "self" focus that defines the achievement component as opposed to an "other" focus that is thought to define the dependability component (Moon, 2001).

Finally, because divergent-thinking ability plays an important role in creative performance and participation in creative activities, a measure of divergent thinking was used as a covariate. Additionally, King et al. (1996) reported an interaction bet-

9. Order	3.39	0.52	.68
10. Dutifulness	3.64	0.53	.34**
11. Deliberation	3.10	0.54	.60
			.44**
			.72

Note: Reliabilities are presented on the main diagonal.  
\*  $p < .05$ ; \*\*  $p < .01$

Table 1  
Descriptive Statistics and Correlations among Study 1 Variables

Construct	Mean	SD	2	3	4	5	6	7	8	9	10	11
1. Creativity	1.76	0.41	.15*	-.00	.07	-.09	.06	.02	.10	-.12	-.03	-.08
2. Diverg. thinking	9.83	6.88	--	.07	.06	.07	.07	.05	.03	-.02	.13	.05
3. Conscientiousness	3.46	0.41		.89	.95**	.92**	.76**	.81**	.85**	.65**	.75**	.65**
Components												
4. Achievement	3.55	0.48			--	.75**	.83**	.87**	.87**	.55**	.62**	.49**
5. Dependability	3.38	0.40				--	.57**	.63**	.70**	.68**	.80**	.74**
Facets												
6. Competence	3.70	0.52					.68	.60**	.55**	.35**	.51**	.41**
7. Achiev. striving	3.52	0.53						.66	.64**	.45**	.54**	.41**
8. Self-discipline	3.44	0.62							.83	.58**	.54**	.43**
9. Order	3.39	0.52								.68	.34**	.20**
10. Dutifulness	3.64	0.53									.60	.44**
11. Deliberation	3.10	0.54										.72

Note: Reliabilities are presented on the main diagonal.  
\*  $p < .05$ ; \*\*  $p < .01$

n will be negatively related for the facet of dutifulness.

graduate students from a Mid-credit or course require-16 (SD = 6.52). The majorly distributed among years

study was creative accom- checklist (CACL, Runco & participants to indicate the fre- of creative pursuits across al arts. Participants respond 2-3 Times, 4-5 Times, 6 or dy was .85. This scale has ce (e.g., Chand & Runco, Berger, 1991). In addition, creativity, indicated that is the most defensible

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d by averaging individual and self-discipline were cets of order, dutifulness, ty component. Although e should be part of the te to place it within the al. (2000). Self-discipline component as opposed to component (Moon, 2001). portant role in creative ure of divergent thinking orted an interaction bet-



ween Conscientiousness and divergent thinking in the prediction of participation in creative activities; therefore, because a measure of divergent-thinking ability was used, an attempt to replicate this interaction would be possible. Divergent thinking was measured using the consequences test developed by Guilford, Christensen, Merrifield, and Wilson (1978). This test asks individuals to write down all possible consequences of a fictitious situation. Two situations were used and scored for the number of responses provided: (a) what would be the result if everybody suddenly could not use their arms or hands, and (b) what would be the result if everybody suddenly lost the ability to read and write. The scores on these two tests were averaged to create one divergent-thinking score.

**Analyses** Correlations were computed to determine the relationships among the Conscientiousness factor, components, and facets and creativity. In addition, a hierarchical regression was used to determine whether the combination of the two Conscientiousness component scores would predict creativity and to determine whether cooperative suppression existed. Divergent-thinking scores were entered first as a control variable and achievement and dependability were entered second, simultaneously. An exploratory regression analysis using all six facets of Conscientiousness was also conducted. Finally, a moderated multiple regression analysis was used to test for an interaction effect of Conscientiousness and divergent thinking on creativity. Conscientiousness and divergent thinking were first centered, and then these centered variables were used to compute the interaction term and to run the regression analysis (Aiken & West, 1991).

**Results**

Means, standard deviations and correlations for Study 1 variables are presented in Table 1. As can be seen, a correlation of zero was observed between the full Conscientiousness factor and participation in creative activities. In addition, neither of the two Conscientiousness components correlated significantly with creativity. The results of the regression analysis examining the effect of the two components of Conscientiousness, achievement and dependability, supported hypothesis one (see Table 2). The first variable entered, divergent thinking, was significant ( $R^2 = .03$ ,  $F(1,166) = 5.03$ ,  $p < .05$ ). The addition of the components significantly increased prediction of creativity (overall  $R^2 = .08$ ,  $F(3,164) = 4.71$ ,  $p < .05$ ), and both components were significant predictors and in the expected direction (*achievement*  $\beta = .30$ ,  $p < .01$ ; *dependability*  $\beta = -.33$ ,  $p < .01$ ). These findings show a cooperative suppression effect (Cohen & Cohen, 1983), with a positive relationship between achievement and creativity and a negative relationship between dependability and creativity when both are entered together in a regression. Alone, neither the components nor the overall factor were related to creativity.

The regression analysis using the six facets was also significant ( $R^2 = .10$ ,  $F(7,160) = 2.45$ ,  $p < .05$ ). Table 3 presents the complete results for this regression analysis. In addition to the divergent thinking measure ( $\beta = .17$ ), two of the six facets had significant regression weights in the hypothesized direction: order ( $\beta = -.23$ ) and self-discipline ( $\beta = .28$ ). In addition, the deliberation facet was close to reaching significance and was in the hypothesized direction: ( $\beta = -.15$ ,  $p < .09$ ).

Finally, the results revealed that there was no interaction between Conscientiousness and divergent thinking. Neither Conscientiousness ( $\beta = -.01$ ) nor divergent

<i>Regression</i>	
Variable	R
Step 1	
Divergent thinking	.17
Step 2	.28
Divergent thinking	
Achievement	
Dependability	

\*  $p < .05$ ; \*\*  $p < .01$

<i>Regression</i>	
<u>Problem Solving</u>	
Variable	
Step 1	
Divergent thinking	
Step 2	
Divergent thinking	
Competence	
Order	
Dutifulness	
Achievement striving	
Self-discipline	
Deliberation	

\*  $p < .05$ ; \*\*  $p < .01$ ;

thinking ( $\beta = .15$ ) ( $R^2 = .02$ , *ns*), and conscientiousness and divergent thinking ( $\beta = .01$ , *ns*).

**Discussion**

Study 1 provided sup

**Table 2**  
*Regression of Creativity on the Components of Conscientiousness*

Variable	Study 1: Creative Activities		Study 2: Creative Problem Solving	
	R	Beta	R	Beta
Step 1				
Divergent thinking	.17*	.17*	.27**	.27**
Step 2	.28*		.36**	
Divergent thinking		.18*		.27**
Achievement		.30**		.28**
Dependability		-.33**		-.25**

\*  $p < .05$ ; \*\*  $p < .01$

**Table 3**  
*Regression of Creativity on the Facets of Conscientiousness*

Variable	Study 1: Creative Activities		Study 2: Creative Problem Solving	
	R	Beta	R	Beta
Step 1				
Divergent thinking	.17*	.17*	.27**	.27**
Step 2	.31*		.37**	
Divergent thinking		.17*		.27**
Competence		.11		.13
Order		-.23*		-.18*
Dutifulness		-.10		-.02
Achievement striving		-.02		.13
Self-discipline		.28*	.04	
Deliberation		-.15 <sup>+</sup>		-.09

\*  $p < .05$ ; \*\*  $p < .01$ ; +  $p < .09$

thinking ( $beta = .15$ ) predicted significantly when entered on the first regression step ( $R^2 = .02, ns$ ), and when entered on the second step, the interaction between Conscientiousness and divergent thinking was also not significant ( $beta = .00$ , overall  $R^2 = .02, ns$ ).

**Discussion**

Study 1 provided support for the major prediction concerning Conscientiousness in

that the overall Conscientiousness factor was not related to creative activities but the two Conscientiousness components were significantly related to creativity in opposite directions when entered simultaneously into a regression analysis (achievement was positively related and dependability was negatively related to creativity). These two components were strongly correlated with each other ( $r = .75$ ), supporting the argument that they are both aspects of Conscientiousness. This strong positive relationship suppressed the individual relationship each component had with creativity. This finding of suppression with these two components is consistent with Moon (2001).

The main limitation associated with Study 1 is that all measures were self-report, which may result in a common method bias. Common method bias can be a source of measurement error in that the variability being analyzed is due to the method of measurement as opposed to the constructs being measured, which can result in inflated or attenuated relationships (Podsakoff, MacKenzie, Lee, & Podsakoff, 2003). In addition, while the CACL measure of creative accomplishments is considered a measure of creative performance (Runco et al., 1990), it is still a self-report measure as opposed to a measure of creative performance where that performance is evaluated by independent observers. Finally, it is not common to find interpretable suppression effects as those predicted and found in Study 1. Also, the two components of Conscientiousness were highly correlated with each other, and using highly correlated predictors in the same regression model can cause regression weights to be unstable (Cohen & Cohen, 1983; Pedhazur, 1997). In order to address the above issues, Study 2 was designed to replicate the results of Study 1 using a non-self-report measure of creativity performance.

## STUDY 2

### Method

**Participants** Data for Study 2 were collected from 181 undergraduate students from a different Midwestern United States university than that used in Study 1. Participants again received course credit or extra-credit for participation. Of the 181 students, 135 were female and 30 were male (16 did not report their gender). Average age was 21.16 years ( $SD = 4.50$ ), and participants were fairly evenly distributed across academic year, though the percentage of first-year students was slightly higher (approximately 29% first-year, 18% second-year, 25% third-year, and 18% fourth-year or higher (remainder were no response)).

**Measures** The dependent measure in study 2 was creative problem solving. A role-play problem-solving exercise was used where participants were asked to assume the role of a student council president at a fictitious university. The main problem participants were asked to solve centered on a student council member who behaved inappropriately at a college football game after drinking too much alcohol. The incident resulted in negative publicity for the student council and the university as a whole. Participants were asked to record how they would perform as student council president in this situation.

A creative problem solution was defined as a solution that was judged to be both original and of high quality (Runco & Charles, 1993). Therefore, each problem solution was independently rated on originality and quality by three separate judges using five-point rating scales. Originality was defined as the degree to which a solution was unusual, imaginative, and not structured by the presentation of the problem information. Quality was defined as the degree to which a solution was viable, feasible, and

practical/appropriate. Judges were told to read all solutions and rate them on a scale from 1 to 5. The correlation between the two raters was .83 for the originality ratings and .82 for the quality ratings: (3,2) in Sheskin's test. The average scores for each problem were as follows:

For Study 2, CACL scores were significantly correlated with the CACL scores in Table 4. An analysis of variance was computed following the same procedure as in Study 1. The results are reported in Table 4. An analysis of variance was computed following the same procedure as in Study 1. The results are reported in Table 4. An analysis of variance was computed following the same procedure as in Study 1. The results are reported in Table 4.

Finally, divergent thinking scores were significantly correlated with the CACL scores in Study 2 so that the relationship between Conscientiousness and divergent thinking was significant in the role-play problem solving exercise (parking problem solving exercise) and the facets of divergent thinking (originality and dependability components). Finally, divergent thinking scores were significantly correlated with the CACL scores in Study 2 so that the relationship between Conscientiousness and divergent thinking was significant in the role-play problem solving exercise (parking problem solving exercise) and the facets of divergent thinking (originality and dependability components). Finally, divergent thinking scores were significantly correlated with the CACL scores in Study 2 so that the relationship between Conscientiousness and divergent thinking was significant in the role-play problem solving exercise (parking problem solving exercise) and the facets of divergent thinking (originality and dependability components).

### Results

Means, standard deviations, and correlations are reported in Table 4. A near zero correlation was found between the Conscientiousness factor and participant scores on the CACL measure of creative performance in Study 1, the achievement component of the CACL ( $p < .05$ ). Regression analysis supported the hypothesis that Conscientiousness predicts achievement ( $R^2 = .08$ ,  $F(1,160) = 6.65$ ,  $p < .05$ ), and both components of Conscientiousness predicted achievement ( $achievement beta = .08$ ,  $F(2,160) = 6.65$ ,  $p < .05$ ).

The regression analysis supported the hypothesis that Conscientiousness predicts achievement ( $R^2 = .14$ ,  $F(2,160) = 6.65$ ,  $p < .05$ ). Similar results were found for the quality component of the CACL ( $beta = .21$ ,  $F(1,160) = 6.65$ ,  $p < .05$ ).

Finally, results supported the hypothesis that Conscientiousness and divergent thinking were significantly correlated ( $R^2 = .08$ ,  $F(2,160) = 6.65$ ,  $p < .05$ ). Conscientiousness predicted divergent thinking ( $R^2 = .08$ ,  $F(2,160) = 6.65$ ,  $p < .05$ ).

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practical/appropriate, including the degree to which it addressed all problem issues. Judges were told to assign ratings using a relative scale and therefore were required to read all solutions before beginning the actual rating process. Interrater reliability was .83 for the quality ratings and .82 for the originality ratings (intraclass correlations: (3,2) in Shrout & Fleiss, 1979). A composite creativity score was computed by averaging each participant's originality and quality ratings.

For Study 2, Conscientiousness was again measured using the NEO-PI-R (Costa & McCrae, 1992). Reliabilities for the Conscientiousness factor and facets are provided in Table 4. An achievement component and a dependability component were computed following the same procedure as in Study 1 (the facets of competence, achievement striving, and self-discipline were combined to form the achievement component, and the facets of order, dutifulness, and deliberation were combined to form the dependability component).

Finally, divergent-thinking ability was also assessed as a proxy for creative ability in Study 2 so that it could be used as a control variable and so that the interaction between Conscientiousness and creative ability could again be assessed. As part of the role-play problem-solving exercise, participants were given information about a parking problem at their university (not enough parking spaces given the number of students). While still assuming the role of student council president, they were asked list as many ideas as they could for solving the parking issues. Their divergent-thinking or fluency score was the total number of ideas generated.

## Results

Means, standard deviations and correlations for Study 2 variables are presented in Table 4. A near zero correlation was again found between the full Conscientiousness factor and participation in creative activities ( $r = .07$ , *ns*). The dependability component of Conscientiousness was also not correlated with creativity. However, unlike Study 1, the achievement component was modestly correlated with creativity ( $r = .16$ ,  $p < .05$ ). Regression analysis examining the achievement and dependability components replicated the suppression effect found in Study 1, providing additional support for hypothesis 1 (see Table 2). The first variable entered, divergent thinking, was significant ( $R^2 = .07$ ,  $F(1,162) = 13.10$ ,  $p < .05$ ). The addition of the components significantly increased prediction of creativity (overall  $R^2 = .13$ ,  $F(3,160) = 7.94$ ,  $p < .05$ ), and both components were significant predictors and in the expected direction (*achievement beta* = .28,  $p < .01$ ; *dependability beta* = -.25,  $p < .01$ ).

The regression of creativity on the six Conscientiousness facets was again significant ( $R^2 = .14$ ,  $F(7,156) = 3.65$ ,  $p < .05$ ). Table 3 presents the full results for this analysis. Similar to Study 1, divergent thinking produced a significant regression weight (*beta* = .27) as did the order facet (*beta* = -.18).

Finally, results of Study 2 also failed to find an interaction between Conscientiousness and divergent thinking. Together, Conscientiousness (*beta* = .04, *ns*) and divergent thinking (*beta* = .27,  $p < .01$ ) significantly predicted creativity ( $R^2 = .08$ ,  $F(2,161) = 6.65$ ,  $p < .05$ ). Entered on the second step, the interaction between Conscientiousness and divergent thinking was not significant (*beta* = -.05, overall  $R^2 = .08$ ,  $F(3,160) = 4.59$ ,  $p < .05$ ).

**Table 4**  
*Descriptive Statistics and Correlations among Study 2 Variables*

Construct	Mean	SD	2	3	4	5	6	7	8	9	10	11
1. Creativity	2.49	0.75	.26**	.07	.16*	-.05	.17*	.14	.11	-.09	.01	-.01
2. Diverg. thinking	3.14	1.64	--	.11	.10	.10	.08	.07	.11	.07	.05	.10
3. Conscientiousness	3.36	0.39		.90	.92**	.87**	.69**	.81**	.84**	.66**	.73**	.60**
Components												
4. Achievement	3.42	0.48		--		.60**	.79**	.89**	.89**	.44**	.57**	.37**
5. Dependability	3.30	0.39			--	--	.41**	.52**	.60**	.77**	.76**	.74**
Facets												
6. Competence	3.52	0.46					.66	.59**	.53**	.25*	.39**	.29**
7. Achiev. striving	3.39	0.57						.72	.69**	.35**	.49**	.36**
8. Self-discipline	3.34	0.65							.82	.51**	.56**	.29**
9. Order	3.22	0.55								.67	.40**	.32**
10. Dutifulness	3.59	0.48									.61	.57**
11. Deliberation	3.10	0.52										.67

Note. Reliabilities are presented on the main diagonal.  
\*  $p < .05$ ; \*\*  $p < .01$

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GENERAL DISCUSSION

The purpose of these studies was to investigate the relationship between the components and the facets of Conscientiousness and creativity<sup>1</sup>. It was hypothesized that the full Conscientiousness factor would not correlate with creative performance but that the two components of conscientiousness would produce a cooperative suppression effect. Results supported this hypothesis. When entered together in a regression, the achievement component positively predicted creativity and the dependability component negatively predicted creativity, even after the effects of creative ability were taken into account (as measured by divergent thinking). The common element to both the dependability and the achievement components is that of hard work. Individuals who are high in either of these components will demonstrate what is viewed as Conscientiousness - hard work. However, it has been suggested that the reason for engaging in this hard work may differ. Some may do so because of their need for achievement and self-enhancement, or their self-focus, others may do so because of a sense of responsibility and duty, or their other-focus (Moon, 2001). Once that common element is removed, the unique aspects then show the pattern of relationships expected. These findings provide further support to previous research on the Big Five that suggested that the individual facets or components may serve as suppressors (e.g., DeYoung et al., 2007, Moon, Hollenbeck, Humphrey, & Maue, 2003). When facets or components are used individually instead of the full factor gains in validity may be found (Moberg, 1997; Moon, 2001; O'Connor & Paunonen, 2007).

This study provides further support to the call by some researchers in the arena of personality for the use of narrower variables rather than the full factors of the Five Factor Model (e.g., Costa, 1997; Hough & Furnum, 2003; O'Connor & Paunonen, 2007; Tett, 1998). It appears that the use of narrower variables may lead to not only better prediction but also better understanding of the relationship between personality and particular criteria when they are theoretically or conceptually matched. The results of this study also indicate that the use of the broader factor of Conscientiousness to predict creativity provides a limited and misleading picture. The factor of Conscientiousness was not related to creativity in either study conducted, whereas the use of the components resulted in significant prediction. Finally, several of the Conscientiousness facets also were significantly related to creativity in the two studies conducted and provided additional information about the specific relationship between Conscientiousness and creativity. The results of this study, therefore, provide support to the recommendation that the full factor of Conscientiousness should not be used as a predictor of performance when creativity is an important aspect of that performance (Hogan & Hogan, 1993).

This study also provides some clarity to the contradicting results in the literature regarding the efficacy of Conscientiousness as a predictor of creativity. A careful review of previous studies shows that Conscientiousness was found to be an inconsistent predictor of creativity, showing positive, negative, and zero relationships. However, if only certain aspects of the Conscientiousness construct were used, different results are likely to emerge. For example, Feist (1998) identified achievement as having a positive relationship with creativity in scientists, and Hough (1992) found that the achievement component positively correlated with creativity. These

<sup>1</sup> We have also evaluated whether Openness would affect these results. Including Openness did not meaningfully change the results.

9. Order	3.22	0.55	.67	.40**	.32**
10. Dutifulness	3.59	0.48	.61	.37**	
11. Deliberation	3.10	0.52	.67		

Note. Reliabilities are presented on the main diagonal.  
\*  $p < .05$ ; \*\*  $p < .01$

studies suggest that the type of narrower construct used would determine the relationship that is uncovered.

### Limitations

Although the results of these studies are important and provide support to other research in this area, several limitations should be considered. First, because both studies were conducted using university students, we were not able to obtain information regarding creative performance outside of a laboratory setting. Although there is no reason to believe these results are specific to college students, there might be unique aspects of creative performance as measured in these studies that do not mirror work-related or life-related creative performance. However, given that nearly identical results were found in two studies conducted at different universities and with different creativity criteria, and given that these results were predicted and similar to those found both in the creativity literature and personnel selection literature, these findings seem to not be limited to the samples or criteria chosen.

Another limitation of the studies presented in this article is the large proportion of female participants in both studies (over 70%), which prevented us from reliably testing for gender differences. Gender differences can significantly influence the interpretation of results using the FFM (Poropat, 2002), and there is some research evidence showing that in the United States, females tend to score slightly higher on conscientiousness (e.g., Lippa, 1995; Schmitt, Realo, Voracek, & Allik, 2008), which may have influenced the results of the two studies presented here. However, not all research has shown a gender difference in conscientiousness in the US (e.g., Costa, Terracciano, & McCrae, 2001), and the small amount of research exploring gender differences at the facet level is mixed with small effect sizes. Roberts, Bogg, Walton, Chernyshenko, and Stark (2004) found females scored slightly higher on reliability, order, impulse control, conventionality, and industrious whereas males scored slightly higher on decisiveness and formalness. Costa et al. (2001) found only one difference using the NEO-PI-R - males scored slightly higher on competence. Therefore, it appears that females may score slightly higher on the conscientiousness factor, though how that difference translates into specific facet or component differences and prediction differences using those narrower variables is still largely unknown and requires further research.

Finally, it is possible that the suppression findings reported here are artifacts resulting from the collinearity between predictors (Cohen & Cohen, 1983). However, several factors negate this suggestion. First, while three of the four zero-order correlations between each component and creativity across the two studies were not significant, they were all in the same direction as the regression weights. Second, the exact same suppression effect was found in two studies, and third, the findings correspond to both theory and past empirical findings regarding the relationship between personality and creative performance as discussed previously in this paper. Thus, it would appear that the suppression results found in these studies are not due to collinearity.

### CONCLUSIONS

The studies conducted provide important support to the growing body of research and theory calling for the judicious use of the broad personality factors and more use of the narrower components or facets when appropriate (Costa, 1997; Hogan & Holland,

2003; Moberg, 1997), other recent studies provide support for narrow components of Conscientiousness have started to gain attention. These findings, specifically regarding the dependability component, dependability, an intriguing notion, which is presented in this paper and discussed. However, additional research exploring the facets and components of the creativity domain and

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2003; Moberg, 1997), particularly when assessing creativity. However, while this and other recent studies provide a good start as to the contexts in which the broad factors or narrow components or facets should be used, more needs to be understood. We have started to gain an initial understanding of the contexts in which specific components of Conscientiousness may be more predictive, and the possible reasons for these findings. Specifically, the factor appears to be comprised of an other-oriented component, dependability, and a self-oriented component, achievement. This is an intriguing notion, which has now been supported by the findings of the studies presented in this paper and by other research (Gutkowski & Osburn, 1999; Moon, 2001). However, additional research supporting this idea is still needed, as is research exploring the facets and components that compose the other Big Five factors, both in the creativity domain and in other performance domains.

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