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The Role of the Environment in the Individual Difference and Creativity Relationship

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FLORIDA INTERNATIONAL UNIVERSITY

Miami, Florida

THE ROLE OF THE ENVIRONMENT IN THE INDIVIDUAL DIFFERENCE AND
CREATIVITY RELATIONSHIP

A thesis submitted in partial fulfillment of the

requirements for the degree of

MASTER OF SCIENCE

in

PSYCHOLOGY

by

Angela C. Reaves

2012

To: Dean Kenneth G. Furton
College of Arts and Sciences

This thesis, written by Angela C. Reaves and entitled The Role of the Environment in the Individual Difference and Creativity Relationship having been approved in respect to style and intellectual content, is referred to you for judgment.

We have read this thesis and recommend that it be approved.

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ABSTRACT OF THE THESIS
THE ROLE OF THE ENVIRONMENT IN THE INDIVIDUAL DIFFERENCE AND
CREATIVITY RELATIONSHIP

by

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Florida International University, 2012

Miami, Florida

Professor Victoria L. Pace, Major Professor

This study examined the relationship between several individual differences (openness to experience, conscientiousness, extraversion, creative self-efficacy, intrinsic motivation, and polychronicity) and creativity. It also examined how the organizational climate (support for creativity) moderated the relationship between the individual differences and creativity. All the individual differences except for polychronicity were positively correlated with creativity as well as support for creativity. Structural Equation Modeling (SEM) found that the individual differences explained 58% of the variance in creativity and that support for creativity moderated the relationship between conscientiousness and creativity and between extraversion and creativity. Because of noticed similarity between creativity and creative self-efficacy items, a factor analysis was done which confirmed some overlap. Implications of the findings of this paper are discussed.

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The Role of the Environment in the Individual Difference and Creativity Relationship

I. Introduction

Although still an emerging field in organizational psychology, considerable evidence exists that creativity can exponentially contribute to organizational productivity. Employees differ from one to another and there are more and less creative employees, ideas, behaviors, works, and jobs (Chamorro-Premuzic & Furnham, 2010). Creativity moves from an individual employee level to the organizational level. This process encompasses employees being creative in their own work, which aid the further development of the creative idea that is then passed through others to enhance the organization's creativity (Shalley, Zhou, & Oldham, 2004). Therefore, understanding what causes creativity to flourish and what may inhibit creativity is beneficial for organizational research. Creative ideas have the potential to add value to the organization. Both personal and contextual factors (Shalley & Zhou, 2008) can affect creative performance, so organizational psychology has placed most of its focus on determining which factors promote creative ideas.

The Nature of Creativity

Although there are several ways of describing and measuring creativity, most researchers have agreed on a definition. In general, creativity has been consistently defined to be both novel-original and useful-adaptive (Feist, 1998). Creativity should be a relatively uncommon response for it to be considered original (Simonton, 1999). However, being original is not always sufficient for creativity (Feist, 1998), and originality is not an absolute criterion because there are degrees of originality (Simonton, 1999). Another way to describe creativity is as the construction, renewal, and revising of

symbol systems in the arts and sciences (Helson, 1996). In other words, a product can be considered creative if old things are integrated in new ways, new relationships emerge from old ideas, or there is some new configuration of ideas (Russ, 1993). Organizational literature differs from general creativity literature because it stresses the useful component in the definition as much as the novel component. The useful component is important because those ideas have the potential to add value to the organization (Shalley & Zhou, 2008).

The above definitions of creativity imply that a concept does not have to be completely original to qualify as creative, but it does need to have a degree of originality, whether it is an uncommon response or a new way of looking at old ideas. In organizations, novelty occurs when the ideas are unique relative to other ideas currently available in the organization. Such ideas are considered useful if they can provide benefits to the organization either directly or indirectly, in the short or long term (Shalley et al., 2004). An example of adding direct and long term worth to the organization is developing a new product for the organization, whereas a slight adaption to a procedure adds indirect and short term value to the organization. Adopting the novel and useful definition of creativity considers everything from minor day-to-day changes in work procedures to huge scientific breakthroughs as creative ideas if they involve a new way of looking at things and serve a purpose for the organization.

Creativity vs. Innovation. Although sometimes used interchangeably and despite being closely linked to one another, it is helpful to understand the difference between creativity and innovation, especially for organizational psychology. Innovation includes both the ideation and application of new ideas (Shalley & Zhou, 2008). Innovation is

taking creative ideas and implementing them at the organizational or unit level. Creativity must exist for innovation, but innovation is not a requirement for creativity; creativity is simply a step in the innovation process (Shalley et al., 2004). Creativity is the seed of all innovation (Amabile, Conti, Coon, Lazenby, & Herron, 1996). So creativity is commonly viewed as the ideation component of innovation (Shalley & Zhou, 2008) and innovation is the successful implementation of creative ideas within an organization (Amabile et al., 1996). The process of innovation includes the adoption of the creative ideas, products, procedures that were invented elsewhere (Woodman, 2008). In organizations, innovation is taking the developed ideas and applying them, for example, by introducing new products or a way of doing things at work (West, 2002).

Creativity Theory. Past research and theories have defined creativity as something that involves development of a novel product, idea, or problem solution that has value to either the individual or to a larger social group. Through experimentation, researchers have focused on both the creativity of the product and the creativity of the person. In the creativity of products, creativity is more situation-dependent and in the creativity of persons, the view is on personality traits (Hennessey & Amabile, 2010). In other words, there can be two types of creativity – trait creativity and achievement creativity. Trait creativity is a latent trait that underlies creative behavior, and is necessary, but not sufficient for creative productivity. Achievement creativity is the novelty and usefulness of products; so basically, it can be the product of trait creativity (Eysenck, 1995).

Although studies that focus on the creativity of the person and the product are relatively common, creativity theory has extended beyond these two. Many creative

theorists have approached creativity through the four P's which includes the process, product, person, and place/press (Runco, 2007). Process is the mental mechanisms that underlie creative thinking or activity. Products can include any creative outcome from art to inventions. Products are the most objective approach to measuring creativity because others can view and judge products and therefore inter-rater reliability can be measured. Theory regarding the creative person focuses on the personality of creative individuals. Oftentimes creative individuals share personality traits such as intrinsic motivation, wide interests, openness to experience, and autonomy. The place/press approach seeks to learn what environments interact with the creative person to bring out creativity best, for instance, in climates that support originality, opportunities for exploration, and independence (Kozbelt, Beghetto, & Runco, 2010). The current research focuses on the personal creativity among individuals of varying personalities and creative inclination and how the creative place/press aids in promoting more creativity within the individual.

II. Literature Review

Organizational psychology has been increasingly turning attention to creativity in the workplace, to learn both about the human capacity of idea generation and how to address workplace issues that require creative solutions. A large portion of the studies are at micro levels, such as research on individual differences (Hennessey & Amabile, 2010). Historically, most of the research on creativity has examined individual differences (Shalley & Zhou, 2008). Many individual differences such as big five personality traits which are openness to experience, conscientiousness, extraversion, agreeableness, and emotional stability, (Batey, Chamorro-Premuzic, & Furnham, 2010; Feist, 1998; Furnham, Zhang, & Chamorro-Premuzic, 2006; Furnham, Batey, Anand, & Manfeild,

2008; Kelly, 2006; King, Walker, & Broyles, 1996; Ma, 2009; Wolfradt & Pretz, 2001), creative self-efficacy (Houghton & DiLiello, 2009; Tierney & Farmer, 2002), intrinsic motivation (Amabile, 1985; Prahbhu, Sutton, & Sauser, 2008), and polychronicity (Madjar & Oldham, 2006) have been found to share a relationship with creativity.

Research on these individual differences has greatly contributed to the understanding of creativity in organizations by giving organizational psychologists insight to the creative individual. Because personality traits are largely stable dispositions, these traits should predict creative outcomes across different times and situations (Chamorro-Premuzic & Furnham, 2010). However, situational variables, such as how much the organizational climate shows support for creativity, can also play a part in moderating the relationship between personality and creative outcomes. Both the creative individual and a creative environment can contribute to creative productivity in employees. Organizations benefit from knowing which traits and environments are conducive to creativity so they can select, place and train employees in order to correctly identify and develop creativity (Rank, Pace, & Frese, 2004).

Personality

Creativity research was originally focused at the individual level because creativity and personality both concentrate on uniqueness (Hennessey & Amabile, 2010). Personality is still a very popular topic of creativity research. Personality researchers believe that some individuals have more creativity than others, whereas some individuals may lack creativity entirely (Simonton, 1999). Several studies have focused on the relationship between individuals' personality characteristics and their creativity. Most of these tend to look at the big five personality traits which have been found to account for

10.6% of the variance in creativity scores (Furnham, Batey, Anand, & Manfeild, 2006) and as much as 22% of the variance in ideational behavior. Feist (1998) conducted the first meta-analysis on personality and creativity, which looked at both artistic and scientific creativity. The general finding was that individuals who were more creative were also more open to experience and less conscientious, with the largest effect size findings on these two personality traits. Openness to experience, agreeableness, and conscientiousness explained the largest portion (35%) of self-reported ideation behavior (Batey, Chamorro-Premuzic, & Furnham 2010). Several measures of the big five account for 5-8% of the incremental validity over hypomania (elevation of mood in mania) and fluid intelligence (thinking logically in novel situations) in creativity (Furnham, Zhang, & Chamorro-Premuzic, 2008).

Openness to Experience. Most studies have found openness to experience to be the personality trait that is most related to creativity (e.g., Batey et al., 2010; Furnham et al., 2006; Kelly, 2006; Wolfradt & Pretz, 2001), with Ma (2009) finding it to display one of the largest mean effect sizes associated with creativity at .71. Openness to Experience is not a surprising trait for creative individuals to have because the disposition of openness is a response style of approaching new ideas, people, and situations. It also encompasses imagination, flexibility, and being receptive to different things. Individuals high on openness to experience are likely to have more thoughts, feelings, and problem-solving strategies to help them develop creative ideas and solutions (Feist, 1998). These thoughts and problem solving skills can be combined to gain more creativity (Ma, 2009) through the generation of novel thought pairings and drawings of less obvious parallels to previously encountered problems and solutions. Batey et al. (2010) found openness to

experience to be significantly related to self-reports of creative achievement. Openness to experience also predicted psychometric creativity as measured by the Barron Walsh Test (Furnham et al., 2006). Kelly (2006) found openness to experience to be related to the Scale of Creative Attributes and Behavior that includes five components of creativity: engagement, cognitive style, spontaneity, tolerance, and fantasy. Creativity and openness to experience were also positively related in Wolfradt and Pretz (2001) where creativity was measured by written stories, personal hobbies, as well as creative personality. In Feist's (1998) meta-analysis, it was also found to have one of the largest effect sizes (median $d = .31$).

Extraversion. Although it goes against the stereotypical idea of the quiet, introverted artist, it is actually extraversion that has been more consistently and positively related to creativity rather than introversion (King et al., 1996; Wolfadt & Pretz, 2001). Extraverts have been described as energetic, bold, assertive, and adventurous (Goldberg, 1991). In Feist's (1998) meta-analysis, the more creative scientists were more extraverted, although this finding was mainly because of the confidence component rather than the social component of extraversion. Another finding was that younger scientists were less introverted. This could be because extraverts are better at expressing their ideas. It is also important to acknowledge that, on the basis of the definition of the low end of extraversion, those scoring low are considered to be over-controlled and emotionally bland and those scoring high are active, passionate, and willing to take risks. These last descriptors all sound like indicators of creative individuals (King et al., 1996) so the link between extraversion and creativity is not as surprising as it originally appears. However, there is still some disagreement on whether extraversion or

introversion is a better predictor of creativity. The reasoning for introversion to be related to creativity is that artists have been consistently found to be introverted because being alone is often a prerequisite of their creativity. Introverts can focus more on thinking and creating because they have the ability work independently and away from others (Feist, 1999).

Conscientiousness. Although conscientiousness and creativity do not initially seem to be related, conscientious work habits may actually inhibit creative production. Individual differences such as capacity for fantasy are indicative of an individual low in conscientiousness, but are actually relevant to creativity (King et al., 1996). In fact, research supports this in a few studies. Conscientiousness was found to be negatively related to creativity measured psychometrically by Furnham et al. (2006). Walfradt and Pretz (2001) found that low conscientiousness predicted story writing creativity, and Batey et al. (2010) found a negative relationship between conscientiousness and ideation behavior. However, conscientiousness was positively related to self-reported creative accomplishments from the past two years in individuals low in creative talent in King et al. (1996), suggesting the possibility that even if someone lacks creative ability, they can still produce creatively through high conscientiousness. Nevertheless, stronger support of a negative relationship is evident because not only did Feist (1998) find that, in general, creative individuals are less conscientious than non-creative individuals, but conscientiousness has one of the largest effect sizes (median $d = .30$) found in the meta-analysis.

Creativity Self-efficacy

Creative self-efficacy is a relatively new construct, and Tierney and Farmer (2002) have contributed to the understanding of the construct by developing a way to measure it. They believed that self-efficacy showed promise toward the understanding of creativity in organizations. To develop this construct, they used both self-efficacy and creativity literature and created items that were indicative of their new construct. Creative self-efficacy stems from Bandura's (1977) general self-efficacy and is simply defined as the belief that one has the ability to produce creative outcomes. Past research is supportive of the importance of self-efficacy for performance (e.g., Judge & Bono, 2001), and the development of creative self-efficacy suggests that the influence extends to employees' creative work performance, although how the process occurs is unique to the setting. For instance, organizational environment and working in an organization that supports creativity may affect the process of creativity. Creative self-efficacy falls within the self-image spectrum of characterizing creative individuals, but is unique from all the other self-views such as self-esteem and self-confidence. Creative self-efficacy differs from general self-efficacy because it is completely creativity-specific. Individuals are not only more confident in their abilities, but are also more likely to perceive opportunities to apply their creativity if they have higher creative self-efficacy (Houghton & DiLiello, 2009).

Tierney and Farmer (2002) have provided evidence that creative self-efficacy is both a valid and distinct construct by displaying discriminant validity with job self-efficacy through confirmatory factor analysis and examining the nomological network. Furthermore, it has also been established that multiple efficacies, such as job self-efficacy

and creative self-efficacy, come into play in creative work and there are differential criterion validities for the separate types of self-efficacy. These authors suggest that future research on creative self-efficacy should focus on identifying additional organizational and personal factors that promote a strong sense of creative capacity and exploring the influence of creative capacity on creative productivity in different contexts or settings.

Although this is a new construct, the small amount of research in the area has posited a significant and positive relationship between creative self-efficacy and creativity (e.g., Houghton & DiLiello, 2009; Karwowski, 2011; Tierney & Farmer, 2002). Karwowski (2010) found that creative self-efficacy was predicted by both creative abilities and self-reported originality. Both of these accounted for 12% of the variance in creative self-efficacy. Creative self-efficacy was also found to explain 5% of the variance in employee creativity in Tierney and Farmer (2002). Houghton and DiLiello (2009) found creative self-efficacy to be related to self-reported individual creativity at work in their military organizational sample as well. The findings from these few studies indicate a promising future for creativity researchers, especially in the area of individual differences because little research has connected creative self-efficacy to other traits related to creativity.

Motivation and Creativity

Feist (1998) concluded that motivation is a dispositional dimension of creative personality. Creative people are generally motivated by ambition and a need to work and do well and they require the perseverance, drive, and discipline to carry out their work. Creativity is not only about idea generation, but it also encompasses the expression of the

idea. Without the motivation to communicate the creative idea, there is no gain from the creativity. The need for expression establishes motivational orientation as an essential part of a creative individual. The proposition that there is a direct relation between motivational orientation and creative performance is the basis for most research on creativity and motivation (Hennessey, 2000).

Two basic types of motivation have been defined: intrinsic and extrinsic motivation. Intrinsically motivated individuals are driven by their own interest and involvement in the task. Extrinsically motivated individuals are driven by external goals, such as rewards or evaluation (Amabile, 1985). In general, research has proposed that intrinsic motivation is conducive to creativity and extrinsic motivation is almost always detrimental (Hennessey, 2001). Amabile (1985) hypothesized and found support for this negative effect. So much evidence supported this notion that the proposition has now become an undisputed principle (Hennessey, 2010).

Research has linked creativity with trait-intrinsic motivation (Amabile, Hill, Hennessey, & Tighe, 1994) as well as experimental manipulation of intrinsic motivation (Amabile, 1985). Prabhu, Sutton, and Sauser (2008) even found that intrinsic motivation partially mediated the relationship between openness to experience and creativity using self-report measures on university students. This finding of this mediation implies that openness to experiences predicts intrinsic motivation, which predicts creativity. Intrinsic motivation drives individuals to work out of interest, enjoyment and personal challenge (Hennessey & Amabile, 2010).

Hennessey (2010) states that hundreds of published investigations show that a promise of reward contingent on task engagement often only undermines intrinsic

motivation and creativity, a result that has been found in everyone from children to professional businessmen. In the face of expected reward or evaluation, individuals are more likely to play it safe and solve the problem at hand in a quick and efficient manner, not necessarily exploring creative options. Extrinsic motivation prompts individuals to take the most straightforward path toward solving a problem that involves as little risk as possible to reach their outcome. By taking this straightforward route, the work they do may be less than acceptable and lacking creativity. To produce something creative, it is necessary to remove oneself from environmental constraints, immerse in the problem, suspend judgment, and experiment. When individuals are focused on the extrinsic, they are less likely to explore alternative paths and creativity is not achieved. The majority of individuals produce safe and mediocre solutions when they are presented with expectation of a reward or evaluation (Hennessey, 2010).

Several theories have been used to link motivation to creativity. Sheldon (1995) used self-determination theory to explain how autonomy would result in creativity. The results of Sheldon's study found that individuals who were high on creative personality strived for self-determined reasons and also had autonomous motivational orientation. Self-determination theory posits that extrinsically motivated behavior is a form of nonautonomous or controlled behavior and intrinsic motivation is a form of autonomous behavior. Most research in self-determination theory has shown that controlling environmental factors such as reward or harsh deadlines can negatively influence the quality of functioning in many ways (Deci & Ryan, 1985). Extrinsically motivated behavior is less flexible, less satisfying, and less spontaneous (Sheldon, 1995). In contrast, autonomy and empowerment at work have been postulated as important factors

in the work environment for creativity. The theory behind this idea that autonomy is critical for creative productivity is that when employees feel a degree of ownership in or control over their work, they will have more intrinsic motivation and will be more likely to fully engage their cognitive processes in problem solving (Hennessy & Amabile, 2010). One study found that child-rearing practices that gave children more autonomy and freedom actually were related to creative potential in early adolescence (Harrington, Block, & Block, 1987). The current study seeks to confirm that trait intrinsic motivation is in fact the better predictor of creativity.

Polychronicity

Polychronicity is the extent to which people prefer to be engaged in two or more tasks simultaneously, and is considered to be a relatively stable individual difference characteristic. Basically, it is the preference for multitasking. It also encompasses the individual's belief that their preference is the best way to do things. Individuals who are polychronic prefer to be involved in several tasks at once, whereas individuals who are monochronic prefer to complete one task before they start another task (Slocombe & Bluedorn, 1999). As with other individual difference variables, people fall somewhere along the continuum of polychronic to monochronic (Conte & Gintoft, 2005).

Polychronicity has been receiving much attention from organizational researchers because it has many implications for job performance and work environments. Conte and Gintoft (2005) found that polychronicity was positively related to both customer service and sales performance. It is a relatively new construct and potentially interesting findings still await this area of research (Schell & Conte, 2008). Polychronicity has been found to provide incremental validity beyond the big five in predicting performance (Conte &

Gintoft, 2005). Polychronicity has been linked to creative behavior because of the increased use of problem solving processes by polychronic individuals when they switch from task to task (Chong & Ma, 2010), which requires them to tap into their creativity more.

In Persing's (1999) discussion about polychronicity and creativity, a convincing argument was made in favor of organizational researchers examining the relationship between polychronicity and creativity. First, individuals with creative jobs (such as engineers or scientists) often do not like to have external controls or manipulations placed on them at work. These jobs direct them instead to have polychronic work schedules that allow them to rotate from task to task. The lack of external controls allows them to choose to adopt a polychronic or monochronic work schedule. Secondly, there seems to be some overlap in the characteristics that define a creative individual with those that describe an individual who is polychronic. The overlap in creativity and polychronicity includes things such as broad interests, integration of diverse ideas and information, as well as being attracted to complexity. Persing (1999) made several interesting propositions regarding polychronicity and creativity that suggested a strong relationship between the two, such that creative individuals would have more tendencies toward polychronicity than monochronicity. Because of creative individuals' tendencies, creative performance should be higher in individuals with a polychronic preference. However, creative individuals may also become so absorbed in their work, they could also be likely to prefer monochronicity. Because relatively little research has been done in the area, the answer to this question still remains unknown.

Since Persing's (1999) propositions, very little research on the relationship between polychronicity and creativity has been done. Past research on polychronicity has primarily included research linking it to performance and personality (Conte & Gintoft, 2005), but some research has started to look at how this individual difference is related to creativity. For instance, Madjar and Oldham (2006) looked at the creativity of individuals rotating through idea generation tasks. Some completed each task before moving on to the next while others rotated through the tasks without completing them before having to move on to the next. The researchers also measured participants' polychronicity. The results indicated that the experimental condition they were put in interacted with polychronicity, such that individuals who preferred involvement with multiple tasks were more creative in the rotation condition whereas individuals who displayed a monochronic orientation were more creative in the condition where they completed the tasks one at a time. Further, Madjar and Oldham (2006) suggested that task rotation might enhance creativity if it is matched to the individual's polychronic preference. Despite the lack of much research in this area, there is clearly evidence presented to hypothesize a relationship between polychronicity and creativity. Situational variables may also enhance this relationship.

Environmental Factors

Climate. Organizational climate is defined as the overall meaning derived from the aggregation of individual perceptions of a work environment. These perceptions are a shared view that infers an organizational climate (James et al., 2008). Perception of the work environment extends from descriptions and perceptions at the individual, group, and/or organizational levels of analysis (West & Richter, 2008). Organizational climate is

an attribute of the organization that is compiled from certain attitudes, feelings, and behaviors that are reflective of the organization (Ekvall, 1987). It is the rules and social norms of the organization. As suggested by West and Richter (2008), having a safe, positive, and unpressured climate can contribute to individual and organizational creativity.

Employees view an organization that displays a climate for innovation as an organization that is overall supportive of creative endeavors. Innovative organizations have been described as places where there is a shared belief among their employees about what the organization is trying to achieve. These organizations encourage employees to contribute new and improved ways of working. Research findings suggest that innovation only occurs when there is strong support in the climate as well as efforts made to introduce new things (West & Richter, 2008). An organization that strives to promote creativity will focus on the place/press aspect of creativity to learn what environments interact with the creative person to bring out creativity best. These environments press the employees to be more creative (Chamorro-Premuzic & Furnham, 2010) by supporting originality, providing opportunities for exploration, and promoting independence (Kozbelt, Beghetto, & Runco, 2010).

Ekvall (1996) concluded that there are ten dimensions that are related to creative climate: challenge, freedom, idea support, trust and openness, dynamism, playfulness/humor, debate, conflict, risk-taking, and idea time. Challenge is the emotional involvement of the employees in the operations and goals of the organization. Freedom is independence of behavior in employees in the organization. Idea support is how new ideas are treated, whether or not there is encouragement or attention given to

new ideas. Trust and openness involve emotional safety in relationships with other individuals in the organization and open communication between all people. Dynamism is how eventful life in the organization is. New and exciting things constantly occur in the organization if the organization is high on dynamism. Having a playful and humorous environment involves spontaneity and a relaxed, fun atmosphere at work. Debate can also contribute to a creative organization when it involves encountering new ideas and different views, experiences, and knowledge. Conflicts are personal and emotional tensions and clashes. Risk taking concerns tolerating uncertainty within the organization. Finally, idea time is how much organizational time people can use to elaborate on their new ideas. An organization that challenges their employees, allows for freedom, supports creative ideas, has trust and openness, is dynamic, allows for playfulness and humor, has a fair amount of debate and conflict, allows for risk taking and idea time is conducive of a creative climate. Of particular interest for the development of a creative climate is idea support.

Support for Creativity. Support for creativity is the extent to which an organization is perceived as supporting the employees in functioning independently and in their pursuit of new ideas. Support for creativity can also extend to employees perceiving the organization as being open to change (Siegel & Kaemmerer, 1978). Support for creativity includes abstract concepts such as flexibility and encouragement (Scott & Bruce, 1994). Such support was related to innovative behavior in Scott and Bruce's (1994) sample of research and design employees. Organizations today must offer this support to remain competitive by producing and being receptive to innovation and creativity (Williams & Yang, 1999).

Ultimately, creativity is more likely to occur when there is support for it. The encouragement of creative thinking styles in organizations allows for more creative outputs. So rewarding and not punishing employees for their creative attempts is important, even if the attempts are unsuccessful (Williams & Yang, 1999). The encouragement refers to several different types. First of all, there must be support for risk taking and idea generation from all levels of employees. Next, an organization that displays support for creativity gives fair and supportive evaluation of ideas, because fear of unfair critique undermines creativity. Fair evaluation can also enhance intrinsic motivation, which, as previously discussed, is also closely tied to creativity. Thirdly, a focus on rewarding and recognizing creativity displays encouragement from the organization. Finally, collaborative idea flow across the organization can promote creativity. These four aspects of encouragement and support aid in increasing ideas and intrinsic motivation in employees that leads to more productive employees (West & Richter, 2008).

III. Present Study

Past research has found a considerable amount of evidence in support of several different traits being related to creativity. Some of these traits, such as certain big five traits and intrinsic motivation, exhibit consistent findings. Although research has only recently begun to look at relationships with creative self-efficacy and polychronicity, both traits show promise for the prediction of creative performance. However, it is important to look not only at the creative person but also to extend our knowledge about the creative place and press and how certain environmental conditions may interact with individual differences. Therefore, the main research goal of this thesis is to understand

how both individual and environmental characteristics contribute to creativity in organizations. This thesis seeks to test the following research hypotheses:

Hypothesis 1a: Openness to experience will be positively related to creativity

Hypothesis 1b: Extraversion will be positively related to creativity

Hypothesis 1c: Conscientiousness will be negatively related to creativity

Hypothesis 2: Creative self-efficacy will be positively related to creativity

Hypothesis 3: Intrinsic motivation will be positively related to creativity

Hypothesis 4: Polychronicity will be positively related to creativity

Hypothesis 5a-f: Support for creativity will moderate the relationships between individual differences and creativity such that perceived support for creativity will strengthen these relationships

IV. Method

Participants

Participants in this study were employed undergraduate students at a large Southeastern university. Originally, 447 participants had completed the study but after examining the data and deleting duplicates, the sample size was reduced to 353 usable surveys. Participants had to be employed for at least 20 hours a week to be eligible for this study. The mean age was about 22 years old ($M = 22.91$, $SD = 5.11$), 23% were male and 77% were female. The race/ethnicity was 73% Hispanic/Latino, 11% Caucasian, 10% Black/African American, 2% Asian, and the rest did not respond or considered themselves “other”.

Measures

Big Five. Big Five personality traits were measured using the Big Five Mini-Markers (Saucier, 1994). The measure is comprised of 40 adjectives that participants are asked to rate on a scale from 1 (*extremely inaccurate*) to 9 (*extremely accurate*) to indicate how well the adjectives describe them. Only 24 adjectives were used, 8 for each trait measured – openness to experience, conscientiousness, and extraversion. An example adjective for openness to experience is “imaginative,” an example adjective for conscientiousness is “organized,” and an example adjective for extraversion is “energetic.” There were both positively and negatively keyed items. Cronbach’s alpha for openness to experience was .75, .79 for extraversion, and .74 for conscientiousness.

Creative self-efficacy. To measure creative self-efficacy, Houghton and DiLiello’s (2009) measure was used. The measure of creative self-efficacy includes Tierney and Farmer’s (2002) original four items plus two more created for their study. An example item is “I feel that I am good at generating novel ideas.” Cronbach’s alpha was .83 for this measure.

Motivation. Motivation was measured by the Workplace Preference Inventory by Amabile et al. (1994) Work Preference Inventory. The Work Preference Inventory is comprised of 30 items, 15 of which represent intrinsic motivation orientations and 15 of which represent extrinsic motivation orientations. Participants were asked to rate on a 4-point Likert-type scale the extent to which each item describes them from 1 (*never or almost never true of me*) to 4 (*always or almost always true of me*). An example of an item that represents intrinsic motivation is “I’m more comfortable when I set my own goals” and an example of an item that represents extrinsic motivation is “I have to feel

that I'm earning something for what I do." There were both positively and negatively keyed items. Cronbach's alpha was .76 for intrinsic motivation.

Polychronicity. Polychronicity was measured using the Inventory of Polychronic Values from Bluedorn et al. (1999). The participants rated the 10 items on a 7-point Likert-type scale from 7 (*strongly agree*) to 1 (*strongly disagree*). An example item that is indicative of polychronicity is "I like to juggle several activities at one time." There were both positively and negatively keyed items. The measure had a .83 Cronbach's alpha.

Support for Creativity. Support for creativity is Factor 1 of the Siegel Scale of Support for Innovation (Seigel, 1978). It contains 24 items that participants used to describe to what extent their organization represents the item. A sample item is "this organization is always moving toward the development of new answers." There were both positively and negatively keyed items. Support for creativity had a Cronbach's alpha of .95.

Creativity. Creativity was measured using Zhou and George's (2001) 13-item scale where statements are measured on a 5-point Likert-type scale from 1 (*not at all characteristic*) to 5 (*very characteristic*). An example item is "often has new and innovative ideas." Participants rated themselves and were asked to have a co-worker complete the ratings as well. Creativity had a Cronbach's alpha of .93 for self-rated creativity and the coworker-rated creativity had a Cronbach's alpha of .94. The inter-rater reliability was .49. Eighty-six percent of the participants had a co-worker rating.

Procedure

Participants completed this study online and it took approximately one hour to complete. They were notified beforehand that they needed to provide a valid email address of a co-worker to complete their creativity rating and receive full credit for the study. They were first presented with the above-described scales, and then demographic information was collected. Participants were given one credit for completing the study with only their rating of creativity and two credits with a returned rating of creativity from their co-worker.

V. Results

Prior to analysis, the data were evaluated for multivariate outliers by examining leverage indices for each individual and defining an outlier as a leverage score four times greater than the mean leverage. No outliers were detected. Missing data bias was assessed by computing a dummy variable reflecting the presence or absence of missing data for each variable in the model and then this dummy variable was correlated with all other variables in the model as well as an array of demographic variables. No meaningful or significant bias was observed in any instance. Every variable had missing data for some respondents. Where missing data occurred, values were imputed using the Expectation-Maximization method with importance re-sampling as described in King, Honaker, Joseph and Scheve (2001). The imputations were performed using the computer program SPSS.

Table 1 presents the means, standard deviations, and correlations between the variables in this study. The correlations allow for the testing of hypotheses 1-4. The findings are described in the following paragraph.

Table 1.
Descriptive statistics and correlations for all variables

Variables	Mean	SD	1	2	3	4	5	6	7	8	9	10
1. Openness to Experience	6.89	1.02	1									
2. Extraversion	6.15	1.26	.30**	1								
3. Conscientiousness	7.26	0.97	.25**	.25**	1							
4. Creative Self-Efficacy	4.12	0.61	.57**	.29**	.32**	1						
5. Intrinsic Motivation	3.76	0.45	.48**	.27**	.24**	.49**	1					
6. Extrinsic Motivation	3.31	0.47	.10*	.05	.01	.19**	.09	1				
7. Polychronicity	3.46	1.05	.03	.03	-.03	.16**	.13*	.04	1			
8. Support for Creativity	3.55	0.77	.17**	.25**	.28**	.19**	.33**	-.06	-.08	1		
9. Self-rated Creativity	3.75	0.72	.45**	.32**	.32**	.57**	.49**	.06	.05	.45**	1	
10. Coworker-rated Creativity	4.16	0.74	.23**	.17**	.13*	.26**	.18**	.03	.02	.13**	.32**	1

N = 353, * $p < .05$, ** $p < .01$

Hypotheses 1a-c concerns the relationship between three of the big five personality traits and creativity. Hypothesis 1a predicted that openness to experience would be positively and significantly related to creativity. Evidence for this hypothesis was found for both the self-rating of creativity as well as the coworker rating of creativity ($r = .45, p < .01$ and $r = .23, p < .01$, respectively). Evidence for hypothesis 1b, that extraversion would be positively and significantly related to creativity was found for both the self-rating of creativity as well as the coworker rating of creativity ($r = .32, p < .01$ and $r = .17, p < .01$, respectively). Hypothesis 1c predicted that conscientiousness would be negatively and significantly related to creativity. The analysis found a significant relationship between conscientiousness and creativity ($r = .32, p < .01$ for self-rating and $r = .13, p < .05$ for coworker rating), however, the relationship was positive, which was in the opposite direction predicted. The result of the relationship between conscientiousness and creativity will be discussed later in this paper. Overall the results point to the conclusion that these three Big Five personality traits and creativity share significant relationships.

Hypothesis 2 predicted that creative self-efficacy would be positively and significantly related to creativity. The data provide evidence for this hypothesis for both the self-rating ($r = .57, p < .01$) and coworker rating ($r = .26, p < .01$) of creativity. However, a deeper look at these two constructs is discussed later with results from a factor analysis of these two constructs was completed.

Hypothesis 3 predicted that trait intrinsic motivation would be positively and significantly related to creativity. Again, evidence was found to support this hypothesis across the self-rating and coworker ratings of creativity ($r = .49, p < .01$ for self-rated

creativity, and $r = .18, p < .01$ for coworker rated creativity). Although not included in the hypotheses, the correlation between extrinsic motivation and creativity was also calculated. Extrinsic motivation was not significantly related to self-rating creativity ($r = .06$, n.s.) or coworker rating creativity ($r = .03$, n.s.).

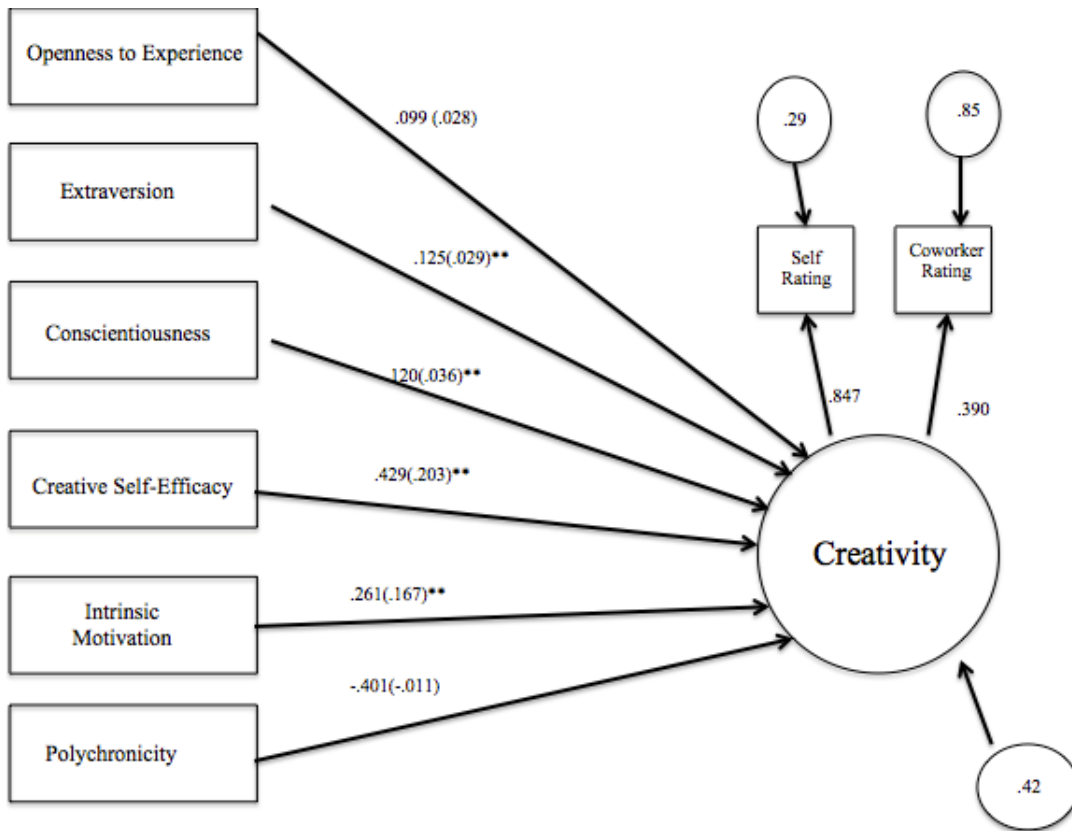
Hypothesis 4, which predicted that polychronicity would be positively and significantly related to creativity, was not supported for either the self-rating ($r = .05$, n.s.) or coworker rating ($r = .02$, n.s) of creativity.

A unique aspect of this study concerns the two ratings of creativity. It is possible to test the relationships between the independent variables and the two ratings of creativity separately; however, other avenues to test the relationship using both ratings at the same time were explored. After careful consideration, it was decided that moving into a structural equation modeling (SEM) framework would provide the most comprehensive understanding of the relationships between the variables. Structural equation modeling allows for modeling creativity as a latent variable, which simultaneously takes into account both the self and coworker rating of creativity. From here the independent variables can also be built into the model and a multiple regression can inform us of the relationships between the variables in the model.

Figure 1 presents a model in which all the individual differences are predicting the latent variable of creativity. The fit of the model was evaluated using AMOS 19 statistical software. The model was statistically overidentified, meaning there are more known than free parameters. A variety of indices of model fit were evaluated. The overall chi square test of model fit was statistically non-significant ($\chi^2 (5) = 2.49, p < 0.77$). Small chi-square and non-significant p values represent good fit. The Root Mean Square

Error of Approximation (RMSEA) was 0.00. RMSEAs below .05 are indicative of good fit, with 0 being perfect fit. The p value for the test of close fit was 0.95. Non-significant p values represent good fit. The Comparative Fit Index was 1.00 and the TLI was 1.03, both indicative of good fit as higher than .95 is desirable. The indices uniformly point towards good model fit. Inspection of the residuals revealed no significant points of ill-fit in the model. Figure 1 presents the parameter estimates. For purposes of presentation, the correlations between exogenous variables are omitted. The residuals are in standardized form and are reflective of unexplained variance in the endogenous variables. All paths except for openness to experience to creativity and polychronicity to creativity were significant. The standardized estimates are presented on the figure and the unstandardized estimates are in the parentheses. The unstandardized estimates are described here. For every one unit increase in openness to experience there was a .028 increase in creativity. For every one unit increase in extraversion, there was a .029 increase in creativity. For every one unit increase in conscientiousness there was a .036 unit increase in creativity. For every one unit increase in creative self-efficacy there was a .203 increase in creativity. For every one unit increase in motivation there was a .167 increase in creativity. Finally, for every one unit increase in polychronicity there was a -.011 decrease in creativity. Overall, the individual difference variables predicted 58% of the variance in creativity. The results found in SEM mirror what was found for the correlations, except the path between openness to experience and creativity was not statistically significant ($p = .11$).

Figure 1.

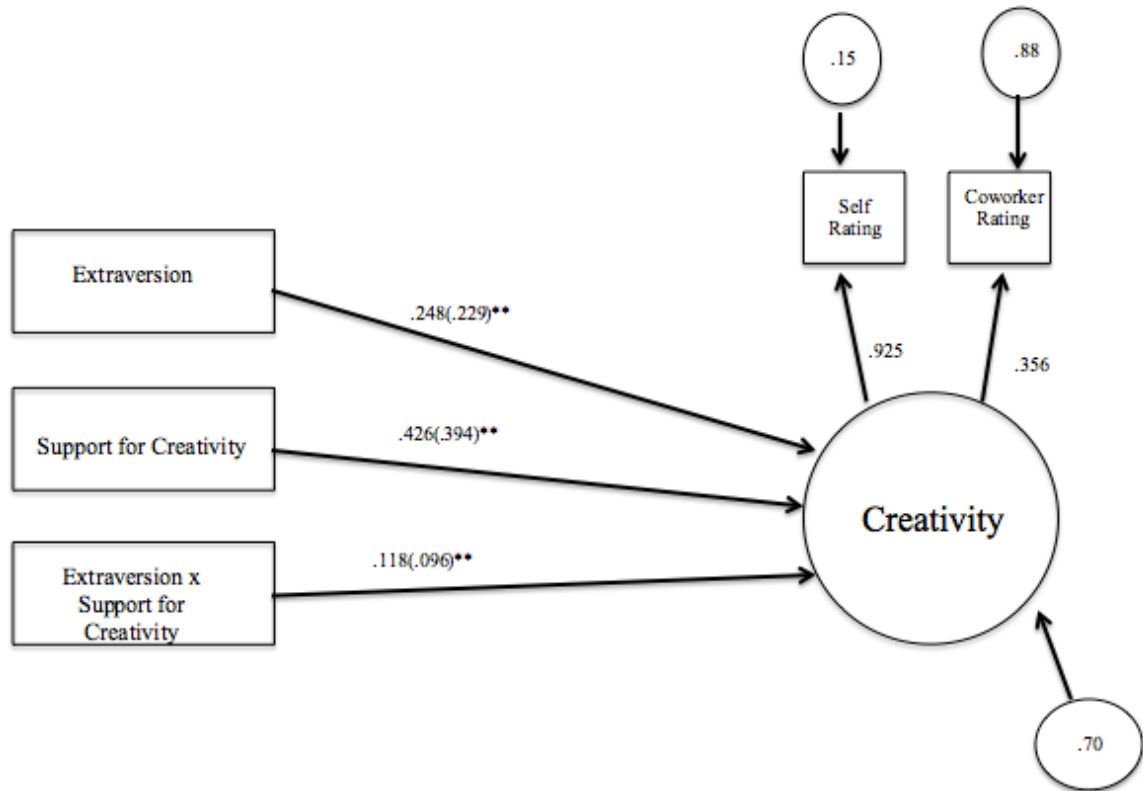


Note. N = 353, * $p < .05$, ** $p < .01$

Hypothesis 5 predicted that support for creativity would moderate the relationship between individual differences and creativity. In order to test these relationships, once again SEM was the most appropriate way to take both ratings of creativity into account. Prior to analysis, the variables were centered and interactions were computed. Support for creativity was found to be a moderator for both the relationship between extraversion and creativity and conscientiousness and creativity, confirming hypotheses 5b and 5c. Hypotheses 5a, 5d, 5e, and 5f were also tested but the interaction term to creativity path was not significant and therefore there was no moderation. Figures 2 and 3 present the results of the significant moderated models.

Figure 2 includes in the interaction of extraversion x support for creativity. The fit of the model was evaluated using AMOS 19 statistical software. The model was statistically overidentified. A variety of indices of model fit for figure 2 were evaluated. The overall chi-square test of model fit was statistically non-significant ($\chi^2(2) = 1.38, p < 0.50$). The Root Mean Square Error of Approximation (RMSEA) was 0.00. The p value for the test of close fit was 0.71. The Comparative Fit Index was 1.00 and the TLI was 1.03. The indices uniformly point towards good model fit. Inspection of the residuals revealed no significant points of ill-fit in the model. Figure 2 presents the parameter estimates. The standardized estimates are presented on the figure and the unstandardized estimates are in the parentheses. For purposes of presentation, the correlations between exogenous variables are omitted. The residuals are in standardized form and are reflective of unexplained variance in the endogenous variables. All paths were statistically significant. For every one unit increase in support for creativity, the slope from extraversion to creativity increased by .096 providing support for moderation.

Figure 2.

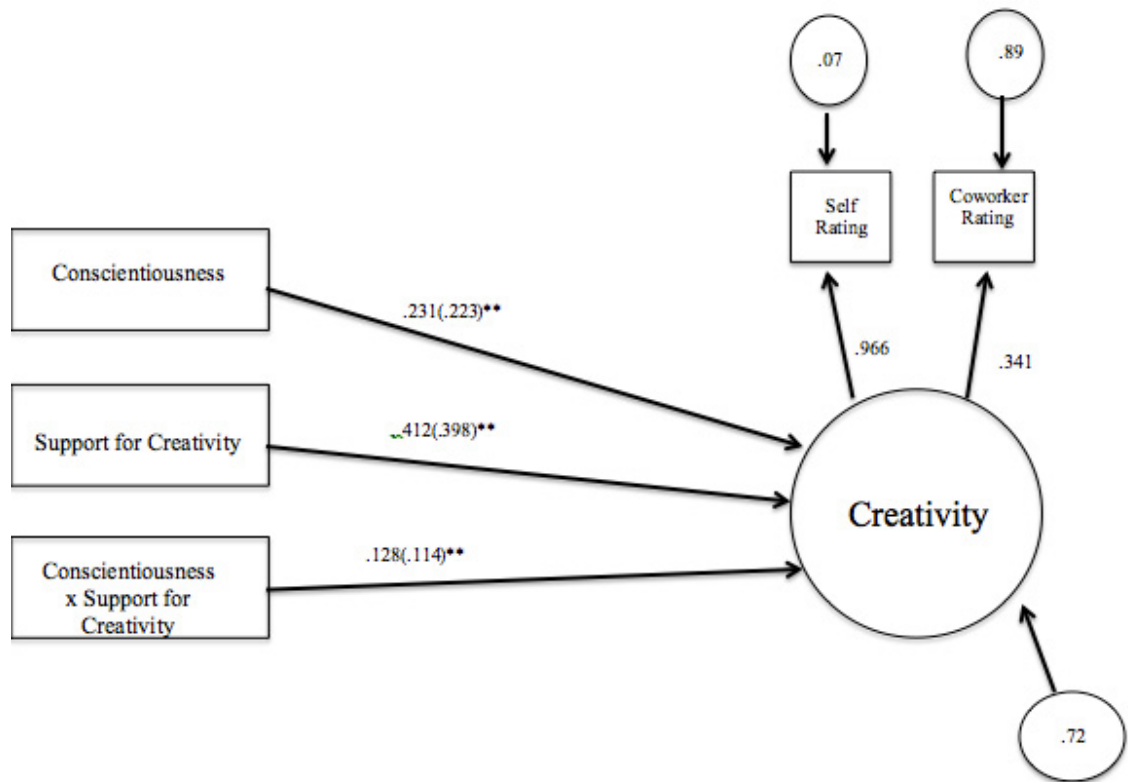


Note. N = 353, * $p < .05$, ** $p < .01$

Figure 3 includes the interaction of conscientiousness x support for creativity. AMOS 19 was used to evaluate the fit of the model. The model was statistically overidentified. A variety of indices of model fit for figure 3 were evaluated. The overall chi-square test of model fit was statistically non-significant ($\chi^2(2) = .418, p < 0.81$). The Root Mean Square Error of Approximation (RMSEA) was 0.00. The p value for the test of close fit was 0.91. The Comparative Fit Index was 1.00 and the TLI was 1.07. These indices uniformly point towards good model fit. Inspection of the residuals revealed no significant points of ill-fit in the model. Figure 3 presents the parameter estimates. The standardized estimates are presented on the figure and the unstandardized estimates are in

the parentheses. For purposes of presentation, the correlations between exogenous variables are omitted. The residuals are in standardized form and are reflective of unexplained variance in the endogenous variables. All paths were statistically significant. For every one unit increase in support for creativity, the slope from conscientiousness to creativity increased by .114 providing support for the moderator effect.

Figure 3.



Note. N = 353, * $p < .05$, ** $p < .01$

Although there were no specific hypotheses about the factor structure of creativity and creative self-efficacy, an exploratory factor analysis was conducted to see if there was overlap between the two constructs.

Principal components analysis was performed on the two variables creativity and creative self-efficacy. Principal components analysis was used because it is more psychometrically sound and conceptually less complex than factor analysis (Field, 2009). Two factors emerged with eigenvalues greater than 1, explaining 46.58% and 10.62% of the variance. These two factors explain a cumulative 57.21% of the variance. The factor loadings are shown below in Table 2. An oblique rotation was performed to facilitate interpretation of the factors because the variables are correlated. All creativity items loaded heavily on Factor 1. The six creative self-efficacy items loaded heavily on to Factor 2, however four of the items loaded slightly higher onto Factor 1.

Table 2.
Principal Components Analysis for Creativity and Creative Self-efficacy

Item	1	2
I come up with creative solutions to problems	.81	-.13
I come up with new and practical ideas to improve performance	.80	-.20
I often have new and innovative ideas	.77	-.15
I suggest new ways of performing work tasks	.75	-.30
I am a good source of creative ideas	.75	.12
I often have a fresh approach to problems	.74	
I suggest new ways to increase quality	.74	-.26
I suggest new ways to achieve goals or objectives	.74	-.32
I promote and champion ideas to others	.73	-.32
I develop adequate plans and schedules for the implementation of new ideas	.72	-.21

<i>I am good at finding creative ways to solve problems</i>	.67	.55
<i>I have confidence in my ability to solve problems creatively</i>	.65	.57
I search out new technologies, processes, techniques, and/or product ideas	.65	-.16
I exhibit creativity on the job when given the opportunity to	.64	-.13
<i>I feel comfortable trying out new ideas</i>	.58	.40
I am not afraid to take risks	.56	
<i>I feel that I am good at generating novel ideas</i>	.56	.45
<i>I have the talent and skills to do well in my work</i>	.37	.47
<i>I have a knack for further developing the ideas of others</i>	.45	.45

Note. Italicized items are Creative Self-efficacy items

V. Discussion

Overall, the findings of this study supported the hypotheses that both individual differences and the organizational environment contribute to creative performance. All of the individual differences except for polychronicity as well as support for creativity were significantly related to both self-rating and coworker ratings of creativity. When moved into a multiple regression in SEM, the individual differences explained a very large portion of the variance in creativity (58%). Overall this finding is consistent with past research that has found these individual differences to be major predictors of creativity.

Hypothesis 1c predicted that conscientiousness would be negatively related to creativity, however the relationship between conscientiousness and creativity was found to be in the opposite direction. After reexamining the literature, this relationship is not completely surprising. Most of the past research on conscientiousness and creativity that found a negative relationship has looked at creativity as some type of creative task such as story writing (e.g., Walfradt & Pretz, 2001). The measure used here focuses on creativity that is displayed on the job, which is a rarity in conscientiousness-creativity research. Also, looking back at Feist's (1998) meta-analysis, conscientiousness was negatively related to artistic creativity, but conscientiousness was positively related to scientific creativity. This finding poses an interesting question as to why many creativity researchers insist on either no relationship or a negative relationship between conscientiousness and creativity. It appears that individuals who are not artists may actually be both conscientious and creative.

The insignificant relationship between polychronicity and creativity (hypothesis 4) was unexpected, but ultimately informative. Persing (1999) made interesting propositions on why there should be a relationship between polychronicity and creativity, but the lack of research finding this association since then probably tells the full story that there really is not a consistent relationship there. Although Madjar and Oldham (2006) looked at polychronicity and creativity, their results indicated that individuals were more creative in the task rotation condition when they were polychronic, but individuals who were monochronic were more creative in the condition in which they did not rotate tasks. This finding brings up a point about polychronicity. Although it is an individual difference, polychronicity is still a preference, so creative individuals can either prefer to multitask or not, which could be why the results found in the current paper were statistically not significant. However, this null finding could be the result of to the nature of the sample as well. Undergraduates' preference for multitasking may not be developed yet and perhaps with an older organizational sample where multitasking is more salient, a relationship could be found.

There was, however, a positive significant relationship between polychronicity and intrinsic motivation as well as a positive significant relationship between polychronicity and creative self-efficacy. There are some possible reasons why this may have occurred. Intrinsic motivation may be related to polychronicity because people who are more intrinsically motivated are interested in different types of work and like to switch between them. No research in the past has yet connected polychronicity to motivation. Perhaps looking at this relationship further can provide a fruitful avenue of research. Creative self-efficacy may be related to polychronicity because individuals who

are more confident in their creative performance are likely to feel more comfortable switching between tasks. Chong and Ma (2010) found a relationship between creative self-efficacy and polychronicity, however, strong arguments have not accompanied this finding. Research should focus on why there is a relationship between polychronicity and creative self-efficacy, but not between polychronicity and creativity. Maybe looking at general self-efficacy and polychronicity may help researchers understand this relationship better.

Probably the most theoretically meaningful finding of this study is that both individual differences and the organizational environment contribute to creativity. Support for creativity moderated the relationship between conscientiousness and creativity, and between extraversion and creativity. These results suggest that even though these individual differences have not been highly associated positively with creativity in the literature, creativity can be enhanced by a supportive organizational climate. In this supportive environment, conscientiousness and extraversion predict creativity better. In other words, having an organizational climate that is supportive of creativity makes the relationship between conscientiousness or extraversion stronger with creativity. Although the moderation of support for creativity was only found for the extraversion to creativity and conscientiousness to creativity relationships, this finding is actually extremely interesting. Traits such as intrinsic motivation have been undeniably and consistently related to all types of creativity. Creative self-efficacy is also likely to highly relate to creativity. The research on extraversion and conscientiousness has been rather mixed, however, this study found that support for creativity strengthened the relationship between those traits and creativity.

Limitations

This study had some interesting findings but there are some limitations that should be noted. Despite the fact that this sample was an undergraduate student sample, many efforts were made to make this study more translatable to organizations. All participants were employed at least part time and had a coworker rate their creativity. Also, instead of viewing creativity as a task such as writing a story or painting a picture, the measure of creativity used in this study by Zhou and George (2001) taps into creativity that can be displayed on the job.

Although the study was strengthened by including both self and coworker rating of creativity, it should be noted that the inter-rater reliability between self and coworker ratings was only .49. Other studies, however, have found inter-rater reliability between self and other ratings around this level (e.g., Barrick & Mount, 1993). Additionally, in the Connelly and Ones (2010) meta-analysis of inter-rater convergence for the Big Five traits, the corrected reliabilities for all self-all other work colleagues were all around this same number as well, with the highest being just .53 for agreeableness. In other words, the convergence of self-ratings of personality with infinitely many co-worker ratings of the target's personality would not exceed .53 when corrected for test-retest reliability in self-ratings and inter-rater reliability in others' personality ratings. Further, they explain that if there is little convergence, then perhaps there is a deficient or contaminated source. However, the closer the inter-rater reliability is to one, the more redundant the two ratings are and little incremental validity can be achieved by having both a self and other rating.

Their findings indicated that having an other-rating of a trait produced increments in validity beyond self alone. The fact that 86% of the participants had a coworker rating and that both ratings could be taken into account at the same time by using the two ratings as indicators of the latent variable attempts to mitigate any issues this may have caused.

It should also be noted that the correlations between the independent variables and self-rating of creativity were larger than the correlations between the independent variables and co-worker rated creativity, although both sets of correlations were significant. Therefore, supplemental analyses on the ratings separately differ on some of the individual differences. When looking at the creativity ratings, it seems as if the self-ratings of creativity are driving the relationship in the SEM models more heavily than the co-worker ratings.

This brings up an issue of common method variance. Method variance is an artifact of measurement that may bias results if all the ratings are collected the same way (Spector, 1987). In this case, when all the measures were self-reported there may have been a response bias or other factor on the part of participants that partially accounts for shared variance among measured variables. However, there was no relationship between extrinsic motivation or polychronicity and the self-rating of creativity. This lack of significant shared variances helps to minimize concerns about common method variance here.

Another concern was that there was a strong correlation between the measures of creativity and creative self-efficacy as well as some observed similarities between items from the two scales, which hinted that there might be some overlap between the two

constructs. It could be that the scales are actually the same construct rather than one construct potentially leading to the other. The factor analysis confirms some similarity between the constructs, so future researchers using these two measures in the same sample should be cautious. Creative self-efficacy probably taps into both creativity and generalized self-efficacy. It might be better for future researchers to use “clean” scales rather than this scale, which combines the two constructs of creativity and self-efficacy. Also, using measures of creativity that are not so focused on organizational creativity or measuring creativity conceptualized in different ways, such as the creativity of products, may result in less overlap. Of course one would assume that creative self-efficacy would be highly predictive of creativity, but actual overlap between the constructs may cause problems. Perhaps improving the items may lead to less overlap. Creative self-efficacy is still a fairly new construct and not much research has been done on it so the findings here contribute to the literature on creative self-efficacy.

Implications

The present study contributes to the growing body of research on individual differences and creativity. The individual differences measured in this study (openness to experience, extraversion, conscientiousness, intrinsic motivation, creative self-efficacy, and polychronicity) contributed 58% of the variance in creativity. These six traits are responsible for over half of the variance, which is a substantial amount. As far as organizational creativity is concerned, both the individual and the organization are involved in creativity. This study found that not only are individual differences predictive of creativity, but the organizational environment also substantially contributes to creativity on the job. The individual differences component has implications for selection

and the support for creativity component has implications for organizational climate.

Both researchers and practitioners can benefit from this research that shows creativity can stem out of both individual's traits and the organization's attempts at fostering creativity through support. When selecting for creative jobs, organizations should look for employees who have the personality make-up of a creative individual. Although these employees may be creative on their own, the organization also plays a substantive role in fostering this creativity through support for creativity.

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