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Predicting individual creative performance from contextual factors

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PREDICTING INDIVIDUAL CREATIVE PERFORMANCE FROM
CONTEXTUAL FACTORS

A Thesis

Presented to

The Faculty of the Department of Psychology

San Jose State University

In Partial Fulfillment

Of the Requirements for the Degree

Master of Science

by

Kyla Ann Vandree

December 2005

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ABSTRACT

PREDICTING INDIVIDUAL CREATIVE PERFORMANCE FROM CONTEXTUAL FACTORS

by Kyla A. Vandree

This thesis considers the relationship between perceived factors in the work environment and creative performance. Two measures of creative performance were used: participants' perceptions of their creative performance and administrator ratings of creative suggestions. The researcher considered four contextual factors predicting creativity (psychological safety, communication, role conflict, and role ambiguity) along with three control variables (creative self-efficacy, organizational role, and tenure) in the analyses.

Results indicate that psychological safety and communication are important predictors of creative performance when they are measured through administrator ratings of creativity while creative self-efficacy and role conflict predict subjective ratings of creative performance. The inconsistent results between criterion measures have important implications for research in creativity. Limitations and opportunities for future research are also presented.

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Introduction

Creativity has become a topic of conversation across researchers and practitioners alike, largely because it is the first step in the innovative process and innovation is necessary for organizations to maintain a competitive advantage over others (Oldham and Cummings, 1996). In order for organizations to develop new and innovative ways of selling their products, improving their processes, and providing optimal service to their customers, they must have individuals within the organization who devote time to generating new ideas to engage in such improvements. Given this knowledge, the present study focuses on factors that might predict the generation of creative ideas. While there are individual differences that contribute to creativity, the focus of this paper is on the contextual factors that might predict creativity. The present study considers the relationship between environmental factors and creative performance, specifically looking at several role-related variables that either promote or hinder creativity.

Overview of Creativity

Creativity is most commonly defined as the generation of novel and potentially useful ideas about organizational products, practices, or procedures (Amabile, 1996). Ideas are novel if they are unique relative to other ideas currently available in the organization. They are considered useful when the ideas can potentially add value to the organization, either in the short- or long-term (Shalley, Zhou, and Oldham, 2004). It is important to note that this definition does not make assumptions about the relative importance of the idea. Ideas may be groundbreaking or simply a new way of processing

tasks effectively; both are considered creative if they are novel and can add value to the organization.

In studying creativity, it is also important to define what is *not* of relevance for this study. While this study is interested in the development of new and useful ideas, it is not concerned with whether these ideas are implemented within the organization. In other words, this study does not consider the degree of innovation, which is defined as a process involving the adoption, implementation, and incorporation of new ideas, practices or artifacts within an organization (Axtell, Holman, Unsworth, Wall, Waterson, and Harrington, 2000). Furthermore, this study is not interested in the mechanism by which creativity occurs in the individual. This study is solely concerned with what factors predict creative performance in individuals, assuming that creativity occurs in each individual.

Oldham (2003) presents an overarching model that outlines the factors influencing individuals' formulation of creative ideas as well as their willingness to share such ideas. The model includes contextual factors inside and outside of work, as well as personal factors that may influence the actual formulation of creative ideas. Within the contextual domain, Oldham suggests several factors that enhance individuals' likelihood of generating creative ideas. For instance, he argues that complex jobs and jobs with goal-oriented deadlines will promote the formulation of creative ideas. In addition, individuals who experience support from their supervisor and coworkers are more likely to generate new and creative ideas than those who do not receive such support. While some research has considered these factors (see Shalley et al., 2004 for review), much

remains unknown about the relationship between the environmental context and individual creative performance.

Work Environment and Creativity

A major part of the creative process is establishing an environment that supports the contribution and discussion of new ideas while minimizing potential inhibitors to the creative process. Numerous studies have shown that creative performance is a function of not only the individual but the environment in which he or she works (Amabile, Conti, Coon, Lazenby, and Herron, 1996; Axtell et al., 2000; Frese, Teng, and Wijen, 1999). In other words, what prompts individuals to generate creative ideas depends not only on the individual but also on what is happening in the environment. For instance, individuals who work in complex jobs, where they are able to exhibit independence in decision making and experience significant task variety, are more likely to exhibit creativity than their counterparts in more routine and less autonomous jobs (Oldham and Cummings, 1996). Other research has found that individuals in work teams were more creative when their team members were supportive and encouraging (Amabile et al.) and that employees are more likely to submit creative ideas to their organization's suggestion program when they have encouraging supervisors (Frese et al.). Thus, understanding what factors in the environment are related to creativity is important in understanding and promoting creativity in the workplace.

Following the work of Amabile et al. (1996), the current study considers the psychological context, or employees' perceptions of the work environment, in relation to creativity. Amabile and her colleagues developed a conceptual model for assessing

perceptions in the work environment that influence creativity. They proposed five broad categories of the work environment that influence creativity. Specifically, they argue that the encouragement of creativity (at all levels within the organization), having a sense of autonomy or freedom, having resources, experiencing work pressures or other organizational impediments are all related to the production of new and useful ideas. However, depending on the type of influence, these broad categories may be either positively or negatively related to creativity.

Amabile and her colleagues (1996) found support for their model, finding that environmental characteristics do in fact predict the degree of creativity in groups. Considering both factors that promoted or inhibited creativity, they found that work groups high in creativity experience significantly different work environments compared to work groups rated as low in creativity. Highly creative groups had higher degrees of environmental stimulants (factors promoting creativity) and fewer environmental obstacles (factors inhibiting creativity). These creative groups experienced challenging work, organizational and supervisory encouragement, support from their work group, autonomy, sufficient resources, and low levels of organizational impediments and workload pressure. Interestingly, the environmental characteristics that emerged as the most important in this study were challenging work, organizational encouragement of creativity, work group supports, and organizational impediments to creativity such as a culture that avoids risk or overly emphasizes the status quo. While environmental stimulants remain the primary predictors of creativity, these findings suggest that both stimulants and inhibitors are important to creativity in these groups. For instance, work

groups who experienced criticism for expressing new ideas and who worked in environments emphasizing the status quo rather than the exploration of new ideas and taking risks showed less creativity than those who did not experience such organizational impediments. Therefore, developing an environment that supports risk taking and the exploration of new ideas, and which also minimizes the barriers to generating new ideas seems important in promoting the creative process.

Environmental stimulants and obstacles in the work environment have also been found to mediate the effect of downsizing on creativity (Amabile and Conti, 1999). The number of environmental stimulants for creativity was significantly reduced during downsizing while the number of environmental obstacles increased. Furthermore, employees reported significant changes in creativity during the downsizing period. More specifically, they indicated lowered creative performance within the organization. As organizational downsizing is often characterized by a decrease in information flow and less autonomy in individuals' work (Cameron, Sutton, and Whetten, 1987, as cited in Amabile and Conti), it can be argued that these contextual factors would mediate the impact of downsizing on creativity. In other words, environmental factors, both stimulants and inhibitors, are strongly related to creativity, and changes in these factors can result in changes in creativity.

One important distinction in Amabile et al.'s (1996) model of creativity is its consideration of environmental and contextual factors at the level of individual perception. While individuals' perceptions may be different from organizational reality, such perceptions are what drive individual behavior (Amabile et al.), and are therefore

important in considering how the work environment relates to employee creativity. Thus, this model is ideal in providing a framework for the current study, as it considers environmental factors at the individual level of analysis.

Environmental Stimulants

Most research on environmental stimulants has focused on two aspects of the work environment: complexity of the job and encouragement received from coworkers, supervisors, and the organization as a whole (Oldham, 2003). Overall, it seems that supportive behavior by other members of the organization (coworkers, supervisors, managers) supports the development of new and potentially useful ideas. Research by Scott and Bruce (1994) suggested that supervisor behaviors are related to individual creativity in two ways. One, they can promote a climate that either supports or inhibits creative performance. Two, their expectations and acts of encouragement towards specific individuals may be related to individual creativity. Research supports this theory. Creative expectations and supportive behavior exhibited by supervisors is positively related to creative performance in individuals (Tierney and Farmer, 2004), even when individuals are dissatisfied with their jobs (Zhou and George, 2001).

Perceptions of psychological safety and communication. While encouragement of creativity is undeniably an important factor in promoting the development of new and useful ideas, there are many different constructs that relate to the overarching concept. For instance, one can consider organizational encouragement (e.g. recognition, rewards), supervisory encouragement (e.g. promoting employees' creative ideas, giving constructive feedback), or work group support (e.g. group commitment to creativity

goals) as constructs of support toward creativity (Amabile et al., 1996). All of these orientations are unique and contribute to the experience of feeling encouraged in the workplace, yet they do not completely capture dimensions related to individuals' perceptions of the overall work climate. For instance, do individuals feel that outside of individuals' acts of encouragement by their supervisor or coworkers, the work environment supports the development of new and useful ideas?

Two constructs that may be important in understanding this broader aspect of encouragement are psychological safety and communication in the work environment. These constructs consider whether individuals feel safe to take risks and share ideas without receiving criticism or ridicule, and whether individuals feel that the environment is conducive to open communication. Anderson and West (1998) suggested that individuals who feel safe enough to participate and voice their opinions are more likely to share their ideas pertaining to creativity. In a study considering how the team climate for innovation relates to creative output, the authors found that perceptions of a participative climate within the team, perceptions of how openly information was shared, and perceptions about interpersonal safety and trust were all important predictors of group innovation. In addition, Gilson and Shalley (2004) found that the teams who were more engaged in the creative process reported their team climate as more supportive of creativity. However, these studies were done under the context of group innovation, and did not consider how these environmental factors relate to individual creativity when no specific creative goal was in place. Despite this gap in the research, Oldham (2003) presents a "safe" and "encouraging" climate as necessary components in the work

environment for creativity to occur. Thus, research needs to consider the relationship between individuals' perceptions of the psychological safety of their work group and their own creative performance, as well as the relationship between perceptions of communication and creativity.

Psychological safety can be defined as the belief that the work unit or team is safe for individuals to take risks (Edmondson, 1999). Individuals in a psychologically safe climate feel they are able to "show and employ themselves without fear of negative consequences to self-image, status, or their career" (Kahn, 1990, p. 708). In such an environment, individuals should feel secure in developing and expressing new ideas, and confident that they will not be embarrassed or rejected for such behaviors. Edmondson argues that the perception of psychological safety stems from mutual respect and trust among team or unit members. As a result, individuals' concern about others' negative reactions to their ideas is alleviated because the group has established a climate for "safe sharing." While psychological safety is a relatively new concept and has not been considered in the creativity research, it falls into the more general category of organizational supports that have been greatly studied in the past decade. Individuals who perceive a sense of psychological safety should feel supported by their group or work unit, such that they feel open to share new ideas and get feedback with their coworkers, which in turn improves the quality of the ideas generated.

Perceptions of communication relate to individuals' belief in how readily accessible and open other individuals are to share thoughts and give feedback.

Woodman, Sawyer, and Griffin (1993) argued that in order to be creative, individuals

needed to be able to freely share their ideas with others and have an opportunity to gain feedback. Other researchers support this notion, saying that open communication between organizational units is an “essential ingredient” for creative production (Kanter, 1988, as cited in Williams and Yang, 1999, p. 375). Similar to the concept of communication, Anderson and West (1998) found support for the value of frequent interaction, involving regular contact with group members and open communication. While this construct is slightly different in its focus on the frequency of contact, its significance in predicting group innovation suggests that some dimension of communication is important for creativity to occur. Thus, perceiving an environment as open to communication might be the first step in generating and sharing creative ideas.

As previously mentioned, psychological safety and communication have not been previously considered as predictors of individual creativity. Therefore, it is necessary to consider research in related organizational domains to provide support for their inclusion in this study. One important distinction between creative performance and the traditional concept of job performance is that the former may not be a requirement for the position. Thus, when considering corollary support for this study, it is important to focus on research pertaining to extra-role behaviors. Two constructs that fulfill this need are pro-social behavior and personal initiative. Interestingly, a model of personal initiative presented by Fay and Frese (2001) is closely related to the model of creativity initially discussed by Oldham (2003). In it, the authors describe personal and environmental components that support the development of personal initiative. Personal initiative is defined as behaviors in which “an individual is taking an active and self-starting

approach to work and going beyond what is formally required in a given job” (Frese, Fay, Hilburger, Leng, & Tag, 1997, p.140). Environmental supports include control of work, job complexity, stressors, and support for personal initiative. Previous research on creativity has already established the relationship between creative performance and many of these variables (Amabile, 1996; Oldham & Cummings, 1996). For instance, job complexity and individual control (autonomy) are widely established as key predictors of creative performance. Thus, it can be argued that other dimensions that relate to personal initiative in this model might also relate to creative performance, especially as creative performance requires a substantial amount of personal initiative in order to develop new and innovative ideas. Using personal initiative research as a model, psychological safety might be a stimulant to creativity because it provides individuals with a sense of support from their coworkers and a feeling that they are free to take risks and generate new ideas without the threat of rejection or negative evaluation. Fay and Frese found support for the relationship between psychological safety and personal initiative, noting that perceived psychological safety was highly related to personal initiative when measured at both the team and organizational levels. Thus, there is corollary support for the relationship between psychological safety and creativity.

Research on pro-social behaviors also provides support towards the value of incorporating psychological safety and communication into the model of creativity. Pro-social behaviors are those which are intended to benefit another individual, the work group, or organization as a whole (George & Bettenhausen, 1990). In their examples of pro-social behaviors, Brief and Motwido (1986) present “suggesting ways to improve the

organization” as a form of pro-social behavior, implying that creativity is encompassed in the construct. They also identified various personal and contextual factors that relate to the engagement of pro-social behavior. They suggest that an organizational climate characterized by warmth, friendliness, supportiveness, and cooperation is positively related to individuals’ pro-social behaviors. They also suggest that individuals in cohesive groups are more likely to engage in pro-social behaviors than those in less cohesive groups. In other words, individuals who experience support from others in their environment are likely to engage in pro-social behaviors. Two forms of support might be psychological safety and perceptions of open communication, as well as the more traditional dimensions of supervisor support and organizational support.

While these constructs have not been explicitly considered in their predictive ability for individual creativity, research on how they predict group creativity and on how related construct predict creative performance provides adequate support for their consideration in this study. Thus, the following two hypotheses are proposed in regards to environmental stimulants and creativity.

Hypothesis 1: Perceived psychological safety will be positively related to creative behavior such that employees who perceive a higher degree of psychological safety will exhibit higher levels of creative performance.

Hypothesis 2: Perceived openness to communication will be positively related to creative behavior such that employees who perceive such openness in communication will exhibit higher degrees of creative performance.

Environmental Inhibitors

While various environmental factors can promote creative performance, a different set of environmental factors can simultaneously inhibit creativity. One major requirement in the creative process is the ability to spend time to think creatively and explore new ideas (Shalley & Gilson, 2004). A recent study found that individuals under time pressure were significantly less likely to engage in creative thought. The same study found that the availability of resources can limit creative output (Amabile et al., 1996). Another study found that barriers to submitting ideas negatively predicted submitting creative suggestions, while positive organizational responses (e.g., supervisor support, organizational responsiveness) had no effect (Frese et al., 1999). The impact of organizational and environmental inhibitors on creativity is not limited to time, resources, or organizational barriers for sharing ideas, however. External evaluation from coworkers or supervisors that involve critical judgments or is presented in a controlling manner negatively predicts creative performance (Shalley et al., 2004). Similarly, extrinsic rewards such as pay or recognition exhibit a negative relationship with creativity, the exception being individuals who work in simple jobs and who adapt to new procedures without question (Baer, Oldham, & Cummings, 2003).

Interestingly, Frese et al. (1999) found that these negative factors outweigh the positive contributors when it comes to predicting creative performance. Seemingly, while providing stimulants for individual creativity is intuitively appealing and is likely to be easier to implement, eliminating barriers for creativity are also important in attempting to enhance individuals' creative performance. This finding has not been

replicated in other studies, although it was noted that many studies measuring contextual factors did not include inhibiting factors (Gilson & Shalley, 2004; Oldham & Cummings, 1996; Scott & Bruce, 1994). The current study will consider this gap in the research and look at the differential predictive value of contextual factors which promote or stifle creativity.

Role stressors. Little is known about the relationship between role stressors and creative performance. Role stressors include role ambiguity, role conflict, and role overload (Glazer & Beehr, 2005). Since most jobs encompass many task requirements and responsibilities, it is likely that a job will be stressful if these requirements conflict with one another, are unclear, or include an unbearable workload (Rizzo, House, & Lirtzman, 1970). While Amabile et al. (1996) found that workload pressures in the form of extreme time pressure and unrealistic expectations for performance outcomes are also negatively related to creativity because they distract from the amount of time individuals can devote to the creative process, little else has been done in regards to role stressors and creativity. Thus, it is necessary to consider research in related domains. Looking again at pro-social behavior and personal initiative, research does not provide evidence towards a solid relationship between the constructs. Brief and Motowidlo (1986) suggest that role stressors may inhibit pro-social behavior. They argue that environmental stressors, among other things, affect interpersonal sensitivity and may therefore reduce individuals' attention in how they behave towards others. Other research supports this claim. Motowidlo, Packard, and Manning (1986) found that nurses who experienced stressors in the work environment were more frequently rated by their coworkers as less considerate,

less tolerant, and less sensitive towards others in the environment. Seemingly, role stressors such as these detract from the opportunity to engage in pro-social behaviors by focusing individuals' attention on obstacles they must address before they can consider anything else. As Brief and Motowidlo have identified creativity as a form of pro-social behavior, creative performance may be limited when role stressors are present.

On the other hand, role stressors are positively related to personal initiative (Fay & Sonnetag, 2002). In a longitudinal study considering the engagement of personal initiative, Fay and Sonnetag found that personal initiative was positively related to two types of role stressors: time pressures and situational constraints. They suggest that individuals exhibiting these types of stressors will work to alleviate the strain by taking personal initiative. While they tested the hypothesis for a curvilinear relationship, it was not supported in their study.

One interesting note about these studies is that they all consider a different type of role stressor. As mentioned earlier, the overall construct includes several types of stressors (Glazer & Beehr, 2005). Work overload can be categorized as a role stressor in that it refers to individuals who feel overwhelmed by the amount of work they have to accomplish within their work role. Similarly, time pressure can be considered a form of role stressor if it places tough requirements on employees for completing assignments. Two additional environmental stressors that contribute to role stress are role ambiguity and role conflict. Role conflict refers to the inconsistency in what an individual is expected to do, while role ambiguity refers to situations where individuals lack the necessary information to clearly understand the requirements of their position (Rizzo et

al., 1970). Rizzo and associates suggest that role conflict can cause a decrease in organizational effectiveness while role ambiguity is negatively related to job performance. In this sense, role conflict and role ambiguity can be negative predictors of performance. However, the question is how and to what degree role conflict and role ambiguity relate to creativity.

Taking a critical look at the research, it seems that role stressors may have a differential relationship with the construct of interest, depending on how role stressors and the criterion are defined. Considering time pressure as the criterion, it is positively related to personal initiative while negatively related to pro-social behavior. Stress may induce individuals to take personal initiative to relieve such stress, but may have adverse effects on pro-social behavior because individuals do not have time to engage in behaviors outside of their immediate job tasks. Of these constructs, creativity is most closely related to pro-social behavior because of its focus on behaviors that benefit others or the organization. In this sense, it might be hypothesized that individuals who experience low levels of role conflict might have time and energy to engage in creative thought whereas those who experience high levels of conflict are unable to focus on ways to improve because they are focused on resolving issues related to their role conflict. Similarly, individuals who experience low levels of role ambiguity will be more likely to show signs of creativity because they understand what is expected in their position and can therefore focus on ways to improve upon the position and the organization. Thus, the following hypotheses are proposed in regards to environmental inhibitors and creativity:

Hypothesis 3: There will be a negative relationship between role conflict and creative behavior such that employees with lower levels of role conflict will be more creative than employees with high levels of role conflict.

Hypothesis 4: There will be a negative relationship between role ambiguity and creative behavior such that employees with lower levels of role ambiguity will be more creative than employees with high levels of role ambiguity.

Control Variables

It is important to mention several control variables that are being used in this study. It can be assumed that for each of the hypotheses presented above, the proposed relationships will occur after controlling for individual creative self-efficacy, organizational role, and tenure. Recent research on creativity has focused on the role of creative self-efficacy in predicting creative performance. Indeed, the extent to which an individual feels confident about his/her ability to produce novel and useful ideas impacts the likelihood that the individual will engage in creative thought or performance. Creative self-efficacy refers to the belief that one has the ability to produce creative ideas and creative outcomes (Tierney and Farmer, 2002). Bandura states that “strong self-efficacy is a necessary condition for productivity and the discovery of ‘new knowledge’” because of its influential role on individuals’ motivation (Bandura, 1997, as cited in Tierney and Farmer, p. 1137). Research supports the notion that creative self-efficacy is positively related to creative performance. Tierney and Farmer found that individuals in both white-collar and blue-collar positions exhibited greater creative performance when they had higher levels of creative self-efficacy. Furthermore, they found that job self-

efficacy and creative self-efficacy had differential validity for predicting creative performance, and that creative self-efficacy had a stronger relationship with creative performance.

While creative self-efficacy continues to be an area of active interest in creativity research, the present study is interested solely in establishing evidence towards the relationship between creativity and several contextual factors. It is not interested in factors relating to individuals' personality or other personal differences. However, it is recognized that creative self-efficacy is an important contributor in the overall equation and may significantly contribute to individuals' creative performance. Thus, the present study will control for this variable prior to the analyses.

In addition, the current study will control for the potential relationship between individuals' organizational role and creativity. Characteristics of individuals' environment might be substantially different depending on whether or not they are in a supervisory role. For instance, supervisors may have more access to information about the organization and therefore more knowledge to draw from when developing creative suggestions. Amabile (1988) noted that "domain-relevant skills" are a necessary component for producing new and useful ideas. These skills include knowledge, technical skills, and a certain degree of talent relating to the job at hand. Similarly, Fay and Frese (2001) argue that in order to take personal initiative, individuals must have a thorough understanding of what the work requires in order to develop ideas of what needs to be improved. They found that in two different samples, job qualifications (knowledge and skills) were positively correlated to personal initiative. In some organizations,

supervisors may also experience greater degrees of autonomy, skill variety, and task significance, which are all positive predictors of creative performance (Shalley et al., 2004). Thus, there may be differential levels of creativity performance with respect to organizational role, which must be controlled for prior to the analyses.

Finally, individuals' tenure in the organization must be controlled for, as it has long been considered an indication of an individuals' knowledge and skills on the job. On the one hand, the extended experience may lead to "habitual" performance (Ford, 1996) and thereby decrease the likelihood of engaging in creative performance. On the other hand, the knowledge and task-familiarity gleaned from years of experience may facilitate the opportunity to engage in creative thought and thus show greater creative performance (Gilson & Shalley, 2004). Interestingly, a study considering the creative process of teams suggested a curvilinear relationship between tenure and creativity (Gilson & Shalley). The team that was most engaged in creativity had a moderate degree of tenure, whereas those with the highest and lowest organizational tenure exhibited significantly lower creativity. These studies indicate that tenure is clearly related to creativity and may have an impact on the current study. Therefore, it will be controlled for in the analyses along with organizational role and creative self-efficacy.

Summary

While creative self-efficacy and other personality factors have been well-established as important contributors to individual creativity, the role of environmental stimulants and inhibitors cannot be ignored. An individual with the "right" personality characteristics and who is confident in his/her abilities to think creatively may not show

signs of creative behavior if the environmental conditions do not support such creativity. For instance, if employees experience an overwhelming workload, they will not have the time or energy to devote to developing new and useful ideas for the organization. On the same note, if employees do not feel their immediate work environment is open to communicating new ideas or do not feel safe sharing such ideas with others, they may not engage in creative behaviors. Thus, the work environment can exhibit a strong relationship with individual creative performance, even after considering the role of individual differences in the creative equation. The present study will do just that, by investigating the relationship between individuals' creative behavior and psychological safety, open communication, role conflict, and role ambiguity. It is important to reiterate that this study considers individuals' *perceptions* of the work environment in relation to creativity. In other words, do individuals perceive that their environment is characterized by a sense of psychological safety and open communication? Do they perceive role stressors exist in the environment? Whether these characteristics actually exist in the environment is not of concern, as it is individuals' perceptions that are likely to drive behavior.

These research questions have important implications for organizations and will provide several unique contributions to the creativity literature. In regards to the academic literature, the present study will make several contributions. One, it will consider variables previously not studied in relation to creativity. As creativity research has focused on a narrow set of environmental stimulants, the consideration of psychological safety and climate for communication makes a large step towards

expanding on the knowledge about what other support factors are significant predictors of creative performance in individuals. Furthermore, research on stress and creativity has only considered work overload in relation to creative performance. The current study proposes that other role stressors may also relate to creativity, and in potentially different ways. Consideration of these new constructs will add important knowledge to the understanding of how the perceived work environment relates to individual creativity. Secondly, the current study uses two measures of the criterion variable in its analysis. Individuals are asked to rate their own creative performance, which will be used as a subjective rating of creativity. They are also asked to submit creative suggestions, which will be rated by two administrators to obtain a more objective rating of creativity. Using two measures will attempt to minimize the effect of participant bias in reporting. Comparing the results between the two measures of the criterion will also provide interesting information about the accuracy of individuals' perceptions of their own creative performance and about how accurate the environmental factors are in predicting creative performance across measures. As a final contribution, the present study uses a new sample population. Previous studies have used participants in positions where creativity is part of the job requirement (see Baer et al., 2003; Scott & Bruce, 1994; Tierney & Farmer, 2002, as examples). As many organizations do not have positions specifically devoted to such creative performance, but may still be concerned with creativity that promotes the improvement of the organization, it is important to consider voluntary creative performance. The present research extends the research by

considering creativity as an extra-role behavior, and focusing on creative suggestions made to improve the functioning of the organization.

Beyond providing evidence to organizations about what factors in the work environment can be improved to boost creative performance, the present study will look at how these contextual factors relate to individuals initiation of creative performance. The present study defines creativity as new and potentially useful suggestions for improving the functioning of the organization. While it was mentioned as a contribution to academic research, this definition goes beyond the traditional consideration of creativity as part of the job. Since many organizations are concerned with soliciting creative suggestions from employees on ways to improve organizational functioning, the present study will be a valuable starting point in considering this topic and what environmental factors promote such creativity.

Method

Participants

The study was conducted at a joint public and University library. Data were collected from employees in eight departments. All employees who were over the age of eighteen and within the departments of interest were asked to participate in the study. Participation in the study was voluntary, although participants were strongly encouraged to participate in order to voice their opinions about the relatively new library partnership. It is important to note that the current study was a subset of a larger study conducted at the library. Thus, the measures used in this study are only a portion of those given to the participants.

The response rate was 61%. Thirty-eight percent of the respondents were supervisors, and 31% worked part time. Twenty-seven percent of the participants reported that they were professional librarians. Other demographic information such as gender or ethnicity was not collected to maintain anonymity of the participants. Three subjects were removed from the original sample because they were under age 18 (a requirement for the study) or did not respond to the age question. Three additional subjects were removed because they did not respond to any questions pertaining to one or more of the constructs; therefore they were missing entire sets of data. No other problems were found that warranted changes to the data set. The final sample size was 164, with 99 participants providing one or more creative suggestions.

Procedure

Surveys were distributed to the unit heads within each department, who then distributed the surveys to the employees within their unit. Participants were instructed to complete and return the survey via inter-university mail within two weeks. Unit-heads were contacted one week after the surveys were distributed as a reminder to encourage participation in the study. With regard to the survey, participants were asked to respond to how they felt about their job, their coworkers, and the organization as a whole, drawing from experiences within the last month. They were also instructed to be as honest and accurate as possible; they were told that their responses would remain anonymous and confidential.

Measures

Perceived psychological safety. Perceived psychological safety was defined as the belief that it was safe to take interpersonal risks in the work team. The measure was taken from Edmondson (1999). The measure included seven items, with three items being reverse-coded. Participants were asked to respond on a five-point scale, ranging from strongly disagree (1) to strongly agree (5). For example, participants were asked to respond to the extent they agreed with the statement that “Members of this unit are able to bring up problems and tough issues.” Cronbach’s alpha in this study was .80.

Perceived openness to communication. Perceived openness to communication refers to individuals’ perceptions about how information is communicated within an organization. This study used a subset of the original communication climate measure, looking specifically at trust and openness in communication (Smidt, Pruyn, & VanRiel,

2001). The subset included five items. Sample items include: “When my colleagues tell me something, I trust them to tell me the truth” and “My colleagues are open to suggestions I put to them.” The response scale was a five-point scale, ranging from strongly disagree (1) to strongly agree (5). Cronbach’s alpha for the trust and openness in communication measure was .82.

Role stressors. Role stressors were assessed on a two-dimensional scale created by Rizzo, House, and Lirtzman (1970). Role stressors included role ambiguity and role conflict. Role ambiguity occurs when role demands are unclear or unknown. A sample item is: “Clear, planned goals and objectives exist for my job” (reverse coded). Role conflict occurs when an individual’s abilities or resources are incompatible with the requirements of a particular role or job requirement. For example, “I received an assignment without the manpower to complete it.” The role stressor scale included nine items, with the response choices ranging from strongly disagree (1) to strongly agree (5). Cronbach’s alpha for role ambiguity was .86; Cronbach’s alpha for role conflict was .80.

Creative performance. Creative performance was defined as the production of novel and useful ideas. Both subjective and objective measures were used in this study. Individuals’ subjective perception of their creative performance was assessed using a five item scale (Tierney, Steven & Graen, 1994; Zhou & George, 2001). Sample items include: “I am a good source of creative ideas” and “I generate novel and useful work-related ideas.” The five-point response scale ranged from strongly disagree (1) to strongly agree (5). Cronbach’s alpha for the subjective measure of creative performance was .91.

To obtain more objective ratings of creative performance, participants were asked to think of three creative suggestions for improving the functioning of the Library. To avoid confusion and ambiguity, creativity was defined for participants as “Ideas that are both unique and potentially useful.” Once the surveys were collected, these suggestions were compiled and rated by two top managers in the organization. These ratings were used as a second measure of individuals’ creative performance. Inter-rater reliability was assessed using James, Demaree, and Wolf’s (1984) r_{wg} index, and was .88.

Creative self-efficacy. Creative self-efficacy refers to the belief that one has the ability to produce creative outcomes, and was assessed using a four-item scale developed by Tierney and Farmer (2002). Participants were asked to respond to the extent to which they agreed with statements such as “I have confidence in my ability to solve complex problems.” The response scale ranged from strongly disagree (1) to strongly agree (5). Cronbach’s alpha for creative self-efficacy was .86.

Organizational role. In order to assess what individuals’ organizational role was in the organization, participants were asked whether they oversee others. Responses to this question were used as a basis to categorize the respondents into two groups for the analysis (supervisors and non-supervisors). In both samples, 38% of the respondents were supervisors.

Tenure. Participants were also asked their length of tenure at the organization. As individuals who have worked at the organization for a longer period of time might have more knowledge about the organization itself and a greater number of resources, it was important to control for this variable in the analysis.

Analyses

Before testing for the hypotheses, descriptive and correlation analyses were conducted to check for missing data, data entry errors, normality and linearity of the variables, and to obtain a general understanding of the relationship between variables. Random surveys were also chosen to check for data entry errors that fell within the response range. After the general data cleaning, Principal Components Analyses were conducted to ensure items loaded with the anticipated construct. The results of the principal components analyses were used as a basis for developing scale means for each construct. The reliability of each scale was also calculated. Once the scales were created, descriptive statistics including the scale mean and standard deviation were calculated. Correlations were also computed to assess the general relationship between variables prior to testing the hypotheses. Once the initial analyses were conducted, a hierarchical linear regression model was used to test the four hypotheses. The hypotheses were tested for both ratings of creative performance.

Results

In order to conduct the hierarchical regression analysis, it was first necessary to conduct inter-item correlations, factor analysis, and develop scale means for the constructs. Therefore, the results begin with a description of this process, specifically discussing the results of the factor and reliability analyses. The results then proceed to a discussion of the correlations among measures and the hypothesis testing.

Factor Analyses

Principal Components Analyses (PCA) was used to check the accuracy of the hypothesized models of environmental stimulants and environmental inhibitors. Both an exploratory analysis and a forced factor analysis were conducted for each model. As the items are inter-correlated, a direct oblimin form of rotation was used.

With respect to the environmental stimulants, the exploratory PCA revealed two factors, accounting for a total of 54% of the total variance. The first factor accounted for 43% of the variance and included all of the communication items and two psychological safety items. The second factor accounted for the remaining 11% of the variance and included all of the psychological safety items except one item. As shown on Table 1, one psychological safety item loaded on both factors, and was therefore considered a complex item. This item was removed from subsequent analyses. A second psychological safety item loaded with the communication items, as opposed to the other psychological safety items. The item read “It is difficult to ask members of this unit for help” (reverse coded), which seems to measure an aspect of communication. Thus, it was included with the communication items when developing scale means for the measures. As anticipated, the

results of the forced two factor solution mimicked the exploratory analysis, providing further evidence for the two-factor model of environmental stimulants. Looking at the item level, items pertaining to management being candid, trusting, and open in their communication loaded the highest, indicating their importance in perceptions of openness to communication. Items noting the absence of outright rejection and deliberate undermining of authority as well as openness to tough issues loaded highest for the psychological safety factor, indicating their importance for this dimension. The two factors were moderately correlated ($r = .49, p > .05$) but appear to be distinct constructs. Therefore, there is one factor measuring psychological safety comprised of six items and a second factor measuring open communication comprised of five items.

With respect to the environmental inhibitors, the exploratory PCA revealed two factors, accounting for 63% of the total variance. The first factor accounted for almost 49% of the total variance, and included items pertaining to role ambiguity as well as one item relating to role conflict. The second factor accounted for the remaining 15% of the variance and included all of the role conflict items. Table 2 presents the factor loadings of the items. While one role conflict item was considered a complex item, it was kept in the analyses under the role conflict construct because this measure only contains three items. The forced two-factor solution mimicked the exploratory analysis, providing additional support for this solution. With regards to the specific item loadings, items pertaining to understanding one's responsibilities and the expectations associated with the job loaded highest, indicating their importance in contributing to perceptions of role ambiguity. Items pertaining to having the manpower to complete tasks and not having to

bend rules to complete tasks were most important in contributing to perceptions of role conflict. The correlation coefficient between the factors was $r = .39, p < .05$, suggesting that they are related but distinct constructs. Therefore, there were two factors, the first measuring role ambiguity and comprising of six items; the second measuring role conflict and comprising of three items.

As two different measures were used for creative performance, it was necessary to conduct a factor analysis to determine if the measures, in fact, measure the same thing. Both an exploratory Principal Components Analysis and forced factor model were used. The exploratory PCA revealed two factors, accounting for a total of 75% of the variance. The first factor included all of the subjective items for creative performance, and accounted for 61% of the total variance. The second factor included the administrators' rating of creativity, and accounted for the remaining 15% of the variance. In the forced one-factor solution, the administrators' rating had a low loading while items from the self-report measure all had high loadings. This indicated that the two creative performance measures were distinct constructs and do not measure the same thing. The single-factor in the second PCA accounted for 61% of the total variance, as in the exploratory analysis. The items that loaded the highest for this dimension were related to perceptions of being able to generate novel and useful ideas, being a good source of such ideas, and making regular suggestions. As a result of the factor analysis, the two measures of creativity will be considered independently in subsequent analyses.

Reliability

Before creating scale means, the internal consistency of each measure was calculated based on the results of the principal components analyses. According to Nunnally (1978), a Cronbach's coefficient alpha that is greater than .70 is considered adequate. This criterion was used in evaluating the internal consistency of the measures included in this study. Coefficient alpha for the open communication scale was .82, which was considered acceptable. The final scale included all five communication items and one psychological safety item, totaling six items. The final psychological safety scale included five items and had an internal consistency of .80, which was also considered acceptable. Both the complex item ("People in this unit sometimes reject others for being different") and item loading on another factor ("It is difficult to ask other members of this unit for help") were removed prior to calculating coefficient alpha and the scale means.

In terms of role ambiguity, the coefficient alpha for the five initial items was .86, which was sufficient for use in this study. While one of the role conflict items was a complex item, it was retained in the final scale because of the small number of items for the scale. The coefficient alpha for the role conflict scale was .71, which was also deemed sufficient.

Finally, looking at the criterion, the coefficient alpha for the subjective creative performance scale was .91 and therefore considered internally consistent. As the more objective creative performance involved administrators' ratings of creative suggestions, it was necessary to determine inter-rater reliability (r_{wg}) of the ratings. According to Klein

et al. (2000), an r_{wg} equal to or greater than .70 suggests sufficient inter-rater reliability and justifies the aggregation of data. This rule was applied when determining if each suggestion had sufficient inter-rater reliability. Suggestions with r_{wg} below .70 were removed from the analyses as the raters did not agree on the degree of creativity in the suggestion. The remaining suggestions provided by a participant were aggregated to create a mean creative rating. Only six of the participants who made suggestions with insufficient inter-rater agreement did not have an additional suggestion to use in the analyses. The overall inter-rater agreement was .88 and was considered acceptable.

Correlations among Measures

Because only a portion of the total sample provided creative suggestions, the correlations and regressions analyses were conducted twice: once with the entire sample ($N = 153$) and once with the subset that provided creative suggestions ($N=86$). This way the results of the administrator's creativity ratings could be compared to the results of the subjective creativity ratings from the same sample of individuals, which could then be compared to the results of the larger sample. Generally the correlations within and between constructs were consistent across the two samples (Tables 1-2). Therefore, only the correlation coefficients from the entire sample (Table 1) are cited in the text, unless otherwise noted.

Looking within the environmental stimulant construct, psychological safety and openness to communication were correlated slightly higher than expected ($r = .64, p < .01$). This inter-correlation may be problematic in that the dimensions overlap enough that they do not individually provide a unique contribution to the variance accounted for

in the criterion. The environmental inhibitor constructs were also moderately correlated with each other ($r = .51, p < .01$), although not as high as the stimulants. Looking at the two measures of creative performance, the correlation coefficient was not significant ($r = -.05, p > .05$), supporting the findings of the factor analysis that the scales measure two distinct constructs.

As anticipated, correlations between the environmental stimulants and environmental inhibitors were all negative. However it was not expected that the relationships would be as strong and significant as they indicate through the correlation coefficients (Tables 1-2). It was noted that these correlations could be a potential problem in the regression analyses as they indicate considerable overlap in the constructs. Looking at the correlations between the predictors and the criterion, psychological safety was positively correlated with the subjective measure of creative performance in both samples ($r = .32, p < .01$ for the entire sample, $r = .31, p < .01$ for the subset). Communication was significant in both samples ($r = .34, p < .01$ for the entire sample, $r = .28, p < .01$ for the subset). Both predictors were also significantly correlated with the administrators' ratings of creative performance. The correlation coefficient for psychological safety was $.32, p < .01$ and was $.29, p < .01$ for communication. Interestingly, the environmental inhibitors were only significantly correlated with the administrators' ratings of creative performance ($r = -.29, p < .01$ for role ambiguity, $r = -.30, p < .01$ for role conflict) and were not significantly correlated with the individuals' ratings of their creativity in the subset of the sample. However, in the larger

sample, role ambiguity was significantly correlated with individuals' perceptions of their creative performance ($r = -.20, p < .05$).

Hierarchical Regression Analyses

Hierarchical linear regression analyses were used to test the hypotheses that environmental stimulants and inhibitors predict creative performance. Both self-reported ratings of creativity and administrator ratings of creative performance were used as the criterion, leading to two regression analyses for each hypothesis. Results from the analyses using the subjective creative performance criterion will be discussed first, followed by the analyses using the administrators' ratings of creative performance as the criterion. Before entering the main predictors, three control variables (creative self-efficacy, organizational role, tenure) were entered into the analyses. It was hypothesized that after controlling for these variables, environmental stimulants (psychological safety and communication) would continue to have a significant and positive relationship with creative performance (H1 and H2) whereas environmental inhibitors (role conflict and role ambiguity) would have a significant but negative relationship with creative performance (H3 and H4).

Predicting subjective perceptions of creative performance. The first regression analyses included the entire sample and used the subjective creative performance as its criterion. As can be seen in Table 3, the control variables (creative self-efficacy, organizational role, tenure) predicted a significant amount of variance in individuals' perceptions of their own creative performance, $R = .84, R^2 = .74, R^2_{adj} = .74, F(3,149) = 143.57, p < .001$. All three predictors made significant contributions to creative

performance, with creative self-efficacy contributing more than organizational role and tenure, $\beta = .84, p < .001$, $\beta = -.11, p < .01$, $\beta = -.09, p < .05$, respectively. The environmental stimulants did not significantly predict subjective creative performance above and beyond that of the control variables, $R = .86$, $\Delta R^2 = .001$, $F(2, 147) = .30, p > .05$. Thus, Hypothesis 1 and Hypothesis 2 were not supported. On the other hand, the environmental inhibitors were significant in predicting creative performance ($R = .87$, $\Delta R^2 = .01$, $F(2, 145) = 3.41, p < .05$). Of these inhibitors, only role conflict was a significant predictor of creative performance ($\beta = .12, p < .05$), providing partial support for Hypothesis 3, but not for Hypothesis 4. Contrary to the hypothesis, however, role conflict predicted creativity in a positive direction. Overall, this model accounted for 76% of the variance explained in subjective creative performance. It was noted that the role inhibitors only explained an additional one percent of the variance, suggesting limited practical significance in their predictive value towards creative performance.

Another regression analysis was conducted using a subset of the sample that provided at least one creative suggestion. As can be seen in Table 4, the control variables (creative self-efficacy, organizational role, tenure) were again significant in predicting subjective creative performance, $R = .88$, $R^2 = .77$, $R^2_{adj} = .76$, $F(3, 82) = 91.71, p < .001$. However in this subset, only creative self-efficacy and tenure were significant predictors ($\beta = .85, p < .001$, $\beta = -.12, p < .05$, respectively). Neither the environmental stimulants ($R = .88$, $\Delta R^2 = .001$, $F(2, 80) = .17, p > .05$) nor the environmental inhibitors ($R = .88$, $\Delta R^2 = .01$, $F(2, 78) = 1.64, p > .05$) were significant predictors of self-reported creative performance in this subset. Thus, the regression analyses using the subjective creative

performance as the criterion provided minimal support for the hypotheses. One important note is that the power of this analysis was significantly reduced by the small sample size, which may have contributed to the differences in results compared to the entire sample. This model explained 77% of the variance in subjective perceptions of creative performance.

Predicting administrator ratings of creative performance. Interestingly, the results from the regression analysis using administrators' ratings of creative performance as the criterion show remarkably different results. As can be seen in Table 5, none of the control variables in this model (creative self-efficacy, organizational role, tenure) were significant predictors of creative performance, $R = .20$, $R^2 = .04$, $R^2_{adj} = .01$, $F(3, 82) = 1.15$, $p > .05$. However, the environmental stimulants were significant predictors of creative performance ($R = .39$, $\Delta R^2 = .11$, $F(2,80) = 5.25$, $p < .01$), with both psychological safety and communication providing significant contributions, ($\beta = .20$, $p < .05$, $\beta = .19$, $p < .05$, respectively). When the environmental inhibitors were entered in the final step, they did not account for significant additional variance in creative performance, $R = .42$, $\Delta R^2 = .03$, $F(2,78) = 1.21$, $p > .05$. Thus, in this sample only psychological safety and communication appear to be important predictors of administrator ratings of creative performance, which contrasts the findings presented for the subjective creative performance rating. The two predictors accounted for 18% of the variance in the administrators' ratings of creative performance.

Post-hoc Analyses

Since individuals assessed their creative self-efficacy and overall creative performance at the same time, there is a high potential for common method variance in these responses. To check this, two principal components analyses were conducted with the items from these two scales. The exploratory analysis revealed a single-factor, with creative self-efficacy and creative performance items loading together. The solution accounted for 66% of the total variance. When a forced two-factor solution was run, all but one item loaded on the first factor. Items loading highest on the factor loading were related to individuals' perceptions of being good at generating ideas, being a good source of ideas, generating novel and useful ideas, and suggesting creative ways for performing tasks. The item relating to developing adequate plans and schedules for developing new ideas was the only item to load on the second factor, and the item pertaining to individuals' ability to further develop others' ideas was a complex item. The forced two-factor solution accounted for 67% of the total variance. Since only one item loaded on the second factor, both the exploratory and forced-factor analyses seem to suggest that the operationalization of creative self-efficacy and subjective creative performance confounded the results.

Discussion

The present study was designed to assess the relationship between contextual factors in the work environment and individual creative performance. The study proposed that two environmental stimulants, psychological safety and communication, would positively predict creative performance, after controlling for creative self-efficacy as well as individuals' organizational role and tenure. It also hypothesized that two environmental inhibitors, role conflict and role ambiguity, would predict creative performance, after controlling for the three variables mentioned above. The results provide moderate support for the predictive value of environmental stimulants and inhibitors in relation to creative performance. Psychological safety and communication were both positive predictors of creative performance when it was rated by administrators. Role conflict was a significant, but surprisingly positive, predictor of subjective ratings of creative performance. Possible explanations for this finding, as well as a deeper consideration of the results are discussed in the following sections.

A Deeper Consideration of the Findings

The stark difference in results with respect to the criterion used to measure creative performance provides interesting discussion points and raises questions about how to appropriately measure creativity. Creative self-efficacy significantly predicts subjective perceptions of creative performance, with tenure, organizational role, and role conflict also adding a small amount of predictive value. However, psychological safety and communication were the significant predictors of creative performance when it was rated by administrators. Drawing from these results, there are four conclusions that can

be considered. One, ratings of creative performance differ substantially with respect to the source of the rating. Seemingly, the criteria individuals and administrators use when rating creative performance is different, resulting in different creativity ratings. Two, subjective perceptions of creative performance are closely tied to creative self-efficacy. One explanation may be that individuals use perceptions of their creative self-efficacy in building a rating of their actual performance, thereby blurring the lines between these two constructs. Three, environmental stimulants are important predictors of the creativity when it is measured by organizational administrators. The results indicate that both environmental stimulants (psychological safety and communication) are important variables in administrators' ratings of creativity, despite their non-significance with subjective ratings of creative performance. Four, role conflict may act as a suppressor variable in predicting creative performance. The following will discuss these findings in further detail.

The predictive value of contextual variables. The findings provide some support for the consideration of new contextual factors that may contribute to the presence (or absence) of creative performance. Both psychological safety and communication were new contextual variables in the creativity research, yet both seem to provide unique contributions to variance explained in creative performance. Looking at the specific nature of the relationship, individuals who experience a psychological safe environment and work in an environment open to communication will exhibit higher creativity than individuals in environments lacking these characteristics. These findings diverge slightly with the model put forth by Oldham (2003). The current study suggests that aspects of

the work environment are significant predictors of creative performance, and not just predictors of individuals' willingness to share their ideas. Specifically, working in a "safe" environment that is characterized by open communication will promote a sense of creativity in the environment. However, Oldham has suggested that such contextual characteristics operate specifically on individuals' willingness to share ideas. The current findings would extend his model to include a relationship between the work context and the formulation of creative ideas.

While creativity research has previously encompassed role stressors, it has not included role conflict or role ambiguity. The present study suggests that role conflict significantly predicts subjective perceptions of creativity, such that individuals who experience greater role conflict will be more likely to engage in creative behavior. This finding contradicts the hypothesized relationship between creativity and role conflict; however it is not completely discordant with previous research. Looking back to the research, the relationship between role stressors and creativity can be modeled after two other constructs: personal initiative and pro-social behavior. The hypothesis generated for this study was modeled after pro-social behavior, and predicted a negative relationship between role conflict and creativity. However, a hypothesis modeled off of personal initiative theory would predict a positive relationship between these constructs. For instance, Fay and Sonnetag (2002) found that individuals experiencing time pressures or situational constraints worked to remove the strain by taking personal initiative. A similar phenomenon may happen for creativity and role conflict. When individuals

experience conflict between aspects of their position, they may engage in creative thought to generate ideas for ways to alleviate the strain caused by the conflict.

One important note about the relationship between role conflict and creative performance, however, is that there may be a suppressor effect occurring. According to Conger (Conger, 1974, as cited in Tzelgov & Henik, 1991), a suppressor variable increases the validity of another variable by its inclusion in the regression equation. Tabachnick and Fidell (2001) further explain that the suppressor variable enhances the prediction because the magnitude of the effect of the first variable is greater with the suppressor variable. Role conflict was not significantly correlated to creative performance in the bivariate correlations, but showed a significant and positive beta weight in the regression. Role ambiguity, however, was significantly correlated to creative performance at the bivariate level, but was not significant in the regression. Therefore, the variables fit the model for a suppressor effect, in which role ambiguity is the suppressor and enhances the predictive value of role conflict. If this is the case, then both variables must be considered in relation to creative performance. Further research should consider the relationship between various role stressors and creativity to more closely define the relationship between these constructs.

Looking at the results of this study in a broader context of environmental stimulants and inhibitors, the current study generally supports previous work on contextual factors and creativity. For instance, Tierney and Farmer (2004) found similar results in a sample of R&D employees. In a study using structural equation modeling, they found that creative self-efficacy significantly predicted an objective measure of

employee creativity. However, only the individual level and demographic variables in their analysis were significant predictors of creative self-efficacy, while environmental factors significantly predicted actual employee creativity. Thus, there is support for a model of creativity that includes creative self-efficacy, but not as a sole contributor of creativity. Environmental factors such as those found in the current study and those found in previous studies are important contributors to creative performance.

Comparing creative self-efficacy and creative performance. The absence of creative self-efficacy as a significant predictor for the administrator ratings of creative performance sparks curiosity in its overall relationship to creativity. Looking at the high correlation between creative self-efficacy and subjective perceptions of creativity as well as the post-hoc analysis, it seems that participants may confuse these two constructs in their subjective ratings for both. For example, participants may have considered how creative they *thought* they were rather than considering *actual instances* of creativity when answering the questions measuring creative performance. In this sense, they may have confused their actual behaviors with their perceptions of creative self-efficacy. Thus, the lingering question is whether individuals actually differentiate between their creative self-efficacy and creative performance or if the findings in this study are specific to the particular sample of library employees and therefore do not generalize to other populations. The researcher was unable to find other studies looking at differences in individuals' perceptions of their own creative self-efficacy and subsequent creative performance. This gap in the literature will be discussed in the implications section to follow.

Differences in ratings of creative performance. As discussed in the results, a Principal Components Analysis with both self-reported and administrator ratings of creative performance revealed two distinct factors. Thus, individuals' ratings of their own creative performance did not concur with administrators' ratings of their submitted creative suggestions. Either individuals were unable to reliably rate their own creative performance such that it mirrored the ratings of administrators, or they were assessing something different than the administrators. For instance, individuals may rate their creative performance on how creative they think they are, but not base this judgment on actual creative behaviors they have engaged in. If this is the case, they may actually use their creative self-efficacy as a basis for judging their creative performance, thereby blurring the distinction between these two constructs. Individuals may also rate their creative performance based on a greater time frame than the administrators, meaning that they determine their creative performance based on multiple instances of creativity as opposed to the single instance rated by the administrators. The discrepancy between these measures has important implications for future research, which will be discussed in the following section.

Contributions and Implications

The results of this study provide numerous discussion topics and starting points for future research, and have important implications for both the theoretical and practical domains. A strong point in this study's methodology was the inclusion of two measures of creative performance because it provided an opportunity to compare self-ratings of creative performance with ratings provided by administrators. However, the remarkable

differences between the measures bring serious question to the validity of these creativity measures. Researchers should take caution when selecting measures to assess creative performance, as not all measures of creativity seem to measure the same thing.

In terms of the difference between self-perceptions of creative self-efficacy and creative performance, the findings of this study suggest that there is substantial overlap between these two constructs. This finding brings to question the predictive validity of not only the subjective measure of creative performance, but also the measure of creative self-efficacy. Research on creative self-efficacy is relatively new; to date there are no studies considering the divergent validity of this construct and creative performance. Therefore, it is currently unclear whether individuals are able to clearly distinguish between perceptions of their creative self-efficacy and creative performance. Looking at the face validity of the items, however, it seems that there is considerable overlap in the two constructs. For instance, two of the creative self-efficacy items read, “I feel I am good at generating novel ideas” and “I am good at finding creative ways to solve problems.” Similarly, there are two items measuring these concepts for creative performance. They read, “I am a good source of creative ideas” and “I come up with creative solutions to problems at work” (see Appendix). Thus, it is questionable whether creative self-efficacy is a distinct and unique construct from creative performance when measured subjectively. The implications of this are important. Creative self-efficacy is a relatively new construct. As such, it may be the focus of numerous studies on creativity in the future. However, if it is redundant with subjective perceptions of creativity, then the findings of these studies are limited. The present study suggests there may in fact be

overlap in the two constructs, therefore providing evidence towards the importance of future research to determine the convergent or divergent validity of these constructs.

As a final contribution, the present study added to the body of creativity literature by using a new sample of employees in its research. Much of the creativity research has been conducted in R&D or other related fields, in which creative performance is a requirement of the job (examples include Amabile et al., 1996; Tierney & Farmer, 2002). As creativity can occur at all levels and positions within an organization, we must also include positions in which creativity is not required by the job to better understand what promotes and inhibits the creative process. It is quite possible that the factors operating to promote employee creativity in R&D are substantially different from the factors which predict employee creativity in other areas. Since R&D employees must develop creative ideas as part of their job requirement, contextual factors in the environment may not be as important predictors as with employees who are engaging in creative behaviors that are not typically required in their job. The current study addressed this gap in the research by using a sample in which creative performance was completely voluntary. Individuals were not required to submit creative suggestions nor act in other creative ways as part of their position. Given this difference in the current sample and the replication of results from Tierney and Farmer's (2004) study conducted in R&D, future researchers can be more confident that their findings are generalizable to the larger population.

On the practical side, the indication that psychological safety and communication are significant predictors of creative performance is critical to organizational design. In pursuit of a creative environment, organizations should design their environments to

promote a supportive and open communication climate. Shalley and Gilson (2004) note that factors which are proximal to the individual's day to day work (e.g. their supervisor or their work group) have a stronger effect than factors which are more distal to the individual (e.g. organizational factors). Therefore, it is important to develop work units that promote an environment supportive of creativity. This includes developing an open network for communication, promoting a safe environment for sharing ideas, and providing positive feedback to individuals who generate novel ideas. Furthermore, the actual significance of environmental factors should provide organizational incentive for continuing the pursuit in understanding the relationship between the organizational context and employee creativity.

Limitations and Future Research

One of the obvious limitations of this study was its cross-sectional design and use of primarily self-report measures. High correlations between creative self-efficacy and subjective ratings of creative performance, as well as their convergence onto a single factor on the Principal Components Analysis provide evidence towards common method variance. This limits the interpretability of the analyses using the subjective form of creative performance.

A second limitation of the study was the small sample size for the analysis involving administrators' ratings of creative performance. As the study was limited in use of this criterion by the number of individuals who provided creative suggestions to the researchers, this limitation could not be compensated for in the analyses. However, it

severely limited the statistical power of the study. Future research using a larger sample of participants is likely to find more significant results.

The design of the “objective” criterion measure was also a potential limitation to the study in that it may limit the generalizeability of the results. Creative performance was measured through administrator ratings of creative suggestions provided by the participants. A strength in these ratings was that the ratings did not come from participants’ direct supervisors, which eliminated concerns for leader-member exchange or other bias effects. However, these suggestions were provided through prompting of the researchers and may not have been reflective of the day-to-day level of creativity in the participants. Other researchers have used supervisory ratings that reflect perceptions of participants’ engagement in creative behavior (George and Zhou, 2001) or have used ratings of creative suggestions that were submitted to a company-wide suggestion box (Axtell et al., 2000). Thus, the use of administrator ratings of creativity is in line with previous research; however future research must consider the relationship between the various forms of measurement to establish convergent validity for these measures. Researchers should consider using a combination of these methods in order to consider their relative success in measuring the criterion of interest, while still pursuing other areas of interest in the creativity domain.

Despite these limitations, the present study made notable contributions to the creativity research. Being the first study to consider the relationship between four new contextual variables (psychological safety, communication, role conflict, role ambiguity) and creative performance, it made headway towards a greater understanding of what

contributes to individuals' creative output. Furthermore, the study brought several design issues to light, which can be addressed in future research. Results from the present study and from studies by Tierney and Farmer (2002, 2004) raise an important question as to how environmental factors relate to creativity. Do they impact creativity directly or act indirectly through creative self-efficacy? Are creative self-efficacy and subjective ratings of creative performance different? Substantial research, including longitudinal studies, will be needed to answer these questions, although the practical and theoretical implications for such knowledge warrant such hard work. Using this study as a foundation, researchers can begin to reevaluate the current literature on employee creativity and start addressing gaps in the literature, especially in regards to the role of creative self-efficacy and contextual variables in predicting creative performance.

References

- Amabile, T.M. (1988). A model of creativity and innovation in organizations. In B.M. Staw & L.L. Cummings (Eds.), *Research in organizational behavior*, 10, 123-167. Greenwich, CT: JAI Press.
- Amabile, T.M. (1996). *Creativity in context*. Boulder, CO: Westview Press.
- Amabile, T.M. & Conti, R. (1999). Changes in the work environment for creativity during downsizing. *Academy of Management Journal*, 42(6), 630-640.
- Amabile, T.M., Conti, R., Coon, H., Lazenby, J. & Herron, M. (1996). Assessing the work environment for creativity. *Academy of Management Journal*, 39, 1154-1184.
- Anderson, N.R., & West, M.A. (1998). Measuring climate for work group innovation: development and validation of the team climate inventory. *Journal of Organizational Behavior*, 19, 235-258.
- Axtell, C.M., Holman, D.J., Unsworth, K.L., Wall, T.D., Waterson, P.E., & Harrington, E. (2000). Shopfloor innovation: Facilitating the suggestion and implementation of ideas. *Journal of Occupational and Organizational Psychology*, 73, 265-285.
- Baer, M., Oldham, G.R., & Cummings, A. (2003). Rewarding creativity: when does it really matter? *The Leadership Quarterly*, 14, 569-586.
- Brief, A.P., & Motowidlo, S.J. (1986). Pro-social Organizational Behaviors. *Academy of Management Journal*, 11(4), 710-725.
- Edmondson, A. (1999). Psychological safety and learning behavior in work teams. *Administrative Science Quarterly*, 44, 250-383.
- Fay, D., & Frese, M. (2001). The concept of personal initiative: An overview of validity studies. *Human Performance*, 14(1), 97-124.
- Fay, D., & Sonnetag, S. (2002). Rethinking the effects of stressors: A longitudinal study on personal initiative. *Journal of Occupational Health Psychology*, 7 (3), 221-234.
- Frese, M., Fay, D., Hilburger, T., Leng, K., & Tag, A. (1997). The concept of personal initiative: Operationalization, reliability, and validity in two German samples. *Journal of Occupational and Organizational Psychology*, 70, 139-161.
- Frese, M., Teng, E., Wijnen, C.J.D. (1999). Helping to improve suggestion systems: predictors of making suggestions in companies. *Journal of Organizational Behavior*, 20, 1139-1155.

- Ford, C.M. (1996). A theory of individual creative action in multiple social domains. *Academy of Management Review*, 21(4), 1112-1142.
- George, J.M., & Bettenhausen, K. (1990). Understanding prosocial behavior, sales performance, and turnover: A group-level analysis in a service context. *Journal of Applied Psychology*, 75 (6), 698-709.
- Gilson, L.L., & Shalley, C.E. (2004). A little creativity goes a long way: An examination of teams' engagement in creative processes. *Journal of Management*, 30(4), 453-470.
- Glazer, S., & Beehr, T.A. (2005). Consistency of implications of role stressors across four countries. *Journal of Organizational Behavior*, 26, 467-487.
- James, L.R., Demaree, R.G., & Wolf, G. (1984). Estimating within-group interrater reliability with and without response bias. *Journal of Applied Psychology*, 89(1), 85-98.
- Kahn, W.A. (1990). Psychological conditions of personal engagement and disengagement at work. *Academy of Management Journal*, 33, 692-724.
- Motowidlo, S.J., Packard, J.S., & Manning, M.R. (1986). Occupational stress: Its causes and consequences for job performance. *Journal of Applied Psychology* (1986), 71(4), 618-629.
- Nunnally, J.C. (1978). *Psychometric Theory*. New York: McGraw-Hill.
- Oldham, G.R. (2003). Stimulating and supporting creativity in organizations. In S.E. Jackson, M.A. Hitt, & A.S. DeNisi (Eds), *Managing knowledge for sustained competitive advantage* (pp. 243-273). San Francisco: Jossey-Bass.
- Oldham, G.R., & Cummings, A. (1996). Employee creativity: Personal and contextual factors at work. *Academy of Management Journal*, 39(3), 607-634.
- Rizzo, J. R., House, R. J., & Lirtzman, S. I. (1970). Role conflict and ambiguity in complex organizations. *Administrative Science Quarterly*, 150-163.
- Scott, S.G., & Bruce, R.A. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal*, 37(3), 580-607.
- Shalley, C.E., & Gilson, L.L. (2004). What leaders need to know: A review of social and contextual factors that can foster or hinder creativity. *Leadership Quarterly*, 15, 33-53.

- Shalley, C.E., Zhou, J., Oldham, G.R. (2004). The effects of personal and contextual characteristics on creativity: Where should we go from here? *Journal of Management*, 30(6), 933-958.
- Smidts, A., Pruyn, A.H., & Van Riel, C.B.M. (2001). The impact of employee communication and perceived external prestige on organizational identification. *Academy of Management Journal*, 49(5), 1051-1062.
- Tabachnick, B.G., & Fidell, L.S. (2001). *Using Multivariate Statistics (4th edition)*. Needham Heights, MA: Allyn and Bacon.
- Tierney, P., & Farmer, S.M. (2002). Creative self-efficacy: Its potential antecedents and relationship to creative performance. *Academy of Management Journal*, 45(6), 1137-1148.
- Tierney, P., & Farmer, S.M. (2004). The Pygmalion process and employee creativity. *Journal of Management*, 30(3), 413-432.
- Tierney, P. F., Steven, M., & Graen, G. B. (1994). An examination of leadership and employee creativity: The relevance of traits and relationships. *Personnel Psychology*, 52(3), 591-620.
- Tzelgov, J., & Henik, A. (1991). Suppression situations in psychological research: Definitions, implications, and applications. *Psychological Bulletin*, 109, 524-536.
- Williams, W.M., & Yang, L.T. (1999). Organizational Creativity. In Sternberg (Ed.) *Handbook of Creativity* (pp. 373-391). Cambridge: Cambridge University Press.
- Woodman, R.W., Sawyer, J.E., & Griffin, R.W. (1993). Toward a theory of organizational creativity. *Academy of Management Review*, 18(2), 293-321.
- Zhou, J., & George, J.M. (2001). When job dissatisfaction leads to creativity: Encouraging the expression of voice. *Academy of Management Journal*, 44(4), 682-696.

Appendix A: Survey Items

Psychological Safety

If you make a mistake in this unit, it is often held against you. (R)
Members of this unit are able to bring up problems and tough issues.
People in this unit sometimes reject others for being different. (R)
It is safe to take a risk in this unit.
It is difficult to ask members of this unit for help. (R)
No one in this unit would deliberately act in a way that undermines my efforts.
Working with members of this unit, my unique skills and talents are valued and utilized.

Communication Climate

When my colleagues tell me something, I trust them to tell me the truth.
When my unit head tells me something, I trust him/her to be candid and honest.
My unit head is open to suggestions I put to him/ her.
If the general management of the King Library tells us something about how we are doing our job, I trust them to tell the truth.
My colleagues are open to suggestions I put to them.

Role Ambiguity

I feel certain about how much authority I have. (R)
Clear, planned goals and objectives exist for my job. (R)
I know that I have divided my time properly. (R)
I know what my responsibilities are. (R)
I know exactly what is expected of me. (R)
I get clear explanations of what has to be done. (R)

Role Conflict

I have to do things that should be done differently.
I receive an assignment without the manpower to complete it.
I have to buck a rule or policy in order to carry out an assignment.

Creative Self-Efficacy

I feel that I am good at generating novel ideas.
I have confidence in my ability to solve problems creatively.
I have a knack for further developing the ideas of others.
I am good at finding creative ways to solve problems.

Creative Performance (self-perception)

I come up with new and practical ideas to improve performance.

I am a good source of creative ideas.

I develop adequate plans for the implementation of new ideas.

I come up with creative solutions to problems at work.

I generate novel and useful work-related ideas.

I suggest creative ways of performing new tasks.

Creative Performance (administrators' rating)

What are some creative suggestions that you have that can improve the functioning of the King Library? By creative, we mean ideas that are both unique and potentially useful.

Please try your best in writing at least 3 creative suggestions.*

*participants were rated by two judges using the following scale.

1	2	3	4	5	6	7	8	9
not at all				moderately				extremely
creative				creative				creative

Table 1.

Principal components analysis of environmental stimulants, with oblimin rotation.

Items	Component	
	Communication	Psychological Safety
When my unit head tell me something, I trust him/her to be candid and honest.	.88	
If the general management of the Library tells us something about how we are doing our job, I trust them to tell the truth.	.80	
My unit head is open to suggestions I put to him/ her.	.76	
It is difficult to ask members of this unit for help. (R)	.63	
My colleagues are open to suggestions I put to them.	.58	
When my colleagues tell me something, I trust them to tell me the truth.	.48	.31
People in this unit sometimes reject others for being different. (R)	.36	.33
It is safe to take a risk in this unit.		.83
No one in this unit would deliberately act in a way that undermines my efforts.		.72
If you make a mistake in this unit, it is often held against you. (R)		.70
Members of this unit are able to bring up problems and tough issues.		.69
Working with members of this unit, my unique skills and talents are valued and utilized.		.65

Table 2.

Principal components analysis of environmental inhibitors, with oblimin rotation.

Items	Component	
	Role Ambiguity	Role Conflict
I know what my responsibilities are. (R)	.90	
I know exactly what is expected of me. (R)	.88	
I know that I have divided my time properly. (R)	.75	
Clear, planned goals and objectives exist for my job. (R)	.74	
I get clear explanations of what has to be done. (R)	.66	
I feel certain about how much authority I have. (R)	.49	
I receive an assignment without the manpower to complete it.		.86
I have to do things that should be done differently.		.82
I have to buck a rule or policy in order to carry out an assignment.	.31	.61

Table 3.

Descriptive statistics and correlations for the entire sample (N=153).

Variables	Mean	SD	1	2	3	4	5	6	7	8
1. Psychological Safety	3.47	.74	.80							
2. Communication	3.79	.70	.64**	.82						
3. Role Conflict	3.21	.81	-.27**	-.45**	.71					
4. Role Ambiguity	2.54	.80	-.44**	-.59**	.51**	.86				
5. Creative Self-Efficacy	3.95	.63	.36**	.36**	.08	-.16	.86			
6. Organizational Role	--	--	-.18*	-.01	-.04	-.02	-.10	--		
7. Tenure	10.14	8.77	.24**	-.05	.05	.05	.01	-.20*	--	
8. Subjective Cr. Performance	3.77	.60	.32**	.34**	.12	-.20*	.85**	-.18*	-.07	.91

** p < .01, * p < .05.

Reliability is shown in bold on the diagonal. All scales used a 5-point Likert scale.

Table 4.

Descriptive statistics and correlation, for the subset of the sample with creative suggestions (N=86).

Variables	Mean	SD	1	2	3	4	5	6	7	8	9
1. Psychological Safety	3.44	.83	.80								
2. Communication	3.82	.71	.70**	.82							
3. Role Conflict	3.22	.89	-.36**	-.54**	.71						
4. Role Ambiguity	2.63	.84	-.46**	-.61**	.63**	.86					
5. Creative Self-Efficacy	4.03	.65	.37**	.29**	.07	-.12	.86				
6. Organizational Role	--	--	-.23*	-.05	.00	-.01	-.26*	--			
7. Tenure	10.06	8.92	.30**	-.01	.05	.00	.02	-.16	--		
8. Subjective Cr. Performance	3.86	.61	.31**	.28**	.08	-.15	.87**	-.28**	-.09	.91	
9. Admin. Cr. Performance Rating	5.64	1.27	.32**	.29**	-.30**	-.29**	-.03	-.05	.20	-.05	.88

** p < .01, * p < .05.

Reliability is shown in bold on the diagonal (with inter-rater reliability reported for objective creative performance). The objective creative performance ratings were based on a 9-point Likert scale. All other scales used a 5-point Likert scale.

Table 5.

Regression analysis predicting subjective perceptions of creative performance (N=153)

	Predictors	β	ΔR^2
Step 1	Creative Self-Efficacy Organizational Role Tenure	.84** -.11** -.09*	.74**
Step 2	Psychological Safety Communication	.01 .03	.00
Step 3	Role Conflict Role Ambiguity	.12* -.10	.01*

** $p < .01$, * $p < .05$

β s are reported after all main effects have been entered.

Table 6.

Regression analyses predicting subjective perceptions of creative performance from subset of sample (N=86)

	Predictors	β	ΔR^2
Step 1	Creative Self-Efficacy	.85**	.77**
	Organizational Role	-.08	
	Tenure	-.12*	
Step 2	Psychological Safety	.00	.00
	Communication	.03	
Step 3	Role Conflict	.13	.01
	Role Ambiguity	-.10	

** p < .01, * p < .05

β s are reported after all main effects have been entered.

Table 7.

Regression analyses predicting administrators' ratings of creative performance (N=86)

	Predictors	β	ΔR^2
Step 1	Creative Self-Efficacy Organizational Role Tenure	-.04 -.03 .19	.04
Step 2	Psychological Safety Communication	.20 .19	.11**
Step 3	Role Conflict Role Ambiguity	-.14 -.10	.03

** $p < .01$, * $p < .05$

β s are reported after all main effects have been entered.