

The Power to be Creative at Work: Examining the Componential Model of Employee Creativity

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Employee creativity, the generation of novel and useful ideas, procedures, and products (Woodman, Sawyer, & Griffin, 1993), is widely viewed as an important precursor for organizational innovation and productivity (Amabile, 1988). Although research on organizational creativity has a relatively short history, the findings thus far corroborate its importance for successful organizational functioning. Oldham and Cummings (1996) found supervisor-rated creativity to be positively related to the number of patent disclosures filed by manufacturing employees ($r=.23$). Similarly, employee innovative behavior was positively related to the number of invention disclosures filed ($r=.33$; Scott & Bruce, 1994). Real estate agents' creativity was marginally related to the number of units sold ($r=.16$, $p=.06$; Wang & Netemeyer, 2004). Additionally, the creativity of academic scholars' work (as rated by journal editors) mediated the positive relation between the number of works published in premier journals and scholarly reputation (Dewett & Denisi, 2004). This evidence suggests that creativity is related to a number of positive outcomes for organizations in very different sectors. It is therefore important to understand the mechanisms that could potentially lead to or encourage creative behavior in the workplace.

Models of Employee Creativity

Research on creativity in organizations has flowed mainly through two theoretical perspectives: the componential model and the interactionist model. The componential model of organizational creativity proposes that individual creativity increases due to

concurrent increases in domain-relevant skills and knowledge, intrinsic motivation, and creativity relevant skills and processes (Amabile, 1988, 1996). The work environment serves to enhance employee creativity through incremental increases in these three major components. Domain-relevant skills refer to one's expertise and knowledge in a specific field. At work, one's domain-relevant knowledge may be reflected through the clarity of understanding of the processes one employs at work. Domain-relevant skills at work would be influenced by the availability of training, resources, and information (Amabile, 1988; Sawyer, 1992). Intrinsic motivation arises from a "positive reaction to qualities of the task itself" (Amabile, 1996, p. 115). Thus, an intrinsically-motivated employee would be interested in and enjoy his/her work due to the qualities inherent in the work he/she performs. Creativity-relevant skills and processes refer to one's abilities (both innate and developed) to generate creative ideas and to recognize, explore, and solve problems creatively. Creativity relevant processes include the ability to engage in creative thought and involvement in prior creative experiences (including creativity training). To date most research addressing the componential model has focused on intrinsic motivation as a precursor to employee creativity. This research has approached creativity from the perspective of cognitive evaluation theory, which suggests that environments contain both informational and controlling aspects (Deci & Ryan, 1985). Informational characteristics promote and controlling aspects inhibit motivation, and subsequently creativity. Researchers exploring the tenets of the componential model have examined several contextual aspects of the work environment that have been proposed to influence employee motivation and creativity. These contextual influences include organizational and supervisory encouragement, work group support of creativity, job autonomy, sufficiency of resources, and workload demands (Amabile et al., 1996)

Like the componential model, the interactionist model of employee creativity also supports the notion that an employee's environment and personal dispositions can greatly impact his/her creativity. However, the interactionist model goes beyond this simple

assertion by claiming that the effects are interactional (Woodman et al., 1993). Creativity is a function of a variety of individual, group, and organizational characteristics all working in tandem to enhance or to inhibit each other. For example, one's high level of job-related knowledge may lead one to perform creatively to a greater extent if one also has a passion for and motivation on the job. Thus one's personal dispositions and knowledge at work may serve to enhance or diminish each other's influence on creative performance. As a note, the interactionist model makes a number of predictions concerning individual, work group, and organization level interactions, but the current paper focuses exclusively on interactions at the individual level.

Present Research Goals

It is the purpose of this paper to integrate the research predictions of both the componential and interactionist models of creativity in the workplace. To date, there has been no research examining Amabile's proposed components simultaneously and interactively in a work environment. This research aims to close this gap in the literature.

Domain-Relevant Skills

The componential model of creativity suggests that intrinsic job motivation, job-relevant skills, and creativity-relevant skills should all impact an employee's creativity at work. The major focus of researchers examining the componential model of creativity has been the motivational component because researchers have assumed that domain-relevant skills and creativity-relevant processes are more stable, and would be less influenced by the environment. However, this may not be the case. In general, domain-relevant skills in an organizational environment refer to one's knowledge of one's job and one's ability to perform the necessary tasks. One variable particularly relevant to the assessment of one's on-the-job skills and abilities is process clarity, one's certainty about one's objectives at work and the proper ways to attain them (Sawyer, 1992). Sawyer found that role ambiguity, although typically assessed as a unitary construct, was actually comprised of both goal and process clarity, each of which was related to distinct job-

related outcomes. Strong clarity regarding one's goals and processes at work would encourage one to search out the best and most creative ways to approach and accomplish tasks.

Intrinsic Motivation

Most of the evidence exploring the predictions of the componential model have focused on the main effects and mediating role of intrinsic motivation. Those employees experiencing a high level of motivation would be more interested in their jobs and would find their work more enjoyable (Amabile, 1988; Shalley, 1991). Consequently, intrinsically motivated employees would be more likely to explore new ideas, take risks, and exhibit creative performance than their less-motivated counterparts. Prior studies have shown the importance of intrinsic motivation in predicting creativity in both work and non-work domains. For example, intrinsic motivation has been linked to creativity on artistic tasks (Amabile, 1979). Laboratory inducement of intrinsic motivation has also led writers to produce more creative work compared to writers subjected to an external motivational inducement (Amabile, 1985). In addition, an interview study examining the determinants of creativity, R & D scientists mentioned intrinsic motivation more often than any other potential determinant of creativity (Amabile, 1988).

Despite its centrality to the predictions of the componential model of employee creativity, intrinsic motivation is rarely empirically assessed (for exceptions, see Aselage, 2005; Eisenberger & Rhoades, 2001; Shin & Zhou, 2003; Tierney et al., 1999). Although it is rarely assessed, researchers still recognize the potential importance of intrinsic motivation to the creative process, often calling upon motivation as the mechanism through which their empirical results were attained (e.g., Oldham & Cummings, 1996). In the present study, I take a step in bridging the gap in the literature left by the infrequent assessment of intrinsic motivation. First, based on theory and past research findings, I predict that intrinsic motivation is positively related to employee creativity.

Second, I examine the potential moderating role of intrinsic motivation on the other two componential model predictors of employee creativity.

Creativity-Relevant Processes

A recent line of research has also begun to explore the role of creativity-relevant processes, such as creative self-efficacy, creative cognitive style, and openness to experience on creativity (Scott & Bruce, 1994; Tierney, 1997). Creative self-efficacy refers to one's belief that one has the ability to produce creative outcomes (Tierney & Farmer, 2002). Creative self-efficacy would lead individuals to feel more confident to take creative risks and to search out creative ways to accomplish tasks. Accordingly, creative self-efficacy has been shown to be related to employee creativity (Tierney & Farmer, 2002, 2004). Additionally, an employee's cognitive style may relate to creativity (Scott & Bruce, 1994). A cognitive style involves an individual's mental method of gathering and evaluating information from the environment. It can affect how individuals search the environment for information and how they integrate new information into their existing cognitive models (Hayes & Allinson, 1998). Individuals with more innovative and creative cognitive styles would enjoy approaching tasks in different, original, and undisciplined ways (Kirton, 1976; Miron et al., 2004). Creative thinkers would have a strong preference for thinking originally and coming up with new ideas. Thus, employees with creative cognitive styles would be more likely to be creative at work (Miron et al., 2004). Personality may also play a key role in bolstering employees' creativity-relevant processes. Specifically, an employee's openness to experience, involving a tendency to search for and enjoy new and varied experiences, would encourage creative exploration and idea generation (Costa & McCrae, 1992). In a recent meta-analysis, openness to experience showed the strongest relation to creativity among artists and scientists of any of the Five-Factor personality traits (Feist, 1998). Furthermore, a number of studies have found links between openness to experience and employee creativity (e.g., George & Zhou, 2001; Williams, 2004).

A Componential Interaction

In the spirit of the interactionist model, I propose that the effects of the three proposed componential antecedents of creativity are interactive. Specifically, the combination of high intrinsic motivation, high domain-relevant skills, and high creativity relevant processes would encourage the greatest creativity on the job. Amabile (1988) has suggested that creativity may be most influenced when creativity-relevant skills build upon a motivational foundation and domain-relevant skills. Thus, motivation would only inspire creativity to the extent that individuals felt they possessed the ability to be creative. In addition, knowledge, skill, and clarity on the job would yield creativity only to the extent that individuals also possessed skills in the creative arena. The latter proposal is supported by Tierney and Farmer (2002) who found that among manufacturing employees, creativity was highest when both job self-efficacy and creative self-efficacy were high. Thus creative skills seem to be necessary for creativity insofar as they build on other skills and motivation in a given domain. Additionally, creativity should be enhanced when one's motivation at work is complemented by the necessary domain-relevant skills. The motivational component will inspire one to explore the work environment and to apply domain-relevant knowledge in new and innovative ways (Amabile, 1988).

Drawing one step further, the most creative individual will possess high levels of motivation, domain-relevant skills and creativity-relevant processes. In other words, I predict a 3-way interaction between the components, such that the positive relation between domain-relevant skills and creativity will be strongest when employees also possess high levels of both intrinsic motivation and creativity-relevant processes.

The following hypotheses test the assertions put forth in the previous paragraphs:

H1: Domain-relevant skills (job self-efficacy, goal and process clarity) are positively related to employee creativity.

H2: Intrinsic job motivation is positively related to employee creativity.

H3: Creativity-relevant processes (creative self-efficacy, creative cognitive style, and openness to experience) are positively related to employee creativity.

H4: The relations proposed in H1 and H2 are stronger when employees possess high levels of creativity-relevant processes.

H5: The relation proposed in H1 is stronger when employees possess high levels of intrinsic motivation.

H6: Domain-relevant skills will be most strongly related to creativity when both intrinsic motivation and creativity-relevant processes are high.

Method

All members of the production staff of a frozen seafood manufacturing plant in the Mid-Atlantic were offered the opportunity to participate in a survey that would assess their intrinsic motivation, domain-relevant skills, and creativity-relevant processes, among other attitudes and work environment variables collected for a more extensive study. Individuals completed the survey in a large on-site conference room with the rest of the employees who shared their shift. The exceptions were the 8 members of the overnight maintenance staff. They were given the survey packet by the human resources executive, who mailed the surveys to me. Participants received an instruction sheet and a survey. The instruction sheet informed them that the survey was anonymous and voluntary, and that upper management would only receive information about group opinions. Participants were also instructed verbally as to the voluntary nature of the task. After completing the survey, it was returned to me in person. Every employee's supervisor was contacted to provide a performance evaluation of the employee. Demographic information and employee data (date of hire, hourly wage) were obtained from company records.

Of the 179 eligible employees, 161 returned survey packets for a return rate of 90%. There were no significant differences in gender, race, or tenure for those who returned surveys versus those who did not. The sample of respondents was comprised of 31% females. The racial breakdown was: 90% black, 9% white, and 1% Hispanic. The average organizational tenure of participants was 3.7 years (SD = 3.1). Sixty-two percent of workers were production line workers, 23% worked as warehouse packers, shippers, and unpackers, and 16% performed other tasks such as maintenance and quality assurance.

Measures

Creativity. In the research on creativity in organizations, the most common way researchers attain measures of creativity is through supervisor evaluations of employees. In a recent meta-analysis of organizational creativity (Eder & Sawyer, 2007), 44 out of the 58 included studies assessed creativity via supervisor or coworker evaluations (with the large majority of these relying on supervisors). Most of the remaining studies relied on self report measures. Since self-reported creativity obviously suffers from a certain level of bias, I relied on supervisor evaluations in the present study. Even Amabile (1996) suggests that at times, a judgment of creativity is the best we can do to gauge an individual's creativity. Creativity was assessed using 9 of the 13 items developed by George and Zhou (2001). The 4 items pertaining to a separate "innovative behavior" concept were not used. The items measuring employee creativity tapped into both the novelty and quality dimensions of creativity as well as employees' general creative inclinations. Cronbach's alpha was .97.

Intrinsic Motivation. Amabile (1988) described a motivated employee as being driven and excited by the work involved in job tasks. Accordingly, intrinsic motivation was

measured using the 4-item scale developed by Eisenberger & Rhoades (2001), assessing the extent to which employees view their jobs as interesting, enjoyable, boring, and unpleasant. The items of this scale tap into an individual's baseline enjoyment of and interest in her job. Cronbach's alpha for this scale was .81.

Domain-relevant skills. Amabile (1988) describes domain-relevant skills as the possible set of cognitive pathways from which something new may be produced. These pathways can include one's technical job skills and one's knowledge concerning the proper ways to do one's job. Accordingly, I assessed domain-relevant skills by asking employees about their perceived clarity concerning the processes involved in their jobs. Five items developed by Sawyer (1992) were used to measure process clarity. Participants were asked about their certainty regarding the procedures they should be using on their jobs (1= Very Uncertain, 7 = Very Certain). Cronbach's alpha for process clarity were both .87.

Creativity-relevant processes. Amabile (1988) described creativity-relevant processes as including an individual's desire to explore new cognitive pathways and a cognitive style favoring creative pursuits and taking multiple perspectives. In the current research I assessed creative self-efficacy, an individual's confidence in her ability to be creative, (Tierney & Farmer, 2002). Creative-self efficacy was assessed using Tierney's (1997) three-item measure (For one of the items I changed the phrase "novel ideas" to "new ideas" to make certain it was understandable for the majority of employees). Cronbach's alpha for this measure was .79.

Control variables. I included employee tenure and hourly wages as controls in the regression equation. A recent meta-analysis showed that tenure in some instances is

related positively to employee creativity, and other times it is negatively related to employee creativity (Eder & Sawyer 2007). Additionally, wages are likely to reflect employee status in the organization based on past performance (both inside and outside the organization). Employees being paid higher wages likely have more responsibilities and more opportunities to demonstrate creativity on the job.

Results

The hypotheses in the current study were assessed using hierarchical linear regression. See Table 1 for the results.

In step 1 of the analysis, I entered employee tenure and hourly wage. In step 2, I added the main effects for intrinsic motivation, domain-relevant skills, and creativity-relevant processes. Contrary to the predictions in Hypotheses 1 through 3, none of the main effects were significant. In step 3, I added the three possible 2-way interactions for the componential model. In support of Hypothesis 5, there was a significant interaction effect for intrinsic motivation and domain-relevant skills. However, this interaction was qualified in step 4 of the analysis by the presence of a significant 3-way interaction.

In order to assess whether the interaction supported the tenets of Hypothesis 6, I plotted lines using the procedure described by Aiken and West (1991; see Figure 1). As Figure 1 shows, domain-relevant skills were positively related to supervisor-rated creativity, but only when intrinsic motivation and creativity-relevant processes were high ($B = .26, t(132) = 2.48, p < .05$). The slope of the line for other combinations of intrinsic motivation and creativity-relevant processes was not significantly greater than zero, $t(132) = -0.31, p = ns$.

In sum, hypotheses 1 thru 3, predicting main effects for the components of the componential model were not supported. Hypothesis 4, involving 2-way interactions between creativity-relevant processes and the other components was also not supported. However, the results do still support the importance of each component interactively. An interaction was observed between intrinsic motivation and domain-relevant skills, which was qualified by a significant 3-way interaction, thus supporting hypotheses 5 and 6.

Discussion

The literature on employee creativity has had a divergent history. One direction, the componential model, has emphasized the importance of three major personal attributes: intrinsic motivation, domain-relevant skills, and creativity-relevant processes (Amabile, 1988). The other direction, the interactionist model, has emphasized the importance of environmental, personal, and contextual variables working in tandem to influence creativity (Woodman et al., 1993). The current study is the first to integrate the tenets of both of these creativity research directions to predict a three-way componential interaction in a work environment.

As argued by Amabile (1988), intrinsic motivation is a primary driver of creativity because it leads to employees being interested in and enjoying their work for the sake of the work itself. Domain-relevant skills, involving job-relevant knowledge and abilities, would provide a strong foundation for creative work. Additionally, creativity-relevant processes, involving one's ability to generate creative ideas, would directly influence creativity. Based on Amabile's (1988) suggestions and the tenets of the interactionist model of creativity, I predicted that the components would exhibit both main (H1-H3) and interactive effects (H4-H6) with each other on creativity.

In the current samples, however, I found no significant main effects after including all the potential interactions in the equation. Although several studies have shown the link between intrinsic motivation and creativity (e.g., Aselage, 2005; Ganesan & Weitz, 1996; Shin & Zhou, 2003), the current finding corroborates the findings of studies where this direct relation was not found (e.g., Amabile et al., 2002; Mainemelis et al., 2006). One reason for the disparity of results in the literature may be the three-way interaction observed in the present study. Intrinsic motivation may only have a positive relation with creativity when domain-relevant skills and creativity-relevant processes are high. This suggests that motivation for one's job may not be sufficient for creativity; one needs to have a sound understanding of the processes of one's work before motivation can exert its influence.

The current results also contrast with the results of Tierney and Farmer (2002) who found that employees' creativity was highest when both creative self-efficacy (a creativity-relevant process) and job self-efficacy (an indicator of domain-relevant skills) were high. Although predicted in hypothesis 4, this two-way interaction was not observed in the present study. Nonetheless, the presence of significant three-way interaction suggests a possible reason for this disparity.

This is the first study to predict and find a three-way interaction between the components of the componential model of creativity in an organizational setting. The finding of a three-way interaction is consistent with the predictions of Amabile (1988) who posited the potential interaction of intrinsic motivation, domain-relevant skills, and creativity-relevant processes in work environments 20 years ago.

The implications of the present study are clear. The current results suggest that the most relevant ways to ensure high levels of employee creativity are to make sure employees are educated in organizational processes, employees are motivated to perform, and that employees are confident in their own creative abilities. These revelations are hardly earth-shattering but nonetheless support the componential model's framework.

The current results also question the assertion that intrinsic motivation is necessary and sufficient for creative work from employees. The componential model has often been referred to as the "Intrinsic Motivation" perspective, and studies often assume that environmental influences on creativity are mediated by intrinsic motivation, even though intrinsic motivation is rarely measured. The current results suggest that such assumption may be, at times, inaccurate, especially in work environments characterized by employees who are low in domain-relevant skills and creativity-relevant processes. Employees who are motivated to produce good work also need to be knowledgeable of their job processes and confident in their creative abilities. Therefore, when organizations desire creative output, any efforts to instill motivation should be coupled with experiences that enhance employees' knowledge of their jobs and the ability to think creatively.

The results of the present study suggest potential additional research directions. Researchers should examine the interactive effects of componential model variables in other contexts. In the present study, intrinsic motivation, domain-relevant skills, and creativity-relevant processes interactively influenced creativity in a manufacturing environment. Similarly, past research has demonstrated 2-way interactions between creativity-relevant processes and domain relevant skills in both manufacturing and white collar jobs (Tierney & Farmer, 2002). Researchers should examine organizational contexts that support or inhibit each of these interactions, as well as other work

environments where all three components may interact to provide the maximum level of employee creativity.

In the current study, creativity-relevant processes were not found to have a main effect on creativity. This conflicts with a number of studies that have shown strong relations between openness to experience, creative cognitive style, creative self-efficacy and creativity. Researchers should continue to examine work situations that enhance or inhibit these relations. For example, supervisor influences (George & Zhou, 2001; Strickland & Towler, 2005) and coworker influences (Miron et al., 2004) have been shown to enhance the effects of creativity-relevant processes. Also, researchers should continue to examine more complex interaction models. For example, Oldham and Cummings (1996) found creative personality to be most related to creativity when supervisors were supportive, did not closely monitor behavior, and when one's job had a high motivating potential.

Limitations

The current study is not without its limitations. First, readers should interpret measures of employee behaviors based upon supervisor reports with caution. Although standard practice in studies of employee creativity (Eder & Sawyer, 2007), supervisor reports of employee performance may suffer from supervisor biases. Supervisors may allow their positive or negative personal relationships with employees to influence their performance ratings. Future research should attempt to gauge creativity through more objective means, such as rewarded employee ideas, suggestions that were implemented, or third party ratings of employee behaviors. Alternatively, researchers could attain multiple ratings of employee behaviors (e.g., from both supervisors and coworkers) to control for individual biases.

Furthermore, there is an additional limitation of using cross-sectional data to test hypotheses that posit "causal" links. It would be more appropriate to evaluate the hypotheses presented in this paper using longitudinal data. Thus, it is possible that the

predicted effects were not observed due to the concurrent measurement of variables hypothesized to have a longitudinal link.

Finally, the organizational sample in the current study was drawn from a manufacturing organization with many rote tasks and potentially limited opportunities for being creative. The hypotheses in this paper should therefore be investigated further in environments more supportive of creative endeavors.

Conclusion

The purpose of the current research was to establish and test a working model of employee creativity that actively combines the tenets of the componential and interactionist models. The current study involved the first completely interactive test of the componential model using organizational samples. Results supported the merits integrating two major theories of organizational creativity. The most creative employees are informed about organizational processes, are motivated by their job tasks, and have confidence that they are able to be creative.

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Table 1. Hierarchical Regression Examination of Hypotheses

<i>Step</i>	<i>R² Change</i>	<i>Fixed Effect</i>	<i>Stand. B</i>	<i>t Ratio</i>	<i>p value</i>
1	.02	Hourly wage	-.07	1.65	<i>ns</i>
		Organizational tenure	.16	-.67	<i>ns</i>
2	.02	Hourly wage	.17	1.73	.086
		Organizational tenure	-.09	-.85	<i>ns</i>
		Domain-relevant skills (DR)	.15	1.56	<i>ns</i>
		Intrinsic motivation (IM)	-.028	-.31	<i>ns</i>
		Creativity-relevant processes (CR)	-.10	-.97	<i>ns</i>
3	.05±	Hourly wage	.19	1.88	<i>ns</i>
		Organizational tenure	-.07	-.75	.062
		Domain-relevant skills (DR)	.17	1.67	.098
		Intrinsic motivation (IM)	-.02	-.23	<i>ns</i>
		Creativity-relevant processes (CR)	-.07	-.66	<i>ns</i>
		IM x CR	-.03	-.28	<i>ns</i>
		DR x CR	-.07	-.55	<i>ns</i>
		IM x DR	.28	2.31	.023
4	.04*	Hourly wage	.19	1.90	.059
		Organizational tenure	-.07	-.66	<i>ns</i>
		Domain-relevant skills (DR)	.11	1.11	<i>ns</i>
		Intrinsic motivation (IM)	-.10	-1.07	<i>ns</i>
		Creativity-relevant processes (CR)	-.09	-.92	<i>ns</i>
		IM x CR	.01	.06	<i>ns</i>
		DR x CR	.02	.14	<i>ns</i>
		IM x DR	.44	3.22	.002
		IM x CR x DR	.37	2.38	.019

Note: ±p<.10; *p<.05

Figure 1. A Three-Way Componential Interaction

