

CREATIVE SELF-EFFICACY: ITS POTENTIAL ANTECEDENTS AND RELATIONSHIP TO CREATIVE PERFORMANCE

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Using data from two different firms, this study tested a new construct, creative self-efficacy, tapping employees' beliefs that they can be creative in their work roles. Results support the discriminant validity of the construct and indicate that job tenure, job self-efficacy, supervisor behavior, and job complexity contribute to creative efficacy beliefs. Creative self-efficacy also predicted creative performance beyond the predictive effects of job self-efficacy. Differences in results between white-collar and blue-collar samples suggest considerations for both theory and practice.

Bandura (1997) cited strong self-efficacy as a necessary condition for creative productivity and the discovery of "new knowledge." Because self-efficacy views influence the motivation and ability to engage in specific behavior (Bandura, 1977), as well as the pursuit of certain tasks (Bandura, 1986), the concept of self-efficacy holds much promise for understanding creative action in organizational settings. In fact, Ford (1996) placed self-efficacy beliefs as a key motivational component in his model of individual creative action. Despite the potential link of self-efficacy to creativity, little attention has been directed toward the concept in a creativity context. Accordingly, we conducted a preliminary investigation of creative self-efficacy focusing on three key issues. The first issue centered on understanding what factors contribute to employees' beliefs that they can be creative in their work role. Using a model of self-efficacy development (Gist & Mitchell, 1992), we proposed a set of creativity-specific self-efficacy determinants theoretically derived from the integration of literature on self-efficacy and creativity. The second issue was establishing discriminant validity for this construct, as well as the criterion validity of creative self-efficacy for creative performance across two diverse work settings. The third issue was exploring how job self-efficacy might moderate the effects of creative self-efficacy on creative performance.

The study should make several contributions. First, it introduces and develops a "self-construct,"

creative self-efficacy, that may be a key personal attribute for creativity in the workplace. Second, it provides the first field test of Ford's (1996) proposition that self-efficacy perceptions influence employee creativity. A third contribution of our study is that it addresses the joint impact of dual efficacies in relation to creativity, providing a more complex view of the self-efficacy–performance association. Although Bandura (1997) claimed that multiple types of self-efficacy come into play for performance in a given domain, few studies to date have examined the joint influence of more than one specific type of self-efficacy on performance in a corporate field setting. Because creativity in organizational contexts is often a choice (cf. Ford, 1996), our consideration of both general job capacity and creativity capacity could provide a partial explanation as to why employees often opt for routine over novel performance. Fourth, we examine both personal and contextual sources of self-efficacy formulation (Gist & Mitchell, 1992) in a creativity performance context, thereby broadening the scope of self-efficacy application. Fifth, the study complements, and augments, other lines of creativity research in meaningful ways. As efficacy judgments constitute a self-regulatory concept inherent in motivational processes (Bandura, 1977, 1986), the notion of creative self-efficacy may shed additional light on how intrinsic motivation (e.g., Amabile, 1983, 1997; Shalley & Perry-Smith, 2001; Tierney, Farmer, & Graen, 1999) and creativity-goal setting (e.g., Shalley, 1995) play out in terms of creative performance. Finally, studies examining either creativity or self-efficacy within multiple organizational contexts are rare. Testing our study model in two distinct organizational contexts permitted examination of the cross-validity and gener-

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alizability of our proposed conceptual links, and it may further enrich current discussions regarding the context specificity of creative behavior (cf. Drizin, Glynn, & Kazanjian, 1999; Ford & Gioia, 2000; Shalley, Gilson, & Blum, 2000).

THEORY AND HYPOTHESES

Definitional Issues

For creative performance, we relied on a product-oriented definition used in recent empirical studies (e.g., Oldham & Cummings, 1996; Tierney et al., 1999) positioning creativity as the generation of domain-specific (cf. Ford, 1996), novel, and useful outcomes (Amabile, 1988). Efficacy measurement must be "tailored to the domain being studied" (Gist, 1987: 472) in terms of content as well as degree of specificity (Bandura, 1997). Although belief in task capacity is a requirement for task accomplishment (Bandura, 1986), and being creative requires domain expertise and knowledge, creative performance also requires a set of skills specific to creativity (Amabile, 1988). It is plausible that individuals can perform a job to standards but lack the ability—or, just as important, perceive themselves as lacking the ability—to be creative in that job. Also, given that novelty and value can be independent performance dimensions (Ford & Gioia, 2000), it is likely that distinctions in capacity beliefs related to the two performance domains will influence the performance route (novel versus routine) employees will choose. Therefore, self-judgments of more general job efficacy and self-judgments of creative efficacy directed toward one's job should be delineated. Working from Bandura's general definition of self-efficacy as targeted perceived capacity, we defined creative self-efficacy as the belief one has the ability to produce creative outcomes. Creators possess a set of core self-concepts conducive to creative endeavors (Mumford & Gustafson, 1988). Although our creative self-efficacy construct should fall within the self-image spectrum characterizing creative individuals (cf. Barron & Harrington, 1981), it is also unique from other self-views. Whereas self-esteem and confidence are broad, generalized feelings, self-efficacy is a capacity judgment made in a more narrow arena (Bandura, 1997). Because it is creativity-specific, creative self-efficacy also differs from general self-efficacy, which reflects overall belief in one's capability across domains (Chen, Gully, & Eden, 2001).

Antecedents to Creative Self-Efficacy

Building on the work of Bandura, Gist and Mitchell (1992) presented a model of work-related self-efficacy development with a typology of efficacy determinants. They noted that individuals engage in a process whereby they assess their personal and situational resources and constraints and subsequently rely on these assessments to yield interpretive data they use to form personal efficacy judgments. We used Gist and Mitchell's model as the conceptual framework to guide our understanding and selection of creative self-efficacy determinants in work settings for our current study. To develop a preliminary nomological net specific to creative self-efficacy, we considered general determinants suggested by their model in light of previous work addressing creativity antecedents. Thus, we investigated two personal sources of creative efficacy, job knowledge and job self-efficacy, and two contextual sources, supervisor behavior and job complexity, as suggested by Gist and Mitchell (1992).

The role of knowledge. Because task knowledge is a stable, personal factor that shapes self-efficacy assessment (Gist & Mitchell, 1992) and creativity performance (Amabile, 1983), we would expect to see an association between job-related knowledge and creative self-efficacy. Two sources of knowledge acquisition are job experience and formal education. These facets represent personal resources available to an employee (Gist & Mitchell, 1992) for creative performance. Research shows that extant experience in a particular field is necessary for creative success (Amabile, 1988) because immersion in a domain over time leads to the level of familiarity requisite for creative work (Weisberg, 1999). Although task familiarity could lead to more "habitual" performance (Ford, 1996), it also provides ample opportunities to prepare for creativity through "deliberate practice" of task-domain skills and activities (Ericsson, Krampe, & Clemens, 1993). Creativity also requires some sense of what has been done in the past within a domain (Bailyn, 1988) and what has historically constituted the status quo. As employees come to understand the nuances of their jobs, they are more likely to feel confident that they can be creative in their work roles. Education experiences are also basic to the development of creative tendencies and processes (Nickerson, 1999). This development may entail cognitive enhancement including an orientation toward use of diverse, multiple perspectives and increasingly complicated schema (Perkins, 1986). Education provides exposure to a variety of experiences, viewpoints, and knowledge bases, reinforces the use of divergent problem-solving skills

and experimentation critical to innovative work (Amabile, 1988), and connects to employee creativity (e.g., Amabile & Gryskiewicz, 1987; Tierney et al., 1999). Given the noted association between creativity and knowledge, and the fact that knowledge is an immediate and "directly accessible" cue for self-efficacy calculation (Gist & Mitchell, 1992), we propose:

Hypothesis 1. Job tenure and education level will positively predict creative self-efficacy.

The role of job self-efficacy. Gist and Mitchell (1992) noted that variable dispositional states are another personal resource that influence employees' self-efficacy judgments. It has been noted that efficacy views fall along a continuum from general to specific (Bandura, 1997), becoming statelike as they increase in specificity (Chen et al., 2001). Although creative self-efficacy is the central focus of our study, a second efficacy judgment also of interest is job self-efficacy, defined as an employee's view of his or her capacity to conduct the overall job. Because it is specific to a situation (that is, a job) and proximal to overall job performance, job self-efficacy would be considered a malleable employee state (see Chen et al., 2001). In contrast to creative self-efficacy, job self-efficacy taps a more global perspective and has a different focus. There is a distinction between what it takes to do a job "well" and what it takes to do a job "creatively" (Amabile, 1988). Likewise, belief about performing a job well is not necessarily the same as belief in one's capacity to generate creative ideas for new products or processes in that work. Bandura suggested that efficacy beliefs do not exist in isolation and that a person may generalize from one efficacy belief to others related by "experience and reflective thought" (1997: 50). He indicated that more general types of self-efficacy shape more specific types, a process that would suggest a link between job self-efficacy and creative self-efficacy. He also noted that attainment views can be perceived as indicating capacity in related domains. Because performance capability in a domain is a precursor to creative capability in that domain (Amabile, 1988), it is reasonable to posit that belief in one's ability to adequately do a job is necessary before one has confidence in an ability to be creative there. In that respect, a sense of general job efficacy may be necessary for the formulation of the more targeted, work-related, creative self-efficacy.

Hypothesis 2. Job self-efficacy will positively predict creative self-efficacy.

The role of supervisor behavior. Employees also collect information useful in forming efficacy

views from their interpersonal task environments (Gist & Mitchell, 1992). Likewise, "an individual's development of a creative frame of reference does not take place in social isolation" (Drazin et al., 1999: 293), and employees rely on cues from members of their work environments to form views relevant to creative acts, including views of their own capability (Ford, 1996). It has been suggested that supervisors are integral in shaping employees' efficacy beliefs (Eden, 1990), and confidence-building behavior has been cited as a requirement for the effective management of employee creativity (Amabile & Gryskiewicz, 1987). Supervisors are a potential vehicle for two experiences that Bandura (1986) suggested play a key role in determining self-efficacy: vicarious learning, or "modeling," and verbal persuasion. Role modeling by supervisors is a fundamental contextual factor for creativity (Amabile & Gryskiewicz, 1987) and is crucial for efficacy development on complex, challenging activities in which demonstration of effective performance and coping are required (Bandura, 1997). Gist and Mitchell (1992) wrote that because employees may lack sufficient information by which to gauge their task success, models demonstrating effective performance strategies provide employees with data by which to assess their own performance efficacy. Supervisors may also engage in acts of verbal persuasion that are conducive to self-efficacy formulation (Bandura, 1986). Efforts to convince employees that they are capable of being creative through verbal expression of trust, confidence, and praise may be instrumental in shaping creativity-related efficacy beliefs (cf. Deci & Ryan, 1985). In addition to persuading, such actions may also elicit positive emotive reactions on the part of an employee also amenable to stronger efficacy views (Bandura, 1997).

Hypothesis 3. Supervisor support (role modeling and verbal persuasion) will positively predict creative self-efficacy.

The role of job complexity. Employees also assess elements of the task or job in which they are involved in determining their levels of perceived capacity (Gist & Mitchell, 1992). Perceptions that tasks are complex may depress self-efficacy levels (Cervone & Peake, 1986). Thus, Gist and Mitchell (1992) posed complexity as a stable contextual factor with the potential to negatively impact self-efficacy views. The nature of the job complexity-self-efficacy association differs, however, when efficacy perceptions relate to creativity. Numerous aspects of a complex job are conducive to creativity. Jobs amenable to creativity are multifaceted, less specified, and nonroutine, and they present a

challenge (Amabile, 1988). Because complex jobs often require flexibility and experimentation and provide the opportunity to use advanced cognitive faculties and processes (Campbell, 1988) endemic to creativity, we would expect that employees conducting complex jobs would have greater efficacy for creative work than would employees in less complex jobs.

Hypothesis 4. Job complexity will positively predict creative self-efficacy.

Because of the challenges associated with learning a more complex job, it is likely that the relationship between complexity and creative self-efficacy will be moderated by job tenure. The positive impact of complexity on creative self-efficacy should become more pronounced over time as an employee develops a greater familiarity with the intricacies of a job and gains opportunities to think of, and practice, unique ways to perform jobs tasks. In contrast, denied the opportunity to practice experimentation and flexibility in their jobs, over time employees may find it difficult to see themselves as someone who could be creative in their work. Thus, we predict that job tenure will amplify both the positive effects of high-complexity jobs and the negative effects of low-complexity jobs, such that both the highest and lowest levels of creative self-efficacy will occur when job tenure is high.

Considering the favorable impact holding a complex job has on creativity (Oldham & Cummings, 1996), even a brief time spent in such a conducive position should permit some element of creative experimentation and the building of confidence in that regard. Thus, we would expect to find the second-highest creative self-efficacy in the high job complexity-low tenure scenario. Also, employees who are relatively new to routine, unchallenging jobs may still foresee the potential for being creative in their work. This latter group would likely possess a higher level of creative efficacy than their peers who have been conducting their structured, simplistic jobs for long periods of time. Thus, we would expect to find the third-highest (or the second-lowest) level of creativity in the low job complexity-low tenure scenario.

Hypothesis 5. Job tenure will moderate the effects of job complexity on creative self-efficacy, such that the positive relationship between job complexity and creative self-efficacy will be stronger for higher levels of job tenure.

Creative Self-Efficacy and Creative Performance

Creative endeavors require some internal, sustaining force that propels individuals to persevere

in the face of the challenges native to creative work (Amabile, 1983; Bandura, 1997). Creative self-efficacy appears to provide such momentum in that strong efficacy beliefs enhance the persistence level and the coping efforts individuals will demonstrate when encountering challenging situations (Bandura, 1977). Employees resisting engagement in creative behaviors when they perceive creative attempts will be unsuccessful (see Ford, 1996) underscores the motivational relevance of self-efficacy for creativity. Only three studies, to date, have focused on self-efficacy beliefs in an explicit creativity context. Two were laboratory studies (Locke, Frederick, Lee, & Bobko, 1984; Redmond, Mumford, & Teach, 1993), and the third was a field study conducted among managers (Gist, 1989) and focusing on idea generation efficacy as an outcome of training method. These studies provide a foundation for further exploration of creativity-specific efficacy, but they do not provide direct empirical evidence as to how creative efficacy views relate to work creativity in a corporate field setting.

Elevated self-efficacy leads to certain cognitive components (for instance, broader information searches, greater memory recall; cf. Cervone, Jiwani, and Wood [1991]) and the sustaining of effort (Bandura, 1997) linked to creative performance (Amabile, 1988). In this sense, both job self-efficacy and creative self-efficacy could serve creative efforts. However, Amabile (1988: 131) noted that creativity skills also entail an "ability to break mental set," a knowledge of "heuristics for generating novel ideas," and confidence in adopting nonconforming perspectives, taking risks, and acting without dependence on social approval. These are all elements specific to creative performance that have not been documented, in a general sense, for self-efficacy. Given that these attributes are key to generating creative ideas, it is likely that individuals who have ascertained they have the capacity to be creative will also possess such attributes. Furthermore, Amabile (1988) stated that creative performance is only evidenced when creativity skills build upon a base of domain expertise. Whereas multiple types of efficacy can influence the same performance, we would expect to see more specific, proximal efficacy types accounting for a significant change in the targeted performance (Bandura, 1997). Because creative self-efficacy specifically "targets" the ability to be creative, we would expect it to have an incremental influence beyond that provided by confidence in the ability to do a job well in general.

Hypothesis 6. Creative self-efficacy will positively predict creativity and will explain variance in creativity beyond that provided by job self-efficacy.

Amabile (1983, 1988) posited that creativity occurs at the intersection of general job domain skills and creativity skills. We propose an analogous scenario, in which creativity occurs at the intersection of perceived job skills and perceived creativity skills. Amabile's arguments suggest that it is at the points at which varying levels of creativity skills are applied to varying levels of job skills that creativity will, or will not, take place. She further stated that job domain expertise provides a set of job-relevant "pathways" for an individual to explore during the full engagement of creativity skills. We therefore posited that job self-efficacy would moderate the relationship between creative self-efficacy and creativity. We expected to find strong creative self-efficacy having the most positive impact on creativity when job self-efficacy was also strong. Insofar as it is difficult to be creative where basic skills are lacking, even in the presence of strong creativity skills (Amabile, 1983, 1988), weaker job capacity beliefs should erode the positive effect that creative self-efficacy brings to creative performance. However, we did not consider it likely that this performance decrement would be complete; it would simply serve to make the relationship less positive than it would be if job self-efficacy were high. One of the basic tenets of the efficacy-performance relationship is that positive efficacy views induce strong motivational tendencies toward the targeted performance (Bandura, 1977, 1986). Accordingly, because high creative efficacy should generate strong creative aspiration levels, we would expect there to be some sustaining of creative attempts, and resulting creative performance, in light of the positive, target-specific creative efficacy judgment. Amabile (1988) also noted that in the absence of creativity skills, creative performance will not occur. She emphasized that although the singular presence of job skills will lead to "technically good" performance, the outcome will not be creative. Thus, we propose that job self-efficacy will have no influence on the creative self-efficacy-creative performance relationship when creative self-efficacy is low.

Hypothesis 7. Job self-efficacy will moderate the effects of creative self-efficacy on creativity in such a way that the positive relationship between creative self-efficacy and creativity will be stronger for employees who have higher job self-efficacy.

METHODS

Sample, Setting, and Procedures

The first sample had 584 permanent, full-time, employees from all hierarchical levels of the manufacturing division of a large consumer products company; respondents represented a 93.4 percent response rate. The sample largely consisted of blue-collar workers such as machinists, line operators, tool and die makers, and technicians. After a preparatory meeting, data were collected via self-administered surveys; the first author was present to answer questions and ensure response confidentiality. Sample members had an average corporate tenure of 12.85 years ($s.d. = 9.50$) and an average of 1.31 years of education beyond high school ($s.d. = 1.65$).

The second sample consisted of 158 out of 207 (a 76.3 percent response rate) of the permanent, full-time, predominantly white-collar employees of the operations division of a high-tech firm, such as program managers, accountants, buyers, and business analysts. After a preparatory meeting to answer questions and ensure response confidentiality, the first author provided self-administered surveys to each employee and sealed envelopes for their return to her. Average corporate tenure was 4.55 years ($s.d. = 2.74$), and average years of education was 2.79 years beyond high school ($s.d. = 2.12$). All respondents were informed that the data collections were part of a larger study examining corporate empowerment and innovation across industries.

Measures

To develop our *creative self-efficacy* measure, we examined literature on both self-efficacy (e.g., Bandura, 1997) and creativity (e.g., Amabile, 1988; Woodman, Sawyer, & Griffin, 1993) and subsequently created an initial set of items, indicative of our content domain, reflecting employees' beliefs in their ability to be creative in their work. In line with Amabile's stance that general creative skills lead to creativity, we worded the items in a general fashion but instructed respondents to answer in terms of their own work roles. Our items were initially administered to 46 respondents working in a broad cross-section of organizations. Drawing on the results from this first test sample, we reduced the item pool to 13, administered it to a separate sample of 233 employees, and conducted exploratory factor analyses. We subsequently reduced the pool to three items (for instance, "I have confidence in my ability to solve problems creatively"). The resulting scale was rated on a seven-point format

(1, "very strongly disagree"; 7, "very strongly agree"). The measure demonstrated a good level of reliability (manufacturing, $\alpha = .83$; operations, $\alpha = .87$) that was not improved by the inclusion of additional items.

Job tenure was measured in years. *Education* was measured on an 11-point scale (0 = high school degree; 1–10 = number of college years completed). *Job self-efficacy* was tapped with a three-item, 7-point Likert scale developed by Spreitzer (1995). In the present study, alphas were manufacturing, .77, and operations, .85. Supervisor behavior was tapped using a nine-item, 6-point Likert scale developed for use in this study. The items were derived from previous work on creativity-conducive (cf. Amabile, 1988; Woodman et al., 1993) and efficacy-conducive factors (cf. Bandura, 1997) and from an earlier qualitative study conducted in a different corporate setting by the first author. Items targeted a supervisor's tendency to engage in modeling and persuasive behaviors related to creativity; a sample item is "My supervisor bolsters my confidence in my creative potential" (manufacturing, $\alpha = .93$; operations, $\alpha = .94$). Job complexity was based on *Dictionary of Occupational Titles* (Roos & Treiman, 1980) substantive complexity scores. Included in the score is a factor tapping the extent to which creativity is a job requirement, a dimension shown to be important for workplace creativity (Shalley et al., 2000). Consistent with prior research (e.g., Oldham & Cummings, 1996; Tierney et al., 1999), creativity was assessed by supervisor ratings of six creativity performance items from Tierney et al. (1999) on a 6-point Likert scale; a sample item is "This employee tries out new ideas and approaches to problems" (manufacturing, $\alpha = .96$; operations, $\alpha = .95$).

RESULTS

We conducted several tests to examine the convergent and discriminant validity of the creative self-efficacy construct versus job self-efficacy. First, we employed confirmatory factor analysis using EQS (Bentler, 1995) to compare a two-factor model with a single-factor model in which the two efficacies are collapsed. Absolute fit indexes for the hypothesized two-factor model ranged from adequate to excellent (manufacturing, $\chi^2 = 41.69$, $df = 8$, $p < .001$, CFI = .97, IFI = .97, RMSEA = .08; operations, $\chi^2 = 12.04$, $df = 8$, $p = .15$, CFI = .99, IFI = .99, RMSEA = .07), and these fit indexes were superior to the single-factor model's in both samples. The two-factor model fit the data significantly better than did the single-factor model according to chi-square difference tests (detailed results are

available upon request). To assess the invariance of factor structures across the two samples, we compared three nested models: (1) an unconstrained model in which item-factor "loadings" and factor correlations were allowed to differ in each sample, (2) a model in which the item-factor loadings were constrained to be equal in the two samples, and (3) a model in which the item-factor loadings and interfactor correlations were constrained to be equal across the two samples. Chi-square difference tests showed no significant degradation of model fit when constraints were added for models 2 and 3, and Lagrange multiplier tests (Bentler, 1995) showed no significant improvement in model fit from releasing any of the individual constraints in these models. Thus, it appears that factor structures are equivalent in the two samples. As an additional test of discriminant validity for creative self-efficacy, we looked at differences in the nomological networks between each of the two efficacy variables using the other study variables. On the basis of our findings (available upon request), in each sample, we statistically rejected a null hypothesis of equal correlations between each efficacy variable and the other study variables, lending additional support for the construct validity of the creative self-efficacy measure. Results from all the above analyses supported the existence of creative self-efficacy as a construct distinct from job self-efficacy.

Descriptive statistics and zero-order correlations for both samples are shown in Table 1. Table 2 provides the results of the hierarchical regression analysis testing for antecedents of creative self-efficacy. Antecedents were entered as a first block, followed by the interaction term in the second step. Total estimated variance explained was 23 percent for the manufacturing firm sample, with the antecedent block explaining 22 percent of the variance and with all variables except job tenure significant and positive. Job tenure was significantly and negatively related to creative self-efficacy. In the operations sample, 31 percent of the estimated variance was explained by the antecedent block, with job self-efficacy, supervisor support, and job complexity being significant predictors. The beta coefficients indicated that the strongest effects on creative self-efficacy in both samples were from job self-efficacy. Results provide partial support for Hypothesis 1 concerning education, and full support for the hypothesized positive associations of job self-efficacy (Hypothesis 2), supervisor support (Hypothesis 3), and job complexity (Hypothesis 4) with creative self-efficacy. The job complexity by job tenure interaction (Hypothesis 5) was signifi-

TABLE 1
Means, Standard Deviation, and Correlations of the Variables^a

Variable	Mean	s.d.	1	2	3	4	5	6
Manufacturing sample								
1. Creativity ratings	3.24	1.02						
2. Creative self-efficacy	5.16	0.92	.17**					
3. Job tenure	8.23	7.49	.20**	.00				
4. Education	1.35	1.70	.03	.12**	.01			
5. Job self-efficacy	5.92	0.79	.13**	.40**	.02	.06		
6. Supervisor support	3.21	1.04	.05	.05	-.14**	-.19**	.01	
7. Job complexity	3.17	1.54	.31**	.18**	.22**	.38**	.04	-.14**
Operations sample								
1. Creativity ratings	3.97	1.06						
2. Creative self-efficacy	5.40	0.93	.24**					
3. Job tenure	3.24	4.21	.03	.12				
4. Education	2.91	2.21	.12	.16	-.10			
5. Job self-efficacy	5.79	0.89	.01	.52**	.19	.02		
6. Supervisor support	4.24	0.98	-.10	.03	.10	-.14	.06	
7. Job complexity	5.93	1.85	.12	.11	-.06	.41	-.16	.14

^a Manufacturing sample, $n = 502$; operations sample, $n = 104$.

* $p < .05$

** $p < .01$

TABLE 2
Results of Hierarchical Regression Analyses for Creative Self Efficacy^a

Variable	Hypothesis	Manufacturing Sample				Operations Sample			
		β	R^2	ΔR^2	Adjusted R^2	β	R^2	ΔR^2	Adjusted R^2
Step 1: Antecedents			.22**	.22**			.31**	.31**	
Job tenure	1	-.08*				.06			
Education level	1	.08*				.07			
Job efficacy	2	.41**				.52**			
Supervisor support	3	.10*				.16*			
Job complexity	4	.20**				.18*			
Step 2: Interaction			.23**	.01**	.22		.31**	.00	.29
Job complexity \times job tenure	5	.11*				.02			

^a After "listwise" deletion, n 's were 536 for the manufacturing sample and 138 for the operations sample.

* $p < .05$

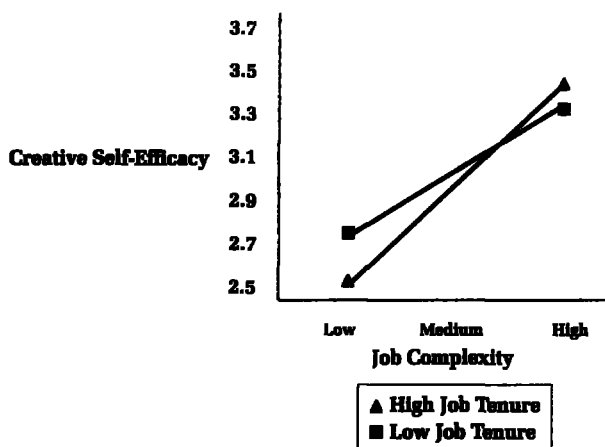
** $p < .01$

cant only in the manufacturing sample, accounting for an additional 1 percent of explained variance beyond that explained by the antecedents. Figure 1 is a graph of this interaction, with the manufacturing sample split into three levels of job complexity (low, mean, and high) and job tenure split into two levels (low and high). As Figure 1 shows, the highest levels of creative self-efficacy were found when both job tenure and job complexity were highest. Our expectation—that at low levels of complexity, greater

tenure would be associated with the lowest levels of creative self-efficacy—was also substantiated.

Table 3 presents the results of hierarchical regression analyses testing the proposed relations between creative self-efficacy and creative performance. Most of our efficacy antecedents also relate to creativity (job complexity and supervisor behavior, for instance; see Oldham and Cummings [1996]), so they were entered first as a block, followed by job self-efficacy in the second step, creative self-efficacy in

FIGURE 1
Interaction of Employee Job Tenure and Job Complexity on Creative Self-Efficacy, Manufacturing Sample



A significant interaction between job and creative self-efficacy (explaining 5 percent of criterion variance) was detected only in the operations sample, whereby creativity is highest when both creative and job self-efficacy are high. Figure 2 is a graph of that interaction, with the job self-efficacy data split at the mean and the creative self-efficacy data split into three levels. Contrary to our expectations, the lowest level of creative performance occurred when employees with high levels of creative efficacy perceived that they lacked job domain skills. Our results pattern suggests that level of job self-efficacy only influences the association between creative self-efficacy and creative performance when employees feel confident in their creative ability. When employees had low creative self-efficacy, job-self efficacy had no moderating impact. Overall, these findings provide partial support for Hypothesis 7.

the third, and the efficacies product term last. The total estimated variance explained was 14 percent for each sample. For the manufacturing sample, the antecedent block explained 13 percent of the variance, with all variables except education significant and positive. In the operations sample, the antecedents did not explain significant variance in creativity, and none were individually significant. Creative self-efficacy was positively and significantly related to creative performance in both samples, explaining an additional 1 percent of the variance in the manufacturing group and an additional 6 percent in the operations sample, supporting Hypothesis 6.

DISCUSSION

Our study makes a number of contributions with implications for theorists and practicing managers. First, we have developed a new efficacy construct specific to work creativity by integrating research findings on self-efficacy and creativity. Second, we have provided evidence for the validity of creative self-efficacy as a distinct construct and have tested a nomological network of antecedents drawn directly from an existing model of self-efficacy development (Gist & Mitchell, 1992). A subset of factors that promote employees' views that they can be

TABLE 3
Results of Hierarchical Regression Analyses for Creativity Ratings^a

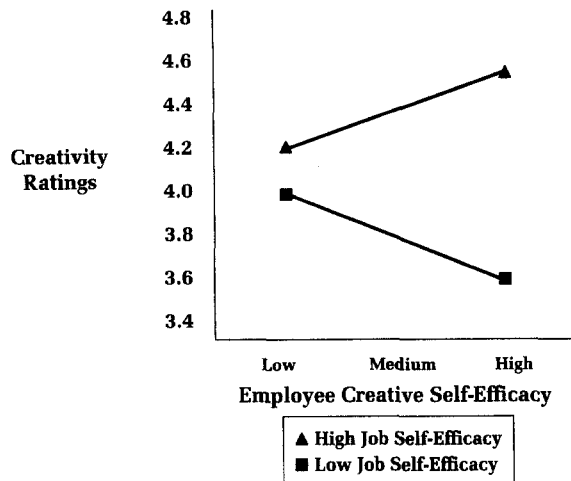
Variable	Manufacturing Sample				Operations Sample			
	β	R^2	ΔR^2	Adjusted R^2	β	R^2	ΔR^2	Adjusted R^2
Step 1		.12**	.12**			.03	.03	
Job tenure	.10*				.05			
Education level	-.02				.07			
Supervisor support	.10*				-.10			
Job complexity	.29**				.10			
Step 2		.13**	.01*			.03	.00	
Job self-efficacy	.11**				.04			
Step 3		.14**	.01*			.09*	.06*	
Creative self-efficacy	.09*				.26*			
Step 4		.14**	.00	.13		.14**	.05*	.07
Job self-efficacy \times creative self-efficacy	-.06				.28*			

^a After "listwise" deletion, *n*'s were 502 for the manufacturing sample and 104 for the operations sample.

* $p < .05$

** $p < .01$

FIGURE 2
Interaction of Employee Creative Self-Efficacy
and Job Self-Efficacy on Creativity Ratings,
Operations Sample



creative in their work role has been suggested. Third, this is the first study to examine specified creative efficacy beliefs in direct relation to employee creativity in an ongoing corporate setting. A fourth contribution is the finding that specific, multiple efficacies come into play for creative work and that creative self-efficacy and job self-efficacy demonstrate differential criterion validity for employee creativity. The finding that the development of creative self-efficacy and its role in creative performance may differ among employees in diverse task settings is the fifth contribution. We feel our findings augment current research on both organizational creativity and self-efficacy by suggesting a new self-concept instrumental to creative performance and by extending the basic efficacy-performance relationship into new arenas.

Overall, our findings support Gist and Mitchell's (1992) proposal that both personal and contextual factors come into play when employees formulate work-related self-efficacy judgments. The results support a generalization effect among efficacy types (cf. Bandura, 1997; Chen et al., 2001) suggesting that a core sense of job capability is important for creative efficaciousness in one's work. Job self-efficacy was the strongest predictor of creative self-efficacy for both samples that provided data for this study. This finding highlights the importance of managers' providing the training and experience opportunities necessary for employees to develop the sense of general job mastery, a foundation for subsequent creative work. Our finding for job complexity is in line with previous research reporting a posi-

tive job complexity-creativity link (Oldham & Cummings, 1996) and contradicts the general notion that complexity obstructs efficacy development (cf. Gist & Mitchell, 1992). The message for managers here is that designing jobs to be multifaceted and to require flexibility and experimentation is a positive step toward promoting stronger creative self-efficacy among employees. Our results also extend previous research on supervisors' link to creativity (cf. Tierney et al., 1999) by highlighting their role in the "sense-making" process, which is central to creative efficacy formulation. It appears that employees believe they have creative capability when they work with supervisors who build their confidence through verbal persuasion and serve as models for activities core to creative performance.

The antecedent pattern for creative self-efficacy we detected differed in our two samples in two noteworthy ways: Education was positively related and job tenure negatively related to creative self-efficacy among the blue-collar sample, but neither had an effect within the white-collar sample. By supporting education, managers may provide blue-collar employees with cognitive enhancement and experiences conducive to feeling creative in their work roles. Given that our blue-collar sample worked within a task and corporate realm in which innovation was historically not a priority, longer time within that system may have stifled creative attempts and experience that could positively shape efficacy views (Bandura, 1997). Our results also suggest that the path to creative self-efficacy for blue-collar employees may be more intricate in that increased job tenure was associated with greater creative self-efficacy only when employees held complex jobs. More experience performing a routine, simple job may diminish employees' beliefs that they can be creative in their work. Although job complexity related to creative self-efficacy among the operations sample employees, it did not show the same moderating pattern. The reason may be the limited variance and low levels of tenure (mode = 2 years) in the sample.

Our findings support the propositions that efficacy states influence employees' decisions to be creative in their work (Ford, 1996) and that multiple efficacies are at play for performance (Bandura, 1997) requiring creativity. The findings also highlight the importance of managers' taking steps to foster employees' beliefs regarding general job mastery skills and creativity-specific skills. Knowledge of the strength of these efficacy beliefs may be useful to managers in selection, placement, and training decisions in which creativity is integral. The pattern of creativity antecedents evidenced by

our study also suggests that creativity models may not necessarily generalize across task settings. In particular, our results suggest that creative performance among white-collar employees may be largely efficacy-driven. Creative self-efficacy was the only factor to have a "main effect"; alone, it was responsible for 5 percent of the variance explained in the creativity of the operations sample employees, and interactively, with job self-efficacy, it accounted for an additional 6 percent, for a total of 11 percent. Such effect sizes meet or exceed those of the individual predictor variables considered in similar creativity studies (cf. Oldham & Cummings, 1996; Tierney et al., 1999).

In the operations setting, high levels of job self-efficacy augmented the positive effects of creative self-efficacy on creative performance, but low job self-efficacy eroded creative performance as creative efficacy levels increased. The lowest creativity occurred among employees who believed they had creative capacity but lacked confidence in their overall job ability. It has been suggested (Eden, 2001) that when multiple efficacies are relevant to performance, the presence of one weak efficacy perception will negate the motivational force of a second strong self-efficacy view. In addition, recent findings (Farmer, Tierney, & Kung, 2001) suggest that employees who see themselves as creative will avoid creative behavior if the outcome is likely to threaten their creative sense of identity. It is possible that employees in the current study who held the strongest views of their own creative capacity were the most adamant in avoiding such behaviors if they felt they lacked basic job skills and, hence, were unlikely to be successful in their creative efforts.

The creative self-efficacy-creativity association was simple and of less magnitude (1 percent of variance explained) in the manufacturing group. The model for creativity among these employees was more balanced in terms of personal and contextual factors, as has been evidenced in previous studies (e.g., Oldham & Cummings, 1996). The prominence of job complexity in relation to creativity among these employees reinforces the potency of job design as a means of eliciting creativity in settings in which such activities are neither traditionally required nor expected (Oldham & Cummings, 1996). Sample differences noted here also illustrate the value of creativity inquiry in a diversity of settings. Such a focus may more accurately portray how organizations can make the transition from creativity-inhibiting to creativity-fostering entities. Constraining research to contexts in which creativity is overtly expected and supported may result in a body of knowledge meaningless to envi-

ronments in which creativity is increasingly needed but is not the norm.

The issue of context is relevant to the pattern of findings we detected in a number of ways. The degree to which the broader context values creative action, and the extent to which creative and general performance are linked, have possible implications for our findings. Ford and Gioia (2000) suggested that the performance dimensions of novelty and value can be independent in certain contexts. We would anticipate that job and creative self-efficacy may be loosely coupled at best, or may even be antithetical to one another in contexts in which no premium is placed on creative action or in which creative and more routine types of performance are independent of one another. In contrast, in a setting in which creativity is a priority and creative and routine performances are more closely linked, we would anticipate a strong, positive connection between job and creative self-efficacy. The contextual differences detected between our more traditional, blue-collar sample and the high-tech, white-collar sample may be partially a function of the differences in the strength of the association between creative performance and more general job performance in the two settings as well as partly a function of the differences in the value placed on creativity. Thus, our findings here align with a context-specific view of creative action (cf. Drizin et al., 1999; Ford & Gioia, 2000). It is also important to note that such contextual differences may serve as boundary conditions for the associations found between job self-efficacy and creative self-efficacy and their relation with creative performance. For individuals whose jobs explicitly entail being creative, the line between the two efficacy types may be less distinct. Future research is needed to test this assertion and examine more closely the impacts of both job and creative self-efficacy in the presence of both routine and creative performance criteria.

Although we framed our hypotheses in a predictive fashion, our study was cross-sectional, and there are clear limits to the causal inferences we can make regarding our findings and their interpretations. Studies tracking the development of creative self-efficacy and its association with creative performance over time are needed. We relied on supervisor-provided creativity ratings, as have other studies (e.g., Oldham & Cummings, 1996; Tierney et al., 1999), but the use of additional techniques (for instance, consensual assessment) in future studies would be beneficial. Although creative self-efficacy accounted for an impressive degree of variance in creativity

among white-collar employees, the relatively small amount of variance explained among the blue-collar employees indicates that great sensitivity to work context is warranted when a researcher is delineating creativity antecedents and their dynamics in relation to creative performance. In a related note, although our study's consideration of two diverse settings is a strength, the job complexity scores were differently skewed in the two samples (manufacturing, mode = 2.1; operations, mode = 6.3), making it difficult to determine with certainty whether variation in findings between the samples is a function of differences in their complexity distributions or of other factors. To unravel this potential confound, research should address study settings with more balanced ranges of job complexity levels. Also, the education ranges found in our samples limited our ability to more conclusively assess the impact of education in the creativity realm. It is possible that we would have seen a stronger role for education (positive or negative) among a more highly educated group (cf. Tierney et al., 1999).

In summary, previous research has supported the importance of self-efficacy for effective performance. Results of the current study suggest that such influence extends to employees' propensity to be creative in their work, but how this occurs is unique to a setting. Future research is needed to identify additional organizational and personal factors that promote a strong sense of creative capacity in the workplace and to further explore the influence of creative capacity on creative productivity in a variety of contexts.

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