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The Pygmalion Process and Employee Creativity

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The study examined the Pygmalion process for creativity among 140 R&D employees. Results generally supported the Pygmalion model. Supervisors holding higher expectations for employee creativity were perceived by employees as behaving more supportively of creativity. The effects of these behaviors on employee creative self-efficacy were mediated by employee view of creativity expectations. Creative self-efficacy mediated the effects of supervisor expectations, supervisor behaviors, and employee view, on creative performance. Implications for theory and practice are discussed.

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Recent models (e.g., Amabile, 1988; Ford, 1996; Woodman, Sawyer & Griffin, 1993) and studies (e.g., Madjar, Oldham & Pratt, 2002) of employee creativity point to the impact of the social milieu as employees embark in creative endeavors in the workplace. Research has identified work group supervisors as one social context work factor with the potential to shape such employee behavior (e.g., Oldham & Cummings, 1996; Tierney, Farmer & Graen, 1999). Because creativity is a complex phenomenon and leaders are likely to influence employee performance in a myriad of complex ways, it is important to establish a strong understanding of the intricate ties that bind leaders to creative performance in the work place (Tierney, *in press*). Although research conducted to date has been useful in informing our preliminary understanding of the role supervisors may play for employee creativity, there remain a number of relevant questions about the supervisor-employee creativity link that have not been empirically addressed.

For example, although leader expectations for creative work are important (Amabile, 1988), the means by which such expectations shape employee creative effort are not quite evident. In addition, although we know that supervisory actions influence work place cre-

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ativity, it is not clear what drives supervisors to direct creativity-conducive behavior towards certain employees, and not others. Nor do we currently have an understanding as to how, or why, supervisor behavior would influence employee creative performance. Answers to such questions are necessary for supervisors to effectively foster creative efforts in the work place, and were the motivation for the current study.

Over forty years ago, researchers began to investigate an interpersonal manifestation of the self-fulfilling prophecy phenomenon (Merton, 1948), labeled the Pygmalion effect, in which positive external expectations about someone's performance or capabilities produce higher performance. Despite recognition as a "promising management tool" (Eden, 1984, p. 72), only a handful of studies (e.g., Phillips & Dipoye, 1989) have examined Pygmalion principles within 'traditional' corporate contexts. Given the relevance of the Pygmalion effect for contemporary organizations, there is a need for further studies examining this process among supervisors and employees in corporate work settings (McNatt, 2000). It has been suggested (Sutton & Woodman, 1989) that the Pygmalion effect may be more pronounced when performance entails a higher degree of challenge and uncertainty, such as with creativity (Amabile, 1988). With its emphasis on interpersonal expectations, resulting behaviors, and performance, we believe the Pygmalion model may offer a rich conceptual framework in which to examine complexities related to supervisor-employee interactions, and the resulting creative outcomes.

Our application of the Pygmalion approach to employee creativity in the current study should make a number of contributions to both theory and practice. First, because the current study is based on a theoretical framework combining literature on employee creativity and the Pygmalion effect, it provides an important integrative theoretical contribution. Such integration should enable us to address a number of outstanding issues and gaps in both creativity and Pygmalion research. Second, with its suggested links among performance expectancies, behaviors, and subsequent efficacy and performance, this integrated Pygmalion perspective may provide insight to the process by which supervisors potentially influence creativity, not provided in previous creativity studies. Third, by accounting for external expectations, the Pygmalion model permits us to trace the association creative performance expectations have with creative work. Although a previous study (Scott & Bruce, 1994) found a link between supervisor innovation expectations and employee innovation, the study's findings did not suggest how such expectations resulted in creative performance.

Fourth, although employee recognition of others' performance expectations of them is crucial to whether the Pygmalion effect will transpire (Darley & Fazio, 1980), past studies have not explicitly accounted for its effect. Because interpretation of social cues relevant to the appropriateness of creative action is a necessary sensemaking step for creativity (Drazin, Glynn & Kazanjian, 1999; Ford, 1996), the current study tests an expanded version of the Pygmalion model including employee's view of external performance expectations for their creativity. Fifth, a major criticism of the Pygmalion research stream is the absence of studies that permit generalizability of the Pygmalion model to 'for-profit' organizations in ongoing work contexts (McNatt, 2000). The current study fills this void by testing the relevance and role of the Pygmalion effect in a corporate setting, thereby determining if the model applies to traditional work performance scenarios involving supervisors and their employees' creativity. Findings of the current study should respond to the need to know how, for whom, and under what performance conditions the Pygmalion effect is operative

(cf. McNatt, 2000). Finally, in the current study, we assess the entire Pygmalion model and thus are able to provide, or discount, support for each portion of the model within a single field study.

The Pygmalion Model and Creative Performance

A recent meta-analysis (McNatt, 2000) supported the validity of the Pygmalion process, and managerial implications of the Pygmalion effect have been presented (cf. Eden, 1984, 1992). The vast majority of non-educational Pygmalion studies have been conducted in military (e.g., Eden & Zuk, 1995) settings, or have focused on unemployed, or trainee (e.g., Eden & Aviram, 1993) samples. The one study conducted in a traditional corporate setting among sales associates (Sutton & Woodman, 1989) did not support the Pygmalion model. For purposes of our study, we built upon an existing Pygmalion model used in this previous study.

Applied to a creativity context, the model suggests how supervisor creativity expectations for employees link with employee creative performance through a series of mediating factors. The flow of the model suggests that the level of supervisors' creativity expectations will determine the extent to which they direct creativity-supportive behaviors toward employees. Such behaviors are instrumental in shaping employees' judgments of their creative self-efficacy, which, in turn, influences their creative performance. As suggested earlier, the current study model also positions a new variable, employees' perception that creative work is expected of them, as intervening between supervisor behavior and employee efficacy beliefs related to creativity.

It is not the intent of the current study to attempt to manipulate supervisors' performance expectations for employees, nor to determine how they are formed. Several studies suggest that supervisor performance expectations may be induced as the Pygmalion effect would suggest (Eden, 1992). Because there is a need to determine *how* the Pygmalion process unfolds within the context of supervisor-employee interactions (McNatt, 2000), our concern is with the self-fulfilling prophecy component of the model once supervisors have formed performance expectations for their employees, regardless of how these expectations were derived. The study approaches creativity in terms of a final product (Amabile, 1988), such as novel and useful ideas, consistent with recent studies (e.g., Madjar et al., 2002; Tierney et al., 1999).

Supervisor Creativity Expectations and Supervisor Creativity-Supportive Behavior

A few studies have examined elements of the self-fulfilling prophecy among supervisors and employees. One study's examination of the association between supervisors' *a priori* competence expectations for employees and the later development of high quality relationships between supervisor and employees (Liden, Wayne & Stilwell, 1993), was based on the premise that supervisors would engage in supportive, relationship-conducive behaviors with those employees they felt had most potential. A second study (Wayne, Shore & Liden, 1997) found that supervisors' expectations contributed to the development of high quality supervisor-employee relations which in turn led to higher performance levels. Cre-

ativity theorists (e.g., Amabile, 1988; Ford, 1996) note that expectation for creativity is a catalyst for creative performance within organizational contexts. Although one previous organizational field study (Scott & Bruce, 1994) did find a positive association between supervisor innovation expectations and employees' innovation-related behavior, the study detected only a direct association between the two variables. The suggestion that "... the process through which supervisor's expectations are translated into changes in subordinate behavior is considerably more complex and problematic than commonly believed" (Sutton & Woodman, 1989, p. 949) connotes that a more intricate association between the two factors may be present.

The Pygmalion model purports that the most basic and proximal link with supervisor expectations is supervisor behavior. Accordingly, the supervisor's anticipation for employees' performance leads to the differential extension of task and interpersonally supportive behaviors among employees (Eden, 1992). Research results indicate that upon establishing expectation levels for employees, supervisors direct more energy toward those they believe have the most potential. Applied in a creativity task context, we would expect that supervisors are more likely to engage in higher levels of behavior supportive of creativity with employees they anticipate or expect to be more creative in their work.

H1: Supervisor creativity expectations are positively associated with supervisor creativity-supportive behavior.

Supervisor Creativity-Supportive Behavior, Employee View, and Creative Self-Efficacy

Eden (1992) discusses 'Pygmalion leadership' in terms of work facilitation, interaction facilitation, interpersonal support, and goal emphasis, and notes that because supervisors' engagement in these behaviors should enhance employees' performance beliefs, Pygmalion leadership is as a "self efficacy building style." In fact, a model of self-efficacy development (Gist & Mitchell, 1992) corroborates the Pygmalion leadership facets noting that such factors should influence self-efficacy development. The importance of resources and role models for task facilitation, collaboration among members, personal support, and the provision of rewards and encouragement that lead people to set creativity aspirations have been suggested as critical to creativity as well (e.g., Amabile, 1988; Woodman et al., 1993). Support for the link between leader behavior and employee self-efficacy in a creativity context was found in a laboratory setting (Redmond, Mumford & Teach, 1993) as well as a field study (Tierney & Farmer, 2002) in which leaders engaging in greater levels of actions supportive of creativity had employees reporting higher efficacy in their ability to be creative in their work.

The sensemaking process whereby employees interpret the meaning of environmental cues is core to the creative process (Drazin et al., 1999). Social cognitions and derived "meanings" held by employees are closely aligned with leadership (Gioia & Chittipeddi, 1991) and guide interpretation of behaviors and expectations. For example, social cues from supervisors make specific aspects of the job more salient for employees (O'Reilly & Caldwell, 1985), and shape their perceptions about broader issues such as the organization's orientation toward innovation (e.g., Dunegan, Tierney & Duchon, 1992). An underlying premise of the Pygmalion model is that supervisors communicate performance expecta-

tions for employees through their behaviors (Eden, 1992). As such, a key responsibility of leaders is to provide signals conveying the organization's orientation toward creative work (Amabile, 1988).

Although the Pygmalion model suggests that supervisor behavior enhances efficacy due to performance expectations it signals, the extent to which this process occurs may be contingent on the employee's interpretation of those behaviors as performance expectations. If the supervisor's behavior confirms for the employee that expectations are held for their creative work, it is likely that enhanced efficacy expectations will be experienced. If however, the employee did not interpret the behavior in such a manner, the corresponding efficacy enhancement may not be evidenced. Although it represents a key link in the Pygmalion process, and the feasibility of a mediating interpretive stage has been suggested (see Darley & Fazio, 1980), previous studies have not determined whether employees actually perceive expectations for their performance as a result of supervisor behavior. It has been noted (Eden et al., 2000) that future studies need to account for the impact of employee awareness and interpretation in the self-fulfilling prophecy process. Thus, the current model tests for an association between supervisor behavior and employees' view that they are expected to be creative in their job, and for an association between this view and employees' creative-self-efficacy.

H2: Supervisor creativity-supportive behavior is positively associated with employee's view of creative performance expectations.

H3: Employee's view of creative performance expectations is positively associated with employee creative self-efficacy.

Employee Creative Self-Efficacy and Employee Creativity

In his model of creative action, Ford (1996) proposes that employee efficacy beliefs are a core component of the motivation to innovate. He notes that in order for employees to be creative in their work, they must hold initial expectations that they can do so successfully. Because self-efficacy magnitude affects task-related attraction, initiation, and sustenance (Bandura, 1997), efficacy levels are likely to influence the extent to which employees enjoy creativity-relevant activities, initiate creative action, and maintain actual creative levels in their work. Creativity is often a time and effort intensive activity with a high potential for failure so it is paramount that employees have sources of perseverance allowing them to sustain creative action in the face of such conditions (Amabile, 1988; Bandura, 1997). Given the stringent demands of creative thought and action, it would appear that a strong self-efficacy for creativity would be necessary for creative action. This proposition is supported by one study (Redmond et al., 1993) in which individuals with a stronger sense of efficacy for marketing skills, produced significantly more creative work on subsequent marketing tasks. A second study demonstrated similar findings in which employees with a stronger creative self-efficacy engaged in higher levels of creativity in their work (Tierney & Farmer, 2002).

H4: Employee creative self-efficacy is positively associated with employee creativity.

Pygmalion Mediating Links

Our testing examined mediating links consistent with the traditional Pygmalion model, with the addition of the employee expectancy view variable. These mediations consist of both proximal and distal associations. Thus, we predict that (1) employee view of creativity expectations will mediate the relationship between supervisor creativity-supportive behavior and employee creative self-efficacy; (2) employee creative self-efficacy will mediate the relationship between employee view of creativity expectations and creative performance; (3) employee view of creativity expectations and employee creative self-efficacy will mediate the relationship between supervisor creativity-supportive behavior and creative performance; and (4) supervisor creativity-supportive behavior, employee view of creativity expectations, and employee creative self-efficacy will mediate the association between supervisor expectations and creativity.

Method

Sample, Setting, and Procedure

The study setting was an R&D unit in a chemical company located in the Midwest. The data were collected as part of a larger study which also provided the basis for an additional article (Tierney et al., 1999) on employee creativity. The employee sample ($n = 191$) was comprised of section leaders, project leaders, research managers, research scientists, work group professionals, and work group technicians from both the Basic (59%) and Applied (41%) divisions. On average, respondents had worked with the company for 12 years (S.D. = 9.46) and in their job for 6 years (S.D. = 6.1). In terms of education, 27% had Doctorate degrees, 15% Masters, 30% Bachelors, and 14% an Associates degree. Surveys containing independent variables were completed at the work-site during operating hours with the first author present. Thirty-four supervisors provided creativity ratings for each of their direct reports (94% response rate). The number of employees rated per supervisor ranged from 1 to 12 (average = 4.6). Among the responding supervisors, average corporate tenure was 14 years, average length of time in task field was 15 years, and they had an average of six years college education. After listwise deletions for missing data, 73% ($n = 140$) of the original respondent data were analyzed. Results of t -tests indicated no differences between respondents and incomplete respondents in education, divisional affiliation, or task expertise, although incomplete respondents tended to come from higher hierarchical levels. Since most supervisors rated several employees, a within-and-between analysis (WABA; Dansereau, Alutto & Yammarino, 1984) was conducted to assess potential supervisor response biases. Although the WABA F -test was not statistically significant, suggesting potential variation both within and between supervisors, E -test results for practical significance indicate that any possible lack of independence of supervisor ratings within groups is not a substantive problem.

Measures

Supervisors expectations for employee creativity. Supervisors were asked to consider their view of each of their employees in terms of the following statement: “This employee

is expected to be innovative at work” using a 6-point Likert scale ranging from “never” (1) to “always” (6). They were instructed to respond in terms of a time frame preceding that of the data collection. Although the use of single-item measures has been questioned, they may be acceptable measures if they are relatively narrow in meaning and unambiguous to the respondent (Gardner, Cummings, Dunham & Pierce, 1998; Wanous, Reichers & Hudy, 1997). Our single item expectations item was generated from a subset of supervisors in the participating company who were asked how supervisor expectations for creative work should be tapped. A second subset of supervisors verified that the single statement was clear in meaning and would be interpreted in a manner consistent with our intent. The only other organizational creativity study to tap supervisors’ expectations for employee creativity (Scott & Bruce, 1994) also relied on a similar, single-item measure. Additional studies using single-item supervisor expectation measures have focused on general performance (Wayne et al., 1997) and relationship effort (Maslyn & Uhl-Bien, 2001). We were able to generate a floor estimate of alpha reliability for our single item, .75, with a technique (Wanous et al., 1997) comparing our single item with a parallel 4-item measure of same construct using a sample of 39 managers from multiple organizations responding to both scales. Test–retest reliability of the single item over a 4-week period for a separate sample of 27 managers was .70, and time 1–time 2 predictive validity of the single item for the creativity ratings scale used in this study was .57. The total item correlation of the single item and the 4-item scale of .72 provides some evidence of convergent validity. Together, these results suggest that the single item measure was tapping its intended construct in a reliable fashion.

Supervisor creativity-supportive behavior. The extent to which supervisors engaged in behaviors conducive to creativity was determined using a 16-item instrument (see appendix for items). Employees indicated how frequently their supervisor engaged in the behaviors using a 6-point Likert scale ranging from “never” (1) to “always” (6). To create this instrument, we followed scale development guidelines set forth by Hinkin (1998) including the conduction of item generation and content validity analysis, and exploratory and confirmatory factor analyses in separate samples. Data from an earlier qualitative study on workplace creativity conducted by the first author in a different setting was analyzed by two independent coders using the open coding method, with the intent of identifying creativity supportive behaviors, sorting these into meaningful categories, and then labeling these categories. The categories were then compared to the relevant literature on creativity context (e.g., Amabile, 1988) and Pygmalion leadership (Eden, 1992). There was a strong level of correspondence between the four dimensions derived by the coders and those suggested by the literature. These initial dimensions were labeled task support, team facilitation, creativity recognition, and creativity initiation. Since the former two factors have been noted as general enablers serving as the foundation for creative action (cf. Amabile, 1988) their items were worded in a general fashion. Since creative performance requires encouragement, advocacy, and goals specific to creative behavior (Kanter, 1988) the items tapping the latter two factors were worded specific to creativity. To further assess the content validity of our item set, five independent subject matter experts (SMEs) conducted a Q-sort in which they back-translated the items onto the four creativity-supportive behavioral dimensions. The calculated substantive-validity coefficient for the sort was .85, indicating a high level of correct matching of items, and providing further evidence of their content validity.

We conducted exploratory factor analysis (EFA) on the 16 items in two additional corporate settings. Since the supervisor factors tapped were conceptually related, the analysis used an oblique rotation allowing factors to correlate. Based on standards of eigenvalue $>.1.0$, and examination of scree plots, a 3-factor solution was evidenced in both samples consistent with our proposed dimensions but with the creativity initiation and creativity recognition items loading on a single factor. This combined factor was labeled creativity encouragement. With the exception of one item, which cross-loaded in one sample, the item loadings were clean.

Because both of these were non-R&D samples, to be conservative, we also conducted the EFA in our current R&D sample to ensure that the same factor solution would hold. Results indicate that the 3-factor solution obtained in the initial two samples was also detected in the R&D sample. One item that had loaded cleanly in the previous two samples, cross-loaded in the current study. Given the theoretical rationale for inclusion of this item, and our intent to use these items as a single scale, we retained the item. We also conducted confirmatory factor analyses on the 16 items in all three samples. Three models were fit: a 3-factor uncorrelated factors model, a 3-factor correlated factors model, and a single-factor model. In all three samples, the 3-factor correlated factors model fit significantly better than the other models, but the factor intercorrelations were very high (minimum of .74 and maximum of .87), suggesting that the three dimensions were conceptually and factorially distinct but empirically highly interrelated. The single factor model fit significantly better than did the 3-factor uncorrelated model in all three samples, supporting that point. Based on these analyses we decided that measurement using a single multi-dimensional scale was most appropriate. (Cronbach alpha = .96 in the current sample, alpha = .95 in both other samples).

Employee view of creativity expectations. Three items (see appendix) generated from the earlier corporate interview study were used to assess employees' perceptions that creativity was expected in their work. The items were measured on a 6-point Likert scale ranging from "never" (1) to "always" (6). (Cronbach alpha = .79). Because these items, with minor wording differences, were also tested in the two additional corporate samples used to assess the supervisor behavior scale, we also conducted EFA and CFA within the three samples. A single factor structure was supported across all three samples. We also computed Cronbach alphas in the additional data sets as a check on internal consistency. Alphas were .85 in both samples, providing some preliminary evidence for the psychometric stability of this scale across settings.

Creative self-efficacy. To assess the employee's sense of efficacy for creative work, we used an existing creative self-efficacy instrument (Tierney & Farmer, 2002). The instrument consists of 3 items using a 7-point scale ranging from 1 "very strongly disagree" to 7 "very strongly agree" (sample item: "I feel that I am good at generating novel ideas") (Cronbach alpha = .76).

Control variables. We also collected data on a number of control variables that might be relevant. Educational level, reflecting task domain knowledge which could potentially influence creative performance (Amabile, 1988), was measured on an 11-point scale (0 = no college degree; 1–10 = number of college years completed). We also included a measure

of task domain expertise, number of years working in a specific task area. Because job complexity has been positively associated with creative performance (Oldham & Cummings, 1996) and self-efficacy (Gist & Mitchell, 1992), employee job complexity scores were collected from Roos and Treiman's (1980) work with the *Dictionary of Occupational Titles*. Hierarchical level has been related to greater involvement in innovation activities and was measured on a 1 (lowest level) to 8 scale (highest level). We also controlled for divisional affiliation (Applied or Basic).

Employee creativity. Consistent with prior research (e.g., Madjar et al., 2002), creative performance was assessed by employees' immediate supervisors using the 9-item, 6-point scaled instrument from Tierney et al. (1999). Supervisors were instructed to report how often each of their employees could be described according to the items. Higher scores indicated higher levels of creativity (sample item: "Generated novel, but operable work-related ideas") (Cronbach alpha .96).

Results

Convergent and Discriminant Validity of Employee Self-Report Scales

The convergent and discriminant validity of four of the study's scales (supervisor creativity-supportive behavior, employee view of creativity expectations, employee creative self-efficacy, and supervisor creativity ratings) were assessed using maximum likelihood estimation in EQS (Bentler, 1995) to compare several nested models representing plausible alternative factor scale structures (cf. Hinkin, 1998). These included (1) the hypothesized four factor model, representing our confirmatory factor model; (2) a three factor model with supervisor behaviors and employee view combined; (3) a three factor model combining employee view and creative self-efficacy; (4) a two factor model combining all constructs except supervisor creativity ratings; and (5) a single factor model. In this and all later structural models, we created three manifest indicators for each latent factor by randomly assigning each item to "testlets" to reduce the number of parameters assessed, thus improving the sample-size to estimator ratio (Anderson & Gerbing, 1988). The hypothesized 4 factor model showed good fit in absolute terms (chi-square = 97.35 on 48 df, $p < .001$, CFI = .96, RMSEA = .09). All paths linking indicators to their appropriate latent constructs were significant. Comparisons of the hypothesized 4-factor model with the other models were favorable (results available from the authors). In each case, the 4-factor model exhibited significantly better fit as assessed by chi-square difference tests, as well as higher CFI and RMSEA indices indicating adequate convergent and discriminant validity.

Hypothesis Testing

Descriptive statistics and zero-order correlations are shown in Table 1. Hypotheses were tested using structural equation modeling in EQS 5.8. Inspection of the normalized Mardia coefficient showed the assumption that the data are multivariate normal to be ten-

Table 1
Means, standard deviations, and intercorrelations of study variables

	Mean	S.D.	1	2	3	4	5	6	7	8	9
1. Employee creativity	3.49	1.14									
2. Creative self-efficacy	4.90	.72	.29**								
3. Employee view of creativity expectations	3.85	1.05	.14	.18**							
4. Supervisor creativity-supportive behavior	3.44	1.03	.17**	.08	.65**						
5. Supervisor expectations of employee creativity	4.33	1.14	.57*	.18*	.28**	.23*					
6. Education (years of college)	4.96	2.80	.37**	.16	.13	.00	.48**				
7. Task expertise (years)	12.48	10.00	-.02	.18*	.16	.05	.17*	.00			
8. Hierarchical level ^a	4.64	2.30	.30**	-.06	.31**	.18*	.49**	.67**	.31**		
9. Divisional affiliation ^b	.54	.50	.10	-.04	-.13	.00	-.13	-.26**	-.13	.07	
10. Job complexity	7.40	1.50	.31**	.06	.23*	.04	.43*	.72**	-.08	.04	.63**

Note. $n = 140$.

^a 1 = lowest, 8 = highest.

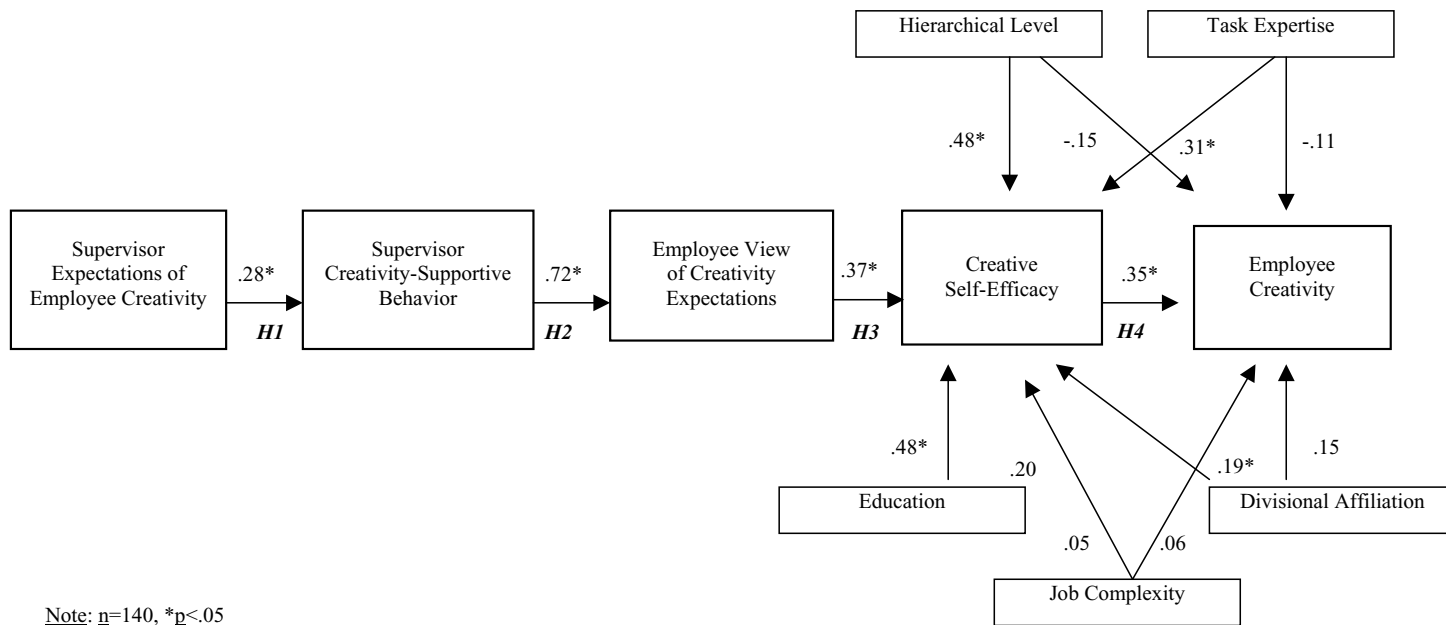
^b 0 = basic, 1 = applied.

* $p < .05$.

** $p < .01$.

able at the .05 probability level (normalized coefficient = 1.20, $p > .05$). Accordingly, maximum likelihood estimation was used to estimate the structural equations. To avoid under-identification of the model, we set the error variance for the single-item supervisor expectations variable at one minus the estimated reliability (or $1 - .75 = .25$); error variance for all other items was free to be estimated. Structural paths were freed for estimation according to the hypotheses as shown in Figure 1. We also estimated item-factor loadings for the three testlets assigned to each structural factor, error terms associated with each testlet, and appropriate disturbance terms associated with endogenous variables. Control variables were allowed to correlate with each other. All other paths were constrained to zero. To account for alternative sources of variation in creative self-efficacy and creative performance, paths to each of these were added from each of the four control variables.

Results show moderately acceptable fit for the overall model in absolute terms (chi-square = 274.40 on 117 df, $p < .001$, CFI = .91, RMSEA = .10). Squared multiple correlations for structural equations are: creative performance, .27; creative self-efficacy, .28; employee view of creativity expectations, .52; and supervisor creativity-supportive behavior, .08. Figure 1 reports the standardized parameter estimates for the structural model. Direct linkages between supervisor expectations and supervisor creativity enhancing behaviors (.28), supervisor behaviors and employee view of creativity expectations (.72), view of expectations and creative self-efficacy (.37), and creative self-efficacy and creative performance (.35) were all significant, supporting Hypotheses 1–4. Although none of the paths from the control variables to creative performance were significant, educational level, hierarchical level, task expertise, and divisional level were all significantly and positively related to creative self-efficacy.



Note: n=140, *p<.05

Figure 1. Hypothesized Pygmalion model for creativity with structural model parameter estimates.

Table 2
Path estimates and standard errors for indirect effects

Indirect effect	Unstandardized path estimate	S.E.	R ²
Supervisor expectations of employee creativity ↓ Supervisor creativity-supportive behaviors ↓ Employee view of creativity expectations	.16*	.06	.04
Supervisor creativity-supportive behaviors ↓ Employee view of creativity expectations	.21**	.06	.07
Employee view of creativity expectations ↓ Creative self-efficacy	.19**	.07	.02
Employee view of creativity expectations ↓ Creative self-efficacy ↓ Employee creativity	.07*	.03	.01
Supervisor expectations of employee creativity ↓ Supervisor creativity-supportive behaviors ↓ Employee view of creativity expectations ↓ Creative self-efficacy	.09**	.04	.01
Supervisor creativity-supportive behaviors ↓ Employee view of creativity expectations ↓ Creative self-efficacy ↓ Employee creativity	.03 ⁺	.02	<.001
Supervisor expectations of employee creativity ↓ Supervisor creativity-supportive behaviors ↓ Employee view of creativity expectations ↓ Creative self-efficacy ↓ Employee creativity			

* $p < .05$.

** $p < .01$.

+ $p < .06$.

Mediating effects consistent with the Pygmalion model were examined by inspection of indirect effects coefficients reported by EQS. Table 2 reports the unstandardized path coefficients, standard errors, and variance explained by the indirect effects. As shown, supervisor behaviors significantly mediate the relationship between supervisor expectations and employee view, and employee view significantly mediates supervisor creativity-supportive

behavior and creative self-efficacy. Also, creative self-efficacy is a significant mediator of employee view of creativity expectations and employee creative performance. In terms of the longer mediated chain, the supervisor creative expectations–creative self-efficacy association is significantly mediated first by supervisor behaviors, then by employee view. Both employee view and creative self-efficacy significantly mediate the relationship between supervisor creativity-supportive behaviors and employee creative performance. Finally, a marginally significant indirect effect of supervisor creativity expectations on employee creativity is indicated, with this relationship mediated by supervisor behaviors, employee view, and creative self-efficacy. Given the distal relationships examined, and the fact that an indirect effect is calculated by multiplying each direct effect in its path, it is not surprising that the magnitudes of some of these indirect effects are relatively low in terms of explained variance.

In summary, all indirect effects in the structural model (those effects not involving control variables), with the exception of one which was nearly significant, were significant providing support for the extended Pygmalion model. Control variables did not have a direct effect on creative performance, but 3 of the 5 had effects mediated by creative self-efficacy.

Tests of Alternative Models

Because the mediating role of employee view of performance expectations has not been tested in previous Pygmalion studies, we tested two possible alternative models: (1) employee view as a partial mediator of the relationship between supervisor behavior and creative self-efficacy; and (2) no mediation, with supervisor behavior directly affecting creative self-efficacy. Results for the partial mediation model (chi-square = 273.64 on 116 df, CFI = .91, RMSEA = .10) revealed a non-significant chi-square difference from the hypothesized model of .76 (1 df, $p > .05$). In this model, the direct link between supervisor creativity-supportive behavior and creative self-efficacy was not significant (unstandardized path estimate = $-.10$, S.E. = $.12$, $p > .05$), but the indirect effect of supervisor creativity-supportive behavior on creative self-efficacy as mediated by employee view was significant (unstandardized path estimate = $.28$, S.E. = $.10$, $p < .01$). Significance of the other hypothesized structural links and indirect effects was not adversely affected. The no-mediation model was not nested within the hypothesized model, precluding a direct chi-square significance test. However, this model showed a much poorer fit in absolute terms (chi-square = 315.38 on 116 df, CFI = .89, RMSEA = .11). Based on these findings, we conclude that employee view of performance expectations fully mediates the relationship between creativity-supportive behaviors and creative self-efficacy in this sample.

Creative self-efficacy was hypothesized to operate as a second-order mediator of supervisor behaviors and employee creative performance in our model. To determine whether supervisor behavior affects employee creative performance solely through employee efficacy expectations, or if a segment of the behaviors' influence is more direct (cf. [Sutton & Woodman, 1989](#)), we also tested a direct link between supervisor behavior and employee creative performance. Results for the partial mediation model (chi-square = 271.00 on 116 df, CFI = .91, RMSEA = .10) revealed a non-significant chi-square difference

from the hypothesized model of 3.40 (1 df, $p > .05$). The direct link between supervisor creativity-supportive behavior and creative performance was not significant (unstandardized path estimate = .15, S.E. = .08, $p > .05$), and significance of the other hypothesized structural links and indirect effects was not adversely affected. Thus, fitting a direct path between supervisor creativity-supportive behavior and employee creative performance did not significantly improve model fit. Finally, we also examined univariate Lagrange multiplier tests (Bentler, 1995) for evidence of any additional partial mediating effects, but none were detected that significantly improved model fit.

Because data for supervisor expectations and employee creativity were both provided by the supervisor, we assessed the possibility that common-method bias resulted in a mis-specification of our model. Standardized residuals and Lagrange multiplier tests did point to a possible common-method bias effect in that our hypothesized model was negatively affected by lack of a structural link between supervisor expectations and manifest indicators of supervisor creativity ratings. To examine this issue further, we used a procedure (Williams & Anderson, 1994) for testing method effects in structural equation models. First, we assessed an initial model with added linkages representing the method effect by cross-loading the supervisor creativity indicators onto the supervisor expectations variable. The chi-square for this model of 228.23 (on 114 df, CFI = .94, RMSEA = .09) indicated a significantly better fit than the hypothesized model (chi-square difference = 46.17 on 3 df), suggesting that some method effects were present. Next, a nearly-identical model with method effects was fit, except that key structural parameters were constrained to equal the same values they took on in the hypothesized model without method effects. Comparison of this model with the prior method effects model tests whether the method bias significantly affected the structural parameters in the model. Chi-square for this model = 245.61 on 132 df, CFI = .94, RMSEA = .08, which is not significantly different in fit from the method effects model with free estimation (chi-square difference = 17.38 on 18 df, $p > .05$). Therefore, while method effects may be present in our data, they did not significantly affect the structural relationships.

Discussion

Our results provide support for the basic relationships proposed by the traditional Pygmalion model applied in a creativity context. The most fundamental tenet of the Pygmalion process is that supervisor performance expectations will ultimately influence employee performance. Although supervisor's innovation expectations have been directly tied to creative productivity (cf. Scott & Bruce, 1994), results of our study suggest that these expectations link to a series of intermediate steps that may culminate in employee creativity. A number of theories hypothesize the motivational impact of expectations on the direction and strength of behavior. This link was supported in our study in that those employees for whom supervisors held higher creativity expectations reported that their supervisors rewarded and recognized their creative efforts, provided more resources, encouraged the sharing of information, collaboration, and creative goal setting, and modeled creativity in their own work.

The addition of the employee 'view' variable in the Pygmalion model revealed some interesting findings. For one, there was a significant congruence between supervisor and employee regarding expectations for employee creative performance ($r = .28$), suggesting that expectations for creative performance are, to some degree, shared. The modest magnitude of this correlation, however, implies that such expectations are either not always well communicated by supervisors, understood by employees, or shaped by forces besides the supervisor. Results also suggest that when employees see supervisor behaviors as supportive of creativity, they tend to interpret these behaviors as communicating creativity expectations. This finding supports the notion that employee sensemaking is an integral process for creative action (Drazin et al., 1999; Ford, 1996), and that those in leadership positions influence such sensemaking.

Testing of the employee's view of creativity expectations is a first step toward determining if supervisor behavior associates with employee efficacy expectations when the behavior is interpreted as signaling performance expectations. Past Pygmalion studies had inferred that employees acknowledged and interpreted their supervisor's action in a manner influential to self-efficacy, but had not confirmed that this perception was present (Eden et al., 2000). As we expected, employees' expectancy view aligned with efficacy levels in that study participants who felt they were expected to be creative reported having stronger beliefs in their creative capacity. Our tests of mediation indicate that in the absence of such acknowledgement, supervisors' actions may have less impact on employees' beliefs in their creative efficacy.

The association detected between creative self-efficacy and creative performance supports the final link in the proposed Pygmalion model. Employees who felt they had the strongest creative capacity exhibited more creativity in their work as reported by their supervisor. This finding supports Bandura's (1997) position that self-efficacy is necessary for action requiring creativity. Finally, a series of proposed mediating links consistent with the traditional Pygmalion model were also confirmed in our study. These results corroborate the intricacy of the inter-relationships among expectations and behaviors posed by Pygmalion theorists and generalize the impact of this effect to non-routine performance scenarios entailing creativity.

Study Contributions

This study represents the first attempt to integrate the Pygmalion and creativity literature streams. In doing so, it provides insight as to how members of the social context at work may influence creative performance via a series of mediating links consistent with the Pygmalion process. Although numerous studies have considered the Pygmalion model, to date, few studies have examined components of the Pygmalion process in an ongoing civilian work setting, and none have considered its relevance for employee creativity. Thus, our study fulfills a need for further field inquiries on the Pygmalion model in for-profit, non-training contexts in relation to a broader performance domain (McNatt, 2000). Contrary to a previous corporate study (Sutton & Woodman, 1989), we found evidence suggesting that the Pygmalion framework may be a relevant and operable model for understanding employee performance, and the manner in which it unfolds in an ongoing work context, when the performance criteria is creativity-based.

The current study also provides further support for previous studies (cf. Redmond et al., 1993; Tierney & Farmer, 2002) examining the role of leadership in terms of self-efficacy and creative performance. The current study augments this earlier work by placing these associations within a more comprehensive framework by accounting for the effect of supervisors' and employee creative expectation views. Because the study took place in a field setting, it also augments earlier work in a laboratory setting (Redmond et al., 1993) by examining the dynamics between supervisor expectations, efficacy and creativity in an ongoing work situation. In addition, the study provides empirical support for the proposition that the interpersonal work environment influences self-efficacy beliefs and fills the need for more studies examining self-efficacy for cognitively complex tasks (Gist & Mitchell, 1992). Finally, our inclusion of employees' expectation view provides a more complete depiction of the associations among the traditional Pygmalion model components by accounting for the impact of employee awareness related to the process. This appears to be a missing, but crucial, link in previous studies examining the general Pygmalion process in work settings.

Practical Implications

The study also points to a number of issues to be heeded by practicing managers regarding the Pygmalion effect and its application. Our results suggest when creativity is paramount, supervisors need to be cognizant of the type of expectations they hold and the extent to which these expectations shape their managerial actions. Such awareness is particularly crucial in situations in which supervisors harbor low expectations for employee creative potential. Although other factors may come into play, our findings indicate that it is possible for supervisors to either stimulate or stifle employees' creative efforts by their beliefs and associated actions. This fact may become particularly relevant among members of the workforce who do not naturally view themselves as creative. Our finding that an employee's sense of mastery for creative tasks is linked to that employee's interpretations of the supervisor's actions, highlights the importance of supervisors clearly communicating high expectations for employees' creative potential. However, it is not enough for supervisors to expect creativity on the part of their employees. They must also ensure that their employees recognize these creativity expectations and are confident that they can fulfill them. Thus, steps must be taken to clearly communicate expectations and bolster employee confidence for creative work. Given the role of employees' view of creative performance expectations, the organization needs to monitor additional work context sources that might also shape these perceptions.

Limitations

The majority of our study hypotheses were derived from past research, but an experimental or longitudinal examination would be required to adequately determine causation. Although supervisor creative performance expectations and employee creativity ratings were both provided by the immediate supervisor, post hoc analyses suggested that any possible common method bias did not degrade the integrity of our model. Also, while WABA results indicated no meaningful problems associated with supervisors rating mul-

multiple employees, the results also do not completely rule out such effects. In addition, although we were able to determine a reliability estimate for the single-item supervisor expectations scale, it is important to note that the general use of such scales has been called into question. Finally, our model testing took place among R&D employees. This setting is a natural context for preliminary examination of the study's propositions, but it is possible that current findings may not generalize to other task settings.

Directions for Future Research

Further research is needed to substantiate the conditions in which interpersonal expectations for creative work are most influential. Our study focused on the role of supervisor as the Pygmalion agent for employee creativity. Work group peers serve as an alternate source of expectations for employees, and their potential impact on creativity has been noted (e.g., Zhou & George, 2001), as well as the influence of non-work related members (Madjar et al., 2002). Therefore, it seems fruitful to test the relevance of multiple constituencies for creativity within a Pygmalion framework. Although few Pygmalion studies (e.g., Eden & Aviram, 1993) have accounted for individual differences, research noting their impact on employee creativity (cf. Oldham & Cummings, 1996) suggest that the influence of personal attributes in Pygmalion settings would be useful. It is possible that certain 'types' of employees may be more, or less, susceptible to the Pygmalion process as it relates to their creative efforts. It has also been noted that creativity is context-specific (Ford & Gioia, 2000) and that the link between supervisors and employee creativity may manifest differently depending on the nature of the context (see Tierney & Farmer, 2002). Therefore, future tests of the Pygmalion process for creativity within different settings are needed. Finally, although the purpose of the current study was to examine what might unfold when supervisors hold high and low creativity expectations for their employees, it is just as important to determine how such expectations are derived. Additional inquiry into why supervisors form the expectations they do, and to the possible personal, task, and contextual factors that lead to such expectations, is warranted.

Creative performance is a challenging and complex performance phenomenon to understand. As indicated by conceptual models (e.g., Amabile, 1988) many factors may account for the emergence of creative work in organizational contexts. By applying the Pygmalion model, the current study provides an opportunity to more fully understand the complexities of supervisors' role in creative action and how they foster employee creativity in the workplace.

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Appendix A

Supervisor Creativity-Supportive Behavior

My functional manager/supervisor

- (1) attempted to get materials I needed to do my job.
- (2) worked persistently to secure resources I needed to be innovative in my work.
- (3) served as a good role model for creativity.
- (4) provided valued rewards for my creative work.
- (5) publicly recognized my innovation efforts.
- (6) encouraged me to set innovation goals.
- (7) praised my creative work.
- (8) ‘stood up’ for my innovative efforts.
- (9) praised my creative efforts even in they weren’t successful.
- (10) took pride in my work and accomplishments.
- (11) bolstered my confidence in my creative potential.
- (12) encouraged me to collaborate with others in my work.
- (13) stressed the importance of idea sharing among colleagues.
- (14) actively sought work interaction with outside members.
- (15) tried to obtain work-related information necessary for my job.
- (16) encouraged me to communicate openly with people in other departments.

Employee View of Creativity Expectations

- (1) There was an expectation that I would do creative work.
- (2) Creativity was required in my daily work.
- (3) I was encouraged to solve problems creatively.

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