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## Self-Efficacy and Work-Related Performance: The Integral Role of Individual Differences

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The present study estimated the unique contribution of self-efficacy to work-related performance controlling for personality (the Big 5 traits), intelligence or general mental ability, and job or task experience. Results, based on a meta-analysis of the relevant literatures, revealed that overall, across all studies and moderator conditions, the contribution of self-efficacy relative to purportedly more distal variables is relatively small. Within moderator categories, there were several cases in which self-efficacy made unique contributions to work-related performance. For example, self-efficacy predicted performance in jobs or tasks of low complexity but not those of medium or high complexity, and self-efficacy predicted performance for task but not job performance. Overall, results suggest that the predictive validity of self-efficacy is attenuated in the presence of individual differences, though this attenuation does depend on the context.

*Keywords:* self-efficacy, motivation, personality, cognitive ability, performance

Social-cognitive theory has been described as “the theory heard ‘round the world’” (D. Smith, 2002, p. 30). Its creator, Albert Bandura, has been credited as the fourth most influential psychologist in the history of psychology (Haggbloom, Warnick, & Warnick, 2002) and ranks among the top five psychologists in the number of citations in psychology texts (Knapp, 1985). Social-cognitive theory or its central variable—self-efficacy—has been studied in more than 10,000 investigations in the past 25 years. In 2004 alone, there were published an average of 1.67 articles per day on self-efficacy. Social-cognitive theory has been labeled “one of the few grand theories that continues to thrive at the beginning of the 21st century” (Zimmerman & Schunk, 2003, p. 448). Thus, it is fair to say that self-efficacy has proven to be one of the most focal concepts in contemporary psychology research.

In industrial-organizational (I-O) psychology, self-efficacy has been remarkably popular as well. In the past 25 years, more than 800 articles on self-efficacy have been published in organizational journals. Virtually every area in organizational research has uti-

lized self-efficacy, including training (Kozlowski et al., 2001), leadership (Chen & Bliese, 2002), newcomer socialization and adjustment (Saks, 1995), performance evaluation (Bartol, Durham, & Poon, 2001), stress (Jex, Bliese, Buzzell, & Primeau, 2001; Schaubroeck, Jones, & Xie, 2001), political influence behaviors (Bozeman, Perrewé, Hochwarter, & Brymer, 2001), creativity (Redmond, Mumford, & Teach, 1993), negotiation (Stevens & Gist, 1997), and group-team processes (Feltz & Lirgg, 1998). In 1989, Landy called self-efficacy “the wave of the future” (p. 410) in work motivation research; judging from interest in the concept in the past 20 years, Landy’s prevision has been borne out by the data.

In I-O psychology, perhaps the most focal variable to which self-efficacy has been related is work-related performance (i.e., job and task performance). Meta-analytic evidence suggests that self-efficacy is rather strongly related to performance ( $\hat{\rho} = .34$ ; Stajkovic & Luthans, 1998). At the same time, because there are other, purportedly more distal, predictors of work performance that would appear to be associated with self-efficacy, this simple correlation does not speak to the predictive validity of self-efficacy over and above individual differences. Bandura (1999) has argued against the importance of traits and other stable individual differences, noting

Given the highly conditional nature of human functioning, it is unrealistic to expect personality measures cast in nonconditional generalities to shed much light on the contribution of personal factors to psychosocial functioning in different task domains under diverse circumstances across all situations. (p. 160)

However, because self-efficacy is defined as individuals’ beliefs about their capabilities to produce designated levels of performance (Bandura, 1994), it appears likely that individuals bring

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with them to the work situation certain characteristics that are related to this self-efficacy (Kanfer, 1990).

Given the conceptual association of self-efficacy and purportedly distal individual differences with performance, and their possible associations with each other, it is important to investigate their joint influence on work-related performance. Yet, surprisingly little research has investigated these joint influences. Accordingly, in this study, we present and test a model that estimates the relative contribution of self-efficacy, general mental ability (GMA), personality in the form of the Big Five traits, and experience to the prediction of work-related performance. In the next section of the article, we review past research on the relationships of individual differences to self-efficacy and present a model that tests their mutual influences on work-related performance.

### Self-Efficacy, Individual Differences, and Performance

The model that was tested, which determined the unique association of self-efficacy with work-related performance in the context of the distal variables, is displayed in Figure 1. In the model, the distal characteristics—cognitive ability, personality (Big Five traits), and experience—are hypothesized to predict self-efficacy, and self-efficacy, in turn, is hypothesized to predict work-related performance. The model also posits direct (i.e., not mediated by self-efficacy) links from the distal variables to performance, because there are many ways that the variables can affect performance beyond self-efficacy. For example, one of the ways in which both cognitive ability and experience affect work-related performance is through the accumulation of job knowledge—intelligent employees are better able to acquire the knowledge

required to perform a job successfully (Weekley & Ployhart, 2005), and experience provides needed opportunities for knowledge acquisition (Schmidt, Hunter, & Outerbridge, 1986). Similarly, conscientiousness leads people to set more ambitious goals and to be more dedicated to them (Gellatly, 1996), and agreeableness and extraversion may lead to higher performance because both facilitate interpersonal interactions at work (Mount, Barrick, & Stewart, 1998).

Obviously, empirical and conceptual support for some of the individual links is stronger than for others. For example, links between cognitive ability and performance, and between conscientiousness and performance, are among the most well established in the literature (Schmidt & Hunter, 1998). Similarly, within the realm of self-efficacy, numerous studies have linked the Big Five traits to self-efficacy (e.g., Judge & Ilies, 2002; Thomas, Moore, & Scott, 1996). Other research has shown that cognitive ability (e.g., Phillips & Gully, 1997) and experience (e.g., Shea & Howell, 2000) are positive predictors of self-efficacy. In keeping with the purpose of the study—to estimate the unique relationships among self-efficacy, individual differences, and work-related performance—we include all of the links from the distal variables to self-efficacy and to performance.

Despite the apparent plausibility of the model—with its prominent role given to individual differences—it is important to note that this is not the perspective taken by many researchers. Bandura (1997, 1999) argued that because performance is inherently conditional, the influence of self-efficacy (as a conditional state) should overwhelm that of the distal variables in predicting performance. We are not aware of any studies that have directly tested

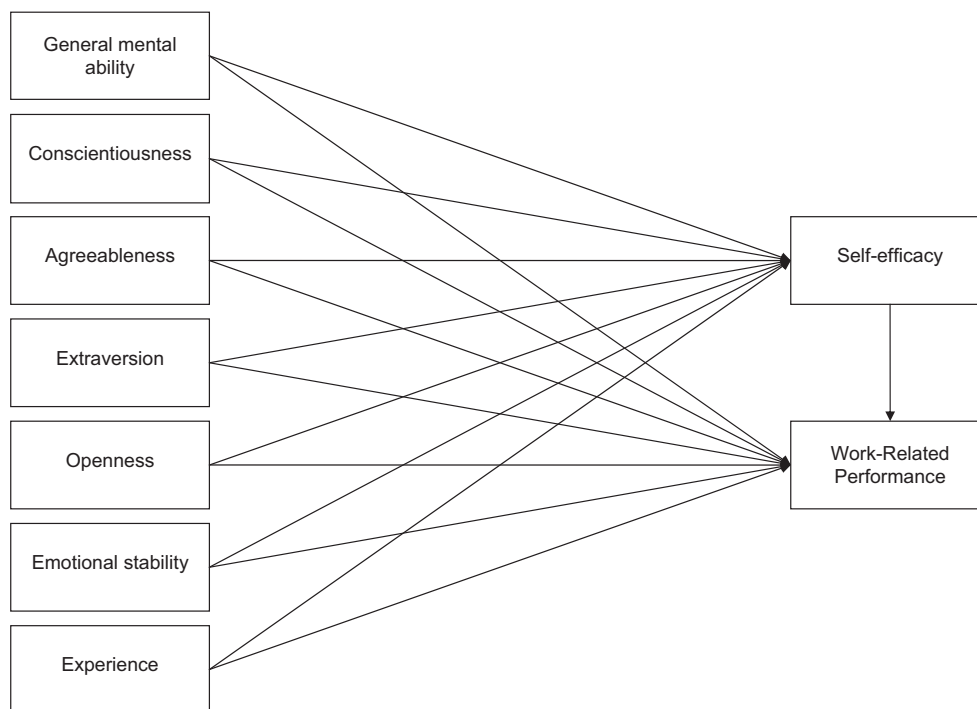


Figure 1. Conceptual path model relating ability, personality, experience, and self-efficacy to work-related performance.

this proposition with a full range of individual differences. Moreover, some have argued that the presumption in the literature has been that self-efficacy mediates the effect of these variables on performance (Kanfer, 1992). Martocchio and Judge (1997), for example, opined, "Self-efficacy represents the mechanism through which the generalized tendencies of conscientiousness manifest themselves" (p. 766).

Few studies have directly tested the dual role of distal traits and proximal states in affecting motivation and performance. In a sample of undergraduates, Phillips and Gully (1997) found that ability, self-efficacy, and self-set goals each made independent contributions to exam performance, controlling for goal orientation and locus of control. In two samples of undergraduates, Chen, Gully, Whiteman, and Kilcullen (2000) found that cognitive ability, self-efficacy, and goals each influenced performance, though the results varied depending on the sample and model tested. Chen, Casper, and Cortina (2001) tested a meta-analytic model to determine whether self-efficacy mediated the relationship of cognitive ability and conscientiousness to job performance. These authors found that the mediation depended on job complexity—mediation was stronger for simple jobs than for complex ones.

In its methodological approach, the Chen et al. (2001) study comes closest to the present study. However, there are three critical differences in purpose and scope. First, Chen et al. (2001) noted that their study was limited by its focus on only a single trait. Obviously, conscientiousness is not the only trait that is relevant to performance (Barrick, Mount, & Judge, 2001) and certainly not the only trait that is related to self-efficacy (Judge & Ilies, 2002). Therefore, it is impossible to gain an accurate understanding of the unique relationship between self-efficacy and performance with consideration of a single personality trait. In this study, we used the entire five-factor model of personality.

Second, Chen et al. (2001) investigated the moderating role of an important contextual factor: job-task complexity. However, self-efficacy research has suggested myriad moderators of self-efficacy effects (Bandura, 1997). In order to understand the relationship of self-efficacy with performance, and to do justice to social-cognitive theory, one must take these contextual factors into account. This study, in considering 10 contextual moderators, represents a much broader investigation of contextual effects based on self-efficacy theory and research.

Third, and perhaps most important, the purpose of this study was quite different from that of Chen et al. (2001). Rather than test a path model that focuses on the degree to which self-efficacy mediates the effects of distal variables (an important empirical question to be sure), we sought to determine the unique relationship of self-efficacy with performance in the context of the distal variables that have been shown to be relevant to performance. We are not aware of a previous study that has tested a comprehensive model that includes the entire Big Five framework, GMA, and experience—all theoretically relevant variables—in investigating the self-efficacy-performance relationship. Moreover, despite Bandura's (1997) strong position on the dubious effects of distal traits on performance, and on the relationship between traits and self-efficacy ("Efficacy beliefs are linked to domains of functioning rather than conforming to an undifferentiated trait"; Bandura, Caprara, & Barbaranelli, 2001, p. 126), the relative influence of self-efficacy in the presence of this full range of individual differences is unclear.

## Potential Moderators of Self-Efficacy Predictive Validities

Perhaps the most obvious moderator of self-efficacy predictive validities is job or task complexity. As Kanfer and Ackerman (1989) noted, when tasks are complex, the benefits of self-regulatory behaviors are hard to realize, meaning that distal characteristics should be relatively more important than self-regulatory skills in predicting performance. This hypothesis was supported by Chen et al. (2001) and Stajkovic and Luthans (1998). Another potentially important moderator is feedback. Bandura (1997) noted that "comparative feedback is essential in the ongoing regulation of motivation" (p. 131). Thus, one would expect self-efficacy to be more valid when such judgments were informed by feedback on the performance of the task, especially when the feedback is delivered in a timely manner (Bandura, 1997). Another condition is whether difficult goals were assigned (as part of a goal-setting intervention). Given the effectiveness of goal interventions (Locke, 1997), one would expect self-regulation to be most effective in the context of difficult goal-setting interventions. As Locke and Latham (2002) noted, self-efficacy is important to the development of task strategies, which are essential to the attainment of difficult goals. Additionally, although there are few data on the issue, some results suggest that self-efficacy effects are ephemeral (McNatt & Judge, 2004). Accordingly, we investigated whether self-efficacy becomes less predictive as the interval between self-efficacy and subsequent performance increases (short interval if the two measurements were within a few hours from each other, medium if the interval was between 1 and 7 days, and long if the interval was more than 7 days). Finally, given the importance of enactive mastery, or the effect of prior exposure to the task that allows one to practice and obtain feedback (Bandura, 1997), we expected self-efficacy to be more predictive when there was task exposure prior to the measurement of self-efficacy.<sup>1</sup>

Beyond the theoretical variables discussed above, measurement and study characteristics also may moderate the self-efficacy-performance relationship. One such moderator is the measure of self-efficacy. Bandura (1986) argued that self-efficacy measures must assess both magnitude and strength, and Lee and Bobko (1994) argued that such grid measures should be used, wherein both self-efficacy magnitude and strength are measured separately with various levels of performance. Conversely, the meta-analysis of Maurer and Pierce (1998) suggested that Likert measures perform as well as grid measures. Given these differing views, we investigated the moderating role of self-efficacy measures (Likert vs. grid). Because effect sizes sometimes vary depending on the measure of performance (Frayne & Geringer, 2000), we also investigated how performance was assessed objectively (units produced, sales volume, etc.) or subjectively (ratings of performance). Finally, we examined three study-level attributes as possibly moderating self-efficacy predictive validities: type of study (laboratory

<sup>1</sup> One might wonder whether enactive mastery and task experience are different concepts. Conceptually, they are different in that enactive mastery depends on prior exposure to the task for purposes of forming self-efficacy judgments, whereas task experience is more general and often measured more broadly (such as years of service in a job or tenure with an organization; Quiñones, Ford, & Teachout, 1995). If one assumes that the two concepts are equivalent, we should note that experience serves as both a distal variable and as a moderating variable in our conceptual model.

Table 1  
*Results of Literature Search for Relationships to Be Meta-Analyzed*

Relationship	Initial search	Relevant abstracts	Coded articles
General mental ability–conscientiousness	138	56	49
General mental ability–agreeableness	91	51	35
General mental ability–extraversion	593	73	54
General mental ability–openness to experience	77	46	43
General mental ability–emotional stability	773	149	54
General mental ability–self-efficacy	635	34	23
General mental ability–experience	358	76	21
Experience–conscientiousness	34	14	9
Experience–agreeableness	228	10	7
Experience–extraversion	44	14	8
Experience–openness to experience	494	7	7
Experience–emotional stability	58	9	7
Experience–self-efficacy	132	72	20
Self-efficacy–performance (1997–2003)	870	113	82
Self-efficacy–performance (total)			186

*Note.* Values represent number of articles.

vs. field), type of work performance (job vs. task), and type of sample (undergraduate students, postgraduate students, and adults). Given the control afforded by laboratory experiments, it seems possible that validities will be higher than in field studies. Although nearly all laboratory studies assess task (vs. job) performance, numerous field studies assess task performance (e.g., self-efficacy to perform a particular task at work vs. self-efficacy to perform a job more globally). Given that task performance clearly falls within the precepts of self-efficacy theory (Bandura, 1997), whereas job performance measures may include many extraneous elements, self-efficacy should better predict task than job performance.

## Method

### *Literature Search*

In forming the correlation matrix that was used as input into the multivariate analyses, we took two steps. First, where meta-analytic estimates were already available, we used these directly. In cases in which multiple meta-analyses were conducted, we used the most recent comprehensive meta-analysis available.<sup>2</sup> Second, where meta-analytic estimates were unavailable, we performed our own meta-analyses. In order to identify the population of articles needed to calculate the remaining estimates in the correlation matrix, we searched the PsycINFO database for studies published between 1887 and 2002 that referenced these remaining relationships. In two instances, multiple keywords were used. For GMA, we used the keywords *intelligence*, *IQ*, *mental ability*, and *cognitive ability*, whereas for emotional stability, we searched for articles that also included the keyword *neuroticism*. The results of the initial search and of the number of studies that were deemed relevant for each relationship can be found in Table 1. Table 2 shows the source of the correlations used in the analyses, including those taken from existing meta-analyses and those that are new from this study.

Next, in order to test potential moderator effects of the self-efficacy–performance relationship, we recoded articles included in

the Stajkovic and Luthans (1998) meta-analysis. Given that their meta-analysis did not include articles published after 1996, we updated the Stajkovic and Luthans meta-analysis by searching the PsycINFO database, using the keywords *self-efficacy* and *performance*, for relevant articles published between 1997 and 2003. Table 1 displays the results of the initial search and the number of studies that were deemed relevant for inclusion in the updated meta-analysis of Stajkovic and Luthans.

### *Rules for Inclusion in the Meta-Analysis*

For the relevant articles identified in the literature search, a number of rules for inclusion were set. These rules were consistent with the criteria set forth by previous meta-analyses of the self-efficacy–performance relationship (Chen et al., 2001; Stajkovic & Luthans, 1998). First, only studies that reported task- or job-specific self-efficacy (as opposed to generalized self-efficacy) were included. Second, the analysis was limited to those studies that measured self-efficacy as a predictor as opposed to a criterion. Third, only those studies that examined the relationship between self-efficacy and behaviors that were plausibly related to tasks performed in organizational settings were included. Thus, those studies that considered health self-efficacy (smoking cessation, weight loss, exercise, overcoming disability, condom use, drug

<sup>2</sup> Obviously, as with any multivariate analysis based on meta-analytic data, the results are only as valid as the correlations that serve as input. Because there have been many meta-analyses of the personality–job performance relationship, we conducted alternative analyses to determine the effect of our reliance on the most recently published (Salgado's, 2003, five-factor) meta-analysis. In relying on some meta-analyses (Hurtz & Donovan, 2000), we found that the results were slightly weaker for personality and somewhat stronger for self-efficacy. In other cases (Mount & Barrick, 1995), the results were slightly stronger for personality and slightly weaker for self-efficacy. In general, though, reliance on Salgado's (2003) meta-analysis caused our results to be in the middle range and very similar to a 2001 meta-analysis (Barrick et al., 2001) of the meta-analyses available at that time.



Table 2  
Sources of Meta-Analytic Estimates

Variable	1	2	3	4	5	6	7	8	9
1. General mental ability	—								
2. Conscientiousness	NEW	—							
3. Agreeableness	NEW	OVR96	—						
4. Extraversion	NEW	OVR96	OVR96	—					
5. Openness	NEW	OVR96	OVR96	OVR96	—				
6. Emotional stability	NEW	OVR96	OVR96	OVR96	OVR96	—			
7. Self-efficacy	NEW	J&I02	J&I02	J&I02	J&I02	J&I02	—		
8. Experience	NEW	NEW	NEW	NEW	NEW	NEW	NEW	—	
9. Work-related performance	S&H98	Sal03	Sal03	Sal03	Sal03	Sal03	NEW	QFT95	—

*Note.* NEW = original to this study; OVR96 = Ones, Viswesvaran, and Reiss (1996); S&H98 = Schmidt and Hunter (1998); Sal03 = Salgado (2003); J&I02 = Judge and Ilies (2002); QFT95 = Quiñones, Ford, and Teachout (1995).

avoidance), clinical self-efficacy (overcoming phobias, depression), voting self-efficacy, and familial role self-efficacy (marital, relationship, or parental self-efficacy) were excluded. Also, studies on special populations (e.g., psychiatric patients, geriatric patients) or studies that included participants who could not legally work were excluded. Fourth, only those studies that measured work-related performance as the criterion, rather than behavioral intentions, were retained. Fifth, the analysis was limited to only those studies that directly measured the personality traits of interest, such as emotional stability or neuroticism (as opposed to those studies that did not directly measure emotional stability or neuroticism but rather measured closely related traits such as negative affectivity). Finally, in the case of GMA, only studies that contained valid indicators of ability were included. Thus, studies that used grade point average or prior performance as measures of ability were excluded.

The remaining studies were then examined to determine whether they contained the information needed to calculate effect sizes. As such, studies that reported percentages or proportions, studies that reported means with no standard deviations, or studies that reported analysis of variance results in such a way that they could not be converted to correlations (e.g., *F* statistics with no indication of direction of effects) were excluded. Studies included in the meta-analysis are denoted in the References section by an asterisk.

### Coding of Task Complexity

As noted above, several moderators for the self-efficacy–performance relationship were coded in the present study, including theoretical and methodological characteristics. The coding categories for many of the moderators are listed above and do not need further explanation. Further elaboration, however, is needed in order to understand the coding of task complexity. The process we used to code task complexity was in multiple steps. First, we had three raters initially code a sample of articles. Second, we met to compare our results and discussed differences in decisions to arrive at a set of coding rules. Finally, two individuals split the remaining articles and coded them. Thus, because we did not have multiple ratings on task complexity for most of the articles, we are not able to report interrater reliability estimates in the manuscript. Wood's (1986) theoretical framework and the coding procedures outlined by Chen et al. (2001) were used to classify tasks as either

being low, medium, or high on task complexity (see also Stajkovic & Luthans, 1998; Wood, Mento, & Locke, 1987). Examples of tasks that were coded low on task complexity in the present study included solving anagrams and generating ideas in a brainstorming exercise. Examples of tasks that were coded medium on task complexity included taking reading and writing tests and generating work schedules. Finally, examples of tasks that were coded high on task complexity included tasks involving participation in complex computer simulations or jobs that were coded as complex (in terms of knowledge, skill, and ability requirements) as informed by the Occupational Information Network.

### Analysis of Moderators

To detect the presence of moderator effects, we used a 90% credibility interval. Credibility intervals provide an estimate of the variability of individual correlations across studies; a 90% credibility interval excluding zero indicates that, for a positive average correlation, at least 95% of the individual correlations in the meta-analysis were greater than zero (less than 5% are zero or less and 5% lie at or beyond the upper bound of the interval). If the credibility interval excludes zero, then it is deemed likely that moderator variables exist. To determine whether a particular moderator variable under study did indeed moderate self-efficacy predictive validities, we used confidence intervals, which estimate variability around the estimated mean correlation after removing variance due to measurement and sampling error; a 95% confidence interval around a positive average corrected correlation that excludes zero indicates that with repeated sampling, 97.5% of the estimated average corrected correlations would be greater than zero. Across two moderator conditions, if the confidence intervals fail to overlap, then one can conclude that the average predictive validities differ across the two conditions.

## Results

### Analysis of Self-Efficacy Across All Studies

The overall correlation matrix among the variables is provided in Table 3. We should note that the number of correlations in Table 3 does not match the values in Table 1 because the latter reflects number of articles, and numerous studies reported correlations for multiple samples or subgroups. In estimating the relative contri-

Table 3  
*Meta-Analytic Estimates of Intercorrelations Among Study Variables*

Variable	1	2	3	4	5	6	7	8	9
1. General mental ability	—								
2. Conscientiousness	-.04 56/15,429	—							
3. Agreeableness	.00 38/11,190	.27 344/162,975	—						
4. Extraversion	.02 61/21,602	.00 632/683,001	.17 243/135,529	—					
5. Openness	.22 46/13,182	-.06 338/356,680	.11 236/144,205	.17 418/252,004	—				
6. Emotional stability	.09 61/21,404	.26 26/5,380	.25 18/3,690	.19 60/10,926	.16 21/4,870	—			
7. Self-efficacy	.20 26/4,578	.22 14/3,483	.11 6/1,099	.33 7/755	.20 3/755	.35 32/6,730	—		
8. Experience	-.04 24/55,086	.01 11/4,366	-.04 7/2,827	-.07 8/2,918	-.06 7/2,811	.05 7/2,827	.24 21/5,783	—	
9. Work-related performance	.51 425/32,124	.28 90/19,460	.13 68/10,716	.12 75/11,940	.08 48/7,562	.16 72/10,786	.37 217/32,123	.27 44/25,911	—

Note. Table entries are estimated population (corrected) correlations ( $\hat{\rho}$ ). Below each correlation appears the number of correlations ( $k$ ) first followed by the total sample size for all studies combined ( $N$ ).

bution of self-efficacy and the distal variables to work-related performance, we used both regression and path analysis, relying on the programs developed by Hunter (1992). Consistent with Judge and Ilies (2002), we used the median sample size for the job performance correlations (in this case,  $\bar{N} = 158$ ) as the sample size for the regression and path analyses.<sup>3</sup> In the regression analysis, we estimated two models. In the first regression, work-related performance was regressed on the distal variables alone. In the second regression, work-related performance was regressed on all of the distal variables, along with self-efficacy. Taken together, the first and second regressions form a hierarchical regression analysis in which the distal variables are entered on the first step and self-efficacy is added on the second step.

Results of both of the regression analyses are provided in Table 4. As the table shows, when self-efficacy was entered into the equation with the distal variables, the coefficient was nonsignificant ( $\hat{\beta} = .13$ ,  $ns$ ), whereas three of the other variables (GMA

$[\hat{\beta} = .52$ ,  $p < .01]$ , conscientiousness  $[\hat{\beta} = .26$ ,  $p < .01]$ , and experience  $[\hat{\beta} = .26$ ,  $p < .01]$ ) significantly predicted performance. Adding self-efficacy on the last step resulted in little improvement in the prediction of performance of  $\Delta R = .009$  ( $ns$ ) and  $\Delta R^2 = .012$  ( $ns$ ).

In the path analysis, the conceptual model presented in Figure 1 was tested. That model includes links from the distal variables (GMA, Big Five traits, experience) to self-efficacy, a link from self-efficacy to work-related performance, and links from the distal variables to work-related performance. Results from this model are provided in Figure 2. A number of the distal variables significantly influenced self-efficacy (GMA  $[\hat{\beta} = .17$ ,  $p < .01]$ , conscientiousness  $[\hat{\beta} = .19$ ,  $p < .01]$ , extraversion  $[\hat{\beta} = .29$ ,  $p < .01]$ , emotional stability  $[\hat{\beta} = .21$ ,  $p < .01]$ , and experience  $[\hat{\beta} = .26$ ,  $p < .01]$ ). Similarly, several variables influenced work-related performance (GMA  $[\hat{\beta} = .52$ ,  $p < .01]$ , conscientiousness  $[\hat{\beta} = .26$ ,  $p < .01]$ , and experience  $[\hat{\beta} = .26$ ,  $p < .01]$ ). Self-efficacy did not significantly influence performance ( $\hat{\beta} = .13$ ,  $ns$ ). The multiple correlations were as follows: self-efficacy  $R = .57$  ( $p < .001$ ) and work-related performance  $R = .68$  ( $p < .001$ ).

Table 4  
*Regression Estimates Predicting Work-Related Performance Across All Studies*

Variable	Distal variables alone	All variables
General mental ability	.54**	.52**
Conscientiousness	.29**	.26**
Agreeableness	.05	.05
Extraversion	.13*	.09
Openness	-.03	-.04
Emotional stability	-.01	-.04
Experience	.30**	.26**
Self-efficacy		.13
Multiple $R$	.67**	.68**
$R^2$	.45	.46

Note.  $\bar{N} = 158$ . Except for  $R$  and  $R^2$  estimates, table entries are standardized regression ( $\hat{\beta}$ ) coefficients.

\*  $p < .05$ . \*\*  $p < .01$ .

<sup>3</sup> In past research, some multivariate analyses of meta-analytic data have used the average sample size (e.g., Judge & Ilies, 2002), whereas others have used the harmonic mean (e.g., Colquitt, LePine, & Noe, 2000). There is an argument in favor of each approach: If one is interested in generalizing to the average study, then the average sample size is best. If one is interested in generalizing to the population of studies, then the harmonic mean is best. Because each approach has merits, we repeated all of the multivariate analyses using the harmonic mean rather than the average sample size. As would be expected, the effect size estimates did not change; however, the standard errors and thus significance levels did. Using the harmonic mean, we found that virtually every coefficient (even those in some analyses as small as  $\hat{\beta} = .01$ ) became statistically significant. In interpreting our results, we can be highly confident that our results generalize to the population of studies. Naturally, one would expect more variability in generalizing to the typical individual study, and this is what the results show.

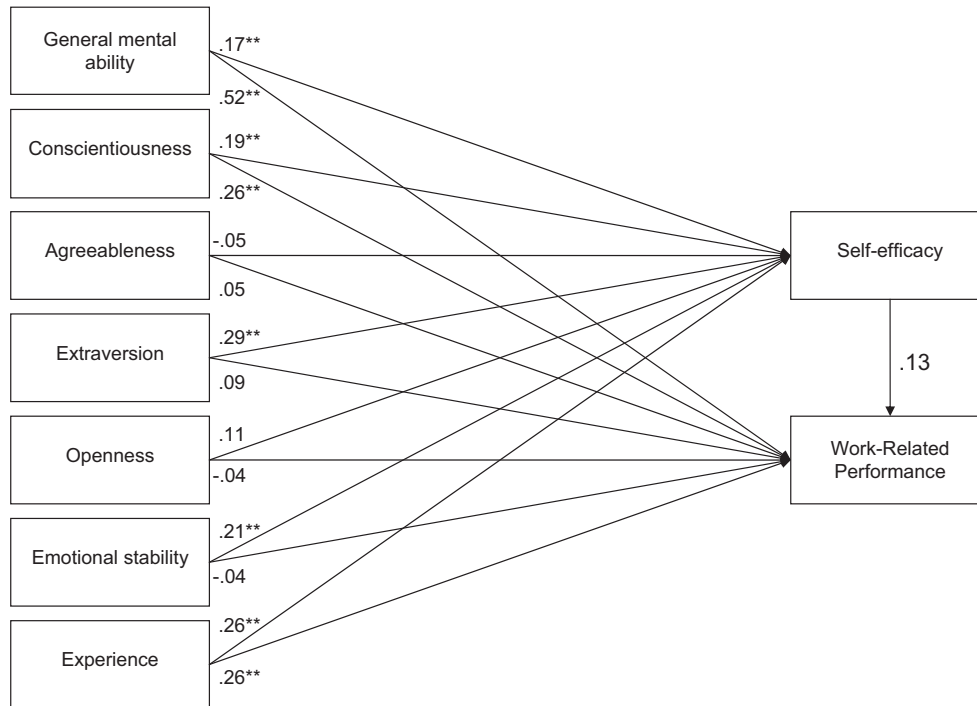


Figure 2. Meta-analytic path model results relating ability, personality, experience, and self-efficacy to work-related performance. \*  $p < .05$ . \*\*  $p < .01$ .

### Results According to Levels of Moderator Variables

Results of the moderator analyses are provided in Table 5. The results, judged by nonoverlapping 95% confidence intervals, show that many variables did moderate the relationship of self-efficacy to work-related performance. Specifically, self-efficacy was more strongly correlated with work-related performance when the job or task was low (vs. high) in complexity ( $\hat{\rho} = .42$  vs.  $\hat{\rho} = .30$ ), there was a short or intermediate (vs. long) interval between the measure of self-efficacy and work-related performance ( $\hat{\rho} = .41$  vs.  $\hat{\rho} = .31$ ), goals were assigned (vs. no goals) ( $\hat{\rho} = .52$  vs.  $\hat{\rho} = .34$ ), individuals had prior (vs. no prior) exposure to the job or task ( $\hat{\rho} = .42$  vs.  $\hat{\rho} = .31$ ); grid (vs. Likert-type) measures of self-efficacy were used ( $\hat{\rho} = .44$  vs.  $\hat{\rho} = .32$ ), and the participants were undergraduate (vs. postgraduate) students ( $\hat{\rho} = .39$  vs.  $\hat{\rho} = .30$ ). (If one were to use a 90% confidence interval, other moderator effects would be concluded to operate as well, including feedback timing [short vs. long interval], performance type [task vs. job performance], performance measure [objective vs. subjective], and study setting [lab vs. field].)

Because the correlation of self-efficacy with work-related performance varies depending on the level of the moderator variables, we estimated regression models predicting work-related performance with the proximal and distal variables within each moderator category. Results of these analyses are provided in Table 6. As the table shows, the relative association of self-efficacy varies considerably within these moderator categories. When we controlled for the distal variables, self-efficacy significantly predicted work-related performance when (a) task complexity was low, (b) the time interval between the measurement of self-efficacy and performance was short or intermediate, (c) feedback was provided

in close temporal proximity to task performance, (d) goals were self-set and/or assigned, (e) individuals were exposed to the task before self-efficacy was measured, (f) grid measures of self-efficacy were used, (g) the criterion was task performance, (h) performance was measured objectively, (i) the study was conducted in a laboratory setting, or (j) the sample was undergraduates. Conversely, when we controlled for the influence of the distal variables, self-efficacy did not significantly predict performance when (a) task complexity was medium or high, (b) the time interval between the measurement of self-efficacy and performance was relatively long, (c) no feedback was provided or feedback was provided well after the task was performed, (d) no goals were present, (e) individuals had no prior exposure to the task, (f) Likert measures of self-efficacy were used, (g) the criterion was job performance, (h) performance was measured subjectively, (i) the study was conducted in a field setting, or (j) the sample was postgraduate students or employed adults.<sup>4</sup> Across all of the conditions, including the distal variables reduced the pre-

<sup>4</sup> Because most measures of job performance in a field setting are subjective (typically, supervisory ratings), one might argue that distal variables strongly predict performance in such situations because performance is broadly defined and encompasses many nontask behaviors such as citizenship, deviance, and so forth (Rotundo & Sackett, 2002). Although this argument is plausible, when we separated field study measures of job performance into objective and subjective measures, the self-efficacy–performance correlations were nearly identical ( $\hat{\rho} = .34$  in both cases) and not significantly different.



Table 5

*Moderator Variable Analysis of Self-Efficacy (SE)–Work-Related Performance (WRP) Relationship*

Moderator category and variable	<i>k</i>	<i>N</i>	$\bar{r}$	$\hat{\rho}$	$SD_{\hat{\rho}}$	CV <sub>L</sub>	CV <sub>U</sub>	CI <sub>L</sub>	CI <sub>U</sub>
Task complexity									
Low	47	7,014	.34	.42	.20	.16	.68	.36	.48
Medium	141	21,069	.30	.36	.21	.09	.64	.33	.40
High	50	6,009	.25	.30	.24	.00	.60	.23	.36
Timing between SE and WRP									
Short or intermediate	162	19,051	.33	.41	.22	.13	.69	.37	.45
Long	70	12,068	.26	.31	.23	.02	.60	.26	.37
Feedback (FB)									
No	153	24,817	.31	.38	.22	.11	.66	.34	.41
Yes: Long interval FB and WRP	23	2,930	.23	.28	.16	.08	.48	.21	.35
Yes: Short interval FB and WRP	53	4,736	.32	.40	.23	.10	.69	.33	.47
Goal setting									
No goals	169	26,191	.28	.34	.22	.07	.62	.31	.38
Self-set	43	5,440	.34	.41	.17	.19	.63	.35	.47
Assigned or self-set and assigned	32	2,832	.41	.52	.15	.21	.83	.43	.61
Prior task exposure									
No	104	17,926	.25	.31	.21	.04	.57	.27	.35
Yes	149	17,217	.35	.42	.22	.15	.70	.39	.46
Self-efficacy measure									
Likert	125	21,608	.26	.32	.19	.07	.57	.28	.35
Grid	107	11,817	.36	.44	.24	.13	.75	.39	.49
Job or task performance									
Job performance	95	15,183	.27	.34	.22	.06	.62	.29	.38
Task performance	123	16,437	.32	.39	.23	.10	.68	.35	.43
Measure of WRP									
Subjective	65	9,651	.26	.32	.21	.06	.58	.27	.38
Objective	178	24,999	.31	.38	.22	.10	.67	.35	.42
Type of study									
Field	122	20,306	.28	.34	.21	.07	.61	.30	.38
Laboratory	119	14,098	.33	.40	.22	.12	.68	.36	.44
Participants									
Undergraduate students	158	22,278	.32	.39	.20	.14	.64	.36	.42
Postgraduate students	63	4,908	.26	.30	.22	.02	.58	.24	.36
Employed adults	63	10,520	.26	.32	.24	.00	.64	.26	.38

Note. *k* = number of correlations; *N* = cumulative sample size;  $\bar{r}$  = estimated mean correlation;  $\hat{\rho}$  = estimated corrected correlation;  $SD_{\hat{\rho}}$  = standard deviation of  $\hat{\rho}$ ; CV = 90% confidence interval; CI = credibility interval; L = lower limit; U = upper limit.

dictive validity of self-efficacy on performance by an average of 67.43%.<sup>5</sup>

### Discussion

Social-cognitive theory and its central variable, self-efficacy, have been the focus of a voluminous amount of research in psychology. Its applicability has been described as “pervasive across contexts and domains of human functioning” (Zimmerman & Schunk, 2003, p. 448). A primary application of self-efficacy has been in the work domain (Bandura, 1997); it appears that the dominant role of self-efficacy in work motivation research anticipated by Landy (1989) has been realized. However, any concept of such widespread use and apparent universality merits critical examination of its usefulness. One crucial test of the usefulness of measures of psychological concepts in I-O psychology is incremental validity. As Hunsley and Meyer (2003) commented,

A psychological test that was intended for applied use (i.e., academic, clinical, or personnel applications) must yield an improvement in prediction compared with the result derived from using data that are easily and routinely obtained as part of the process of assessment. (p. 446)

Results of this analysis suggest that, across studies, the incremental validity of self-efficacy on task and especially job performance was substantially attenuated by the inclusion of important individual differences. Specifically, although self-efficacy is moderately correlated with performance, once the individual differences are taken into account, the predictive validity of self-efficacy

<sup>5</sup> Given the close connection between self-efficacy and goal setting (Locke & Latham, 2002) and the fact that both form the motivational hub thought to have the most proximal influences on performance (Locke, 1991), it is important to include goals in a model relating self-efficacy to performance. Locke (1997) has suggested because of the relationship between self-set goals and self-efficacy, in some models they are combined. The relationship we found between self-efficacy and self-set goals was strong ( $\hat{\rho} = .50$ ;  $k = 50$ ,  $N = 8,126$ ); however, when we added self-set goals to the overall analysis, it had a small effect on the self-efficacy–performance coefficient, decreasing it from  $\hat{\beta} = .13$  (*ns*) to  $\hat{\beta} = .09$  (*ns*). Moreover, within the moderator analyses, adding self-set goals did not change the significance of self-efficacy in any of the regressions. Thus, though self-set goals are considered part of the motivational hub (Locke, 1991), it does not appear that the question of the relative influence of distal variables and self-efficacy depends on whether self-set goals are included.

Table 6

*Self-Efficacy (SE)–Work-Related Performance (WRP) Relationship Under Moderator Conditions*

Moderator category and variable	$\hat{r}_c$	$\hat{\beta}_{SE}$	$\hat{R}$	% reduction
Task complexity				
Low	.42	.23**	.62**	45.24
Medium	.36	.12	.68**	66.67
High	.30	.00	.74**	100.00
Timing between SE and WRP				
Short or intermediate	.41	.19*	.68**	53.66
Long	.31	.04	.67**	87.10
Feedback (FB)				
No	.38	.15	.68**	60.53
Yes: Long interval FB and WRP	.28	.00	.67**	100.00
Yes: Short interval FB and WRP	.40	.18*	.68**	55.00
Goal setting				
No goals	.34	.09	.68**	73.53
Self-set	.41	.19*	.69**	53.66
Assigned or self-set and assigned	.52	.36**	.73**	30.77
Prior task exposure				
No	.31	.04	.67**	87.10
Yes	.42	.21**	.69**	50.00
Self-efficacy measure				
Likert	.31	.04	.67**	87.10
Grid	.42	.21**	.69**	50.00
Job or task performance				
Job performance	.34	.09	.68**	73.53
Task performance	.39	.16*	.69**	58.97
Measure of WRP				
Subjective	.32	.06	.68**	81.25
Objective	.44	.24**	.70**	45.45
Type of study				
Field	.34	.09	.68**	73.53
Laboratory	.40	.18*	.69**	55.00
Participants				
Undergraduate students	.39	.16*	.69**	58.97
Postgraduate students	.30	.03	.67**	90.00
Employed adults	.32	.06	.68**	81.25

Note.  $\hat{r}_c$  = corrected simple correlation between self-efficacy and performance;  $\hat{\beta}_{SE}$  = standardized regression coefficient for self-efficacy when distal variables are included;  $\hat{R}$  = multiple correlation for all variables in predicting performance; % reduction = percentage reduction in effect of self-efficacy on performance by adding distal variables ( $[\hat{r}_c - \hat{\beta}_{SE}]/\hat{r}_c$ ).

\*  $p < .05$ . \*\*  $p < .01$ .

shrinks dramatically. There are three ways in which these findings are important.

First, the effect sizes involving variables in psychological theories must be evaluated in terms of incremental validity. The predictive validity of specific factors must be evaluated in the presence of broad traits so the specific-factor variance can be examined (see Lubinski & Dawis, 1992). As Dawis (1992) wrote, "Only occasionally does someone . . . attempt to assess the overlap among measures" (p. 16). In the specific area of self-regulation and motivation, Kanfer and Heggstad (1997) called for more research on the degree to which traits and self-regulatory skills in concert influence work behavior. Even in the cases in which self-efficacy did uniquely predict performance, its contribution was no greater than the contribution of several distal variables. For example, one of the stronger predictive validities of self-efficacy was in low-complexity tasks-jobs ( $\hat{\beta} = .23, p < .01$ ). However, even in this case, cognitive ability ( $\hat{\beta} = .38, p < .01$ ) and conscientiousness ( $\hat{\beta} = .28, p < .01$ ) were more predictive of performance. Similarly, in situations in which individuals had prior task exposure, self-efficacy significantly predicted perfor-

mance ( $\hat{\beta} = .21, p < .05$ ), but, again, cognitive ability ( $\hat{\beta} = .53, p < .01$ ) and conscientiousness ( $\hat{\beta} = .30, p < .01$ ) better predicted performance. Chen et al. (2000) noted that self-efficacy is "strongly and positively related to performance" (p. 837). However, overall, the results of this analysis suggest that this conclusion may overstate the true unique effect of self-efficacy on performance.

Second, whereas the point above deals with the unique effect of self-efficacy on work-related performance, our results also inform causality issues in self-efficacy research and the relevance of distal variables to self-regulation. Bandura and Locke (2003) commented, "A central question in any theory of the cognitive regulation of motivation and action is the issue of causality. Do beliefs of personal efficacy contribute to human functioning?" (p. 87). Bandura and Locke obviously answered this question in the affirmative, and Bandura (1997) has argued further that broad traits are unlikely to predict performance controlling for self-efficacy. Our results suggest that, in general, individual differences are at least as important as self-efficacy. Moreover, the mediational relationship involving self-efficacy and the distal variables does not appear to

be supported by these results, for two main reasons. First, as was noted above, the distal variables—cumulatively and in some cases individually—had stronger associations with work-related performance than did self-efficacy. Second, inclusion of the distal variables and self-efficacy simultaneously reduced the predictive validities of self-efficacy to a much greater degree than it did the distal variables. There were cases in which self-efficacy did partly mediate the relationship between the individual differences and performance (e.g., when goals were assigned). However, in most cases, the mediation effect was in a direction opposite to that posited in that the self-efficacy–performance relationship was reduced by inclusion of the distal variables to a much greater degree than the distal variables’ relationship to performance was reduced by the inclusion of self-efficacy. Indeed, across all moderator conditions, including the distal variables reduced self-efficacy’s predictive validity by 67.43%. Thus, it appears that the traits  $\rightarrow$  self-efficacy  $\rightarrow$  performance view needs to be reexamined.

Broadly, our results support Kanfer’s (Kanfer, 1990; Kanfer & Ackerman, 1989; Kanfer & Heggstad, 1997) view of motivational traits and states in that rather than proximal states necessarily completely mediating the effect of traits on behavior, the relative importance of purportedly distal and proximal characteristics depends on the situation—especially the information-processing demands of a job or task. Although our analyses did not directly test the information-processing demands of the jobs or tasks, our results did support the importance of the context in determining the relative influence of distal and proximal influences on performance.

Third, self-efficacy matters in some conditions but not in others. Clearly, there are many circumstances in which self-efficacy does make unique contributions to work-related performance. However, there are also many situations in which self-efficacy does not uniquely predict performance. Some of these conditions are methodological, such as how self-efficacy is measured. Other conditions are more theoretical in nature and reflect conditions that need to be in place in accordance with self-efficacy theory (e.g., the timing of feedback in relation to task performance). Still other substantive conditions—such as task complexity or in employment contexts more broadly—suggest contexts in which self-efficacy is likely to be of limited utility.

One might argue that such findings are not a problem for self-efficacy research and, indeed, one can clearly design studies in which self-efficacy uniquely contributes to performance even in the presence of the distal variables. However, given the situation-specific nature of self-efficacy, researchers need to take these measurement and contextual elements into account if they are to find unique effects for self-efficacy.

For example, of the 10 studies conducted using assigned (or assigned plus self-set) goals on tasks of low complexity in laboratory settings, where the time intervals between the measurement of self-efficacy and performance were brief, and the measures of task performance were objective, self-efficacy correlated  $\hat{\rho} = .69$  with performance, and, repeating the analysis in Table 6, the beta coefficient for self-efficacy in predicting performance was  $\hat{\beta} = .66$  ( $p < .01$ ). Clearly there are conditions under which self-efficacy has a unique association with performance, but those conditions have been met in a small percentage of extant research (10/217 correlations, or 4.6%). Consequently, generalizations about self-efficacy’s effects need to be confined to those contexts. In short,

there are conditions under which self-efficacy works (i.e., has incremental validity), but these are more limited than many have assumed and may require a combination of a host of factors such as low-complexity tasks of short duration, in which there is considerable experimental control and optimal measures are used.

The overall conclusion from the study seems to be that self-efficacy is constrained by the inclusion of individual differences. However, another way of looking at the findings is that they are in accordance with what one would expect. That is, self-efficacy is only important in studies that have high internal validity and in which conditions exist that are consistent with the theory. It is possible that in most studies, there are either measurement problems or the right conditions are not in place for self-efficacy to be important. For example, one might argue that self-efficacy is only meant to work when the judgment of self-efficacy is relatively accurate (e.g., as a result of feedback or experience). In addition, as suggested by one reviewer, the effects of self-efficacy on performance may be partly a bandwidth issue, as self-efficacy matters more in the presence of distal variables for task performance but not job performance. This notion fits rather well with the bandwidth–fidelity debate (e.g., Cronbach & Gleser, 1965), which would suggest that self-efficacy, given its relatively task-specific nature, is likely to be a stronger predictor of narrow performance measures such as task performance. Thus, one might argue that the results actually support self-efficacy theory and show how important it is to design a study in an appropriate way to assess this effect.

Of the moderator analysis results, the only one that was surprising was the feedback result because self-efficacy was nearly as predictive of performance when no feedback was provided as when it was provided. In examining the data, we found that there were only 11 studies in which feedback was provided in the context of a goal-setting intervention. In those 11 studies, the corrected correlation between self-efficacy and performance was  $\hat{\rho} = .50$ . Thus, the feedback results should be interpreted with some degree of caution, as it appears that feedback may only moderate the self-efficacy–performance relationship in the context of goal-setting interventions. This joint effect of feedback and goals should not be surprising because goal-setting researchers (Locke & Latham, 2002) have argued that the strongest effects of goal-setting interventions on performance are obtained in the presence of feedback.

### *Limitations and Contributions*

One limitation of this study, which is common to many meta-analyses, is that there were an insufficient number of studies to conduct fully hierarchical moderator analyses in which one moderator condition is nested within another (Hunter & Schmidt, 1990). Thus, although we were able to delineate many specific conditions that affected the predictive validity of self-efficacy, we were not able to completely decompose nested moderator effects. Although some nested analyses would be possible, such analyses would be fairly scattered, depending on the number of entries that is acceptable to conduct analyses.

Second, one might criticize the analyses because many of the studies included in the multivariate analyses were based on bivariate relationships cumulated from different studies (E. Locke, personal communication, March 10, 2004). Indeed, no individual

study contained all of the variables studied herein. Thus, one might argue that our study represents a combination of apples and oranges. Although such a criticism may, at first blush, seem plausible, there are several problems with it. First, in a real sense, this criticism is untestable as one can never know or test the effect of uncollected or unavailable data. Second, this criticism rests on the assumption that sample specificity exerts an important effect on relationships among the variables. However, this is exactly what meta-analysis is designed to eliminate (Hunter & Schmidt, 1990). So, the only way that analyzing results culminated from different studies would affect the results is if, somehow, the study characteristics were unrepresentative of the population of studies and interactive with the effect sizes. This seems an unlikely prospect and one that has not been shown with any known multivariate analyses of meta-analytic data. Viswesvaran and Ones (1995) noted,

The data synthesizing capabilities of meta-analysis facilitates the testing of realistic and meaningful theories involving several constructs that are not all measured in the same individual study. We believe that combining psychometric meta-analysis and structural equations modeling facilitates building theories of work behavior that capture the richness and complexity of real world phenomena, a richness and complexity uncapturable in individual studies. (p. 881)

Third, it is possible that some of the personality measures, although ostensibly reflecting distal processes, may have incorporated into them questions that make them more proximal than assumed. For example, some have advocated the use of “work tags” to increase the validity of personality measures (Holtz, Ployhart, & Dominguez, 2005). Although we do not believe that most personality measures are so oriented, to the extent such measures incorporate into them self-efficacy, the relative validity of self-efficacy may be artificially attenuated. Moreover, as noted by a reviewer, the relatively greater predictive validities for some of the distal variables (namely, GMA, conscientiousness, and experience) may be due to the fact that these variables have effects on performance through multiple pathways, self-efficacy being only one of them.

Given the centrality of self-efficacy to psychology in general and I-O psychology in particular, there have been surprisingly few efforts to determine the unique or incremental validity of self-efficacy. However, a previous study—Chen et al. (2001)—evaluated the joint relationship of cognitive ability, conscientiousness, and self-efficacy to performance. Thus, it is important to highlight the ways in which our study contributes to the literature beyond the Chen et al. (2001) study in particular.

First, Chen et al. (2001) identified one boundary condition of self-efficacy effects on performance: job–task complexity. Although this certainly is a relevant moderator, in this study we identified nine other contextual factors that affect the incremental contribution of self-efficacy in predicting performance. Self-efficacy adds to the prediction of performance when these boundary conditions are met, although even in those circumstances the unique relationship of self-efficacy with performance is attenuated by the presence of the distal variables.

Second, Chen et al. (2001) found a larger mediating effect for self-efficacy than this study, for several reasons. First, Chen et al. (2001) studied only two distal variables, whereas we included a much more comprehensive set of distal variables (all of the Big

Five traits, GMA, and experience). Second, Chen et al. (2001) relied on a very strong self-efficacy correlation for low-complexity jobs ( $\hat{\rho} = .59$ ), a value that is substantially higher than the corrected correlations reported by Stajkovic and Luthans (1998) or this meta-analysis. Finally, in some cases, we relied on different data than Chen et al. (2001). For example, they excluded data from laboratory settings, and in some cases the database we used from our own meta-analyses was substantially larger than that used by Chen et al. (2001).

Finally, partly because the purpose of the Chen et al. (2001) study was different from our own, and partly because of the aforementioned limitations, the conclusions one would draw about the implications of self-efficacy are different. For example, Chen et al. (2001) argued that their focus was on whether “self-efficacy can explain the cognitive ability–performance and conscientiousness–performance relations” (p. 225), whereas our focus was on the relative contributions of self-efficacy and purportedly distal variables in predicting performance.

### *Future Research*

Given the results observed here, one clear area for future research is to integrate individual differences into existing models of motivation and performance. In reviewing the literature, Kanfer and Heggstad (1997) lamented, “We view the broad neglect of person characteristics in scientific models of work motivation over the past several decades as a serious impediment to progress in the development of useful integrative work motivation models” (p. 3). With respect to cognitive ability, Phillips and Gully (1997) noted that although most researchers assume that self-efficacy is distinct from ability, ability is often neither controlled nor directly measured when self-efficacy is used as a predictor. Thus, existing models need to be revised to take dispositional traits and abilities into account and to incorporate into them the strong direct influences the distal characteristics may have on the criteria.

Additionally, given our results, future research should explore other statelike variables as potential mediators of individual differences. Perhaps proximal variables other than self-efficacy are important. For example, mood states (Erez & Isen, 2002), self-development activities (Maurer, Weiss, & Barbeite, 2003), and empathy (Conway, 2000) are just a few of the proximal states that could be studied further. Relatedly, because recent research has investigated team efficacy (Chen, Thomas, & Wallace, 2005; Katz-Navon & Erez, 2005), whereas other research has investigated team composition in terms of personality and cognitive ability (LePine, 2003; Porter et al., 2003; Stewart, Fulmer, & Barrick, 2005), it would be worthwhile to investigate unique efficacy–work-related performance relationships by merging these two streams of research. It is possible that team efficacy–team performance relationships may vary not only by average trait levels across teams but also by variability across teams.

Third, as Parker (1998) has noted, it is possible that given the movement away from jobs defined by narrowly defined job descriptions, task-specific efficacy may not be the optimal way to conceptualize the concept. Parker has shown, in several studies, that role breadth self-efficacy is perhaps a more useful concept than specific task-based self-efficacy in predicting job performance in modern work contexts (e.g., Parker, 2000). Given our results, and those of Parker, future research should further explore



role breadth self-efficacy as well as other statelike conceptualizations.

Fourth, an additional direction for future research concerns the conceptual role of self-efficacy in predicting performance. Specifically, although self-efficacy traditionally has been examined as a mediator of individual differences, a promising area for future research is to examine the role of self-efficacy as a moderator of the effects of individual differences. For example, self-efficacy may interact with conscientiousness in predicting performance, such that high self-efficacy is especially beneficial for highly conscientious individuals. Conversely, one might predict that self-efficacy is less important for individuals high in conscientiousness because such individuals already have characteristics that promote task accomplishment, such as a strong achievement orientation (Stewart, 1999) and a tendency to set more ambitious goals (Gellatly, 1996). To date, few studies have explicitly examined self-efficacy in this regard; thus, primary studies are needed to explore this alternative conceptual framework.

Finally, other researchers recently have raised questions about the positive effects of self-efficacy in motivation research. Vancouver, Thompson, Tischner, and Putka (2002) argued that, over time, self-efficacy can lead to overconfidence and thereby detract from performance. Vancouver, Thompson, and Williams (2001) argued that the effect of self-efficacy on performance is due to the influence of past performance on self-efficacy. Bandura and Locke (2003) have presented evidence questioning these conclusions. Heggestad and Kanfer (2005) demonstrated that the effect of self-efficacy on task performance may be an artifact of how past performance is statistically altered and that when past performance is directly controlled, the unique effect of self-efficacy on performance is substantially mitigated. These debates are worth noting, though the purpose of our study was not to resolve these continuing debates.

To wit, although our purpose was not to criticize the self-efficacy concept, our results do both affirm the relative predictive validity of self-efficacy in certain contexts, while raising questions about its incremental contribution in others. We should note, however, that even if the incremental contribution of self-efficacy in predicting work-related performance is, at times, rather small, this does not necessarily mean the concept has no utility. Sometimes small effects can be important, and, practically, one advantage of self-efficacy is that it is malleable in a way that may be relatively costless (McNatt & Judge, 2004). Thus, future research should not only continue to explore the conditions under which self-efficacy is important but also should identify how self-efficacy might be improved in those conditions.

## Conclusion

Our goal in this study was to test a model involving the influence of the proximal variable self-efficacy and the distal variables of personality, cognitive ability, and experience. In so doing, our results focused on the relative incremental contributions of states and traits. In discussing the concept of incremental validity, Hunsley and Meyer (2003) commented,

This requirement presents a rather stringent test of validity, as it requires not only that the prediction of an outcome with a test be better than that obtained by chance but also that the test demonstrate its

value in comparison with other relevant sources of information. (pp. 446–447)

Although the approach utilized in this study is, perhaps, stringent, the demonstration of incremental validity is a critical step in the justification of psychological measures (Wiggins, 1973) yet one that is rarely taken (Hunsley, 2003). Future research can build on these results by further elucidating the conditions under which self-efficacy and distal characteristics affect performance and through further investigations of the relationship between purportedly distal traits and psychological states.

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