Journal of Applied Psychology
2007, Vol. 92, No. 1, 107–127

0021-9010/07/$12.00 DOI: 10.1037/0021-9010.92.1.107

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

Timothy A. Judge
University of Florida

Christine L. Jackson
Purdue University

John C. Shaw
Mississippi State University

Brent A. Scott and Bruce L. Rich
University of Florida

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 utilized 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

Timothy A. Judge, Brent A. Scott, and Bruce L. Rich, Department of Management, Warrington College of Business, University of Florida; Christine L. Jackson, Department of Organizational Behavior and Human Resource Management, Krannert Graduate School of Management, Purdue University; John C. Shaw, Department of Management and Information Systems, College of Business and Industry, Mississippi State University.

Bruce L. Rich is now at the College of Business Administration, California State University at San Marcos.

Correspondence concerning this article should be addressed to Timothy A. Judge, Department of Management, Warrington College of Business, University of Florida, 211D Stuzin Hall, P.O. Box 117165, Gainesville, FL 32611-7165. E-mail: timothy.judge@cba.ufl.edu

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

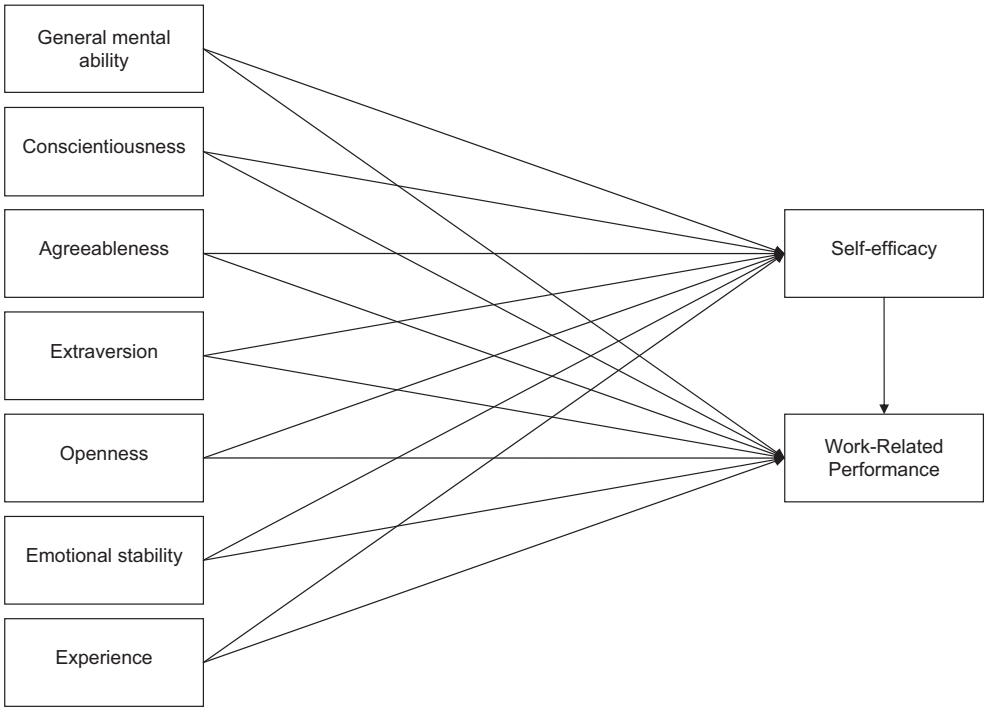

Figure 1. Conceptual path model relating ability, personality, experience, and self-efficacy to work-related performance.

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.[1]

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

[1] 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.[2] 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

[2] 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.[3] 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*).

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

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 $R = .68$ ($p < .001$).

[3] 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.

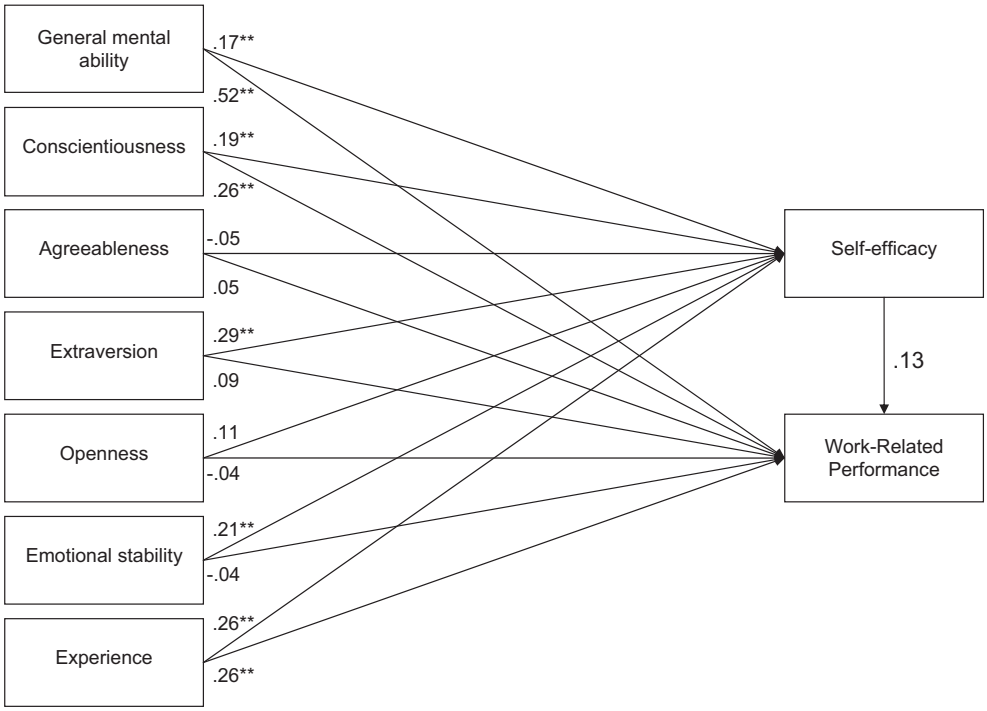

Figure 2. Meta-analytic path model results relating ability, personality, experience, and self-efficacy to work-related performance. * $p < .05$. ** $p < .01$.

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.[4] Across all of the conditions, including the distal variables reduced the pre-

[4] 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	k	N	$\bar{r}$	$\hat{\rho}$	$SD_{\hat{\rho}}$	CV_L	CV_U	CI_L	CI_U
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%.[5]

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

[5] 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 Heggestad (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 performance ($\hat{\beta} = .21$, $p < .05$), 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 → self-efficacy → performance view needs to be reexamined.

Broadly, our results support Kanfer's (Kanfer, 1990; Kanfer & Ackerman, 1989; Kanfer & Heggestad, 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 cumulated 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 Heggestad (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.

References

References marked with an asterisk indicate studies included in the meta-analyses.

*Ackerman, P. L., & Kanfer, R. (1993). Integrating laboratory and field study for improving selection: Development of a battery for predicting air traffic controller success. *Journal of Applied Psychology, 78,* 413–432.

*Ackerman, P. L., Kanfer, R., & Goff, M. (1995). Cognitive and noncognitive determinants and consequences of complex skill acquisition. *Journal of Experimental Psychology: Applied, 1,* 270–304.

*Alden, L. (1986). Self-efficacy and causal attributions for social feedback. *Journal of Research in Personality, 20,* 460–473.

*Allworth, E., & Hesketh, B. (2000). Job requirements biodata as a predictor of performance in customer service roles. *International Journal of Selection and Assessment, 8,* 137–147.

*Ashton, M. C., Lee, K., & Vernon, P. A. (2000). Fluid intelligence, crystallized intelligence, and the openness/intellect factor. *Journal of Research in Personality, 34,* 198–207.

*Audia, P. G., Locke, E. A., & Smith, K. G. (2000). The paradox of success: An archival and a laboratory study of strategic persistence following radical environmental change. *Academy of Management Journal, 43,* 837–853.

*Austin, E. J., Deary, I. J., & Gibson, G. J. (1997). Relationships between ability and personality: Three hypotheses tested. *Intelligence, 25,* 49–70.

*Austin, E. J., Deary, I. J., Whiteman, M. C., Fowkes, F. G. R., Pedersen, N. L., Rabbitt, P., et al. (2002). Relationships between ability and personality: Does intelligence contribute positively to personal and social adjustment? *Personality and Individual Differences, 32,* 1391–1411.

*Austin, E. J., Deary, I. J., & Willock, J. (2001). Personality and intelligence as predictors of economic behaviour in Scottish farmers. *European Journal of Personality, 15,* S123–S137.

*Avolio, B. J., & Waldman, D. A. (1994). Variations in cognitive, perceptual, and psychomotor abilities across the working life span: Examining the effects of race, sex, experience, education, and occupational type. *Psychology and Aging, 9,* 430–442.

*Awang-Hashim, R., O'Neil, H. F., Jr., & Hocevar, D. (2003). Ethnicity, effort, self-efficacy, worry, and statistics achievement in Malaysia: A construct validation of the state–trait motivation model. *Educational Assessment, 8,* 341–364.

*Ballantine, K., & Nunns, C. G. (1998). The moderating effect of supervisory support on the self-efficacy work–performance relationship. *South African Journal of Psychology, 28,* 164–173.

Bandura, A. (1986). *Social foundations of thought and action: A social cognitive view.* Englewood Cliffs, NJ: Prentice Hall.

Bandura, A. (1994). Self-efficacy. In V. S. Ramachaudran (Ed.), *Encyclopedia of human behavior* (Vol. 4, pp. 71–81). New York: Academic Press.

Bandura, A. (1997). *Self-efficacy: The exercise of control.* New York: Freeman.

Bandura, A. (1999). A social–cognitive theory of personality. In L. Pervin & O. John (Eds.), *Handbook of personality* (2nd ed., pp. 154–196). New York: Guilford Press.

Bandura, A., Caprara, G. V., & Barbaranelli, C. (2001). Sociocognitive self-regulatory mechanisms governing transgressive behavior. *Journal of Personality and Social Psychology, 80,* 125–135.

*Bandura, A., & Cervone, D. (1983). Self-evaluative and self-efficacy mechanisms governing the motivational effects of goal systems. *Journal of Personality and Social Psychology, 45,* 1017–1028.

*Bandura, A., & Cervone, D. (1986). Differential engagement of self-reactive influences in cognitive motivation. *Organizational Behavior and Human Decision Processes, 38,* 92–113.

*Bandura, A., & Jourden, F. J. (1991). Self-regulatory mechanisms governing the impact of social comparison on complex decision making. *Journal of Personality and Social Psychology, 60,* 941–951.

Bandura, A., & Locke, E. A. (2003). Negative self-efficacy and goal effects revisited. *Journal of Applied Psychology, 88,* 87–99.

*Bandura, A., & Wood, R. (1989). Effect of perceived controllability and performance standards on self-regulation of complex decision making. *Journal of Personality and Social Psychology, 56,* 805–814.

*Barling, J., & Beattie, R. (1983). Self-efficacy beliefs and sales performance. *Journal of Organizational Behavior Management, 5,* 41–51.

*Baron, R. A. (1988). Negative effects of destructive criticism: Impact on conflict, self-efficacy, and task performance. *Journal of Applied Psychology, 73,* 199–207.

Barrick, M. R., Mount, M. K., & Judge, T. A. (2001). Personality and performance at the beginning of the new millennium: What do we know and where do we go next? *International Journal of Selection and Assessment, 9,* 9–30.

*Barrick, M. R., Mount, M. K., & Strauss, J. P. (1994). Antecedents of involuntary turnover due to a reduction in force. *Personnel Psychology, 47,* 515–535.

*Barrick, M. R., Stewart, G. L., Neubert, M. J., & Mount, M. K. (1998). Relating member ability and personality to work-team processes and team effectiveness. *Journal of Applied Psychology, 83,* 377–391.

*Barrios, F. X. (1985). A comparison of global and specific estimates of self-control. *Cognitive Therapy and Research, 9,* 455–469.

*Barry, B., & Friedman, R. A. (1998). Bargainer characteristics in distributive and integrative negotiation. *Journal of Personality and Social Psychology, 74,* 345–359.

*Bartol, K. M., Durham, C. C., & Poon, J. M. L. (2001). Influence of performance evaluation rating segmentation on motivation and fairness perceptions. *Journal of Applied Psychology, 86,* 1106–1119.

*Bartone, P. T., Snook, S. A., & Tremble, T. R., Jr. (2002). Cognitive and personality predictors of leader performance in West Point cadets. *Military Psychology, 14,* 321–338.

*Bates, T. C., & Shieles, A. (2003). Crystallized intelligence as a product of speed and drive for experience: The relationship of inspection time and openness to g and Gc. *Intelligence, 31,* 275–287.

*Bauer, T. N., Maertz, C. P., Jr., Dolen, M. R., & Campion, M. A. (1998). Longitudinal assessment of applicant reactions to employment testing and test outcome feedback. *Journal of Applied Psychology, 83,* 892–903.

*Beier, M. E., & Ackerman, P. L. (2001). Current-events knowledge in adults: An investigation of age, intelligence, and nonability determinants. *Psychology and Aging, 16,* 615–628.

*Bell, B. S., & Kozlowski, W. J. (2002). Goal orientation and ability: Interactive effects on self-efficacy, performance, and knowledge. *Journal of Applied Psychology, 87,* 497–505.

*Bhanthumnavin, D. (2003). Perceived social support from supervisor and group members' psychological and situational characteristics as predictors of subordinate performance in Thai work units. *Human Resource Development Quarterly, 14,* 79–97.

*Black, J. (2000). Personality testing and police selection: Utility of the "Big Five." *New Zealand Journal of Psychology, 29,* 2–9.

*Bong, M. (2001). Role of self-efficacy and task-value in predicting college students' course performance and future enrollment intentions. *Contemporary Educational Psychology, 26,* 553–570.

*Bong, M. (2002). Predictive utility of subject-, task-, and problem-specific self-efficacy judgments for immediate and delayed academic performances. *Journal of Experimental Education, 70,* 133–162.

*Bores-Rangel, E., Church, A. T., Szendre, D., & Reeves, C. (1990). Self-efficacy in relation to occupational consideration and academic performance in high school equivalency students. *Journal of Counseling Psychology, 37,* 407–418.

*Borman, W. C., Hanson, M. A., Oppler, S. H., & Pulakos, E. D. (1993). Role of early supervisory experience in supervisor performance. *Journal of Applied Psychology, 78,* 443–449.

*Borrelli, B., & Mermelstein, R. (1994). Goal setting and behavior change in a smoking cessation program. *Cognitive Therapy and Research, 18,* 69–83.

*Boudreau, J. W., Boswell, W. R., Judge, T. A., & Bretz, R. D., Jr. (2001). Personality and cognitive ability as predictors of job search among employed managers. *Personnel Psychology, 54,* 25–50.

*Bouffard-Bouchard, T. (1990). Influence of self-efficacy on performance in a cognitive task. *Journal of Social Psychology, 130,* 353–363.

*Bouffard-Bouchard, T., Parent, S., & Larivée, S. (1991). Influence of self-efficacy on self-regulation and performance among junior and senior high-school age students. *International Journal of Behavioral Development, 14,* 153–164.

Bozeman, D. P., Perrewé, P. L., Hochwarter, W. A., & Brymer, R. A. (2001). Organizational politics, perceived control, and work outcomes: Boundary conditions on the effects of politics. *Journal of Applied Social Psychology, 31,* 486–503.

*Bozionelos, N. (2004). The relationship between disposition and career success: A British study. *Journal of Occupational and Organizational Psychology, 77,* 403–420.

*Brosnan, M. J. (1998). The impact of computer anxiety and self-efficacy upon performance. *Journal of Computer Assisted Learning, 14,* 223–234.

*Brown, K. G. (2001). Using computers to deliver training: Which employees learn and why? *Personnel Psychology, 54,* 271–296.

*Brown, S. D., Lent, R. W., & Larkin, K. C. (1989). Self-efficacy as a moderator of scholastic aptitude: Academic performance relationships. *Journal of Vocational Behavior, 35,* 64–75.

*Brown, S. P., Cron, W. L., & Slocum, J. W., Jr. (1998). Effects of trait competitiveness and perceived intraorganizational competition on salesperson goal setting and performance. *Journal of Marketing, 62,* 88–98.

*Brutus, S., & Ryan, A. M. (1998). A new perspective on preferential treatment: The role of ambiguity and self-efficacy. *Journal of Business and Psychology, 13,* 157–178.

*Busato, V. V., Prins, F. J., Elshout, J. J., & Hamaker, C. (2000). Intellectual ability, learning style, personality, achievement motivation and academic success of psychology students in higher education. *Personality and Individual Differences, 29,* 1057–1068.

*Button, S. B., Mathieu, J. E., & Aikin, K. J. (1996). An examination of the relative impact of assigned goals and self-efficacy on personal goals and performance over time. *Journal of Applied Social Psychology, 26,* 1084–1103.

*Callahan, J. S., Brownlee, A. L., Brtek, M. D., & Tosi, H. L. (2003). Examining the unique effects of multiple motivational sources on task performance. *Journal of Applied Social Psychology, 33,* 2515–2535.

*Cannon-Bowers, J. A., Salas, E., Tannenbaum, S. I., & Mathieu, J. E. (1995). Toward theoretically based principles of training effectiveness: A model and initial empirical investigation. *Military Psychology, 7,* 141–164.

*Caplan, R. D., Vinokur, A. D., Price, R. H., & Van Ryn, M. (1989). Job seeking, reemployment, and mental health: A randomized field experi-

ment in coping with job loss. *Journal of Applied Psychology, 74,* 759–769.

*Carless, S. A. (1999). Career assessment: Holland's vocational interests, personality characteristics, and abilities. *Journal of Career Assessment, 7,* 125–144.

*Carson, J. A. S., Gillham, M. B., Kirk, L. M., Reddy, S. T., & Battles, J. B. (2002). Enhancing self-efficacy and patient care with cardiovascular nutrition education. *American Journal of Preventive Medicine, 23,* 296–302.

*Cervone, D. (1989). Effects of envisioning future activities on self-efficacy judgments and motivation: An availability heuristic interpretation. *Cognitive Therapy and Research, 13,* 247–261.

*Cervone, D., Jiwani, N., & Wood, R. (1991). Goal setting and the differential influence of self-regulatory processes on complex decision-making performance. *Journal of Personality and Social Psychology, 61,* 257–266.

*Cervone, D., & Peake, P. K. (1986). Anchoring, efficacy, and action: The influence of judgmental heuristics on self-efficacy judgments and behavior. *Journal of Personality and Social Psychology, 50,* 492–501.

*Cervone, D., & Wood, R. (1995). Goals, feedback, and the differential influence of self-regulatory processes on cognitively complex performance. *Cognitive Therapy and Research, 19,* 519–545.

*Chamorro-Premuzic, T., Moutafi, J., & Furnham, A. (2005). The relationship between personality traits, subjectively-assessed and fluid intelligence. *Personality and Individual Differences, 38,* 1517–1528.

*Chan, D., & Schmitt, N. (2002). Situational judgment and job performance. *Human Performance, 15,* 233–254.

*Chemers, M. M., Li-tze, H., & Garcia, B. F. (2001). Academic self-efficacy and first year college student performance and adjustment. *Journal of Educational Psychology, 93,* 55–64.

*Chen, G., & Bliese, P. D. (2002). The role of different levels of leadership in predicting self- and collective efficacy: Evidence for discontinuity. *Journal of Applied Psychology, 87,* 549–556.

*Chen, G., Bliese, P. D., Payne, S. C., Zaccaro, S. J., Webber, S. S., Mathieu, J. E., et al. (2002). Simultaneous examination of the antecedents and consequences of efficacy beliefs at multiple levels of analysis. *Human Performance, 15,* 381–410.

Chen, G., Casper, W. J., & Cortina, J. M. (2001). The roles of self-efficacy and task complexity in the relationships among cognitive ability, conscientiousness, and work-related performance: A meta-analytic examination. *Human Performance, 14,* 209–230.

*Chen, G., Gully, S. M., Whiteman, J. K., & Kilcullen, R. N. (2000). Examination of relationships among trait-like individual differences, state-like individual differences, and learning performance. *Journal of Applied Psychology, 85,* 835–847.

Chen, G., Thomas, B., & Wallace, J. C. (2005). A multilevel examination of the relationships among training outcomes, mediating regulatory processes, and adaptive performance. *Journal of Applied Psychology, 90,* 827–841.

*Chou, H. W. (2001). Effects of training method and computer anxiety on learning performance and self-efficacy. *Computers in Human Behavior, 17,* 51–69.

*Chowdhury, J. (1993). The motivational impact of sales quotas on effort. *Journal of Marketing Research, 30,* 28–41.

*Christiansen, N. D., Wolcott-Burnam, S., Janovics, J. E., Burns, G. N., & Quirk, S. W. (2005). The good judge revisited: Individual differences in the accuracy of personality judgments. *Human Performance, 18,* 123–149.

*Christie, M., & Raine, A. (1988). Lateralized hemisphere activity in relation to personality and degree course. *Personality and Individual Differences, 9,* 957–964.

*Clevenger, J., Pereira, G. M., Wiechmann, D., Schmitt, N., & Harvey, V. S. (2001). Incremental validity of situational judgment tests. *Journal of Applied Psychology, 86,* 410–417.

*Clifford, J. S., Boufal, M. M., & Kurtz, J. E. (2004). Personality traits and critical thinking skills in college students: Empirical tests of a two-factor theory. *Assessment, 11,* 169–176.

*Colarelli, S. M., Dean, R. A., & Konstans, C. (1987). Comparative effects of personal and situational influences on job outcomes of new professionals. *Journal of Applied Psychology, 72,* 558–566.

*Cole, B. L., & Hopkins, B. L. (1995). Manipulations of the relationship between reported self-efficacy and performance. *Journal of Organizational Behavior Management, 15,* 95–135.

Colquitt, J. A., LePine, J. A., & Noe, R. (2000). Toward an integrative theory of training motivation: A meta-analytic path analysis of 20 years of research. *Journal of Applied Psychology, 85,* 678–707.

Conway, J. M. (2000). Managerial performance development constructs and personality correlates. *Human Performance, 13,* 23–46.

*Cooper, S. E., & Robinson, D. A. (1991). The relationship of mathematics self-efficacy beliefs to mathematics anxiety and performance. *Measurement and Evaluation in Counseling and Development, 24,* 4–11.

*Costa, P. T., Fozard, J. L., McCrae, R. R., & Bosse, R. (1976). Relations of age and personality dimensions to cognitive ability factors. *Journal of Gerontology, 31,* 663–669.

*Crant, J. M. (1995). The Proactive Personality Scale and objective job performance among real estate agents. *Journal of Applied Psychology, 80,* 532–537.

Cronbach, L. J., & Gleser, G. C. (1965). *Psychological tests and personnel decisions*. Urbana: University of Illinois Press.

*Davis, W. D., Fedor, D. B., Parsons, C. K., & Herold, D. M. (2000). The development of self-efficacy during aviation training. *Journal of Organizational Behavior, 21,* 857–871.

Dawis, R. V. (1992). The individual differences tradition in counseling psychology. *Journal of Counseling Psychology, 39,* 7–19.

*Demetriou, A., Kyriakides, L., & Avraamidou, C. (2003). The missing link in the relations between intelligence and personality. *Journal of Research in Personality, 37,* 547–581.

*Denzine, G. M., & Anderson, C. M. (1999). I can do it: Resident assistants' sense of self-efficacy. *Journal of College Student Development, 40,* 247–255.

*de Saintonge, D. M. C., & Dunn, D. M. (2001). Gender and achievement in clinical medical students: A path analysis. *Medical Education, 35,* 1024–1033.

*Díaz, R. J., Glass, C. R., Arnkoff, D. B., & Tanofsky-Kraff, M. (2001). Cognition, anxiety, and prediction of performance in 1st-year law students. *Journal of Educational Psychology, 93,* 420–429.

*Dollinger, S. J., LaMartina, A. K., & Kilman, A. (1998). A note on moral reasoning and the five-factor model. *Journal of Social Behavior & Personality, 13,* 349–358.

*Earley, P. C. (1986). Supervisors and shop stewards as sources of contextual information in goal setting: A comparison of the United States with England. *Journal of Applied Psychology, 71,* 111–117.

*Earley, P. C. (1993). East meets West meets Mideast: Further explorations of collectivistic and individualistic work groups. *Academy of Management Journal, 36,* 319–348.

*Earley, P. C. (1994). Self or group? Cultural effects of training on self-efficacy and performance. *Administrative Science Quarterly, 39,* 89–117.

*Earley, P. C., & Erez, M. (1991). Time-dependency effects of goals and norms: The role of cognitive processing on motivational models. *Journal of Applied Psychology, 76,* 717–724.

*Earley, P. C., Lee, C., & Hanson, L. A. (1990). Joint moderating effects of job experience and task component complexity: Relations among goal setting, task strategies, and performance. *Journal of Organizational Behavior, 11,* 3–15.

*Earley, P. C., & Lituchy, T. R. (1991). Delineating goal and efficacy effects: A test of three models. *Journal of Applied Psychology, 76,* 81–98.

*Eaton, M. J., & Dembo, M. H. (1997). Differences in the motivational beliefs of Asian American and non-Asian students. *Journal of Educational Psychology, 89,* 433–440.

*Eby, L. T., & Dobbins, G. H. (1997). Collectivistic orientation in teams: An individual and group-level analysis. *Journal of Organizational Behavior, 18,* 275–295.

*Eden, D., & Ravid, G. (1982). Pygmalion versus self-expectancy: Effects of instructor- and self-expectancy on trainee performance. *Organizational Behavior and Human Performance, 30,* 351–364.

*Egan, V. (1994). Intelligence, inspection time and cognitive strategies. *British Journal of Psychology, 85,* 305–315.

*Elias, S. M., & Loomis, R. J. (2002). Utilizing need for cognition and perceived self-efficacy to predict academic performance. *Journal of Applied Social Psychology, 32,* 1687–1702.

*Ellis, A. P. J., & Ryan, A. M. (2003). Race and cognitive-ability test performance: The mediating effects of test preparation, test-taking strategy use and self-efficacy. *Journal of Applied Social Psychology, 33,* 2607–2629.

*Ellis, R. A., & Taylor, M. S. (1983). Role of self-esteem within the job search process. *Journal of Applied Psychology, 68,* 632–640.

Erez, A., & Isen, A. M. (2002). The influence of positive affect on the components of expectancy motivation. *Journal of Applied Psychology, 87,* 1055–1067.

*Evers, W., Tomic, W., & Brouwers, A. (2001). Effects of aggressive behavior and perceived self-efficacy on burnout among staff of homes for the elderly. *Issues in Mental Health Nursing, 22,* 439–454.

*Eyring, J. D., Johnson, D. S., & Francis, D. J. (1993). A cross-level units-of-analysis approach to individual differences in skill acquisition. *Journal of Applied Psychology, 78,* 805–814.

*Farley, F. H. (1968). Moderating effects of intelligence on the independence of extraversion and neuroticism. *Journal of Consulting and Clinical Psychology, 32,* 226–228.

*Farrell, J. N., & McDaniel, M. A. (2001). The stability of validity coefficients over time: Ackerman's (1988) model and the General Aptitude Test Battery. *Journal of Applied Psychology, 86,* 60–79.

*Farsides, T., & Woodfield, R. (2003). Individual differences and undergraduate academic success: The roles of personality, intelligence, and application. *Personality and Individual Differences, 34,* 1225–1243.

*Feather, N. T. (1988). Values, valences, and course enrollment: Testing the role of personal values within an expectancy-valence framework. *Journal of Educational Psychology, 3,* 381–391.

Feltz, D. L., & Lirgg, C. D. (1998). Perceived team and player efficacy in hockey. *Journal of Applied Psychology, 83,* 557–564.

*Ferry, T. R., Fouad, N. A., & Smith, P. L. (2000). The role of family context in a social–cognitive model for career-related choice behavior: A math and science perspective. *Journal of Vocational Behavior, 57,* 348–364.

*Fink, A., Schrausser, D. G., & Neubauer, A. C. (2002). The moderating influence of extraversion on the relationship between IQ and cortical activation. *Personality and Individual Differences, 33,* 311–326.

*Finney, S. J., & Schraw, G. (2003). Self-efficacy beliefs in college statistics courses. *Contemporary Educational Psychology, 28,* 161–186.

*Ford, J. K., Quiñones, M. A., Sego, D. J., & Sorra, J. S. (1992). Factors affecting the opportunity to perform trained tasks on the job. *Personnel Psychology, 45,* 511–527.

*Ford, J. K., Smith, E. M., Sego, D. J., & Quiñones, M. A. (1993). Impact of task experience and individual factors on training-emphasis ratings. *Journal of Applied Psychology, 78,* 583–590.

*Ford, J. K., Smith, E. M., Weissbein, D. A., Gully, S. M., & Salas, E. (1998). Relationships of goal orientation, metacognitive activity, and practice strategies with learning outcomes and transfer. *Journal of Applied Psychology, 83,* 218–233.

*Frayne, C. A., & Geringer, J. M. (2000). Self-management training for improving job performance: A field experiment involving salespeople. *Journal of Applied Psychology, 85,* 361–372.

*Frayne, C. A., & Latham, G. P. (1987). Application of social learning theory to employee self-management of attendance. *Journal of Applied Psychology, 72,* 387–392.

*Friborg, O., Barlaug, D., Martinussen, M., Rosenvinge, J. H., & Hjemdal, O. (2005). Resilience in relation to personality and intelligence. *International Journal of Methods in Psychiatric Research, 14,* 29–42.

*Friedlander, M. L., Keller, K. E., Peca-Baker, T. A., & Olk, M. E. (1986). Effects of role conflict on counselor trainees' self-statements, anxiety level, and performance. *Journal of Counseling Psychology, 33,* 73–77.

*Furnham, A., & Chamorro-Premuzic, T. (2004). Estimating one's own personality and intelligence scores. *British Journal of Psychology, 95,* 149–160.

*Furnham, A., & Chamorro-Premuzic, T. (2004). Personality, intelligence, and art. *Personality and Individual Differences, 36,* 705–715.

*Furnham, A., Moutafi, J., & Chamorro-Premuzic, T. (2005). Personality and intelligence: Gender, the Big Five, self-estimated and psychometric intelligence. *International Journal of Selection and Assessment, 13,* 11–24.

*Gardiner, M., Luszcz, M. A., & Bryan, J. (1997). The manipulation and measurement of task-specific memory self-efficacy in younger and older adults. *International Journal of Behavioral Development, 21,* 209–227.

*Garland, H., & Adkinson, J. H. (1987). Standards, persuasion, and performance: A test of cognitive mediation theory. *Group & Organization Studies, 12,* 208–220.

*Gau, B. S., Horner, S. D., Chang, S. C., & Chen, Y. C. (2002). Asthma management efficacy of school nurses in Taiwan. *International Journal of Nursing Studies, 39,* 279–285.

Gellatly, I. R. (1996). Conscientiousness and task performance: Test of cognitive process model. *Journal of Applied Psychology, 81,* 474–482.

*Gellatly, I. R., & Meyer, J. P. (1992). The effects of goal difficulty on physiological arousal, cognition, and task performance. *Journal of Applied Psychology, 77,* 694–704.

*Gentry, T. A., Polzine, K. M., & Wakefield, J. A. (1985). Human genetic markers associated with variation in intellectual abilities and personality. *Personality and Individual Differences, 6,* 111–113.

*Ghaith, G., & Shaaban, K. (1999). The relationship between perceptions of teaching concerns, teacher efficacy, and selected teacher characteristics. *Teaching and Teacher Education, 15,* 487–496.

*Gibbons, D. E., & Weingart, L. R. (2001). Can I do it? Will I try? Personal efficacy, assigned goals, and performance norms as motivators of individual performance. *Journal of Applied Social Psychology, 31,* 624–648.

*Gibson, C. B. (2001). Me and us: Differential relationships among goal-setting training, efficacy and effectiveness at the individual and team level. *Journal of Organizational Behavior, 22,* 789–808.

*Gibson, H. B. (1975). Relations between performance on the advanced matrices and the EPI in high-intelligence subjects. *British Journal of Social & Clinical Psychology, 14,* 363–369.

*Gist, M. E. (1989). The influence of training method on self-efficacy and idea generation among managers. *Personnel Psychology, 42,* 787–805.

*Gist, M. E., Schwoerer, C., & Rosen, B. (1989). Effects of alternative training methods on self-efficacy and performance in computer software training. *Journal of Applied Psychology, 74,* 884–891.

*Gist, M. E., Stevens, C. K., & Bavetta, A. G. (1991). Effects of self-efficacy and post-training intervention on the acquisition and maintenance of complex interpersonal skills. *Personnel Psychology, 44,* 837–861.

*Glass, C. R., Arnkoff, D. B., Wood, H., & Meyerhoff, J. L. (1995). Cognition, anxiety, and performance on a career-related oral examination. *Journal of Counseling Psychology, 42,* 47–54.

*Griffin, B., & Hesketh, B. (2003). Adaptable behaviours for successful

work and career adjustment. *Australian Journal of Psychology, 55,* 65–73.

*Gully, S. M., Payne, S. C., Koles, K. L. K., & Whiteman, J. K. (2002). The impact of error training and individual differences on training outcomes: An attribute–treatment interaction perspective. *Journal of Applied Psychology, 87,* 143–155.

*Hackett, G., Betz, N. E., Casas, J. M., & Rocha-Singh, I. A. (1992). Gender, ethnicity, and social–cognitive factors predicting the academic achievement of students in engineering. *Journal of Counseling Psychology, 39,* 527–538.

Haggbloom, S. J., Warnick, R., & Warnick, J. E. (2002). The 100 most eminent psychologists of the 20th century. *Review of General Psychology, 6,* 139–152.

*Hampton, N. Z., & Mason, E. (2003). Learning disabilities, gender, sources of efficacy, self-efficacy beliefs, and academic achievement in high school students. *Journal of School Psychology, 41,* 101–112.

*Hansen, C. P. (1989). A causal model of the relationship among accidents, biodata, personality, and cognitive factors. *Journal of Applied Psychology, 74,* 81–90.

*Harris, J. A. (2004). Measured intelligence, achievement, openness to experience, and creativity. *Personality and Individual Differences, 36,* 913–929.

*Hattrup, K. (1998). The role of self-perceptions in reactions to preferential and merit-based hiring. *Journal of Applied Social Psychology, 28,* 225–234.

*Hattrup, K., O'Connell, M. S., & Wingate, P. H. (1998). Prediction of multidimensional criteria: Distinguishing task and contextual performance. *Human Performance, 11,* 305–319.

Heggestad, E. D., & Kanfer, R. (2005). The predictive validity of self-efficacy in training performance: Little more than past performance. *Journal of Experimental Psychology: Applied, 11,* 84–97.

*Hertenstein, E. J. (2001). Goal orientation and practice condition as predictors of training results. *Human Resource Development Quarterly, 12,* 403–419.

*Hill, A. B. (1975). Work variety and individual differences in occupational boredom. *Journal of Applied Psychology, 60,* 128–131.

*Hill, M., Mann, L., & Wearing, A. J. (1996). The effects of attitude, subjective norm and self-efficacy on intention to benchmark: A comparison between managers with experience and no experience in benchmarking. *Journal of Organizational Behavior, 17,* 313–327.

*Hinsz, V. B., & Matz, D. C. (1997). Self-evaluations involved in goal setting and task performance. *Social Behavior and Personality, 25,* 177–182.

*Hochwarter, W. A., Witt, L. A., & Kacmar, K. M. (2000). Perceptions of organizational politics as a moderator of the relationship between consciousness and job performance. *Journal of Applied Psychology, 85,* 472–478.

*Hogan, T. P., Wyckoff, L. A., Krebs, P., Jones, W., & Fitzgerald, M. P. (2004). Tolerance for error and computational estimation ability. *Psychological Reports, 94,* 1393–1403.

*Hollenbeck, J. R., & Brief, A. P. (1987). The effects of individual differences and goal origin on goal setting and performance. *Organizational Behavior and Human Decision Processes, 40,* 392–414.

*Hollenbeck, J. R., Moon, H., Ellis, A. P. J., West, B. J., Ilgen, D. R., Sheppard, L., et al. (2002). Structural contingency theory and individual differences: Examination of external and internal person–team fit. *Journal of Applied Psychology, 87,* 599–606.

Holtz, B. C., Ployhart, R. E., & Dominguez, A. (2005). Testing the rules of justice: The effects of frame-of-reference and pre-test validity information on personality test responses and test perceptions. *International Journal of Selection and Assessment, 13,* 75–86.

*Horn, C., Bruning, R., Schraw, G., & Curry, E. (1993). Paths to success in the college classroom. *Contemporary Educational Psychology, 18,* 464–478.

*Hundal, P. S., & Singh, M. (1971). A factor analytical study of intellectual and non-intellectual characteristics. *Multivariate Behavioral Research, 6,* 503–514.

Hunsley, J. (2003). Introduction to the special section on incremental validity and utility in clinical assessment. *Psychological Assessment, 15,* 443–445.

Hunsley, J., & Meyer, G. J. (2003). The incremental validity of psychological testing and assessment: Conceptual, methodological, and statistical issues. *Psychological Assessment, 15,* 446–455.

Hunter, J. E. (1992). *REGRESS: A multiple regression program in BASICA.* Unpublished user's manual, Michigan State University, Department of Psychology.

Hunter, J. E., & Schmidt, F. L. (1990). *Methods of meta-analysis.* Newbury Park, CA: Sage.

*Hunthausen, J. M., Truxillo, D. M., Bauer, T. N., & Hammer, L. B. (2003). A field study of frame-of-reference effects on personality test validity. *Journal of Applied Psychology, 88,* 545–551.

Hurtz, G. M., & Donovan, J. J. (2000). Personality and job performance: The Big Five revisited. *Journal of Applied Psychology, 85,* 869–879.

*Innes, J. M. (1972). The relationship of word-association commonality response set to cognitive and personality variables. *British Journal of Psychology, 63,* 421–428.

*Jackson, J. W. (2002). Enhancing self-efficacy and learning performance. *Journal of Experimental Education, 70,* 243–254.

*Jacobs, B., Prentice-Dunn, S., & Rogers, R. W. (1984). Understanding persistence: An interface of control theory and self-efficacy theory. *Basic and Applied Social Psychology, 5,* 333–347.

*Jenkins, A. L. (1994). The role of managerial self-efficacy in corporate compliance with the law. *Law and Human Behavior, 18,* 71–88.

Jex, S. M., Bliese, P. D., Buzzell, S., & Primeau, J. (2001). The impact of self-efficacy on stressor–strain relations: Coping style as an explanatory mechanism. *Journal of Applied Psychology, 86,* 401–409.

*Johnson, D. S., Perlow, R., & Pieper, K. F. (1993). Differences in task performance as a function of type of feedback: Learning-oriented versus performance-oriented feedback. *Journal of Applied Social Psychology, 23,* 303–320.

*Johnson, D. S., Turban, D. B., & Pieper, K. F. (1996). Exploring the role of normative- and performance-based feedback in motivational processes. *Journal of Applied Social Psychology, 26,* 973–992.

*Jones, G. R. (1986). Socialization tactics, self-efficacy, and newcomers' adjustments to organizations. *Academy of Management Journal, 29,* 262–279.

*Joo, Y. J., Bong, M., & Choi, H. J. (2000). Self-efficacy for self-regulated learning, academic self-efficacy and Internet self-efficacy in web-based instruction. *Educational Technology Research and Development, 48,* 5–17.

*Judge, T. A., Higgins, C. A., Thoresen, C. J., & Barrick, M. R. (1999). The big five personality traits, general mental ability, and career success across the life span. *Personnel Psychology, 52,* 621–652.

Judge, T. A., & Ilies, R. (2002). Relationship of personality to performance motivation: A meta-analysis. *Journal of Applied Psychology, 87,* 797–807.

*Kalnbach, L. R., & Hinsz, V. B. (1999). A conceptualization and test of the influences of individual differences in goal-setting situations. *Journal of Applied Social Psychology, 29,* 1854–1878.

Kanfer, R. (1990). Motivation theory and industrial and organizational psychology. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (Vol. 1, pp. 75–170). Palo Alto, CA: Consulting Psychologists Press.

Kanfer, R. (1992). Work motivation: New directions in theory and research. In C. L. Cooper & I. T. Robertson (Eds.), *International review of industrial and organizational psychology* (Vol. 7, pp. 1–53). Chichester, England: Wiley.

Kanfer, R., & Ackerman, P. L. (1989). Motivation and cognitive abilities:

An integrative/aptitude–treatment interaction approach to skill acquisition. *Journal of Applied Psychology, 74,* 657–690.

Kanfer, R., & Heggestad, E. D. (1997). Motivational traits and skills: A person-centered approach to work motivation. *Research in Organizational Behavior, 19,* 1–56.

*Kanfer, R., & Hulin, C. L. (1985). Individual differences in successful job searches following lay-off. *Personnel Psychology, 38,* 835–847.

*Karl, K. A., O'Leary-Kelly, A. M., & Martocchio, J. J. (1993). The impact of feedback and self-efficacy on performance in training. *Journal of Organizational Behavior, 14,* 379–394.

Katz-Navon, T. Y., & Erez, M. (2005). When collective- and self-efficacy affect team performance: The role of task interdependence. *Small Group Research, 36,* 437–465.

*Kelly, K. R., & Nelson, R. C. (1999). Task-specific occupational self-efficacy scale: A predictive validity study. *Journal of Career Assessment, 7,* 381–392.

*Kirkpatrick, S. A., & Locke, E. A. (1996). Direct and indirect effects of three core charismatic leadership components on performance and attitudes. *Journal of Applied Psychology, 81,* 36–51.

Knapp, T. J. (1985). Who's who in American introductory psychology textbooks: A citation study. *Teaching of Psychology, 12,* 15–17.

*Kolz, A. R., McFarland, L. A., & Silverman, S. B. (1998). Cognitive ability and job experience as predictors of work performance. *Journal of Psychology: Interdisciplinary and Applied, 132,* 539–548.

*Kozlowski, S. W. J., Gully, S. M., Brown, K. G., Salas, E., Smith, E. M., & Nason, E. R. (2001). Effects of training goals and goal orientation traits on multidimensional training outcomes and performance adaptability. *Organizational Behavior and Human Decision Processes, 85,* 1–31.

*Krishnan, B. C., Netemeyer, R. G., & Boles, J. S. (2002). Self-efficacy, competitiveness, and effort as antecedents of salesperson performance. *Journal of Personal Selling & Sales Management, 22,* 285–295.

*Lachman, M. E., & Jelalian, E. (1984). Self-efficacy and attributions for intellectual performance in young and elderly adults. *Journal of Gerontology, 39,* 577–582.

*Lachman, M. E., Steinberg, E. S., & Trotter, S. D. (1987). Effects of control beliefs and attributions on memory self-assessments and performance. *Psychology and Aging, 2,* 266–271.

*Lam, S. S. K., Chen, X. P., & Schaubroeck, J. (2002). Participative decision making and employee performance in different cultures: The moderating effects of allocentrism/idiocentrism and efficacy. *Academy of Management Journal, 45,* 905–914.

Landy, F. J. (1989). *Psychology of work behavior.* Pacific Grove, CA: Brooks/Cole.

*Lane, J., & Lane, A. (2001). Self-efficacy and academic performance. *Social Behavior and Personality, 29,* 687–693.

*Lane, J., & Lane, A. M. (2002). Predictive validity of variables used to select students for postgraduate management courses. *Psychological Reports, 90,* 1239–1247.

*Larson, L. M., Suzuki, L. A., Gillespie, K. N., & Potenza, M. T. (1992). Development and validation of the Counseling Self-Estimate Inventory. *Journal of Counseling Psychology, 39,* 105–120.

*Latham, G. P., Erez, M., & Locke, E. A. (1988). Resolving scientific disputes by the joint design of crucial experiments by the antagonists: Application to the Erez–Latham dispute regarding participation in goal setting. *Journal of Applied Psychology, 73,* 753–772.

*Latham, G. P., & Frayne, C. A. (1989). Self-management training for increasing job attendance: A follow-up and a replication. *Journal of Applied Psychology, 74,* 411–416.

*Latham, G. P., & Seijts, G. H. (1999). The effects of proximal and distal goals on performance on a moderately complex task. *Journal of Organizational Behavior, 20,* 421–429.

*Latham, G. P., Winters, D. C., & Locke, E. A. (1994). Cognitive and motivational effects of participation: A mediator study. *Journal of Organizational Behavior, 15,* 49–63.

*Leach, C. W., Queirolo, S. S., DeVoe, S., & Chemers, M. (2003). Choosing letter grade evaluations: The interaction of students' achievement goals and self-efficacy. *Contemporary Educational Psychology, 28,* 495–509.

*Lee, C. (1983). Self-efficacy and behaviour as predictors of subsequent behaviour in an assertiveness training programme. *Behaviour Research and Therapy, 21,* 225–232.

*Lee, C. (1984). Accuracy of efficacy and outcome expectations in predicting performance in a simulated assertiveness task. *Cognitive Therapy and Research, 8,* 37–48.

*Lee, C., & Bobko, P. (1992). Exploring the meaning and usefulness of measures of subjective goal difficulty. *Journal of Applied Social Psychology, 22,* 1417–1428.

*Lee, C., & Bobko, P. (1994). Self-efficacy beliefs: Comparison of five measures. *Journal of Applied Psychology, 79,* 364–369.

*Lee, C., & Gillen, D. J. (1989). Relationship of Type A behavior pattern, self-efficacy perceptions on sales performance. *Journal of Organizational Behavior, 10,* 75–81.

*Lee, H. J. (2001). Willingness and capacity: The determinants of prosocial organizational behaviour among nurses in the UK. *International Journal of Human Resource Management, 12,* 1029–1048.

*Lee, T. W., Locke, E. A., & Phan, S. H. (1997). Explaining the assigned goal-incentive interaction: The role of self-efficacy and personal goals. *Journal of Management, 23,* 541–559.

*Lent, R. W., Brown, S. D., & Larkin, K. C. (1986). Self-efficacy in the prediction of academic performance and perceived career options. *Journal of Counseling Psychology, 33,* 265–269.

*Lent, R. W., Lopez, F. G., & Bieschke, K. J. (1993). Predicting mathematics-related choice and success behaviors: Test of an expanded social–cognitive model. *Journal of Vocational Behavior, 42,* 223–236.

LePine, J. A. (2003). Team adaptation and postchange performance: Effects of team composition in terms of members' cognitive ability and personality. *Journal of Applied Psychology, 88,* 27–39.

*LePine, J. A., Colquitt, J. A., & Erez, A. (2000). Adaptability to changing task contexts: Effects of general cognitive ability, conscientiousness, and openness to experience. *Personnel Psychology, 53,* 563–593.

*LePine, J. A., Hollenbeck, J. R., Ilgen, D. R., & Hedlund, J. (1997). Effects of individual differences on the performance of hierarchical decision-making teams: Much more than g. *Journal of Applied Psychology, 82,* 803–811.

*LePine, J. A., & Van Dyne, L. (2001). Voice and cooperative behavior as contrasting forms of contextual performance: Evidence of differential relationships with Big Five personality characteristics and cognitive ability. *Journal of Applied Psychology, 86,* 326–336.

*Lerner, B. S., & Locke, E. A. (1995). The effect of goal setting, self-efficacy, competition, and personal trials on the performance of an endurance task. *Journal of Sport & Exercise Psychology, 17,* 138–152.

*Ley, P., Spelman, M. S., Davies, A. D. M., & Riley, S. D. (1966). The relationships between intelligence, anxiety, neuroticism and extraversion. *British Journal of Educational Psychology, 36,* 185–191.

*Lindley, L. D., & Borgen, F. H. (2002). Generalized self-efficacy, Holland theme self-efficacy, and academic performance. *Journal of Career Assessment, 10,* 301–314.

Locke, E. A. (1991). The motivation sequence, the motivation hub, and the motivation core. *Organizational Behavior and Human Decision Processes, 50,* 288–299.

Locke, E. A. (1997). The motivation to work: What we know. *Advances in Motivation and Achievement, 10,* 375–412.

*Locke, E. A., Frederick, E., Lee, C., & Bobko, P. (1984). Effect of self-efficacy, goals, and task strategies on task performance. *Journal of Applied Psychology, 69,* 241–251.

Locke, E. A., & Latham, G. P. (2002). Building a practically useful theory

of goal setting and task motivation: A 35-year odyssey. *American Psychologist, 57,* 705–717.

*Lopez, F. G., Lent, R. W., Brown, S. D., & Gore, P. A. (1997). Role of social-cognitive expectations in high school students' mathematics-related interest and performance. *Journal of Counseling Psychology, 44,* 44–52.

Lubinski, D., & Dawis, R. V. (1992). Aptitudes, skills and proficiencies. In M. D. Dunnette & L. M. Hough (Eds.), *Handbook of industrial and organizational psychology* (2nd ed., Vol. 3, pp. 1–59). Palo Alto, CA: Consulting Psychologists Press.

*Lynn, R., & Gordon, I. E. (1961). The relation of neuroticism and extraversion to intelligence and educational attainment. *British Journal of Educational Psychology, 31,* 194–203.

*Lynn, R., Hampson, S., & Agahi, E. (1989). Genetic and environmental mechanisms determining intelligence, neuroticism, extraversion and psychoticism: An analysis of Irish siblings. *British Journal of Psychology, 80,* 499–507.

*Mangos, P. M., & Steele-Johnson, D. (2001). The role of subjective task complexity in goal orientation, self-efficacy, and performance relations. *Human Performance, 14,* 169–186.

*Manstead, A. S. R., & van Eekelen, S. A. M. (1998). Distinguishing between perceived behavioral control and self-efficacy in the domain of academic intentions and behaviors. *Journal of Applied Social Psychology, 28,* 1375–1392.

*Martocchio, J. J. (1994). Effects of conceptions of ability on anxiety, self-efficacy, and learning in training. *Journal of Applied Psychology, 79,* 819–825.

*Martocchio, J. J., & Dulebohn, J. (1994). Performance feedback effects in training: The role of perceived controllability. *Personnel Psychology, 47,* 357–373.

*Martocchio, J. J., & Judge, T. A. (1997). Relationship between conscientiousness and learning in employee training: Mediating influences of self-deception and self-efficacy. *Journal of Applied Psychology, 82,* 764–773.

*Mathieu, J. E., & Button, S. B. (1992). An examination of the relative impact of normative information and self-efficacy on personal goals and performance over time. *Journal of Applied Social Psychology, 22,* 1758–1775.

*Mathieu, J. E., Martineau, J. W., & Tannenbaum, S. I. (1993). Individual and situational influences on the development of self-efficacy: Implications for training effectiveness. *Personnel Psychology, 46,* 125–147.

Maurer, T. J., & Pierce, H. R. (1998). A comparison of Likert scale and traditional measures of self-efficacy. *Journal of Applied Psychology, 83,* 324–329.

Maurer, T. J., Weiss, E. M., & Barbeite, F. G. (2003). A model of involvement in work-related learning and development activity: The effects of individual, situational, motivational, and age variables. *Journal of Applied Psychology, 88,* 707–724.

*Mavis, B. (2001). Self-efficacy and OSCE performance among second year medical students. *Advances in Health Sciences Education, 6,* 93–102.

*Maynard, D. C., & Hakel, M. D. (1997). Effects of objective and subjective task complexity on performance. *Human Performance, 10,* 303–330.

*McCrae, R. R. (1993–1994). Openness to experience as a basic dimension of personality. *Imagination, Cognition, and Personality, 13,* 39–55.

*McCrae, R. R., & Costa, P. T. (1985). Updating Norman's "adequacy taxonomy": Intelligence and personality dimensions in natural language and in questionnaires. *Journal of Personality and Social Psychology, 49,* 710–721.

*McDonald, T., & Siegall, M. (1992). The effects of technological self-efficacy and job focus on job performance, attitudes, and withdrawal behaviors. *Journal of Psychology, 126,* 465–475.

*McIntire, S. A., & Levine, E. L. (1991). Combining personality variables and goals to predict performance. *Journal of Vocational Behavior, 38,* 288–301.

McNatt, D. B., & Judge, T. A. (2004). Boundary conditions of the Galatea effect: A field experiment and constructive replication. *Academy of Management Journal, 47,* 550–565.

*Mehryar, A. H., Khajavi, F., Razavieh, A., & Hosseini, A. (1973). Some personality correlates of intelligence and educational attainment in Iran. *British Journal of Educational Psychology, 43,* 8–16.

*Meier, S. T., McCarthy, P. R., & Schmeck, R. R. (1984). Validity of self-efficacy as a predictor of writing performance. *Cognitive Therapy and Research, 8,* 107–120.

*Mento, A. J., Locke, E. A., & Klein, H. J. (1992). Relationship of goal level to valence and instrumentality. *Journal of Applied Psychology, 77,* 395–405.

*Mitchell, T. R., Hopper, H., Daniels, D., & George-Falvy, J. (1994). Predicting self-efficacy and performance during skill acquisition. *Journal of Applied Psychology, 79,* 506–517.

*Mohammed, S., Mathieu, J. E., & Bartlett, A. L. (2002). Technical-administrative task performance, leadership task performance, and contextual performance: Considering the influence of team- and task-related composition variables. *Journal of Organizational Behavior, 23,* 795–814.

*Mohan, J., & Kaur, M. (1993). Adjustment, personality, intelligence, values & socioeconomic status of male–female university research scholars. *Social Science International, 9,* 39–50.

*Mone, M. A. (1994). Comparative validity of two measures of self-efficacy in predicting academic goals and performance. *Educational and Psychological Measurement, 54,* 516–529.

*Mone, M. A., & Baker, D. D. (1992). A social–cognitive, attributional model of personal goals: An empirical evaluation. *Motivation & Emotion, 16,* 297–321.

*Mone, M. A., Baker, D. D., & Jeffries, F. (1995). Predictive validity and time dependency of self-efficacy, self-esteem, personal goals, and academic performance. *Educational and Psychological Measurement, 55,* 716–727.

*Morrison, R. F., & Brantner, T. M. (1992). What enhances or inhibits learning a new job? A basic career issue. *Journal of Applied Psychology, 77,* 926–940.

*Morros, M., Pushkar, D., & Reis, M. (1998). A study of current, former, and new elderly volunteers: A comparison of developmental and trait models of personality. *Journal of Adult Development, 5,* 219–230.

Mount, M. K., & Barrick, M. R. (1995). The Big Five personality dimensions: Implications for research and practice in human resources management. *Research in Personnel and Human Resources Management, 13,* 153–200.

Mount, M. K., Barrick, M. R., & Stewart, G. L. (1998). Five-Factor Model of personality and performance in jobs involving interpersonal interactions. *Human Performance, 11,* 145–165.

*Mount, M. K., Barrick, M. R., & Strauss, J. P. (1999). The joint relationship of conscientiousness and ability with performance: Test of the interaction hypothesis. *Journal of Management, 25,* 707–721.

*Mumford, M. D., Baughman, W. A., Uhlman, C. E., & Costanza, D. P. (1993). Personality variables and skill acquisition: Performance while practicing a complex task. *Human Performance, 6,* 345–381.

*Nauta, M. M., Epperson, D. L., & Kahn, J. H. (1998). A multiple-groups analysis of predictors of higher level career aspirations among women in mathematics, science, and engineering majors. *Journal of Counseling Psychology, 45,* 483–496.

*Neuman, G. A., & Wright, J. (1999). Team effectiveness: Beyond skills and cognitive ability. *Journal of Applied Psychology, 84,* 376–389.

*Newman, E. J., & Tuckman, B. W. (1997). The effects of participant modeling on self-efficacy, incentive, productivity, and performance. *Journal of Research & Development in Education, 31,* 38–45.

*Newsome, S., Day, A. L., & Catano, V. M. (2000). Assessing the

predictive validity of emotional intelligence. *Personality and Individual Differences, 29,* 1005–1016.

*Nietfeld, J. L., & Schraw, G. (2002). The effect of knowledge and strategy training on monitoring accuracy. *Journal of Educational Research, 95,* 131–142.

*O'Neill, B. S., & Mone, M. A. (1998). Investigating equity sensitivity as a moderator of relations between self-efficacy and workplace attitudes. *Journal of Applied Psychology, 83,* 805–816.

Ones, D. S., Viswesvaran, C., & Reiss, A. D. (1996). Role of social desirability in personality testing for personnel selection: The red herring. *Journal of Applied Psychology, 81,* 660–679.

*Orpen, C. (1999). The impact of self-efficacy on the effectiveness of employee training. *Journal of Workplace Learning, 11,* 119–122.

*Ozer, E. M., & Bandura, A. (1990). Mechanisms governing empowerment effects: A self-efficacy analysis. *Journal of Personality and Social Psychology, 58,* 472–486.

*Pajares, F., & Miller, M. D. (1994). Role of self-efficacy and self-concept beliefs in mathematical problem solving: A path analysis. *Journal of Educational Psychology, 86,* 193–203.

Parker, S. K. (1998). Enhancing role breadth self-efficacy: The roles of job enrichment and other organizational interventions. *Journal of Applied Psychology, 83,* 835–852.

Parker, S. K. (2000). From passive to proactive motivation: The importance of flexible role orientations and role breadth self-efficacy. *Applied Psychology: An International Review, 49,* 447–469.

*Peake, P. K., & Cervone, D. (1989). Sequence anchoring and self-efficacy: Primacy effects in the consideration of possibilities. *Social Cognition, 7,* 31–50.

*Perlmutter, M., Kaplan, M., & Nyquist, L. (1990). Development of adaptive competence in adulthood. *Human Development, 33,* 185–197.

*Phillips, J. C., & Russell, R. K. (1994). Research self-efficacy, the research training environment, and research productivity among graduate students in counseling psychology. *The Counseling Psychologist, 22,* 628–641.

*Phillips, J. M., & Gully, S. M. (1997). Role of goal orientation, ability, need for achievement, and locus of control in the self-efficacy and goal-setting process. *Journal of Applied Psychology, 82,* 792–802.

*Pietsch, J., Walker, R., & Chapman, E. (2003). The relationship among self-concept, self-efficacy, and performance in mathematics during secondary school. *Journal of Educational Psychology, 95,* 589–603.

*Pond, S. B., & Hay, M. S. (1989). The impact of task preview information as a function of recipient self-efficacy. *Journal of Vocational Behavior, 35,* 17–29.

Porter, C. O. L. H., Hollenbeck, J. R., Ilgen, D. R., Ellis, A. P. J., West, B. J., & Moon, H. (2003). Backing up behaviors in teams: The role of personality and legitimacy of need. *Journal of Applied Psychology, 88,* 391–403.

*Potosky, D. (2002). A field study of computer efficacy beliefs as an outcome of training: The role of computer playfulness, computer knowledge, and performance during training. *Computers in Human Behavior, 18,* 241–256.

*Potosky, D., & Ramakrishna, H. V. (2002). The moderating role of updating climate perceptions in the relationship between goal orientation, self-efficacy, and job performance. *Human Performance, 15,* 275–297.

*Prussia, G. E., Anderson, J. S., & Manz, C. C. (1998). Self-leadership and performance outcomes: The mediating influence of self-efficacy. *Journal of Organizational Behavior, 19,* 523–538.

*Pulakos, E. D., Schmitt, N., Dorsey, D. W., Arad, S., Hedge, J. W., & Borman, W. C. (2002). Predicting adaptive performance: Further tests of a model of adaptability. *Human Performance, 15,* 299–324.

Quiñones, M. A., Ford, J. K., & Teachout, M. S. (1995). The relationship between work experience and job performance: A conceptual and meta-analytic review. *Personnel Psychology, 48,* 887–910.

*Randhawa, B. S., Beamer, J. E., & Lundberg, I. (1993). Role of mathematics self-efficacy in the structural model of mathematics achievement. *Journal of Educational Psychology, 85,* 41–48.

*Rao, N., Moely, B. E., & Sachs, J. (2000). Motivational beliefs, study strategies, and mathematics attainment in high- and low-achieving Chinese secondary school students. *Contemporary Educational Psychology, 25,* 287–316.

*Rath, R. (1961). Subjective factors in judging personality traits. *Journal of Social Psychology, 55,* 85–96.

*Rebok, G. W., & Balcerak, L. J. (1989). Memory self-efficacy and performance differences in young and old adults: The effect of mnemonic training. *Developmental Psychology, 25,* 714–721.

*Redmond, M. R., Mumford, M. D., & Teach, R. (1993). Putting creativity to work: Effects of leader behavior on subordinate creativity. *Organizational Behavior and Human Decision Processes, 55,* 120–151.

*Renn, R. W., & Fedor, D. B. (2001). Development and field test of a feedback seeking, self-efficacy, and goal setting model of work performance. *Journal of Management, 27,* 563–583.

*Roberts, M. J. (2002). The relationship between extraversion and ability. *Personality and Individual Differences, 32,* 517–522.

Rotundo, M., & Sackett, P. R. (2002). The relative importance of task, citizenship, and counterproductive performance to global ratings of job performance: A policy-capturing approach. *Journal of Applied Psychology, 87,* 66–80.

*Rovine, M. J., & Weisman, G. D. (1989). Sketch-map variables as predictors of way-finding performance. *Journal of Environmental Psychology, 9,* 217–232.

*Ryan, A. M., Ployhart, R. E., Greguras, G. J., & Schmit, M. J. (1998). Test preparation programs in selection contexts: Self-selection and program effectiveness. *Personnel Psychology, 51,* 599–621.

*Sadri, G. (1996). A study of agentic self-efficacy and agentic competence across Britain and the USA. *Journal of Management, 15,* 51–61.

*Saklofske, D. H., Michayluk, J. O., & Randhawa, B. S. (1988). Teachers' efficacy and teaching behaviors. *Psychological Reports, 63,* 407–414.

*Saks, A. M. (1995). Longitudinal field investigation of the moderating and mediating effects of self-efficacy on the relationship between training and newcomer adjustment. *Journal of Applied Psychology, 80,* 211–225.

Salgado, J. F. (2003). Predicting job performance using FFM and non-FFM personality measures. *Journal of Occupational and Organizational Psychology, 76,* 323–346.

*Sanna, L. J., & Pusecker, P. A. (1994). Self-efficacy, valence of self-evaluation, and performance. *Personality and Social Psychology Bulletin, 20,* 82–92.

Schaubroeck, J., Jones, J. R., & Xie, J. L. (2001). Individual differences in utilizing control to cope with job demands: Effects on susceptibility to infectious disease. *Journal of Applied Psychology, 86,* 265–278.

*Schmidt, A. M., & Ford, J. K. (2003). Learning within a learner control training environment: The interactive effects of goal orientation and metacognitive instruction on learning outcomes. *Personnel Psychology, 56,* 405–429.

Schmidt, F. L., & Hunter, J. E. (1998). The validity and utility of selection methods in personnel psychology: Practical and theoretical implications of 85 years of research findings. *Psychological Bulletin, 124,* 262–274.

Schmidt, F. L., Hunter, J. E., & Outerbridge, A. N. (1986). Impact of job experience and ability on job knowledge, work sample performance, and supervisory ratings of job performance. *Journal of Applied Psychology, 71,* 432–439.

*Schratchley, L. S., & Hakstian, A. R. (2000–2001). The measurement and prediction of managerial creativity. *Creativity Research Journal, 13,* 367–384.

*Schulte, M. J., Ree, M. J., & Carretta, T. R. (2004). Emotional intelligence: Not much more than g and personality. *Personality and Individual Differences, 37,* 1059–1068.

*Seijts, G. H., & Latham, G. P. (2001). The effect of distal learning, outcome, and proximal goals on a moderately complex task. *Journal of Organizational Behavior, 22,* 291–307.

*Sexton, T. L., Tuckman, B. W., & Crehan, K. (1992). An investigation of the patterns of self-efficacy, outcome expectation, outcome value, and performance across trials. *Cognitive Therapy and Research, 16,* 329–348.

*Shea, C. M., & Howell, J. M. (2000). Efficacy-performance spirals: An empirical test. *Journal of Management, 26,* 791–812.

*Shell, D. F., Murphy, C. C., & Bruning, R. H. (1989). Self-efficacy and outcome expectancy mechanisms in reading and writing achievement. *Journal of Educational Psychology, 81,* 91–100.

*Siegel, R. G., Galassi, J. P., & Ware, W. B. (1993). A comparison of two models for predicting mathematics performance: Social learning versus math aptitude anxiety. *Journal of Counseling Psychology, 32,* 531–538.

*Silver, W. S., Mitchell, T. R., & Gist, M. E. (1995). Responses to successful and unsuccessful performance: The moderating effect of self-efficacy on the relationship between performance and attributions. *Organizational Behavior and Human Decision Processes, 62,* 286–299.

*Simon, A., Fontana, D., & Williams, E. (1986). Performance on tests of study habits, neuroticism, extraversion, academic self-concept, intelligence and A level by polytechnic students classified as focusers and scanners on a concept matrix test. *Personality and Individual Differences, 7,* 229–231.

Smith, D. (2002). The theory heard 'round the world. *Monitor on Psychology, 33,* 30.

*Smith, R. J., Arnkoff, D. B., & Wright, T. L. (1990). Test anxiety and academic competence: A comparison of alternative models. *Journal of Counseling Psychology, 37,* 313–321.

*Solberg, V. S., Good, G. E., Fischer, A. R., & Brown, S. D. (1995). Career decision-making and career search activities: Relative effects of career search self-efficacy and human agency. *Journal of Counseling Psychology, 42,* 448–455.

*Spector, P. E., Schneider, J. R., Vance, C. A., & Hezlett, S. A. (2000). The relation of cognitive ability and personality traits to assessment center performance. *Journal of Applied Social Psychology, 30,* 1474–1491.

Stajkovic, A. D., & Luthans, F. (1998). Self-efficacy and work-related performance: A meta-analysis. *Psychological Bulletin, 124,* 240–261.

*Staples, D. S., Hulland, J. S., & Higgins, C. A. (1999). A self-efficacy theory explanation for the management of remote workers in virtual organizations. *Organization Science, 10,* 758–776.

*Staudinger, U. M., Maciel, A. G., Smith, J., & Baltes, P. B. (1998). What predicts wisdom-related performance? A first look at personality, intelligence, and facilitative experiential contexts. *European Journal of Personality, 12,* 1–17.

*Stevens, C. K., Bavetta, A. G., & Gist, M. E. (1993). Gender differences in the acquisition of salary negotiation skills: The role of goals, self-efficacy, and perceived control. *Journal of Applied Psychology, 78,* 723–735.

*Stevens, C. K., & Gist, M. E. (1997). Effects of self-efficacy and goal-orientation training on negotiation skill maintenance: What are the mechanisms? *Personnel Psychology, 50,* 955–978.

Stewart, G. L. (1999). Trait bandwidth and stages of job performance: Assessing differential effects for conscientiousness and its subtraits. *Journal of Applied Psychology, 84,* 959–968.

Stewart, G. L., Fulmer, I. S., & Barrick, M. R. (2005). An exploration of member roles as a multilevel linking mechanism for individual traits and team outcomes. *Personnel Psychology, 58,* 343–365.

*Stock, J., & Cervone, D. (1990). Proximal goal-setting and self-regulatory processes. *Cognitive Therapy and Research, 14,* 483–498.

*Stone, D. N. (1994). Overconfidence in initial self-efficacy judgments: Effects on decision processes and performance. *Organizational Behavior and Human Decision Processes, 59,* 452–474.

*Stumpf, S. A., Brief, A. P., & Hartman, K. (1987). Self-efficacy expectations and coping with career-related events. *Journal of Vocational Behavior, 31,* 91–108.

*Sue-Chan, C., & Ong, M. (2002). Goal assignment and performance: Assessing the mediating roles of goal commitment and self-efficacy and the moderating role of power distance. *Organizational Behavior and Human Decision Processes, 89,* 1140–1161.

*Sujan, H., Weitz, B. A., & Kumar, N. (1994). Learning orientation, working smart, and effective selling. *Journal of Marketing, 58,* 39–52.

*Tabernero, C., & Wood, R. E. (1999). Implicit theories versus the social construal of ability in self-regulation and performance on a complex task. *Organizational Behavior and Human Decision Processes, 78,* 104–127.

*Taggar, S., Hackett, R., & Saha, S. (1999). Leadership emergence in autonomous work teams: Antecedents and outcomes. *Personnel Psychology, 52,* 899–926.

*Taylor, M. S., Locke, E. A., Lee, C., & Gist, M. E. (1984). Type A behavior and faculty research productivity: What are the mechanisms? *Organizational Behavior and Human Performance, 34,* 402–418.

*Tenebaum, G., Hall, H. K., Calcagnini, N., Lange, R., Freeman, G., & Lloyd, M. (2001). Coping with physical exertion and negative feedback under competitive and self-standard conditions. *Journal of Applied Social Psychology, 31,* 1582–1626.

*Theodorakis, Y. (1995). Effects of self-efficacy, satisfaction, and personal goals on swimming performance. *Sport Psychologist, 9,* 245–253.

*Thomas, K. M., & Mathieu, J. E. (1994). Role of causal attributions in dynamic self-regulation and goal processes. *Journal of Applied Psychology, 79,* 812–818.

*Thomas, P., Moore, K. S., & Scott, K. S. (1996). The relationship between self-efficacy for participating in self-managed work groups and the big five personality dimensions. *Journal of Organizational Behavior, 17,* 349–362.

*Thompson, R. F., & Perlini, A. H. (1998). Feedback and self-efficacy, arousal, and performance of introverts and extraverts. *Psychological Reports, 82,* 707–716.

*Trank, C. Q., Rynes, S. L., & Bretz, R. D., Jr. (2002). Attracting applicants in the war for talent: Differences in work preferences among high achievers. *Journal of Business and Psychology, 16,* 331–345.

*Tsang, E. W. K. (2001). Adjustment of mainland Chinese academics and students to Singapore. *International Journal of Intercultural Relations, 25,* 347–372.

*Tuckman, B. W. (1990). Group versus goal-setting effects on the self-regulated performance of students differing in self-efficacy. *Journal of Experimental Education, 58,* 291–298.

*Tuckman, B. W., & Sexton, T. L. (1992). The effects of informational feedback and self-beliefs on the motivation to perform a self-regulated task. *Journal of Research in Personality, 26,* 121–127.

*Utsch, A., & Rauch, A. (2000). Innovativeness and initiative as mediators between achievement orientation and venture performance. *European Journal of Work and Organizational Psychology, 9,* 45–62.

Vancouver, J. B., Thompson, C. M., Tischner, E. C., & Putka, D. J. (2002). Two studies examining the negative effect of self-efficacy on performance. *Journal of Applied Psychology, 87,* 506–516.

*Vancouver, J. B., Thompson, C. M., & Williams, A. A. (2001). The changing signs in the relationships among self-efficacy, personal goals, and performance. *Journal of Applied Psychology, 86,* 605–620.

*van den Berg, P. T., & Feij, J. A. (2003). Complex relationships among personality traits, job characteristics, and work behaviors. *International Journal of Selection and Assessment, 11,* 326–339.

*VandeWalle, D., Cron, W. L., & Slocum, J. W., Jr. (2001). The role of goal orientation following performance feedback. *Journal of Applied Psychology, 86,* 629–640.

*van Ryn, M., & Vinokur, A. D. (1992). How did it work? An examination of the mechanisms through which an intervention for the unemployed

promoted job-search behavior. *American Journal of Community Psychology, 20,* 577–597.

*Vasil, L. (1992). Self-efficacy expectations and causal attributions for achievement among male and female university faculty. *Journal of Vocational Behavior, 41,* 259–269.

Viswesvaran, C., & Ones, D. S. (1995). Theory testing: Combining psychometric meta-analysis and structural equations modeling. *Personnel Psychology, 48,* 865–885.

*Vrugt, A. J., Langereis, M. P., & Hoogstraten, J. (1997). Academic self-efficacy and malleability of relevant capabilities as predictors of exam performance. *Journal of Experimental Education, 66,* 61–72.

*Waldersee, R. (1994). Self-efficacy and performance as a function of feedback sign and anxiety: A service experiment. *Journal of Applied Behavioral Science, 30,* 346–356.

*Wang, A. Y., & Newlin, M. H. (2002). Predictors of web-student performance: The role of self-efficacy and reasons for taking an on-line class. *Computers in Human Behavior, 18,* 151–163.

*Wang, G., & Netemeyer, R. G. (2002). The effects of job autonomy, customer demandingness, and trait competitiveness on salesperson learning, self-efficacy, and performance. *Journal of the Academy of Marketing Science, 30,* 217–228.

*Warwick, J., & Nettelbeck, T. (2004). Emotional intelligence is . . .? *Personality and Individual Differences, 37,* 1091–1100.

*Waters, L. (2004). Protégé–mentor agreement about the provision of psychosocial support: The mentoring relationship, personality, and workload. *Journal of Vocational Behavior, 65,* 519–532.

*Weekley, J. A., & Jones, C. (1999). Further studies of situational tests. *Personnel Psychology, 52,* 679–700.

Weekley, J. A., & Ployhart, R. E. (2005). Situational judgment: Antecedents and relationships with performance. *Human Performance, 18,* 81–104.

*Wickett, J. C., & Vernon, P. A. (2000). Replicating the movement time-extraversion link . . . with a little help from IQ. *Personality and Individual Differences, 28,* 205–215.

Wiggins, J. S. (1973). *Personality and prediction: Principles of personality assessment.* Menlo Park, CA: Addison Wesley.

*Williams, J. E. (1994). Gender differences in high school students' efficacy-expectation/performance discrepancies across four subject matter domains. *Psychology in the Schools, 31,* 232–237.

*Windholz, G. (1968). The relation of creativity and intelligence constellations to traits of temperament, interest, and value in college students. *Journal of General Psychology, 79,* 291–299.

*Witherspoon, K. M., Speight, S. L., & Thomas, A. J. (1997). Racial identity attitudes, school achievement, and academic self-efficacy among African American high school students. *Journal of Black Psychology, 23,* 344–357.

*Wolfe, S. L., Nordstrom, C. R., & Williams, K. B. (1998). The effect of enhancing self-efficacy prior to job training. *Journal of Social Behavior & Personality, 13,* 633–650.

*Wood, R., & Bandura, A. (1989). Impact of conceptions of ability on self-regulatory mechanisms and complex decision making. *Journal of Personality and Social Psychology, 56,* 407–415.

*Wood, R., Bandura, A., & Bailey, T. (1990). Mechanisms governing organizational performance in complex decision-making environments. *Organizational Behavior and Human Decision Processes, 46,* 181–201.

Wood, R. E. (1986). Task complexity: Definition of the construct. *Organizational Behavior and Human Decision Processes, 37,* 60–82.

*Wood, R. E., Atkins, P. W. B., & Bright, J. E. H. (1999). Bonuses, goals, and instrumentality effects. *Journal of Applied Psychology, 84,* 703–720.

*Wood, R. E., & Locke, E. A. (1987). The relation of self-efficacy and grade goals to academic performance. *Educational and Psychological Measurement, 47,* 1013–1024.

Wood, R. E., Mento, A. J., & Locke, E. A. (1987). Task complexity as a moderator of goal effects: A meta-analysis. *Journal of Applied Psychology, 72,* 416–425.

*Wright, P. M., & Kacmar, K. M. (1995). Mediating roles of self-set goals, goal commitment, self-efficacy, and attractiveness in the incentive performance relation. *Human Performance, 8,* 263–296.

*Yi, M. Y., & Davis, F. D. (2003). Developing and validating an observational learning model of computer software training and skill acquisition. *Information Systems Research, 14,* 146–169.

*Zimmerman, B. J., Bandura, A., & Martinez-Pons, M. (1992). Self-motivation for academic attainment: The role of self-efficacy beliefs and personal goal setting. *American Educational Research Journal, 29,* 663–676.

Zimmerman, B. J., & Schunk, D. H. (2003). Albert Bandura: The man and his contributions to educational psychology. In B. J. Zimmerman & D. H. Schunk (Eds.), *Educational psychology: One-hundred years of contributions* (pp. 431–457). Mahwah, NJ: Erlbaum.

Received March 21, 2005
Revision received January 19, 2006
Accepted January 26, 2006 ■