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HOW BROADLY DOES EDUCATION CONTRIBUTE TO JOB PERFORMANCE?

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This study looks at the effects of education level on job performance in 2 ways. First, it provides a meta-analysis on the relationships between education level and 9 dimensions of job behaviors representing task, citizenship, and counterproductive performance. Results here show that, in addition to positively influencing core task performance, education level is also positively related to creativity and citizenship behaviors and negatively related to on-the-job substance use and absenteeism. Second, we investigate the moderating effects of sample and research design characteristics on the relationships between education and job performance. Significant results were found for gender, race, job level, and job complexity. The article concludes with implications for future research and the management of an increasingly educated workforce.

According to U. S. National Center for Education Statistics, the proportion of Americans attaining more education continues to increase. For example, the percentage of individuals completing high school increased from 69% in 1980 to 86% in 2006; the percentage of individuals (aged 25 and older) who have completed college increased from 17% in 1980 to 28% in 2006. In both the labor economics and organizational sciences literatures, there is substantial evidence that individuals' educational attainments are associated with positive career outcomes, including salary level, number of promotions, development opportunities, and job mobility (Cappelli, 2000; Howard, 1986; Lazear, 1981; Ng, Eby, Sorensen, & Feldman, 2005).

Because most organizations use education as an indicator of a person's skill levels or productivity (Benson, Finegold, & Mohrman, 2004), they frequently employ it as a prerequisite in hiring decisions. However, over the past 2 decades, there has been very little research directly examining the relationship between educational level and job performance. This is particularly surprising given that it was during this time period

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when educational opportunities increased substantially (Trusty & Niles, 2004), when many organizations raised their educational qualifications for jobs (Kroch & Sjoblom, 1994), and when the conceptualization of job performance expanded considerably to include more extrarole behaviors (Welbourne, Johnson, & Erez, 1998). In this study, we provide a quantitative analysis of the relationship between education level and a wide range of inrole and extrarole performance dimensions.

For organizations, this study has relevance for at least three reasons. First, if highly educated workers contribute only marginally more to organizational effectiveness than less educated workers do, then the higher costs of staffing with highly educated workers are unlikely to be recouped. For example, many organizations subsidize current employees to acquire bachelor's or advanced degrees (Benson et al., 2004) but do not rigorously assess the short-term returns (e.g., improved performance) or long-term returns (e.g., heightened occupational commitment) on those investments.

Second, past research in this area has focused primarily on the effects of educational level on core task performance (Karatepe, Uludag, Menevis, Hadzimehmeddagic, & Baddar, 2006; Kaufman, 1978; Maglen, 1990). However, as noted above, there are numerous other job-related behaviors that legitimately fall under the umbrella of job performance, too (Borman & Motowidlo, 1997; Hunt, 1996; Rotundo & Sackett, 2002). Thus, it is important to examine the impact of educational level on multiple dimensions of performance.

Third, the extent to which education affects productivity can affect corporate support for governmental subsidies for education. Individuals' educational attainments are not only part of a company's human capital but also a part of a community's core assets (Lepak & Snell, 1999). In many localities, generous subsidies for education are largely based on the assumption that governmental investments in human capital will strengthen the economy as a whole by enhancing employees' productivity (Lanzi, 2007; Trusty & Niles, 2004). When education does not build human capital proportionate to expenditures, though, organizations may oppose tax increases for education, move to localities with better educational systems, or develop their own internal education programs to supplant publicly financed ones (Vinod & Kaushik, 2007).

In the next section of the article, we first discuss the constructs of "education level" and "job performance." Then, we discuss the theoretical reasons for expecting specific relationships between education level and various job performance dimensions and for expecting moderator effects in those relationships. In the following section, we present the results of a meta-analysis examining these relationships. Finally, in the concluding section, we discuss the implications of our findings for future research and the management of an increasingly educated workforce.

Definitions of Key Constructs

Education Level

Education level refers to the academic credentials or degrees an individual has obtained. Although education level is a continuous variable, it is frequently measured categorically in research studies. Here, we use the term "educated employees" to refer to those individuals who hold at least bachelor's degrees because these degrees are necessary for entry into many higher-paying occupations (Howard, 1986; Trusty & Niles, 2004).

For practical reasons, we are not investigating differences among school majors. Because few organizational studies have considered differences in majors, we are constrained in that regard in the current meta-analysis. In any event, individuals with specialized skills (such as accounting) will gravitate to specific kinds of firms (such as major accounting firms). As a result, it is difficult to assess differences between accountants and nonaccountants in the same firm in any meaningful way. For much the same reasons, we are not examining the effects of obtaining vocational education here. There is little previous research, for example, on the impact of vocational education on citizenship behaviors. Moreover, it is difficult to compare college graduates to those who received vocational training because they do not have similar access to, or similar rates of participation in, each other's labor markets.

Job Performance

The conceptualization of job performance has been expanded in recent years to include *core task behaviors*, *citizenship behaviors*, and *counterproductive behaviors*. Core task performance refers to the basic required duties of a particular job. Citizenship performance refers to those extra behaviors engaged in by employees, over and above their core task requirements, which actively promote and strengthen the organization's effectiveness (e.g., helping coworkers; Hunt, 1996; Organ, 1988). Counterproductive performance refers to voluntary behaviors that harm the well-being of the organization (e.g., theft; Bennett & Robinson, 2000).

Rotundo and Sackett (2002) compared the relative importance of these three groups of performance behaviors in managerial ratings of subordinates' overall job performance. They found that each of these three categories of performance behaviors contributed to overall performance rating, with core task performance given the highest weight, followed by counterproductive performance and citizenship performance. Consistent with these findings, then, this study also focuses on three categories of performance behaviors, too.

Education and Job Performance

Human Capital Theory

Human capital theory suggests that the abilities and knowledge acquired by individuals are likely to be rewarded with higher earnings in the labor market (Becker, 1964). Education and work experience are the two forms of human capital individuals are most likely to acquire during their careers (Myers, Griffeth, Daugherty, & Lusch, 2004; Singer & Bruhns, 1991; Strober, 1990). It should be noted, though, that in numerous cases educational level and amount of work experience are likely to be negatively correlated. Those who spend more years in school will have less time available in which to accumulate work experience, whereas those who enter the labor market early typically accumulate less formal education.

There has been mounting research evidence indicating the career benefits of human capital investments. For instance, in one of the earliest studies of the effect of education on salary, Mincer (1974) found that an additional year of schooling yielded a net increase of 11.5% in annual earnings. A meta-analysis conducted by Quiñones, Ford, and Teachout (1995) showed that work experience was positively related to job performance at .27. Further, the positive effects of human capital investments (e.g., in schooling) in early career on subsequent earnings are large (Sweetland, 1996). Thus, human capital theory is particularly useful for explaining income dispersion across social and occupational groups, for identifying the rate of return on educational expenditures, and for explaining national differences in economic growth (Becker, 1964; Denison, 1962; Sweetland, 1996).

Previous research suggests that human capital can affect earning potential in two ways. First, human capital is a short-hand signal to organizations of individuals' abilities and accumulated knowledge and, therefore, grants individuals with more human capital greater access to higher paying professional jobs (Sicherman & Galor, 1990; Strober, 1990). Second, human capital is often a short-hand signal to organizations about personal attributes frequently desired by organizations, such as diligence and self-motivation (Ceci, 1991; Swenson-Lepper, 2005). Organizations are often willing to pay higher wages to individuals possessing these attributes, too.

Ability and Knowledge

Ability has generally been discussed in terms of an individual's power, strength, or capacity to perform a task (Hunter, 1986; Ree, Earles, & Teachout, 1994). General mental ability has been the focus of much of this research, and the results suggest that individuals with higher levels of education have both greater fluid and crystallized intelligence (Ceci, 1991; Neisser et al., 1996). Fluid intelligence refers to the capacity of working memory, abstract reasoning, attention, and processing complex information, whereas crystallized intelligence refers to general knowledge, extent of vocabulary, and verbal comprehension related to vocational and a-vocational topics and areas. Fluid intelligence tends to decay more quickly as individuals age (Kanfer & Ackerman, 2004).

By and large, intelligence and education level are positively and significantly correlated. Individuals who have high fluid intelligence are more likely to get into college and stay in school, whereas those with less fluid intelligence are more likely to be weeded out along the way (Kaufman, 1990; Trusty & Niles, 2004). At the same time, education stimulates the development of students' minds and promotes the growth of crystallized intelligence. For example, researchers have found that those who attended college scored higher on IQ tests than did those who did not attend colleges (Howard, 1986; Kuncel, Hezlett, & Ones, 2004). Individuals with more education are also likely to have greater indepth, analytical knowledge (crystallized intelligence) as well (Ceci, 1991).

Knowledge typically refers to the understanding of information related to job duties (McCloy, Campbell, & Cudeck, 1994). Researchers usually differentiate between two forms of knowledge, namely, declarative and procedural knowledge (Campbell, 1990). Declarative knowledge refers to expertise regarding facts, rules, and principles, whereas procedural knowledge refers to the application of declarative knowledge in practice (Ree, Earles, & Teachout, 1994).

Education also promotes core task performance by providing individuals with more declarative and procedural knowledge with which they can complete their tasks successfully. For example, more education in accounting helps students acquire the expertise needed to become CPAs and advance in the accounting profession. The underlying premise is that, by equipping students with greater declarative and procedural knowledge, schools help students develop deeper competence in their chosen vocations and help them move up organizational and occupational career ladders more quickly.

Taking these findings together, then, we expect that education will be positively related to *core task performance*. In two major studies, Hunter and his colleagues (Hunter & Hunter, 1984; Schmidt & Hunter, 1998) found that cognitive ability was strongly related to job performance (.51) and was an important contributor to success on virtually every job. Further, Hunter (1986) suggests that cognitive ability facilitates the learning of job-relevant knowledge and thereby indirectly promotes stronger job performance as well.

Hypothesis 1: Education level is positively related to core task performance.

Work Values

Values are intrinsic, enduring perspectives on what is fundamentally right or wrong (Judge & Bretz, 1992; Ravlin & Meglino, 1987; 1989). In high school and college, rarely is the focus of education only on enhancing cognitive ability and job knowledge. Instead, through classroom instruction and extracurricular activities, students are trained to follow rules, respect discipline and tradition, maintain high moral standards, and exercise mature judgment after graduation (Bear, Manning, & Izard, 2003; Ford, Olmi, Edwards, & Tingstorm, 2001; Rest, 1986; Swenson-Lepper, 2005). Furthermore, education also promotes self-confidence, self-motivation, carefulness, and the desire and ability to set personal goals for the future (Di Vesta & Thompson, 1970; Howard, 1986; UNDP, 1995).

Thus, another reason why education is likely to increase individuals' earning potential is that it imparts work values frequently necessary for job success. Although ability and knowledge are likely to contribute most directly to core task performance, work values such as responsibility, concern for others, social relationships, and honesty are likely to promote stronger *citizenship performance*. For instance, Johnson and Elder (2002) found in a longitudinal study that, compared with high school graduates, those who have college degrees tend to attach greater importance to altruistic rewards (e.g., helping others) and social rewards (e.g., developing good relationships with others). Rose (2005) and Lindsay and William (1984) found similar results in cross-sectional studies.

Furthermore, researchers have found that years of education were positively related to Conscientiousness, even when controlling for other sociodemographic variables (Dudley, Orvis, Lebiecki, & Cortina, 2006; Goldberg, Sweeney, Merenda, & Hughes, 1998). In addition, Brenner (1982) compared individuals with different levels of education—8 years or less, 9–11 years, 12 years, 1–3 years of college, 4 years of college, some graduate work, master degree, and PhD —in terms of their achievement motivation. This study suggests that, as level of education increased, achievement orientation increased as well.

Conversely, values acquired through education (such as responsibility and moral integrity) should be negatively related to *counterproductive performance*. For example, college-educated individuals tend to display a greater adherence to rules regarding attendance and protection of organizational property (Konovsky & Organ, 1996). Workers with more years of education are also less likely to impose danger on coworkers or customers by ignoring safety instructions (Oh & Shin, 2003; Taylor & Thompson, 1976). Thus, many organizations use educational attainment as a selection criterion not only because education level reflects higher levels of values associated with good citizenship behaviors but also because education level reflects lower levels of values associated with counterproductive behaviors (Berry, Gruy, & Sackett, 2006).

Hypothesis 2: Education level is positively related to citizenship performance.

Hypothesis 3: Education level is negatively related to counterproductive performance.

Moderating Effects of Work Experience

In this study, we adopted job and organizational tenure as measures of work experience because they are the most frequently used time-based operationalizations of this construct (Quiñones et al., 1995). By virtue of participating longer in the labor market, individuals develop greater knowledge about how to perform their jobs more effectively and more quickly (Tesluk & Jacobs, 1998). Consequently, individuals with greater work experience are likely to be compensated more generously by their employers and be given even more developmental opportunities in the future (Ng et al., 2005).

We suggest that work experience may strengthen the relationship between educational level and job performance. Work experience is likely to provide tacit, practical knowledge less frequently provided by formal education. When coupled with the indepth, analytical knowledge provided by formal education, work experience may enhance job performance even further. In addition, the knowledge and skills necessary for effective job performance are likely to be strengthened and sharpened over years of service and learning by trial and error (Schmidt, Hunter, & Outerbridge, 1986). Therefore, we predict that:

Hypothesis 4: The relationships between educational level and the dimensions of job performance are moderated by both job tenure (Hypothesis 4a) and organizational tenure (Hypothesis 4b). The relationships will be stronger for individuals with higher job and organizational tenure.

Moderating Effects of Job Level and Job Complexity

Managerial jobs differ from other employees' jobs in that they are usually less structured and more ambiguous in nature (Staw & Barsade, 1993). In these "weak" situations, managers' abilities, knowledge, and work values become even stronger determinants of job performance (Pavett &

Lau, 1983). Thus, although education facilitates performance in most jobs (Hunter, 1986; Kuncel et al., 2004), its effects are likely to be more pronounced in the case of managers. For example, it is particularly critical for managers to be persistent in their efforts and to seek out more responsibility (Rose, 2005). Greater cognitive ability may be especially important on abstract managerial tasks like developing market strategy, whereas greater emotional intelligence may be especially important in managerial tasks like leading change. Although counterproductive behavior, by definition, hurts organizational effectiveness, its effects are far more widespread when initiated by managers. Consequently, we predict that the relationship between educational level and job performance will be stronger for managerial jobs than for nonmanagerial jobs.

Hypothesis 5a: The relationships between educational level and the dimensions of job performance are moderated by job level. The relationships will be stronger for managerial jobs than for nonmanagerial jobs.

Based on similar reasoning, we expect that the relationships between education and job performance will be stronger for individuals in high-complexity jobs. Avolio and Waldman (1990) define job complexity as the level of general intelligence, verbal ability, and numerical ability required to perform a job. Jobs of high complexity (e.g., doctors, engineers, lawyers, scientists) not only demand greater intellectual capacity and job knowledge, but also require incumbents to have strong motivation and persistence in order to excel (Klehe & Anderson, 2007). In contrast, jobs of low complexity (e.g., file clerks) are unlikely to put the same demands on individuals' abilities, knowledge, and effort levels. As a result, the positive outcomes of education (e.g., greater cognitive ability, greater job knowledge, and greater achievement motivation) are likely to accelerate performance on jobs with high complexity even further.

Hypothesis 5b: The relationships between educational level and the dimensions of job performance are moderated by job complexity. The relationships will be stronger for high complexity jobs than for low-complexity jobs.

Moderating Effects of Gender and Race

Scholars often argue that the workplace experiences of women and racial minorities differ markedly from those of white males and that these differences result in poorer workplace outcomes for them (Lyness & Thompson, 1997, 2000; Stroh, Brett, & Reilly, 1992). There is some evidence that women and minorities may have more difficulty entering higher-paying occupations, suffer some unequal treatment after being hired, and may be less likely to get promoted or promoted quickly (Lyness & Thompson, 1997; Powell, Butterfield, & Parent, 2002; Ragins, 1997). As a result, the career payoffs of educational investments may be weaker for women and racial minorities than for other employees.

For example, women may receive less sponsorship from their mentors and consequently have less access to high-paying positions that allow them to demonstrate their abilities and knowledge acquired in school (Baron, Davis-Blake, & Bielby, 1986; Lancaster & Drasgow, 1994). Women's more pronounced struggles with work–family balance (Hochschild, 1997) may also dampen the positive effects of education on career advancement. Along similar lines, members of racial minorities may be victims of racial stereotypes that leave them with fewer opportunities for training and development and poorer appraisal ratings (Ragins, 1997; Sidanius & Pratto, 1999; Williams & O'Reilly, 1998). Therefore, we predict that:

Hypothesis 6: The relationships between educational level and the dimensions of job performance are moderated by both gender (Hypothesis 6a) and race (Hypothesis 6b). The relationships will be stronger for men than for women and stronger for Caucasians than for non-Caucasians.

Method

Literature Search

We performed a comprehensive search for those field studies published in or before 2007 that examined the relationship between education level and job performance (core task performance, citizenship performance, and counterproductive performance). We also searched for unpublished studies and dissertations (Rosenthal, 1979) and utilized numerous research databases, including *Dissertation Abstracts International*, *EBSCOHost*, *Emerald*, *Factiva*, *JSTOR*, *Oxford Journals*, *Proquest*, *PsycINFO*, *ScienceDirect*, *Sage Full-Text Collections*, and several *Wiley InterScience* databases. In addition, the reference lists of recent meta-analyses that focused on core task performance, citizenship performance, or counterproductive performance were examined to locate other relevant articles (e.g., Berry, Ones, & Sackett, 2007; Hoffman, Blair, & Meriac, 2007; Judge, Thoresen, Bono, & Patton, 2001; LePine, Erez, & Johnson, 2002).

Our search yielded a total of 293 empirical studies, which contained 332 independent samples. Fourteen were unpublished dissertations and studies. The list of studies is provided in the Appendix. Two researchers (the first author and a research assistant) were responsible for coding the meta-analysis, including measures used in individual studies, effect sizes, reliability information, sample characteristics, and job complexity. Interrater agreement was 93%.

Measures of Key Constructs

Education level. All studies we identified measured self-reported education level in one of the following three ways: as a binary variable (e.g., bachelor degree vs. no bachelor degree), as an ordinal variable (e.g., 1 = *grade school,* 2 = *some high school* ... 7 = *graduate work*), or as a continuous variable (e.g., years of schooling).

Performance dimensions. Nine specific groups of behaviors representing the three performance dimensions discussed above were identified in this search. They include *core task performance*, *performance in training programs*, *citizenship behavior*, *creativity*, *counterproductive work behaviors*, *workplace aggression*, *substance use*, *tardiness*, and *absenteeism*.

Core task performance. Most previous studies examining educational level and job performance have focused on task performance. Four sources of task performance ratings were included in the current meta-analysis: ratings by supervisors, ratings by others (peers, subordinates, and customers), self-ratings, and objective measures.

Performance in training programs. Performance in training programs can be viewed as an additional indicator of core task performance because the purpose of most organizational training programs is to enhance the skill levels of employees on core tasks (Tracey, Tannenbaum, & Michael 1995). Here, we focused on studies that involved training of adults on tasks that have at least some relevance in organizational contexts. Furthermore, only studies that had an explicit training intervention and had measured post-training performance, competence, or learning were included. Studies that assessed employees' participation in computer usage training programs are representative of the kinds of research articles included in this regard.

Organizational citizenship behaviors (OCB). We included two types of OCB in the meta-analysis. The first set of studies examined general OCB and did not differentiate among beneficiaries of those citizenship behaviors. The second set of studies examined OCB targeted at three specific beneficiaries: other people on the job, the employer organization as a whole, and the tasks themselves. Within each of these three subtypes, we differentiated self-ratings, ratings by supervisors, and ratings by peers or others. These behaviors are equivalent to the citizenship performance dimension in Rotundo and Sackett's (2002) framework and have been identified by previous researchers as reasonable groupings of behaviors in this domain (LePine et al., 2002).

Creativity. Creativity is also considered as an indicator of citizenship performance here (Welbourne et al., 1998). In fact, in many organizations, creativity is used as a separate criterion in performance appraisals because employee creativity contributes to organizations' ability to adapt to rapidly changing business environments (De Jonge & De Ruyter, 2004; Johnson, 2001). It should be noted that we did not differentiate between creativity and innovation (Anderson, De Dreu, & Nijstad, 2004); both types of measures are included in our study. In previous studies, creativity has been measured either via self-ratings or ratings by others; we used these two categories in our meta-analysis as well (Janssen, 2001).

General counterproductive work behaviors. This category of behaviors is equivalent to the counterproductive performance dimension of Rotundo and Sackett's (2002) framework. Most studies have measured general counterproductive work behaviors without differentiating targets, that is, without specifying the target of the counterproductive behavior. A sample item here would be: "I get some pleasure out of causing a little confusion at work once in a while" (Gottfredson & Holland, 1990).

A few studies have differentiated between counterproductive work behaviors directed at specific others and those directed at the organization as a whole (e.g., Liao, Joshi, & Chuang, 2004). Because of the small number of studies making this distinction, we did not differentiate between these two categories of studies here. In those few studies that reported both interpersonal and organizational counterproductive work behaviors, we averaged the correlations to obtain an estimate of general counterproductive work behavior. Here, too, we differentiated self-ratings of counterproductive work behavior from ratings by others.

Workplace aggression. In addition to general counterproductive work behaviors, we also examined four *specific* forms of counterproductive work behavior that have been discussed separately and extensively in the organizational literature. The first of these is workplace aggression, which consists of employees' efforts to harm coworkers and the reputations of their current employers (Lapierre, Spector, & Leck, 2005). Measures of workplace aggression typically ask respondents to indicate the frequency of occurrence of aggressive behaviors, such as swearing at others, damaging others' property, and fighting (Glomb & Liao, 2003). All the studies we located utilized self-reported measures.

On-the-job substance use. On-the-job substance use involves drinking alcohol or taking illegal drugs at work or during work time (Lehman & Simpson, 1992). Measures of on-the-job substance use typically ask respondents to indicate the frequency of on-the-job use of alcohol or drugs (Frone, 2003). Here, too, all the studies identified utilized self-ratings.

Tardiness. Tardiness is lateness for work (Blau, 1994; Koslowsky, Sagie, Krausz, & Singer, 1997). It is typically measured in two ways.

In the first, employees are asked self-report questions like: “How often are you late from work? (never to constantly)” (Hanisch & Hulin, 1990). In the second, archival measures of lateness are obtained directly from personnel records (Conte & Jacobs, 2003). We included both types of measures in this meta-analysis.

Absenteeism. Skipping work has also been conceptualized as a form of employee counterproductive behavior (Bennett & Robinson, 2000; Harrison & Martocchio, 1998; Martocchio, 1989). Absenteeism has been measured in three different ways in previous research (Johns & Xie, 1998; Xie & Johns, 2000). The first group of studies measure *general* absenteeism; these studies do not differentiate between when employees are absent due to sickness or for purely discretionary reasons. Other studies in this line of research measure either the number of days absent from work in a given period (absence duration) or the frequency of absence spells in a given period (absence frequency). Because these indices are all closely related (Conte & Jacobs, 2003), they are aggregated together in the present meta-analysis.

A second research stream includes studies that measure *sickness* absenteeism. As an example, De Jonge, Ruevers, Houtman, & Kompier, (2000) computed sickness absence as the number of separate spells of sickness absence during one full calendar year.

The third, and last, group of absence studies consists of those that measure *nonsickness-related* absenteeism (Deery, Erwin, & Iverson, 1999). For instance, Vigoda (2001) asked respondents to report their estimates of days missed work for reasons other than sickness. In contrast to sickness-related absence, researchers have generally viewed nonsickness-related absence as an indicator of voluntary withdrawal behavior (Dalton & Todor, 1993).

Meta-Analytical Procedures

Raju, Burke, Normand, and Langlois’s (1991) meta-analysis technique, which includes corrections for range restriction, measurement error variance, and sampling error variance, was used. The Raju et al. procedures are optimally designed for the purpose of estimating appropriately defined standard errors for corrected correlations when sample-based and assumed (fixed) artifact values (e.g., sample-based reliability estimates) are incorporated into the corrections. More details and updated discussions of Raju et al.’s (1991) meta-analysis technique, particularly on the estimation of the standard errors for individually corrected correlations with sample-based and assumed (fixed) article values, can be found in Raju and Brand (2003) and Raju, Lezotte, and Fearing (2006). Burke and Landis (2003) provide equations to estimate the standard error of the mean corrected correlation for both fixed and random effects models. In the present analysis, the standard errors (the square root of the quantity in Burke and Landis's equation 10) and confidence intervals around the mean corrected effect were estimated for the random effects model. A mean corrected correlation was judged to be significant at $\alpha = .05$ when its 95% confidence interval did not include the value of zero. We note that corrections, as discussed in more detail below, were made for direct range restriction, criterion unreliability, and sampling error in order to estimate construct (as opposed to operational true validity) relationships between educational level and the various performance dimensions.

Correction for range restriction. We first corrected the observed correlations for range restriction in educational level. In many cases, organizations have a prespecified education criterion in hiring decisions (e.g., require a college degree to be hired as an accountant); this would directly result in range restriction. In other cases, organizations may hire employees based on the results of an aptitude test administered in the selection process, and those who score highly on these aptitude tests are frequently those who have more formal education. Such a scenario would indirectly result in range restriction. And, although range restriction often occurs in high-level jobs (like medicine), it can also occur in lower-level jobs as well. For example, fast food chains rarely hire college-educated workers into entry-level positions because new hires can be easily trained to do those jobs well. In any event, range restriction in educational level is likely to lower the observed correlation of educational level with other variables, including job performance (Hunter, Schmidt, & Le, 2006; Linn, Harnisch, & Dunbar, 1981).

In order to correct for range restriction in educational level, we needed to determine the standard deviation (*SD*) of education level, not only in the employee samples in the meta-analysis but in the broader population as well (Raju et al., 1991). Across the 85 studies that reported *SD* of years of education associated with samples, the average *SD* was 2.3 years. When we differentiated the average estimate of *SD* by job complexity, we found that samples working in low-complexity jobs had an average *SD* of 2.0 years, samples working in high-complexity jobs had an average *SD* of 2.4 years, and heterogeneous samples in terms of job complexity had an average *SD* of 2.3 years. Avolio and Waldman (1994) found similar estimates of *SD* (1.8 years) in a large, heterogeneous sample of 25,000 American employees. Therefore, it is reasonable to estimate that, in our pooled employee samples, the average *SD* of years of education is about 2 years.

It was much harder to gather information about the *SD* of education level in the population as a whole because applicants who do not have the "right" educational qualifications are often screened out early in the selection process (Sackett & Ostgaard, 1994). Therefore, we used U.S. government statistics to make our estimate (Hoffman, 1995). Specifically, the U. S. National Educational Center reported the highest educational attainments achieved by people aged 25 or above in the United States. The average *SD* of years of education reported in 2007 was 2.94 years. This average *SD* was quite consistent over time (3.01 years in 2006, 3.02 years in 2005, etc.). Therefore, it is reasonable to estimate that, in the unrestricted population, the average *SD* of years of education is approximately 3 years.

Thus, the estimated ratio of the *SD* of the years of education in the restricted population to the *SD* of the years of education in the unrestricted employee samples is 2:3. We applied this ratio (u) to the correction formula proposed by Raju et al. (1991).

Correction for measurement error variance. The observed correlation between educational level and job performance required disattenuation so that the interpretation of effect sizes would not be confounded by measurement error variance. Even though some researchers have used *interrater reliability* to correct for imperfect measurement when task performance is rated by others (Judge et al., 2001; Schmidt & Hunter, 1996; Viswesvaran, Ones, & Schmidt, 1996), other researchers have argued that measures of *intrarater reliability* (that is, alpha coefficients or internal consistency estimates) are more appropriate in this regard (Murphy & De Shon, 2000). Following Murphy and De Shon's recommendation, therefore, we disattenuated the observed correlations for imperfect intrarater reliability.

The disattenuation procedures of the observed correlations between education level and subjective ratings of performance dimensions (e.g., creativity) were straightforward. We first corrected observed correlations for the lack of perfect intrarater reliability. This type of correction requires the use of alpha coefficients (i.e., internal consistency estimates) reported in individual studies. Similar to other researchers (Judge et al., 2001), if no alpha value was reported for a particular scale in a study, the average alpha value calculated from the rest of the studies using the same scale was taken as a substitute.

The disattenuation procedures of the observed correlations between education level and objective performance measures were different. We adopted Sturman, Cheramie, and Cashen's (2005) estimate of test–retest reliability of objective task performance for disattenuation purpose for three reasons. First, studies included in our meta-analysis seldom reported any kind of reliability estimates for objective measures of task performance. Second, Sturman et al. (2005) argue that although the notion of intrarater reliability does not apply to objective measures of task performance, correlations based on objective measures are still likely to be attenuated by error variance. Third, Sturman et al.'s estimates were based on multiple empirical studies of job performance rather than merely one single study (e.g., Judge & Cable, 2004) or a hypothetical artifact distribution (e.g., Roth, Huffcutt, & Bobko, 2003).

Based on 22 empirical studies, Sturman et al. assessed the test–retest reliability to be .50 for high-complexity jobs (e.g., managers) and .61 for low complexity (e.g., machine workers) jobs. We used those estimates here as well. For those studies that sampled mixed job complexity types, we used the average value of Sturman et al.'s two estimates as the proxy.

Objective measures of performance were also available for training test scores, lateness, and absence. Pearlman, Schmidt, and Hunter (1980), based on their review of the training literature and test manuals, estimated the expected value of the distribution of reliability values for training criterion to be .80. We, therefore, adopted this value in our procedures, too.

Regarding company record of absence, Martocchio's (1989) meta-analysis of employee absenteeism reported an average reliability estimate across studies of .63 for both frequency and time-based measures of absence. Therefore, we adopted this value too in our diattenuation procedures involving objective measures of absence. Finally, there were no estimates of average reliability for objective indices of lateness, even in the two meta-analyses that had examined employee lateness (Koslowsky et al., 1997; Lau, Au, & Ho, 2003). Because organizations are likely to keep record of employee lateness the same way they document their absence, we used the estimates reported by Martocchio (1989) mentioned above (.63) as a proxy here.

Corrections for sampling error variance. The third artifact that we corrected for was sampling error due to sample size differences (Raju et al., 1991).

Testing moderation effects. In order to test for moderating effects, we adopted a regression procedure, recommended by Steel and Kammeyer-Mueller (2002), which has been found to be more reliable and robust than other moderation testing methods. An additional advantage of Steel and Kammeyer-Mueller's (2002) method is that both categorical (e.g., gender) and continuous (e.g., job tenure) moderator variables can be included. These regression-based moderator tests have been used successfully in previous research studies (e.g., Wright & Bonett, 2002).

To illustrate this moderator testing procedure, we will use the example of gender. Specifically, we used the proportion of women in the sample as an independent variable, in a weighted least squares multiple regression, to predict the Fisher-z-transformed correlation coefficients for the education level-job performance relationship. If the percentage of women in the sample was a significant predictor of a relationship between education level and a dimension of job performance, then it would suggest that gender moderated that relationship.

The coding of demographic characteristics and research design characteristics of the studies is self-explanatory (e.g., percentage of Caucasians). The coding of job complexity requires some further explanation. Following previous authors (e.g., Avolio & Waldman, 1990; Salgado et al., 2003; Wood, Mento, & Locke, 1987), we classified each sample occupation into high and low job complexity according to the general intelligence, verbal ability, and numerical ability required to perform the job. The Dictionary of Occupational Titles (DOT) was used to assist the coding, too, because jobs in the DOT are classified according to several dimensions (e.g., data, people, and things) that reflect job complexity. Examples of "high-complexity" jobs are accountants, engineers, and IT professionals. "Low-complexity" jobs include clerks, restaurant workers, and receptionists.

Results

The meta-analysis results for the relationships between education level and the nine performance dimensions are presented in Table 1. Sixty-nine percent (69%) of criterion reliability data were sample-based.

Main Effects

Core task performance. Hypothesis 1 predicted that education level is positively related to task performance. We found support for this prediction. Education level was related to objective measures of task performance at .24, peer-rated task performance at .18, supervisor-rated task performance at .09, and self-rated task performance at .06.

However, we found that education level was very weakly related to performance in training programs (−.03). It should be noted, though, that many of the training performance studies involve computer training or computer-mediated learning, and employees have many opportunities to become excellent in information technology without attaining college.

Citizenship performance. Hypothesis 2 predicted that education level is positively related to citizenship performance. With respect to general OCB (OCB without differentiated targets), education level was related to ratings by supervisors at .17 and by oneself (.12). The relationship was only .03 when OCB was measured by peers.

With respect to interpersonal OCB, education level was weakly related to ratings by supervisors at .06, but largely unrelated to peer-ratings (.01) and self-ratings (.02). With respect to OCB directed at organizations, education level was related to ratings by supervisors at .12, ratings by

TABLE 1
Meta-Analytical Relationships Among Education Level and Task, Citizenship, and Counterproductive Performance

	N	*k*	r_u	*SD*u	AR	r_c	*SD*c	95% CI	90% CrI
Task performance									
Rated by supervisors	47,125	85	.06	.07	.88	.09	.07	(.08, .10)	(−.03, .21)
Rated by peers or others	1,562	7	.13	.18	.95	.18	.18	(.05, .31)	(−.12, .48)
Objective measures	4,685	24	.14	.24	.56	.24	.23	(.15, .33)	(−.14, .62)
Self-rated	18,184	43	.04	.10	.81	.06	.11	(.03, .09)	(−.21, .24)
Performance in training programs	4,348	16	−.01	.18	.80	−.03	.17	(−.11, .05)	(−.31, .25)
OCB									
General (undifferentiated targets)									
Rated by supervisors	3,036	10	.11	.04	.89	.17	.04	(.15, .19)	(.10, .24)
Rated by peers or others	1,394	4	.02	.05	.74	.03	.05	(−.02, .08)	(−.05, .11)
Self-rated	3,787	13	.07	.11	.75	.12	.13	(.05, .19)	(−.09, .33)
Directed at others									
Rated by supervisors	6,024	22	.04	.08	.87	.06	.09	(.02, .10)	(−.09, .21)
Rated by peers or others	2,063	14	.00	.06	.82	.01	.07	(−.03, .05)	(−.11, .13)
Self-rated	3,888	15	.01	.06	.76	.02	.07	(−.02, .06)	(−.10, .14)
Directed at organization									
Rated by supervisors	5,601	21	.07	.08	.82	.12	.11	(.07, .17)	(−.06, .30)
Rated by peers or others	1,811	8	.08	.09	.88	.13	.09	(.07, .19)	(−.02, .28)
Self-rated	5,290	20	.07	.09	.73	.11	.11	(.06, .16)	(−.07, .29)
Directed at tasks									
Rated by supervisors	1,034	4	.14	.12	.87	.23	.14	(.09, .37)	(−.00, .46)
Creativity									
Rated by supervisors	4,278	22	.17	.14	.90	.25	.15	(.19, .31)	(.00, .50)
Self-rated	1,324	7	.17	.16	.86	.27	.17	(.14, .40)	(−.01, .55)

continued

TABLE 1 (continued)

	N	k	r_u	SDu	AR	r_c	SDc	95% CI	90% CrI
General counterproductive work behavior									
Rated by supervisor or peers	4,158	7	−.02	.14	.71	−.04	.18	(−.17, .09)	(−.34, .26)
Self-rated	3,529	12	.01	.06	.77	.01	.08	(−.04, .06)	(−.12, .14)
Self-rated workplace aggression	1,801	9	−.05	.03	.81	−.09	.04	(−.12, −.06)	(−.16, −.02)
Self-rated on-the-job substance use	11,515	10	−.17	.10	.71	−.28	.11	(−.35, −.21)	(−.46, −.10)
Tardiness									
Objective measures	645	4	.02	.16	.63	.03	.15	(−.12, .18)	(−.22, .28)
Self-rated	6,117	12	.02	.08	.76	.04	.23	(−.09, .17)	(−.34, .42)
Absenteeism									
General absence (undifferentiated causes)									
Objective measures	70,003	23	−.11	.10	.63	−.22	.09	(−.26, −.18)	(−.37, −.07)
Self-rated	4,962	12	−.06	.06	.78	−.10	.06	(−.13, −.07)	(−.20, .00)
Sickness absence									
Objective measures	3,730	12	−.08	.07	.63	−.16	.05	(−.19, −.13)	(−.24, −.08)
Self-rated	33,622	5	−.02	.01	.78	−.04	.01	(−.05, −.03)	(−.06, −.02)
Nonsickness-related absence									
Objective measures	1,372	6	−.03	.07	.63	−.07	.04	(−.10, −.04)	(−.14, .00)
Self-rated	957	3	.02	.05	.78	.04	.06	(−.03, .11)	(−.06, .14)

Notes. N = cumulative sample size; k = number of studies cumulated; r_u = sample-size weighted uncorrected (observed) correlation; SDu = standard deviation of r_u; AR = average or assumed criterion reliability value; r_c = sample-size weighted (fully) corrected correlation; SDc = standard deviation of r_c; CI = confidence interval for r_c; CrI = credibility interval for r_c.

peers at .13, and ratings by oneself at .11. With respect to OCB directed at tasks, education level was related to ratings by supervisors at .23.

As noted earlier, employee creativity can be viewed as an additional dimension of OCB. We found that education level was related to employee creativity rated by supervisors or measured objectively at .25 and to self-reported creativity (.27). Overall, then, the results provide some support for Hypothesis 2. All the results are in the predicted direction.

Counterproductive performance. Hypothesis 3 predicted that education level is negatively related to counterproductive performance. We found that education level was largely unrelated to general counterproductive work behaviors (those without differentiated targets). Education level was very weakly related to supervisors/peers' ratings (−.04) and unrelated to self-ratings.

However, education level is inversely related to the first two specific counterproductive work behaviors we investigated, namely, workplace aggression and on-the-job substance use. Education level was negatively related to workplace aggression at −.09 and negatively related to on-the-job substance use at −.28.

Education level was very weakly related to the third specific indicator of counterproductive work behavior, namely, tardiness (.03 for objective measures and .04 for self-ratings). The fourth specific counterproductive work behavior we examined was absenteeism. Here, the effect sizes of education level depended on the type of absence measure utilized. When general measures of absence were used (i.e., absence measures that did not differentiate among causes for absence), education level was negatively related to objective measures at −.22. The effect size of education level on general absenteeism by self-ratings was only −.10. A similar pattern of results emerged for sickness-related absence; education level was negatively related to objective measures at −.16 but to self-ratings only at −.04. In contrast, education level had little relationship with non-sickness absence; the effect size was −.07 for objective measures and .04 for self-ratings.

Hypothesis 3, then, received partial support. Education is inversely related to workplace aggression, substance abuse, and objective measures of absence. On the other hand, education is unrelated to general counterproductive behaviors and tardiness.

Moderator Effects

Table 2 presents the results of the moderator regression analyses. Two points, in particular, are worth noting about these results. First, moderator searches were conducted on only those subsets of studies that we used for calculating the corrected correlations presented in Table 1 *and* had complete sample descriptions. In these cases, we used a regression-based

TABLE 2
Moderators of the Education Level-Job Performance Relationship

Relationship	k^{a}	ß	Explained variance
Education level-Core task performance (rated by supervisors, peers, or others)			
Average job tenure	24	.02	.00
Average organizational tenure	72	.04	.00
Proportion of managers	46	.10	.01
Job complexity (low vs. high)	77	.15†	.02
Proportion of women	91	−.20*	.04
Proportion of racial minority	36	−.22†	.05
Education level-General OCB (rated by supervisors, peers, or others)			
Average job tenure	17	−.20	.04
Average organizational tenure	68	−.11	.01
Proportion of managers	39	−.31*	.10
Job complexity (low vs. high)	44	.07	.01
Proportion of women	72	.11	.02
Proportion of racial minority	28	−.30†	.09
Education level-Counterproductive work behavior (self-rated)[b]			
Average organizational tenure	22	.11	.01
Job complexity (low vs. high)	15	.38†	.14
Proportion of women	34	.02	.00
Proportion of racial minority	22	.00	.00

†$p<.10$ *$p < .05$.
Note.
k = number of studies cumulated; ß = standardized beta weight for the respective moderator.
[a]Only relationships that involved 15 or more studies with complete sample descriptions were examined.
[b]This category of performance included self-rated general counterproductive work behaviors, workplace aggression, on-the-job substance use, and tardiness.

moderator search solely for the purpose of detecting the existence and direction of moderator effects. Second, the moderator search focused on three relationships that had the largest number of cumulative samples (k): (a) education-core task performance (rated by supervisors or others); (b) education-general OCBs (rated by supervisors or others); (c) education-counterproductive work behaviors (self-rated).

Hypothesis 4 predicted that the relationship between educational level and job performance is moderated by job tenure (Hypothesis 4a) and organization tenure (Hypothesis 4b). Contrary to expectations, we found that average job tenure and average organizational tenure did not moderate any of the education-performance relationships. Thus, Hypothesis 4 was not supported.

Hypothesis 5a predicted that the education-performance relationship would be stronger for managerial jobs than for nonmanagerial jobs. Contrary to our expectations, we found that the relationship between education level and OCB was more positive for nonmanagers than for managers. Hypothesis 5a, then, was not supported.

Hypothesis 5b predicted that the education-performance relationship would be stronger for high-complexity jobs than for low-complexity jobs. Providing support for our prediction, the education-task performance relationship was more positive for high-complexity jobs. However, contrary to our expectations, we found that the relationship between education level and counterproductive work behavior was less negative for high-complexity jobs than for low-complexity jobs. Hypothesis 5, then, received mixed support.

Finally, Hypothesis 6 predicted that the education-performance relationship will be stronger for men (vs. women; Hypothesis 6a) and for Caucasians (vs. non-Caucasians; Hypothesis 6b). With respect to the relationship between education level and task performance, we found that the relationship was more positive for Caucasians than for other racial groups and for men than for women. Further, we found that the relationship between education and OCB was more positive for Caucasians than for other racial groups. These results provide some support for Hypothesis 6a and Hypothesis 6b.

Discussion

In this article, we suggest that the range of effects of education extend beyond core task performance to include citizenship and counterproductive performance too. Highly educated workers are likely to contribute more effectively to noncore activities at work as well (Pennings, Lee, & van Witteloostuijn, 1998). Further, in "weak situations" where performance demands or role expectations are not strong, the effect of one's human capital may be particularly evident. For example, the meta-analysis shows that highly educated workers tend to display greater creativity and to demonstrate more citizenship behaviors than do less educated workers. Moreover, highly educated workers appear to engage in fewer counterproductive work behaviors like workplace aggression, workplace substance use, and absenteeism.

Limitations of Current Research and Implications for Research Designs

The meta-analytical results presented highlight the need for new approaches to studying the education-performance relationship in the future. From researchers' initial design decisions through their conclusions about their findings, we identify several specific issues that need to be addressed before robust conclusions about this relationship can be drawn.

Longitudinal studies. The positive effect of human capital investments on individuals' career earnings may be more observable in the long run (Quiñones et al., 1995; Sweetland, 1996). For instance, college graduates may not be able to fully apply what they have learned in school to the work setting during the stressful school-to-work transition (Ng & Feldman, 2007). Once they become fully comfortable with the work environment, though, the beneficial effects of education on productivity might become more observable. In our pool of studies, only 11% used longitudinal designs. Additional longitudinal studies, then, are certainly needed.

Mediating mechanisms. We suggest that the process of human capital acquisition evokes a number of cognitive and emotional changes in individuals that may help explain more precisely why and how human capital is related to career success. For instance, educational level can enhance cognitive ability, increase job-relevant knowledge, and promote the development of a strong work ethic, all of which can strengthen job performance in turn. Furthermore, college education may also help build stronger social ties in the profession, thereby promoting job success (Ng et al., 2005). Conceptualizing and measuring mediating processes may be one of the most effective ways to help researchers explain *why* education matters to career success, not only *that* education matters to career success.

In particular, it is vital to examine the extent to which the processes of human capital acquisition cause changes in the levels of mediating variables. If the argument is being made, for example, that the reason why education promotes job performance is that it enhances individuals' work ethic, then multiple measurements of the presumed mediating variable (work ethic) need to be gathered, too.

Operationalization of education. The focus of this study is largely on education level. However, there are other aspects of the educational experience that also warrant greater attention. For instance, very few studies have considered differences in college majors (indeed, only 3% of the studies here reported information about employees' college major) or compared the effects of vocational and nonvocational education on job performance. It may be that vocational or technical schools directly promotes high levels of core task performance, but the broad development focus of bachelor's education is more likely to enhance individuals' citizenship and counterproductive performance. In an excellent example of using multiple ways to operationalize education qualifications, Howard (1986) measured five college education experiences, including level of education, grades, quality of undergraduate institution, major field of study, and participation in extracurricular activities, and the authors correlated these measures with job performance. She found that education level, college major, and participation in extracurricular activities were most strongly related to job performance.

Operationalization of performance. One of our key findings is that whether education matters to job performance partially depends on the definition of job performance. For instance, if counterproductive work behavior is defined very specifically as level of tardiness, education might have no effect whatsoever. On the other hand, if performance is defined in terms of absence or workplace aggression, the influence of education may be stronger. Thus, in order to obtain a more complete picture of the broad effects of education on worker productivity, we also recommend researchers to collect at least two kinds of performance measures in each study.

Our results also indicate that who evaluates job performance may affect the strength of the education-performance relationship. For instance, we found that supervisors and employees themselves have quite similar ratings of creativity (.25 vs. .27) and that supervisors, peers, and employees themselves share quite similar views of the level of OCB directed at organizations (.12, .13, and .11, respectively). On the other hand, there is much greater disparity among these raters when it comes to evaluating core task performance. Therefore, we also recommend future studies to collect performance measures from multiple sources and consider more fully why there is convergence or divergence in multisource ratings.

Sample characteristics. We found general support for our moderator hypothesis that the education-performance relationship is weaker for women than for men and for racial minority than for Caucasian employees (Maume, 1999; Ohlott, Ruderman, & McCauley, 1994; Stroh et al., 1992). Either due to selection bias or higher performance standards set for these groups, the investments of women and racial minorities into education may have less impact on their job performance. Thus, studies that are not heterogeneous or representative on important sample characteristics may yield nongeneralizable results.

As noted earlier, we found that years of work experience (operationalized as job and organizational tenure) did not moderate the education-performance relationship. One possible explanation is that these proxies capture the quantity but not the quality or variety of work experience (Quiñones et al., 1995). Another possibility is that work experience has a curvilinear relationship with performance, with its positive effects being stronger for the early- and midcareer groups and lower for the late career cohorts (Sturman, 2003). A third possibility is that work experience and education have somewhat similar predictive power on some dimensions of performance, such as objective ratings of task performance (cf. Quiñones et al., 1995).

Indeed, the exact relationship of work experience to formal education—and their joint impact on job performance—needs further study. In some cases, work experience may partially offset or compensate for lower levels of formal education; in fact, in its visa application procedures, the U.S. government equates 3 years of work experience to 1 year of formal education. For example, in skilled trade jobs, one could easily see how work experience might offset or even dominate the contributions of education to job performance. In other cases, work experience may be an accelerator of work performance. For instance, in middle-management positions, work experience may not fully substitute for having the content knowledge gained in an MBA program, but it might accelerate the performance of middle managers who have completed their MBAs.

Along similar lines, future research should examine the factors that prompt individuals to choose obtaining more education over more work experience and vice versa. It is equally important for researchers to investigate the factors that affect organizations' preferences (in both hiring and promotion decisions) for years of education or educational degrees over years of work experience. In some studies (e.g., Singer & Bruhns, 1991), researchers have found that interviewers weight applicants' work experience more heavily than academic qualifications in hiring decisions. Undoubtedly, industry and organizational preferences come in to play here as well and warrant further attention, too.

The set of unexpected results in this study revolved around the moderating effects of job complexity and job type on the education-performance relationship. Contrary to expectations, highly educated workers in highly complex jobs were more likely to engage in counterproductive behavior. One possibility is that high stress levels among educated workers on complex jobs give rise to more counterproductive behavior. Along the same lines, we found that the relationship between education level and OCB was more positive for nonmanagers than for managers. One reason for this result may be that OCBs (such as promoting the organization to outsiders) are more often viewed as part of a manager's core job than as part of a nonmanager's core job; another is that highly educated nonmanagers may have greater incentives to demonstrate OCBs if they want to get promoted (Hui, Lam, & Law, 2000). Here, too, sample characteristics can strongly influence research results.

Use of meta-analyses. Although meta-analyses provide a robust picture of accumulated research findings, they also have some limitations. For instance, because of unreported data, we were not able to search for moderators for all education-performance relationships of interest here. A second limitation is the relatively small number of aggregated studies for some of the relationships investigated. Even though meta-analysis can be executed with as few as two studies (Hunter & Schmidt, 1990), the cumulated effect sizes are more stable when the number of cumulative studies increases. Third, due to the data contained in individual studies, we had to use proxy variables in some of our moderator analyses (such as the percentage of women for the effect of gender). As the quality of empirical research in this area is strengthened, the inherent restrictions imposed by meta-analyses will be lessened as well.

Managerial Implications

To effectively contain hiring costs, managers frequently use job applicants' educational level as a screening criterion (Kroch & Sjoblom, 1994; Maglen, 1990). At the aggregate level, the results of this study suggest that using education level as a screening device has quite robust validity. In many cases, then, the higher recruitment costs and wage costs that typically accompany hiring highly educated workers are justifiable.

However, hiring highly educated workers requires managers to attend to other HR issues more carefully as well. For example, hiring educated workers does not necessarily lead to better performance in training programs; as the results here suggest, education level is largely unrelated to performance in training programs. Workers with more education may be more confident about their skills and therefore take training less seriously, or workers with less education may be more motivated to take advantage of this opportunity. In either event, though, using education level as the screen for entry into training programs may be less important than ensuring that recipients of training are fairly homogeneous in terms of skill levels.

In this study, we presented evidence that educated employees, as a group, perform more effectively at task, citizenship, and counterproductive performance, and that certainly augurs well for the fulfillment of managers' expectations of highly educated workers. At the same time, given the variance among self-evaluations, peer evaluations, and supervisor evaluations reported here, highly educated workers may especially need and benefit from the use of 360-degree feedback systems that include citizenship and counterproductive performance dimensions (Welbourne et al., 1998).

In the final analysis, the benefits of a highly educated workforce extend beyond core task performance to include several facets of citizenship and counterproductive performance. The relationships between education and performance dimensions, though, are not uniformly strong, not uniformly consistent across employee groups, and not consistently observed by different groups of raters. For these reasons, then, a finer-grained, strategic approach is needed to ensure that the premium paid to hire more educated workers results in the specific outcomes most valued by organizations.

REFERENCES

Anderson N, De Dreu CK, Nijstad BA. (2004). The routinization of innovation research: A constructively critical review of the state-of-the-science. *Journal of Organizational Behavior, 25*, 147–173.

Avolio BJ, Waldman DA. (1990). An examination of age and cognitive test performance across job complexity and occupational types. *Journal of Applied Psychology, 75*, 43–50.

Avolio BJ, Waldman DA. (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.

Baron JN, Davis-Blake A, Bielby WT. (1986). The structure of opportunity: How promotion ladders vary within and among organizations. *Administrative Science Quarterly, 31*, 248–273.

Bear GG, Manning MA, Izard CE. (2003). Responsible behavior: The importance of social cognition and emotion. *School Psychology Quarterly, 18*, 140–157.

Becker G. (1964). *Human capital: A theoretical and empirical analysis with special reference to education*. New York: Columbia University Press.

Bennett RJ, Robinson SL. (2000). Development of a measure of workplace deviance. *Journal of Applied Psychology, 85*, 349–360.

Benson GS, Finegold D, Mohrman S. (2004). You paid for the skills, now keep them: Tuition reimbursement and voluntary turnover. *Academy of Management Journal, 47*, 315–331.

Berry CM, Gruys ML, Sackett PR. (2006). Educational attainment as a proxy for cognitive ability in selection: Effects of levels of cognitive ability and adverse impact. *Journal of Applied Psychology, 91*, 696–705.

Berry CM, Ones DS, Sackett PR. (2007). Interpersonal deviance, organizational deviance, and their common correlates: A review and meta-analysis. *Journal of Applied Psychology, 92*, 410–424.

Blau G. (1994). Developing and testing a taxonomy of lateness behavior. *Journal of Applied Psychology, 79*, 959–970.

Borman WC, Motowidlo SJ. (1997). Task performance and contextual performance: The meaning for personnel selection research. *Human Performance, 10*, 99–109.

Brenner OC. (1982). Relationship of education to sex, managerial status, and the managerial stereotype. *Journal of Applied Psychology, 67*, 380–383.

Burke MJ, Landis RS. (2003). Methodological and conceptual challenges in conducting and interpreting meta-analysis. In Murphy KR (Ed.), *Validity generalization: A critical review* (pp. 287–309). Mahwah, NJ: Erlbaum.

Campbell JP. (1990). Modeling the performance prediction problem in industrial and organizational psychology. In Dunnette MD, Hough LM (Eds.), *Handbook of industrial and organizational psychology* (Vol. 1, 2nd ed., pp. 687–732). Palo Alto, CA: Consulting Psychologists Press.

Cappelli P. (2000). A market-driven approach to retaining talent. *Harvard Business Review, 78*, 103–111.

Ceci SJ. (1991). How much does schooling influence general intelligence and its cognitive components? A reassessment of the evidence. *Developmental Psychology, 27*, 703–722.

Conte JM, Jacobs RR. (2003). Validity evidence linking polychronicity and big five personality dimensions to absence, lateness, and supervisory performance ratings. *Human Performance, 16*, 107–129.

Dalton DR, Todor WD. (1993). Turnover, transfer, absenteeism: An interdependent perspective. *Journal of Management, 19*, 193–219.

De Jonge A, De Ruyter K. (2004). Adaptive versus proactive behavior in service recovery: The role of self-managing teams. *Decision Sciences, 35*, 457–491.

De Jonge J, Reuvers MMEN, Houtman ILD, Kompier MAJ. (2000). Linear and nonlinear relations between psychosocial job characteristics, subjective outcomes, and sickness absence: Baseline results from SMASH. *Journal of Occupational Health Psychology, 5*, 256–268.

Deery S, Erwin P, Iverson R. (1999). Industrial relations climate, attendance behaviour and the role of trade unions. *British Journal of Industrial Relations, 37*, 533–558.

Denison EF. (1962). *The sources of economic growth in the United States and the alternatives before us*. New York: Committee for Economic Development.

Di Vesta FJ, Thompson GG. (1970). *Educational psychology: Instruction and behavioral change*. New York: Appleton-Century-Crofts.

Dudley NM, Orvis KA, Lebiecki JE, Cortina JM. (2006). A meta-analytic investigation of conscientiousness in the prediction of job performance: Examining the intercorrelations and the incremental validity of narrow traits. *Journal of Applied Psychology, 91*, 40–57.

Ford AD, Olmi DJ, Edwards RP, Tingstorm DH. (2001). The sequential introduction of compliance training components with elementary-aged children in general education classroom settings. *Social Psychology Quarterly, 16*, 142–157.

Frone MR. (2003). Predictors of overall and on-the-job substance use among young workers. *Journal of Occupational Health Psychology, 8*, 39–54.

Glomb TM, Liao H. (2003). Interpersonal aggression in work groups: Social influence, reciprocal, and individual effects. *Academy of Management Journal, 46*, 486–496.

Goldberg LR, Sweeney D, Merenda PF, Hughes JE. (1998). Demographic variables and personality: The effects of gender, age, education, and ethic/racial status on self-descriptions of personality attributes. *Personality and Individual Differences, 24*, 393–403.

Gottfredson GD, Holland JL. (1990). A longitudinal test of the influence of congruence: Job satisfaction, competency utilization, and counterproductive behavior. *Journal of Counseling Psychology, 37*, 389–398.

Hanisch KA, Hulin CL. (1990). Job attitudes and organizational withdrawal: An examination of retirement and other voluntary withdrawal behaviors. *Journal of Vocational Behavior, 37*, 60–78.

Harrison DA, Martocchio JJ. (1998). Time for absenteeism: A 20-year review of origins, offshoots, and outcomes. *Journal of Management, 24*, 305–350.

Hochschild AR. (1997). *The time bind*. New York: Henry Holt.

Hoffman BJ, Blair CA, Meriac JP. (2007). Expanding the criterion domain? A quantitative review of the OCB literature. *Journal of Applied Psychology, 92*, 555–566.

Hoffman CC. (1995). Applying range restriction corrections using published norms: Three case studies. PERSONNEL PSYCHOLOGY, *48*, 913–923.

Howard A. (1986). College experiences and managerial performance. *Journal of Applied Psychology, 71*, 530–552.

Hui C, Lam SSK, Law KKS. (2000). Instrumental values of organizational citizenship behavior of promotion: A field quasi-experiment. *Journal of Applied Psychology, 85*, 822–828.

Hunt ST. (1996). Generic work behavior: An investigation into the dimensions of entry-level, hourly job performance. PERSONNEL PSYCHOLOGY, *49*, 51–83.

Hunter JE. (1986). Cognitive ability, cognitive aptitudes, job knowledge, and job performance. *Journal of Vocational Behavior, 29*, 340–362.

Hunter JE, Hunter RF. (1984). Validity and utility of alternative predictors of job performance. *Psychological Bulletin, 96*, 72–98.

Hunter JE, Schmidt HL. (1990). *Methods of meta-analysis: Correcting for sources of error and bias in research findings*. Newbury Park, CA: Sage.

Hunter JE, Schmidt HL, Le H. (2006). Implications of direct and indirect range restriction for meta-analysis methods and findings. *Journal of Applied Psychology, 91*, 594–612.

Janssen O. (2001). Fairness perceptions as a moderator in the curvilinear relationships between job demands, and job performance and job satisfaction. *Academy of Management Journal, 44*, 1039–1050.

Johns G, Xie JL. (1998). Perceptions of absence from work: People's Republic of China versus Canada. *Journal of Applied Psychology, 83*, 515–530.

Johnson JW. (2001). The relative importance of task and contextual performance dimensions to supervisor judgments of overall performance. *Journal of Applied Psychology, 86*, 984–996.

Johnson MK, Elder GH. (2002). Educational pathways and work value trajectories. *Sociological Perspectives, 45*, 113–138.

Judge TA, Bretz RD. (1992). Effects of work values on job choice decisions. *Journal of Applied Psychology, 77*, 261–271.

Judge TA, Cable DM. (2004). The effect of physical height on workplace success and income: Preliminary test of a theoretical model. *Journal of Applied Psychology, 89*, 428–441.

Judge TA, Thoresen CJ, Bono JE, Patton GK. (2001). The job satisfaction-job performance relationship: A qualitative and quantitative review. *Psychological Bulletin, 127*, 376–407.

Karatepe OM, Uludag O, Menevis I, Hadzimehmeddagic L, Baddar L. (2006). The effects of individual characteristics on frontline employee performance and job satisfaction. *Tourism Management, 27*, 547–560.

Kaufman HG. (1978). Continuing education and job performance: A longitudinal study. *Journal of Applied Psychology, 63*, 248–251.

Kaufman HG. (1990). *Assessing adolescent and adult intelligence*. Needham Heights, MA: Allyn & Bacon.

Kanfer R, Ackerman PL. (2004). Aging, adult development, and work motivation. *Academy of Management Review, 29*, 440–458.

Klehe U, Anderson N. (2007). Working hard and work smart: Motivation and ability during typical and maximum performance. *Journal of Applied Psychology, 92*, 978–992.

Konovsky MA, Organ DW. (1996). Dispositional and contextual dimensions of organizational citizenship behavior. *Journal of Organizational Behavior, 17*, 253–266.

Koslowsky M, Sagie A, Krausz M, Singer AD. (1997). Correlates of employee lateness: Some theoretical considerations. *Journal of Applied Psychology, 82*, 79–88.

Kroch EA, Sjoblom K. (1994). Schooling as human capital or a signal: Some evidence. *Journal of Human Resources, 29*, 156–180.

Kuncel NR, Hezlett SA, Ones DS. (2004). Academic performance, career potential, creativity, and job performance: Can one construct predict them all? *Journal of Personality and Social Psychology, 86*, 148–161.

Lancaster AR, Drasgow F. (1994). Choosing a norm group for counseling: Legislation, regulation, and nontraditional careers. *Psychological Assessment, 6*, 313–320.

Lanzi D. (2007). Capabilities, human capital, and education. *Journal of Socio-Economics, 36*, 424–435.
Lapierre LM, Spector PE, Leck JD. (2005). Sexual versus nonsexual workplace aggression and victims' overall job satisfaction: A meta-analysis. *Journal of Occupational Health Psychology, 10*, 155–169.
Lau VCS, Au WT, Ho JMC. (2003). A qualitative and quantitative review of antecedents of counterproductive behavior in organizations. *Journal of Business and Psychology, 18*, 73–99.
Lazear EP. (1981). Agency, earnings profiles, productivity, and hours restrictions. *American Economic Review, 71*, 606–620.
Lehman WEK, Simpson DD. (1992). Employee substance use and on-the-job behaviors. *Journal of Applied Psychology, 77*, 309–321.
Lepak DP, Snell SA. (1999). The human resource architecture: Toward a theory of human capital allocation and development. *Academy of Management Review, 24*, 31–48.
LePine JA, Erez A, Johnson DE. (2002). The nature and dimensionality of organizational citizenship behavior: A critical review and meta-analysis. *Journal of Applied Psychology, 87*, 52–65.
Liao H, Joshi A, Chuang A. (2004). Sticking out like a sore thumb: Employee dissimilarity and deviance at work. PERSONNEL PSYCHOLOGY, *57*, 969–1000.
Lindsay P, William EK. (1984). Continuity and change in work values among young adults. *American Journal of Sociology, 89*, 918–931.
Linn RL, Harnisch DL, Dunbar SB. (1981). Corrections for range restriction: An empirical investigation of conditions resulting in conservative corrections. *Journal of Applied Psychology, 66*, 655–663.
Lyness KS, Thompson DE. (1997). Above the glass ceiling? A comparison of matched samples of female and male executives. *Journal of Applied Psychology, 82*, 359–375.
Lyness KS, Thompson DE. (2000). Climbing the corporate ladder: Do female and male executives follow the same route? *Journal of Applied Psychology, 85*, 86–101.
Maglen LR. (1990). Challenging the human capital orthodoxy: The education-productivity link re-examined. *The Economic Record, 66*, 281–294.
Martocchio JJ. (1989). Age-related differences in employee absenteeism: A meta-analysis. *Psychology and Aging, 4*, 409–414.
Maume DJ. (1999). Glass ceilings and glass escalators. *Work and Occupations, 26*, 483–509.
McCloy RA, Campbell JP, Cudeck R. (1994). A confirmatory test of a model of performance determinants. *Journal of Applied Psychology, 79*, 493–505.
Mincer J. (1974). *Schooling*, *experience*, *and earnings*. New York: NBER.
Murphy KR, De Shon R. (2000). Interrater correlations do not estimate the reliability of job performance ratings. PERSONNEL PSYCHOLOGY, *53*, 873–900.
Myers MB, Griffeth DA, Daugherty PJ, Lusch RF. (2004). Maximizing the human capital equation in logistics: Education, experience, and skills. *Journal of Business Logistics, 25*, 211–232.
Neisser U, Boodoo G, Bouchard TJ, Boykin AW, Brody N, Ceci SJ, et al. (1996). Intelligence: Knowns and unknowns. *American Psychologist, 51*, 77–101.
Ng TWH, Eby LT, Sorensen KL, Feldman DC. (2005). Predictors of objective and subjective career success: A meta-analysis. PERSONNEL PSYCHOLOGY, *58*, 367–408.
Ng TWH, Feldman DC. (2007). School-to-work transition: A role identity perspective. *Journal of Vocational Behavior, 71*, 114–134.
Oh J, Shin EH. (2003). Inequalities in nonfatal work injury: The significance of race, human capital, and occupations. *Social Science and Medicine, 57*, 2173–2182.

Ohlott PJ, Ruderman MN, McCauley CD. (1994). Gender differences in managers' developmental job experiences. *Academy of Management Journal, 37*, 46–67.

Organ DW. (1988). A restatement of the satisfaction-performance hypothesis. *Journal of Management, 14*, 547–557.

Pavett CM, Lau AW. (1983). Managerial work: The influence of hierarchical level and functional specialty. *Academy of Management Journal, 26*, 170–177.

Pearlman K, Schmidt FL, Hunter JE. (1980). Validity generalization results for tests used to predict job proficiency and training success in clerical occupations. *Journal of Applied Psychology, 65*, 373–406.

Pennings JM, Lee K, van Witteloostuijn A. (1998). Human capital, social capital, and firm dissolution. *Academy of Management Journal, 41*, 425–440.

Powell GN, Butterfield A, Parent JD. (2002). Gender and managerial stereotypes: Have the times changed? *Journal of Management, 28*, 177–193.

Quiñones MA, Ford JK, Teachout MS. (1995). The relationship between work experience and job performance: A conceptual and meta-analytic review. PERSONNEL PSYCHOLOGY, *48*, 887–910.

Ragins BR. (1997). Diversified mentoring relationships: A power perspective. *Academy of Management Review, 22*, 482–521.

Raju NS, Brand PA. (2003). Determining the significance of correlations corrected for unreliability and range restriction. *Applied Psychological Measurement, 27*, 52–71.

Raju NS, Burke MJ, Normand J, Langlois GM. (1991). A new meta-analytic approach. *Journal of Applied Psychology, 76*, 432–446.

Raju NS, Lezotte DV, Fearing BK. (2006). A note on correlations corrected for unreliability and range restriction. *Applied Psychological Measurement, 30*, 145–149.

Ravlin EC, Meglino BM. (1987). Effects of values on perception and decision making: A study of alternative work values measures. *Journal of Applied Psychology, 72*, 666–673.

Ravlin EC, Meglino BM. (1989). The transitivity of work values: Hierarchical preference ordering of social desirable stimuli. *Organizational Behavior and Human Decision Processes, 44*, 494–508.

Ree MJ, Earles JA, Teachout MS. (1994). Predicting job performance: Not much more than *g*. *Journal of Applied Psychology, 79*, 518–524.

Rest JR. (1986). *Moral development: Advances in research and theory*. New York: Praeger.

Rose M. (2005). Do rising levels of qualification alter work ethic, work orientation and organizational commitment for the worse? Evidence from the UK, 1985–2001. *Journal of Education and Work, 18*, 131–164.

Rosenthal R. (1979). The "file drawer problem" and tolerance for null results. *Psychological Bulletin, 86*, 638–641.

Roth PL, Huffcutt AI, Bobko P. (2003). Ethnic group differences in measures of job performance: A new meta-analysis. *Journal of Applied Psychology, 88*, 694–706.

Rotundo M, Sackett PR. (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.

Sackett PR, Ostgaard DJ. (1994). Job-specific applicant pools and national norms for cognitive ability tests: Implications for range restriction corrections in validation research. *Journal of Applied Psychology, 79*, 680–684.

Salgado JF, Anderson N, Moscoso S, Bertua C, de Fruyt F, Rolland JP. (2003). A meta-analytic study of general mental ability validity for different occupations in the European community. *Journal of Applied Psychology, 88*, 1068–1081.

Schmidt FL, Hunter JE. (1996). Measurement error in psychological research: Lessons from 26 research scenarios. *Psychological Methods, 1*, 199–223.

Schmidt FL, Hunter JE. (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 FL, Hunter JE, Outerbridge AN. (1986). The 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.

Sicherman N, Galor O. (1990). A theory of career mobility. *Journal of Political Economy, 98*, 169–192.

Sidanius J, Pratto F. (1999). *Social dominance: An inter-group theory of social hierarchy and oppression*. New York: Cambridge University Press.

Singer MS, Bruhns C. (1991). Relative effect of applicant work experience and academic qualification on selection interview decisions: A study of between-sample generalizability. *Journal of Applied Psychology, 76*, 550–559.

Staw BM, Barsade SG. (1993). Affect and managerial performance: A test of the sadder-but-wiser vs. happier-and-smarter hypotheses. *Administrative Science Quarterly, 38*, 304–331.

Steel PD, Kammeyer-Mueller JD. (2002). Comparing meta-analytic moderator estimation techniques under realistic conditions. *Journal of Applied Psychology, 87*, 96–111.

Strober MH. (1990). Human capital theory: Implications for HR managers. *Industrial Relations, 29*, 214–239.

Stroh LK, Brett JM, Reilly AH. (1992). All the right stuff: A comparison of female and male managers' career progression. *Journal of Applied Psychology,* 77, 251–260.

Sturman MC. (2003). Searching for the inverted U-shaped relationship between time and performance: Meta-analyses of the experience/performance, tenure/performance, and age/performance relationships. *Journal of Management, 29*, 609–640.

Sturman MC, Cheramie RA, Cashen LH. (2005). The impact of job complexity and performance measurement on the temporal consistency, stability, and test-retest reliability of employee job performance ratings. *Journal of Applied Psychology, 90*, 269–283.

Sweetland SR. (1996). Human capital theory: Foundations of a field of inquiry. *Review of Educational Research, 66*, 341–359.

Swenson-Lepper T. (2005). Ethical sensitivity for organizational communication issues: Examining individual and organizational differences. *Journal of Business Ethics, 59*, 205–231.

Taylor RN, Thompson M. (1976). Work value systems of young workers. *Academy of Management Journal, 19*, 522–536.

Tesluk PE, Jacobs RR. (1998). Toward an integrated model of work experience. PERSONNEL PSYCHOLOGY, *51*, 321–355.

Tracey JB, Tannenbaum SI, Michael J. (1995). Applied trained skills on the job: The importance of work environment. *Journal of Applied Psychology, 80*, 239–252.

Trusty J, Niles SG. (2004). Realized potential or lost talent: High school variables and bachelor's degree completion. *Career Development Quarterly, 53*, 2–15.

United Nations Development Program (UNDP). (1995). *Capacity development for sustainable human development: Conceptual and operational signposts*. New York. Oxford University Press.

Vigoda E. (2001). Reactions to organizational politics: A cross-cultural examination in Israel and Britain. *Human Relations, 54*, 1483–1518.

Vinod H, Kaushik SK. (2007). Human capital and economic growth: Evidence from developing countries. *American Economist, 51*, 29–39.

Viswesvaran C, Ones DS, Schmidt FL. (1996). Comparative analysis of the reliability of job performance ratings. *Journal of Applied Psychology, 81*, 557–574.

Welbourne TM, Johnson DE, Erez A. (1998). The role-based performance scale: Validity analysis of a theory-based measure. *Academy of Management Journal, 41*, 540–555.

Williams KY, O'Reilly CA. (1998). Demography and diversity in organizations: A review of 40 years of research. *Research in Organizational Behavior, 20*, 77–140.

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

Wright TA, Bonett DG. (2002). The moderating effects of employee tenure on the relationship between organizational commitment and job performance: A meta-analysis. *Journal of Applied Psychology, 87*, 1183–1190.

Xie JL, Johns G. (2000). Interactive effects of absence culture salience and group cohesiveness: A multi-level and cross-level analysis of work absenteeism in the Chinese context. *Journal of Occupational and Organizational Psychology, 73*, 31–52.

APPENDIX

Empirical studies included in the meta-analysis.

Adebayo DO. (2005). Ethical attitudes and prosocial behavior in the Nigeria police: Moderator effects of perceived organizational support and public recognition. *Policing: An International Journal of Police Strategies and Management, 28*, 684–705.

Allen TD. (2006). Rewarding good citizens: The relationship between citizenship behavior, gender, and organizational rewards. *Journal of Applied Psychology, 36*, 120–143.

Ang S, Van Dyne L, Begley TM. (2003). The employment relationships of foreign workers versus local employees: A field study of organizational justice, job satisfaction, performance, and OCB. *Journal of Organizational Behavior, 24*, 561–583.

Aryee S, Chen ZX, Sun L, Debrah YA. (2007). Antecedents and outcomes of abusive supervision: Test of a trickle-down model. *Journal of Applied Psychology, 92*, 191–201.

Aryee S, Wyatt T, Stone R. (1996). Early career outcomes of graduate employees: The effect of mentoring and ingratiation. *Journal of Management Studies, 33*, 95–118.

Avis JM, Kudisch JD, Fortunato VJ. (2002). Examining the incremental validity and adverse impact of cognitive ability and conscientiousness on job performance. *Journal of Business and Psychology, 17*, 87–105.

Babakus E, Yavas U, Karatepe OM, Avci T. (2003). The effect of management commitment to service quality on employees' affective and performance outcomes. *Academy of Marketing Science Journal, 31*, 272–286.

Baer M, Oldham GR. (2006). The curvilinear relation between experienced creative time pressure and creativity: Moderating effects of openness to experience and support for creativity. *Journal of Applied Psychology, 91*, 963–970.

Baer M, Oldham GR, Cummings A. (2003). Rewarding creativity: When does it really matter? *The Leadership Quarterly, 14*, 569–586.

Bardsley JJ, Rhodes SR. (1996). Using the Steers-Rhodes (1984) framework to identify correlates of employee lateness. *Journal of Business and Psychology, 10*, 351–365.

Barling J, MacEwen KE. (1991). Maternal employment experiences, attention problems and behavioral performance: A mediational model. *Journal of Organizational Behavior, 12*, 495–505.

Barone S, Rakich JS, Meek G. (1975). *A multivariate analysis of job performance of hospital business office employees*. Academy of Management Proceedings.

Baruch Y, O'Creevy MF, Hind P, Vigoda-Gadot E. (2004). Prosocial behavior and job performance: Does the need for control and the need for achievement make a difference? *Social Behavior and Personality, 32*, 399–412.

Bass AR, Bharucha-Reid R, Delaplane-Harris K, Schork MA, Kaufman R, McCann D, Foxman B, et al. (1996). Employee drug use, demographic characteristics, work reactions, and absenteeism. *Journal of Occupational Health Psychology, 1*, 92–99.

Bass WS. (2003). *The acculturation stress/employee withdrawal relationship.* Unpublished dissertation. The Florida State University.

Begley TM, Lee C, Hui C. (2006). Organizational level as a moderator of the relationship between justice perceptions and work-related reactions. *Journal of Organizational Behavior, 27*, 705–721.

Bekker MHJ, Croon MA, Bressers B. (2005). Childcare involvement, job characteristics, gender and work attitudes as predictors of emotional exhaustion and sickness absence. *Work and Stress, 19*, 221–237.

Benson GS, Finegold D, Mohrman SA. (2004). You paid for the skills, now keep them: Tuition reimbursement and voluntary turnover. *Academy of Management Journal, 47*, 315–331.

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.

Bluen SD, Barling J, Burns W. (1990). Predicting sales performance, job satisfaction, and depression by using the achievement strivings and impatience-irritability dimensions of Type A behavior. *Journal of Applied Psychology, 75*, 212–216.

Blumberg M. (1980). Job switching in autonomous work groups: An exploratory study in a Pennsylvania coal mine. *Academy of Management Journal, 23*, 287–306.

Bond FW, Bunce D. (2001). Job control mediates change in a work reorganization intervention for stress reduction. *Journal of Occupational Health Psychology, 6*, 290–302.

Borycki C, Thorn RG, LeMaster J. (1998). Job satisfaction and organization commitment: A comparison of United States and Mexico employees. *International Journal of Commerce and Management, 8*, 7–25.

Bowler WM. (2002). *Relationships and organizational citizenship behavior: A social network approach*. Unpublished doctoral dissertation. University of Kentucky.

Bowler WM, Brass DJ. (2006). Relational correlates of interpersonal citizenship behavior: A social network perspective. *Journal of Applied Psychology, 91*, 70–82.

Bowling NA, Beehr TA, Johnson AL, Semmer NK, Hendricks EA, Webster HA. (2004). Explaining potential antecedents of workplace social support: Reciprocity or attractiveness? *Journal of Occupational Health Psychology, 9*, 339–350.

Breaugh JA, Dossett DL. (1989). Rethinking the use of personal history information: The value of theory-based biodata for predicting turnover. *Journal of Business and Psychology, 3*, 371–385.

Brenner OC. (1982). Relationship of education to sex, managerial status, and the managerial stereotype. *Journal of Applied Psychology, 67*, 380–383.

Bretz RD, Thompsett RE. (1992). Comparing traditional and integrative learning methods in organizational training programs. *Journal of Applied Psychology, 77*, 941–951.

Brown KG. (2005). A field study of employee e-learning activity and outcomes. *Human Resource Development Quarterly, 16*, 465–480.

Brown KG. (2001). Using computers to deliver training: Which employees learn and why? PERSONNEL PSYCHOLOGY, *54*, 271–296.

Buchko AA. (1993). The effects of employee ownership on employee attitudes: An integrated causal model and path analysis. *Journal of Management Studies, 30*, 633–657.

Burke LA. (2004). Personality and high-maintenance employee behavior. *Journal of Business and Psychology, 18*, 349–363.

Burton JP, Lee TW, Holtom BC. (2002). The influence of motivation to attend, ability to attend, and organizational commitment on different types of absence behaviors. *Journal of Managerial Issues, 14*, 181–197.

Burton CH. (2003). A*n empirical investigation of the interrelationships of organizational culture, managerial values, and organizational citizenship behaviors.* Unpublished dissertation. George Washington University.

Campion MA, Cheraskin L, Stevens MJ. (1994). Career-related antecedents and outcomes of job rotation. *Academy of Management Journal, 37*, 1518–1542.

Carmeli A, Schaubroeck J. (2007). The influence of leaders' and other referents' normative expectations on individual involvement in creative work. *The Leadership Quarterly, 18*, 35–48.

Carmeli A, Meitar R, Weisberg J. (2006). Self-leadership skills and innovative behavior at work. *International Journal of Manpower, 27*, 75–90.

Carmeli A, Shalom R, Weisberg J. (2007). Considerations in organizational career advancement: What really matters. *Personnel Review, 36*, 190–206.

Chen Z, Aryee S. (2007). Delegation and employee work outcomes: An examination of the cultural context of mediating processes in China. *Academy of Management Journal, 50*, 226–238.

Chen Z, Lam W, Zhong JA. (2007). Leader-member exchange and member performance: A new look at individual-level negative feedback-seeking behavior and team-level empowerment climate. *Journal of Applied Psychology, 92*, 202–212.

Chen ZX, Francesco AM. (2003). The relationship between the three components of commitment and employee performance in China. *Journal of Vocational Behavior, 62*, 490–510.

Chen ZX, Tsui AS, Farh J. (2002). Loyalty to supervisor vs. organizational commitment: Relationships to employee performance in China. *Journal of Occupational and Organizational Psychology, 75*, 339–356.

Cheng B, Jiang D, Riley JH. (2003). Organizational commitment, supervisory commitment, and employee outcomes in the Chinese context: Proximal hypothesis or global hypothesis. *Journal of Organizational Behavior, 24*, 313–334.

Chow IH, Lo TW, Sha Z, Hong J. (2006). The impact of developmental experience, empowerment, and organizational support on catering service staff performance. *Hospitality Management, 26*, 478–495.

Clark K, Peters SA, Tomlinson M. (2005). The determinants of lateness: Evidence from British workers. *Scottish Journal of Political Economy, 52*, 282–304.

Clark SC. (2001). Work cultures and work/family balance. *Journal of Vocational Behavior, 58*, 346–365.

Cohen A, Kirchmeyer C. (2005). A cross-cultural study of the work/nonwork interface among Israeli nurses. *Applied Psychology: An International Review, 54*, 537–567.

Cohen A, Vigoda E. (1999). Politics and the workplace: An empirical examination of the relationship between political behavior and work outcomes. *Public Productivity and Management Review, 22*, 389–406.

Cote S, Miners CTH. (2006). Emotional intelligence, cognitive intelligence, and job performance. *Administrative Science Quarterly, 51*, 1–28.

Dabos GE, Rousseau DM. (2004). Mutuality and reciprocity in the psychological contracts of employees and employers. *Journal of Applied Psychology, 89*, 52–72.

Day AL, Carroll SA. (2004). Using an ability-based measure of emotional intelligence to predict individual performance, group performance, and group citizenship behaviors. *Personality and Individual Differences, 36*, 1443–1458.

Day R, Allen TD. (2004). The relationship between career motivation and self-efficacy with protégé career success. *Journal of Vocational Behavior, 64*, 72–91.

De Jonge J, Reuvers MMEN, Houtman ILD, Bongers PM, Kompier MAJ. (2000). Linear and nonlinear relations between psychosocial job characteristics, subjective outcomes, and sickness absence: Baseline results from SMASH. *Journal of Occupational Health Psychology, 5*, 256–268.

Deckop JR, Mangel R, Cirka CC. (1999). Getting more than you pay for: Organizational citizenship behavior and pay-for-performance plans. *Academy of Management Journal, 42*, 420–428.

Deckop JR, Merriman KK, Blau G. (2004). Impact of variable risk preferences on the effectiveness of control by pay. *Journal of Occupational and Organizational Psychology, 77*, 63–80.

Deery S, Erwin P, Iverson R. (1999). Industrial relations in climate, attendance behavior and the role of trade unions. *British Journal of Industrial Relations, 37*, 533–558.

Deery SJ, Iverson R, Walsh J. (2002). Work relationships in telephone call centers: Understanding emotional exhaustion and employee withdrawal. *Journal of Management Studies, 39*, 471–496.

Deery SJ, Iverson RD, Walsh JT. (2006). Toward a better understanding of psychological contract breach: A study of customer services employees. *Journal of Applied Psychology, 91*, 166–175.

Demerouti E. (2006). Job characteristics, flow, and performance: The moderating role of conscientiousness. *Journal of Occupational and Organizational Psychology, 11*, 266–280.

Den Hartog DN, Belschak FD. (2007). Personal initiative, commitment, and affect at work. *Journal of Occupational and Organizational Psychology, 73*, 1–29.

Devine K, Reay T, Stainton L, Collins-Nakai R. (2003). Downsizing outcomes: Better a victim than a survivor? *Human Resource Management, 42*, 109–142.

Dewberry C. (2001). Performance disparities between whites and ethnic minorities: Real differences or assessment bias? *Journal of Occupational and Organizational Psychology, 74*, 659–673.

Dilchert S, Ones DS, Davis RD, Rostow CD. (2007). Cognitive ability predicts objectively measured counterproductive work behaviors. *Journal of Applied Psychology, 92*, 616–627.

Douglas SC, Martinko MJ. (2001). Exploring the role of individual differences in the prediction of workplace aggression. *Journal of Applied Psychology, 86*, 547–559.

Downey BJ. (2005). *Unity of command: Impacts of multiple supervisors in cross-functional working environments*. Unpublished doctoral dissertation. Touro University International.

Dreher GF. (1981). Predicting the salary satisfaction of exempt employees. PERSONNEL PSYCHOLOGY, *34*, 579–589.

Dupre KE, Barling J. (2006). Predicting and preventing supervisory workplace aggression. *Journal of Occupational Health Psychology, 11*, 13–26.

Dupre KE, Inness M, Connelly CE, Barling J, Hoption C. (2006). Workplace aggression in teenage part-time employees. *Journal of Applied Psychology, 91*, 987–997.

Dwyer S, Richard O, Shepherd CD. (1998). An exploratory study of gender and age matching in the salesperson-prospective customer dyad: Testing similarity-performance predictions. *Journal of Personal Selling and Sales Management, 18*, 55–69.

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

Ellemers N, de Gilder D, Van den Heuvel H. (1998). Career-oriented versus team-oriented commitment and behavior at work. *Journal of Applied Psychology, 83*, 717–730.

Ellingson JE, Gruys M, Sackett PR. (1998). Factors related to the satisfaction and performance of temporary employees. *Journal of Applied Psychology, 83*, 913–921.

Farh J, Earley PC, Lin S. (1997). Impetus for action: A cultural analysis of justice and organizational citizenship behavior in Chinese society. *Administrative Science Quarterly, 42*, 421–444.

Farh J, Hackett RD, Liang J. (2007). Individual-level cultural values as moderators of perceived organizational support employee outcome relationships in China: Comparing the effects of power distance and traditionality. *Academy of Management Journal, 50*, 715–729.

Farmer SM, Tierney P, Kung-Mcintyre K. (2003). Exploring creativity in Taiwan: An application of role identity theory. *Academy of Management Journal, 46*, 618–630.

Feldman DC, Turnley WH. (2004). Contingent employment in academic careers: Relative deprivation among adjunct faculty. *Journal of Vocational Behavior, 64*, 284–307.

Ferris GR, Witt LA, Hochwarter WA. (2001). Interaction of social skill and general mental ability on job performance and salary. *Journal of Applied Psychology, 86*, 1075–1082.

Ferris KR. (1982). Educational predictors of professional pay and performance. *Accounting, Organization and Society, 7*, 225–230.

Fields D, Dingman ME, Roman PM, Blum TC. (2005). Exploring predictors of alternative job changes. *Journal of Occupational and Organizational Psychology, 78*, 63–82.

Flynn FJ. (2003). How much should I give and how often? The effects of generosity and frequency of favor exchange on social status and productivity. *Academy of Management Journal, 46*, 539–553.

Francesco AM, Chen ZX. (2004). Collectivism in action: Its moderating effects on the relationship between organizational commitment and employee performance in China. *Group and Organization Management, 29*, 425–441.

Frone MR, Barnes GM, Farrell MP. (1994). Relationship of work-family conflict to substance use among employed mothers: The role of negative affect. *Journal of Marriage and the Family, 56*, 1019–1030.

Fuller JB. (2007). An exploratory examination of voice behavior from an impression management perspective. *Journal of Managerial Issues, 14*, 134–151.

Gbadamosi G, Joubert P. (2005). Money ethic, moral conduct and work related attitudes: Field study from the public sector in Swaziland. *Journal of Management Development, 24*, 754–763.

George JM. (1989). Mood and absence. *Journal of Applied Psychology, 74*, 317–324.

George JM, Zhou J. (2007). Dual tuning in a supportive context: Joint contributions of positive mood, negative mood, and supervisory behaviors to employee creativity. *Academy of Management Journal, 50*, 605–622.

Gilbert JA, Ivancevich JM. (2001). Effects of diversity management on attachment. *Journal of Applied Social Psychology, 31*, 1331–1349.

Gist ME, 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.

Glisson C, James LR. (2002). The cross-level effects of culture and climate in human service teams. *Journal of Organizational Behavior, 23*, 767–794.

Goldberg LR, Sweeney D, Merenda PF, Hughes JE. (1998). Demographic variables and personality: The effects of gender, age, education, and ethnic/racial status on self-descriptions of personality attributes. *Personality and Individual Differences, 24*, 393–403.

Gong Y, Shenkar O, Luo Y, Nyaw M. (2001). Role conflict and ambiguity of CEOs in international joint ventures: A transaction cost perspective. *Journal of Applied Psychology, 86*, 764–773.

Gordon T. (1949). The airline pilot's job. *Journal of Applied Psychology, 33*, 122–131.

Gottfredson GD, Holland JL. (1990). A longitudinal test of the influence of congruence: Job satisfaction, competency utilization, and counterproductive behavior. *Journal of Counseling Psychology, 37*, 389–398.

Greenberg L, Barling J. (1999). Predicting employee aggression against coworkers, subordinates and supervisors: The roles of person behaviors and perceived workplace factors. *Journal of Organizational Behavior, 20*, 897–913.

Grunberg L, Moore SY, Greenberg E. (2001). Differences in psychological and physical health among layoff survivors: The effects of layoff contact. *Journal of Occupational Health Psychology, 6*, 15–25.

Gruys ML. (2000). *The dimensionality of deviant employee behavior in the workplace*. Unpublished dissertation. University of Minnesota.

Gruys ML, Sackett PR. (2003). Investigating the dimensionality of counterproductive work behavior. *International Journal of Selection and Assessment, 11*, 30–42.

Hammer TH, Landau JC, Stern RN. (1981). Absenteeism when workers have a voice: The case of employee ownership. *Journal of Applied Psychology, 66*, 561–573.

Hampson SE, Goldberg LR, Vogt TM, Dubanoski JP. (2006). Forty years on: Teachers' assessments of children's personality traits predict self-reported health behaviors and outcomes at midlife. *Health Psychology, 25*, 57–64.

Hanisch KA, Hulin CL. (1990). Job attitudes and organizational withdrawal: An examination of retirement and other voluntary withdrawal behaviors. *Journal of Vocational Behavior, 37*, 60–78.

Hanisch KA, Hulin CL. (1990). General attitudes and organizational withdrawal: An evaluation of a causal model. *Journal of Vocational Behavior, 39*, 110–128.

Hargis MB, Baltes BB, Fried Y, Levi A. (2006). Race differences in termination at work: The role of educational inequality. *Journal of Business and Psychology, 20*, 587–598.

Hattrup K, O'Connell MS, Labrador JR. (2005). Incremental validity of locus of control after controlling for cognitive ability and conscientiousness. *Journal of Business and Psychology, 19*, 461–481.

Hendriks AAJ, Smets EMA, Vrielink MR, Van ES SQ, De Haes JCJM. (2006). Is personality a determinant of patient satisfaction with hospital care? *International Journal for Quality in Health Care, 18*, 152–158.

Hochwarter WA, James M, Johnson D, Ferris GR. (2004). The interactive effects of politics perceptions and trait cynicism on work outcomes. *Journal of Leadership and Organizational Studies, 10*, 44–57.

Hochwarter WA, Witt LA, Kacmar KM. (2000). Perceptions of organizational politics as a moderator of the relationship between conscientiousness and job performance. *Journal of Applied Psychology, 85*, 472–478.

Hoffi-Hofstetter H, Mannheim B. (1999). Managers' coping resources, perceived organizational patterns, and responses during organizational recovery from decline. *Journal of Organizational Behavior, 20*, 665–685.

Holmes T. (2004). *Effect of goal setting on job performance*. Unpublished master thesis. Roosevelt University.

Holtom BC, Lee TW, Tidd ST. (2002). The relationship between work status congruence and work-related attitudes and behaviors. *Journal of Applied Psychology, 87*, 903–915.

Huang I, Lin H, Chuang C. (2006). Constructing factors related to worker retention. *International Journal of Manpower, 27*, 491–508.

Hui C, Lam SSK, Law KKS. (2000). Instrumental values of organizational citizenship behavior of promotion: A field quasi-experiment. *Journal of Applied Psychology, 85*, 822–828.

Hui C, Lam SSK, Schaubroeck J. (2001). Can good citizens lead the way in providing quality service? A field quasi experiment. *Academy of Management Journal, 44*, 988–995.

Huselid MA, Day NE. (1991). Organizational commitment, job involvement, and turnover: A substantive and methodological analysis. *Journal of Applied Psychology, 76*, 380–391.

Ivancevich JM, McMahon JT. (1977). Education as a moderator of goal setting effectiveness. *Journal of Vocational Behavior, 11*, 83–94.

Iverson RD, Buttigieg DM. (1999). Affective, normative, and continuance commitment: Can the "right kind" of commitment be managed? *Journal of Management Studies, 36*, 307–333.

Iverson RD, Pullman JA. (2000). Determinants of voluntary turnover and layoffs in an environment of repeated downsizing following a merger: An event history analysis. *Journal of Management, 26*, 977–1003.

Jacobsen DI. (2000). Managing increased part-time: Does part-time work imply part-time commitment? *Managing Service Quality, 10*, 187–200.

Janssen O. (2000). Job demands, perceptions of effort-reward fairness and innovative work behavior. *Journal of Occupational and Organizational Psychology, 73*, 287–302.

Janssen O. (2001). Fairness perception as a moderator in the curvilinear relationships between job demands and job performance and job satisfaction. *Academy of Management Journal, 44*, 1039–1050.

Johns G. (1978). Attitudinal and nonattitudinal predictors of two forms of absence from work. *Organizational Behavior and Human Performance, 23*, 431–444.

Jones JR, Schaubroeck J. (2004). Mediators of the relationship between race and organizational citizenship behavior. *Journal of Managerial Issues, 16*, 505–527.

Judge TA. (1993). Does affective disposition moderate the relationship between job satisfaction and voluntary turnover? *Journal of Applied Psychology, 78*, 395–401.

Judiesch MK, Lyness KS. (1999). Left behind? The impact of leaves of absence on managers' career success. *Academy of Management Journal, 42*, 641–651.

Kahya E. (2007). The effects of job characteristics and working conditions on job performance. *International Journal of Industrial Ergonomics, 37*, 515–523.

Kanfer R, Crosby JV, Brandt DM. (1988). Investigating behavioral antecedents of turnover at three job tenure levels. *Journal of Applied Psychology, 73*, 331–335.

Karatape OM, Kilic H. (2007). Relationships of supervisor support and conflicts in the work-family interface with the selected job outcomes of frontline employees. *Tourism Management, 28*, 238–252.

Karatape OM, Tekinkus M. (2006). The effects of work-family conflict, emotional exhaustion, and intrinsic motivation on job outcomes of front-line employees. *International Journal of Bank Marketing, 24*, 173–193.

Kaufman HG. (1978). Continuing education and job performance: A longitudinal study. *Journal of Applied Psychology, 63*, 248–251.

Keller RT. (1984). The role of performance and absenteeism in the prediction of turnover. *Academy of Management Journal, 27*, 176–183.

Kirchmeyer C. (2002). Gender differences in managerial careers: Yesterday, today, and tomorrow. *Journal of Business Ethics, 37*, 5–24.

Kliegel M, Zimprich D. (2005). Predictors of cognitive complaints in older adults: A mixture regression approach. *European Journal of Ageing, 2*, 13–23.

Koberg CS, Boss RW, Senjem JC, Goodman EA. (1999). Antecedents and outcomes of empowerment: Empirical evidence from the health industry. *Group and Organization Management, 24*, 71–91.

Koch JL, Rhodes SR. (1981). Predictors of turnover of female factor worker. *Journal of Vocational Behavior, 18*, 145–161.

Korsgaard MA, Roberson L, Rymph RD. (1998). What motivates fairness? The role of subordinate assertive behavior on managers' interactional fairness. *Journal of Applied Psychology, 83*, 731–744.

Koster F, Sanders K. (2006). Organisational citizens or reciprocal relationships? An empirical comparison. *Personnel Review, 35*, 519–537.

Kraimer ML, Wayne SJ, Liden RC, Sparrowe RT. (2005). The role of job security in understanding the relationship between employees' perceptions of temporary workers and employees' performance. *Journal of Applied Psychology, 90*, 389–398.

Kuehn KW, Al-Busaidi Y. (2002). Citizenship behavior in a non-western context: An examination of the role of satisfaction, commitment and job characteristics on self-reported OCB. *International Journal of Commerce and Management, 12*, 107–125.

Kwok C, Au WT, Ho JMC. (2005). Normative controls and self-reported counterproductive behaviors in the workplace in China. *Applied Psychology: An International Review, 54*, 465–475.

Laker DR, Steffy BD, Shimko BW. (1992). The impact of household economy on stress reactions among professional women. *Journal of Business and Psychology, 7*, 99–107.

Lam SSK, Chen X, 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.

Lambert EG, Edwards C, Camp SD, Saylor WG. (2005). Here today, gone tomorrow, back again the next day: Antecedents of correctional absenteeism. *Journal of Criminal Justice, 33*, 165–175.

Lamont LM, Lundstrom WJ. (1977). Identifying successful industrial salesmen by personality and personnel characteristics. *Journal of Marketing Research, 14*, 517–529.

Latack JC, Josephs SL, Roach BL, Levine MD. (1987). Carpenter apprentices: Comparison of career transitions for men and women. *Journal of Applied Psychology, 72*, 393–400.

Lee K. (2000). *Job affect as a predictor of organizational citizenship behavior and workplace deviance*. Unpublished dissertation. The University of Western Ontario.

Lee K, Allen NJ. (2002). Organizational citizenship behavior and workplace deviance: The role of affect and cognitions. *Journal of Applied Psychology, 87*, 131–142.

Lee TW, Mowday RT. (1987). Voluntarily leaving an organization: An empirical investigation of Steers and Mowday's model of turnover. *Academy of Management Journal, 30*, 721–743.

Lehman WEK, Simpson DD. (1992). Employee substance use and on-the-job behavior. *Journal of Applied Psychology, 77*, 309–321.

LePine JA, Van Dyne L. (1998). Predicting voice behavior in work groups. *Journal of Applied Psychology, 83*, 853–868.

Lester SW, Brower HH. (2003). In the eyes of the beholder: The relationship between subordinates' felt trustworthiness and their work attitudes and behaviors. *Journal of Leadership and Organizational Studies, 10*, 17–33.

Levin DZ, Whitener EM, Cross R. (2006). Perceived trustworthiness of knowledge sources: The moderating impact of relationship length. *Journal of Applied Psychology, 91*, 1163–1171.

Liang S, Ling H, Hsieh S. (2007). The mediating effects of leader-member exchange quality to influence the relationship between paternalistic leadership and organizational citizenship behaviors. *Journal of American Academy of Business, Cambridge, 10*, 127–137.

Loudermilk KM. (1966). Prediction of efficiency of lumber and paper mill employees. PERSONNEL PSYCHOLOGY, *19*, 301–310.

Lucas GH. (1985). The relationships between job attitudes, personal characteristics, and job outcomes: A study of retail store managers. *Journal of Retailing, 61*, 35–62.

Lynch PD, Eisenberger R, Armeli S. (1999). Perceived organizational support: Inferior versus superior performance by wary employees. *Journal of Applied Psychology, 84*, 467–483.

Lyness KS, Judiesch MK. (2001). Are female managers quitters? The relationships of gender, promotions, and family leaves of absence to voluntary turnover. *Journal of Applied Psychology, 86*, 1167–1178.

Lyness KS, Heilman ME. (2006). When fit is fundamental: Performance evaluations and promotions of upper-level female and male managers. *Journal of Applied Psychology, 91*, 777–785.

Lyness KS, Thompson DE. (1997). Above the glass ceiling? A comparison of matched samples of female and male executives. *Journal of Applied Psychology, 82*, 359–375.

Macan TH. (1994). Time management: Test of a process model. *Journal of Applied Psychology, 79*, 381–391.

Madjar N. (2008). Emotional and informational support from different sources and employee creativity. *Journal of Occupational and Organizational Psychology, 81*, 83–100.

Madjar N, Oldham GR, Pratt MG. (2002). There's no place like home? The contributions of work and nonwork creativity support to employees' creative performance. *Academy of Management Journal, 45*, 757–767.

Mannheim B, Baruch Y, Tal J. (1997). Alternative models for antecedents and outcomes of work centrality and job satisfaction of high-tech personnel. *Human Relations, 50*, 1537–1562.

Markman GD, Baron RA, Balkin DB. (2005). Are perseverance and self-efficacy costless? Assessing entrepreneurs' regretful thinking. *Journal of Organizational Behavior, 26*, 1–19.

Martin TN. (1980). Modeling the turnover process. *Journal of Management Studies, 17*, 261–274.

Martocchio JJ, Webster J. (1992). Effects of feedback and cognitive playfulness on performance in microcomputer software training. PERSONNEL PSYCHOLOGY, *45*, 553–578.

Mathieu JE, Farr JL. (1991). Further evidence for the disciminant validity of measures of organizational commitment, job involvement, and job satisfaction. *Journal of Applied Psychology, 76*, 127–135.

Mathieu JE, Tannenbaum SI, Salas E. (1992). Influences of individual and situational characteristics on measures of training effectiveness. *Academy of Management Journal, 35*, 828–847.

McBey K, Karakowsky L. (2000). Examining sources of influence on employee turnover in the part-time work context. *Leadership and Organization Development Journal, 21*, 136–144.

McElroy JC, Morrow PC, Power ML, Iqbal Z. (1993). Commitment and insurance agents' job perceptions, attitudes, and performance. *Journal of Risk and Insurance, 60*, 363–384.

McEnrue MP. (1988). Length of experience and the performance of managers in the establishment phase of their careers. *Academy of Management Journal, 31*, 175–185.

McFarlin SK, Fals-Stewart W, Major DA, Justise EM. (2001). Alcohol use and workplace aggression: An examination of perception and victimization. *Journal of Substance Use, 13*, 303–321.

McManus IC, Furnham A. (2006). Aesthetic activities and aesthetic attitudes: Influences of education, background, and personality on interest and involvement in the arts. British *Journal of Psychology, 97*, 555–587.

Metz I, Tharenou P. (2001). Women's career advancement: The relative contribution of human and social capital. *Group and Organization Management, 26*, 312–342.

Meyer HH. (1970). The validity of the in-basket as a measure of managerial performance. PERSONNEL PSYCHOLOGY, *23*, 297–307.

Miron E, Erez M, Naveh E. (2004). Do personal characteristics and cultural values that promote innovation, quality, and efficacy compete or complement each other? *Journal of Organizational Behavior, 25*, 175–199.

Mohyeldin A, Suliman T. (2007). Links between justice, satisfaction and performance in the workplace: A survey in the UAE and Arabic context. *Journal of Management Development, 26*, 294–311.

Moideenkutty U. (2000). *Correlates and outcomes of organizational citizenship behavior directed toward the organization, the supervisor, and coworkers: A social exchange perspective*. Unpublished dissertation. Temple University.

Monsen EW. (2005). *Employees do matter: Autonomy, teamwork, and corporate entrepreneurial culture*. Unpublished doctoral dissertation. University of Colorado.

Moorman RH, Wells DL. (2003). Can electronic performance monitoring be fair? Exploring relations among monitoring characteristics, perceived fairness, and job performance. *Journal of Leadership and Organizational Studies, 10*, 2–16.

Morgeson FP, Delaney-Klinger K, Hemingway MA. (2005). The importance of job autonomy, cognitive ability, and job-related skill for predicting role breadth and job performance. *Journal of Applied Psychology, 90*, 299–406.

Morin L, Renaud S. (2004). Participation in corporate university training: Its effect on individual job performance. *Canadian Journal of Administrative Sciences, 21*, 295–306.

Morrow PC, McElroy JC, Laczniak KS, Fenton JB. (1999). Using absenteeism and performance to predict employee turnover: Early detection through company records. *Journal of Vocational Behavior, 55*, 358–374.

Moshavi D, Brown FW, Dodd NG. (2003). Leader self-awareness and its relationship to subordinate attitudes and performance. *Leadership and Organization Development Journal, 24*, 407–418.

Motowidlo SJ. (1982). Relationship between self-rated performance and pay satisfaction among sales representatives. *Journal of Applied Psychology, 67*, 209–213.

Moye NA. (2001). *The role of psychological contract in individual motivation to gender bias*. Unpublished dissertation. University of Maryland at College Park.

Mulligan RG. (2003). *Self-assessment of social and emotional competences of floor covering salespeople and its correlation with sales performance.* Unpublished dissertation. The State University of New Jersey.

Nafukho FM, Hinton BE. (2003). Determining the relationship between drivers' level of education, training, working conditions, and job performance in Kenya. *Human Resource Development Quarterly, 14*, 265–283.

Near JP, Miceli MP. (1986). Retaliation against whistle blowers: Predictors and effects. *Journal of Applied Psychology, 71*, 137–145.

Nemanich LA, Keller RT. (2007). Transformational leadership in an acquisition: A field study of employees. *Leadership Quarterly, 18*, 49–68.

Neubert MJ, Taggar S. (2004). Pathways to informal leadership: The moderating role of gender on the relationship of individual differences and team member network centrality to informal leadership emergence. *Leadership Quarterly, 15*, 175–194.

O'Bannon DP, Pearce CL. (1999). An exploratory examination of gainsharing in service organizations: Implications for organizational citizenship behavior and pay satisfaction. *Journal of Managerial Issues, 11*, 363–378.

Obstfeld D. (2005). Social networks, the Tertius Iungens Orientation, and involvement in innovation. *Administrative Science Quarterly, 50*, 100–130.

Ohly S, Fritz C. (2007). Challenging the status quo: What motivates proactive behavior? *Journal of Occupational and Organizational Psychology, 80*, 623–629.

Oldham GR, Gordon BI. (1999). Job complexity and employee substance use: The moderating effects of cognitive ability. *Journal of Health and Social Behavior, 40*, 290–306.

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

Organ DW, Konovsky M. (1989). Cognitive versus affective determinants of organizational citizenship behavior. *Journal of Applied Psychology, 74*, 157–164.

Ostroff C, Atwarter LE. (2000). Does whom you work with matter? Effects of referent group gender and age composition on managers' compensation. *Journal of Applied Psychology, 88*, 725–740.

Parasuraman S. (1982). Predicting turnover intentions and turnover behavior: A multivariate analysis. *Journal of Vocational Behavior, 21*, 111–121.

Parasuraman S, Alutto JA. (1984). Sources and outcomes of stress in organizational settings: Toward the development of a structural model. *Academy of Management Journal, 27*, 330–350.

Penner LA. (2002). Dispositional and organizational influences on sustained volunteerism: An interactional perspective. *Journal of Social Issues, 58*, 447–467.

Perry-Smith JE. (2006). Social yet creative: The role of social relationships in facilitating individual creativity. *Academy of Management Journal, 49*, 85–101.

Phillips A, Bedeian AG. (1994). Leader-follower exchange quality: The role of personal and interpersonal attributes. *Academy of Management Journal, 37*, 990–1001.

Prenda KM, Lachman ME. (2001). Planning for the future: A life management strategy for increasing control and life satisfaction in adulthood. *Psychology and Aging, 16*, 206–216.

Ramamoorthy N, Flood PC. (2004). Individualism/collectivism, perceived task interdependence and teamwork attitudes among Irish blue-collar employees: A test of the main and moderating effects. *Human Relations, 57*, 347–366.

Ramaswami SN. (1996). Marketing controls and dysfunctional employee behaviors: A test of traditional and contingency theory postulates. *Journal of Marketing, 60*, 105–120.

Renn RW, Fedor DB. (2001). Development and field test of a feedback setting, self- efficacy, and goal setting model of work performance. *Journal of Management, 27*, 563–583.

Rentsch JR, Steel RP. (1992). Construct and concurrent validation of the Andrews and Withey job satisfaction questionnaire. *Educational and Psychological Measurement, 52*, 357–367.

Rentsch JR, Steel PR. (1998). Testing the durability of job characteristics as predictors of absenteeism over a six-year period. PERSONNEL PSYCHOLOGY, *51*, 165–190.

Robinson SL, O'Leary-Kelly AM. (1998). Monkey see, monkey do: The influence of work groups on the antisocial behavior of employees. *Academy of Management Journal, 41*, 658–672.

Rodwell JJ, Kienzle R, Shadur MA. (1998). The relationships among work-related perceptions, employee attitudes, and employee performance: The integral role of communication. *Human Resource Management, 37*, 277–293.

Roe RA, Zinovieva IL, Dienes E, Ten Horn LA. (2000). A comparison of work motivation in Bulgaria, Hungary, and the Netherlands: Test of a model. *Applied Psychology: An International Review, 49*, 658–687.

Roman S, Munuera JL. (2005). Determinants and consequences of ethical behavior: An empirical study of salespeople. *European Journal of Marketing, 39*, 473–495.

Rosenblatt Z, Shirom A. (2005). Predicting teacher absenteeism by personal background factors. *Journal of Educational Administration, 43*, 209–225.

Rutherford MW. (2007). Corporate entrepreneurship: An empirical look at the innovativeness dimension and its antecedents. *Journal of Organizational Change, 20*, 429–446.

Sager JK, Johnston MW. (1989). Antecedents and outcomes of organizational commitment: A study of salespeople. *Journal of Personal Selling and Sales Management, 9*, 30–41.

Schaubroeck J, Lam SSK. (2002). How similarity to peers and supervisor influences organizational advancement in different cultures. *Academy of Management Journal, 45*, 1120–1136.

Schlotzhuaer DL, Rosse JG. (1985). A five-year study of a positive incentive absence control program. PERSONNEL PSYCHOLOGY, *38*, 575–585.

Scott SG, Bruce RA. (1994). Determinants of innovative behavior: A path model of individual innovation in the workplace. *Academy of Management Journal, 37*, 580–607.

Shaw JD, Gupta N. (2001). Pay fairness and employee outcomes: Exacerbation and attenuation effects of financial need. *Journal of Occupational and Organizational Psychology, 74*, 299–320.

Shin SJ, Zhou J. (2003). Transformational leadership, conversation, and creativity: Evidence from Korea. *Academy of Management Journal, 46*, 703–714.

Shore T, Sy T, Strauss J. (2006). Leader responsiveness, equity sensitivity, and employee attitudes and behavior. *Journal of Business and Psychology, 21*, 227–241.

Shore LM, Barksdale K, Shore TH. (1995). Managerial perceptions of employee commitment to the organization. *Academy of Management Journal, 38*, 1593–1615.

Siguaw JA, Honeycutt ED. (1995). An examination of gender differences in selling behaviors and job attitudes. *Industrial Marketing Management, 24*, 45–52.

Skarlicki DP, Latham GP. (1996). Increasing citizenship behavior within a labor union: A test of organizational justice theory. *Journal of Applied Psychology, 81*, 161–169.

Skarlicki DP, Latham GP. (1997). Leadership training in organizational justice to increase citizenship behavior within a labor union: A replication. PERSONNEL PSYCHOLOGY, *50*, 617–633.

Smith CA, Organ DW, Near JP. (1983). Organizational citizenship behavior: Its nature and antecedents. *Journal of Applied Psychology, 68*, 653–663.

Smulders PGW, Nijhuis FJN. (1999). The job demands job control model and absence behavior: Results of a 3-year longitudinal study. *Work and Stress, 13*, 115–131.

Sosik JJ. (2001). Self-other agreement on charismatic leadership: Relationships with work attitudes and managerial performance. *Group and Organization Management, 26*, 484–511.

Spector PE, Cooper GL, Aguilar-Vafaie ME. (2002). A comparative study of perceived job stressor sources and job strain in American and Iranian Managers. *Applied Psychology: An International Review, 51*, 446–457.

Spencer DG, Steers RM. (1980). The influence of personal factors and perceived work experiences on employee turnover and absenteeism. *Academy of Management Journal, 23*, 567–572.

Spencer DG, Steers RM. (1981). Performance as a moderator of the job satisfaction turnover relationship. *Journal of Applied Psychology, 66*, 511–514.

Steel RP, Rentsch JR. (1995). Influence of cumulation strategies on the long-range prediction of absenteeism. *Academy of Management Journal, 38*, 1616–1634.

Steel RP, Rentsch JR, Hendrix WH. (2002). Cross-level replication and extension of Steel and Rentsch's (1995) longitudinal absence findings. *Journal of Business and Psychology, 16*, 447–456.

Steel RP, Rentsch JR, Van Scotter JR. (2007). Timeframes and absence frameworks: A test of Steers and Rhodes' (1978) model of attendance. *Journal of Management, 33*, 180–195.

Steers RM. (1975a). Effects of need for achievement on the job performance job attitude relationship. *Journal of Applied Psychology, 60*, 678–682.

Steers RM. (1975b). Task-goal attributes, n achievement, and supervisory performance. *Organizational Behavior and Human Performance, 13*, 392–403.

Stroh LK, Brett JM. (1996). Family structuring, glass ceiling, and traditional explanations for the differential rate of turnover of female and male managers. *Journal of Vocational Behavior, 49*, 99–118.

Stumpf SA, Dawley PK. (1981). Predicting voluntary and involuntary turnover using absenteeism and performance indices. *Academy of Management Journal, 24*, 148–163.

Sturges J, Conway N, Guest D, Lifeooghe A. (2005). Managing the career ideal: The psychological contract as a framework for understanding career management, organizational commitment and work behavior. *Journal of Organizational Behavior, 26*, 821–838.

Suliman A, Iles P. (2000). Is continuance commitment beneficial to organizations? Commitment-performance relationship: A new look. *Journal of Managerial Psychology, 15*, 407–426.

Sulkin HA, Pranis RW. (1967). Comparison of grievants with non-grievants in a heavy machinery company. PERSONNEL PSYCHOLOGY, *20*, 111–119.

Sy T, Tram S, O'Hara LA. (2006). Relation of employee and manager emotional intelligence to job satisfaction and performance. *Journal of Vocational Behavior, 68*, 461–473.

Tan H, Tan C. (2002). Temporary employees in Singapore: What drives them? *Journal of Psychology, 136*, 83–102.

Tang TL, Ibrahim AHS. (1998). Antecedents of organizational citizenship behavior revisited: Public personnel in the United States and in the Middle East. *Public Personnel Management, 27*, 529–550.

Tang TL, Kim JK, Tang DS. (2000). Does attitude toward money moderates the relationship between intrinsic job satisfaction and voluntary turnover? *Human Relations, 53*, 213–245.

Tepper BJ, Uhl-Bien M, Kohut GF, Rogelberg SG, Lockhart DE, Ensley MD. (2006). Subordinates' resistance and managers' evaluation of subordinates' performance. *Journal of Management, 32*, 185–209.

Thomas DC, Au K. (2003). (2002). The effect of cultural differences on behavioral responses to low job satisfaction. *Journal of International Business Studies, 33*, 309–326.

Thomas DC, Pekerti AA. (2003). Effect of culture on situational determinants of exchange behavior in organizations: A comparison of New Zealand and Indonesia. *Journal of Cross-Cultural Psychology, 34*, 269–281.

Tierney P, Farmer SM. (2002). Creative self-efficacy: Its potential antecedents and relationship to creative performance. *Academy of Management Journal, 45*, 1137–1148.

Tierney P, Farmer SM. (2004). The Pygmalion process and employee creativity. *Journal of Management, 30*, 413–432.

Tierney P, Farmer SM, Graen GB. (1999). An examination of leadership and employee creativity: The relevance of traits and relationships. PERSONNEL PSYCHOLOGY, *52*, 591–620.

Tompson HB, Werner JM. (1997). The impact of role conflict/facilitation on core and discretionary behaviors: Testing a mediated model. *Journal of Management, 23*, 583–601.

Torkelson E, Muhonen T. (2004). The role of gender and job level in coping with occupational stress. *Work and Stress, 18*, 267–274.

Tremblay M, Roger A. (1993). Individual, familial, and organizational determinants of career plateau. *Group and Organization Studies, 18*, 411–435.

Trevor CO. (2001). Interactions among actual ease-of-movement determinants and job satisfaction in the prediction of voluntary turnover. *Academy of Management Journal, 44*, 621–638.

Truxillo DM, Bennett SR, Collins ML. (1998). College education and police job performance: A ten-year study. *Public Personnel Management, 27*, 269–280.

Tsui AS, O'Reilly CA. (1989). Beyond simple demographic effects: The importance of relational demography in superior-subordinate dyads. *Academy of Management Journal, 32*, 402–423.

Tsui AS, Porter LW, Egan TD. (2002). When both similarities and dissimilarities matter: Extending the concept of relational demography. *Human Relations, 55*, 899–929.

Turban DB, Jones AP. (1988). Supervisor-subordinate similarity: Types, effects, and mechanisms. *Journal of Applied Psychology, 73*, 228–234.

Turner JW, Grube JA, Tinsley CH, Lee C, O'Pell C. (2006). How does media use reflect organizational norms and affect performance? *Journal of Business Communication, 43*, 220–250.

Vandenberg R J, Dejoy DM, Wilson MG, Ng TWH, Butts MM. (2006, April). *Effects of work environment on organizational commitment in changing careers.* Paper presented at the 21st Annual Conference of the Society for Industrial and Organizational Psychology, Dallas, TX.

Van Dyne L, Ang S. (1998). Organizational citizenship behavior of contingent workers in Singapore. *Academy of Management Journal, 41*, 692–703.

Van Dyne L, LePine JA. (1998). Helping and voice extra-role behaviors: Evidence of construct and predictive validity. *Academy of Management Journal, 41*, 108–119.

Van Dyne L, Pierce JL. (2004). Psychological ownership and feelings of possession: Three field studies predicting employee attitudes and organizational citizenship behavior. *Journal of Organizational Behavior, 25*, 439–459.

Van Emmerik IJH, Jawahar IM, Stone TH. (2005). Associations among altruism, burnout dimensions, and organizational citizenship behavior. *Work and Stress, 19*, 93–100.

Van Emmerik IJH, Jawahar IM. (2005). Lending a helping hand: Provision of helping behaviors beyond professional career responsibilities. *Career Development International, 10*, 347–358.

Vesse RM, Nihuis FJN, Kok G. (1998). Associations between work stress, alcohol consumption and sickness absence. *Addiction, 93*, 231–241.

Vigoda E. (2000). Organizational politics, job attitudes, and work outcomes: Exploration and implications for the public sector. *Journal of Vocational Behavior, 57*, 326–347.

Vigoda E. (2001). Reactions to organizational politics: A cross-cultural examination in Israel and Britain. *Human Relations, 54*, 1483–1518.

Vigoda E. (2002). Stress-related aftermaths to workplace politics: The relationships among politics, job distress, and aggressive behavior in organizations. *Journal of Organizational Behavior, 23*, 571–591.

Vigoda-Gadot E. (2007). Redrawing the boundaries of OCB? An empirical examination of compulsory extra-role behavior in the workplace. *Journal of Business and Psychology, 21*, 377–405.

Waldman DA, Avolio BJ. (1991). Race effects in performance evaluations: Controlling for ability, education, and experience. *Journal of Applied Psychology, 76*, 897–901.
Wanberg CR, Banas JT. (2000). Predictors and outcomes of openness to change in a reorganizing workplace. *Journal of Applied Psychology, 85*, 132–142.
Wanberg CR, Kanfer R, Banas JT. (2000). Predictors and outcomes of networking intensity among unemployed job seekers. *Journal of Applied Psychology, 85*, 491–503.
Wanberg CR, Watt JD, Rumsey DJ. (1996). Individuals without jobs: An empirical study of job-seeking behavior and reemployment. *Journal of Applied Psychology, 81*, 76–87.
Warr P, Bunce D. (1995). Trainee characteristics and the outcomes of open learning. PERSONNEL PSYCHOLOGY, *48*, 347–375.
Waters LK, Roach D. (1971). Relationship between job attitudes and two forms of withdrawal from the work situation. *Journal of Applied Psychology, 55*, 92–94.
Waters LK, Waters CW. (1970). Peer nominations as predictors of short-term sales performance. *Journal of Applied Psychology, 54*, 42–44.
Wayne JH, Musisca N, Fleeson W. (2004). Considering the role of personality in the work-family experience: Relationships of the big five to work-family conflict and facilitation. *Journal of Vocational Behavior, 64*, 108–130.
Webster J, Martocchio JJ. (1995). The differential effects of software training previews on training outcomes. *Journal of Management, 21*, 757–787.
Wiggins JD, Weslander DL. (1979). Personality characteristics of counselors rated as effective or ineffective. *Journal of Vocational Behavior, 15*, 175–185.
Williams S, Pitre R, Zainuba M. (2002). Justice and organizational citizenship behavior intentions: Fair rewards versus fair treatment. *Journal of Social Psychology, 142*, 33–44.
Wilson RS, Mendes de Leon CF, Bienias JL, Evans DA, Bennett DA. (2004). Personality and mortality in old age. *Journal of Gerontology, 59*, 110–116.
Witt LA. (1998). Enhancing organizational goal congruence: A solution to organizational politics. *Journal of Applied Psychology, 28*, 835–861.
Wong C, Law KS, Wong P. (2004). Development and validation of a forced choice emotional intelligence measure of Chinese respondents in Hong Kong. *Asia Pacific Journal of Management, 21*, 535–559.
Wong Y, Wong C, Ngo H, Lui H. (2005). Different responses to job insecurity of Chinese workers in joint ventures and state-owned enterprises. *Human Relations, 58*, 1391–1418.
Yang J. (2008). Can't serve customers right? An indirect effect of co-workers' counterproductive behavior in the service environment. *Journal of Occupational and Organizational Psychology, 81*, 29–46.
Yang J. (2005). *The role of trust in organizations: Do foci and bases matter?* Unpublished doctoral dissertation. Nanjing University, China.
Yang J, Mossholder KW, Peng TK. (2007). Procedural justice climate and group power distance: An examination of cross-level interaction effects. *Journal of Applied Psychology, 92*, 681–692.
Youngblood SA. (1984). Work, nonwork, and withdrawal. *Journal of Applied Psychology, 69*, 106–117.
Van Yperen NW, Hagedoorn M, Geurts SAE. (1996). Intent to leave and absenteeism as reactions to perceived inequity: The role of psychological and social constraints. *Journal of Occupational and Organizational Psychology, 69*, 367–372.
Zellars KL, Tepper BJ, Duffy MK. (2002). Abusive supervision and subordinates' organizational citizenship behavior. *Journal of Applied Psychology, 87*, 1068–1076.
Zhou J. (2003). When the presence of creative coworkers is related to creativity: Role of supervisor close monitoring, developmental feedback, and creative personality. *Journal of Applied Psychology, 88*, 413–422.