COGNITIVE ABILITY, PERSONALITY, AND EXPERIENCE:

EVIDENCE FOR DIFFERENTIAL IMPACT ON JOB PERFORMANCE FACTORS

A Thesis

by

ANDREW JOSEPH SLAUGHTER

Submitted to the Office of Graduate Studies of
Texas A&M University
in partial fulfillment of the requirements for the degree of

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May 2004

Major Subject: Psychology

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Approved as to style and content by:

Stephanie C. Payne (Chair of Committee)	Angelo DeNisi (Member)
Winfred Arthur, Jr. (Member)	Steven Rholes (Head of Department)

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ABSTRACT

Cognitive Ability, Personality, and Experience:

Evidence for Differential Impact on Job Performance Factors. (May 2004)

Andrew Joseph Slaughter, B.A., University of Kentucky

Chair of Advisory Committee: Dr. Stephanie C. Payne

Using a sample of 443 participants employed in a variety of jobs, the interactions between cognitive ability, conscientiousness, agreeableness, task experience, and task and contextual performance were explored. Results suggest that task experience is a better predictor of task performance than contextual performance; that agreeableness is associated with greater levels of contextual performance, but only for those lower in cognitive ability; and that conscientiousness moderates the interaction between cognitive ability and task experience on task performance. Specifically, it was found that for higher levels of conscientiousness, task performance converged for those of different cognitive abilities when task experience was high; likewise, for lower levels of conscientiousness, task performance diverged for those of different cognitive abilities when task experience was high. The impact and limitations of these results are discussed.

DEDICATION

To my parents, the rest of my family, and all of my friends – without you, this work would not have been possible. Thank you for the years of love and support.

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INTRODUCTION

Although industrial psychology has many criteria of interest, it would not be far from the truth to refer to the variable job performance as the sine qua none of the art. This is not surprising; after all, one of the fundamental goals of the science is to help organizations select and retain those individuals who will perform well on the job. In the course of trying to accomplish this goal, psychologists have sometimes hypothesized huge webs of causality, gigantic nomological networks all aimed at finding those factors which predict performance on the job, but the ultimate criterion of interest - job performance - remained a veritable black box.

While a "black box" may be a useful concept in physics, it is a sign of weakness in the theory of job performance and demonstrates the relative lack of understanding we possess about that important concept. So, this led researchers and theoreticians over the last decade to explore the nature of job performance and begin to investigate the "black box" of job performance. This study will attempt to integrate some of the past literature on job performance and important individual-level predictors in light of more recent developments in our understanding of the nature of that important criterion of interest. It will focus on the use of certain aspects of personality, intelligence and experience as independent and joint predictors of different dimensions of job performance. It also explores when these relationships exist, providing information about the conditions under which these relationships are likely to occur. Specifically, this study examines the

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This thesis follows the style and format of the *Journal of Applied Psychology*.

potential interactions of conscientiousness, agreeableness, cognitive ability, and task experience when predicting task and contextual performance, and the degree to which some of these interactions may differ depending on the type of performance being measured.

Job Performance

Although there was no theory about the *underlying* nature of job performance for many years, there have been various attempts to provide broad definitions. One such definition is Campbell's (1990) characterization of job performance as "those actions or behaviors relevant to the organization's goals" (p. 704). He also makes the distinction between performance (the behaviors), effectiveness (the evaluation of the results of performance), and productivity (the cost of getting to certain levels of effectiveness). Because the latter two measures are the results of both performance and other factors (such as opportunity, weather, and the like), Campbell notes that to the degree they are contaminated, they are not be acceptable measures of performance. In contrast, Motowidlo (2003) have defined job performance as “the total expected value to the organization of the ... behavioral episodes ... over a standard period of time” (p. 39).

Campbell (1990) also distinguishes between the *determinants,* or causes, of job performance and the *components* of job performance which form its latent structure. In his model, job performance is the result of three factors: declarative knowledge, procedural knowledge and skills, and motivation. In the same vein, he proposes that

there are eight factors which can describe the structure of job performance: job-specific task proficiency, non-job specific task proficiency, written and oral communication tasks, degree of effort, personal discipline, facilitating team and peer performance, supervisory skills, and management or administration. Campbell discusses this taxonomy in terms of those factors which vary *across* jobs and those which are *constant*.

Dimensions of Job Performance

Campbell's model was one of the earlier models of job performance, yet it reflected the belief held by many people - a consensus still held today - that job performance is "inherently multidimensional." However, that does not mean that the latent structure of performance is similar across subsequent models; one of the more popular theories describes job performance along two primary dimensions: *task* performance and *contextual* performance. This theory was originally proposed by Borman and Motowidlo (1993), but interest in the value of this theory has been growing for several years, due in no small part to the relative parsimony of the theory. This model differs from Campbell's in that it focuses on the organizational consequences of behaviors, rather than the content domain (Motowidlo, 2003).

Task performance is generally described as the "effectiveness with which job incumbents perform activities that contribute to the organization's technical core" (Borman & Motowidlo, 1997, p. 99). Contextual performance is a conceptual distillation of previous models of organizational citizenship behaviors and prosocial behaviors which can be described as a set of processes which "maintain the broader organizational,

social, and psychological environment in which the technical core must function" (Motowidlo, Borman, & Schmit, 1997, p. 75). Both contextual performance and task performance are made up of habits, skills, and knowledge. Habits are aspects of behavior that are learned over time. Skills refer to the ability to make judgments and handle information that are either centered on the technical aspects of the job (i.e., task performance) or on the people/organizational aspects of the job (i.e., contextual performance). Skills can also be described as the degree of facility in applying different types of job knowledge. Job knowledge is the knowledge of facts and procedures that apply to either task or contextual aspects of a job.

Subsequent research has focused on identifying the factor structure of contextual performance. Coleman and Borman (2000) examined many different models of contextual performance, and describe contextual performance as consisting of three latent factors: interpersonal citizenship performance, organizational citizenship performance, and job-task conscientiousness. Interpersonal citizenship includes those behaviors which benefit individuals within the organization (e.g., coworkers) such as cooperation, participation, interpersonal facilitation, and related behaviors. Organizational citizenship behaviors benefit the organization, and include behaviors such as following rules, supporting organizational objectives, and favorably representing the organization to outsiders. Job-task conscientiousness is defined as those behaviors which benefit the task or job, and include volunteering, taking on extra responsibilities, and persisting on task with enthusiasm.

Thus, the performance model on which this study is based will define task and contextual performance according to past research, which have typically classified major facets of contextual performance (and the related construct of organizational citizenship behaviors) in terms of (but not limited to) those behaviors which relate to the *social* and *interpersonal* context of the organization (Befort & Hattrup, 2003; Borman & Motowidlo, 1993). In this view, broad measures of overall contextual performance would therefore be intrinsically linked to those capabilities, propensities, and behaviors which affect an individual's ability to function socially within the organization by communicating, supporting, and cooperating with other organizational members. In Borman and Motowidlo's model (1993, 1997), task performance is defined in terms of the proficiency with which an individual performs those activities related to the "technical core" of the organization: specifically, activities which are a formal part of the employee's job. This study will use Borman and Motowidlo's (1997) definition of task performance, operationalized in terms of those aspects of productivity, quality, accuracy, and knowledge related to a given individual's job.

To date, there has been some research suggesting the concepts of task and contextual performance are truly distinct entities which each have an impact on global job performance ratings. Researchers have supported the differentiation between aspects of task and contextual performance, finding different patterns of relationships and interactions for these two constructs (e.g., Griffin, Neal, & Neale, 2000). Motowidlo and Van Scotter (1994) found that task and contextual performance each contributed independently to global job performance ratings. Johnson (2001) found that the three

contextual performance behaviors described by Coleman and Borman (2000) each contribute to supervisor ratings independently of task performance. He also found contextual behaviors to be at least as important as job-specific and non-job-specific task proficiency, and that jobs differ in the relative importance of task and contextual performance behaviors.

Measures of Job Performance

Motowidlo et al. (1997) theorized that these different dimensions of overall job performance have different antecedents; specifically, that personality variables primarily affect contextual performance and that cognitive ability variables primarily affect task performance. As evidence, they reference work on Project A (Campbell, McHenry, & Wise, 1990), which found that cognitive ability was more predictive of technical proficiency than personal discipline. Campbell also found that certain personality measures were more highly predictive of personal discipline than technical proficiency. Specifically, cognitive ability correlated .33 with measures of technical proficiency, but only .08 with "personal discipline," a measure that is conceptually related to contextual performance. By contrast, measures of dependability (a personality variable) correlated only .11 with technical proficiency, but .30 with personal discipline. These and similar patterns of results seem to be the main source of support for the theory so far (Hattrup, O'Connell, & Wingate, 1998).

By examining different dimensions of job performance, Borman and Motowidlo (1993, 1997) have provided a potential explanation as to why cognitive ability and

personality differentially predict job performance across professions. Since jobs differ in the degree to which task and contextual performance are integral to performance (Johnson, 2001), antecedents of those aspects of performance such as personality and cognitive ability will therefore tend to relate to global job performance ratings differentially across jobs types.

Personality

Personality variables have received a great deal of attention over the past few years, and there has been a good deal of research that has demonstrated significant relationships between various personality facets and job performance. For example, Mount and Barrick (1995) found an overall validity of .11 for a weighted combination of the Big Five personality factors in their meta-analysis. Tett, Jackson, and Rothstein (1991), who used different parameters for inclusion in a similar meta-analysis, cite a mean validity of .33 for a composite of the five-factor personality variables. More recent studies have focused on which specific aspects of personality are most predictive of job performance, with a particular focus on conscientiousness (Mount & Barrick, 1995; Schmidt & Hunter, 1998).

There have also been a few studies which have examined the effects of different personality factors on particular dimensions of job performance. Motowidlo and Van Scotter (1994) found that the personality variables Adjustment, Cooperativeness, Dependability, Dominance, Internal Control, and Work Orientation were significantly related to contextual performance measures, while only two personality measures

(Dependability and Work Orientation) were predictive of task performance. Another study by McManus and Kelly (1999) found that the dimensions describing Sociable, Analytical, and Self-Confident aspects of personality were predictive of contextual performance, but that only Sociability and Self-Confidence had any relation to task performance.

Similar studies which made use of the five-factor model have found similar patterns of differential results. Van Scotter and Motowidlo (1996) found that Conscientiousness was related to task performance, while Conscientiousness, Extroversion, Positive Affectivity, and Agreeableness were predictive of contextual performance. Beaty, Cleveland, and Murphy (2001) found that three of the Big Five personality factors - Extroversion, Agreeableness, and Emotional Stability - were positively correlated with contextual performance. Finally, a meta-analysis by Hurtz and Donovan (2000) found that the validity coefficients of various personality traits depended on which facet of job performance - task or interpersonal - was being measured. For task performance, Conscientiousness had the highest validity coefficient at .16, followed by emotional stability at .14. For interpersonal facilitation, an aspect of contextual performance, the best validities were obtained for Conscientiousness (.18) and Agreeableness (.20).

Cognitive Ability

Cognitive ability has a track record of being one of the strongest predictors of job performance across many different job types (Hunter & Hunter, 1984), with Schmidt and

Hunter's (1998) meta-analysis reporting an overall validity of about .5. However, the precise mechanism by which cognitive ability affects job performance ratings is not entirely clear. One of the most important mechanisms by which cognitive ability impacts job performance is through the learning of job-related knowledge and skills. Past studies have indicated direct effects of cognitive ability on job knowledge (Schmidt, Hunter, & Outerbridge, 1986), which includes both task and contextual-related knowledge. While cognitive ability has strong effects on job knowledge, that is not necessarily the only way in which it can affect job performance. For example, Schmidt et al. (1986) also found that cognitive ability has direct effects on work sample performance over and above the mere accumulation of job-related knowledge.

Given that cognitive ability has mainly been described as acting through job-related knowledge, it is not surprising that Borman and Motowidlo (1997) believe cognitive ability to be a better predictor of task performance than contextual performance - ostensibly, contextual performance is based less on job-related knowledge than task performance. However, this does not mean that cognitive ability cannot predict contextual performance. There are aspects of intelligence - traditionally ignored by the job performance literature - which could significantly impact contextual performance. For instance, the psychometric concept of cognitive ability has shown some overlap with the conceptual and biological correlates of executive functioning, a broad cognitive term which includes the ability to monitor and control one’s actions and impulses (Crinella & Yu, 2000; Duncan, Emslie, & Williams, 1996). Specifically, cognitive ability has been shown to be associated with the ability to manage moods and prevent individuals from

biasing decisions (Ciarrochi, Chan, & Caputi, 2000). Moreover, cognitive ability has been associated with greater accuracy in judging the personality of others (Lippa & Dietz, 2000). Finally, Church, Katigbak, and Almario-Velazco (1985) found that psychometric measures of general cognitive ability were substantially correlated with measures of adaptive competence, a measure which includes skills needed for everyday interaction with others. These findings strongly suggest that cognitive ability will lead to an increased ability to adapt and make decisions regarding personal relationships with others, and should lead to a positive relationship with contextual performance.

Experience

In contrast to cognitive ability, experience has received less consistent support from the literature regarding its relationship with job performance. Most studies support the usual assumption that that greater experience leads to greater performance and have demonstrated a positive relationship between experience and job performance (e.g., Lance & Bennett, 2000; Schmidt et al., 1986; Schmidt, Hunter, Outerbridge, & Goff, 1988). However, at least two studies have actually shown a *negative* relationship between performance and experience in certain situations. First, Ceci and Liker (1986) found that greater levels of experience were associated with *less* accurate predictions of a horse race, a complicated real-world task. Second, Fiedler (1995) found that low-stress situations led to a small *decline* in the correlation between job experience and leadership performance. In an effort to find the true relationship between experience and job performance, Quinones, Ford, and Teachout (1995) meta-analyzed 44 studies and

estimated the correlation between experience and job performance to be 0.27. The extent to which experience predicts job performance above and beyond ability has also been explored. Schmidt and Hunter (1998) found experience explained only 3% of the variance over and above cognitive ability.

The Quinones et al. (1995) meta-analysis also provides potential explanations for the variation in the predictive validity of job experience. According to their study, the way in which experience and job performance are operationalized has an impact on their relationship. Experience can be measured at the task level of specificity (e.g., the amount of experience individuals have doing specific tasks), at the job level of specificity (e.g., the number of years performing a specific job), and at the career level of specificity (e.g., the number of years an individual has spent within an organization). Quinones et al. found that measuring the amount of experience at the task level of specificity led to the highest correlations with measures of job performance. Moreover, they found that objective, quantifiable measures of job performance - as compared to subjective measures - also increased the correlation between experience and job performance. They conclude that the appropriate level of measurement of experience depends upon the theoretical linkages between experience and other outcomes, and that measuring experience across tasks could obscure important differences within tasks.

While variables such as the levels of measurement are clearly very important, it is possible that other issues are causing some of the variation in the correlations between experience and job performance. It is possible that experience is having differential effects depending on the job and tasks being studied, and the extent to which

performance on those jobs and tasks is measured in terms of task or contextual performance. Quinones et al. (1995) reported the differences between objective and subjective performance criteria suggest that standard objective measures of performance may be unable to pick up on individual differences in contextual performance; therefore, these measures capture only task performance. Is experience associated with greater contextual or task performance? Does it affect them equally? Probably not. Contextual performance is defined by behaviors in which feedback is potentially less certain and more subtle (Coleman & Borman, 2000). After all, it is easy to use one's past task performance to guide future behavior: the task doesn't change, and the feedback is clear - one either succeeds or fails. Contextual performance offers much less opportunity for clear feedback. After all, how many organizational citizenship behaviors are "enough"? How does one know when they have crossed the line between supporting an individual or organization, and being a sycophant? It is this uncertainty which will likely lead to a much smaller correlation between experience and contextual performance than between experience and task performance when experience is measured at the task level of specificity.

Research to date supports these arguments. One study by Motowidlo and Van Scotter (1994) found that years of experience in the Air Force were correlated more highly with task (.34) than contextual (.16) performance and that these differences were significant. While these results are very suggestive, the study is subject to the same levels-of-measurement issue raised previously, since they measured experience via tenure, a career-level measure of experience. This study will attempt to replicate this

finding on a non-military sample, using a task-based experience measure more appropriate for predicting task performance.

H1: Task experience will be more strongly associated with task performance than contextual performance.

Interaction Between Cognitive Ability and Experience

The relationship between experience and performance may also be affected by various individual difference variables such as cognitive ability. There are two possible outcomes if experience and cognitive ability significantly interact with one another. Schmidt et al. (1988) describe these as the *convergence* and the *divergence* hypotheses. The *convergence* hypothesis theorizes that greater experience will allow low cognitive ability individuals to "catch up" with higher cognitive ability individuals over time. The *divergence* hypothesis predicts that greater cognitive ability will allow individuals to learn more from their experience, all other things being equal, thus increasing the performance gap between the two extremes of cognitive ability over time.

Two studies explicitly testing this hypothesis have found no support for an interaction (Lance & Bennett, 2000; Schmidt et al., 1988). In contrast, Lance, Hedge, and Alley (1989) found that experience decreased the positive relationship between cognitive ability and performance, lending support to the convergence hypothesis. In considering these different results, Lance and Bennett (2000) suggest that different methods of measuring experience may perhaps be responsible, with measures of experience that aggregate across tasks obscuring important relationships. They theorize that a measure of experience that takes into account experience on specific tasks might

be more likely to find an interaction than broad measures such as job and career-level experience. Indeed, research by Fleishman and Mumford (1989) found that the effect of intelligence decreases as experience on specific tasks increase, a result which supports the work of Lance et al. (1989).

A later study by Lance and Bennett (2000) failed to find an interaction using task-based measures of experience, calling into question the validity of their hypothesis. However, it is worth mentioning that even the Lance and Bennett (2000) study used aggregate task-level measures of experience; specifically, they summed and averaged task-level measures of experience to form a general "task experience" variable for each participant, ignoring the variance of task experience across specific task components.

> H2: There will be a significant interaction between cognitive ability and task experience, such that experience will decrease the effect of cognitive ability on task performance when experience is measured at the task level of specificity.

Arguably more importantly than the distinction between within-task and across-task levels of experience is the fact that none of this research examining interactions between cognitive ability and experience have differentiated between task and contextual performance (or, indeed, have used anything other than global supervisor ratings of performance.) Given the apparently multidimensional nature of job performance (Campbell, 1990; Coleman et al., 2000), this relative lack of data is may be problematic when interpreting the validity of these past studies.

While there is no data on what specific factors can be said to affect constructs such as task and contextual performance outside of the direct effects of job knowledge, several studies offer suggestive avenues for research. A recent study by Beaty,

Cleveland, and Murphy (2001) found that the strength of situational cues affected the relationship between the Big Five personality variables and contextual performance, such that weaker, more vague cues were associated with stronger correlations between personality variables and contextual performance. While this study did not explore the direct effect of cue strength on contextual performance, it does suggest that ambiguity in organizational tasks and social cues can have important effects on job performance.

Task and contextual performance are likely to differ in the degree to which they contain strong and weak cues. Specifically, contextual performance is related to social behaviors which are rarely overtly measured or specified in organizational contexts, though they may have a real effect on performance evaluations and other variables. Task performance is measured in much more overt ways, and is hence defined by "stronger," less vague cues.

Research into role ambiguity and cue perception suggests that more vaguely defined tasks and situations will be associated with lower job performance (Tubre & Collins, 2000). Therefore, the ability to reduce ambiguity in such situations should be associated with greater performance. Since the ability to correctly interpret various types of cues is often considered a part of cognitive ability, it is possible that those with higher levels of cognitive ability may demonstrate higher levels of contextual performance, all other things being equal. Although there is not a great deal of research into cognitive ability and social cue perception, research on cognitive ability has shown consistent, albeit small, correlations with purely physical aspects of cue perception such as perceptual speed (Finkel & Pederson, 2000). More research has been done with clinical

and learning disabled populations, suggesting that lower levels of cognitive ability are related with a decreased ability to attend to and use situational and social cues (Moore, 2001; Nabuzoka & Smith, 1999). Obviously, the use of clinical and learning disability research must be applied very carefully to normal populations, but with the lack of research into normal populations, it is still suggestive.

Experience also ostensibly increases one's ability to notice and react to complex social and situational cues. Here again, research into learning disabled populations shows support for this idea: there is evidence that as children with learning disabilities grow older, their cue perception deficiencies (compared to their non-learning-disabled peers) tend to become less severe (Nabuzoka & Smith, 1999). This suggests that the relative effects of cognitive ability on contextual performance will decrease with more experience. However, since there is evidence that contextual performance is much less dependent on cognitive ability to begin with, the effect of the interaction should be much smaller on contextual performance as compared to task performance.

H3: There will be a significant interaction between cognitive ability and task experience on contextual performance such that experience will decrease the effect of cognitive ability on contextual performance.

H4: The interaction between task experience and cognitive ability should be smaller for contextual than task performance.

Interaction Between Cognitive Ability and Conscientiousness

Although often viewed as completely independent constructs, there is some evidence that personality and cognitive ability have the potential to produce a joint effect on different aspects of job performance. Conscientiousness ostensibly affects both task

and contextual performance through the mechanisms of an increased need for achievement, endurance, and impulse control. Conscientiousness also seems to be related to the amount of effort put forth (e.g., Sansone, Wiebe, & Morgan, 1999).

Experiments testing an interaction between the cognitive ability and conscientiousness have found discrepant results. A study by Wright, Kacmar, McMahan, and Deleeuw (1995) found that an interaction between "achievement need" and cognitive ability increased the total explained variance in supervisor ratings of overall job performance by 9% - small, but significant. In contrast, Mount, Barrick, and Strauss (1999) found no significant interaction between conscientiousness and cognitive ability. However, their study used only general supervisory ratings of performance; there may be very different patterns of relationships for task and contextual performance. The Mount, Barrick, and Strauss study also used people who had been on the job for long periods of time (the average tenure was eight years); such a long period of time might be masking the presence of an interaction. Finally, they used job-level measures of performance, whereas this study is primarily concerned with task-level measurements of performance. Again, their measures may not be using the appropriate level of specificity to capture a possible interaction.

Given that none of these studies looked at task or contextual performance, the present study will attempt to take these different factors of job performance into account while using task-level performance measures rather than broad job-based measures. Task performance is primarily based on task-related knowledge, skills, and abilities (Motowidlo, et al., 1997). People high in conscientiousness may put forth more effort to

gain the knowledge and skills necessary for both task and contextual performance. Since, for a given amount of effort, those people higher in cognitive ability will tend to get more out of that effort, they are also likely to benefit from higher levels of conscientiousness.

H5: There will be an interaction between conscientiousness and cognitive ability on task performance, such that higher levels of conscientiousness will lead to a stronger relationship between cognitive ability and task performance.

H6: There will be an interaction between conscientiousness and cognitive ability on contextual performance, such that higher levels of conscientiousness will lead to a stronger relationship between cognitive ability and contextual performance.

However, the effects of conscientiousness on cognitive ability will likely be less pronounced for contextual performance than task performance, since it may be more difficult for effort to lead to performance - regardless of cognitive ability - in social situations, which are likely to be much more fluid.

H7: The influence of conscientiousness on the cognitive ability-performance relationship will be stronger for task performance than contextual performance.

Interaction Between Cognitive Ability and Agreeableness

Agreeableness is another variable that has shown some differential relationships with various dimensions of job performance; specifically, it appears to have a stronger relationship with contextual performance than task performance (Beaty et al., 2001; Van Scotter et al., 1996). Agreeableness is often defined as "friendly compliance vs. hostile non-compliance" (Digman & Takemoto-Chock, 1981). Agreeableness relates to contextual performance because it contains some elements of prosocial behavior, which

are behaviors with the goal of promoting the welfare of certain groups and individuals (Borman & Motowidlo, 1997).

Although there are no studies examining the interaction between cognitive ability and agreeableness, a study by Ferris, Witt, and Hochwarter (2001) found that social skill (defined by them as interpersonal perceptiveness and behavioral flexibility) interacted with cognitive ability to explain variation in task performance and general measures of job performance and success. They found that social skills interacted significantly ($p \leq 0.05$) with cognitive ability when predicting task performance, overall job performance, and salary. The interaction between social skills and cognitive ability on contextual performance was also significant at the 0.10 level. While social skill is not analogous to agreeableness, there was a significant correlation ($r = 0.22$, $p \leq 0.05$) between the constructs. The Ferris et al. (2001) study also used Van Scotter and Motowidlo's (1996) two-factor structure of contextual performance, in which contextual performance is defined by job dedication and interpersonal facilitation behaviors. This factor structure seems to have been largely superseded by Coleman and Borman's (2000) three-factor model of contextual performance.

Given the conceptual overlap between agreeableness and contextual performance, it is likely that the prior variable affects the latter by controlling the rate of prosocial and non-threatening conforming behaviors. It is also possible that high levels of cognitive ability may increase the rate of *successful* helping behavior incidents in which high agreeableness people are likely to engage. More successful contextual performance behaviors will ostensibly lead to more requests for similar performance in

the future, thus increasing the number of opportunities for future contextual performance episodes.

H8: There will be a significant interaction between agreeableness and cognitive ability, such that higher levels of cognitive ability will increase the strength of the positive relationship between agreeableness and contextual performance.

Interaction Between Conscientiousness, Cognitive Ability, and Experience

Personality variables also have the potential to moderate the joint effect of cognitive ability and experience on the various dimensions of job performance. No matter how intelligent a person is, if they do not have those personality traits which predispose them to care about either task or contextual performance, then they will be unlikely to acquire those skills which will lead to success on those measures. Of the big five personality variables, Conscientiousness is the one which has the most specific associations with effort across time, particularly through its relationships to aspects of personality and cognitive functioning such as impulse control, stability, and endurance (Hogan & Ones, 1997; Sansone, Wiebe, & Morgan, 1999). As such, conscientiousness has often been associated with an individual's effort over time. The view that effort leads to higher performance over time is supported by the results of Tett et al.'s (1991) meta-analysis, who found that the predictive validities of various big five personality factors increased as the tenure of the sample increased.

H9: Conscientiousness will moderate the joint effect of cognitive ability and task experience on task performance, such that higher levels of conscientiousness will increase the joint effect of cognitive ability and task experience on task performance, as described in Hypothesis 2.

METHOD

Power Analysis

Due to the number of interactions included in the study, a power analysis was conducted to determine the number of subjects necessary to achieve a power level of 0.80. The analysis showed that for the two-way interactions, 230 people were required; for the three-way interactions, approximately 450 people were necessary to achieve adequate power (Borenstein, Rothstein, & Cohen, 1997).

Demographics

Participants. A final total of 443 participants from 13 organizations were included in the current study; the majority of which came from educational institutions (40.5%), retail and non-medical service institutions (27.1%), medical institutions (26.8%), and technical institutions (5.7%). These institutions were located in one of two small towns in the central and southern US. Participants' jobs can be described using the broad categories from the Dictionary of Occupational Titles (DOT). Of the nine such categories defined in the DOT, four categories were represented in the present sample: clerical and sales positions (33.8%), technical/professional positions (33.6%), managerial positions (18%), and service occupations (14.6%). Technical and professional positions represented jobs such as computer and network technicians, nurses and lab technicians, and teachers. Managerial positions represented jobs such as department heads at medical facilities and technical training facilities. Clerical and sales positions encompassed jobs such as sales clerks at retail stores, secretaries, and data

entry. Service positions included jobs such as customer service, food service, and groundskeepers.

Participants represented a wide variety of educational backgrounds and ages, but were fairly homogenous with respect to race. The average age of participants was 39.5 years, with an average of 14.3 years of education. The majority of the sample were female (79.5%) and white (84.5%). Of the remaining participants, 3.6% were African American, 2.5% were Hispanic, and 2.5% described themselves as "other."

Supervisors. As a group, supervisors were older than their employee counterparts, with an average age of 43.7 years; they were also much more evenly split in terms of gender (50.1% female). Supervisors had an average of 8.1 years of supervisory experience. Supervisors ranged from low-level, front-line supervisors directly overseeing work to high-level managers within their respective organizations.

Measures

Wonderlic Personnel Test. The Wonderlic Personnel Test (WPT) served as a measure of general cognitive ability. The test is relatively short, taking 12 minutes to administer, and the validity of the WPT has been established for many years, with reported validity coefficients of between .26 and .61 (Wonderlic, 1992). Typical validity coefficients for office workers are well over .30; typical validities for professionals are over .5. The WPT does not measure different factors of intelligence, instead providing a single score which loads highly on psychometric g. Scores on the WPT have been highly correlated with clinical measures of intelligence such the WAIS-R (at about .92), although it has not been validated for use on clinical populations. In this sample, the

mean and standard deviation of the WPT are 24.1 and 6.8, respectively. Previous test-retest reliabilities of the WPT range between .82 and .94, and the KR-20 (a measure of internal consistency, which is equivalent to Cronbach's α for dichotomously scored items) reliability has been estimated at .88 (Wonderlic, 1992). The reliability of the Wonderlic in this sample, as measured by α, was 0.85.

Personality. To measure the personality factors of interest, conscientiousness and agreeableness, the Saucier Mini-Markers were used. They represent a 40-item personality measure designed to assess the Big Five personality factors, and were originally designed as a short form of the Goldberg Unipolar Big-Five Markers. The test has shown acceptable reliability, with inter-item correlations of .36 and .29 for conscientiousness and agreeableness, respectively (Saucier, 1994). Validity of the Mini-Markers has been demonstrated in Dwight, Cummings, and Glenar (1998). The reliability of the Mini-Markers proved acceptable within the study, though less than ideal, with an α of .78 for conscientiousness and .69 for agreeableness. Appendix A contains copies of the personality measure used in the study.

Experience. Task-level experience was measured by asking participants to estimate the number of months they had performed certain job-relevant tasks, across all organizations. Task-level experience was operationalized as the average number of months spent performing job-related tasks. The major tasks related to each job type were identified by talking to managers and using O*NET (Peterson et al., 2001). Appendix B contains all of the experience forms used for the various job types.

Task performance. Task performance was measured using a five-item Likert scale adapted from the GATB validation study by the Department of Labor (Douglas, McDaniel, & Snell, 1996) that asks supervisors to rate employees on the pace of their work, the quality of their work, the accuracy of their work, their job-related knowledge, and the variety of tasks the worker is capable of performing. The reliability of the task performance scale was $\alpha = .88$. Appendix C contains the performance measures used in the study.

Contextual performance. Supervisor ratings of employee contextual performance were measured using a 16-item, 5-point Likert scale adapted from Motowidlo and Van Scotter (1994; see Appendix C). The scale includes items regarding the employee's compliance with instructions, team cooperation, persistence, appearance, willingness to take on additional duties, follow proper procedures, seek challenging assignments, help others, attend to details, defend supervisor's decisions, support coworkers, take the initiative in solving a problem, exercise self-control, tackle a difficult job with enthusiasm, and voluntarily do more than the job requires. The scale displayed a very high internal consistency ($\alpha = .96$).

Overall performance. As an aid to interpretation, an overall job performance scale was included; this should allow for comparisons to past research which use only a single overall job performance rating, where needed. The overall performance scale consisted of four items (Appendix C) which asked supervisors to rate their employees overall level of job performance. Internal consistency was quite high, with $\alpha = .93$.

Procedure

Organization recruitment. Organizations were recruited to take part in the study in a number of ways (phone, letter, personal contact, etc.), but a specific focus was placed on recruiting organizations with a relatively small cross-section of easily identifiable job types, such as health care facilities and schools.

Participant recruitment. After securing permission from management to recruit participants for the study, materials were distributed to employees at each organization, describing the study. Employees were entered in a raffle for four prizes of $50 each as an incentive to participate. Those who agreed to participate were given a time and place where testing sessions were to occur.

Testing. At each testing session, employees completed the Wonderlic, the Mini-Markers, and the task experience scale appropriate to their position. Afterwards, supervisors were mailed copies of the performance evaluation forms in a self-addressed, stamped envelope.

Data analysis. Data were analyzed using multivariate regression. Task experience for each subject was averaged across across tasks to form an index of task experience. Also, because there is evidence that experience does not necessarily impact job performance in a strictly linear fashion (Schmidt et al., 1988), the effect of experience on performance was examined for linearity. Finally, the hypotheses were tested using a hierarchical regression model.

RESULTS

Descriptive Statistics

Table 1 contains information on the means, standard deviations, reliabilities, and correlations between the independent and dependent variables in the study. As can be seen from the table, the two primary performance scales were highly correlated, which suggests that managers in the study perhaps had a difficult time effectively distinguishing between task and contextual performance. Among the independent variables of interest to the study, cognitive ability was significantly related to both task performance ($r = .26$, $p < .01$) and contextual performance ($r = .13$, $p < .01$). Conscientiousness was also significantly related to both task and contextual performance ($r = .24$, $p < .01$ and $r = .11$, $p < .05$, respectively.) Finally, task experience also proved to be important to job performance, with a correlation of $r = .13$, $p < .01$.

Table 1

Means, Variance, Intercorrelations, and Reliabilities of Variables

	Variables	N	Mean	SD	1	2	3	4	5	6	7	8	9	10
	Predictors													
1	Cognitive ability	442	24.1	6.8	[.85]									
2	Conscientiousness	433	32.2	4.8	.08	[.78]								
3	Agreeableness	432	34.6	4.2	-.01	***.38***	[.69]							
4	Openness	423	28.5	4.7	***.23***	***.19***	***.19***	[.70]						
5	Neuroticism	429	28.4	5.6	***.16***	***.24***	***.31***	.01	[.70]					
6	Extroversion	426	28.2	6	.05	***.13***	***.17***	***.14***	**.11**	[.82]				
7	Task experience	444	77.4	24.8	.00	.04	-.02	***-.13***	.17	-.09	[.98]			
	Performance													
8	Task	439	19.2	3.3	***.26***	***.24***	.07	.01	.07	.04	***.13***	[.88]		
9	Contextual	439	64.7	10.5	***.13***	**.11**	.05	-.01	.02	.00	.01	***.74***	[.96]	
10	Overall	439	18.7	4	***.23***	**.11**	.01	.01	.01	-.03	***.13***	***.80***	***.72***	[.93]

Note: **Bold** numbers are significant at 0.05; ***italic*** numbers are significant at 0.01. Coefficient alpha is listed in brackets on the diagonals.

Tables 2, 3, 4, and 5 present means, standard deviations, and correlations broken down by job type. Looking at them, some interesting differences emerge between the various job types[1]; for technical and professional jobs, the only significant predictors of any type of job performance are cognitive ability and task experience. For managerial jobs, the only predictor of performance is cognitive ability. Task performance in clerical and sales jobs is predicted primarily by cognitive ability, conscientiousness, agreeableness, and task experience, though agreeableness does not predict contextual or overall performance. Service jobs had the most complex pattern of results - task

Table 2

Means, Variance, Intercorrelations, and Reliabilities of Variables for Technical/Professional Jobs

	Variables	N	Mean	SD	1	2	3	4	5	6	7	8	9	10
	Predictors													
1	Cognitive ability	148	25.3	6.7	[0.85]									
2	Conscientiousness	146	32.3	4.9	0.09	[0.78]								
3	Agreeableness	146	34.9	4	-0.13	***0.24***	[0.69]							
4	Openness	144	29.1	4.5	***0.27***	0.07	0.11	[0.70]						
5	Neuroticism	145	28.4	6.1	0.15	**0.20**	***0.25***	0.05	[0.70]					
6	Extroversion	145	28.4	6.2	-0.04	0.08	0.16	0.05	0.10	[0.82]				
7	Task experience	149	92.2	28.1	0.08	0.06	0.09	-0.03	***0.27***	-0.01	[0.98]			
	Performance													
8	Task	148	19.2	3.2	***0.25***	0.11	-0.07	-0.03	0.01	-0.06	***0.19***	[0.88]		
9	Contextual	148	63.4	11.3	**0.21**	-0.02	-0.03	-0.01	-0.06	-0.07	0.08	***0.76***	[0.96]	
10	Overall	148	18.7	4.1	**0.21**	-0.05	-0.08	-0.02	-0.07	**-0.19**	0.12	***0.77***	***0.76***	[0.93]

Note **Bold** numbers are significant at 0.05, ***italic*** numbers are significant at 0.01. Coefficient alpha is listed in brackets on the diagonals.

[1]Only correlations among predictors specifically included in the hypotheses are discussed; however, the correlation matrices present data for all five personality factors, and significant differences do exist among the groups on variables not included in the results above.

Table 3

Means, Variance, Intercorrelations, and Reliabilities of Variables for Managerial Jobs

	Variables	N	Mean	SD	1	2	3	4	5	6	7	8	9	10
	Predictors													
1	Cognitive ability	80	27.7	5.4	[0.85]									
2	Conscientiousness	79	32.5	4.8	0.07	[0.78]								
3	Agreeableness	79	34	3.9	-0.04	***0.30***	[0.69]							
4	Openness	76	28.7	5.1	0.14	**0.23**	***0.34***	[0.70]						
5	Neuroticism	79	29.5	5.1	-0.04	0.20	***0.38***	0.07	[0.70]					
6	Extroversion	79	29.2	5.7	-0.15	0.15	**0.24**	0.19	0.13	[0.82]				
7	Task experience	80	77.4	18.5	0.10	0.01	-0.10	0.02	0.08	-0.21	[0.98]			
	Performance													
8	Task	79	20.2	2.7	**0.29**	0.15	-0.12	0.07	**-0.26**	-0.04	0.03	[0.88]		
9	Contextual	79	66.3	8.5	***0.30***	0.03	-0.09	0.18	**-0.25**	0.03	-0.07	***0.77***	[0.96]	
10	Overall	79	19.5	4.1	***0.35***	0.04	-0.09	0.11	**-0.25**	0.04	0.04	***0.77***	***0.72***	[0.93]

Note: **Bold** numbers are significant at 0.05; ***italic*** numbers are significant at 0.01. Coefficient alpha is listed in brackets on the diagonals.

Table 4

Means, Variance, Intercorrelations, and Reliabilities of Variables for Clerical/Sales Jobs

	Variables	N	Mean	SD	1	2	3	4	5	6	7	8	9	10
	Predictors													
1	Cognitive ability	149	22.7	6.4	[0.85]									
2	Conscientiousness	148	31.9	4.7	-0.10	[0.78]								
3	Agreeableness	147	34.8	4.4	-0.03	***0.43***	[0.69]							
4	Openness	147	28	4.7	**0.19**	**0.20**	**0.20**	[0.70]						
5	Neuroticism	147	27.9	5.5	0.13	***0.21***	***0.35***	-0.09	[0.70]					
6	Extroversion	146	27.8	6	0.08	0.13	**0.19**	0.06	0.07	[0.82]				
7	Task experience	150	74.0	26	-0.10	0.14	-0.02	***-0.28***	**0.19**	-0.10	[0.98]			
	Performance													
8	Task	147	18.8	3.8	**0.17**	***0.29***	**0.19**	-0.11	**0.17**	0.08	***0.26***	[0.88]		
9	Contextual	147	64.3	10.9	0.02	**0.20**	0.14	-0.13	**0.18**	0.06	0.14	***0.76***	[0.96]	
10	Overall	147	18.5	4.1	0.14	***0.23***	0.12	-0.12	**0.18**	-0.01	***0.29***	***0.85***	***0.75***	[0.93]

Note: **Bold** numbers are significant at 0.05; ***italic*** numbers are significant at 0.01. Coefficient alpha is listed in brackets on the diagonals.

Table 5

Means, Variance, Intercorrelations, and Reliabilities of Variables for Service Jobs

	Variables	N	Mean	SD	1	2	3	4	5	6	7	8	9	10
	Predictors													
1	Cognitive ability	65	20.2	6.5	[0.85]									
2	Conscientiousness	60	32.1	5	***0.41***	[0.78]								
3	Agreeableness	60	33.9	4.5	***0.36***	***0.69***	[0.69]							
4	Openness	56	27.7	4.4	0.25	***0.39***	0.16	[0.70]						
5	Neuroticism	58	28.5	5.5	***0.36***	***0.42***	***0.35***	0.02	[0.70]					
6	Extroversion	56	27.2	6	0.18	0.23	0.09	***0.49***	0.17	[0.82]				
7	Task experience	65	59.3	19.4	***-0.33***	**-0.28**	**-0.29**	**-0.32**	-0.07	-0.24	[0.98]			
	Performance													
8	Task	65	19	2.9	***0.41***	***0.53***	***0.36***	***0.36***	0.23	0.24	***-0.39***	[0.88]		
9	Contextual	65	66.8	9.6	0.12	***0.34***	0.22	0.12	0.10	0.04	***-0.38***	***0.62***	[0.96]	
10	Overall	65	18.2	3.5	***0.32***	***0.34***	0.17	**0.32**	0.12	**0.28**	**-0.25**	***0.82***	***0.58***	[0.93]

Note: **Bold** numbers are significant at 0.05; ***italic*** numbers are significant at 0.01

performance was predicted by cognitive ability, conscientiousness, agreeableness, and task experience. Contextual performance was predicted only by conscientiousness and task experience. Overall performance was predicted by cognitive ability, conscientiousness, and task experience. Interestingly, the correlations between task experience and the various types of job performance measures was negative, such that as task experience increased, average performance ratings decreased.

To test the appropriateness of the tests being used, basic regression diagnostics such as skew, kurtosis, Cook's D, and residual analysis were used to detect extreme deviations from normality, multivariate outliers, and heteroscedasticity, respectively. Table 6 presents the skew and kurtosis for the variables in the study. Cook's D did not reveal any observations with undue influence, and an examination of residuals did not reveal any heteroscedasticity. However, a closer look at the primary predictors in the study indicated that task experience and overall job experience were positively skewed and slightly kurtotic. Further examination of the task experience distribution confirmed this; therefore, new task experience and job experience variables were created by taking the square root of the original values, producing a more normal distribution.

To determine whether it was appropriate to aggregate data across multiple job types, a multivariate analysis of variance was conducted to test the interaction between job type and each of the four basic predictor variables in the equation, as well as their respective interactions. The results of the analysis did not find any significant overall effects of job type on the main effects or interactions being tested (Tables D13 and D14

in Appendix D). Thus, although there do exist some differences among the variables' relationships across the various jobs, there is evidence that the results of the overall regression equation, which combines data across all job types, may be meaningfully interpreted without resorting to lower-level intra-job analyses.

Table 6

Skew and Kurtosis

Variables	Skew	Kurtosis
Cognitive ability	-0.15	-0.22
Conscientiousness	-0.73	0.74
Agreeableness	-0.54	1.15
Task experience (untransformed)	2.04	6.67
Task experience (transformed)	0.74	0.22
Task performance	-0.19	-0.24
Contextual performance	-0.36	-0.6
Overall performance	-0.2	0.05

Inferential Statistics

All of the hypotheses were tested using hierarchical regression; following Cohen's (1978) suggestion for tests of interactions, three steps were used. The main effects were entered in the first step, the first-order interactions in the second step, and any higher-order interactions were entered in the third step. Because there was strong reason to expect a significant interaction involving conscientiousness, cognitive ability, and task experience, only one regression equation for each type of performance was created to test hypotheses involving those terms, to avoid producing biased parameter estimates of lower-order effects (Tables 7-8). A separate regression equation was

Table 7

The Effect of Cognitive Ability, Conscientiousness, Task Experience, and Interactions on Task Performance

Variable	β	SE	t	sr^2	R^2	ΔR^2
Step 1					0.12	
Cognitive ability	0.246	0.04580	5.37**	0.065		
Conscientiousness	0.219	0.04548	4.81**	0.049		
Task experience	0.100	0.04564	2.19*	0.010		
Step 2					0.13	0.01
Cognitive ability x conscientiousness	-0.02	0.04492	-0.44	0.000		
Cognitive ability x task experience	0.09	0.04621	1.86	0.008		
Conscientiousness x task experience	0.04	0.04568	0.81	0.001		
Step 3					0.15	0.02*
Cognitive ability x conscientiousness x task experience	- 0.13	0.04982	- 2.59**	0.010		

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table 8

The Effect of Cognitive Ability, Conscientiousness, Task Experience, and Interactions on Contextual Performance

Variable	β	SE	t	sr^2	R^2	ΔR^2
Step 1					0.035	
Cognitive ability	0.149	0.04797	3.11**	0.024		
Conscientiousness	0.103	0.04764	2.17*	0.011		
Task experience	0.012	0.04781	0.25	0.000		
Step 2					0.042	0.01
Cognitive ability x conscientiousness	- 0.016	0.04717	- 0.34	0.000		
Cognitive ability x task experience	0.069	0.04851	1.43	0.005		
Conscientiousness x task experience	0.031	0.04796	0.66	0.001		
Step 3					0.046	0.00
Cognitive ability x conscientiousness x task experience	- 0.070	0.05262	- 1.33	0.004		

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

produced to test the proposed interaction between cognitive ability and agreeableness (Table 9).

Table 9

The Effect of Cognitive Ability and Agreeableness on Contextual Performance

Variable	β	SE	t	sr^2	R^2	ΔR^2
Step 1					0.026	
Cognitive ability	0.154	0.0478	3.22**	0.024		
Agreeableness	0.051	0.0481	1.06	0.003		
Step 2					0.037	0.01
Cognitive ability x agreeableness	- 0.100	0.0462	-2.15*	0.011		

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Several of the hypotheses involved comparing a predictor's effect on task and contextual performance. To test these hypotheses, the beta weights from the respective regression equations were compared by plotting the respective point estimates along with their 95% confidence intervals. Table 10 summarizes these comparisons, and lists the beta weights with their associated confidence intervals. It should be noted, however, that while the beta weights from a multiple regression equation do provide for an estimate of the strength of an effect, and can be compared within a given regression equation, they are not directly comparable to other effect sizes, such as correlation coefficients.

Hypothesis 1 predicted that task experience would be more strongly associated with task performance than contextual performance; an examination of the beta weights shows that the effect of task experience was indeed stronger for task performance than contextual performance (0.107 vs. 0.02) , but there was sizeable overlap in the 95%

confidence intervals of the two estimates (Table 10). Therefore, a MANOVA was used (see Table 11) to test whether the task experience parameter differed significantly from task performance to contextual performance. This test showed that there was indeed a significant difference between the two parameters, supporting the idea that task experience is a better predictor of task performance than contextual performance (Hypothesis 1).

Table 10

Comparison of Beta Weights: Hypotheses 1, 4, and 7

Hypothesis	N	B	95%CI_L	95%CI_U
Hypothesis 1: Task experience effect				
Task performance	431	0.107	0.0166	0.1966
Contextual performance	431	0.016	-0.0783	0.1111
Hypothesis 4: Cognitive ability x experience effect				
Task performance	431	0.050	-0.0309	0.1313
Contextual performance	431	0.047	-0.0383	0.1323
Hypothesis 7: Cognitive ability x conscientousness effect				
Task performance	431	-0.004	-0.0907	0.0837
Contextual performance	431	-0.010	-0.1019	0.081

Table 11

Multivariate Tests of Hypotheses 1, 4, and 7

Hypothesis	df	df(error)	F
Hypothesis 1: Task experience effect	1	424	6.94**
Hypothesis 4: Cognitive ability x experience effect	1	421	0.25
Hypothesis 7: Cognitive ability x conscientousness effect	1	421	0.01

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Hypotheses 2, 3, and 4 all involved the interaction between cognitive ability and task experience. Hypothesis 2 predicted that there would be a significant interaction between cognitive ability and task experience when predicting task performance. This was tested by creating a multiple regression equation and entering in all relevant terms simultaneously. Multiple regression (Table 7) showed that the interaction between cognitive ability and task experience was non-significant. Hypothesis 3 predicted a significant cognitive ability/task experience interaction for contextual performance; this interaction was also non-significant (Table 8). Finally, Hypothesis 4 predicted that the interaction between cognitive ability and task experience would be greater for task than contextual performance. Comparing the beta weights and their respective 95% confidence intervals showed little difference between the two estimates (see Table 10 for more detail). A more detailed test of the beta weights (Table 11) confirmed this fact. Therefore, Hypotheses 2, 3, and 4 were not supported.

Hypotheses 5, 6, and 7 were all concerned with the interaction between conscientiousness and cognitive ability. Hypotheses 5 and 6 predicted that higher levels of conscientiousness would lead to a greater effect of cognitive ability on task and contextual performance, respectively (Tables 10 and 11). The multiple regression equation did not reveal a significant effect for either of these interactions, providing no support for Hypotheses 5 and 6. Hypothesis 7 predicted that this effect would be greater for task performance than contextual performance; a comparison of the 95% CI for the two beta weights shows considerable overlap between the two estimates (Table 10),

indicating that the data failed to support Hypothesis 7. Again, a more detailed test (Table 11) also failed to provide support for this hypothesis.

Hypothesis 8 predicted a cognitive ability/agreeableness interaction for contextual performance, such that greater cognitive ability would increase the effect of agreeableness on contextual performance. A test of this interaction using multiple regression showed a significant interaction (Table 9), but a closer examination of the simple effects showed that the direction of the interaction was not in the direction originally predicted. Instead of cognitive ability exacerbating the effect of agreeableness in contextual performance, it appears that greater cognitive ability interfered with high levels of agreeableness, leading to lower contextual performance. Contrary to Hypothesis 8, it was only for relatively lower levels of cognitive ability that higher agreeableness led to an increase in contextual performance (see Figure 1).

The final hypothesis (Hypothesis 9) predicted a 3-way interaction between conscientiousness, cognitive ability, and task experience. Specifically, it was believed that higher levels of conscientiousness would enhance the interaction between cognitive ability and experience, as described in Hypothesis 2. The data supported this hypothesis (Table 7), suggesting that for those with high levels of conscientiousness, increasing task experience appeared to make up for deficits in relative levels of cognitive ability. Conversely, for those people with lower levels of conscientiousness, increasing task experience led to progressively worse task performance ratings for those people with lower levels of cognitive ability, while higher levels of cognitive ability and task experience was associated with increased levels of task performance (see Figure 2).

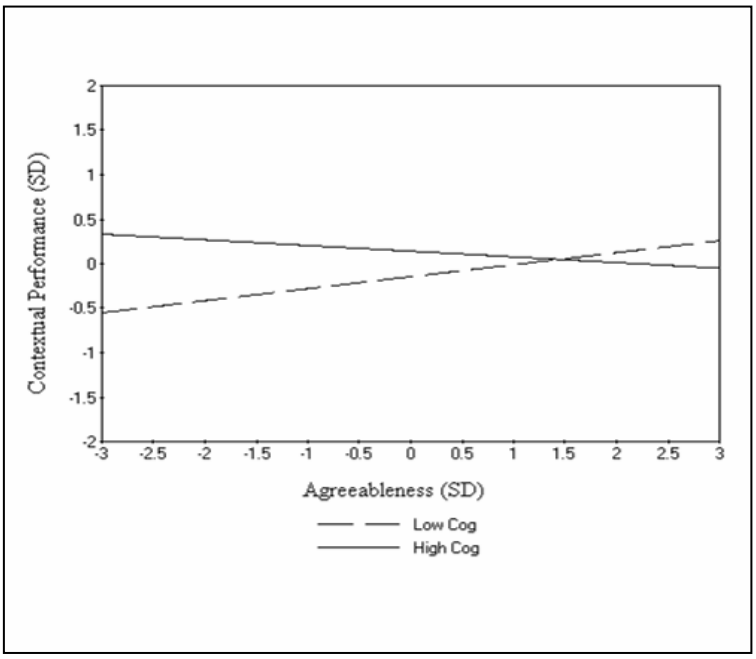

Figure 1. Cognitive Ability x Agreeableness Interaction on Contextual Performance

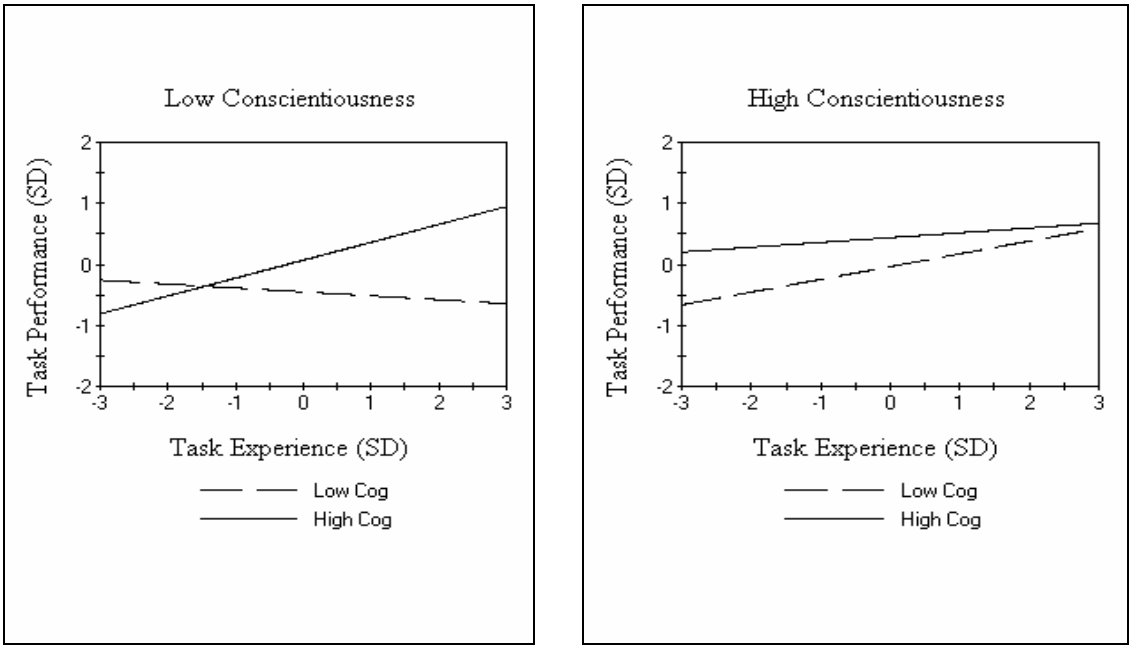

Figure 2. Conscientiousness x Cognitive Ability x Experience Interaction on Task Performance

Job-type Specific Results

To allow for more specific understanding of the relationships between the variables examined in the study, the analyses above were conducted for each of the four general job types included in the study. Although this greatly reduces the number of participants available for each individual analysis, and hence the power to detect significant effects, doing so should provide a clearer picture of how these variables interact for different types of jobs. Tables D1-D4 in Appendix A present the results of these analyses, broken down by job type, for Hypotheses 2, 3, 5, 6, and 9; tables D5-D8 present the results of the analyses for Hypothesis 8; and tables D9-D12 present the within-job results of Hypotheses 1, 4, and 7.

As can be seen from the tables, the pattern of the results do differ to some degree among the various job types, which is not surprising. Specifically, conscientiousness proved to be a stronger predictor for lower level positions (e.g., clerical/sales/service positions); inconsistent with past findings (e.g., Hunter & Hunter, 1984), cognitive ability proved to be just as strong a predictor of performance in service-oriented jobs as technical, professional, and managerial jobs. Task experience varied as well, proving to be a more consistent predictor of job performance for clerical/sales and service jobs than for technical/professional and managerial jobs.

In terms of the higher-order effects, the two-way interaction between cognitive ability and agreeableness, as described in the results, proved to be strongest for technical and service positions and weakest for managerial and clerical/sales positions. The three-way interaction between cognitive ability, conscientiousness, and task experience also

showed some variance among the different job types; specifically, the effect appeared to be relatively weaker for technical, professional, managerial, and clerical/sales positions, but stronger for service positions.

These results indicate that the effects discussed in the present study may not apply equally across all job types. However, the results of the analysis presented in Appendix D (Tables D13 and D14) suggest that the overall results from the aggregated data may be meaningfully interpreted.

DISCUSSION

Performance prediction is at the core of much modern industrial psychology research, and three of the most important and often-discussed predictors are cognitive ability, various personality variables such as those in the Big Five, and job-related experience. However, until relatively recently, much of this research had failed to investigate the theoretical issues of using a multidimensional performance construct. This research uses Borman and Motowidlo's (1993) model of performance, which divides job performance into two basic factors: task and contextual performance. By taking into account potential differences in the theoretical relationships among task and contextual performance, it was hoped that past research on the predictors of task and contextual performance could be replicated, past research on interactions between cognitive ability, personality, and experience could be more accurately modeled, and discrepant results from past studies could be explained.

Cognitive Ability

Cognitive ability has consistently been shown to be one of the best predictors of job performance in the literature (Schmidt & Hunter, 1998). The present study replicates these findings, demonstrating that cognitive ability was a strong predictor of both task and contextual performance. However, the relationship between cognitive ability and contextual performance did differ somewhat depending on the type of position; technical, professional, and managerial jobs showed a strong relationship between

cognitive ability and contextual performance, while there appeared to be no significant relationship between the two variables for clerical, sales, and service jobs.

Personality

By contrast, the two primary personality variables tested in the present study - conscientiousness and agreeableness - have a mixed history as predictors of job performance. On the one hand, recent meta-analyses (Barrick & Mount, 1991; Tett et al., 1991; Salgado, 1997) have found that conscientiousness appears to be a consistent predictor of performance, and that agreeableness can be an effective predictor of performance, depending on the job. These same studies, however, also show that the magnitude of the relationship between conscientiousness and performance tends to be weaker than the relationship between cognitive ability and job performance (e.g., Schmidt & Hunter, 1998), and that the link between agreeableness and performance tends to be relatively weak when aggregated across job types. The results of the current study generally supports these past findings. Conscientiousness proved to be a strong predictor of task performance, though not of contextual performance, contrary to past research (e.g., Johnson, 2001; Motowidlo & Van Scotter, 1994). Agreeableness proved a strong predictor of task performance for sales, clerical, and service jobs.

Moreover, the model of job performance described by Borman and Motowidlo (1993) has led some to suggest that personality variables will be more strongly related to contextual than task performance, a proposition which the present study largely failed to confirm. Specifically, it was found that cognitive ability was a significantly stronger

predictor of task than contextual performance ($F(1, 436) = 8.83$, $p < 0.01$), which follows past predictions. However, conscientiousness was also a significantly better predictor of task than contextual performance ($F(1,436) = 9.67$, $p < 0.01$), contrary to past research (Johnson, 2001; Motowidlo & Van Scotter, 1994). The relationship between agreeableness and task and contextual performance was equivocal.

The discrepant result with regards to the link between conscientiousness and contextual performance may be a result of the specific jobs used in the analysis. Tables 5 through 8 show that conscientiousness appears to be a good predictor of contextual performance for clerical/sales and service jobs, but not for technical/professional or managerial jobs. It may be that conscientiousness fails to predict contextual performance in technical, professional, and managerial jobs because such jobs fail to offer enough opportunities for employees to display the type of contextual performance behaviors measured by the contextual performance scale used in this study. It may also be that managers of employees in these positions have less of an opportunity to observe such behaviors in the workplace.

Experience

The use of experience as a selection criteria has a long history in employment practices, based on the assumption that people with more experience will tend to perform better on the job, but research examining the relationship has sometimes suggested that experience may not always be as strong a predictor of performance as some would like to believe. For instance, Schmidt and Hunter showed that experience

explained very little variance in job performance above and beyond cognitive ability. However, more detailed research by Quinones, Ford, and Teachout (1995) has shown that experience can be a good predictor of job performance depending on the measure of experience and performance. As a result of this research, experience in this study was defined in terms of experience on job-related tasks. There has been little research on the way in which the relationship between experience and performance may differ depending on the performance factors being measured. Consistent with past research, the current study found that task experience significantly predicted task performance. Moreover, task experience was a significant predictor of job performance, even after the effects of cognitive ability, personality, and all interactions have been accounted for. This result supports the general findings of Quinones et al.'s meta-analysis - that experience at the task level can predict job performance. Moreover, the finding that experience - measured at the task level - is a significant predictor of task performance, but not contextual performance, suggests that experience in job-related tasks may have different effects on the various dimensions of job performance.

Thus, the present research largely supports past conclusions on the effects of cognitive ability, conscientiousness, agreeableness, and experience on job performance. However, there are some discrepancies with past research; specifically, the idea that cognitive ability is a better predictor of task performance than contextual performance was not supported. However, most of these results - while instructive - are only tertiary to the main objectives of the paper, and offer little in the way of new findings.

Interactions

The primary objective of this study was to investigate the interactions between cognitive ability, conscientiousness, agreeableness, and task experience, and how these interactions vary for different aspects of job performance. Past research on the multidimensional nature of job performance has suggested that these variables can have very different effects, depending on what type of performance is being measured. Past attempts to quantify interactive relationships between these predictors have been limited by the type of performance data typically collected in past research, supervisor ratings of overall job performance. By expanding the type of performance data to include more specific dimensions of performance on the job, it was hoped that a clearer picture of these potentially important relationships might emerge. A secondary objective of this paper was to try to explain the lack of clear results in past research investigating the potential interaction between cognitive ability and experience on job performance. Finally, conscientiousness was proposed as a key moderator of the relationship between cognitive ability, experience, and task performance. Specifically, it was proposed that higher levels of conscientiousness would be associated with an increase of the joint effect of cognitive ability task experience on task performance; in other words, that higher levels of conscientiousness and task experience would lead to a greater convergence of the task performance of people with different levels of cognitive ability.

Given the mixed results of previous research on the interaction between cognitive ability and experience (Lance & Bennett, 2000; Lance, Hedge, & Alley, 1989; Schmidt et al., 1988), it was believed that the use of more specific performance ratings (as

opposed to overall job performance ratings) and a less general measure of experience might allow for a better test of the interactions that previous research had suggested, but largely failed to support. However, the results of this study confirmed the majority of the previous results, failing to find an interaction between cognitive ability and experience. Thus, there is no evidence to support either the convergence or divergence hypotheses described by Schmidt et al. (1988), even when experience is measured at the task level, and performance is divided into task and contextual components. Furthermore, there was no difference in the relative magnitude of the interaction for task or contextual performance.

An interaction between conscientiousness and experience for task and contextual performance was also predicted. However, this study failed to find any significant interaction between conscientiousness and experience for either measure of performance, suggesting that the effect of conscientiousness on performance does not depend on one's degree of experience on important job-related tasks. Further analysis of the estimated effects showed no difference in the magnitude of the effects for task and contextual performance, counter to expectations.

The paper also predicted that cognitive ability would increase the effect of agreeableness on contextual performance. While there was a significant interaction, it was not in the direction initially predicted by theory. Specifically, the data suggest that while cognitive ability and agreeableness are both predictors of contextual performance, agreeableness is primarily associated with increased contextual performance only for those with low levels of cognitive ability. Thus, rather than cognitive ability increasing

the effect of agreeableness on contextual performance, it appears that cognitive ability acts in a compensatory fashion, allowing people to make up for lower levels of agreeableness, but does nothing for those with higher levels of agreeableness.

This compensatory relationship is interesting, but the precise explanation for this effect remains unclear. It may be that those people with higher cognitive ability are simply more aware with regards to their work environment, and realize that the behaviors represented by the contextual performance ratings are an important part of their job performance ratings, even though such behaviors are not typically role prescribed. In this sense, high cognitive ability may be affecting the propensity to engage in contextual performance behaviors independently of any effect of agreeableness. It may also be possible that cognitive ability affects the ability to hide or otherwise prevent managers from accurately observing various types of behaviors that would lead to lower contextual performance ratings. There is some past research to suggest that impression management behaviors lead to increased performance ratings (Wayne & Liden, 1995). Thus, it may be that low cognitive ability employees are simply less able to consistently engage in those types of faking or impression management behaviors that might lead to higher contextual performance ratings.

The secondary objective of the paper was addressed by examining the three-way interaction between conscientiousness, cognitive ability, and task experience on job performance. This study suggested that past attempts to measure the interaction between cognitive ability and experience were flawed, insofar as they failed to take into account differences in effortful persistence over time, represented by conscientiousness. Thus, it

was suggested that once conscientiousness was taken into account, a significant interaction between cognitive ability and experience would emerge. The data support this idea, showing some support for the "convergence" hypothesis discussed in Schmidt et al. (1988) for those high in conscientiousness, and support for the "divergence" hypothesis for those low in conscientiousness. Thus, it appears that conscientiousness may play a significant role in determining the joint effects of cognitive ability and experience on task performance, providing at least one explanation for the lack of clear results on the interaction between cognitive ability and experience (Fleishman & Mumford, 1989; Lance & Bennett, 2000; Lance, Hedge, & Alley, 1989; Schmidt et al., 1989).

Limitations and Directions for Future Research

There are several limitations in the present study which need to be addressed. First, the correlation between the dependent variables is higher than reported in several other studies involving task and contextual performance. Because the task performance measure involved supervisor estimates of general aspects of task-related performance, it may be that in this sample, supervisors were unable to adequately separate an employee's performance on specific job tasks from their contextual performance. The nature of some of the jobs investigated may also have contributed to this high correlation, insofar as certain jobs (e.g., managerial positions, sales positions) may include tasks that require behaviors not easily separated from contextual performance. Certainly, the correlation between task and contextual performance does appear to vary depending on the job.

Thus, future research involving task and contextual performance may need to focus on ways of better separating the two, such as through the use of objective measures of task performance which would not rely on supervisors' ability to distinguish between the two.

Another issue in this study was the use of cross-job data. Although such aggregation is not uncommon, and there was evidence that job type did not *significantly* alter any of the effects in the study, there was still some sizable variance within the job-specific regression estimates and correlations, particularly with regards to the three-way interaction. This suggests some limitations in the degree to which those analyses may be said to generalize across job types, and in particular suggests that the most pronounced effect of the three-way interaction may be for less complex jobs, such as service positions, and that the size and perhaps even direction of this effect may change depending the specific job type under investigation. It also suggests yet another possible reason for the discrepant results found in past research on the *convergence* and *divergence* hypotheses. Thus, future research should attempt to further define the factors which might affect this interaction, in order to more accurately determine the precise method by which conscientiousness impacts the relationship between cognitive ability, experience, and performance.

Also, because this study used supervisor ratings of performance, it may be possible that supervisors have very different *expectations* of performance for those of varying levels of experience and cognitive ability, depending on job type. Thus, this study cannot totally discount the possibility that the significant effects found in the present study are - at least partially - an artifact of supervisor expectations. Research

using more objective measures of task performance may reduce some of the differences in the reported effects of these variables and provide a more accurate picture of the relationships being investigated.

Avenues for future research include investigating how changes in the definition and measurement of task performance alter the relationships described above, as well as determining which aspects of tasks and jobs are associated with changes in these effects. In addition to continuing to develop the network of relationships surrounding the construct of job performance, and factors such as task and contextual performance, future research should also begin to investigate the process by which conscientiousness acts to alter the influence of cognitive ability and experience. Specifically, does conscientiousness act by influencing persistence over long periods of time? Is the relationship between cognitive ability and conscientiousness actually time-dependent, or is it a result of changes in the employee sample over time? Longitudinal studies might help explain this mechanism, and lead to a better understanding of the dynamic nature performance in the workplace.

CONCLUSION

Given these caveats, there are still several conclusions that can be drawn from the results of the present study. First, it is apparent that changes in task experience are associated with very different effects on task and contextual performance. Second, agreeableness appears to provide a buffer for low cognitive ability with regards to contextual performance. Finally, it appears that conscientiousness can play a critical role in determining the effect that cognitive ability and task experience have on task-related performance, suggesting that the utility of traditional selection criteria can change as employees' increase in experience, though it is likely that the effect may not necessarily be stable across all job types. Overall, the present study suggests that the relationships between common performance predictors and various aspects of job performance may be more complex than commonly thought, and that a better understanding of this complexity can potentially be critical to the accurate prediction of performance on the job.

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APPENDIX A
Personality Measure
(from Saucier, 1994)

Personality Questionnaire

Name/ID#: _____ Sex: M F Age:_____

Ethnicity: (circle one)
White
African-American
Non-white Hispanic
Asian
Other

Job title: _____

Total number of years of education: _____

Instructions:
Please use the following list of common traits to describe yourself as accurately as possible. Describe yourself as you see yourself at the present time, not as you would wish to be in the future. Describe yourself generally, compared to others you know of the same sex and similar age.

Please use the following scale to make your ratings:

1 = Very inaccurate
2 = Moderately inaccurate
3 = Neither accurate nor inaccurate
4 = Moderately accurate
5 = Very accurately

1. _____ Bashful
2. _____ Bold
3. _____ Careless
4. _____ Cold
5. _____ Complex
6. _____ Cooperative
7. _____ Creative
8. _____ Deep
9. _____ Disorganized
10. _____ Efficient
11. _____ Energetic
12. _____ Envious
13. _____ Extraverted
14. _____ Fretful
15. _____ Harsh
16. _____ Imaginative
17. _____ Inefficient
18. _____ Intellectual
19. _____ Jealous
20. _____ Kind
21. _____ Moody
22. _____ Organized
23. _____ Philosophical
24. _____ Practical
25. _____ Quiet
26. _____ Relaxed
27. _____ Rude
28. _____ Shy
29. _____ Sloppy
30. _____ Sympathetic
31. _____ Systematic
32. _____ Talkative
33. _____ Tempermental
34. _____ Touchy
35. _____ Uncreative
36. _____ Unenvious
37. _____ Unintellectual
38. _____ Unsympathetic
39. _____ Warm
40. _____ Withdrawn

APPENDIX B
Task Experience Rating Forms

Experience Rating Scale for Clerical Personnel

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential. If an item does not apply to your job, please mark "NA".

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Compiles, copies, sorts, and files records of office activities, business transactions, and other activities. _____

   Computes, records, and proofreads data and other information, such as records or reports. _____

   Operates office machines, such as photocopier, fax, and personal computer. reports. _____

   Completes and mails bills, contracts, policies, invoices, or checks. _____

   Stuffs envelopes and addresses, stamps, sorts, and distributes mail, packages, and other materials. _____

   Transcribes dictation and composes and types letters and other correspondence, using typewriter or computer. _____

   Orders materials, supplies, and services, and completes records and reports. _____

   Answers telephone, responds to requests, delivers messages, and runs errands. _____

   Reviews files, records, and other documents to obtain information to respond to requests. _____

Experience Rating Scale for Managers/Administrators (General)

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Coordinates activities of clerical and administrative personnel in establishment or organization. _____

   Analyzes internal processes and plans or implements procedural and policy changes to improve operations. _____

   Recommends cost saving methods, such as supply changes and disposal of records to improve efficiency of department. _____

   Prepares and reviews operational reports and schedules to ensure accuracy and efficiency. _____

   Formulates budgetary reports. _____

   Hires and terminates clerical and administrative personnel. _____

   Conducts classes to teach procedures to staff. _____

Experience Rating Scale for HR Specialists

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Examines employee files to answer inquiries and provide information for personnel actions. _____

   Records employee data, such as address, rate of pay, absences, and benefits, using personal computer. _____

   Compiles and types reports from employment records. _____

   Maintains and updates employee records to document personnel actions and changes in employee status. _____

   Processes and reviews employment application to evaluate qualifications or eligibility of applicant. _____

   Interviews applicants to obtain and verify information. _____

   Answers questions regarding examinations, eligibility, salaries, benefits, and other pertinent information. _____

   Communicates with employees or applicants to explain company personnel policies and procedures. _____

Experience Rating Scale for Library Staff

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Issues borrower's identification card according to established procedures. _____

   Issues books to patrons and records or scans information on borrower's card. _____

   Sorts books, publications, and other items according to procedure and returns them to shelves, files, or other designated storage area. _____

   Locates library materials for patrons, such as books, periodicals, tape cassettes, Braille volumes, and pictures. _____

   Classifies and catalogs items according to contents and purpose. _____

   Maintains records of items received, stored, issued, and returned and files catalog cards according to system used. _____

   Answers routine inquiries and refers patrons who need professional assistance to librarian. _____

   Delivers and retrieves items to and from departments by hand or push cart. _____

   Prepares, stores, and retrieves classification and catalog information, lecture notes, or other documents related to document stored, using computer. _____

Experience Rating Scale for Maintenance Workers

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Sweeps, mops, scrubs, and vacuums floors of buildings, using cleaning solutions, tools and equipment. _____

   Cleans or polishes walls, ceilings, windows, plant equipment and building fixtures, using steam cleaning equipment, scrapers, brooms and variety of hand and power tools. _____

   Gathers and empties trash. _____

   Tends, cleans, adjusts and services furnaces, air conditioners, boilers and other building heating and cooling systems. _____

   Notifies management personnel concerning need for major repairs or additions to building operating systems. _____

   Dusts furniture, walls, machines, and equipment. _____

   Services and repairs cleaning and maintenance equipment and machinery and performs minor routine painting, plumbing, electrical, and related activities. _____

Experience Rating Scale for Marketing Personnel

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Develops marketing strategy, based on knowledge of establishment policy, nature or market, and cost and markup factors. _____

   Coordinates and publicizes marketing activities to promote products and services. _____

   Conducts economic and commercial surveys to identify potential markets for products and services. _____

   Analyzes business developments and consults trade journals to monitor market trends and determine market opportunities for products. _____

   Coordinates promotional activities and shows to market products and services. _____

   Prepares report of marketing activities. _____

Experience Rating Scale for Recruiters

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Interviews applicants to obtain work history, education, and other background information. _____

   Provides potential applicants with information regarding facilities, operations, benefits, and opportunities in organization. _____

   Conducts reference and background checks on applicants. _____

   Schedules on-campus interviews potential students and employees. _____

   Notifies applicants by mail or telephone to inform them of consideration and selection. _____

   Evaluates recruitment and selection criteria to ensure conformance to professional, statistical, and testing standards, and recommends revision as needed. _____

   Assists and advises establishment management in organizing, preparing, and implementing recruiting and retention programs. _____

Experience Rating Scale for Financial Aid Staff

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Analyzes applicant's financial status, credit, and property evaluation to determine feasibility of granting aid. _____

   Approves aid within specified limits. _____

   Interviews applicant and requests specified information for aid application. _____

   Contacts applicant to resolve questions regarding application information. _____

   Ensures loan agreements are complete and accurate according to policy.
   Computes payment schedule. _____

   Submits application for verification and recommendation. _____

Experience Rating Scale for Teachers

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Conducts classes, workshops, and demonstrations to teach principles, techniques, procedures, or methods of designated subject. _____

   Administers oral, written, and performance tests and issues grades in accordance with performance. _____

   Plans course content and method of instruction. _____

   Prepares outline of instructional program, lesson plans, and establishes course goals. _____

   Selects and assembles books, materials, and supplies for courses or projects. _____

   Observes students to determine and evaluate qualifications, limitations, abilities, interests, aptitudes, temperament, and individual characteristics. _____

   Directs and supervises student project activities and performances. _____

Experience Rating Scale for Physicians

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following job tasks:

   Examines or conducts tests on patient to provide information on medical condition. _____

   Analyzes records, reports, test results, or examination information to diagnose medical condition of patient. _____

   Prescribes or administers treatment, therapy, medication, vaccination, and other specialized medical care to treat or prevent illness, disease, or injury. _____

   Explains procedures and discusses test results on prescribed treatments with patents. _____

   Operates on patients to remove, repair, or improve functioning of diseased or injured body parts and systems. _____

   Collects, records, and maintains patient information, such as medical history, reports, and examination results. _____

   Refers patient to medical specialist or other practitioner when necessary.
   Advises patients and community concerning diet, activity, hygiene, and disease prevention.
   _____

   Plans, implements, or administers health programs or standards in hospital, business, or community for information, prevention, or treatment of injury or illness. _____

   Directs and coordinates activities of nurses, students, assistants, specialists, therapists, and other medical staff. _____

Experience Rating Scale for Housekeeping Positions

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following job tasks:

   Cleans rooms, hallways, lobbies, lounges, restrooms, corridors, elevators, stairways, and locker rooms and other work areas. _____

   Cleans rugs, carpets, upholstered furniture, and draperies, using vacuum cleaner. Dusts furniture and equipment. _____

   Empties wastebaskets, and empties and cleans ashtrays. _____

   Sweeps, scrubs, waxes, and polishes floors, using brooms and mops and powered scrubbing and waxing machines. _____

   Collects soiled linens for laundering, and receives and stores linen supplies in linen closet. _____

   Polishes metalwork, such as fixtures and fittings. _____

   Washes walls, ceiling, and woodwork. _____

   Washes windows, door panels, and sills. _____

   Transports trash and waste to disposal area. _____

Experience Rating Scale for Administrative Assistants

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following job tasks:

   Coordinates and directs office services, such as records and budget preparation, personnel, and housekeeping, to aid executives. _____

   Prepares records and reports, such as recommendations for solutions of administrative problems and annual reports. _____

   Files and retrieves corporation documents, records, and reports. _____

   Analyzes operating practices and procedures to create new or to revise existing methods. _____

   Interprets administrative and operating policies and procedures for employees. _____

   Studies management methods to improve workflow, simplify reporting procedures, or implement cost reductions. _____

   Plans conferences. _____

Experience Rating Scale for Instructional Designers

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following job tasks:

   Researches, evaluates, and prepares recommendations on curricula, instructional methods, and materials. _____

   Develops tests, questionnaires, and procedures to measure effectiveness of curriculum and to determine if program objectives are being met. _____

   Orders or authorizes purchase of instructional materials, supplies, equipment, and visual aids. _____

   Confers with officials and administrative staff to plan and develop curricula and establish guidelines for instructional programs. _____

   Plans, conducts, and evaluates training programs and conferences for instructors to study new procedures, instructional materials, and teaching aids. _____

   Advises on implementation of programs and procedures. _____

Experience Rating Scale for Training/Development Managers

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following job tasks:

   Analyzes training needs to develop new training programs or modify and improve existing programs. _____

   Plans and develops training procedures utilizing knowledge of relative effectiveness of individual training, classroom training, demonstrations, on-the-job training, meetings, conferences, and workshops. _____

   Formulates training policies and schedules, utilizing knowledge of identified training needs. _____

   Evaluates effectiveness of training programs and instructor performance. _____

   Develops and organizes training manuals, multimedia visual aids, and other educational materials. _____

   Coordinates established courses with technical and professional courses provided by community schools and designates training procedures. _____

   Develops testing and evaluation procedures. _____

   Confers with management and supervisory personnel to identify training needs based on projected production processes, changes, and other factors. _____

   Reviews and evaluates training and apprenticeship programs for compliance with government standards. _____

   Prepares training budget for department or organization. _____

Experience Rating Scale for Engineering Managers

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following job tasks:

   Establishes procedures, and directs testing, operation, maintenance, and repair of transmitter equipment. _____

   Evaluates contract proposals, directs negotiation of research contracts, and prepares bids and contracts. _____

   Plans and directs installation, maintenance, testing, and repair of facilities and equipment. _____

   Directs, reviews, and approves product design and changes, and directs testing. _____

   Plans, coordinates, and directs engineering project, organizes and assigns staff, and directs integration of technical activities with products. _____

   Analyzes technology, resource needs, and market demand, and confers with management, production, and marketing staff to plan and assess feasibility of project. _____

   Administers planning, construction, and maintenance, and reviews and recommends or approves contracts and cost estimates. _____

Experience Rating Scale for Nurses

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months you have been primarily responsible for the following tasks:

   Preparing patients for and assisting with examinations: _____

   Conducts specified laboratory tests: _____

   Maintains stock of supplies: _____

   Orders, interprets, and evaluates diagnostic tests to identify and assess patient's condition: _____

   Records patient's medical information and vital signs: _____

   Prepares rooms, sterile instruments, and equipment and supplies: _____

   Discusses cases with physician or obstetrician: _____

Experience Rating Scale for Loan Officers/Interviewers/Clerks

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Analyzes applicant's financial status, credit, and property evaluation to determine feasibility of granting loan. _____

   Approves loan within specified limits. _____

   Refers loan to loan committee for approval. _____

   Interviews applicant and requests specified information for loan application. _____

   Contacts applicant or creditors to resolve questions regarding application information. _____

   Ensures loan agreements are complete and accurate according to policy. _____

   Computes payment schedule. _____

   Submits application to credit analyst for verification and recommendation. _____

   Petitions court to transfer title and deeds of collateral to bank. _____

   Confers with underwriters to aid in resolving mortgage application problems. _____

Experience Rating Scale for Bank Tellers

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Receives checks and cash for deposit, verifies amount, and examines checks for endorsements. _____

   Cashes checks and pays out money after verification of signatures and customer balances. _____

   Counts currency, coins, and checks received for deposit, shipment to branch banks, or Federal Reserve Bank by hand or currency-counting machine. _____

   Prepares daily inventory of currency, drafts, and travelers' checks. _____

   Examines coupons and bills presented for payment to verify issue, payment date, and amount due. _____

   Enters customers' transactions into computer to record transactions and issues computer-generated receipts. _____

   Issues checks to bond owners in settlement of transactions. _____

   Balances currency, coin, and checks in cash drawer at end of shift and calculates daily transactions. _____

   Quotes unit exchange rate, following daily international rate sheet or computer display. _____

   Removes deposits from automated teller machines and night depository, and counts and balances cash in them. _____

Experience Rating Scale for Parking Officers

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are sometimes considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Enforces parking regulations. _____

   Gives warning/issues tickets. _____

   Provides information to employees, students, and visitors regarding campus parking regulations and directions. _____

   Provide low-level security while patrolling. _____

   Sets up cones, barricades, and other traffic control equipment. _____

   Performs traffic control and direction duties. _____

   Inspects parking facilities. _____

   Provides training in the field to junior parking services officers. _____

   Handles routine and emergency communications for parking, traffic, and shuttle bus operations. _____

   Identifies maintenance requirements of parking facilities. _____

   Supervises towing of vehicles. _____

   Maintains and assigns vehicles, equipment, uniforms and other materials. _____

Experience Rating Scale for Machinery Operators

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Confers with operators and observes, tests, and evaluates operation of machinery and equipment to diagnose cause of malfunction. _____

   Disassembles machinery and equipment to remove parts and make repairs. _____

   Examines parts for defects, such as breakage or excessive wear. _____

   Repairs, replaces, adjusts, and aligns components of machinery and equipment. _____

   Cleans and lubricates parts, equipment, and machinery. _____

   Test-runs repaired machinery and equipment to verify adequacy of repairs. _____

   Fabricates replacement parts. _____

   Welds to repair broken metal parts, fabricate new parts, and assemble new equipment. _____

   Orders or requisitions parts and materials. _____

   Repairs and replaces electrical wiring and components of machinery. _____

Experience Rating Scale for Retail Salesperson

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Describes merchandise and explains use, operation, and care of merchandise to customers. _____

   Totals purchases, receives payment, makes change, or processes credit transaction. _____

   Recommends, selects, and obtains merchandise based on customer needs and desires. _____

   Demonstrates use or operation of merchandise. _____

   Greets customer. _____

   Estimates quantity and cost of merchandise required, such as paint or floor covering. _____

Experience scale for Managers (Health Care)

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Administers fiscal operations, such as planning budgets, authorizing expenditures and coordinating financial reporting. _____

   Directs and coordinates activities of medical, nursing, technical, clerical, service, and maintenance personnel of health care facility or mobile unit. _____

   Develops or expands medical programs or health services for research, rehabilitation, and community health promotion. _____

   Implements and administers programs and services for health care or medical facility. _____

   Establishes work schedules and assignments for staff, according to workload, space and equipment availability. _____

   Prepares activity reports to inform management of the status and implementation plans of programs, services, and quality initiatives. _____

   Recruits, hires, and evaluates the performance of medical staff and auxiliary personnel. _____

   Reviews and analyzes facility activities and data to aid planning and cash and risk management and to improve service utilization. _____

   Consults with medical, business, and community groups to discuss service problems, coordinate activities and plans, and promote health programs.
   _____

Experience scale for Lab Technicians

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Conducts quantitative and qualitative chemical analyses of body fluids, such as blood, urine, and spinal fluid. _____

   Performs blood counts, using microscope. _____

   Incubates bacteria for specified period and prepares vaccines and serums by standard laboratory methods. _____

   Conducts blood tests for transfusion purposes. _____

   Inoculates fertilized eggs, broths, or other bacteriological media with organisms. _____

   Tests vaccines for sterility and virus inactivity. _____

   Prepares standard volumetric solutions and reagents used in testing. _____

   Draws blood from patient, observing principles of asepsis to obtain blood sample. _____

Experience Rating Scale for Customer Service Representatives

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Confers with customer by phone or in person to receive orders for services or changes in services. _____

   Resolves billing or service complaints and refers grievances to designated departments for investigation. _____

   Determines charges for service requested and collects deposits. _____

Experience Rating Scale for Office Clerks (general)

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Compiles, copies, sorts, and files records of office activities, business transactions, and other activities. _____

   Computes, records, and proofreads data and other information, such as records or reports. _____

   Operates office machines, such as photocopier, telecopier, and personal computer. _____

   Completes and mails bills, contracts, policies, invoices, or checks. _____

   Stuffs envelopes and addresses, stamps, sorts, and distributes mail, packages, and other materials. _____

   Transcribes dictation and composes and types letters and other correspondence, using typewriter or computer. _____

   Orders materials, supplies, and services, and completes records and reports. _____

   Answers telephone, responds to requests, delivers messages, and runs errands. _____

   Reviews files, records, and other documents to obtain information to respond to requests. _____

Experience Rating Scale for Bookkeeping, Accounting, and Auditing Clerks

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Records financial transactions and other account information to update and maintain accounting records. _____

   Compiles reports and tables to show statistics related to cash receipts, expenditures, accounts payable and receivable, and profit and loss. _____

   Verifies balances and entries, calculations, and postings recorded by other workers. _____

   Performs financial calculations such as amounts due, balances, discounts, equity, and principal. _____

   Debits or credits accounts. _____

   Complies with federal, state, and company policies, procedures, and regulations. _____

   Processes negotiable instruments such as checks and vouchers. _____

   Evaluates records for accuracy of balances, postings, calculations, and other records pertaining to business or operating transactions and reconciles, or notes discrepancies. _____

Experience Rating Scale for Statement Clerks

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Compares previously prepared bank statements with canceled checks, prepares statements for distribution to customers, and reconciles discrepancies in records and accounts. _____

   Recovers checks returned to customer in error, adjusts customer account, and answers inquiries. _____

   Matches statement with batch of canceled checks by account number. _____

   Inserts statements and canceled checks in envelopes and affixes postage, or stuffs envelopes and meters postage. _____

   Routes statements for mailing or over-the-counter delivery to customers. _____

   Keeps canceled checks and customer signature files. _____

   Posts stop-payment notices to prevent payment of protested checks. _____

   Encodes and cancels checks, using machine. _____

   Takes orders for imprinted checks. _____

Experience Rating Scale for New Accounts Clerks

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Interviews customer to obtain information needed to open account or rent safe-deposit box. _____

   Assists customer in completing application forms for loans, accounts, or safe-deposit boxes, using typewriter or computer, and obtains signature. _____

   Answers customer questions, and explains available services, such as deposit accounts, bonds, and securities. _____

   Enters account information in computer, and files forms or other documents. _____

   Collects and records fees and funds for deposit from customer, and issues receipt, using computer. _____

   Issues initial and replacement safe-deposit key to customer, and admits customer to vault. _____

   Investigates and corrects errors upon customer request, according to customer and bank records, using calculator or computer. _____

   Executes wire transfers of funds. _____

   Obtains credit records from reporting agency. _____

Experience Rating Scale for Financial Managers (Branch or Department)

This questionnaire is designed to measure your degree of experience in your current job, and in those tasks which are usually considered part of that job. Please answer as completely as possible. All data will be completely confidential.

Please read each question and answer as honestly and accurately as you can.

1. Please indicate the number of months you have been employed in your current position with your current employer. If you are unsure of the exact number, please estimate as closely as you can. _____

2. Please indicate the number of months you have held equivalent positions with other organizations. _____

3. Please indicate the number of months for which you have been responsible for the following tasks:

   Directs and coordinates activities of workers engaged in conducting credit investigations and collecting delinquent accounts of customers. _____

   Plans, directs, and coordinates risk and insurance programs of establishment to control risks and losses. _____

   Manages branch or office of financial institution. _____

   Directs and coordinates activities to implement institution policies, procedures, and practices concerning granting or extending lines of credit and loans. _____

   Prepares financial and regulatory reports required by law, regulations, and board of directors. _____

   Analyzes and classifies risks as to frequency and financial impact of risk on company. _____

   Selects appropriate technique to minimize loss, such as avoidance and loss prevention and reduction. _____

   Prepares operational and risk reports for management analysis. _____

   Directs floor operations of brokerage firm engaged in buying and selling securities at exchange. _____

   Establishes procedures for custody and control of assets, records, loan collateral, and securities to ensure safekeeping. _____

APPENDIX C
Performance Questionnaire
\
Supervisor Information

Age: _____ Sex: M F Job title: _____

Number of years in current position: _____

Number of years of supervisory experience: _____

Type of business: _____

Ratee's name: _____

Task performance ratings:
INSTRUCTIONS: CHECK ONE BOX FOR EACH QUESTION

1. How much can this employee get done? (Employee's ability to make efficient use of time and to work at a high speed.) (If it is not possible to rate ONLY the quantity of work which a person can do on this job, choose "Does not apply.")

- ☐ Does not apply
- ☐ Capable of very low work output. Can perform only at an unsatisfactory pace.
- ☐ Capable of low work output. Can perform at a slow pace.
- ☐ Capable of average work output. Can perform at an acceptable pace.
- ☐ Capable of high work output. Can perform at a fast pace
- ☐ Capable of very high work output. Can perform only at an unusually fast pace.

2. How good is the quality of the employee's work? (Employee's ability to do high-grade work which meets quality standards.)

- ☐ Performance is very inferior; almost never meets quality standards.
- ☐ Performance is inferior in quality.
- ☐ Performance is neither inferior nor superior; performance is acceptable.
- ☐ Performance is superior in quality.
- ☐ Performance is very superior in quality.

3. How accurate is the employee's work? (Employee's ability to avoid making mistakes.)

- ☐ Always makes mistakes. Work needs constant checking.
- ☐ Very often makes mistakes. Work needs more checking than is desirable.
- ☐ Sometimes makes mistakes. Work only needs normal checking.
- ☐ Rarely makes mistakes. Work seldom needs checking.
- ☐ Never makes a mistake. Work never needs checking.

4. How much knowledge does the employee know about the job?

- ☐ Has no knowledge. Does not know enough to do the job adequately.
- ☐ Has very limited knowledge. Knows enough to get by.
- ☐ Has some knowledge. Knows enough to do fair work.
- ☐ Has quite a bit of knowledge. Knows enough to do a good job.
- ☐ Has a great deal of knowledge. Knows the job thoroughly.

5. How large a variety of job duties can the employee perform efficiently? (Employee's ability to handle several different operations.)

- ☐ Cannot perform different operations adequately.
- ☐ Can perform a limited number of operations with reasonable efficiency.
- ☐ Can perform several different operations with reasonable efficiency.
- ☐ Can perform many different operations efficiently.
- ☐ Can perform an unusually large variety of operations efficiently.

Contextual performance ratings:

Please use the following scale to answer the questions below:

1 = not at all likely
2 = fairly unlikely
3 = neither likely nor unlikely
4 = fairly likely
5 = very likely

1. Comply with instructions even when supervisors aren't present.	1	2	3	4	5
2. Cooperate with others on the team.	1	2	3	4	5
3. Persistent in overcoming obstacles to complete a task.	1	2	3	4	5
4. Display proper appearance and bearing.	1	2	3	4	5
5. Volunteer for additional work.	1	2	3	4	5
6. Follow proper procedures.	1	2	3	4	5
7. Look for a challenging assignment.	1	2	3	4	5
8. Offer to help others accomplish their work.	1	2	3	4	5
9. Pay close attention to details.	1	2	3	4	5
10. Defend the supervisor's decisions.	1	2	3	4	5
11. Render proper courtesy.	1	2	3	4	5
12. Support and encourage a coworker with a problem.	1	2	3	4	5
13. Take the initiative to solve a work problem.	1	2	3	4	5
14. Exercise personal discipline and control.	1	2	3	4	5
15. Tackle a difficult work assignment enthusiastically.	1	2	3	4	5
16. Voluntarily does more than the job requires to help others, or contribute to team effectiveness.	1	2	3	4	5

Overall performance ratings:

Considering the factors already rated, and ONLY these factors, how good is the employee in terms of his or her ALL-AROUND ABILITY to do the job? Select one of the following choices:

- ☐ Very inferior
- ☐ Inferior
- ☐ Neither inferior nor superior
- ☐ Superior
- ☐ Very superior

Overall, how would you rate this employee?

- ☐ 7 – Exceeds standards for job performance
- ☐ 6
- ☐ 5
- ☐ 4 – Meets standards for job performance
- ☐ 3
- ☐ 2
- ☐ 1 – Does not meet standards for job performance

- ☐ 7 – Performs at a high level compared to others in the same position
- ☐ 6
- ☐ 5
- ☐ 4 – Performs at an average level compared to others in the same position
- ☐ 3
- ☐ 2
- ☐ 1 – Performs at a low level compared to others in the same position

- ☐ 7 – Contributes more to unit effectiveness than most members of the work unit
- ☐ 6
- ☐ 5
- ☐ 4 – Makes an average contribution to unit effectiveness
- ☐ 3
- ☐ 2
- ☐ 1 – Contributes less to unit effectiveness than most members of the work unit

APPENDIX D
Additional Analyses

Table D1

Regression Analyses for Technical/Professional Jobs

Task performance

Variable	β	SE	t	sr^2	R^2
Step 1					0.098
Cognitive ability	0.235	0.08286	2.83**	0.07	
Conscientiousness	0.083	0.08060	1.03	0.01	
Task experience	0.162	0.08167	1.98*	0.03	
Step 2					0.107
Cognitive ability x conscientiousness	0.022	0.09115	0.24	0.00	
Cognitive ability x task experience	-0.107	0.09100	- 1.18	0.01	
Conscientiousness x task experience	0.006	0.08152	0.07	0.00	
Step 3					0.108
Cognitive ability x conscientiousness x task experience	- 0.006	0.10320	-0.06	0.000	

Contextual performance

Variable	β	SE	t	sr^2	R^2
Step 1					0.041
Cognitive ability	0.268	0.11019	2.43*	0.08	
Conscientiousness	0.130	0.10996	1.18	0.02	
Task experience	0.019	0.11155	0.17	0.00	
Step 2					0.060
Cognitive ability x conscientiousness	0.138	0.13607	1.01	0.02	
Cognitive ability x task experience	0.126	0.12494	1.01	0.01	
Conscientiousness x task experience	- 0.014	0.11176	-0.12	0.00	
Step 3					0.064
Cognitive ability x conscientiousness x task experience	0.016	0.14491	0.11	0.01	

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table D2

Regression Analyses for Managerial Jobs

Task performance

Variable	β	SE	t	sr^2	R^2
Step 1					0.097
Cognitive ability	0.268	0.11019	2.43*	0.08	
Conscientiousness	0.130	0.10996	1.18	0.02	
Task experience	0.019	0.11155	0.17	0.00	
Step 2					
0.124					
Cognitive ability x conscientiousness	0.138	0.13607	1.01	0.02	
Cognitive ability x task experience	0.126	0.12494	1.01	0.01	
Conscientiousness x task experience	- 0.0140	0.11176	- 0.12	0.00	
Step 3					0.124
Cognitive ability x conscientiousness x task experience	0.016	0.14491	0.11	0.000	

Contextual performance

Variable	β	SE	t	sr^2	R^2
Step 1					0.095
Cognitive ability	0.301	0.10970	2.74**	0.09	
Conscientiousness	0.009	0.10947	0.09	0.00	
Task experience	- 0.079	0.11105	- 0.71	0.01	
Step 2					0.150
Cognitive ability x conscientiousness	0.198	0.13337	1.48	0.03	
Cognitive ability x task experience	0.153	0.12246	1.25	0.01	
Conscientiousness x task experience	- 0.090	0.10954	- 0.82	0.01	
Step 3					0.181
Cognitive ability x conscientiousness x task experience	0.227	0.13943	1.63	0.03	

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table D3

Regression Analyses for Clerical/Sales Jobs

Task performance

Variable	β	SE	t	sr^2	R^2
Step 1					0.176
Cognitive ability	0.223	0.07576	2.94**	0.03	
Conscientiousness	0.278	0.07680	3.62**	0.09	
Task experience	0.228	0.07696	2.96**	0.05	
Step 2					0.192
Cognitive ability x conscientiousness	- 0.064	0.06711	-0.96	0.01	
Cognitive ability x task experience	0.105	0.07749	1.35	0.01	
Conscientiousness x task experience	0.024	0.07940	0.30	0.00	
Step 3					0.193
Cognitive ability x conscientiousness x task experience	-0.047	0.08749	-0.54	0.00	

Contextual performance

Variable	β	SE	t	sr^2	R^2
Step 1					0.052
Cognitive ability	0.057	0.08143	0.70	0.00	
Conscientiousness	0.186	0.08254	2.25*	0.04	
Task experience	0.107	0.08272	1.29	0.01	
Step 2					0.056
Cognitive ability x conscientiousness	-0.019	0.07265	-0.26	0.00	
Cognitive ability x task experience	0.062	0.08389	0.73	0.00	
Conscientiousness x task experience	0.026	0.08596	0.31	0.00	
Step 3					0.060
Cognitive ability x conscientiousness x task experience	0.068	0.09464	0.71	0.00	

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table D4

Regression Analyses for Service Jobs

Task performance

Variable	β	SE	t	sr^2	R^2
Step 1					0.380
Cognitive ability	0.162	0.12791	1.27	0.18	
Conscientiousness	0.407	0.11773	3.46**	0.16	
Task experience	- 0.240	0.11672	-2.05*	0.05	
Step 2					0.502
Cognitive ability x conscientiousness	0.187	0.12966	1.44	0.00	
Cognitive ability x task experience	0.369	0.11913	3.09**	0.12	
Conscientiousness x task experience	- 0.034	0.13909	-0.24	0.00	
Step 3					0.595
Cognitive ability x conscientiousness x task experience	- 0.500	0.14499	-3.45**	0.09	

Contextual performance

Variable	β	SE	t	sr^2	R^2
Step 1					0.200
Cognitive ability	- 0.037	0.14639	-0.26	0.04	
Conscientiousness	0.268	0.13475	1.99	0.08	
Task experience	- 0.319	0.13359	-2.38*	0.08	
Step 2					0.346
Cognitive ability x conscientiousness	- 0.070	0.14974	-0.47	0.03	
Cognitive ability x task experience	0.263	0.13757	1.91	0.10	
Conscientiousness x task experience	0.139	0.16063	0.87	0.01	
Step 3					0.395
Cognitive ability x conscientiousness x task experience	- 0.368	0.17848	-2.06*	0.05	

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table D5

The Effect of Cognitive Ability and Agreeableness on Contextual Performance for Technical/Professional Jobs

Variable	β	SE	t	sr^2	R^2
Step 1					0.035
Cognitive ability	0.191	0.08449	2.26*	0.035	
Agreeableness	- 0.002	0.08291	- 0.02	0.000	
Step 2					0.053
Cognitive ability x agreeableness	- 0.111	0.06942	- 1.60	0.017	

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table D6

The Effect of Cognitive Ability and Agreeableness on Contextual Performance for Managerial Jobs

Variable	β	SE	t	sr^2	R^2
Step 1					0.095
Cognitive ability	0.290	0.10813	2.68**	0.089	
Agreeableness	-0.080	0.10928	-0.74	0.007	
Step 2					0.096
Cognitive ability x agreeableness	-0.013	0.11243	-0.11	0.000	

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table D7

The Effect of Cognitive Ability and Agreeableness on Contextual Performance for Clerical/Sales Jobs

Variable	β	SE	t	sr^2	R^2
Step 1					0.018
Cognitive ability	0.020	0.08069	0.24	0.000	
Agreeableness	0.136	0.08447	1.61	0.018	
Step 2					0.019
Cognitive ability x agreeableness	-0.032	0.09184	-0.35	0.001	

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table D8

The Effect of Cognitive Ability and Agreeableness on Contextual Performance for Service Jobs

Variable	β	SE	t	sr^2	R^2
Step 1					0.069
Cognitive ability	0.167	0.14414	1.16	0.047	
Agreeableness	0.162	0.13915	1.16	0.022	
Step 2					0.168
Cognitive ability x agreeableness	-0.370	0.14308	-2.59*	0.099	

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table D9

Multivariate Tests of Hypotheses 1, 4, and 7 for Technical/Professional Jobs

Hypothesis	df	df(error)	F
Hypothesis 1: Task experience effect	1	141	2.76
Hypothesis 4: Cognitive ability x experience effect	1	138	0.38
Hypothesis 7: Cognitive ability x conscientousness effect	1	138	0.17

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table D10

Multivariate Tests of Hypotheses 1, 4, and 7 for Managerial Jobs

Hypothesis	df	df(error)	F
Hypothesis 1: Task experience effect	1	74	1.58
Hypothesis 4: Cognitive ability x experience effect	1	71	0.10
Hypothesis 7: Cognitive ability x conscientousness effect	1	71	0.39

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table D11

Multivariate Tests of Hypotheses 1, 4, and 7 for Clerical/Sales Jobs

Hypothesis	df	df(error)	F
Hypothesis 1: Task experience effect	1	141	4.55*
Hypothesis 4: Cognitive ability x experience effect	1	138	0.56
Hypothesis 7: Cognitive ability x conscientousness effect	1	138	0.83

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table D12

Multivariate Tests of Hypotheses 1, 4, and 7 for Service Jobs

Hypothesis	df	df(error)	F
Hypothesis 1: Task experience effect	1	56	0.49
Hypothesis 4: Cognitive ability x experience effect	1	53	0.77
Hypothesis 7: Cognitive ability x conscientousness effect	1	53	3.80

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table D13

Overall Task Performance MANOVA Including Job Type

Variable	df	Type III SS	MS	F
JOB	3	0.217	0.072	0.08
COGAB	1	1.626	1.626	1.85
COGAB*JOB	3	2.052	0.684	0.78
CONSC	1	6.869	6.869	7.80**
CONSC*JOB	3	0.748	0.250	0.28
COGAB*CONSC	1	0.536	0.536	0.61
COGAB*CONSC*JOB	3	1.303	0.434	0.49
AGREE	1	0.037	0.037	0.04
AGREE*JOB	3	3.256	1.085	1.23
COGAB*AGREE	1	0.092	0.092	0.10
COGAB*AGREE*JOB	3	0.051	0.0170	0.02
CONSC*AGREE	1	0.039	0.039	0.04
CONSC*AGREE*JOB	3	3.868	1.289	1.46
COGAB*CONSC*AGREE	1	1.432	1.432	1.62
COGA*CONSC*AGREE*JOB	3	1.802	0.601	0.68
EXP	1	1.728	1.728	1.96
EXP*JOB	3	1.963	0.654	0.74
COGAB*EXP	1	0.040	0.040	0.05
COGAB*EXP*JOB	3	2.043	0.681	0.77
CONSC*EXP	1	1.539	1.539	1.75
CONSC*EXP*JOB	3	1.480	0.493	0.56
COGAB*CONSC*EXP	1	3.713	3.713	4.21*
COGA*CONSC*EXP*JOB	3	3.973	1.324	1.50
AGREE*EXP	1	2.662	2.662	3.02
AGREE*EXP*JOB	3	1.691	0.564	0.64
COGAB*AGREE*EXP	1	1.237	1.237	1.40
COGA*AGREE*EXP*JOB	3	1.653	0.551	0.63
CONSC*AGREE*EXP	1	0.448	0.448	0.51
CONS*AGREE*EXP*JOB	3	1.370	0.458	0.52
COGA*CONS*AGRE*EXP	1	0.574	0.574	0.65
COG*CON*AGR*EXP*JOB	3	0.967	0.322	0.37
ERROR	405	342.11	0.845	
MODEL	22	81.77	3.72	4.4**

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

Table D14

Overall Contextual Performance MANOVA Including Job Type

Variable	df	Type III SS	MS	F
JOB	3	1.223	0.408	0.44
COGAB	1	2.686	2.686	2.91
COGAB*JOB	3	4.175	1.391	1.51
CONSC	1	0.857	0.857	0.93
CONSC*JOB	3	1.727	0.576	0.62
COGAB*CONSC	1	0.004	0.004	0.00
COGAB*CONSC*JOB	3	3.405	1.135	1.23
AGREE	1	0.406	0.406	0.44
AGREE*JOB	3	1.580	0.527	0.57
COGAB*AGREE	1	0.113	0.113	0.12
COGAB*AGREE*JOB	3	0.883	0.294	0.32
CONSC*AGREE	1	0.273	0.273	0.30
CONSC*AGREE*JOB	3	1.280	0.427	0.46
COGAB*CONSC*AGREE	1	1.618	1.618	1.75
COGA*CONSC*AGREE*JOB	3	4.713	1.571	1.70
EXP_STD	1	0.049	0.049	0.05
EXP_STD*JOB	3	1.454	0.485	0.52
COGAB*EXP_STD	1	0.804	0.804	0.87
COGAB*EXP_STD*JOB	3	2.913	0.971	1.05
CONSC*EXP_STD	1	0.095	0.0950	0.10
CONSC*EXP_STD*JOB	3	0.409	0.1365	0.15
COGAB*CONSC*EXP_STD	1	0.589	0.589	0.64
COGA*CONSC*EXP_S*JOB	3	3.676	1.225	1.33
AGREE*EXP_STD	1	1.783	1.783	1.93
AGREE*EXP_STD*JOB	3	4.349	1.450	1.57
COGAB*AGREE*EXP_STD	1	0.863	0.863	0.93
COGA*AGREE*EXP_S*JOB	3	0.771	0.257	0.28
CONSC*AGREE*EXP_STD	1	0.442	0.442	0.48
CONS*AGREE*EXP_S*JOB	3	2.474	0.823	0.89
COGA*CONS*AGRE*EXP_S	1	3.441	3.441	3.73
COG*CON*AGR*EXP_*JOB	3	3.489	1.163	1.26

Note: Numbers marked with a single asterisk are significant at $p < 0.05$. Numbers marked with a double asterisk are significant at $p < 0.01$.

VITA

Name and Permanent Address
Andrew J. Slaughter
1402 Bellemeade Dr.
Mayfield, KY 42066

Contact information
Phone: (979) 219-4355
Email: bratslavia@neo.tamu.edu

Education

1999	BA in Psychology, University of Kentucky. Cum laude.

Research Activities

2002-2003	Cognitive ability, personality, experience, and job performance prediction.
2003-	Leadership and social network analysis.
2003-	Team personality and performance.

Teaching

2001-2003	Teaching assistant, undergraduate courses in experimental psychology, statistics. Dr. Winfred Arthur, Dr. Bryan Edwards, Dr. Kathy Copeland.

Publications and Presentations

Slaughter, A. Cognitive ability, personality, and experience: Evidence for differential impact on job performance factors. Poster presented at the 15th Annual Conference of the Society for Industrial Organizational Psychology, Chicago, IL.